



VDR-100G3/G3S Installation Manual

RUT-TD-10-001, Rev.1.4

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Rutter Technologies Inc
VDR-100G3/G3S Installation Manual

RUT-TD-10-001, Rev. 1.4

Revision Issue Date: 15 January 2009

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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-100G3/G3S.

GENERAL

Only a Rutter Technologies Inc. Certified Technician should access the interior components of the VDR-100G3/G3S equipment.

To ensure compliance with the IMO standards, installation of the VDR-100G3/G3S **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-100G3/G3S 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-100G3/G3S 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-100G3/G3S must be utilized to ensure its proper operation.

POWER SUPPLY

Prior to connecting the power supply of the VDR-100G3/G3S 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 Organization

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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Chapter 1: System Overview, Rev. 1.1

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1 SYSTEM OVERVIEW

1.1 VDR-100G3 System Components

The VDR-100G3 is a modular data storage system for marine vessels. It is designed to collect and maintain a secure, retrievable record of information related to the vessel's position, movement, physical status, and command and control.

While this manual references the VDR-100G3, it is also applicable to the Simplified Voyage Data Recorder (VDR-100G3S) unless otherwise stated.

There are 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-100G3 has the capability to record public address systems, internal communications, additional radios, or audio data from other areas of the ship if necessary.
2. **Video data** captured at 15 second intervals from one of the ship's master displays. The VDR-100G3 can record images captured from multiple radars, electronic chart, or CCTV displays at various capture intervals. A Simplified Voyage Data Recorder (SVDR) is required to capture video data but if no output is available AIS may be connected instead.
3. **NMEA 0183/IEC 61162 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-100G3. 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 the *IEC 61996.2* and *MSC.163(78) performance standards*.

1.1.1 Base System

The VDR-100G3 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 Centre
 - 2 x 12Ah 12V batteries
 - Cooling Fan
 - 4GB USB Memory Stick
2. **Interfaces ***, consisting of:
 - 4-Channel Audio Module: upgradeable
 - 1-Channel Video Module: upgradeable
 - 8-Channel NMEA Module: upgradeable

* *The Data Acquisition Unit (DAU) is an optional component. The above interfaces can optionally be installed in a DAU cabinet.*

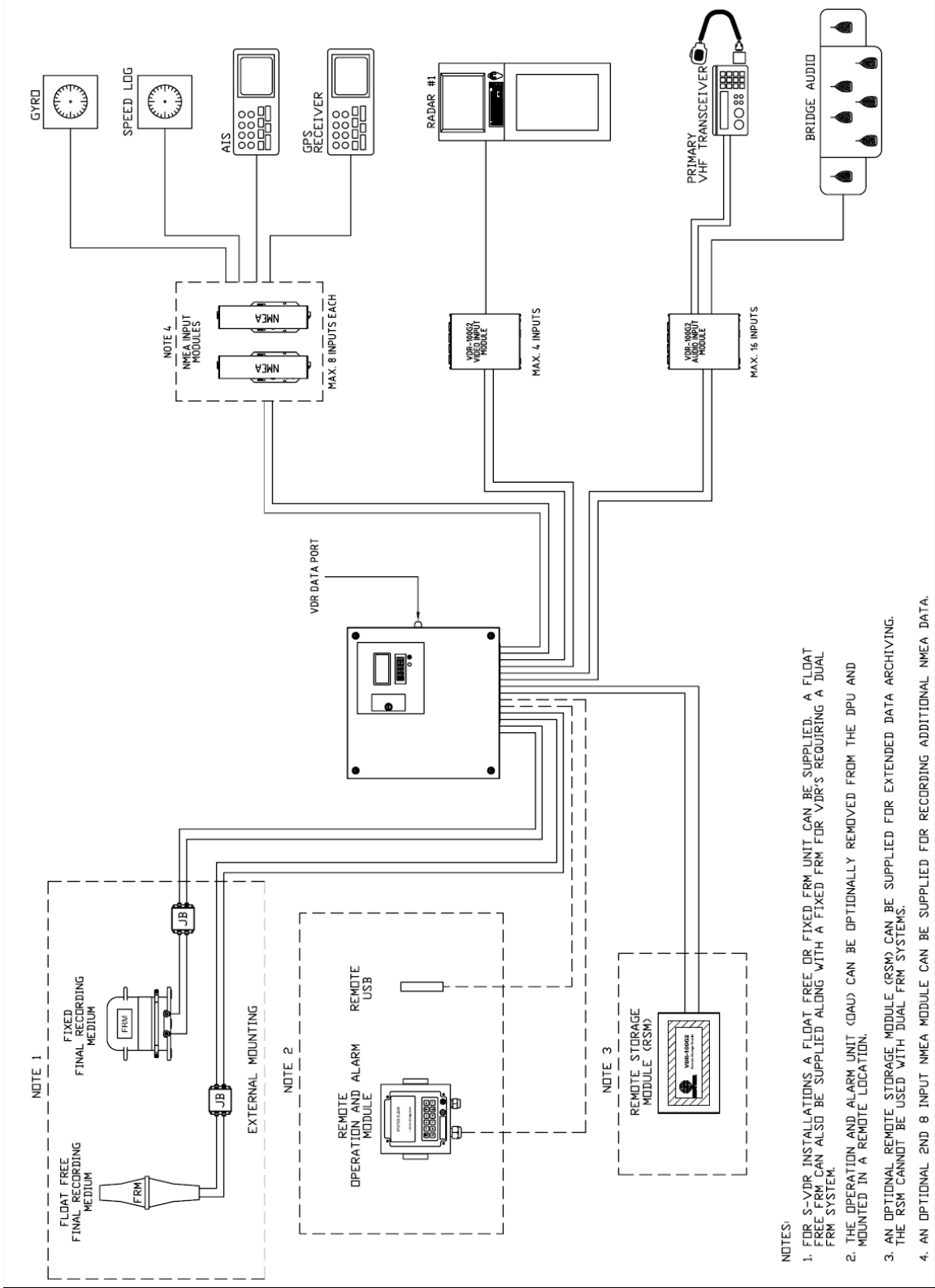
3. **Operation and Alarm Unit (OAU)** is incorporated into the DPU or, as an option. It can be installed away from the unit.
4. **Final Recording Medium (FRM)** includes fixed and/or float free.
5. **Internal and External Microphones**

1.1.2 Optional Components

The VDR-100G3 can also be supplied with the following upgradeable/optional features

1. The base 4-channel audio module may be replaced by an optional 6-channel or 8-channel audio module.
2. The base 1-channel video module can be upgraded with up to 3 additional video channels (for a maximum of 4 video channels).
3. The base 8-channel NMEA module may be upgraded in increments of 8 channels.
4. Remote Storage Module (RSM) implemented for additional data backup storage retrieval.
5. Data interfaces (to convert non-standard signals to NMEA format). The VDR-100G3 has an interface to convert analogue signals to digital data acceptable for the NMEA module and includes
 - discrete/contact;
 - synchro/gyro; and
 - speed log/depth sounder.

NOTE: Interfaces for VHF and radar may also be necessary. Refer to the VHF and Radar documentation supplied with those units to determine the applicable interface.



- NOTES:
1. FOR S-VDR INSTALLATIONS A FLOAT FREE OR FIXED FRM UNIT CAN BE SUPPLIED. A FLOAT FREE FRM CAN ALSO BE SUPPLIED ALONG WITH A FIXED FRM FOR VDR'S REQUIRING A DUAL FRM SYSTEM.
 2. THE OPERATION AND ALARM UNIT (OAU) CAN BE OPTIONALLY REMOVED FROM THE DPU AND MOUNTED IN A REMOTE LOCATION.
 3. AN OPTIONAL REMOTE STORAGE MODULE (RSM) CAN BE SUPPLIED FOR EXTENDED DATA ARCHIVING. THE RSM CANNOT BE USED WITH DUAL FRM SYSTEMS.
 4. AN OPTIONAL 2ND 8 INPUT NMEA MODULE CAN BE SUPPLIED FOR RECORDING ADDITIONAL NMEA DATA.

Figure 1-1 - Standard interconnection arrangement

1.1.3 Data Processing Unit

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 and the Final Recording Medium (FRM).

The VDR-100G3 power system is housed in the DPU, and accepts universal AC from the ship's emergency power while providing 24VDC to the VDR-100G3 modules. The power system includes batteries to provide uninterrupted power to the audio recording system, OAU and FRM in the event of a blackout.

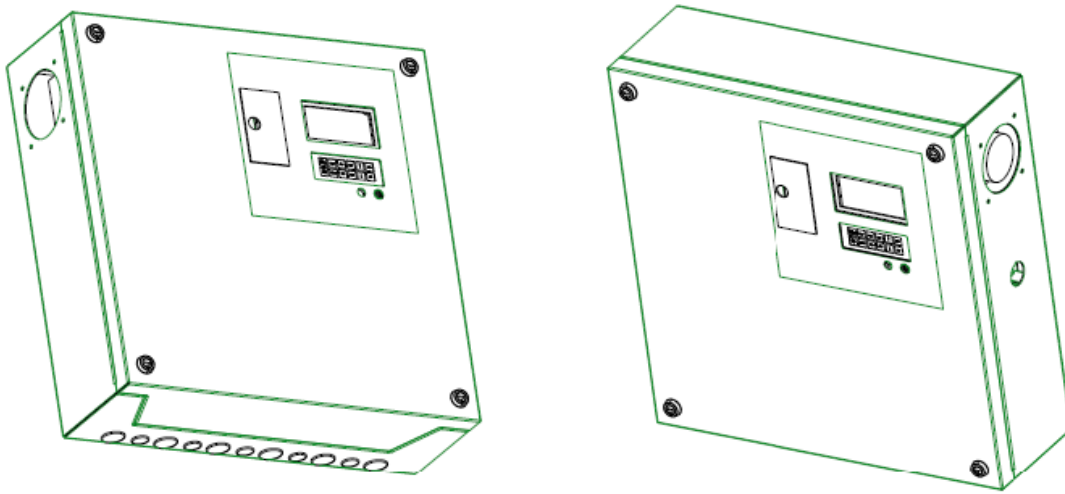


Figure 1-2 - Standard Data Processing Unit

The VDR 100G3 hard drive capacity in the base DPU system is partitioned into 3 segments:

1. A segment for the current 12-hour data set;
2. A segment for secured 12-hour data sets; and
3. A segment for archived data sets.

1.1.3.1 Data Management Module

The **Data Management Module** (DMM) is a rugged, small form factor Pentium computer. It is equipped with Ethernet ports, serial ports and USB ports, a high capacity hard disk drive, and a compact flash card.

The DMM compresses and stores data received from the interface modules and, simultaneously, outputs processed data to the FRM and real-time display (as described below).

The DMM communicates via a serial port with the OAU and the Power Control Centre.

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 helps protect (but cannot completely prevent) previously recorded data sets from being overwritten.

1.1.4 Power Distribution and Reserve Power

1.1.4.1 Power Input and Output

The VDR-100G3 is powered by AC supply. For details see Chapter 2: Technical Specifications.

1.1.4.2 Power Control Centre

The Power Control Centre (PCC) monitors the power system and communicates the power system status information to the DMM. It provides a means to supply external power through circuit breakers and terminal blocks for connection to system modules. The PCC contains power and data connections as well as associated circuit breakers/fuses. To reduce cabling the PCC can supply power for the Audio, Video and NMEA modules over an Ethernet cable.

1.1.4.3 Reserve Power

The VDR-G3100 has two 12V, 12Ah lead acid batteries that provide up to two hours of audio recording, FRM storage, and alarm events if there is a power failure.

1.1.5 Data Acquisition Unit

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

- Audio Module.
- Video Module.
- 2 NMEA Modules.

(See Chapter 5 for full DAU details)

1.1.5.1 Audio Module

The **Audio Module** receives audio information from microphones, VHF and other optional line inputs. All audio data is routed to the DMM for processing, storage, and retrieval. The Audio Module also features:

- Efficient cable management.
- Up to 16 input ports for capturing any combination of microphones and radio communications channels.

(See Chapter 8 for full Audio Module details.)

1.1.5.2 Video Module

The **Video Module** is a video capture and broadcast device capable of recording video input from a variety of ship's video output devices including radar and chart displays and other optional devices. The module digitizes the video signals and outputs the video data through an Ethernet port. The Video Module also features:

- Up to 4 input ports for capturing images from the main radar display and 3 additional displays.
- Capability to accommodate 1600 x 1200 x 24-bit colour images.
- Refresh rates up to 85Hz.
- Configurable for a capture interval as short as 3 seconds.

(See Chapter 9 for full Video Module details.)

1.1.5.3 NMEA Input Modules

The **NMEA Input Modules** capture data items in IEC 61162 (NMEA 0183) and limited ASCII data formats. NMEA modules accept up to 8 NMEA-0183 data streams from shipboard systems and multiplexes them for simultaneous output to an Ethernet connection and a single RS-232/422 serial data channel. Captured data is sent to the DMM via an Ethernet connection for storage and retrieval. The NMEA module also features:

- 8 available inputs with each module.
- Capability to daisy-chain (cascade) optional modules.
- Output to bridge alarm systems for data in IEC 61162 (NMEA 0183) format.
- Output to bridge alarm systems for direct connection of Automatic Identification System (AIS).
- Output to bridge alarm systems from additional cascading (DC) or Rutter interface data outputs.

(See Chapter 10 for full NMEA Module details.)

1.1.6 Operation & Alarm Unit

The **Operation & Alarm Unit** (OAU) provides a visible and audible alarm to alert the ship's officer on watch of any detected failure within the VDR-100G3. The alarm unit is also used to initiate a download operation on the VDR-100G3. This allows a user to:

- Save recorded data. The user should save and secure this recorded data within 12 hours of any incident to prevent the recording from being overwritten;
- Disconnect the optional Remote storage Module (RSM) and download USB drive;
- Copy secured, archived, or current data to the download USB drive.

(See Chapter 11 for full OAU details.)



The OAU is integrated into the Data Processing Unit of the VDR-100G3, but a *remotely mounted* OAU module is **also available as an option**. It is preferable that the optional remotely mounted OAU be specified when the VDR-100G3 is ordered but it can be field mounted.

1.1.7 Final Recording Medium (FRM/SFRM)

The **Final Recording Medium** (FRM/SFRM) is a solid-state storage unit capable of storing 12 hours of VDR-100G3 data in compliance with IMO resolution A.861(20). It can be either a fixed or float-free capsule.

Additional information:

- The primary function of the FRM/SFRM is to provide a protective capsule for the IMO-required data recorded by the VDR. In the event of an incident, this data can be used by the 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.

1.1.7.1 Fixed Capsule

Fixed capsules are designed to ensure that critical voyage data can survive the following environmental conditions:

- Impact shock: 50 half sine-wave pulse for 11 milliseconds (NOTE: The Fixed SFRM capsules do not meet this specification.);
- Penetration: 250 kg mass dropped 3 metres impacting with 100 mm diameter pin;
- 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).

(See Chapter 12 for full FRM/SFRM details.)

1.1.7.2 Float-Free Capsule

A float-free capsule is a combined FRM and Cospas-Sarsat EPIRB (Emergency Positioning Indicating Radio Beacon). Several models are approved for use with the VDR-100G3. Each capsule contains a memory module to record 12 hours of data. If a ship sinks, the capsule floats free and transmits both its position and MMSI for at least 7 days.

The interface between the VDR-100G3 and the memory capsule is a standard 10/100 Base-T Ethernet connection using TCP/IP standard protocol.

Power for the capsule is provided depending on the make of the capsule.

(See Chapter 12 for full FRM/SFRM details.)

1.1.8 Remote Storage Module (RSM)

The **Remote Storage Module (RSM)** is an optional removable data storage device which provides the ability to retrieve copies of recorded data.

The optional RSM uses the USB port located in the front panel of the DPU and is available to customers requiring additional capacity for data retrieval.

The module has an AC adaptor and a USB 2.0 port which allows the stored data to be retrieved and/or reviewed on a PC equipped with a USB 2.0 port.

1.1.9 External Data Interfaces

The **External Data Interfaces** convert data signals from ship's equipment to IEC 61162 (NMEA 0183) compliant data sentences. These are recorded via the NMEA Module described in Section 1.1.5.3

NOTE: See *Appendix 6 – External Interface Modules* for further details.

1.1.10 VDR Software

The playback module accompanies the base model VDR and is installed 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.

In addition, the playback software may be supplied for shoreside use.

Software installed on client PC includes:

1. VDR Playback application
2. VDR Download application

Optionally, the following software may also be purchased:

3. VDR Real Time Display Module
4. Graphical Analysis

Software included on the CD that accompanies the VDR:

Data Recovery CD

1. VDR Download application
2. VDR Playback application

Install CD

1. Audio Config Suite
2. Data Extraction
3. FRM download application
4. Product Key updater
5. VDR Config Utility
6. VDR Download application
7. VDR Parameters (.ini file)
8. VDR Playback application
9. VDR utility
10. VDR apps Folder
11. Video Config Suite
12. NMEA Config

1.2 Client/Playback PC

Only a certified technician can connect a PC service laptop to the DMM via an Ethernet connection. This PC can be used to configure the VDR using a remote desktop.

This PC can also be used to copy, download and playback data; to autoarchive; and to display real-time NMEA and video data.

The download/playback software, which is supplied as part of the system, offers the following features:

- Plug and play with automatic display configuration;
- Password-protected (general playback and audio);
- Multiple display capability and output to Electronic Chart Display and Information System and Electronic Chart Display;
- User-friendly controls with search and fast forward features.

NOTE: Software associated with the optional Client PC is described in Appendix 5: Playback Software.

1.2.1.1 Recommended (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
- 10/100 base-T 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: Match power supply from ship or office
- English O/S Edition: Windows® 2000 or Windows® XP (recommended).

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Chapter 2: Technical Specifications. Rev. 1.1

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2 VDR-100G3/G3S TECHNICAL SPECIFICATIONS

The following tables contain a summary of the technical specifications for the Rutter VDR-100G3 system components:

2.1 Power Consumption	
Normal Operating Current (approx.)	0.80 A @220VAC 0.480 A @120VAC
Maximum Current Draw (approx.)	1.2 A @220VAC 2.1 A @120VAC
Recommended Ship Main Breaker	10 A @220VAC 10 A @120VAC

2.2 DPU Specifications	
Weight	20.2 Kg
Dimensions	457 x 457 x 150mm (H x W x D)
Input Power	85 -264 VAC 50-60Hz
Output Power	24VDC to FRM, Audio, Video, NMEA, Alarm Module, optional Remote Storage and optional interfaces
Data Ports	Ethernet input from Audio, Video, and NMEA Modules Ethernet Output to FRM Ethernet Output / Download PC RS232 Input/Output for Alarm Module USB and optional remote storage
Battery Backup Power	2 Hrs @ -15 Deg C for Audio system, Alarm Module, DMM, and FRM
Data Storage Capacity	The internal HDD is 160GB <ul style="list-style-type: none"> ▪ Current Data = 4.88GB ▪ Internal Secured Data = 20G ▪ Internal Archived Data = 124GB (NOTE: Some storage reduction due to drive partitioning) USB memory stick External Archived data

2.3 DAU Specifications (DAU Cabinet is optional)	
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 mega pixels input resolution, up to 340MHz pixel rate captured from two consecutive frames with clock inversion (Includes 1600 x 1200 x 75 Hz & 1280 x 1024 x 85 Hz) 24 bit RGB; monochrome H and V sync input
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"> • DataAnalog analog signal interface • DataDiscrete contact signal interface • DataGyro gyrocompass interface • DataSynchro synchro interface

2.4 FRM/SFRM Specifications

HVR-02/03 FRM

Weight	10.9kg;
Dimensions	Height: 218.3mm, Diameter: 206.5mm, Base Width: 182.39mm
Input Power	24VDC
Memory Type	Solid State
Capacity	12-hour minimum (2GB)

SVR-02/03 FRM

Weight	10.4kg
Dimensions	Height: 215.17mm, Diameter: 206.5mm, Base Width: 182.39mm
Input Power	24VDC
Memory Type	Solid State
Capacity	12-hour minimum (2GB)

JoTron Float-Free SFRM

Weight	3.5kg + 4.6 kg bracket=8.1 kg
Dimensions	Height: 695mm, Depth: 226mm, Width: 205mm
Input Power	24VDC
Memory Type	Flash Disc
Capacity	12-hour minimum (1.7GB)

Rutter-ACR Float-Free SFRM

Weight	1.021kg
Dimensions	Height: 444mm, Depth: 121mm, Width: 89mm
Input Power	24VDC
Memory Type	Flash Disc
Capacity	12-hour minimum (4GB)

Rutter FRM/SFRM (RUT-02447)

Weight	18 kg
Dimensions	Height: 350 mm, Diameter 220 mm
Input Power	24VDC
Memory Type	Solid State
Capacity	Minimum of 12 +12 hours recording time: 8 GB: 4 GB (protected) + 4GB unprotected for incident recording. Additional memory (optional): up to 160 GB for longer recording times or extended number of recording channels.)

2.5 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	55dBA

2.6 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

2.7 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

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

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Chapter 3: Installation Planning Overview, Rev. 1.1

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3 INSTALLATION PLANNING OVERVIEW

In order to successfully complete a VDR-100G3 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-100G3 components, including the DAU, DPU, FRM, OAU, external interfaces such as the DataDiscrete, DataAnalog, and DataProtocol, and bridge microphones can be found in the Appendix drawings.

3.1 Required Tools

At minimum, the following tools are required for a VDR-100G3 installation:

- Multi-meter
- Wire Ferrule Crimper
- RG6/11 Coaxial Crimper
- RJ45 Crimper
- Wire Stripper
- Terminal Screwdriver
- Laptop with 10/100 base-T Ethernet Interface
- No.2 Phillips Screwdriver
- Slot-head screwdriver
- Allen Key Set (Metric)
- 13mm wrench
- 1/4" socket driver
- 1/4" ratchet
- 1/4" extension
- 13mm deep socket
- 5.5mm socket
- 7mm socket
- 8mm socket

3.2 Cabling Specification

Recommended cable types for the VDR-100G3 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	<u>2x2x0.5</u> OR Category 5e FTP	Twisted pair with an overall shield. Individual conductors are stranded, category 5e with flammability per IEC 95.
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 for Main Cabinet	3x1.5	
Power for Interfaces	2x0.5	

Table 3-1 - Cabling Specifications



Note! Rutter Technologies recommends the above specifications. Alternative 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

0.5mm² 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

0.5mm² 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

0.75mm² 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

0.75mm² 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

3x1.5mm² 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

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

3.3 Power Requirements

For information on power requirements see Chapter 2: Technical Specifications.

3.4 Documentation

The final planning requirement for a VDR-100G3 installation is to prepare the installation documentation. This documentation should contain detailed interconnect drawings that include:

- Connection points in the VDR-100G3 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.

3.4.1 Documentation/Data Required by Rutter Technologies

The following documentation/data is required to be submitted to Rutter Technologies when the installation and commissioning is complete.

- Parameters file.
- Configuration file.
- Error Log.
- Small sample of extracted data (See Appendix 4: Playback for information on using the extraction utility).
- Copy of the completed and signed Commissioning Files.
- Copy of the completed Rutter Installation Checklist (see Appendix 1 for the checklist).

This documentation may be forward to Rutter Technologies by email to *support@ruttertech.com* or by saving the documentation to CD and mailing it to:

Product Support Department
Rutter Technologies
70 Brookfield Road, St. John's, NL, Canada, A1E 3T9.

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Rutter VDR-100G3/G3S Installation Manual

Chapter 4: Data Processing Unit, Rev. 1.2

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4 DATA PROCESSING UNIT

4.1 Data Processing Unit (DPU)

The DPU also includes:

- Cable entry system with a series of holes and cable securing points large enough to fit any exterior cables needed to connect inside the DPU.
- A fan and intake vent for cooling.

The DPU is designed to be bulk head mounted. For DPU dimensions (W x H x D) refer to drawing set in Appendix 7: Approved Drawings

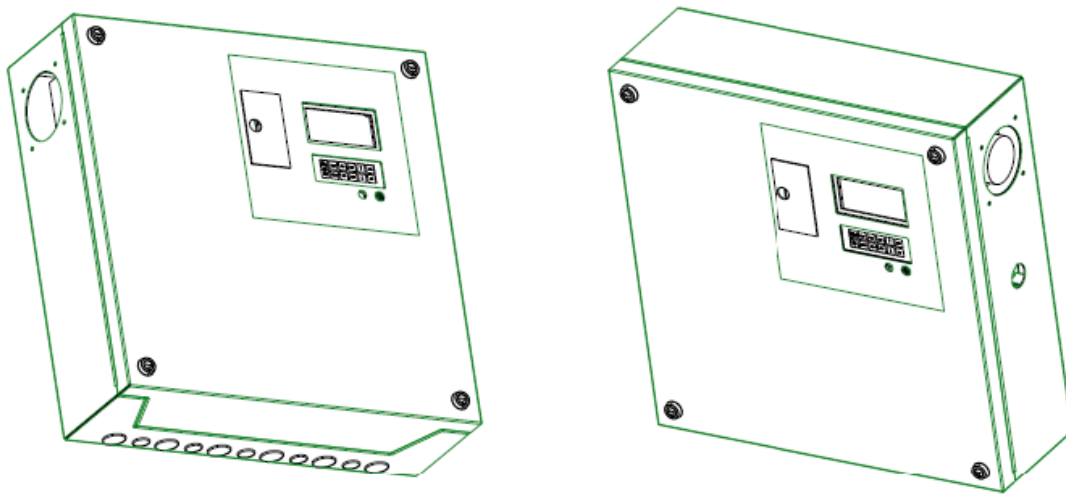


Figure 4-1- Data Processing Unit

4.1.1 Installing the DPU

The Data Processing Unit (DPU) cabinet is installed on the prepared base or can be attached to the wall directly. Refer to Appendix 7 – Approved Drawings for details on mounting holes and the prepared base.

4.1.2 Layout of the DPU

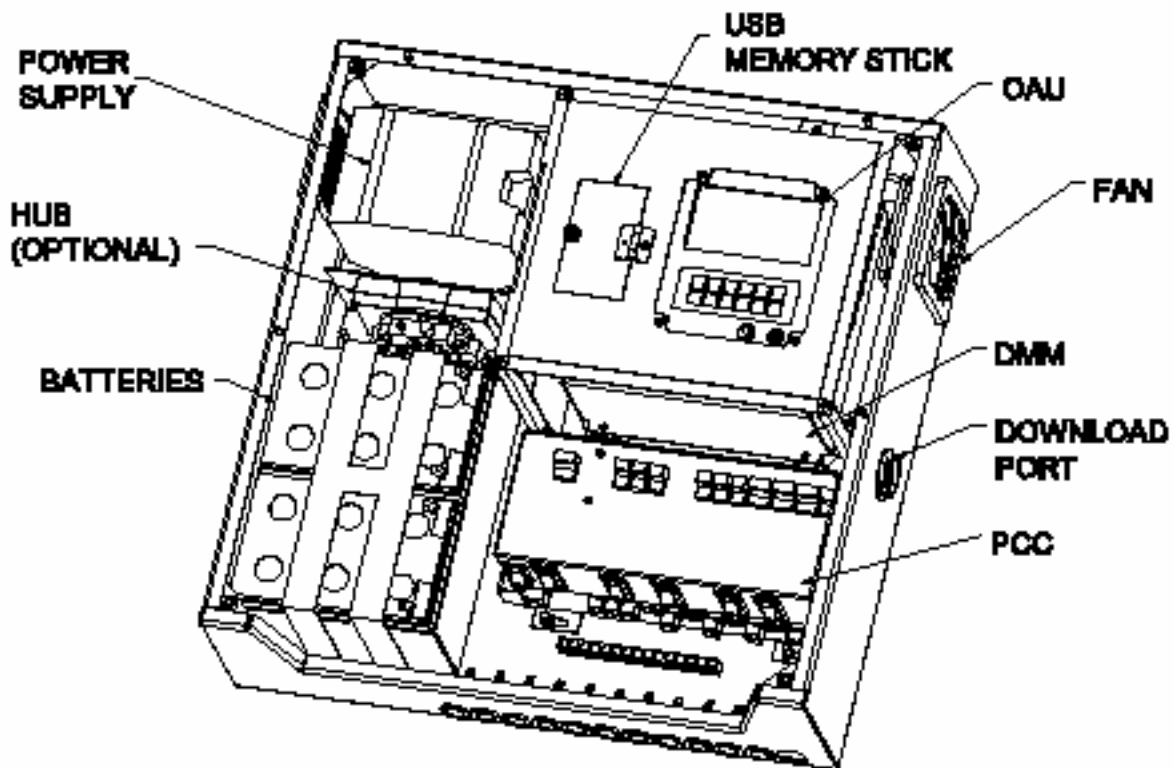


Table 4-1 - Internal layout of the DPU

4.2 Ethernet Data

The Data Management Module (DMM) supports 5 Ethernet connections for the transfer of data to and from the DMM. The physical connection of these Ethernet ports is either by a crossover or straight thru connection.

4.2.1 DMM / Data Module IP Address

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

Port / Module Name	Port Module #	IP Address
DMM Download Port	(5)	200.200.200.200
Download PC		200.200.200.XXX
DMM Video Port	(3)	192.168.199.1
Video Module		192.168.199.228
DMM NMEA Port	(4)	192.168.199.25
DMM FRM Port	(2)	192.168.0.189
FRM		192.168.0.2
DMM Audio Port	(1)	192.168.200.189
Audio Module		192.168.200.228

Table 4-2-DMM / Data Module IP Address

4.2.2 Straight-through Connection

A service PC can be connected to the Ethernet port on the side of the DPU to download stored data or service the VDR.

4.2.3 Crossover Connection

1. The Audio Module output is connected directly to the PCC via a **crossover** Ethernet cable, which is plugged into the Audio Port of the PCC.
2. The FRM is connected to the PCC via a **crossover** Ethernet cable, which is plugged into The FRM Port of the PCC.
3. The Video Module output is connected to the PCC via a **crossover** Ethernet cable which is plugged into the Video Port of the PCC.
4. The NMEA Module is connected to the PCC via a **crossover** Ethernet cable which is plugged into the NMEA Port of the PCC.

4.3 Power Control Centre

The Power Control Centre (PCC) monitors the power system and communicates the power status information to the DMM. It routes power to circuit breakers and terminal blocks for connection to modules. The PCC contains power and data connections as well as associated circuit breakers/fuses. (See diagram of Power Control Centre on the next page.)

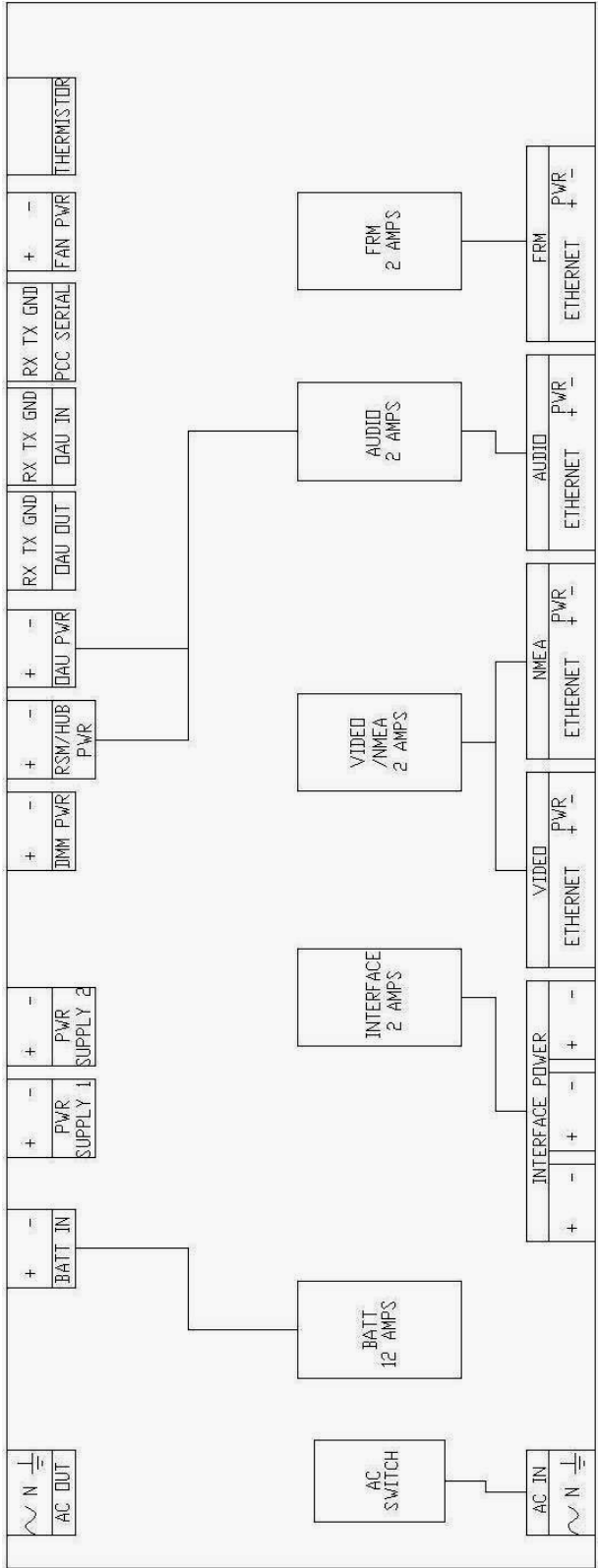


Figure 4-2 – Power Control Centre

Rutter VDR-100G3/G3S Installation Manual

Chapter 5: Data Acquisition Unit, Rev. 1.1

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5 DATA ACQUISITION UNIT (DAU)

5.1 DAU PLANNING

The DAU is an optional EMC shielded enclosure with a bolt on cover. 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. Coaxial cables 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.

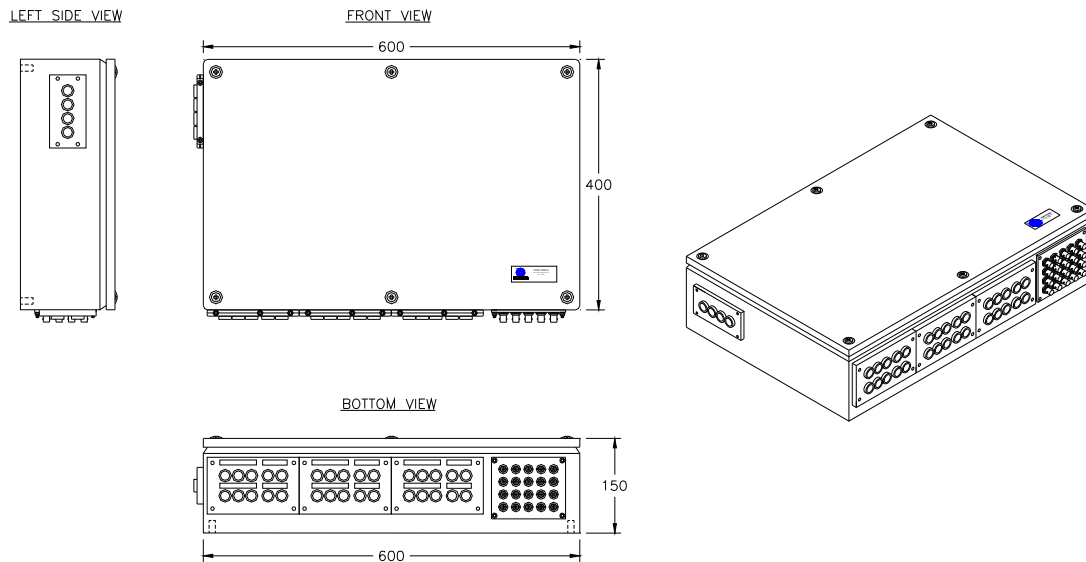


Figure 5.1 - DAU Dimensions

5.2 INSTALLING 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.

The DAU cabinet is installed on the prepared base as shown in Appendix 7: Approval Drawings at the end of this manual. Alternatively the DAU can be attached directly to the wall.

5.3 DAU Connections



Note! All cabling should be clearly labeled at all connection points to allow for easier identification, particularly at all VDR-100G3 entry points.

The DAU, when available, contains 6 terminal block connections, broken into two (2) physical groups:

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 5.1 - DAU Terminal Block (One)

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

Table 5.2 - DAU Terminal Block (Two)

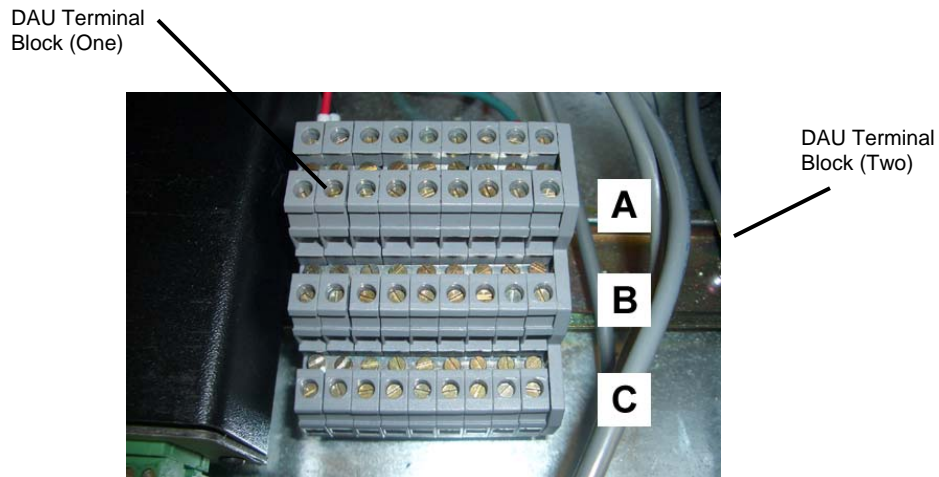


Figure 5.2 - Terminal Block Letter Labeling

5.3.1 Cable Entry System

The DAU is equipped with cable entry panels, similar to that illustrated in *Figure 5.3 - 10-Hole Cable Entry Plate* below.

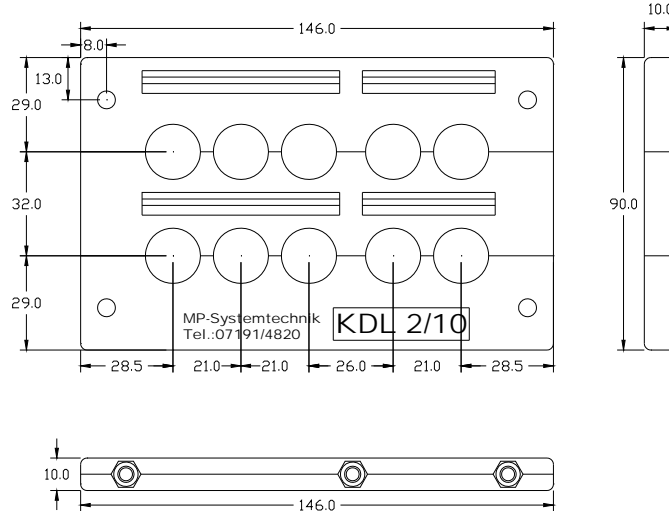


Figure 5.3 - 10-Hole Cable Entry Plate

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 size;
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; and
9. Screw the entry plate to its original cut-out position.

5.3.2 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 separately).

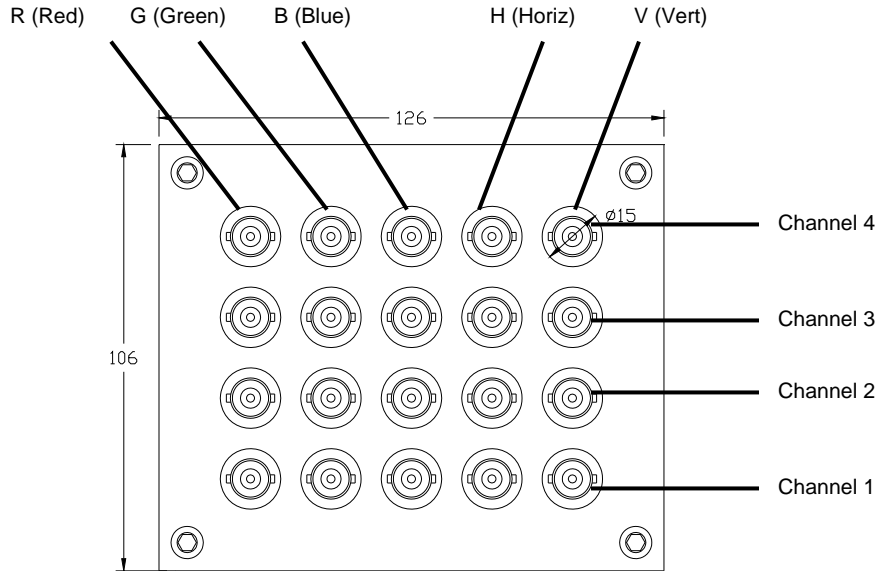


Figure 5.4 - DAU Video Input Connections

Coaxial video cables from the vessel's video source must be fitted with male BNC connectors. These are then connected to the appropriate BNC female bulkhead connectors.

NOTE: If the video feed occurs over multiple cables, it is important to ensure that all video cables are connected to the bulkhead connectors that match the correct signal type (i.e., red=red, green=green, blue=blue, etc.).

Rutter VDR-100G3/G3S Installation Manual

Chapter 6: Initial Power-up, Rev. 1.1

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6 INITIAL POWER-UP

6.1 Software Modules

The Data Management Unit (DMM) is required to carry out the following functions simultaneously while recording.:

1. Capture video through the Video Module;
2. Record bridge audio and radio communications audio through the Audio Module;
3. Record serial data through the NMEA 0183/IEC 61162 NMEA Module;
4. Synchronize time to UTC/GMT through a GPS receiver feed or other time references via a NMEA Module input;
5. Monitor the status of Power Supply and backup battery from the Power Control Module through a serial communications port;
6. Provide Server Services to download client(s) in a Fast Ethernet LAN configuration;
7. 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;
8. Generate an alarm if an error condition develops in the VDR-100G3;
9. Auto Archive;
10. Transmit data as it is recorded for real time display; and
11. Allow user to secure and move data.

The DMM system software is a Windows XP application program. The program is designed to support a multi-threaded operation. It provides the best use of the CPU for acquiring data, and synchronizing, and compressing multiple streams of data.

The following section describes the system software operation.



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

6.2 Power On

Once the unit has been mounted for operation, it is necessary to power on the VDR-100G3 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 Center will switch to the backup battery for power in the event of a power interruption. If a power interruption lasts more than 2 hours, the VDR-100G3 will shut down to preserve battery life and to ensure any critical data are not overwritten. 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-100G3:

1. Remove the cover of the DPU.
2. Ensure all circuit breakers and switches are **off**. (Refer to Figure 4.2: Power Control Centre for illustration of cables and switches.)
3. Close the 12A battery circuit breaker.
4. Apply ship's power to the VDR-100G3.
5. Close the remaining circuit breakers one at a time to ensure that each applicable component is receiving power.
6. Connect either the required PC peripherals (mouse, keyboard, monitor.) or a client PC via an Ethernet connection to establish remote desktop connection to the DMM (see Section 6.3: *Connecting to the DPU* for more information on establishing a remote desktop connection with the DMM.)

NOTE: *PC peripherals do not establish remote desktop connections.*

6.3 Connecting to the DPU

When accessing the internal operating software (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.

6.3.1 Using a Keyboard, Mouse, and Monitor

1. Remove the Cover of the DPU.
2. Connect the USB keyboard, USB mouse, and monitor to the DMM front panel located under the OAU.
3. Once the monitor has been turned on, the record application (VDR_Record_G3) should be visible.
4. Observe log window for potential problems.
5. Shut down the Watchdog Application.
6. Shut down VDR_Record_G3 to terminate the recording process (a password is required).
7. When the record application has been terminated, log off the current user account
8. Log in as an Administrator (an Administrator password is required).
9. In administrative mode, configure VDR or make necessary changes.
10. Software can be loaded to the DMM via USB memory sticks.



*All changes to DMM software and/or operating system **MUST** be committed to the flash memory of the DMM to take effect. See directions below.*

To save changes to DMM software and/or operating system to the DMM flash memory:

1. Locate and double-click the *commit.exe* icon on the desktop.



Figure 6.1 - commit.exe Icon

2. Restart the DMM via Start > Shut Down.
3. The DMM will reboot and all record application software will restart.
4. Verify that all applicable applications have restarted and are performing correctly.
5. Unplug the keyboard, mouse, and monitor.
6. Secure the cover of the DPU.

6.3.2 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 later.
- Computer name **must not** be "VDR".
- Within the IP range of 200.200.200.x (where 'x' can be any IP other than 200.)

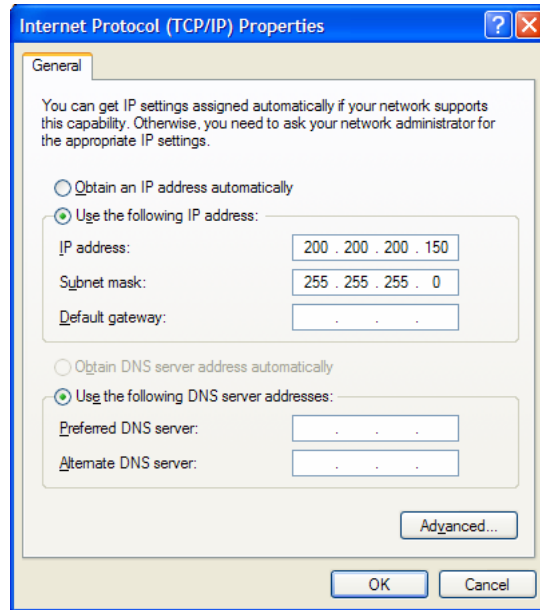


Figure 6.2 - IP Range

To connect via remote desktop

1. Unscrew the cover on the Ethernet download port located on the right side of the DPU. Connect the Remote Desktop PC to the VDR via the download port. Refer to Chapter 4 in the section on Ethernet data connections for information on the type of connections.
2. At client PC go to:
Start > All Programs > Accessories > Communications > Remote Desktop Connection.
3. 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

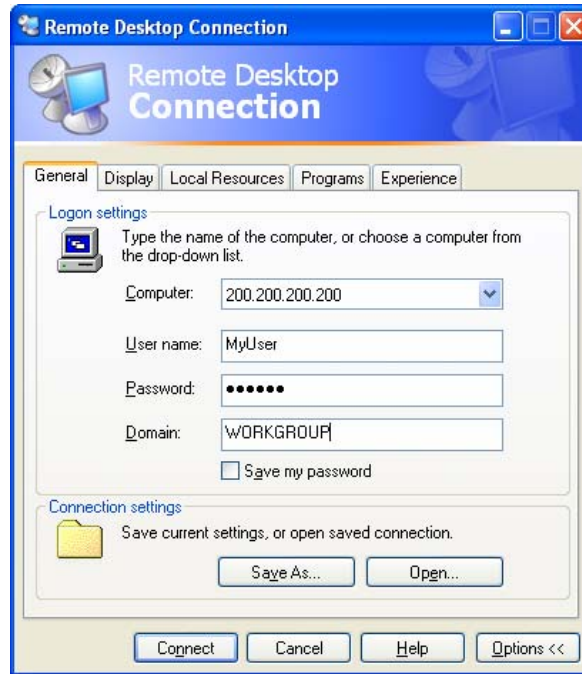


Figure 6.3 - Logon Settings

4. Click the “Connect” button.

NOTE: The DMM operating system desktop will display and the record application <VDR_Record> should be visible.

5. Observe the log window for problems;
6. Select Watchdog application located in the task bar (next to the “Start” button);
7. In the Watchdog window, select the “Cancel” button;
8. When prompted for a password enter **VDR**;
9. Terminate the recording process with the following steps:
 - a. Shut down the Watchdog application.
 - b. Shut down the VDR Record Application (a password is required).
 - c. Log off the MyUser account via Start > Log Off.



Figure 6.4 - MyUser Logoff

10. Reconnect to the VDR-100G3 via the Remote Desktop using the following settings:
 - a. Computer: 200.200.200.200
 - b. User name: Administrator
 - c. Password: [Enter applicable administrative password here]
 - d. Domain: WORKGROUP

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. For changes to the DMM software and/or operating system to take effect , **these changes MUST** be committed to the DMM flash memory as follows:
 - Locate and double-click the *commit.exe* icon located on the desktop (see *Figure 6.1 - commit.exe Icon*).
 - Accept the automated restart.



Note! *If necessary to log on using an administrator account after restart, Log on to MyUser, stop and log off and then log on to administrator.*

Rutter VDR-100G3/G3S Installation Manual

Chapter 7: VDR Record Operating Instructions, Rev. 1.1

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7 VDR RECORD OPERATING INSTRUCTIONS



NOTE: 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. Several features within the VDR_Record application 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.

7.1 File Menu

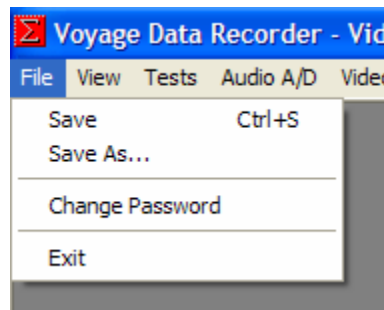


Figure 7-1 - File Menu

Save – Saves the selected window to the VDRapps folder on the internal drive.



NOTE: The **window capture** will 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.



WARNING: The Record Application password should only be changed at the demand of the customer.

Changing the password may make future service impossible or very difficult if the password is not properly communicated. Rutter assumes no responsibility for additional service time related to difficulties created by loss/change of a password.

It is a violation of VDR regulations to give the password to the customer.

Exit – Closes the VDR_Record application. The application cannot close if any of the test modes are selected.

7.2 View Menu

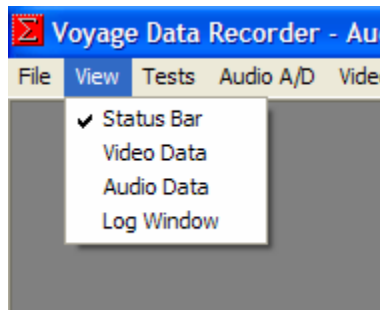


Figure 7-2 - View Menu

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



Figure 7-3 - Status Bar

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

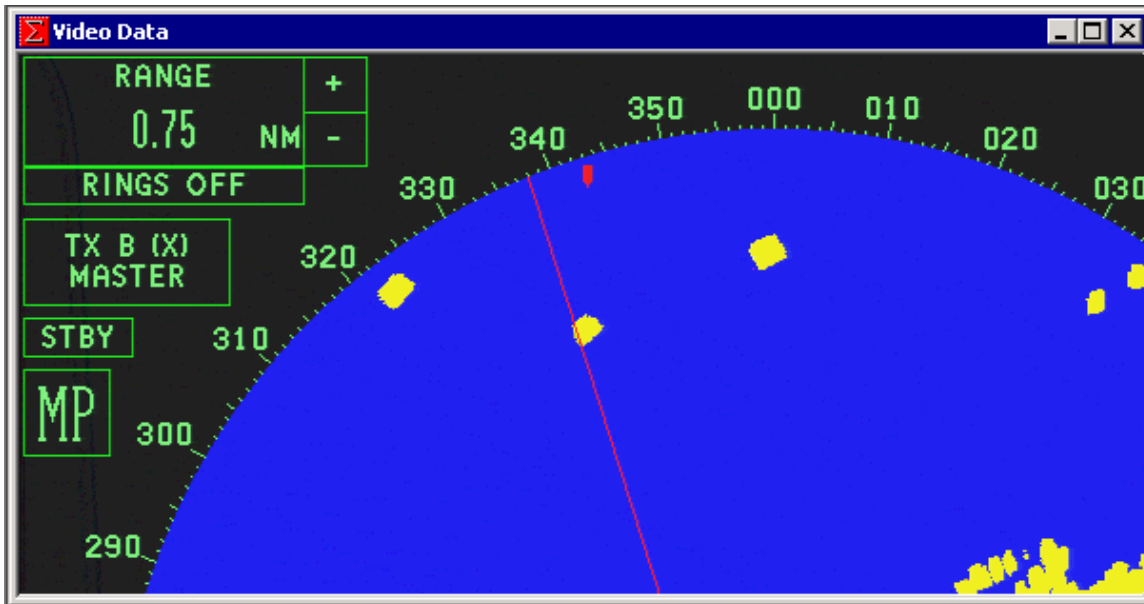


Figure 7-4 - Video Window

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

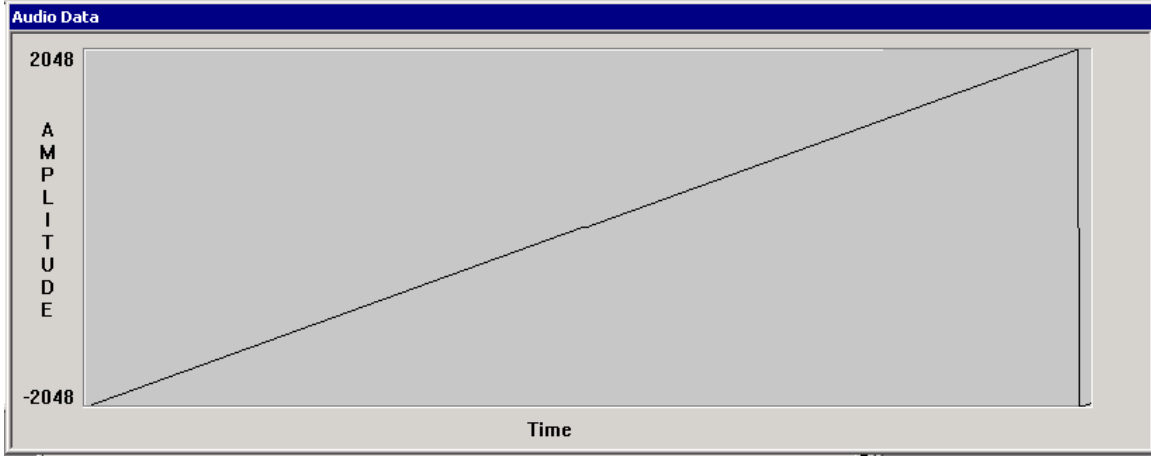


Figure 7-5 - Audio Window

Log Window – Selects the Log window to be displayed.

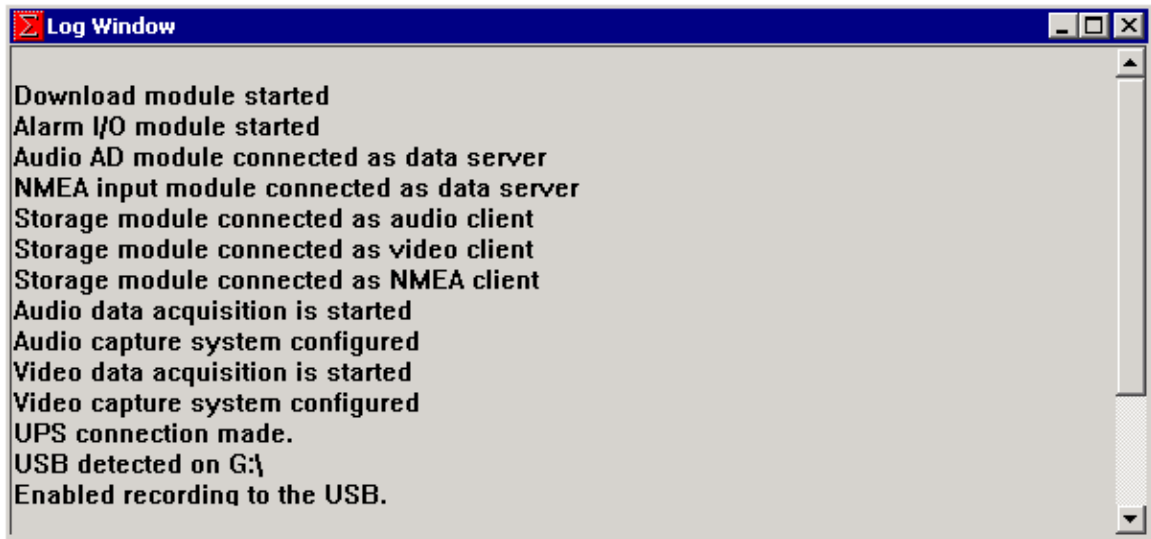


Figure 7-6 - Log Window

7.3 Tests Menu

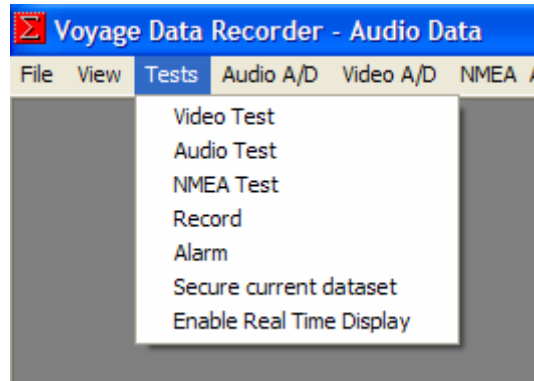


Figure 7-7 - Tests Menu



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. If more than one video source is captured, the Video Data window will display the images based on the capture interval set 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. To test the microphone buzzers with this test refer to [Chapter 8](#).

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.

Record – Activates the VDR record mode. In this mode the record status and errors will be displayed in the Log Window. Video, Audio, or NMEA data WILL NOT be updated in their windows. This is the standard operating mode for the VDR.

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 2 seconds.

Secure current dataset – Secures and timestamps the most recent 12 hours of captured data. Time is set in the `<vdrparams.ini>` file.

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 is purchased, this option is not displayed because it is already active.

NOTE: Real Time Display is not a test mode and may be operated as the same time as the record mode.

7.4 Audio A/D Menu

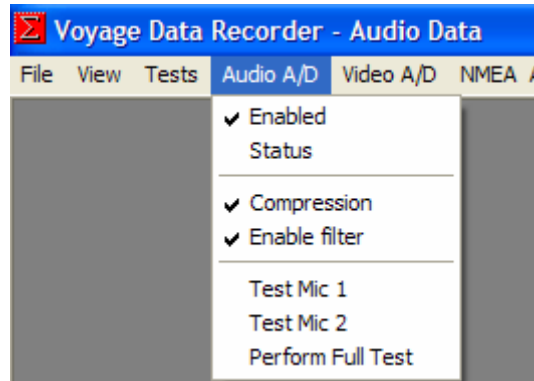


Figure 7-8 - Audio A/D Menu

Enabled – Default is set to Enabled. Enables the audio capture by the VDR audio subsystem and stores the audio data to the DMM 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.



NOTE: If the test is not successful on the first attempt, the test will stay active until the next retry interval as set in the <vdrparams.ini> file. Once the test is activated it CANNOT be activated again until a successful mic test or until all retries (as set in the <vdrparams.ini>) have been completed. Shut down record application and restart to reset.

7.5 Video A/D Menu

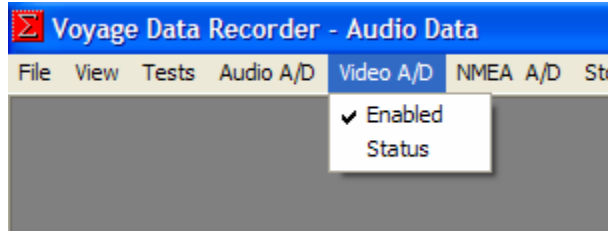


Figure 7-9 - Video A/D menu

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.

7.6 NMEA A/D Menu

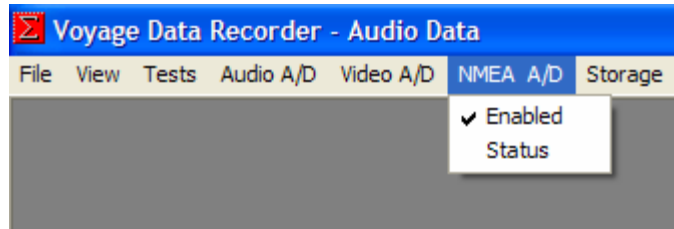


Figure 7-10 - NMEA A/D menu

Enabled – Default is set to enabled. Enables the NMEA capture by the VDR NMEA 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.

7.7 Storage Menu

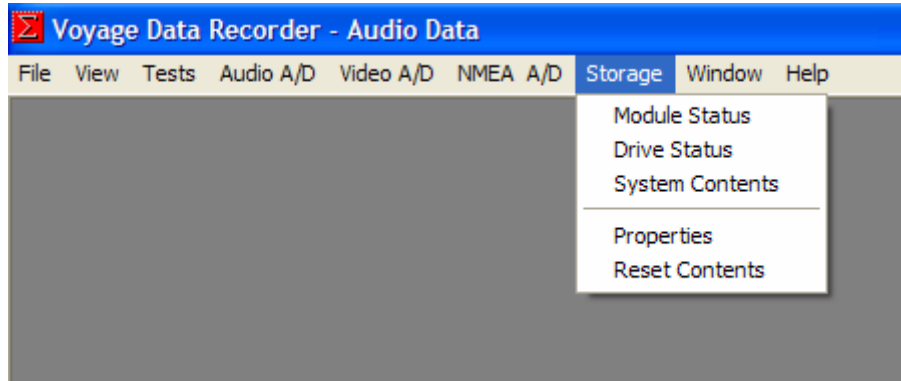


Figure 7-11 - Storage Menu

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

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 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.



NOTE: 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. Commit to save.

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

7.8 Window Menu

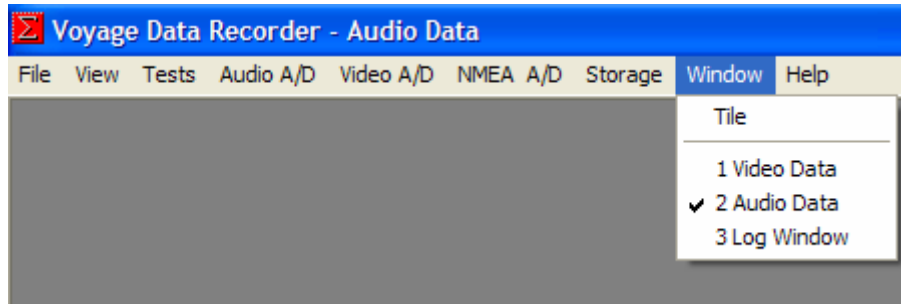


Figure 7-12 - Window Menu

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.

7.9 Help Menu

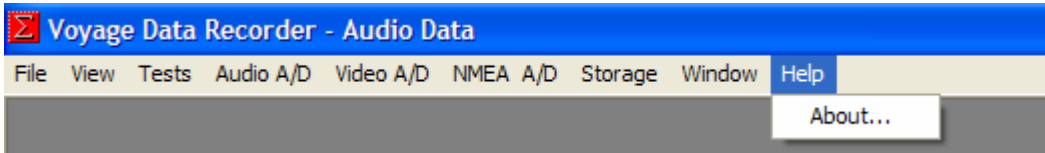


Figure 7-13 - Help Menu

About – Display the Version number, Serial Number, and Product Key applicable to each VDR.



Figure 7-14 - Help Menu 'About' Dialog Box

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

Rutter VDR-100G3/G3S Installation Manual

Chapter 8: Audio Module, Rev. 1.1

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8 AUDIO MODULE

Introduction

The **Audio Module** receives audio information from microphones and vessel radios in accordance with the *IEC 61996.2* and the *MSC.163(78)* standards. All audio data is sent to the DMM for processing, storage, and retrieval. This module also controls the buzzers used to test microphones connected to the VDR-100G3.

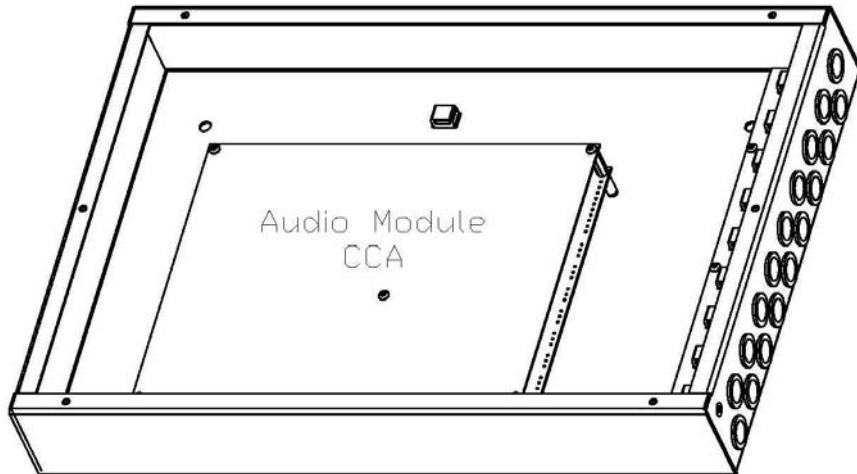


Figure 8-1 - Audio Module Enclosure

8.1 Audio Module Planning

The basic Audio Module contains a 4-channel configuration. Each channel contains 2 inputs.

See table below for more details on the basic and optional channel configurations

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 8-1 - Audio Module Channel configurations for the basic and optional models.

Below is an example of a typical S-VDR 4-channel Audio Module arrangement:

- Channel 1: Transmitted and received signals from the primary VHF radio;
- Channels 2, 3, and 4: 2 FWD Helm Area microphones, 2 AFT Chart Table/GMDSS Area microphones, and 2 Outdoor Wing Area microphones.

In this configuration, the inputs are utilized as follows:

- VHF TX/RX: Input 1-2
- Internal Microphones: Input 3-4 and Input 5-6
- External Microphone: Input 7-8

The Audio Module digitizes the audio inputs from all input channel and transmits the combined data through the Ethernet port.

NOTE: *Optional 6-input channel (12 input-port) or 8-input channel (16 input-port) Audio Modules are available for capturing audio data from additional microphones or other sources.*

Additional specifications:

- The audio inputs can be configured as either microphone or line level (VHF) connections during installations;
- The 8, 12, or 16 audio inputs are mixed 2:1 (either LEFT/RIGHT or FWD/AFT for microphones, or TX/RX for VHF) to produce 4, 6, or 8 data input channels;
- Separate gain control potentiometers on the circuit board, can be adjusted for each audio input. These levels are preset during manufacturing; and
- The Audio Module Ethernet is connected to a dedicated Ethernet port on the DMM.

The placement of microphones on the bridge is critical to ensure that all required areas on the bridge which require audio recording are monitored. The areas to be covered include:

- Conning/helm stations;
- Radar displays;
- Chart tables; and
- All other bridge workstations;

There are 2 types of microphones available with the VDR-100G3. Both microphone assemblies include an integrated microphone test buzzer:

1. Indoor microphones are black and use condenser style boundary technology. They usually mount to the ceiling in the bridge area, with a junction box located above the ceiling for cable connection; and
2. Outdoor microphones are white, use condenser style boundary technology and come with an externally mounted wiring junction box.

The microphone locations must be determined during the planning phase of installation.

The Audio Module supports a maximum of 8 audio input channels. Typical channel input sources include:

- Pairs of indoor microphones;
- A pair of outdoor microphones, and
- A transmit (Tx) and receive (Rx) VHF radio line (as in Duplex systems) or combined Tx/Rx on a single pair of wires (as in Symplex systems).



NOTE1: *Primary VHF MUST be on separate channels*



NOTE2: *If only 1 microphone will be connected to an audio input channel, it must be wired to the top input (odd number) of the channel for proper self test operation.*

8.1.1 Planning Zones

For recording purposes, the bridge is divided into recording areas. The number of recording areas determines the number of microphones required. Microphones in similar areas must be wired to the same two-input audio input channel. The number of microphones plus the number of VHF inputs equals the number of audio channels required. (The audio input channels are located on the back of the Audio Module.)



NOTE: *An outdoor microphone and an indoor microphone should NEVER be connected to the same channel. When the input is mixed the loud outdoor sounds will mask the quiet indoor sounds and make the indoor microphone sounds difficult to hear.*

When the bridge audio requires more than six microphones for total area coverage, then the INI file must be configured to mix audio input data from two, three or four audio inputs (two input channels) into a single zone to create an audio output channel. This is necessary because the FRM only accepts data from 4 audio output channels (including the dedicated VHF output channel).

Two microphones from similar areas can be wired to 1 audio input channel (1 microphone is connected to the top channel input and one is connected to the bottom channel input). The Audio Module digitizes the audio input from each input channel and sends it via Ethernet to the DMM. The DMM mixes the data and sends it to the recording media. Using DMM software the installer can mix the data from up to 2 input channels with similar sources to form a zone.

NOTE: *A zone is one audio output channel. An audio output channel may consist of:*

1. *One audio input channel; or*
2. *Two audio input channels combined (software mixed).*

Up to 4 microphones or 2 radios can be assigned to a *zone*. The parameters for each zone are set in the `<vdrparams.ini>` file as an **OutputChannelX**. Each **OutputChannelX** mixes the audio input from a zone to create one audio output channel.

A ship with 12 microphones on the bridge would require the installer to use the DMM software to mix the audio input into three 3 zones of 4 microphones each—being careful not to wire external and internal microphones to the same input channels that will be combined as an audio output channel zone in the DMM.

NOTE: *Microphones should be installed starting on the port side of the bridge and continuing to the starboard side.*

The microphone wiring layout should allow for simultaneous activation of (test source) buzzers. Buzzers are associated with the microphones as follows:

- TOP MIC input ports (odd numbered ports) connect to Buzzer1 bank ;
- BOTTOM MIC input ports (even numbered ports) connect to Buzzer 2 bank.

The microphones should be installed to record audio from intercoms, PA systems, and bridge alarms.

In Playback, each audio output channel has an ON/OFF selection box. This controls the location source and volume for the playback sounds. The areas enclosed by clouds represent basic zones for audio recording. The boxed areas indicate bridge panels or workstations.

Figure 8-2: Typical VDR/SVDR Microphone Zoning (6 Microphones) below illustrates a bridge zoning arrangement for the base VDR-100G3 system, complete with 6 microphones. The zoning on this system provides 3 zones with 2 microphones each.

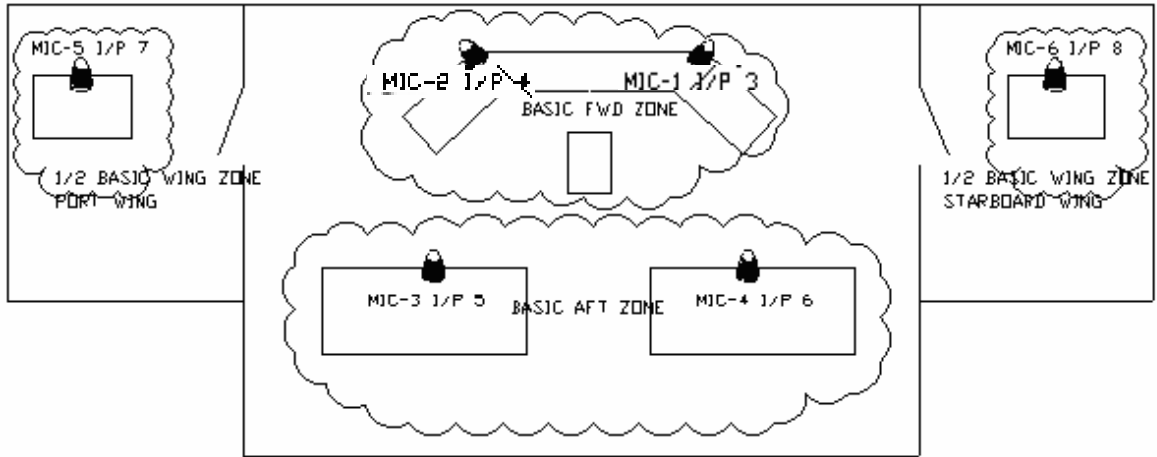


Figure 8-2: Typical VDR/SVDR Microphone Zoning (6 Microphones)

Automatic audio testing is performed at the same time across each zone (audio output channel) when the VDR is in record mode. The buzzers connected to buzzer 1 outputs are simultaneously activated during testing immediately followed by activation of buzzers connected to buzzer 2 outputs. For further explanation of microphone installation and testing (including a description of zoning), see Section 8.1.3: Understanding Zones.



NOTE: The placement of microphones and the zoning of the bridge require careful planning. The placement of the bridge audio recording must meet the IEC 61996.2 and the MSC.163(78) standards.

8.1.2 Coverage Patterns

Placement of microphones must be planned to ensure coverage of all required areas and to avoid over-coverage. The external and internal microphones:

- Have a horizontal coverage area (-3 dB) of 130°, centered around the front of the microphone;
- Have a vertical coverage angle of 45 degrees from the front of the microphone area;
- Coverage area extends approximately 3m from the front of the microphone;
- Should be installed in front of and above the area to be monitored. Microphones can also be installed in front of and below the area to be monitored, depending on the physical configuration of the area.

When planning for the installation of microphones consider the following:

- All areas are monitored and have adequate coverage;
- Individual microphones should be separated by a minimum of 4m to ensure there is no overlapping coverage. Overlapping coverage can make it hard to determine the source location when playing back recorded audio.



NOTE: Exterior microphones must be protected from direct exposure to sea spray and precipitation.

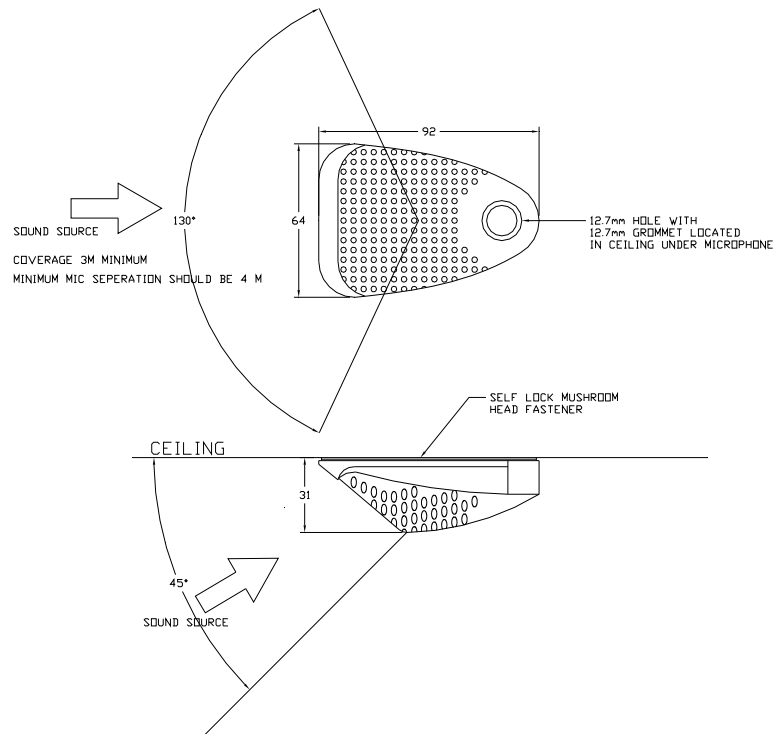


Figure 8-3 - Microphone Coverage

8.1.3 Understanding Zones

The Audio Module samples each audio input channel, digitizes it and sends the digital data via Ethernet to the DMM. Based on the `<vdrparams.ini>` file, the DMM creates audio output channels (tracks of audio data). These output channels are then sent for storage to the appropriate recording medium or media. The data on each of these output channels—as identified in the **OutPutChannelX** fields in the `<vdrparams.ini>` file—represents a zone.

Each zone is determined by the number of input channels placed in individual **OutPutChannelX** fields in the `<vdrparams.ini>` file.

For example, consider a vessel that has 12 indoor bridge microphones and 1 VHF source. The channel configuration would follow this hardware connection arrangement:

- VHF source = Channel 1 (inputs 1 and 2)
- Mics 1 and 2 = Channel 2 (inputs 3 and 4), Indoor MICs
- Mics 3 and 4 = Channel 3 (inputs 5 and 6), Indoor MICs
- Mics 5 and 6 = Channel 4 (inputs 7 and 8), Indoor MICs
- Mics 7 and 8 = Channel 5 (inputs 9 and 10), converted from factory set VHF to Indoor MICs
- Mics 9 and 10 = Channel 6 (inputs 11 and 12), Indoor MICs
- Mics 11 and 12 = Channel 7, (inputs 13 and 14), Indoor MICs

All bridge microphones and Primary VHF audio is captured and digitized by the Audio Module and then sent via audio input channels to the DMM. The data is then mixed in the DMM and sent via 4 available audio output channels (4 zones) to the FRM for storage, each audio channel may include audio input from up to 4 microphones or 2 VHF's.

By using software mixing, 2 audio channels can be entered per **OutPutChannelX** field of the `<vdrparams.ini>` file. Note however that the primary VHF must have a dedicated **OutPutChannelX** field.

Using the 12 microphone example provided above, the **OutPutChannelX** fields would be similar to the following:

- **OutPutChannel1** = 1 (Primary VHF)
- **OutPutChannel2** = 2, 3 (4 microphones)
- **OutPutChannel3** = 4, 5 (4 microphones)
- **OutPutChannel4** = 6, 7 (4 microphones)

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

- Zone 1 (Audio Output Channel 1) = Audio Input Channel 2 and 3
- Zone 2 (Audio Output Channel 2) = Audio Input Channel 4 and 5
- Zone 3 (Audio Output Channel 3) = Audio Input Channel 6 and 7

A maximum of 2 channels can be mixed per **OutPutChannelX** field, so a **zone** can include a maximum of 4 inputs.

Wherever possible every zone must contain microphones recording similar source information. For example,

- DO NOT mix an internal microphone channel with an external microphone channel;
- External microphones must be contained within their own zone.

See *Section 8.5.1 - Microphone Installation - Sample One* and *Section 8.5.2 - Microphone Installation – Sample* for more detailed examples of configuring the microphone parameters and zones (audio output channels).

8.2 Audio Mounting

8.2.1 Mounting Bridge Microphones

8.2.1.1 Microphone Mounting

It is important that the surface on which the microphone is mounted be clean, dry, and smooth. The Mushroom-Lock fastener's adhesive must make complete contact with the mounting surface or the adhesive may not stick properly. Clean the surface thoroughly and remove any loose material, such as paint flakes and labels.

The microphone may also be mounted on top of the microphone junction box. If so, the microphone junction box must be located where the microphone will provide the required coverage.

If these surface conditions cannot be met, and the junction box cannot be located in an acceptable position for microphone coverage, then the microphone can be secured with hardware. (Any such hardware is not supplied with the VDR100-G3). The choice of hardware depends on the surface where the microphone is to be installed and the mounting method.

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.

8.2.1.2 Indoor Microphone Assembly

The dimensions of the indoor microphone and microphone junction box are shown in *Figure 8-4 – Internal/Indoor Microphone with Junction Box*.

The audio (indoor grade) junction box must be installed **within a 2m cable length from the microphone**. The provided cable, attached to the devices, should not be changed.

The audio coverage from the indoor microphone is uni-directional with a horizontal coverage angle (-3 dB) of 130°, and a vertical coverage angle (up and down) of 45° from the **front** of the microphone area. Install the indoor microphone (which includes an integrated audio test source or buzzer) so that the coverage range described by these angles includes the area to be recorded.



Note: The Microphone Junction Box is normally installed behind the ceiling panels.

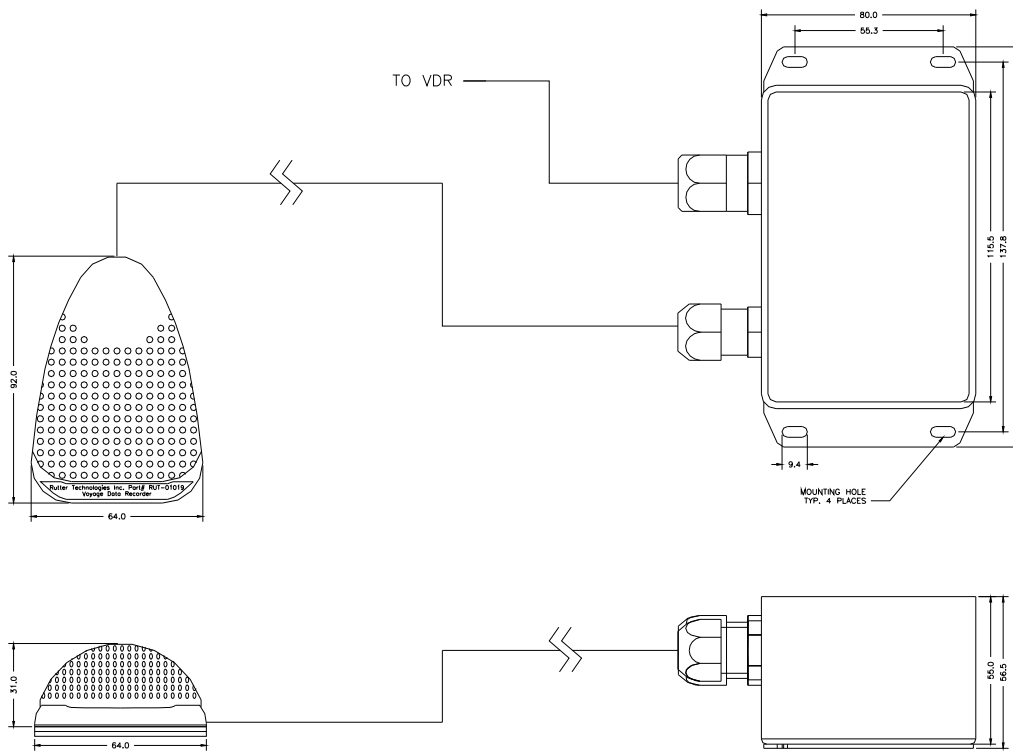


Figure 8-4 – Internal/Indoor Microphone with Junction Box

8.2.1.3 Outdoor Microphone Assembly

The outdoor microphone (which includes an integrated audio test source or buzzer) is supplied with an outdoor grade wiring junction box. It is the installer's responsibility to create an adequate mounting system or bracket when mounting the junction box outdoors. *Figure 8-5 - External (outdoor) Microphone and Junction Box* illustrates the microphone and junction box.

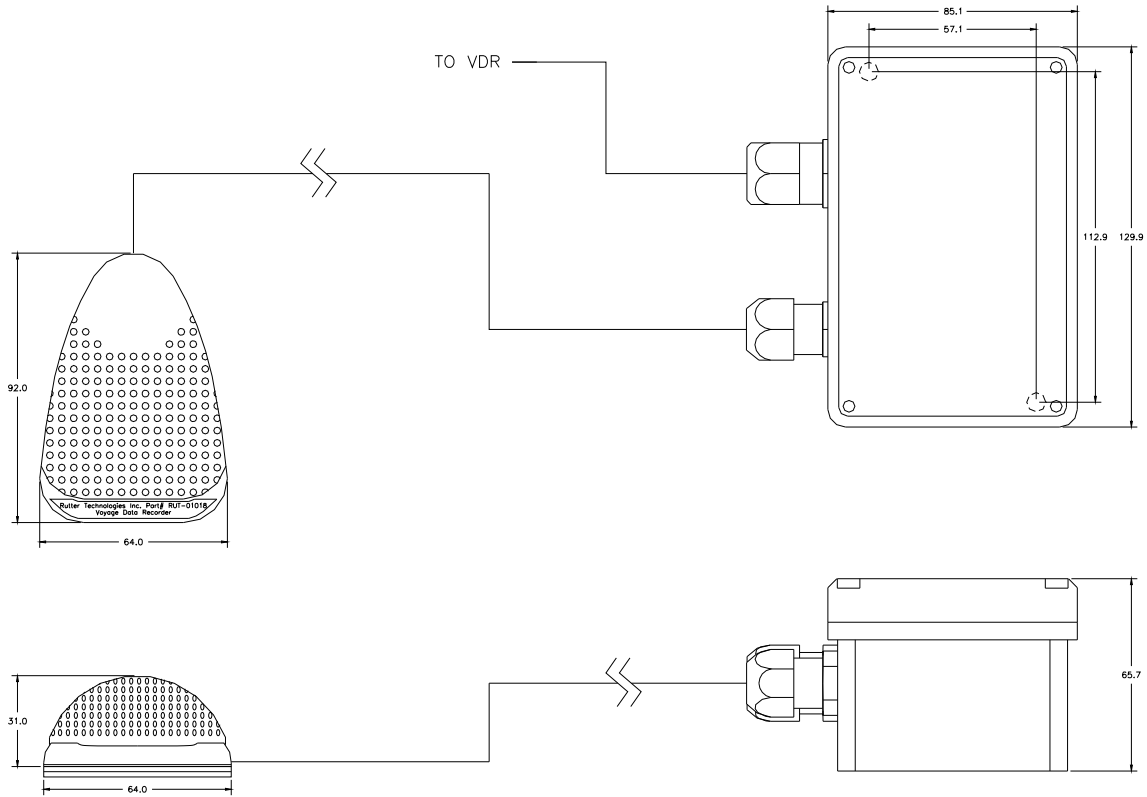


Figure 8-5 - External (outdoor) Microphone and Junction Box

Audio coverage from the external microphone is uni-directional. Therefore, the assembly should be mounted in a protected location where the coverage range from the front of the microphone includes the area to be recorded. Sounds from behind the microphone will not be covered.

NOTE: To minimize exposure to sea spray and rain, it is recommended that the unit be mounted under the wing control cover if possible, and wherever possible the microphone should be facing down.

8.2.2 Mounting the Audio Module



Note: The Audio Module, when installed without a DAU **must** be grounded to the ship's hull.

8.3 Audio Connections

Each microphone (complete with its internal buzzer) is connected to the VDR-100G3 through its junction box which contains wiring terminals and a microphone pre-amp:

- The microphone junction box is wired to the VDR-100G3 using a two-pair shielded cable;
- The microphone connects same as below in the audio junction box; and
- The buzzer is connected to the terminal blocks in the audio junction box.

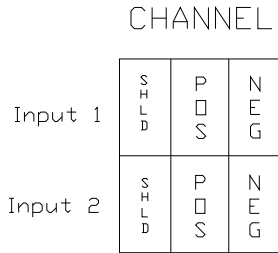


Figure 8-6 - Audio Module - Individual Channel Connections

8.3.1 Indoor Microphone and Buzzer

NOTES:

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

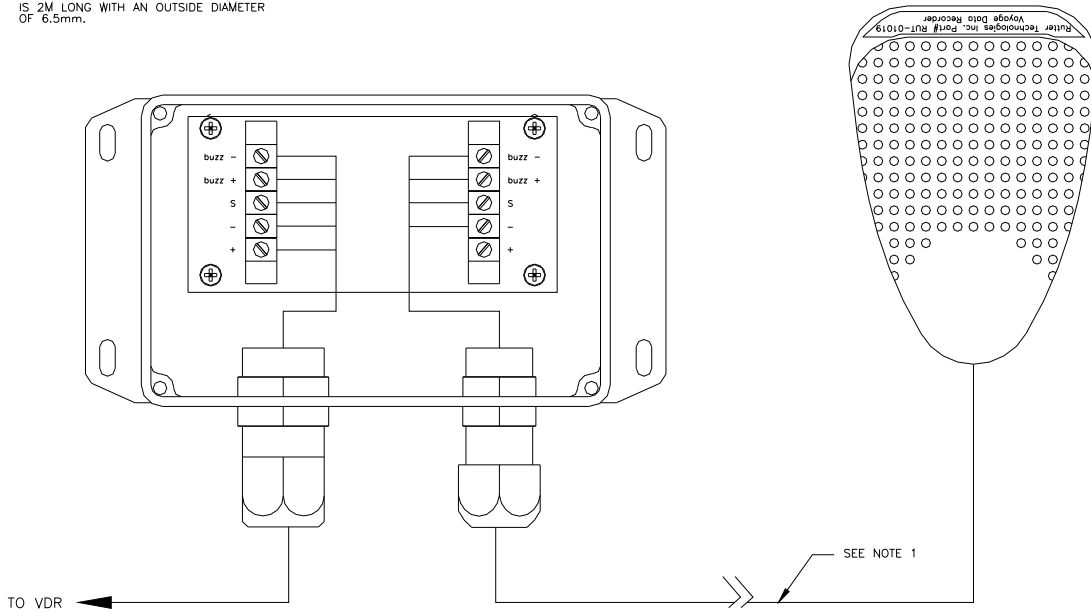


Figure 8-7 - Internal Microphone Terminal Block



Note! The conductor marked “SHD”, “S”, or “Audio Channel Shield” **MUST NOT** be grounded to the internal ground bolt of the DPU.

To minimize wiring from the audio junction boxes to the VDR-100G3, it is possible to connect the VDR-100G3 cable from all the audio junction boxes to a central junction box and run a single

multi-lead cable back to the VDR-100G3. This central junction box **is not** provided with the VDR-100G3.

Each microphone/buzzer unit is connected, via its associated junction box, to the Audio Module.

8.3.2 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.



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

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 8-2- Audio Module Configuration



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

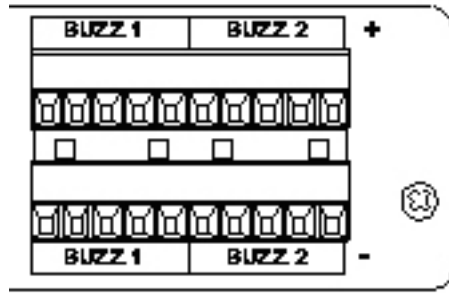


Figure 8-8 – 12-Input (6-Channel) Audio Module

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.

The shield wires connected to each MIC input **MUST BE** isolated from vessel ground. This shield must only be wired to the shield connect points in the audio junction box and in the Audio Module.

8.3.3 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:

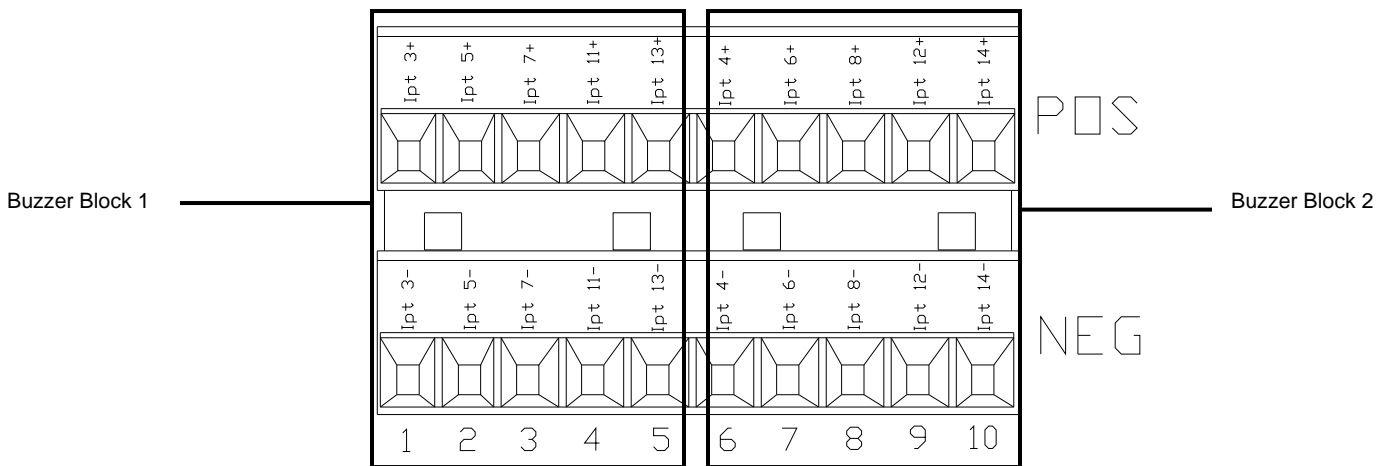


Figure 8-9 – Audio Module Buzzer Connections

For buzzer connection, follow this rule: Wire the Odd numbered or top wired MICs to Buzzer 1 bank starting from left to right AND wire the Even numbered or lower MICs to Buzzer 2 bank also starting from left to right.

For example, an indoor microphone connected to Channel 2, Input 3 would connect to Buzzer 1 connection point #1 (positive and negative). An indoor microphone connected to Channel 2 Input 4 would connect to Buzzer 2 connection point #6.

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 the DAU.

8.3.4 External (Outdoor) Microphone Assembly

The external microphone assembly consists of an outdoor microphone, (which includes an audio test source or buzzer), and wiring junction box. See *Figure 8-5 - External (outdoor) 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 8.3 – Audio Connections, 8.3.2 - Audio Module Inputs, and 8.3.3 – Buzzer Connections* above.

NOTES:

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

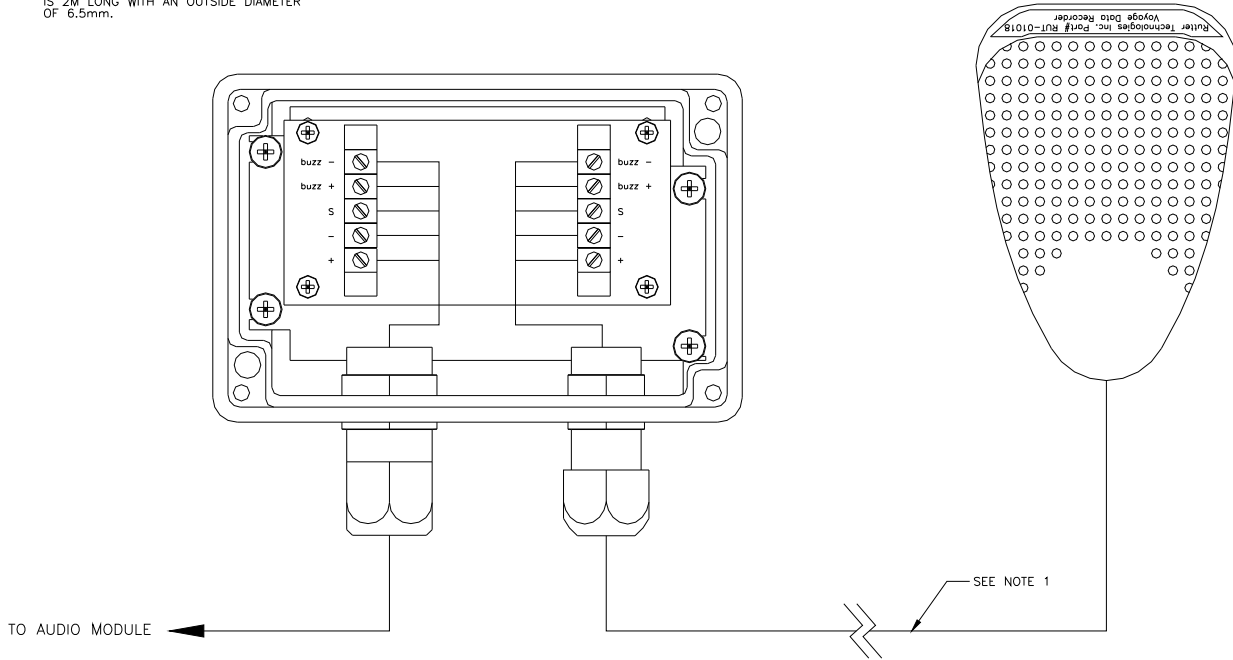


Figure 8-10 - External Microphone Terminal Block

8.3.5 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.
- No shield connection is made to the audio module

The interconnections required for the VHF are similar to those described in Section 8.3:Audio Connections.

NOTE: *The Audio Module when installed without a DAU, must be grounded to the ship's hull. See Section: 8.3: Audio Connections above.*

8.4 Audio Configuration

To capture audio recording correctly, the audio capture settings are configured in hardware and software.

8.4.1 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. The following terms explain all the entries found in the [AUDIO] section of the *<vdrparams.ini>* file:

- **blocks =60** always set to this number (effects data file size);
- **ChannelEnabledX = 0** or 1. This parameter shows whether the applicable channel is enabled or disabled.
=0 disabled
=1 enabled
- **NumOutputChannels = 4**, gives the number of audio output channels to be stored on the FRM (this is set to for a value from 1 – 8);
- **OutputChannelX** shows the number of Output channels after software mixing;
Note: Only first 4 Output channels will go to the FRM. Channels mixed in software will be next to each other separated by a coma such as: OutPutChannel2 – 2,3.
- **numVHFChannels** gives the number of channels connected to record radios, PA systems, bridge telephone, etc;
- **VHF-ChannelX** shows the channel(s) on which the radio(s) are being recorded;
- **MikesOnMixerX** gives the number of microphones on each microphone channel;
- **DetectionThresholdX** gives the number calculated during installation testing, in order of the lowest MIC input to the highest MIC input number;
- **ChirpLength = 30** gives the chirp length setting—should be set for 30 ms;
- **MikeRetryInterval** gives the wait period for the retrial of a failed mic test—should be set for 3600 seconds, which is 1 hour;
- **MaxMikeRetrys =11** gives the number of times the system will retry before declaring a MIC error alarm— Always set for 11.

The number of channels sampled by the VDR-100G3 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.

8.4.2 Audio Module Internal Processing Board

The Audio Module's internal processing board may need to be configured for each installation.

IMPORTANT! If the Audio Module must be opened **DO NOT** remove the rear end plate (channel and buzzer). To access to the Audio Module input circuit card assembly, **first remove the front plate** then **remove of the black (top) casing**. The top casing slides away from the silver (bottom) casing.



NOTE 1: **DO NOT** attempt to pull the internal processing board away from the silver (bottom) casing.

NOTE 2: Before beginning any physical adjustments to the internal processing board, **power must be removed** from the Audio Module unit.

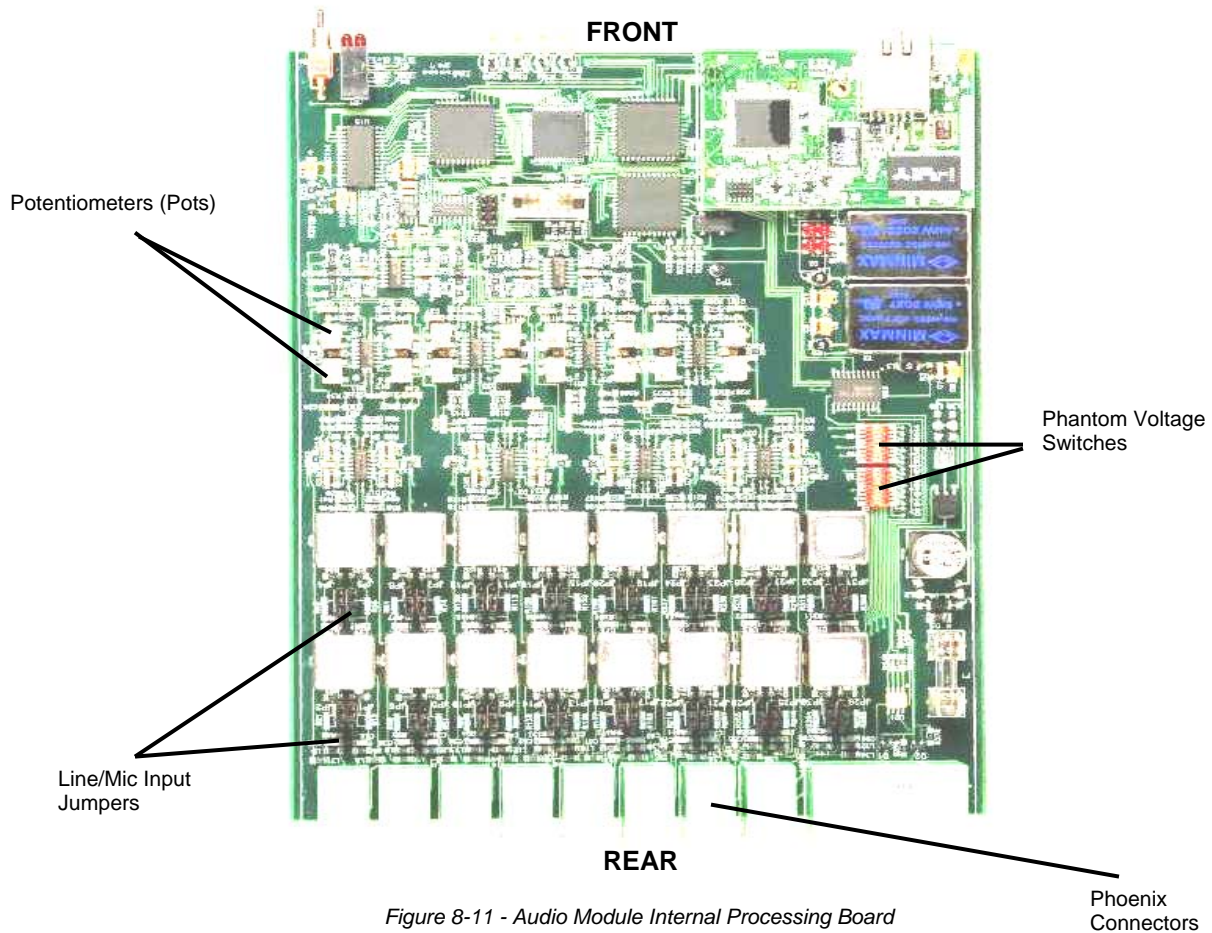
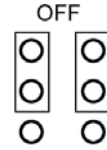


Figure 8-11 - Audio Module Internal Processing Board

8.4.2.1 Setting Line/Mic Input

Select **Line** input for VHF connections. Select **Mic** input for microphone connection.

To select **Line** input, the jumpers for the audio input must be set to **OFF**. The 2 jumpers must cover the **top** 4 pins.



Note! The top 4 jumper setting pins are the 4 pins farthest from the phoenix connectors (located at the rear of the Audio Module circuit card assembly). The bottom 4 pins are the 4 pins closest to the phoenix connectors. See Figure 8-11 - Audio Module Internal Processing Board above.

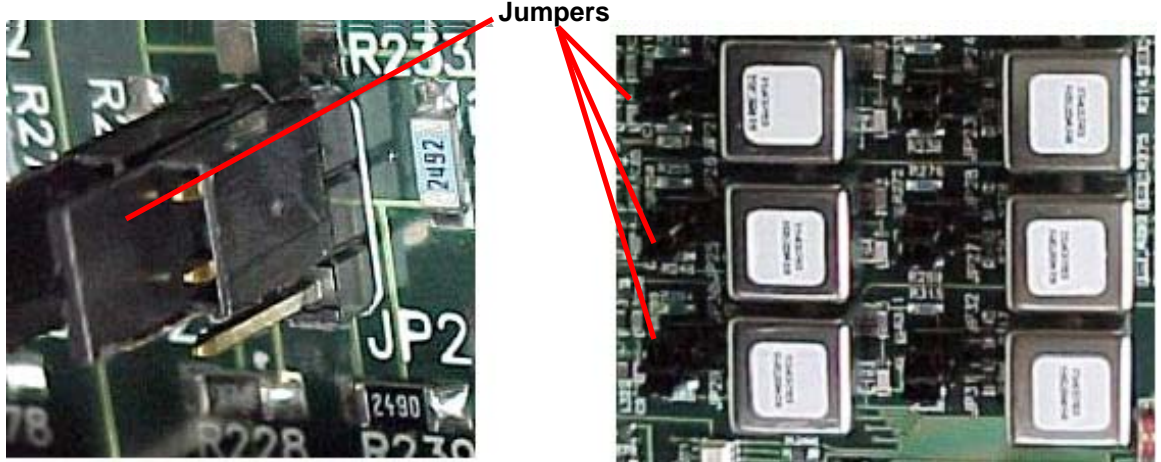
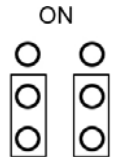


Figure 8-12 - Left is Jumper Close-Up (in OFF position) and Jumpers (long view).

To select **Mic** input, the jumpers for the audio input must also be switched to ON. The 2 jumpers must cover the **bottom** 4 pins. The table below provides information for jumper numbers and their audio 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 8-3 - Jumper to Audio Module Input Associations

8.4.2.2 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	RUT-01018-AA	Condenser	ON
Indoor Microphone	RUT-01019-AA	Condenser	ON
VHF	N/A	N/A	OFF

Table 8-4 - Phantom Voltage Status

The phantom voltage in the Audio Module is adjusted via DIP-Switches S2 – S5 (as shown in Figure 8-13 - Phantom Voltage DIP-Switches):

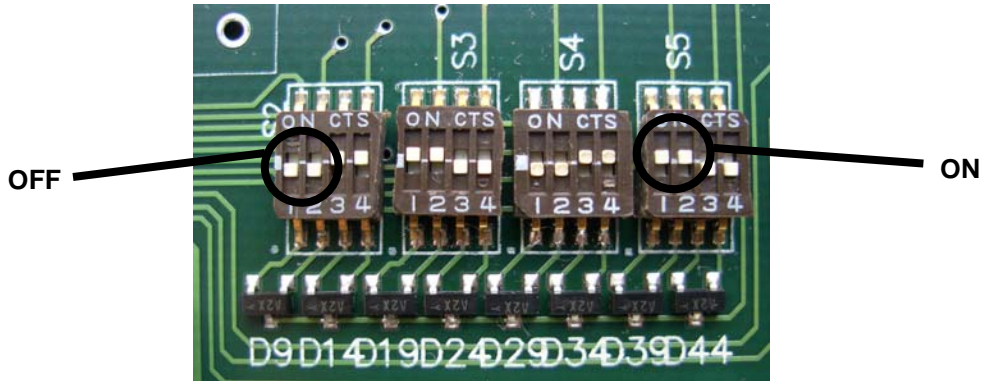


Figure 8-13 - Phantom Voltage DIP-Switches

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 8-5 - Phantom Voltage to Audio Module Input Associations

8.4.2.3 Adjusting the Gain

Gain is normally only adjusted for line level inputs such as VHF. For microphone inputs the factory defaults should be used. Each audio input on the Audio Module may be configured to accept either line level or microphone inputs. To configure the audio input to accept an input other than the current factory default setting, it may be necessary to adjust the gain for that audio input.

Refer to Table 8-6 - Recommended Resistance Readings for the recommended resistance settings for the various inputs types.

Recommended Resistance Reading	
Internal Microphones	45k Ohms
Outdoor Microphones	45k Ohms
VHF	Dependant upon VHF manufacturer.

Table 8-6- Recommended Resistance Readings

Note: the resistance readings do not have to exactly match these numbers. They are provided here only as recommendations.

To adjust audio input gain:

1. Remove power to the Audio Module;
2. Locate the audio input potentiometer to be adjusted. Refer to Figure 8-14: Audio Input Potentiometer Layout to identify the potentiometer that corresponds to the audio input.
3. Connect the multimeter probes to lead 1 and lead 2 of the potentiometer to be adjusted. Refer to Figure 8-15 – Potentiometer Leads and Figure 8-16 - Potentiometer Lead Resistance Reading
4. Measure the resistance of the potentiometer associated with the audio input being adjusted; Refer to Figure 8-14 - Audio Input Potentiometer layout;

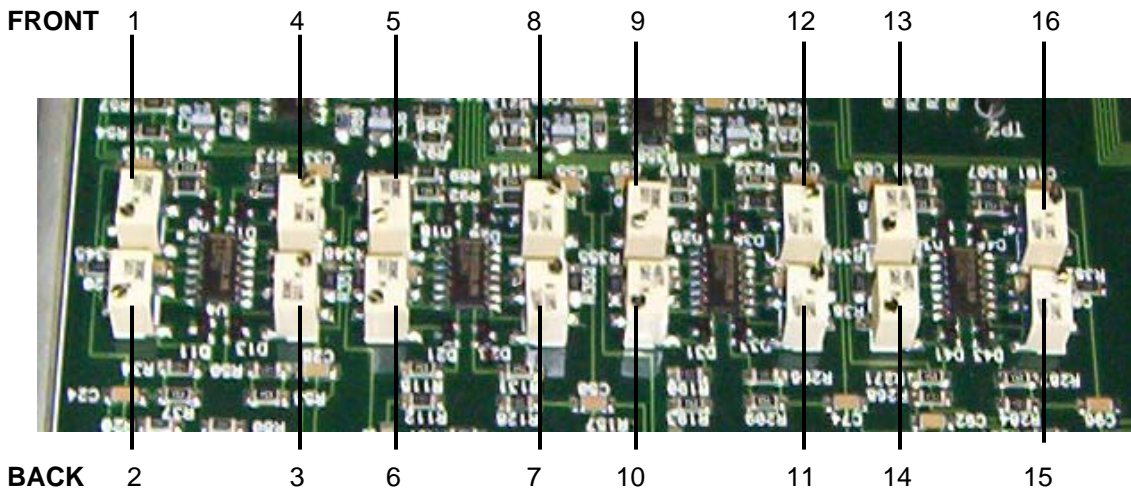


Figure 8-14 – Audio Input Potentiometer layout

- Adjust the potentiometer gain using the Gain adjustment screw on the potentiometer for the desired resistance. Refer to *Table 8.6: Recommended Resistance Readings*. The higher the resistance the higher the gain (This increases or decreases the audio input level). Turn the Gain adjustment screw clockwise to increase the gain.

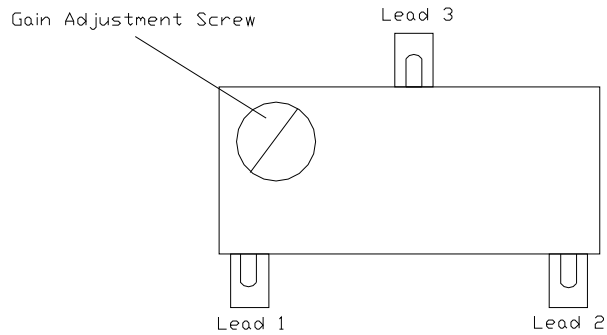


Figure 8-15 – Potentiometer Leads

Note! There are 3 leads for each potentiometer. Only 2 of these leads are used to measure a resistance reading.

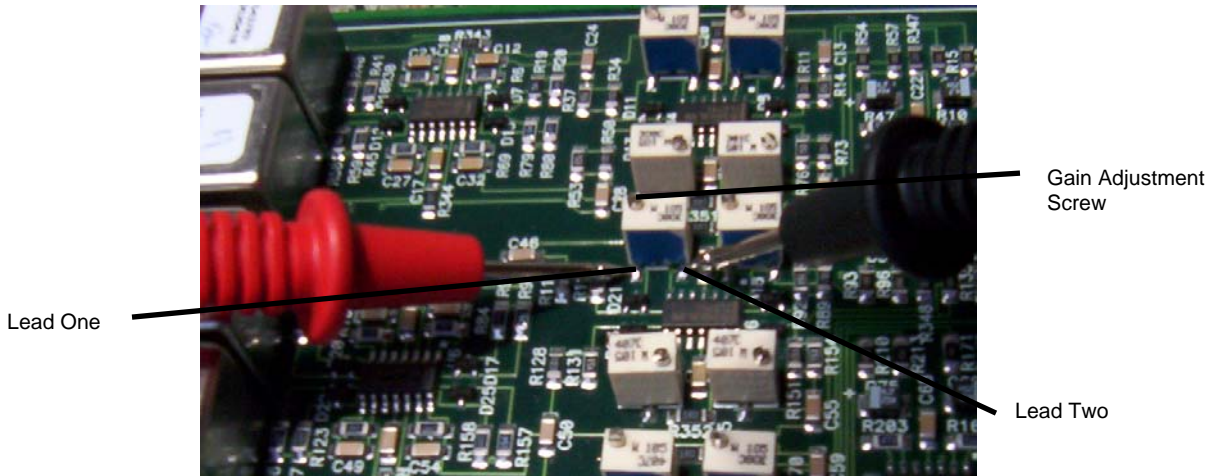


Figure 8-16 - Potentiometer Lead Resistance Reading

8.4.3 AudioConfigSuite (Audio Diagnostics) Application

The AudioConfigSuite will allow a user to configure the audio section of the <vdrparams.ini> file.

The audio information can also be manually set-up and adjusted. The Detection Threshold must be **manually** configured.

The Audio Diagnostics (ADi) application is used to capture and configure audio recording from bridge microphones, externally mounted microphones, and line level (VHF radio) sources. It exists on the DMM for the purpose of configuring the [AUDIO] portion of the <vdrparams.ini> file.



*In all cases the Record application **MUST be stopped and closed when using the** AudioConfigSuite.*

- This application must be run from D drive and not from the <C:\VDRApps> folder to avoid Windows Virtual Memory Resource errors.
- To run the Audio Configuration Suite in D:drive, go to **Start/All Programs/Utilities** and **right-click AudioConfigSuite** and select **Properties** and ensure that the **Start In** box shows < D: >

8.4.4 Audio Config Suite Operation: Version 4.2.0.4

8.4.4.1 Startup

The <AudioConfigSuite.exe> file is located in the following path **Start/All Programs/Utilities**. The Audio Module IO Configuration window will open when the when the AudioConfigSuite is started. See Figure 8-17 - Audio Configuration panel, below.

The <AudioConfigSuite.exe> file can also be run on the service PC. To run the Audio Configuration Suite on the service PC place the following files in a new folder:

- <AudioConfigSuite.exe>
- <RutAudio.dll>
- <RutACS.dll>



Figure 8-17 - Audio Configuration panel

8.4.4.2 Configuring the [AUDIO] Portion of the <vdrparams.ini> File

The **Audio Module IO Configuration** window, as shown in *Figure 8-18- Blank Configuration Panel*, offers the ability to:

- Create a new audio configuration in the <vdrparams.ini> file; or
- Load an existing audio configuration from a <vdrparams.ini> file for review or editing.

To load an existing audio configuration setting from a <vdrparams.ini> file:

1. Press the **Load** button in the lower left corner of the window. A browser window will open;
2. Select the <vdrparams.ini> file to be reviewed.

To create a new audio configuration setting in a <vdrparams.ini> file:

1. Press the **New** button in the upper left corner. A decision box will open and reads: **This Will Reset Audio Module Configuration. Continue?**
2. **Choose Yes or No to reset the audio configuration.**
 - Pressing **Yes** will reset all existing settings to default.
 - Pressing **No** cancels the **New** operation.

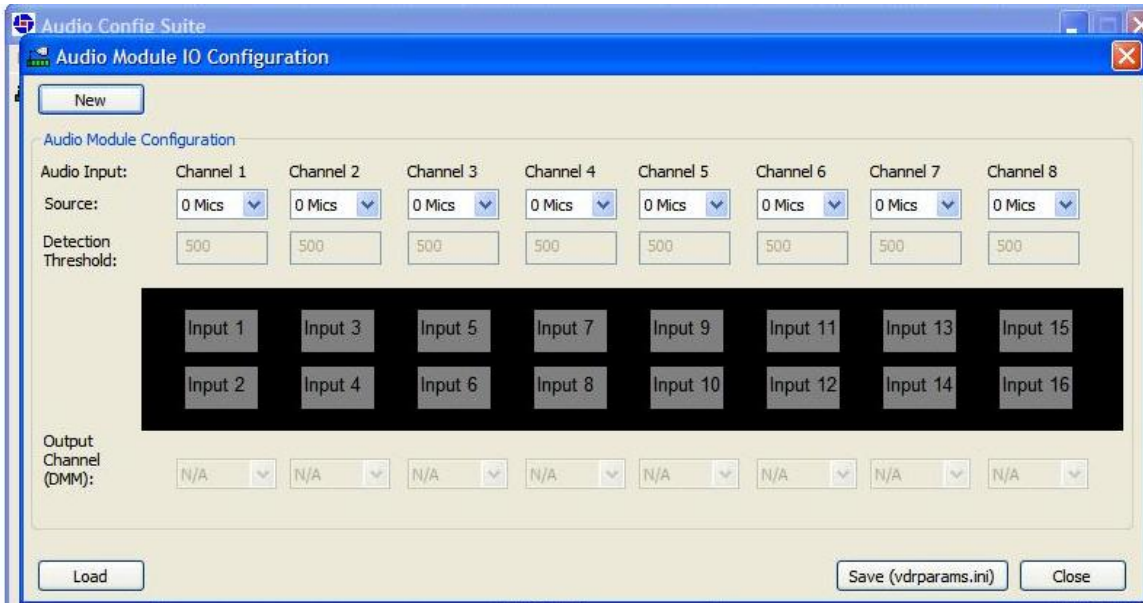


Figure 8-18- Blank Configuration Panel

8.4.4.3 Starting from a Blank Audio Module I/O Configuration Window

The Audio Module I/O configuration is recreated to copy the Audio Module: each input channel is shown from Channel 1 (inputs 1 and 2) on the left to Channel 8 (inputs 15 and 16) on the right.

PART 1: Setting the Audio Input Source

These steps identify the types of inputs and the number of inputs connected to the audio module. Refer to Section 8.3: Audio Connections for details on the physical connections of each input.

Start new I/O configuration by selecting the settings for Channel 1 that match the installation and work your way right to the highest channel on your module.

STEP 1: In the Source drop-down menu (Figure 8-19 - Selecting Channel Source, shows the **Source** pull-down selection for Channel 1 being (normally) chosen as **VHF**) select the types of Audio Inputs connected to each audio input channel.



NOTE: If there are no microphone connections on an audio input channel set the Source to "0 Mics"

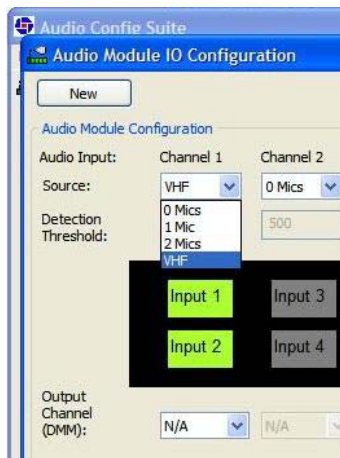


Figure 8-19 - Selecting Channel Source

PART 2: Establishing the Audio Output Channels

This step will establish the audio output channels to be saved to the FRM and DMM and the audio output channels saved only to the DMM



NOTE: Only 4 Audio Output Channels may be stored to the FRM. To store more than 4 audio input channels to the FRM software mixing of the audio input channels can be set to create zones.

STEP 2: In the Output Channel drop-down box shown below in *Figure 8-20 - Output channel selection*, select the output channel to be used.



NOTE: The Primary VHF and ALL bridge microphones MUST BE stored to the FRM.

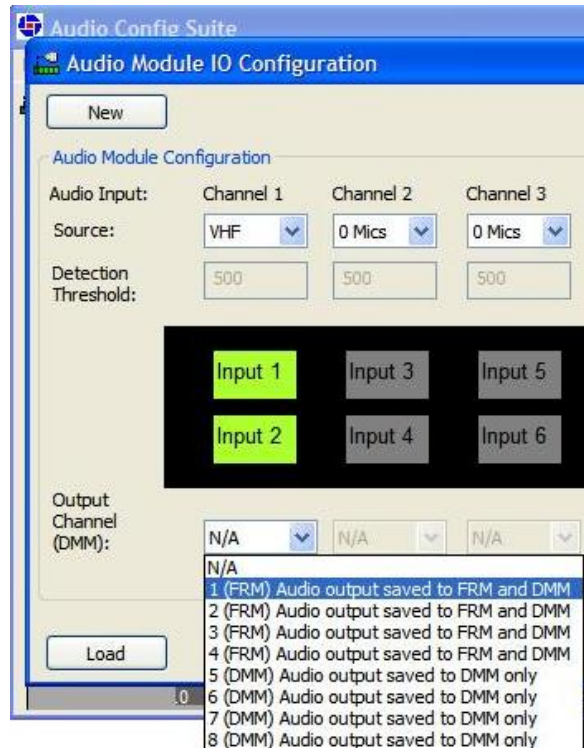


Figure 8-20 - Output channel selection



NOTE: Software mixing to create zones can be set by selecting the same output channel for two audio input channels. It is not possible to mix VHF audio input channels with microphone audio input channels. And it is not possible to mix more than 2 audio input channels (4 inputs).

STEP 3: Save <vdrparams.ini>

NOTE: Detection threshold values will be set once audio recording levels are verified as correct. Refer to Section 8.4.4 for details on calculating detection threshold values

STEP 4: Close the Audio Module I/O Configuration window.

The following figure shows a typical Audio I/O Configuration consisting of Primary VHF and 6 microphones (4 bridge and 2 wing microphones)

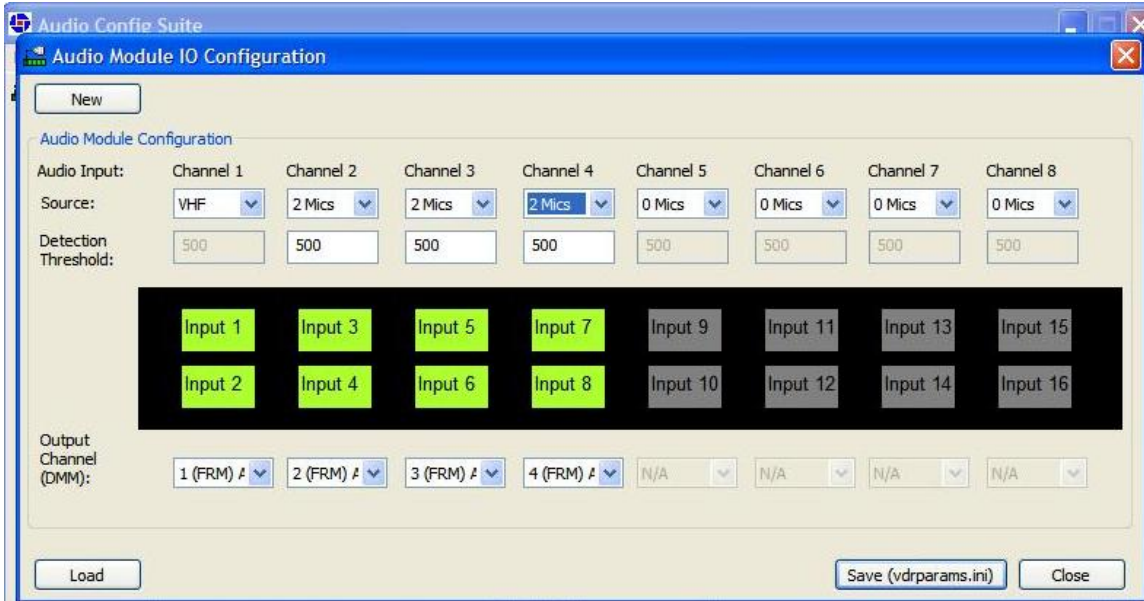


Figure 8-21 - Typical VDR configuration: Primary VHF, 4 bridge MICs, and 2 wing MICs.

An Audio I/O configuration consisting of 2 VHF and 8 microphones with software mixing (zones) is shown in the following figure

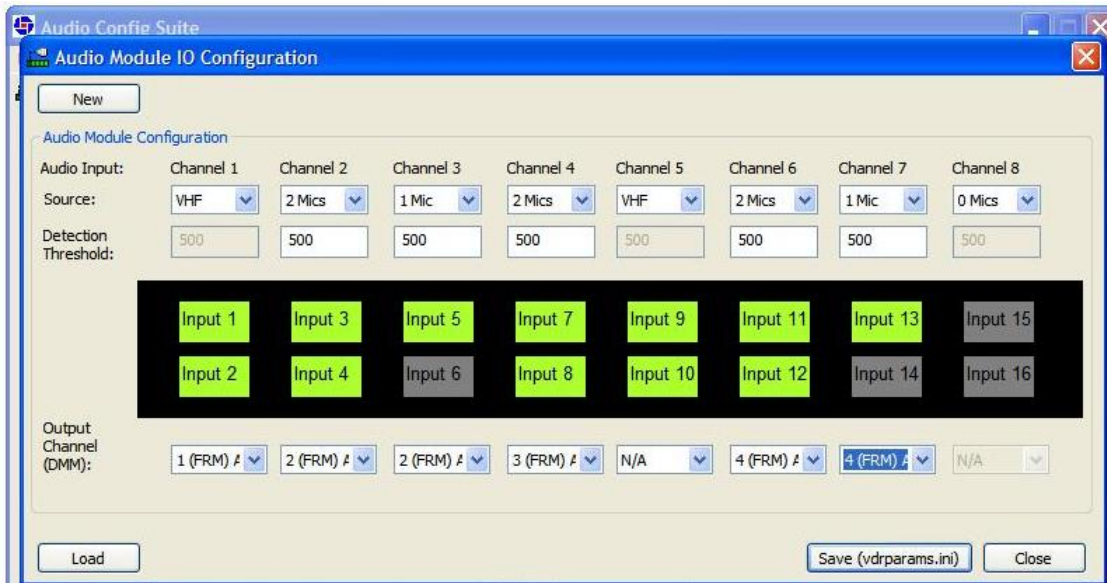


Figure 8-22 - Zones software mixing to send all audio source data to the FRM.

8.4.4.4 Detection Threshold Entry Field

In Figure 8-21 - Typical VDR configuration: Primary VHF, 4 bridge MICs, and 2 wing MICs. also shows a box provided to insert the calculated Detection Threshold value. Refer to *Section 8.4.66 – Detection Threshold* for instructions on calculating detection thresholds.

8.4.4.5 Audio Capture

To begin capturing and reviewing audio data, complete the following steps:

1. Open the AudioConfigSuite;
2. Select **Multiple Waveforms** (if not already visible) from the View Menu as seen in *Figure 8-23 - Using the audio analysis tool to select Multiple Waveforms*;
3. Enable **Audio Capture** from the Audio pull down menu as shown in *Figure 8-24 - Enable Audio Capture*.
4. Observe a histogram (oscilloscope) view of each active source.

8.4.4.6 Audio Recording and Analysis

Audio data can be recorded in the AudioConfigSuite application and played back independently for each channel.

1. Ensure that **Capture** is NOT turned on;
2. Select **Enable Recording Mode** from the Audio pull down menu shown in *Figure 8-24 – Enable Audio Capture*;
3. Set the recording time:
 - Select **Settings** from the Audio pull down menu, and
 - Under **Capture Settings**, change the **Recording Time** to the new recording time in seconds.

NOTE: The default recording time is 60 seconds

4. Select **Enable Capture** from Audio menu;
 - Allow each channel to record data until it reaches the set recording time (e.g. 60 seconds of data);
5. Disable Audio capture when the required data is captured;
6. Click the desired Channel Tab to select the channel (selected channel tabs are blue);
7. Click the green **Play** button on the toolbar to begin channel playback;
8. A vertical line scrolls across the channel to indicate the playback position;
9. Click the red **Stop** button on the Toolbar to stop playback;
10. To play data on another channel, repeat steps 7 through 10 above.

For live playback of all channels:

1. Disable Audio Capture;
2. Disable Recording Mode;
3. Select **Launch AudioConfigSuite v4.0.1.7** from the Window pull down menu. This will prompt a dialog and begin a previous version of the AudioConfigSuite which will appear in the Desk Top task tray of the PC running the Configuration Suite.
4. Click the task tray icon
5. Select **Live Playback**.
6. Select the check the boxes for the channels you want to hear;
7. Click the task tray icon;
8. Select **Analyze Audio** to display the **Audio Analysis** window.
9. Click the task tray icon;
10. Select **Capture Audio** to begin audio capture;
11. When done listening to live audio, click the **Ok** button to close Audio Analysis;
12. Click the task tray icon;
13. Select Capture Audio again to stop audio capture.
14. To close **AudioConfigSuite v4.0.1.7** click the task tray icon and select **Terminate**.

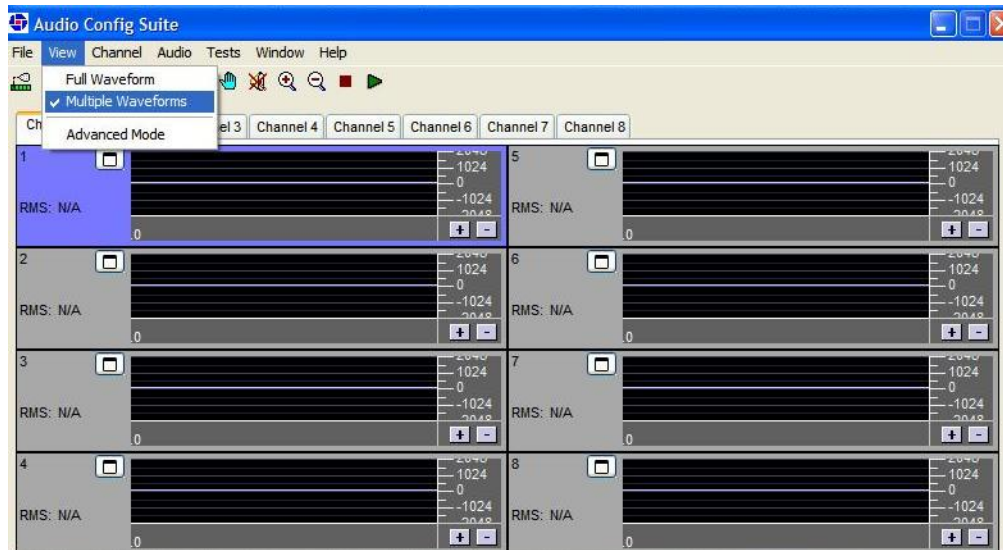


Figure 8-23 - Using the audio analysis tool to select *Multiple Waveforms*

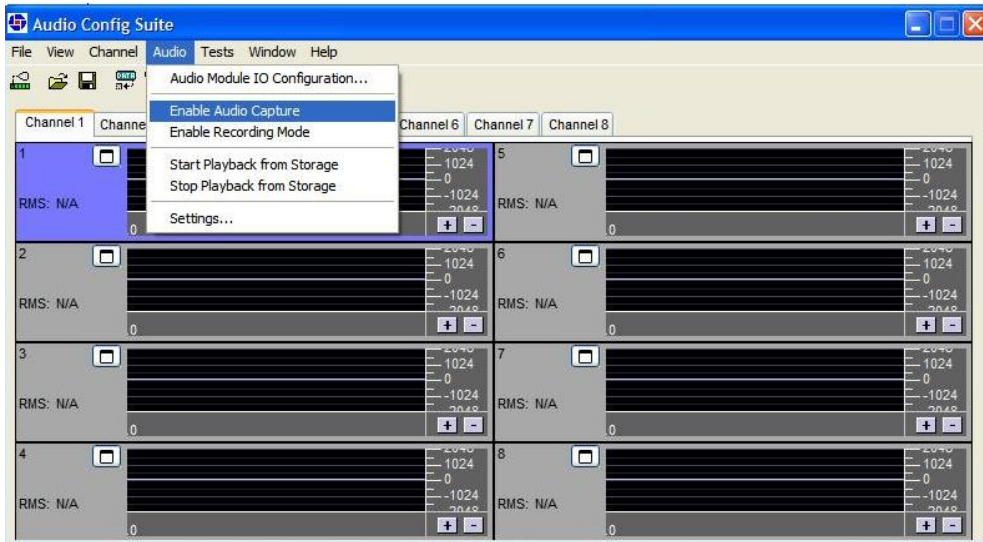


Figure 8-24 - Enable Audio Capture.

8.4.5 Manual Audio Configuration

The Audio Diagnostics application is the most effective way to configuring the VDR's audio information, but this audio information can also be manually configured.

8.4.5.1 Testing Microphones

The VDR automatically performs a microphone **self-test routine** soon after the Record Application is started up. The service technician may also force an audio self-test to be performed when the Record application is in either the Audio Test Mode or the Record mode.

1. Under the **Tests** menu, select **Buzzer Tests** as shown in Figure 8-25 – Select Buzzer Tests;
2. In the Buzzer Tests window choose a single buzzer test selection OR Repetitive Buzzer Test selections as per Figure 8-26 - Select Buzzer.

NOTE: The Buzzer Test window includes a slider control to adjust the buzzer/chirp length from its standard length of 30 ms. Rutter recommends that this setting be maintained. Changing this setting can interfere with MIC test operation. For example, the software will hear a 100 ms buzzer/chirp as high background noise and abort audio tests.

3. When valid Detection Threshold values are set and the Audio I/O Configuration is satisfactory, a full microphone test can be performed. Under Buzzer Tests, select Perform Full MIC Test to open the Log Window seen in Figure 8-27 -.Microphone Test Log Window. It shows the status of the Full MIC test.
4. Copy this log window to the clipboard as documentation.
5. For information on determining the correct detection threshold see Section 8.4.6 – Detection Threshold for sample calculations.

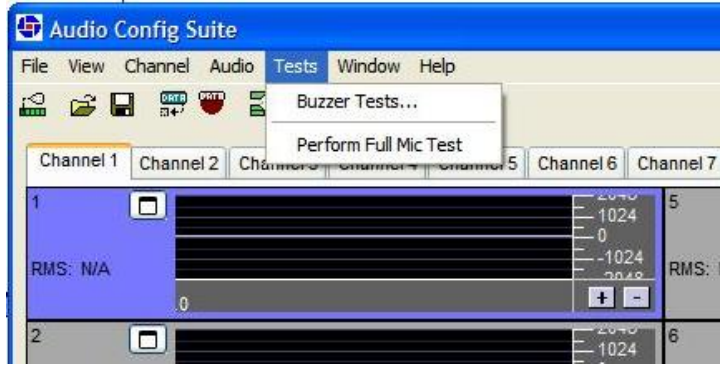


Figure 8-25 - Select Buzzer Tests

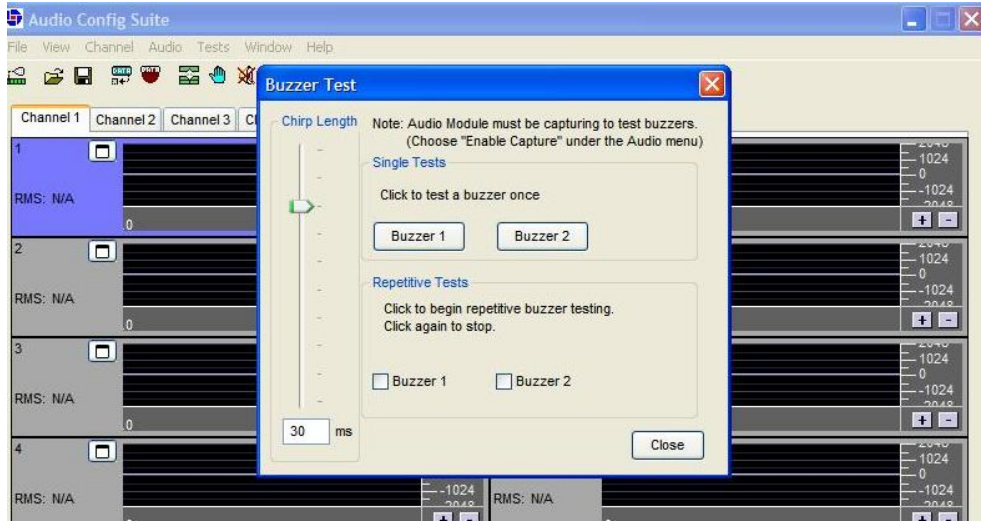


Figure 8-26 - Select Buzzer.

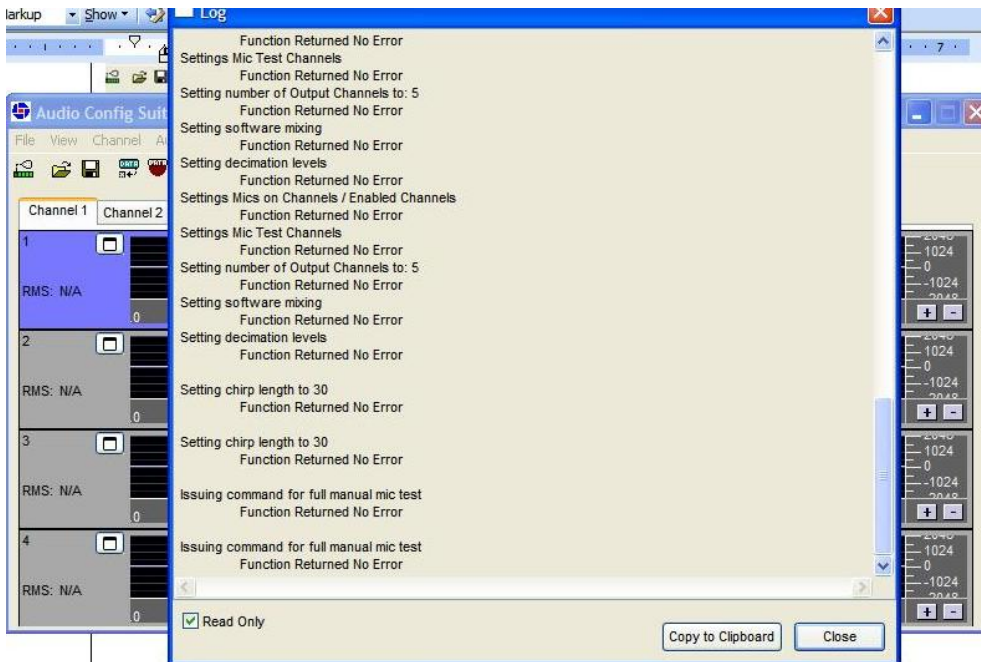


Figure 8-27 -.Microphone Test Log Window

A *Perform Full MIC Test* can be selected within the AudioConfigSuite utility under the *Tests* menu. Numerous entries in the INI file are used to configure this process. During self-testing, the system will:

- Generate a tone from each microphone's buzzer;
- Receive it on the microphone; and
- Detect this tone in the captured data block.

The VDR-100G3 will perform self-testing of all microphone ports identified in the MikesOn MixerX parameter of the INI file. For each 2-channel microphone port a “chirp” or buzzer test will be performed on all buzzer block 1 microphones (ALL of the top channel inputs such as 3, 5, 7, 9, 11, 13, 15) followed by a test of the buzzer block 2 microphones (ALL of the bottom channel inputs such as 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 microphone on each channel is tested simultaneously. Each audio input channel (except the VHF channels) has its own detection threshold, which is loaded from the INI file via the **DetectionThreshold1**, **DetectionThreshold2**, **DetectionThreshold3**, **DetectionThreshold4**, **DetectionThreshold5**, **DetectionThreshold6** parameters and so on.

To calculate the Detection Threshold, see *Section 8.4.6 - Detection Threshold*,

8.4.6 Detection Threshold



NOTE: *Microphone testing requires careful planning. The Bridge Audio test must be done during a quiet time on the bridge to prevent noise interference with the voice recording. Such interference may make the test useless if the noise levels are not normal for the bridge.*

The **Detection Threshold** level is a test value and does not have an affect on the level of the audio recorded. It is used as a baseline for 2 measurements during the audio self-test.

1. The first measurement determines the average noise level.
2. The second measurement is for the detected microphone chirp or buzzer level—above the detection threshold value—to determine if the microphone detected the buzzer.

8.4.6.1 Record Application – Log Window



NOTE: *The Log Window will only display audio channels enables in the <vdrparams.ini> file. The Audio data window will display an audio histogram showing only the Audio channels enables*

Example 1

During a buzzer1 audio test, the Log Window will read similar to the following:

```
Mike 1 test – chirp detected on channel 2 – 869.459 (359.906)
Mike 1 test – chirp detected on channel 3 – 869.459 (359.906)
Mike 1 test – chirp detected on channel 4 – 869.459 (359.906)
Mike 1 test – chirp detected on channel 6 – 1169.459 (659.906)
```

And during a buzzer2 audio test, the Log Window will read similar to the following:

```
Mike 2 test – chirp detected on channel 2 – 855.059 (359.022)
Mike 2 test – chirp detected on channel 3 – 869.459 (359.022)
Mike 2 test – chirp detected on channel 4 – 869.459 (359.022)
Mike 2 test – chirp detected on channel 6 – 1290.459 (659.022)
```

Example 2

The Audio Module has the following connections:

Channel 1 = VHF
 Channel 2 = Mic1, Mic2 (Fwd Bridge mics)
 Channel 3 = Empty
 Channel 4 = Mic 3, Mic4 (Wing mics)
 Channel 5 = Empty
 Channel 6 = Mic 5, Mic 6 (Aft Bridge mics)
 Channel 7 = Mic 7 (Radio room)
 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 buzzer1 audio test, the Log Window will read similar to the following:

```
Mike 1 test – chirp detected on channel 2 – 869.459 (359.906)
Mike 1 test – chirp detected on channel 3 – 1269.459 (659.906) (Note: is actually CH4)
Mike 1 test – chirp detected on channel 4 – 869.459 (359.906) (Note: is actually CH6)
Mike 1 test – chirp detected on channel 5 – 869.459 (359.906) (Note: is actually CH7)
```

And during a buzzer2 audio test, the Log Window will read similar to the following:

```
Mike 2 test – chirp detected on channel 2 – 869.459 (359.906)
Mike 2 test – chirp detected on channel 3 – 1269.459 (659.906) (Note: is actually CH4)
Mike 2 test – chirp detected on channel 4 – 869.459 (359.906) (Note: is actually CH5)
```



NOTE: If a **ChannelEnabled** field is not enabled (=0), 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.

8.4.6.2 Microphone Self-Testing

Every 12 hours VDR Record application performs microphone self testing to determine if the VDR is recording audio from the microphones. An explanation of the self-test procedure is as follows:

- The buzzer 1 bank of the audio module is activated and all buzzers connected to this bank are turned on.
- Then buzzer 2 bank of the audio module is activated and all buzzers connected to bank 2 are turned on.

Note! Each buzzer bank is energized for the period specified in the `vdrparams.ini` file – the **ChirpLength** field (*ChirpLength* is specified in milliseconds: default is 30).

- The RMS for the entire data record (1 second) for each input channel is computed;
- If the RMS value of this one second test period 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 buzzer chirp;
- The log window will show the test on that channel was aborted;
- If the test is not aborted, an RMS value is computed for each sub-interval;

Note! Each sub-interval is half the *ChirpLength* duration.

- If 1 or more of the calculated sub-intervals exceeds the detection threshold, the chirp is declared detected and the microphone operational;
- 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-100G3 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 1 microphone fails all self-test attempts, a Micxx Error alarm (E.g. Mic07 error) will be generated; and
- The alarm will not clear until all microphones have been successfully tested on that channel.

NOTE: If the **DetectionThreshold** value in the `<vdrparams.ini>` file is set too high, the chirp from the test source will not be detected and the test will fail resulting in a mic error message. If the **DetectionThreshold** is set too low the microphone test will be aborted. This will not create an error message but the microphone testing will be incomplete and will continue to retry every hour until the test is successful.

8.4.7 Microphone test

A microphone test can be manually performed within the VDR record application by a technician:

1. **Ensure the VDR_Record application is not recording;**
2. **Perform the test by starting an *Audio Test*, which creates an audio histogram in the audio data window (see figure below);**

NOTE: The audio histogram is divided into equal sections. The number of sections depends on the **NumOutPutChannels** field set in the <vdrparams.ini> file. Each section represents 1 second of audio for each **OutPutChannel** field. An audio “spike” may be observed in each Audio Output section if a buzzer chirp is detected on that channel (See Figure 8-28 - Channel 1, Mic 1 Test.)

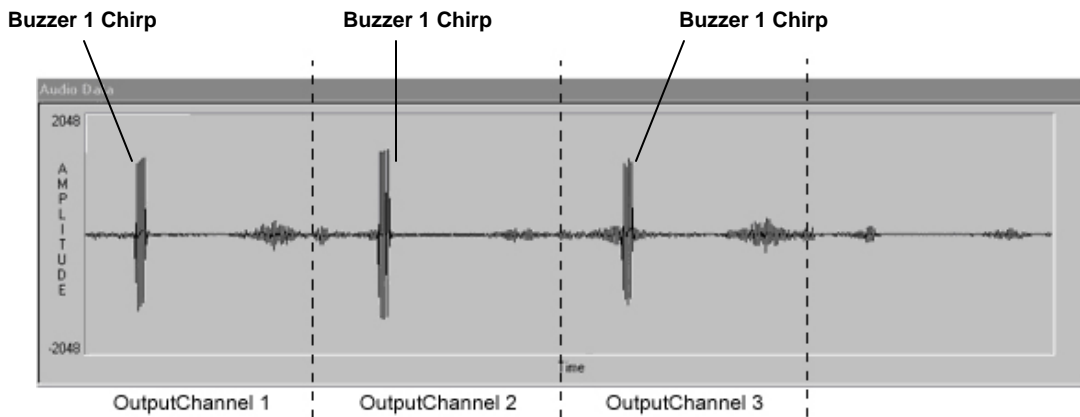


Figure 8-28 - Channel 1, Mic 1 Test



Note! The audio spikes shown in the audio histogram are related to the audio module channels **after** they have been software mixed via the *OutPutChannel* fields of the INI file (output audio). Spikes may exceed top and bottom of histogram screen.

3. **Activate a microphone test by selecting Test Mic X from the Audio A/D menu**
4. **Review the test results in the Log Window as illustrated in Figure 8-29 - Microphone Test Results.**

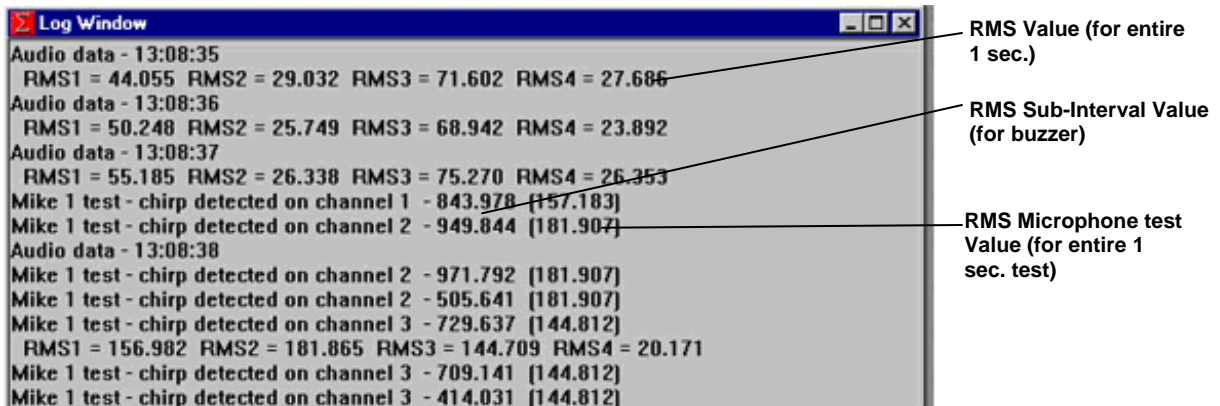


Figure 8-29 - Microphone Test Results

The RMS value is the calculated average noise for 1 second of audio data.

NOTE: Only RMS values for Audio Output channels are displayed in the log window.

The RMS Microphone Test value is the number in parentheses “()”. It is the RMS for the entire data record (1 second) during the microphone test.

The RMS sub-Interval value is the first number computed for a successful test.

NOTE: In Audio Test mode the RMS values scrolling in the Log Window are for output channels. During a successful microphone self test the RMS values for each input channel is displayed in the Log Window.

A successful test should show results similar to the following:

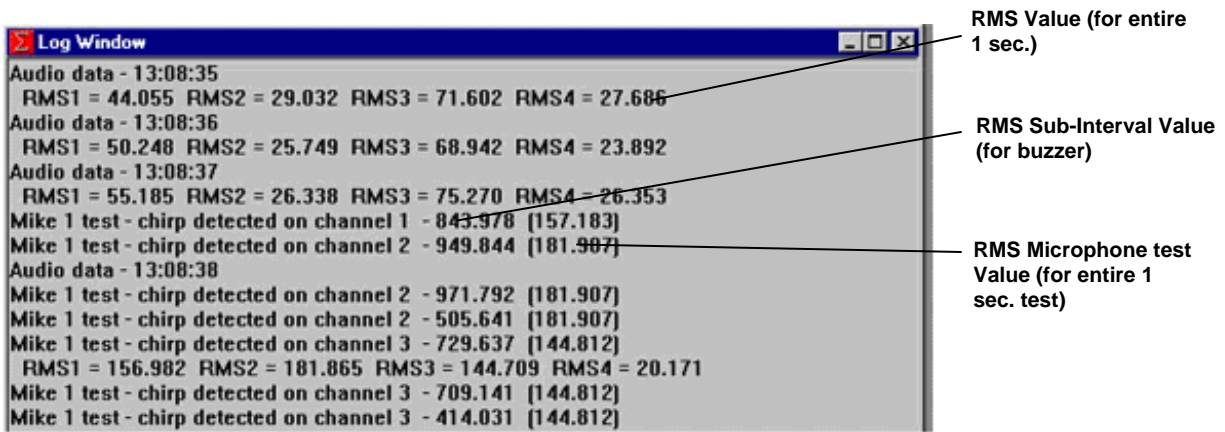


Figure 8-30 - Microphone Test Results

NOTE: A chirp not detected on channel X during a manually activated audio test 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 in this mode only; This will not display an error during the audio testing while in record mode.

5. Make note of the RMS Sub-Interval Value and RMS Microphone Test Value displayed when a chirp is detected;

For example for the audio input channels:

- Mike 1 test – chirp detected on channel 1 – 843.978 (157.183)
- Mike 1 test – chirp detected on channel 2 – 949.844 (181.907)
- Mike 1 test – chirp detected on channel 3 – 729.637 (144.812)



Note! If a manually activated 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

6. Repeat steps 2 through 5 for microphone 2 test. This will activate all Buzzer 2 connections on the Audio Module. Results similar to Test 1 should be observed;

- Mike 2 test – chirp detected on channel 1 – 863.978 (167.183)
- Mike 2 test – chirp detected on channel 2 – 939.844 (171.907)
- Mike 2 test – chirp detected on channel 3 – 759.637 (149.812)

7. **Deselect Audio Test from the Test menu of the record application. This stops the audio test;**
8. **Compare the mic test results for each channel;**
For example:
Mike 1 test – chirp detected on channel 1 – 843.978 (157.183)
Mike 2 test – chirp detected on channel 1 – 863.978 (167.183)
9. **Determine the highest RMS Microphone Test Value;**
For example:
Mike 2 test – chirp detected on channel 1 – 863.978 (167.183)
10. **Divide the RMS Microphone Test Value by 0.707**
For example:
 $167.183 / 0.707 = 236.47$



Note! The Detection Threshold Calculations are a guide to place the values within an operating range. It may be necessary to set the Detection Threshold levels higher **by adding 5 percent to the calculated value** to ensure successful test results.

11. Repeat the above steps for each channel requiring a detection threshold setting for a microphone.



Note! The audio testing procedure, and calculation of the detection threshold for each channel, should be repeated several times to ensure the results produce a consistent successful test result.

12. **Edit the value into the Open the <vdrparams.ini> file from the Windows desktop. as the value. Alternatively steps 10, 11 and 12 can be performed through the Audio Configuration Suite;**
13. **Scroll to the [AUDIO] section and edit the following settings for bridge audio testing configuration.**
DetectionThreshold1 = 500
DetectionThreshold2 = 500
DetectionThreshold3 = 500
DetectionThreshold4 = 500
DetectionThreshold5 = 500
DetectionThreshold6 = 500

NOTE: If it is necessary to set more than 6 detection thresholds then this is done by adding DetectionThreshold7 & DetectionThreshold8 lines in the INI file below DetectionThreshold6.

14. **Save the changes and close the <vdrparams.ini> file.**
15. **Select Audio Test;**
16. **Select “Perform Full Test” under the Audio A/D Menu;**
17. **The log window should display “Mike Test Performed Successfully”**



NOTE: If the bridge is extremely noisy, the test may not pass until after multiple retries. If the log **does not** display “Mike Test Performed

Successfully” then it is necessary to repeat the detection threshold calculation procedure.

18. When the detection thresholds are set correctly close the record application; and then

19. Commit these changes to the VDR by selecting the <Commit.exe> icon on the DMM’s desktop

NOTE: For a sample calculation of detection thresholds, see Section: 8.4.7.1: Sample Detection Threshold Calculations;

8.4.7.1 Sample Detection Threshold Calculations

This section provides an example for calculating detection thresholds for audio input channels. Below is an example of how to calculate detection thresholds.

NOTE: This example calculates the threshold for Channel 2 **only**. In order to correctly calculate all available channel detection thresholds, the steps provided below must be completed for each of the channels.

1. Conduct an audio test for each available microphone and record the results (it is common for each microphone to produce more than 1 result).
 - a. Mike 1 test – chirp detected on channel 2 – 971.378 (300.967)
 - a. Mike 1 test – chirp detected on channel 2 – 1081.232 (300.967)
 - b. Mike 1 test – chirp detected on channel 3 – 903.644 (261.255)
 - b. Mike 1 test – chirp detected on channel 3 – 943.323 (261.255)
 - c. Mike 1 test – chirp detected on channel 4 – 990.313 (316.459)
 - c. Mike 1 test – chirp detected on channel 4 – 922.433 (316.459)
 - a. Mike 2 test – chirp detected on channel 2 – 998.937 (321.623)
 - a. Mike 2 test – chirp detected on channel 2 – 1067.232 (321.623)
 - b. Mike 2 test – chirp detected on channel 3 – 956.135 (290.967)
 - b. Mike 2 test – chirp detected on channel 3 – 982.204 (290.967)
 - c. Mike 2 test – chirp detected on channel 4 – 1010.550 (324.374)
 - c. Mike 2 test – chirp detected on channel 4 – 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 Microphone Test Value

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

- b. Mike 1 test – chirp detected on channel 3 – 903.644 (261.255)
- b. Mike 1 test – chirp detected on channel 3 – 943.323 (261.255)
- b. Mike 2 test – chirp detected on channel 3 – 956.135 (290.967)
- b. Mike 2 test – chirp detected on channel 3 – 982.204 (290.967)

- c. Mike 2 test – chirp detected on channel 4 – 1010.550 (324.374)
- c. Mike 2 test – chirp detected on channel 4 – 1211.322 (324.374)
- c. Mike 1 test – chirp detected on channel 4 – 990.313 (316.459)
- c. Mike 1 test – chirp detected on channel 4 – 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 Microphone Test Value

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

For Channel 2, 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, note the lowest RMS Sub-Intervals for each channel:

RMS Sub- Interval / RMS Microphone Test Value

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

For Channel 2, 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 2 (971.378) is a higher value than the calculated Channel Detection Threshold (425.696), the calculated value is a valid Detection Threshold for Channel 2.

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

8.4.7.2 Test Bridge Audio with a Voice/Sound Check

Once the [AUDIO] configuration is completed verify that the audio inputs are being recorded correctly:

1. Record a short, live audio test;
2. Download the data; and
3. Listen to the audio quality of each audio output channel through playback software.



When recording audio for the audio test, it is important to speak clearly and in a normal tone of voice within a normal distance of each microphone. A good voice script includes the words “Testing Microphone (location)” followed by a voice count from 1 to 10), a reverse count back to 1, ending with the words “Test Out”.

The procedure for testing audio inputs is as follows:

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 location;
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 Client PC to download a small data set containing voice audio tests (For more information go to the *Operator’s Manual*, Chapter 4: Data Retrieval) for download instructions; and
7. Play back the data to ensure bridge audio was recorded properly.

NOTE: It is preferable to conduct the Bridge Audio test during a quiet time on the bridge to prevent noise interference with the voice recording. Such interference may invalidate the test if it is not normal for the bridge.

8.4.7.3 Test VHF Radios

To test the VHF audio, a short broadcast must be completed.



***NOTE:** When broadcasting on VHF, ensure that no transmissions are made that could be confused with anything other than a test transmission.*

The voice test should be performed from another VHF radio (VHF2) so that you are now testing the Rx signal recording of VHF1 and say the words “**Test VHF1 Receive**” 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”.

To test the VHF recording 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. A normal voice procedure is to say the words:
 - “**Test VHF1 Transmit**”
 - Count from 1 to 10 and reverse the count back to 1,
 - Finish the transmission with words “**Test Out**”.

***NOTE:** When transmitting, ensure that the VHF is switched to a channel that cannot be confused with any local distress or working frequencies*

5. Note test time.
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 Client PC containing transmit and receive VHF audio tests ((For more information go to the *Operator's Manual*, Chapter 4: 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.

It is advised that you combine live microphone sound/recording test with the VHF sound/recording test while you have all NMEA devices turned on as well as radar screen active (at least in STBY. Mode) so that your recording contains everything possible connected to the VDR. This practice is very good for commissioning and Annual Performance Test (APT) as well.

8.5 Audio Installation Examples

Provided below are 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 4 OutputChannel fields (OutputChannel1, OutputChannel2, OutputChannel3, and OutputChannel4) of the <vdrparams.ini> file are saved to the FRM. A user can enter a maximum of 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.

8.5.1 Microphone Installation - Sample One

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

*NOTE: In Figure 8-32 - 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 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.*

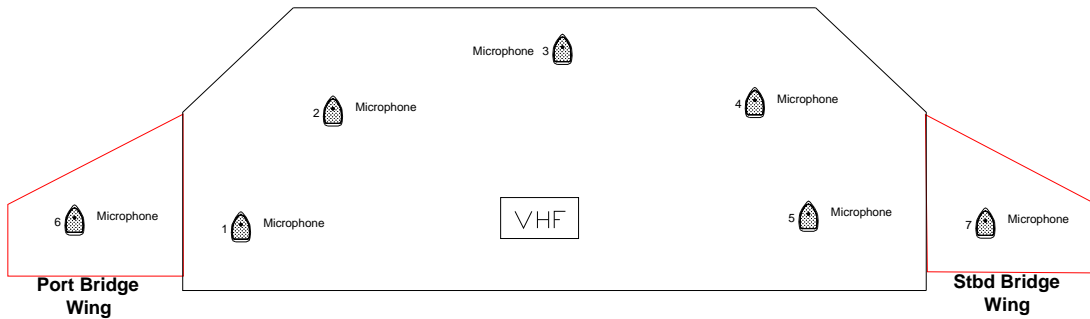


Figure 8-31 - Sample Mic Layout for Ship Example 1

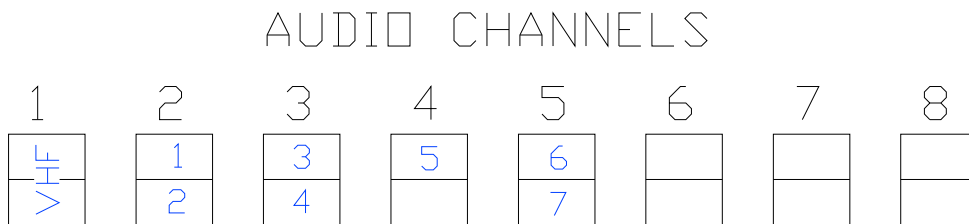


Figure 8-32 - Sample Audio Module Connections for Ship Example 1



Note! In this example, the vessel has only 1 VHF. Microphones are shown connected to Audio Module Channel #5, so that channel must be reconfigured for external outdoor microphone by assessing the internal processing board. The Phantom Voltage DIP-Switch and Jumper setting must be set to ON, and the resistance value of associated potentiometers (pots) must be adjusted down.

Microphone installation sample 1 steps:

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:

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) only 1 st 4 go to the FRM
OutputChannel1	1	
OutputChannel2	2	
OutputChannel3	3,4	
OutputChannel4	5	
OutputChannel5	5	Because the NumOutputChannels field has been specified as 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; this refers to the first mic channel. Here it is Channel 2.
MikesOnMixer2	2	
MikesOnMixer3	1	
MikesOnMixer4	2	
MikesOnMixer5	0	
MikesOnMixer6	0	
MikesOnMixer7	0	
MikesOnMixer8	0	
DetectionThreshold1	450	The test signal RMS must exceed this to be declared detected
DetectionThreshold2	450	
DetectionThreshold3	475	
DetectionThreshold4	475	
DetectionThreshold5	445	
DetectionThreshold6	445	
DetectionThreshold7	700	
DetectionThreshold8	700	
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 8-7 – Parameters for Microphone Installation Settings - Sample 1

3. Save the changes and close the <vdrparams.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 3 and 4 (containing input connections for microphones 3, 4, and 5) are mixed on OutPutChannel3.

8.5.2 Microphone Installation – Sample 2

Ship Sample 2 has 9 Internal Microphones installed on the bridge and 4 Internal Microphones installed in the engine room. There is 1 VHF source.

*NOTE: in Figure 8-34 - 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 4 interior microphones located in the engine room (10, 11, 12, and 13) are connected to Channels 7 and 8. Since the 4 engine room mics are **located in a separate section of the ship** from the 9 Bridge mics, they are not placed on the same channel as the Bridge mics.*

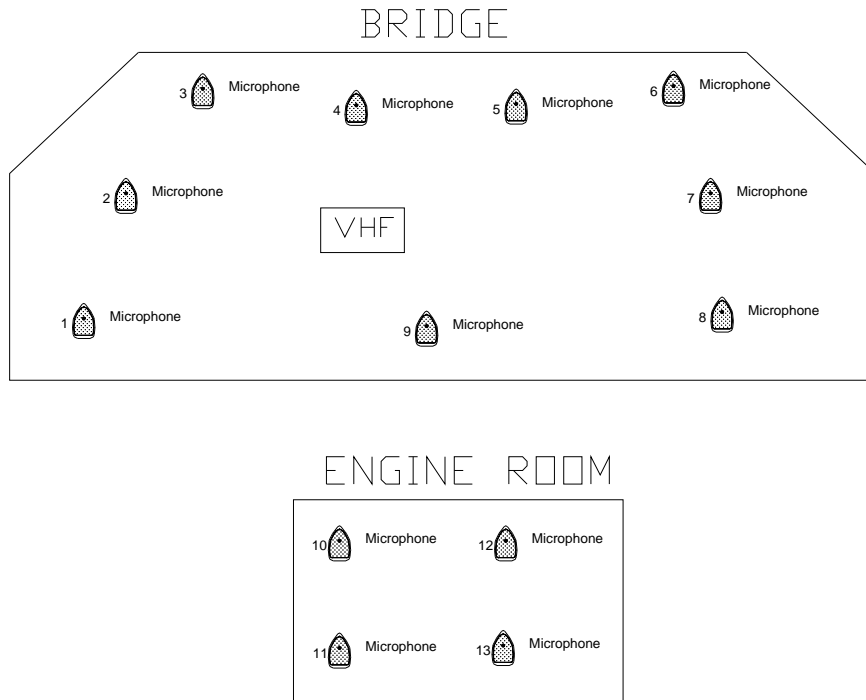


Figure 8-33 - Sample Mic Layout for Ship Example 2

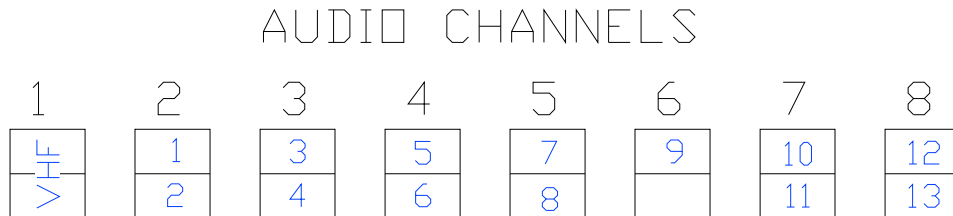


Figure 8-34 - Sample Audio Module Connections for Ship Example 2

Microphone installation sample 2 steps:

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:

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 channels to mix (max. 2 per channel) only 1 st 4 go to the FRM
OutputChannel1	1	
OutputChannel2	2,3	
OutputChannel3	4,5	
OutputChannel4	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; this refers to the first mic channel. In this example, it is Channel 2.
MikesOnMixer2	2	
MikesOnMixer3	2	
MikesOnMixer4	2	
MikesOnMixer5	1	
MikesOnMixer6	2	
MikesOnMixer7	2	
MikesOnMixer8	0	
DetectionThreshold1	300	The RMS of the test signal must exceed this to be declared detected
DetectionThreshold2	300	
DetectionThreshold3	300	
DetectionThreshold4	300	
DetectionThreshold5	300	
DetectionThreshold6	300	
DetectionThreshold7	450	
DetectionThreshold8	450	
ChirpLength	30	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 8-8 - Parameters for Microphone Installation Settings - Sample 2

3. Save the changes and close the <vdrparams.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. The engine control room mics are not recorded in the FRM BUT would be recorded on the DMM along with all other microphone data.



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

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Rutter VDR-100G3/G3S Installation Manual

Chapter 9: Video Module, Rev. 1.2

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9 VIDEO MODULE

9.1 Introduction

The **Video Module** captures RGB, RGBHV, Monochrome, and composite video information from radars, video cameras, ECDIS, and other video sources.

The Video Module has 4 input ports for capturing images from a dedicated buffered output port of the video source. Normally only the primary radar is recorded. The module digitizes the video signal and then outputs the video data through an Ethernet port. Video modules can be configured for 4 inputs, enabling the VDR-100G3 to capture and record images from the primary radar plus up to 3 additional video sources. During installation, the video system must be configured to accept each source's video resolution, interlacing, refresh rate, etc.

Refer to Chapter 2: Specifications for Video Module capture specifications.

Information is gathered from the <VidChanX.ini> file (based on its VIDEOFORMAT entry information.) If more than 1 source is specified by the MAXSOURCES entry, then Control Input/Output connector signals are used to indicate the currently active source. The video signal configuration is read and a new image is captured. If the system is configured for 2 or more video channels, then the next channel in the sequence is selected.



NOTE: If the video module fails to capture an image because there is no video signal (i.e., radar is OFF), an entry is made in the error log. However, this failure **will not generate a video error alarm on the OAU**. A video error alarm is **only triggered when a failure is detected in the video capture hardware (i.e. bad or unpowered video module or Ethernet cable path failure).**

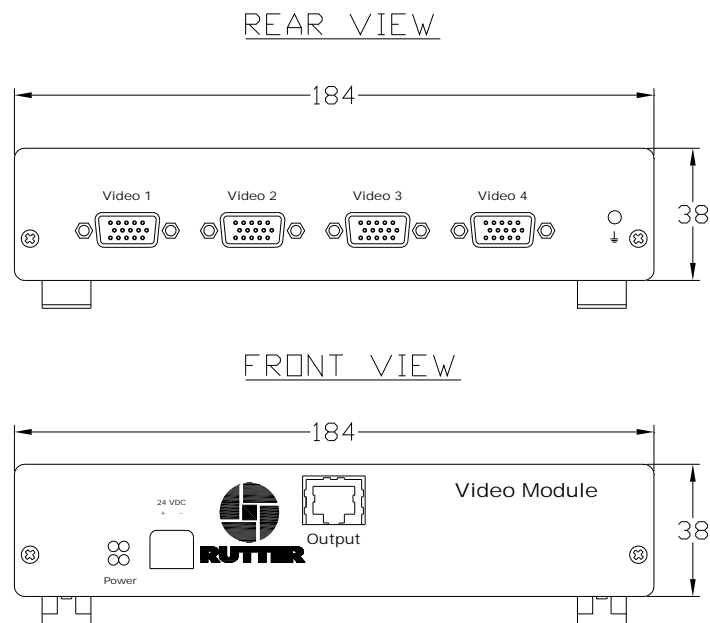


Figure 9-1 - Video Module

9.2 Video Module Planning

All VDR-100G3 and SVDR-100G3 installations include a single video module for capture of up to 4 video channels.

When only one video channel is connected to the video module, the module is often mounted in the bottom cabinet of the source radar. Many modern radar's offer their buffered video (VDR) signal via a standard VGA 15-Pin receptacle and in this case often only a simple (1 meter long) manufactured VGA cable assembly is required for connection.

In cases where the video module is not co-located with its video source the following video cable types are recommended to bridge the distance between video sources and the video module:

1. 75 ohm Coaxial cable - RG11 for cable lengths > 30m
 - a. Reference: FLAMEX RG11AU
 - b. Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant
 - c. Approval: ABS, BV, DNV, GL, LRS or RINA
2. 75 ohm Coaxial cable – RG6 for cable lengths < 30m
 - a. Reference: FLAMEX RG11AU
 - b. Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant
 - c. Approval: ABS, BV, DNV, GL, LRS or RINA
3. 75 ohm Coaxial cable – RG-59 for cable lengths < 10m

The above cables must be converted to a 15-Pin Male VGA Plug at the Video Module end using a manufactured BNC to VGA cable assembly and possibly BNC F/F Unions in order to connect to the Video Module input.



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

9.3 Video Module Mounting

The Video Module is designed to be mounted on two rows of 35mm “Top Hat” style DIN Rail available on the optional Rutter Data Acquisition Unit (DAU). If there is no DAU then, before the Video Module can be mounted, two strips of DIN Rail must be installed. The module is held in place with clips on the back.

NOTE: The DIN Rail is **NOT** supplied with the Video Module.

Figure 9-2- DIN Rail shows the typical dimensions of the DIN Rail required for mounting an external interface. It is acceptable to use a DIN Rail deeper than 7.5mm (15mm deep DIN rail is commonly available), but the 35mm width must be maintained.

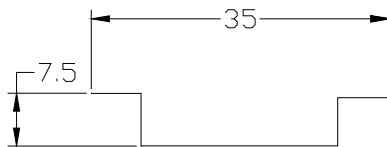


Figure 9-2- DIN Rail

SIDE VIEW

BOTTOM VIEW

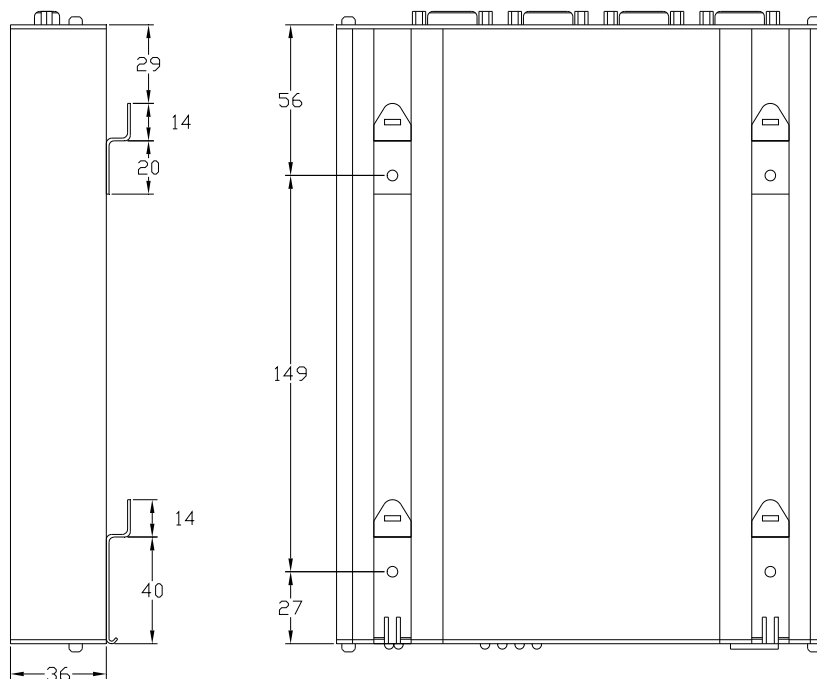


Figure 9-3 - Video Module DIN Rail Clips

Alternative mounting method would be to remove the 4 DIN Rail clips from the back of the Video Module and use 2 strips of high-quality heavy-duty Velcro (not supplied) to attach the Video Module to a clean and dry prepared surface within the radar cabinet.



Note! The Video Module must be grounded firmly to the ship using the ground stud on the rear of the module. This grounding must be done regardless of which mounting method is chosen by the installer.

9.4 Video Module Connecting

The Video Module is connected to the VDR-100G3 via an Ethernet cable and a DC power cable:

- The Ethernet communication output is connected via a crossover through Ethernet cable to the Video port on the Power Control Center located within the DPU.
- The DC power supply is provided by a connector next to the Video Ethernet port on the PCC. DC power is connected via 2 conductor power cables to the power input on the Video Module.
- All connection points are outlined in the following tables.

Video Module Front Panel Connection

Connector	Description
10-30 VDC+	Input power positive
10-30 VDC-	Input power negative
RJ45 connector	Ethernet Connection (UDP)

Table 9-1 - Video Module Front Panel Connection

Video Module Back Panel Connection

Connector	Description
Video1	Channel 1 Video DB-15HD input
Video2	Channel 2 Video DB-15HD input
Video3	Channel 3 Video DB-15HD input
Video4	Channel 4 Video DB-15HD input

Table 9-2 - Video Module Back Panel Connection

9.5 Video Module Configuring

The required video capture interval is 15 seconds (4 images per minute) for each video source. To determine the TransferRate divide 15 seconds by the number of video sources (i.e. when there are 2 video sources set the transfer rate in the *<vdrparams.ini>* file to 7.5 seconds to ensure that the primary video source is recorded every 15 seconds. A base VDR system has only one active video channel (CH-1), additional radar channels may be captured but must be enabled by a product key.

The 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 Phase Locked Loop (PLL) -generated pixel clock (or selection of an external clock); and
- The dimensions (number of samples and lines) of the captured frame.

The VDR-100G3 video capture can be configured using the VDR Params tab in the Video Configuration Suite (see Section 9.5.6: VDR Params Tab) or the video capture can be configured manually as follows:

- Manually edit the [VIDEO] section of the *<vdrparams.ini>* file located in the C:\Windows directory of the DMM to set up basic video information to reflect your installation;
- Edit the *<VidChanX.ini>* file for each video source found in the C:\VDRApps directory on the DMM to set up the video format and configuration (the VDR-100-G3 Video Configuration Utility known as VCS2 is used for this set up operation); and
- Test input sources first through Video Test within the Record Application and finally by viewing quality video during playback of downloaded data.

The <*vdrparams.ini*> file, located in the C:\WINDOWS directory on the DMM, must be edited to reflect the VDR's video configuration. 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 1 video source, 7500 for 2 video sources, 5000 for 3 video sources, 3750 for 4 video sources);
 - c. **blocks** – images to be stored in each 1-minute block (4 * **numSources**);
4. Save and close the <*vdrparams.ini*> file.
5. Select the **Commit.exe icon** on the DMM's desktop to save settings and reboot
6. The VDR will restart in MyUser mode with the VDR_Record application running.

Refer to the <*vdrparams.ini*> appendix of this document for a complete listing of video parameter settings and their respective descriptions.

9.5.1 Video Channel Configuration File

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

Manual editing of an existing <*VidChanx.ini*> file is generally not done unless the file fails to provide an adequate initial capture. This may be the case whereby a <*VidChanx.ini*> file is copied/supplied from a previous successful radar connection and the file fails to provide an adequate image capture on a new connection of the same type of radar.

Below is a list of the contents within a <*VidChanx.ini*> file and their meaning.

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 < <i>VideoConfigSuite.exe</i> >
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 9-3 - CLOCK Parameters

Parameter	Typical Value	Remarks
HPOL1	1	0 or 1. HSYNC Polarity - Changing this value will increase margin at the left of the image - Choose the value which produces the widest margin, and then adjust with XDim1
VPOL1	1	0 or 1. VSYNC Polarity Captured images will not be rectangular if 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 9-4 - SYNCS 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 9-5 - VIDEO Parameters

9.5.1.1 Customize Entries in the VidChanX.ini Files

Each entry in the <VidChanX.ini> file indicates the voltage level, timing, and signal characteristics of the video source. The values generated by Video Configuration Utility (VCS2) are based on VESA and Industry Standards and are adequate in order to capture initial images.

If a video capture does not initiate, the most likely reason is that the VPOL1 field may be set wrong. The Video Configuration Utility (VCS2), if provided with a channel number, 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 proper video alignment.

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

9.5.2 Video Configuration Suite (VCS2) Application

The Video Configuration Suite (VCS2) application is used to detect and adjust images to be captured by the Video Module. It has a built-in AutoDetection routine which detects many of the necessary parameters for the <VidChanX.ini> files. Existing <VidChanX.ini> files can also be directly modified within this application.

The executable file is located in both C:\VDRApps directory and on D:\drive and should be set to run on the DMM's D:\drive to avoid virtual memory problems. Select the **VCS2.exe icon** available in the following path on the DMM: Start>All Programs>Utilities to open the application.



Note! Prior to starting the VCS2 application, the VDR_Record application MUST BE STOPPED and CLOSED.

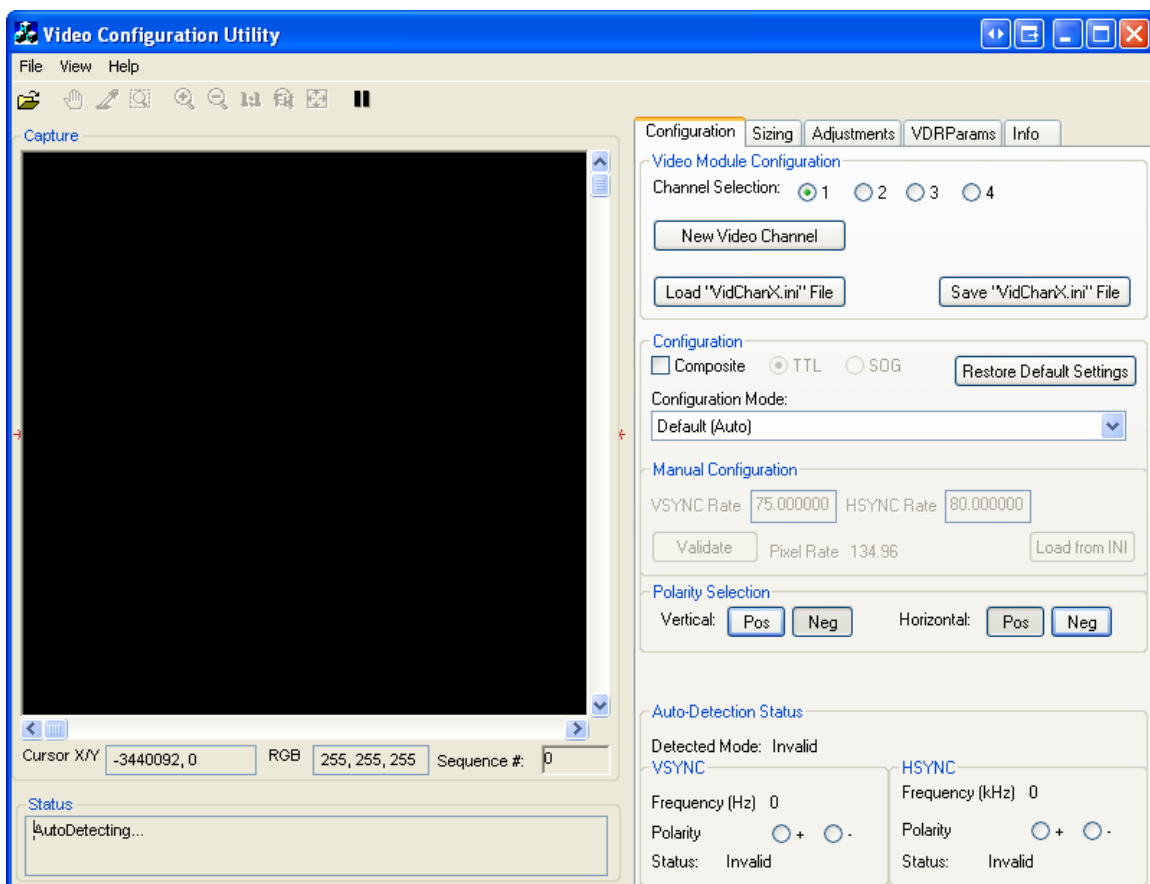


Figure 9-4 - Video Configuration Utility User Interface

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.

9.5.2.1 Video Capture

The Video Configuration Utility automatically attempts to detect the video input on channel 1. To change the channel selection, click the radio button next to the number of the desired channel.

To create settings for a new channel click the New Video Channel button. If the channel uses Composite Syncs, select the “Composite” check box and use the associated radio buttons to indicate whether the composite sync is:

- On a separate TTL output; or
- SOG, Encoded in the input on the video channel.

To reset all settings for the current channel, click the “Restore Default Settings” button. If the auto detection is successful the image will be displayed in the Capture area, and the Auto-Detection Status configuration data fields will display the appropriate information.

If the auto detection fails, the capture must be manually configured.

1. Select a different Configuration Mode from the Configuration Mode drop list;
2. If you know the values of VSYNC and HSYNC, select Manual Configuration mode (The fail safe modes may help if you are unsure of the VSYNC and HSYNC rates.);
3. Enter the VSYNC and HSYNC values;
4. Press Validate.
5. To load from a previous <VidchanX.ini> file,
 - a. Select Manual Configuration mode; and
 - b. Press the “Load from INI button” and select the desired file.

Once an initial image has been captured (either through Auto-Detection or Manual Configuration mode), go to Section 9.5.2.2: *Horizontal Polarization* to continue setup.

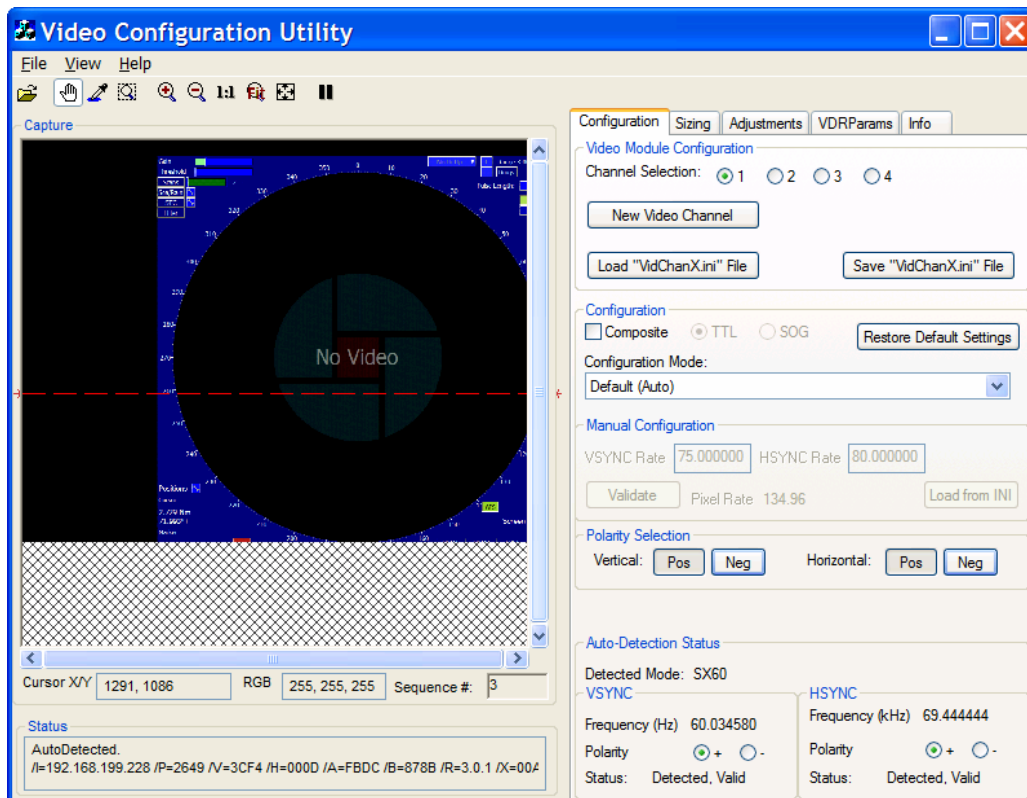


Figure 9-5 - Successful auto detection

9.5.2.2 Horizontal Polarization

The Horizontal Polarity setting is used to set the most possible black space to the left of the captured image. Complete the following steps to establish the correct Horizontal Polarity setting:

1. Click the Video Configuration Utility's tab **Configuration** to open the **Configuration** page
2. In the **Polarity Section**, select the other **Horizontal** button available either Positive or Negative and then,;
3. Note the width of black space visible in the Image window on the left side of the image;
4. Select the setting either Negative or Positive in the Horizontal section which provides the most amount of **black** to the left of the image and leave it on this setting.

9.5.2.3 Vertical Polarization

Use the Vertical Polarity setting to correct skewed images.

Upon initial capture, the image should appear with sides at perfect right angles to each other (similar to image #1 below). If it is vertically skewed (similar to Figure 9-6 – Correct vertical polarity on left. Vertically skewed image on right. below), Vertical Polarity must be adjusted.

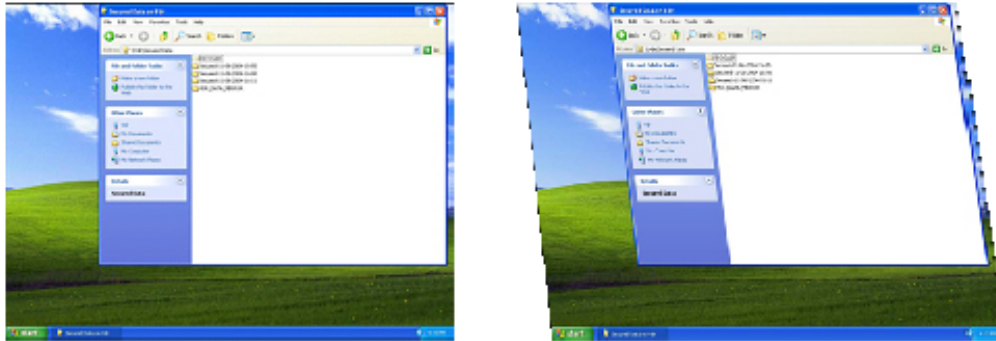


Figure 9-6 – Correct vertical polarity on left. Vertically skewed image on right.

Once the image has been captured, complete the following steps to correct the vertical polarity setting:

1. If the image appears skewed, select Pos in the **Vertical Section** of the Polarity Selection;
2. If the skewing is not corrected, select Neg in the **Vertical Section** of the Polarity Selection;
3. Note which setting establishes a correct image with sides at right angles to each other.

9.5.3 Sizing

To capture the entire image, the image size and offset values must be adjusted using the controls under the **Sizing** tab. When adjusting the sizes, remember that a proper capture should fill the Capture window and keep all 4 edges of the image within the Capture window.



Important! It IS NOT mandatory to adjust the captured image so that it completely fills the entire capture window.

The image should be adjusted so that it is as **close as possible to the top and left edges of the capture window** to set the least amount of black space on the right and bottom of the capture window.

9.5.3.1 Horizontal/Vertical Offset

First, adjust the Horizontal and Vertical offset:

1. Press the “Start” button in the **Horizontal/Vertical Offset** section on the Sizing tab page.
2. This will display the following warning:

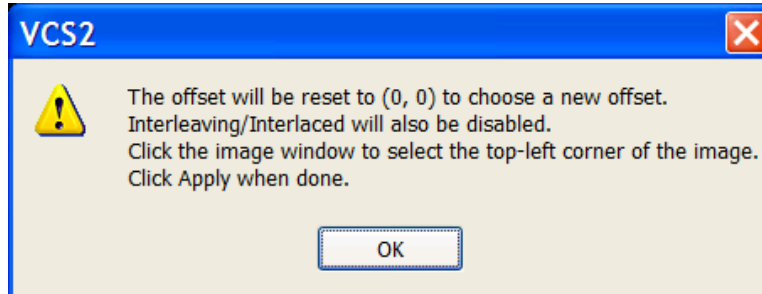


Figure 9-7 - Offset Adjustment Warning

3. Click OK, and follow the instructions below to select the offset position;

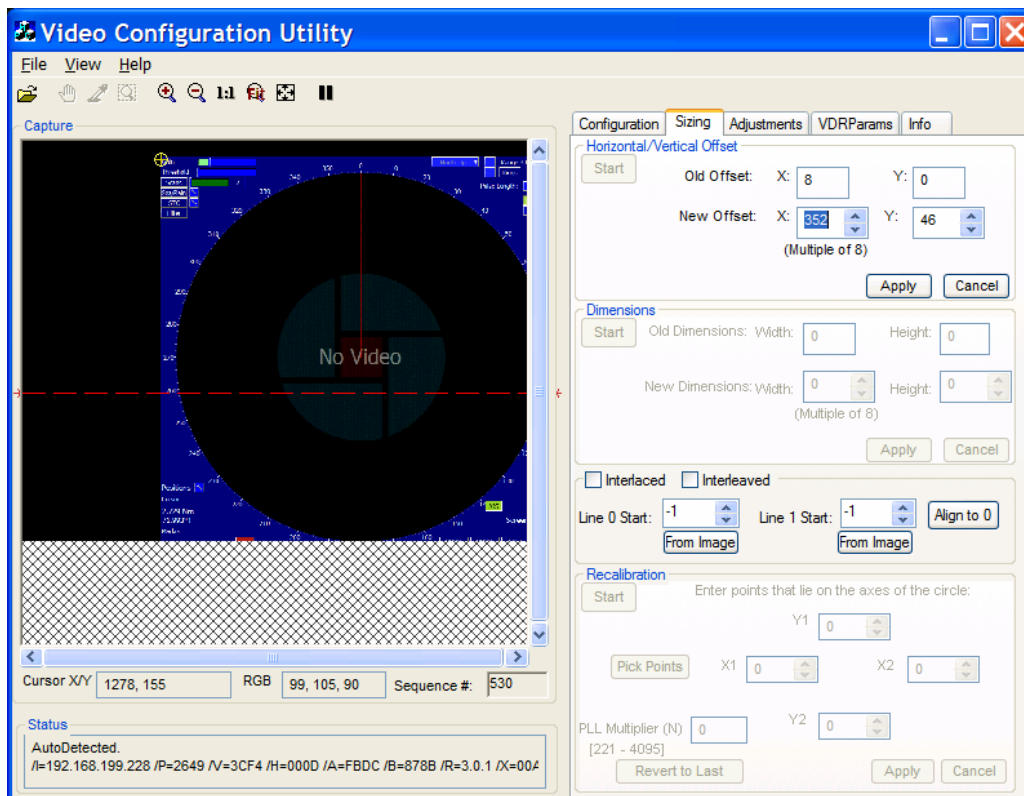


Figure 9-8 - Selecting the image offset

4. Position the cross-hair on the top-left corner of the image by clicking on the top-left corner of the image in the Capture window. Horizontal and vertical values (co-ordinates will display in the Capture window.
5. You may also adjust the position of the cross-hair by changing the New Offset text entry boxes for the X and Y values in the Horizontal/Vertical Offset section of the Sizing page;

NOTE 1: Horizontal X Offset must be a multiple of 8. It is recommended to leave a small amount of black space to help determine RGB settings.

NOTE 2: Use the Zooming and Panning/Scrolling options to ensure the corner of the image is placed as close as possible to the top left of the Capture window.

6. Click the **Apply** button in the lower right hand corner of the Horizontal/Vertical Offset section;
7. The image will automatically re-adjust.

NOTE: The "Sequence #" field under the Capture window will be red until the adjusted image is updated for the new setting.

9.5.3.2 Dimensions

If part of the image is not visible in the Capture window after it is moved to the upper left corner, it may be necessary to adjust the image height and/or width. To adjust the image size:

1. Click the “Start” button on the **Dimensions** section of the **Sizing** page;
2. The following warning will be displayed;

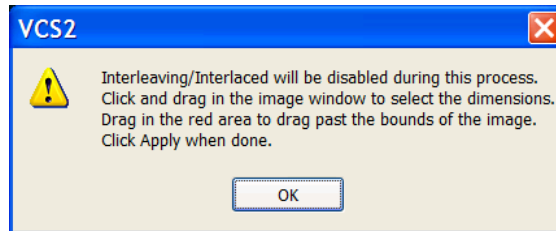


Figure 9-9 – “Adjusting the Image Size” Warning

3. Click **Okay** and the captured video image will appear as in Figure 9-10 - Setting the dimensions:

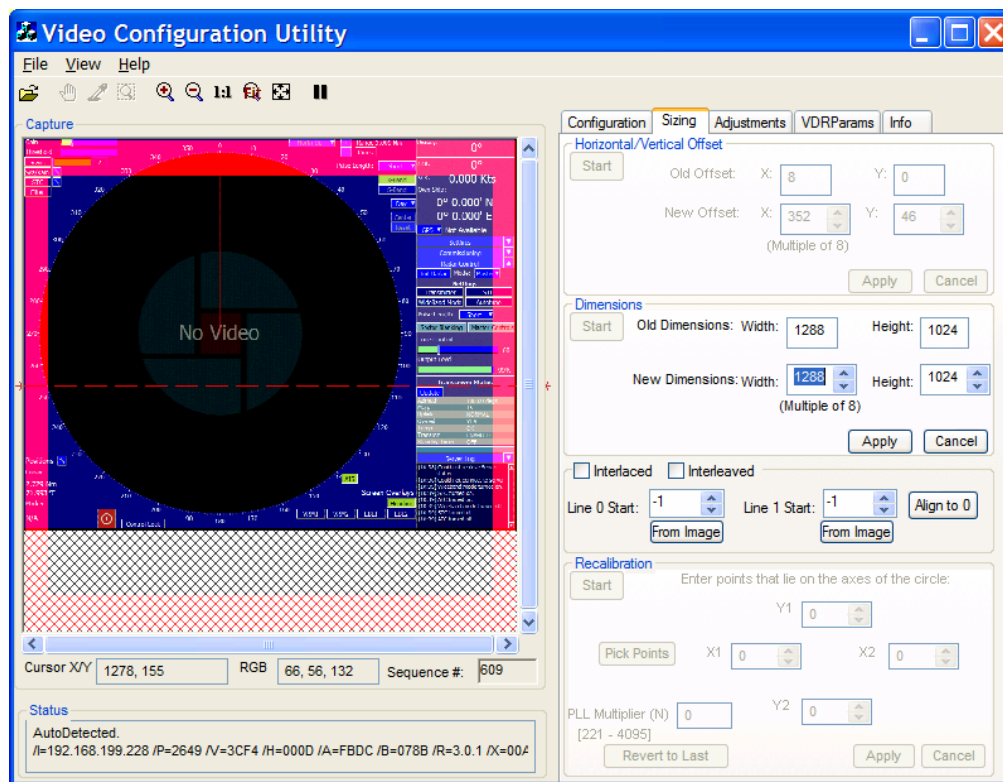


Figure 9-10 - Setting the dimensions

4. Click and drag the cursor on the image to reveal a rectangle that defines the image size;
5. Click and drag the rectangle in the red transparent area;
6. Pan the image outside the current viewing area to select a larger size;
7. Alternatively, enter a Width and Height number by::
 - a. Entering the desired width in the **New Dimensions: Width** scroll box (Must be multiple of 8),
 - b. Entering the desired height in the **New Dimensions: Height** scroll box;
8. Click the **Apply** button in the lower right corner of the Dimensions section.
9. The “Extents Changed” dialogue box confirms that the image size is adjusted;
10. Click “OK”.

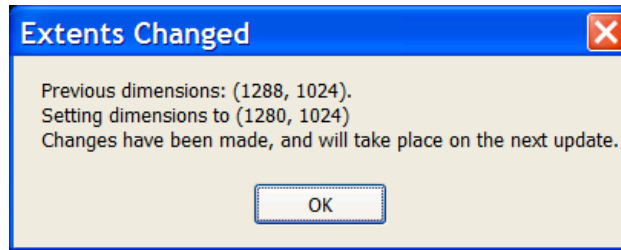


Figure 9-11 - Image Dimensions Ajustement confirmation

9.5.3.3 Interlaced Image

A video source may provide a captured interlaced image like the one below. The captured image appears vertically 2 or 3 times within the **Capture** window. To adjust a captured interlaced image, complete the following steps:

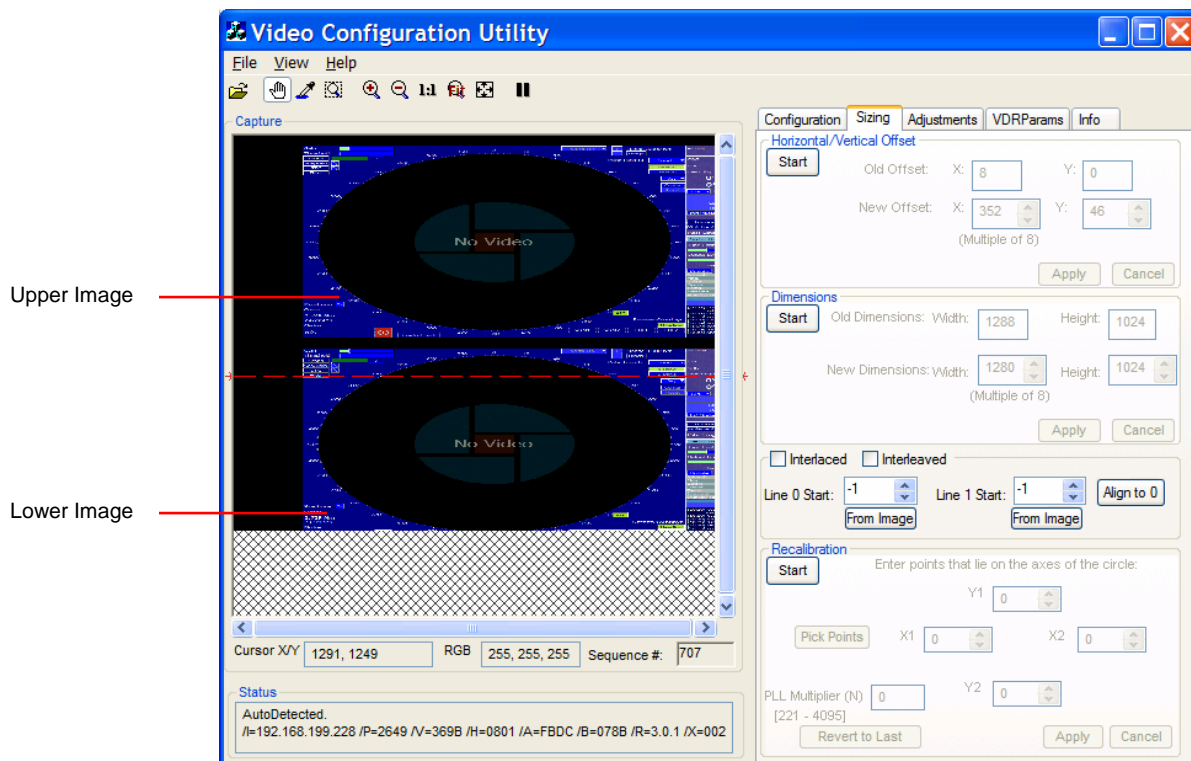


Figure 9-12 - Interlaced image

1. On the **Configuration Page**; set the Vertical Polarity to the same setting (negative or positive) as indicated in the **Auto-Detection** Information Box.
2. Repeat for the Horizontal Polarity setting.
3. If either Polarity is different, change them to the setting indicated in the Auto-Detection Information Box (for example, if the Auto-Detection indicated the Vertical Polarity is negative ensure it is set to negative once the image has been captured.)
4. If the images captured are not fully visible, then the image height must be adjusted.
 - i. Click the Sizing tab to open the Sizing page;
 - ii. Click the Start button in the Dimensions section;
 - iii. Increase the image height to make this lower image visible;
 - iv. Adjust the Image Dimensions as written above; and
 - v. Adjust the height as necessary.

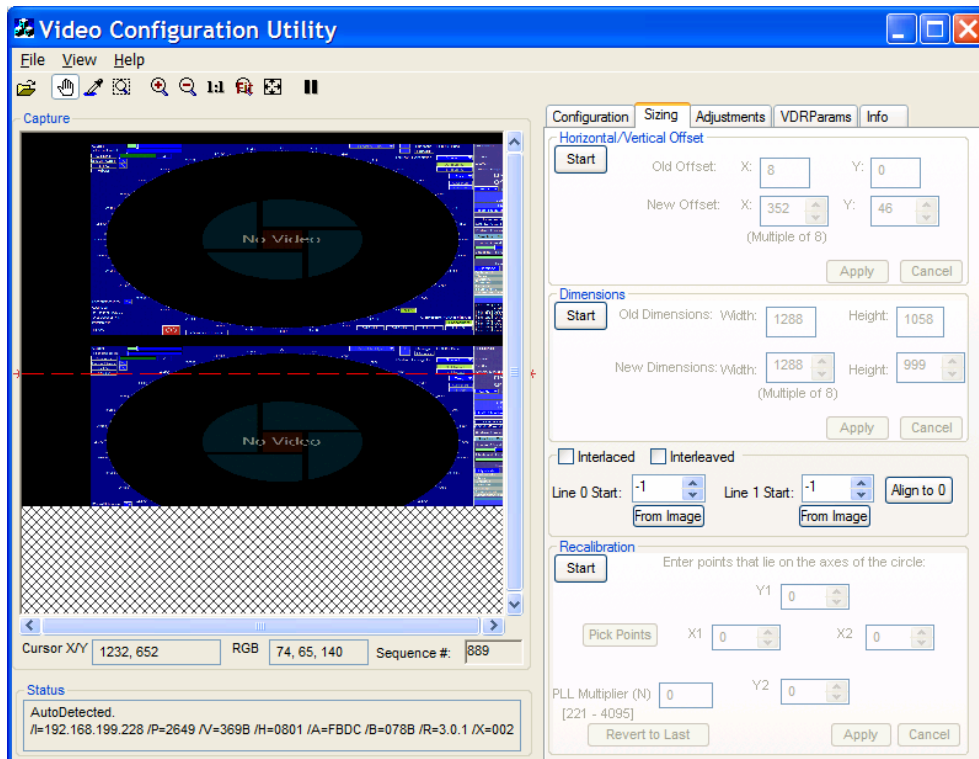


Figure 9-13 - Interlaced image with height too small

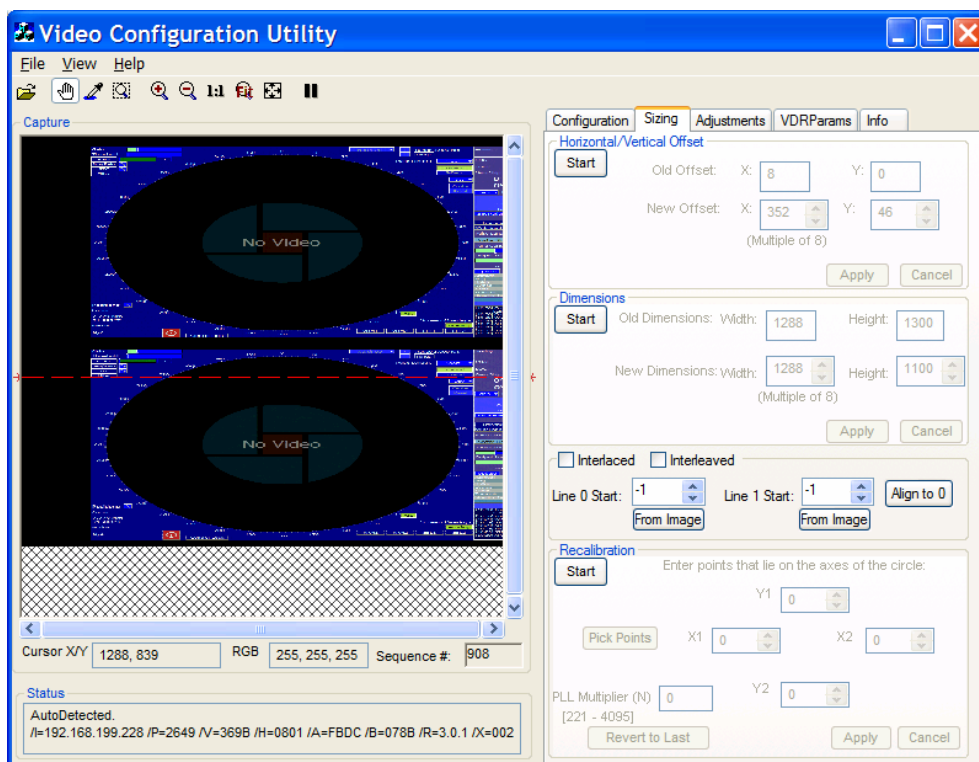


Figure 9-14 - Interlaced image with height set properly

- Once the images are entirely visible; Ensure a small amount of black space still appears at the top of the Capture window to allow for further adjustments. To increase the amount of black space at the top of the Capture window:

- a. Click the Start button in the Horizontal/Vertical Offset section of the Sizing page;
- b. Decrease the Vertical Offset.

NOTE: In most cases, the Vertical Offset value will only need to be decreased slightly (for example, if the setting is 24 adjust to 16.);

6. Zoom in on upper image using Zoom in toolbar button OR View\Zoom In menu item;
7. Use the scrollbars to pan the image and find the top edge of the first image;
8. Click the **From Image** button under the **Line 0 Start** scroll box,
9. A message will allow user to click a point to find the top edge of the image.
10. Once the top edge of the image is found, scroll down to the lower image
11. Locate the top edge of the second image using the same process; however click the “From Image” button in the Line 1 Start section instead for the bottom image.

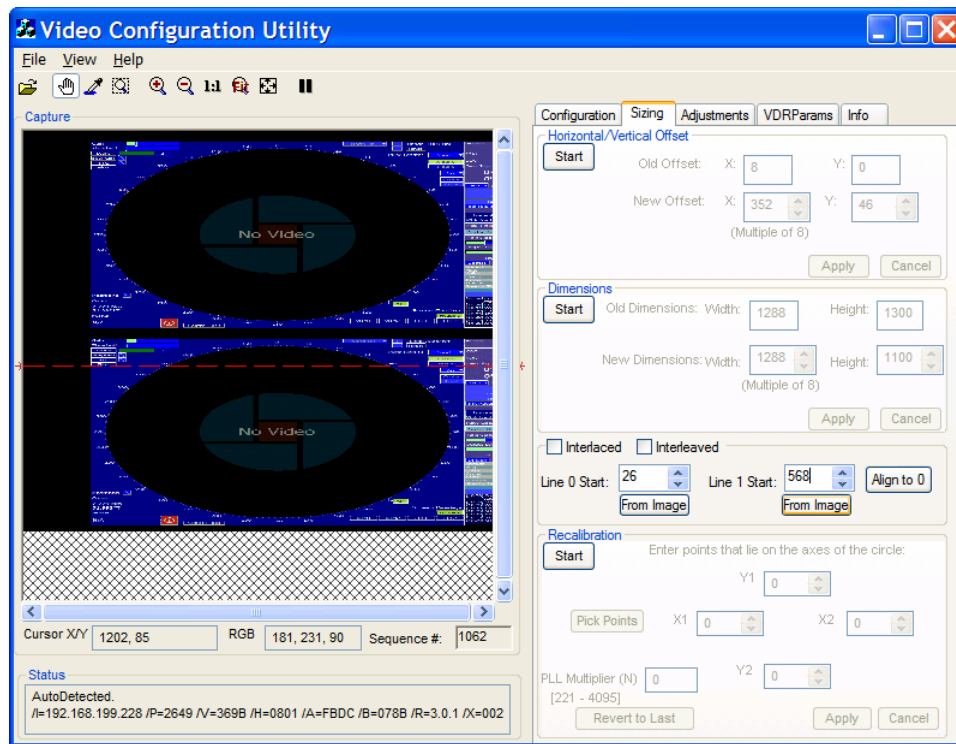


Figure 9-15 - Interlaced values chosen

12. The image values have now been set;
13. Click the **Interlaced** checkbox on the Sizing tab page;
14. The interlaced images automatically merge into a single image.
15. If the image does not appear corrected or the image's numbers look blurry (see Figure below), it is very likely the installer chose the wrong pixel coordinates. That means the image is interlaced incorrectly. To correct the interlacing and sharpen the image:
 - i. Click the up or down arrow on the Line 0 Start scroll box, adjusting the value 1 pixel at a time;
 - ii. Wait for the next image before making another adjustment;
 - iii. Click the up or down arrow on the Line 1 Start scroll box adjusting the value 1 pixel at a time;
 - iv. Wait for the next image before making another adjustment.
 - v. Repeat steps i-iv above until the image is clear and sharp.
16. Once the image is properly interlaced, it can now be adjusted to finish correcting the image.

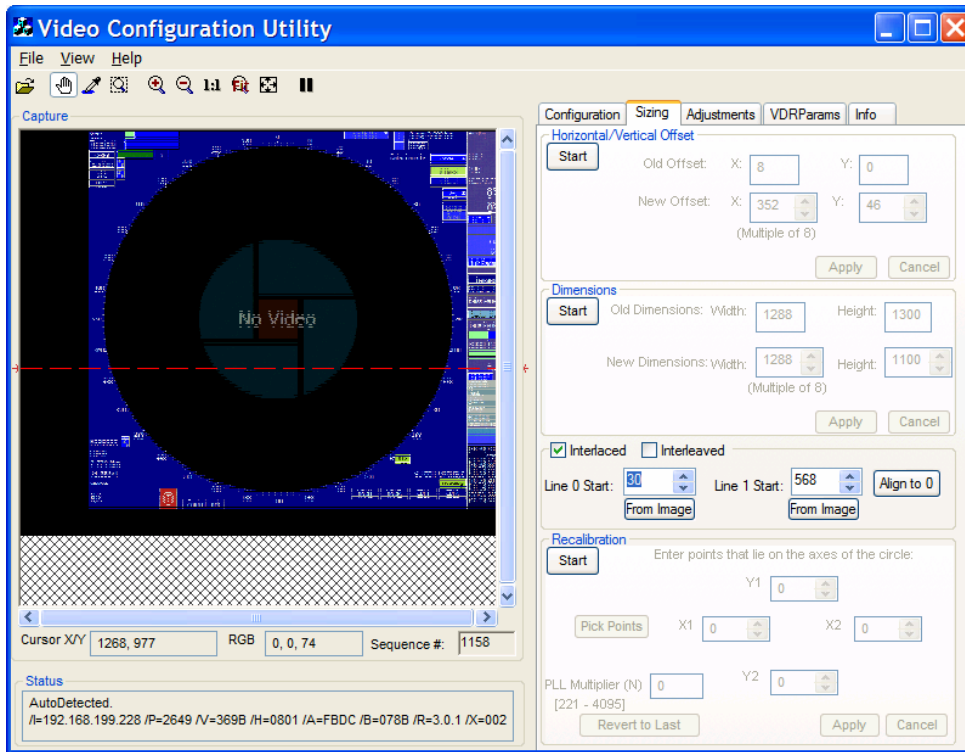


Figure 9-16 – Incorrectly Interlaced image



Note: To achieve the optimal image capture. After properly interlacing the image, the installer may need to adjust the Sizing page's Horizontal/Vertical offsets and Width and Height dimensions

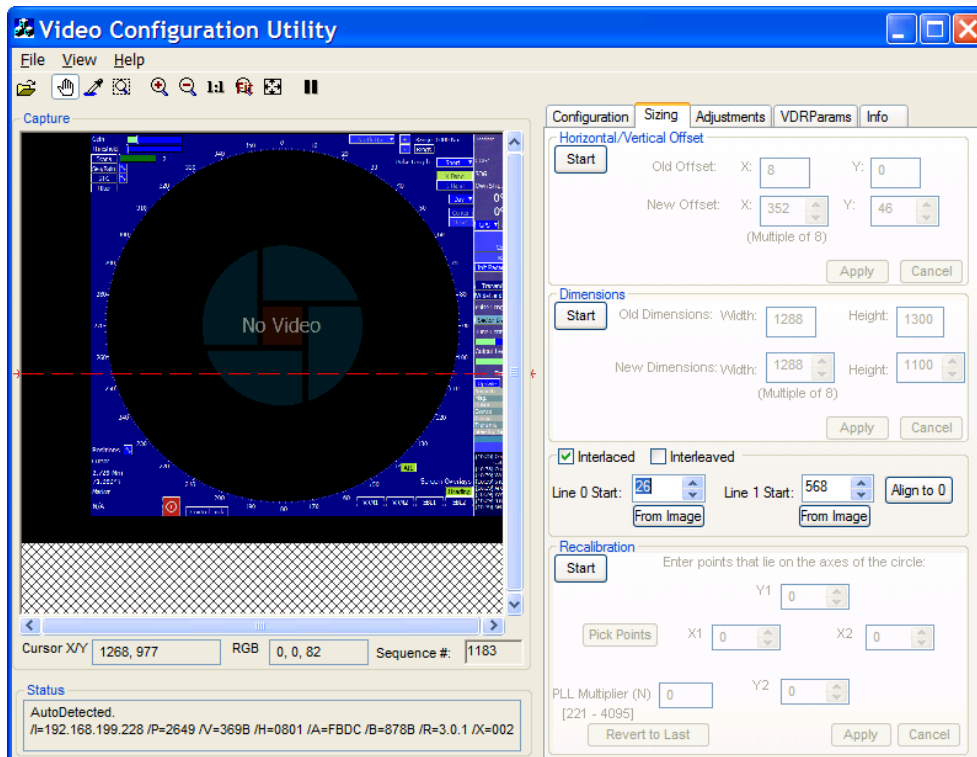


Figure 9-17 - Properly Interlaced Image

9.5.3.4 Interleaved Image

If the captured image has a **resolution of 1600 x 1200 pixels or greater**, it may appear repeated within the Capture window as below. In order to correct this image it must be properly interleaved. Complete the following steps:

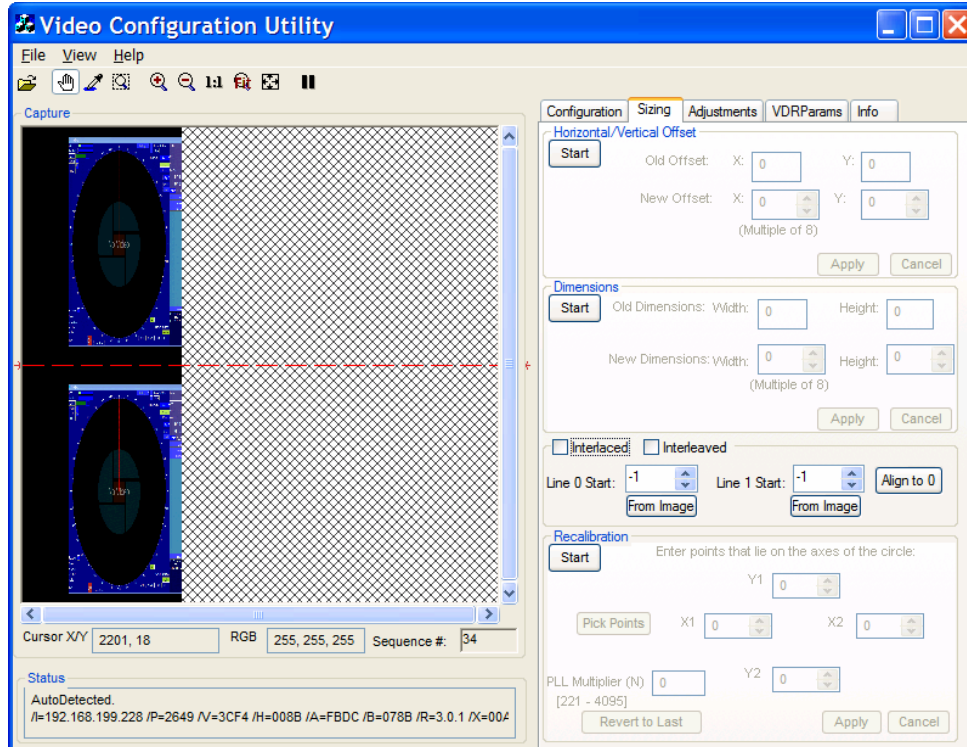


Figure 9-18 - Interleaved capture

1. Click the Sizing tab to open the Sizing page;
2. Click the Start button in the Horizontal/Vertical Offset section;
3. Use the New Offset X scroll box and Y scroll box to change the horizontal and vertical offsets to move the image as close to the top left hand corner of the Capture window as possible, as given above in the Offset adjustment section.
4. With the image in place, and using the Zooming options, determine the top edge of both images. Click the "From Image" under Line 0 Start to select the uppermost pixel for the top image, and click the "From Image" under Line 1 Start to select the top edge for the bottom image.

Note: Line 0 Start should usually be left at 0 and Line 1 Start should be adjusted.

5. Click the Interleaved checkbox to activate Interleaved mode.
6. If step 5 causes a prompt to increase the height of the image, click Yes. (In most cases the image height will be too small.)
7. Zoom into the image.
8. If the image does not look correct, adjust Line 1 Start one value at a time until it looks correct.

Note: You may need to readjust the image dimensions to better fit the image into the capture window.

9.5.3.5 Recalibration

Once the image has been captured (or adjusted in the case of an interlaced image), it must be checked to ensure a proper capture that fills the Capture window but keeps all 4 image sides (edges) visible in the window.

Check the aspect ratio by looking for a skewed circle. If the image does not appear skewed and the aspect ratio is correct, then this section can be skipped. But, if the installer can see a skewed circle, or if the image has the wrong aspect ratio, then the captured image may need recalibration

Use the following steps to recalibrate the captured image:



NOTE! It is **recommended** that the installer write down all settings before making any changes to the captured image because it may be necessary to revert to these settings.

1. Once the image has been captured to the Capture window, ensure the Vertical Polarity and Horizontal Polarity is set properly.

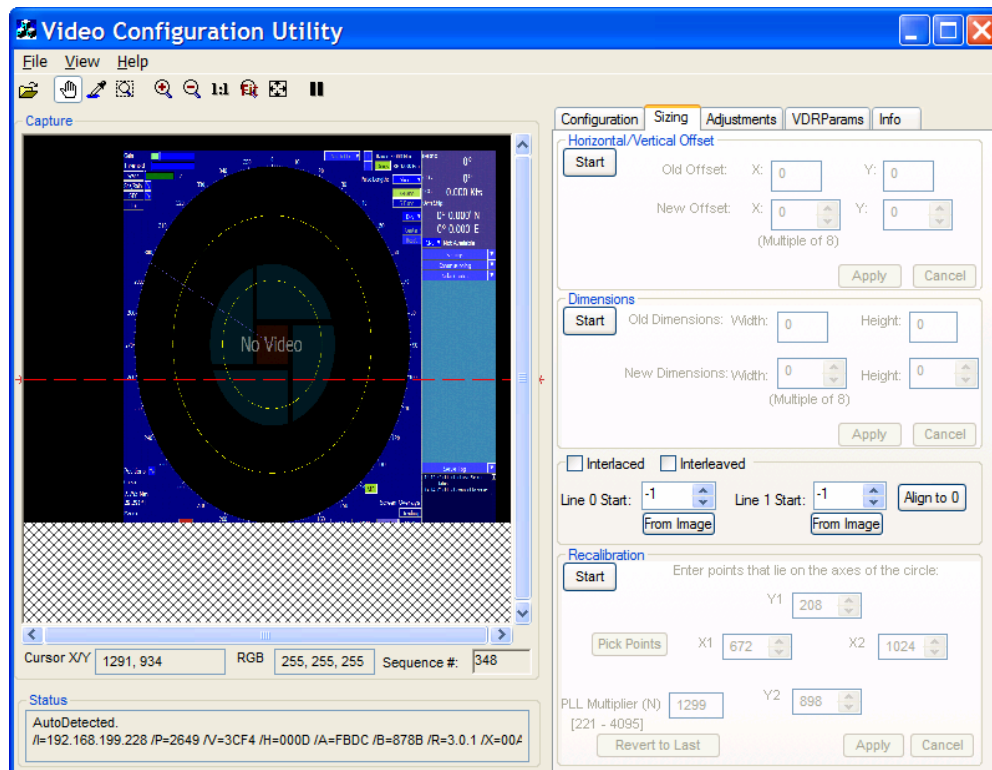


Figure 9-19 - Incorrect aspect ratio on capture

First, locate a circle in the radar image in the Capture window. A Variable Range Marker (VRM) or range ring, available on most radar images, provides effective circles for assessing recalibration. If the image requires recalibration the ring will appear more oval than round. In that case it is necessary to recalibrate the image by setting the proper aspect ratio;

- To begin recalibration, click the Sizing Tab which opens the Sizing page;

- ii. Click the Start button in the **Recalibration** section at the bottom of the Sizing page;
- iii. In the Capture window click and drag a rectangle around the circle, OR click the **Pick Points** button to select the points of the circle in order. (Picking points may be easier.);
- iv. When 4 points of the circle are selected by either method above, click the Apply button;
- v. This applies the adjusted value of the Phase Lock Loop PLL Multiplier Number (N) and recalibrates the captured image;
- vi. If the recalibrated image has improved but needs further recalibration, click and drag a rectangle around the circle, OR click the Pick Points button to select the points of the circle in order. (Picking points may be easier.);
- vii. When 4 points of the circle have been chosen, by either method above, click the Apply button;
- viii. This will apply the newly re-adjusted value of the PLL Multiplier Number (N);
- ix. If the circle in the newly recalibrated image appears more oval than in step vi, click Start to begin again;
- x. Click **Revert to Last** to reset to the previous value of the PLL Multiplier (N);
- xi. Click Apply, and repeat this procedure from step iv.

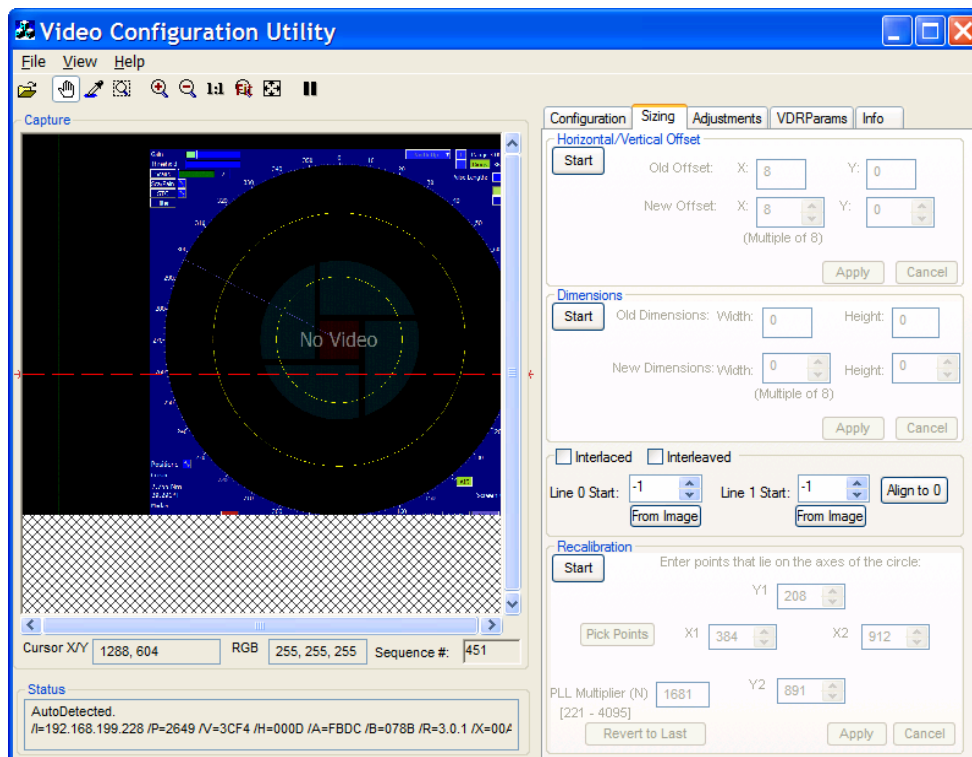


Figure 9-20 - Correct aspect ratio after recalibration

2. The Image Offset of the captured image will need to be re-adjusted. Follow the steps above Section 9.5.3.1: Horizontal/Vertical Offset to adjust the upper left corner of the image.

Note: With many radar images, it may be difficult to determine the true upper left corner of the captured image. The installer may 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.

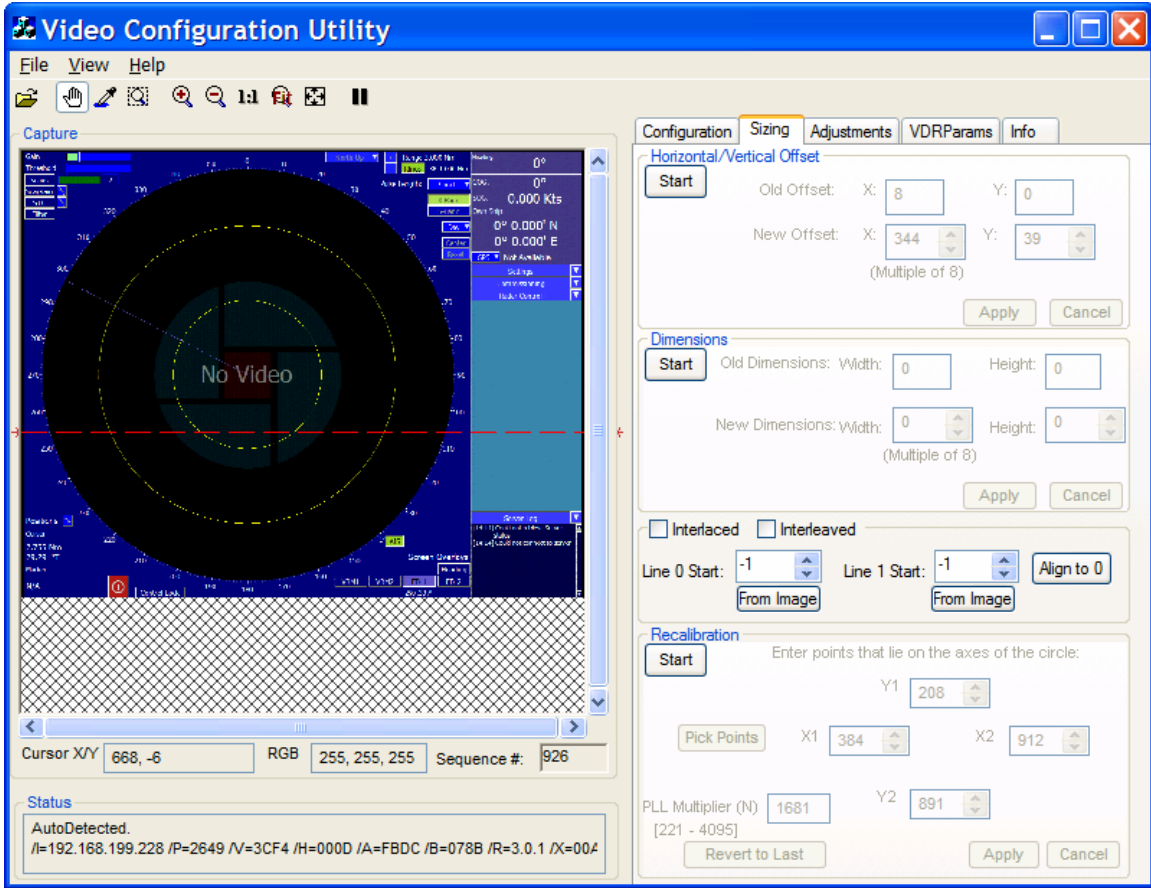


Figure 9-21 - Recalibrated image with Image Offsets adjusted

9.5.4 Adjustments Tab

To adjust the image quality, click the **Adjustments tab** to open the **Adjustments page**. This page includes 4 sections including

1. Sharpness;
2. Gain / Offset Adjustment;
3. Clamp; and
4. Coast.

In these for sections the installer will find all the controls needed to adjust the image values as described below.

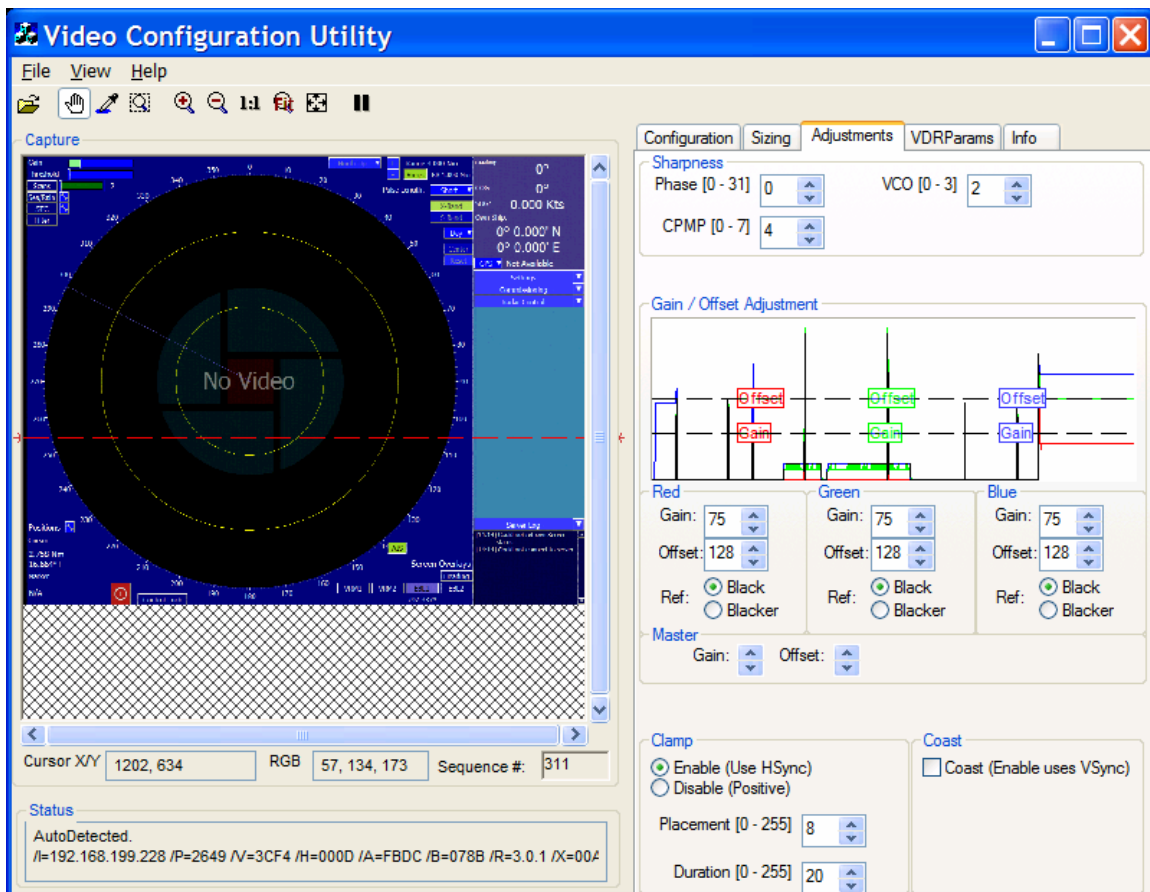


Figure 9-22 - Adjustment Page

9.5.4.1 Sharpness

The **Sharpness** section of the Adjustments page holds three scroll boxes to adjust the **Phase**, charge pump (**CPMP**), and the voltage controlled oscillators (**VCO**).

1. Phase

Once the image position is adjusted, it may still display pixilation (visible noise), banding, and/or soft edges. This means the image phase must be adjusted. To adjust the Phase:

- Enter a value or clicking the up/down controls on the Phase scroll box (The range available for adjustment is 0 to 31.);
- The image changes immediately to reflect the change.

Continue to adjust the number until the image is sharp.

Example: The image is highly pixilated at the left edge. Adjust Phase to 16. and the image appears clearer and more uniform. Adjust to 14, and the left edge of the image is now sharper, repeat until desired image quality is achieved.

2. CPMP (Charge Pump)

When the image phase is sharpened, minor oscillation may still appear in the image. If so it may be necessary to adjust the image **CPMP**.

- Check for oscillations at either the top of the image or near any straight black lines where they are most apparent;
- Note the image quality and use the CPMP scroll box to set CPMP between 0 and 3;
- The image is automatically updated to reflect the change
- Note the image quality for improvement; and
- Make further adjustments as necessary

Example: The image has varied individual lines of oscillation at its left edge. Adjust CPMP to 1. The left edge of the image is now much clearer and uniform. Adjust to 2. The left edge of the image is now sharp.

3. VCO (Voltage Controlled Oscillators)



NOTE: The VCO setting **should NOT be adjusted** unless the captured image is **severely distorted**.

The **VCO** scroll box allows the installer to adjust the voltage controlled oscillator. The range available for adjustment is 0 (default) to 3.

VCO range can be selected in accordance with the following table:

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 9-6 - VCO Pixel rate range (MHz)

9.5.4.2 Gain/Offset

To create a more uniform image, the installer can fine-tune the gain and/or offset in the **Gain/Offset Adjustment** section. This section includes:

- A histogram.
- Red, Green and Blue Gain and Offset controls; and
- A Master Gain and Master Offset control.

These controls give the installer three different options to adjust the Gain and Offset values for the Capture window. Adjusting Gain stretches the image vertically in the Capture window. Adjusting Offset shifts the image up and down in the Capture window.

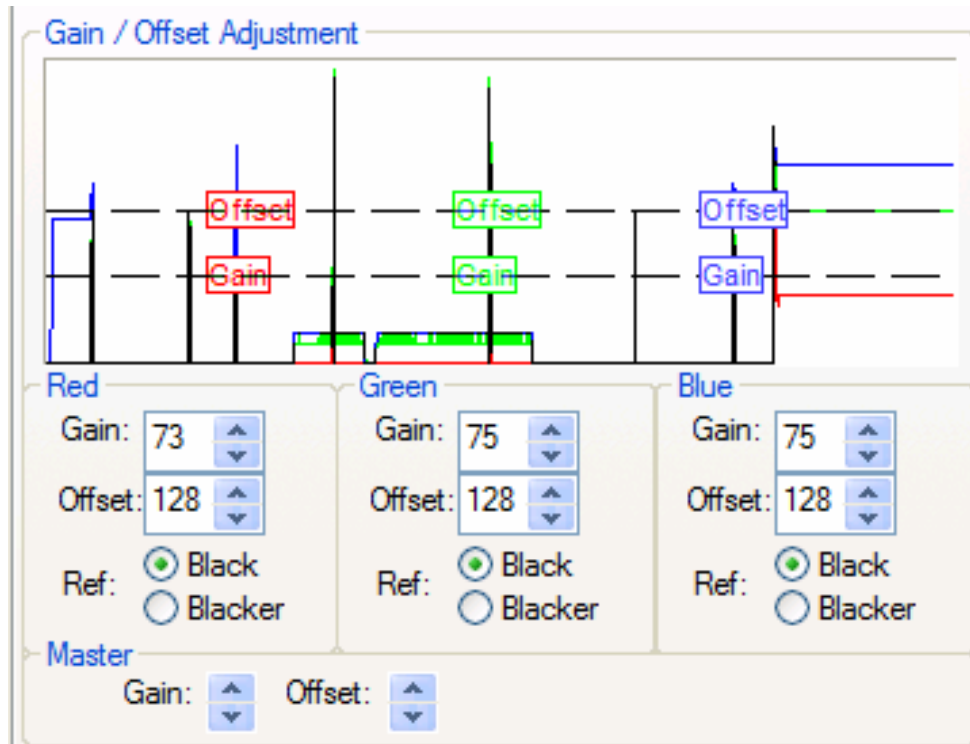


Figure 9-23 - Gain/Offset Adjustment

To fine tune the Gain and Offset using the histogram of Red, Green, and Blue icons:

1. Click on the histogram icon to be adjusted;
2. Drag the icon and observe changes in the Capture window image;
3. When the adjustment is finished, release the icon;
4. The new value is displayed in the corresponding scroll box beneath the histogram. (The range is 0-255);
5. Repeat the process for each of the controls in the histogram until the captured image is satisfactory.

For example, click the Red Offset icon in the histogram and drag it up or down to adjust the Red Offset value.

To fine tune the Gain and Offset Red, Green, and Blue separately, using scroll boxes and the Ref: selection:

1. Click on the scroll box for the value to be adjusted;
2. Set the Gain or Offset to the new value. (The range is 0 to 255);
3. Continue adjusting values until the image in the Capture window is fine tuned.

To fine tune the Gain and Offset using the **Master** Gain and Offset scroll buttons:

Adjusting Gain stretches the image vertically in the Capture window.

1. Click on the Master Gain scroll button to adjust the Gain of the entire image—instead of the individual Red, Green and Blue values. (The range is 0 to 255).
2. Click on the Master Offset scroll button to adjust the Offset of the entire image—instead of the individual Red, Green and Blue values. (The range is 0 to 255). Adjusting the offset shifts the image up and down in the Capture window.

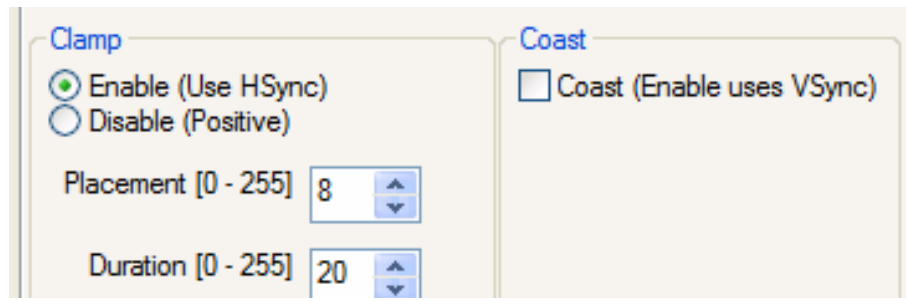


Figure 9-24 – Clamp and Coast sections of the Adjustments tab page.

9.5.4.3 Clamp

At the lower left of the Adjustments page is the **Clamp** section. It allows the installer to enable or disable the video capture HSync signal default. The Clamp controls are necessary so the installer can enable VSYNC signal capture if there is no HSYNC signal.

- **Enable (Use HSYNC) check button:** In the absence of a VSYNC signal, the video capture circuitry will use the HSYNC signal. This is the Clamp command default setting.
- **Disable (Positive) check button:** The Disable (Positive) setting overrides the HSYNC signal and disables the Clamp command.
- **Placement [0 – 255] and Duration [0 – 255] scroll boxes:** These scroll boxes are only active if the Enable (Use HSync) check box is selected. They allow for the sampling of video to determine voltage corresponding to the image's black levels.

9.5.4.4 Coast

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

- **Checked:** In the absence of an HSYNC signal, the video capture circuitry will use the VSYNC signal.
- **Unchecked:** This setting overrides the usage of the VSYNC signal and, effectively, disables the “Coast” command.

9.5.5 Sync-on-Green (SOG)

If a video source transmits via Sync-on-Green (SOG), the associated <VidChanX.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 Video Config Suite 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 Video Configuration Suite application;
2. In the Configuration tab page, under the Configuration group, select "Composite";
3. Select the "SOG" radio button;
4. The HSync and VSync values will appear in the Auto-Detection Status group;
5. Record the HSync value and its polarity;
6. Select Manual Configuration mode;
7. Enter the HSync information and parameter information discussed at the beginning of this section into the applicable <VidChanX.ini> file;
8. Save the file;
9. Click the Load <VidChanX.ini> file; and
10. Choose the <VidChanX.ini> file which was altered and saved in Step 5 above.

The above procedure provides an image in the Video Config Suite application that can be properly configured in accordance with Section 9.5.2 - Video Configuration Suite (VCS2) Application.



NOTE: If the HSync value was obtained via the Video Config Suite application, it is recommended that the installer carefully check to make sure that the VCO, CPMP, and Phase settings are correct for the captured image.

9.5.5.1 Save Settings (REMEMBER!)

Once the image has been adjusted correctly, click the Configuration tab page and click Save <VidChanX.ini> file to save the settings.

You MUST also select the "**Commit.exe**" icon on the DMM's desktop (and accept a system re-boot) for your changes to be made permanent.

9.5.6 VDR Params Tab

Some of the <*vdrparams.ini*> file settings can be adjusted with the Video Configuration Utility. For explanation of these settings, please see *Section 9.5 Video Module Configuring*.

To start, press the Load button.

Figure 9-25 - VDRParams.INI file settings

Controls Defined

- **Number of Sources:** This numeric box sets the number of Video sources by adjusting the **numSources** INI key.
- **Maximum Colors:** This scroll button sets the maximum number of colors, adjusting the **maxColors** INI key.
- **Enhanced Compression:** This checkbox enables or disables enhanced compression, adjusting the **enhancedCompression** INI key. Default is off or not checked.
- **Noise Clipping:** This check box enables or disables noise clipping, adjusting the **noiseClipping** INI key. Default is off or not checked.
- **The Calculated Video Setting Outputs:** This section displays settings for the **Transfer Rate** and **Blocks** which will be written to the INI file. The keys modified are “transferRate” and “blocks”, respectively.
- The FRM Storage section lets the user select which Video Channel(s) will be sent to the FRM. This updates the “VideoToFRM” key in the INI file. NOTE: Primary radar (usually X-Band) must be saved to the FRM; all other radar connections are optional.



NOTE: The VDR product key must be set to enable features above the basic IMOP requirement

9.5.7 Info Tab

Selecting the **Info** tab of the Video Configuration Utility opens the **Info** page. It provides statistics on the capture image.

The **Histogram** window displays the histogram for the image.

The **Cross-Section** window (indicated by the dashed red line) shows a graph of the current cross-section of the image, as well as minimum and maximum values of Red, Green, and Blue on the cross-section line.

Channel Selection lets the user enable or disable which color channels are selected or deselected. For example the installer can disable Green.

The Status controls at the bottom of the page enable the installer to display information about the image such as:

- BPP (bits per pixel);
- Image size;
- Cursor position;
- RGB value at the cursor position;
- Viewing bounds; and
- Zoom level.

9.5.7.1 VCS2 Menu Overview

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

1. File Menu

- **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.
- **Save Bitmap:** This will save the current image to a bitmap file.
- **Save Histogram:** This will save the Histogram from the Info page to a CSV file (Comma Separated Value file).
- **Save Cross-Section:** This will save the cross-section of pixel data indicated by the dashed red line in the Capture window to a CSV file.
- **Exit:** This will exit the application.

2. View Menu

- **Zoom In:** Zooms into the image.
- **Zoom Out:** Zooms out of the image.
- **Fit to Window:** Will cause the image the edges of the image to fill to the edges of the Image window.
- **Full Screen:** This sets the Video Configuration Utility to Full-Screen mode. Right click on the image in Full-Screen mode to access the menu.

3. Toolbar

- **Load:** Load a bitmap, same as File->Load Bitmap.
- **Pan Tool:** Activate the Panning tool for the Image Window. This is the default.
- **Eyedropper Tool:** Activate the Eyedropper tool to choose a pixel and get the value.
- **Zoombox Tool:** Activate the ZoomBox tool, which lets the user select an area to zoom.
- **Zoom 1:1:** Zooms to the original scale of the image.
- **Zoom In:** Increase the zoom magnification.
- **Zoom Out:** Decrease the zoom magnification.
- **Fit to Window:** Display the full image in the window.

- **Fullscreen:** Toggle between full screen mode and other views.
- **Freeze Image:** Toggle Freeze mode to freeze the current image, do not load any new images from the capture sequence.

9.5.8 Test Video Inputs

To ensure that video capture has been properly configured:

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;
8. Play back the video data.

NOTE: Refer to Appendix 5: Playback Software for download and playback instructions:

9. Ensure the video is presented correctly. If not, stop recording and make the necessary changes to the configuration:
 - a. If the top edge of the image capture is not captured correctly, go to the VidChanX.ini file and increase the value assigned to CPMP1 field.
 - b. 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**;
 - c. If the captured image has a primarily black background and noise is present at the low end of the captured signal, remove the noise by setting the noiseClipping field to **1** in [VIDEO] section of the <vdrparams.ini> file.



Note! This setting must be used with care. If there is no noise near the black level a change in the noiseClipping field may set most of the image to black.

This setting is only used if enhanced compression is enabled.

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

9.5.9 Set-Up Laptop for Video Module Connection

In certain situations it may be necessary to connect the Video Module to a service PC and run the VCS2 remotely. 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.
 - Press 'OK'.
9. Press the 'Add' button and in the **Service Settings** window:
 - **Description of service:** Enter **Video UDP**
 - **Name or IP address':** Enter **192.168.199.228**
 - External Port number for this service: Enter **2649**
 - Internal Port number for this service: Enter **2649**
 - Select the **UDP** radio button.
 - Press 'OK'.
10. Press OK in the **Advanced Settings** window;
11. Press OK in the **Windows Firewall** window;
12. Press 'Close' in the **Local Area Connection Properties** window;
13. Install VCS2 on the Service PC; and
14. Run VCS2 on the service PC.

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Rutter VDR-100G3/G3S Installation Manual

Chapter 10: NMEA Module, Rev. 1.3

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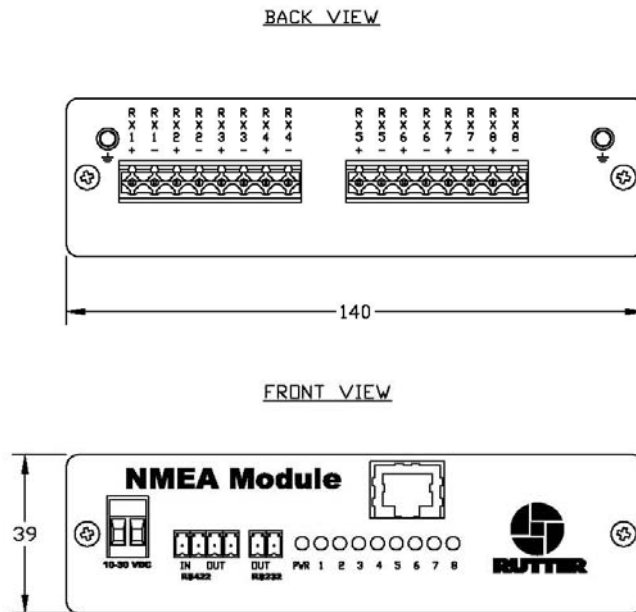
10 NMEA MODULE

10.1 Introduction

The **NMEA Module** provides a connection to all IMO-required data in both NMEA 0183/IEC 61162 and limited ASCII data formats. The NMEA module multiplexes up to 8 NMEA-0183 data streams from shipboard systems onto an RS-232/422 serial data channel, and at the same time onto an Ethernet connection (UDP). The captured data is sent to the DMM via an Ethernet connection for storage and retrieval.

These modules use embedded microprocessor technology with real-time buffer storage to handle data from multiple channels at the same time. In addition:

- 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; and
- An efficient anti-collision algorithm preserves the integrity of the data even at high incoming data rates.



*The NMEA module is integrated into the Data Acquisition Unit of the VDR-100G3, but a remotely mounted NMEA module is also available as an option. The optional **remotely mounted NMEA module must be specified when the VDR-100G3 is ordered.***

10.2 NMEA Module Planning

The VDR-100G3 base system is composed of 1 NMEA 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 are 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 or 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 the NMEA module for recording.

NMEA Module Specifications:

- Up to 8 RS-232 and RS-422 inputs
- Standard NMEA-0183 format input at 9600 or 4800 baud (configurable up to 115,200 baud)
- RS-232 and RS-422 Output formats at 9600, 19.6k and 38.4k baud (DIP switch selectable).
- Front panel LEDs indicate individual input serial channel data activity
- Units can be daisy chained to capture more than 8 inputs
- Data stream broadcast over an Ethernet link
- Measures 39mm x 106mm x 155mm
- Weighs less than 1000 grams
- Operates on 24V DC
- Fully compliant with IEC 61996
- Fully IEC 60945 compliant, CE mark
- Rack mount or DIN-Rail mount configurations available

10.3 NMEA Module Mounting

The NMEA module, if supplied separately and not as part of a Data Acquisition Unit (DAU), is designed to mount on a 35mm “Top Hat” style DIN Rail. The DIN Rail is mounted in a desired location and the NMEA module is mounted on the rail using the clips on the back. The DIN Rail is **not** supplied with the NMEA module.

Figure 10–2 - DIN Rail below shows the typical dimensions of the DIN Rail required for mounting a NMEA module. It is acceptable to use a DIN Rail that is deeper than 7.5mm (15mm deep DIN Rail is commonly available), as long as the 35mm width is maintained.

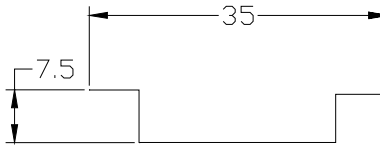


Figure 10–2 - DIN Rail

10.4 NMEA Module Connection

The NMEA Module is connected to the VDR-100G3 via an Ethernet cable and a DC power cable.

- The Ethernet communication output is connected via a crossover through Ethernet cable to NMEA port on the PCC located within the DPU.
- The DC power supply is provided by a connector next to the NMEA Ethernet port on the PCC, and connected via a two conductor power cable to the power input on the NMEA Module.
- All connection points are outlined in the following tables:

NMEA Module Front Panel Connection

Connector	Description
10-30 VDC+	Input power
10-30 VDC-	Input power common
RS422 In+	RS422 Data Input (pos)
RS422 In-	RS422 Data Input (neg)
RS422 Out+	RS422 Data Output (pos)
RS422 Out-	RS422 Data Output (neg)
RS232 Out+	RS232 Data Output (pos)
RS232 Out-	RS232 Data Output (neg)
RJ45 connector	Ethernet Connection (UDP)

Table 10-1 - NMEA Module Front Panel Connection

NMEA Module Back Panel Connection

Connector	Description
RX1+	Channel 1 RS232/422 input (pos)
RX1-	Channel 1 RS232/422 input (neg)
RX2+	Channel 2 RS232/422 input (pos)
RX2-	Channel 2 RS232/422 input (neg)
RX3+	Channel 3 RS232/422 input (pos)
RX3-	Channel 3 RS232/422 input (neg)
RX4+	Channel 4 RS232/422 input (pos)
RX4-	Channel 4 RS232/422 input (neg)
RX5+	Channel 5 RS232/422 input (pos)
RX5-	Channel 5 RS232/422 input (neg)
RX6+	Channel 6 RS232/422 input (pos)
RX6-	Channel 6 RS232/422 input (neg)
RX7+	Channel 7 RS232/422 input (pos)
RX7-	Channel 7 RS232/422 input (neg)
RX8+	Channel 8 RS232/422 input (pos)
RX8-	Channel 8 RS232/422 input (neg)

Table 10-2 - NMEA Module Back Panel Connection

If the VDR installation includes multiple NMEA modules, they can be connected using the cascading (daisy chaining) method. This involves connecting the RS422 output port on the front of the NMEA Module that **is not connected** via Ethernet, to the RS422 input port on the front of the NMEA Module that **is connected** via Ethernet. This allows the data to be collected on one module and then sent to the second one which will then transmit that data to the DMM via Ethernet.



Note! When daisy chaining NMEA modules, the MUX ID of the NMEA modules must be changed so that they reflect what position they are in the “chain”. NMEA module 1 would use “MUX ID 1”, NMEA module 2 would use “MUX ID 2”, etc. Refer to 10.5.3 NMEA Module ID (MUX ID) – DIP Switch Settings for the DIP switch settings for changing the Mux ID on the NMEA module.

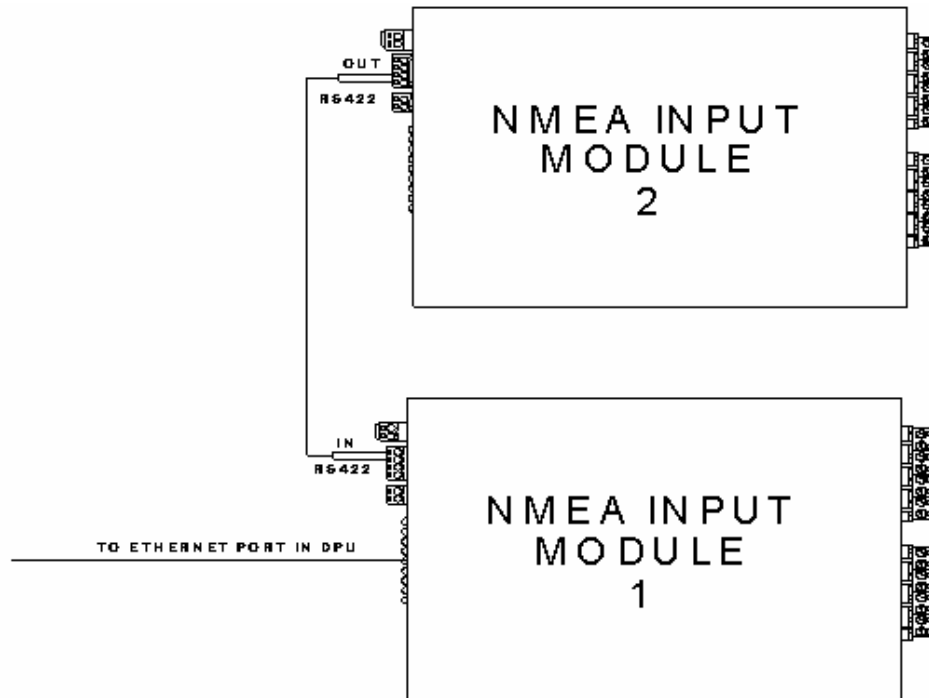


Figure 10–3 - Connecting multiple NMEA modules using the (daisy chaining method).

10.5 NMEA Module Configuration

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

10.5.1 Checking the NMEA Module Configuration

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

1. Ensure that **only 1 NMEA Module is connected** at one time. **ALL** inputs must be disconnected as each NMEA 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 *NMEA Module Config* utility.

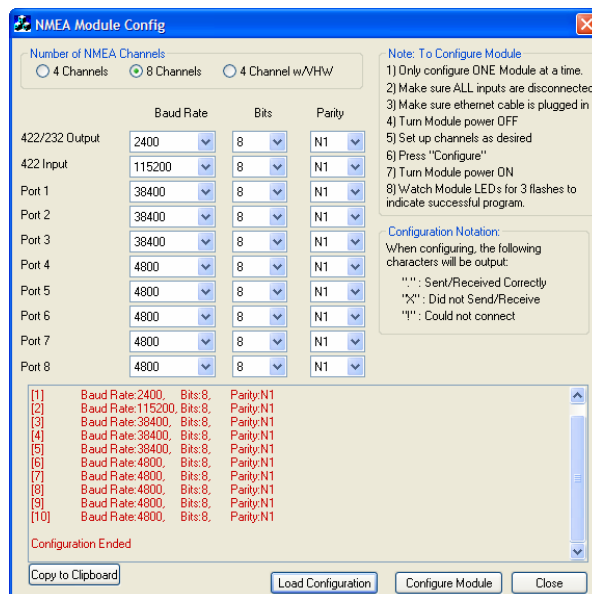


Figure 10–4 - NMEA Module Configuration Utility

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** select ‘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.

10.5.2 Configuring the NMEA Module

To configure the NMEA Module, complete the following steps:

1. Ensure that **only 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 *NMEA Module Config* 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 that is larger than the data output rate is selected because this could potentially corrupt the data. However, these settings can still be updated for proper data management. If these settings are updated, the technician MUST verify that the data from the RS232 and RS422 outputs are correct.*

8. A message box appears: "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 5 LEDs will come on for 5 seconds and turn off. The first 3 LEDs will flash 3 times to indicate successful programming.

If the NMEA Module is the **4-Channel** version:

- The first 4 LEDs will flash.

If the 3 LEDs (8-Ch or 4-Ch w/VHW) or 4 LEDs (4-Ch) stay **on** for the full duration of the programming, OR the reset sequence, then the programming was unsuccessful. If programming was unsuccessful cycle the 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.*

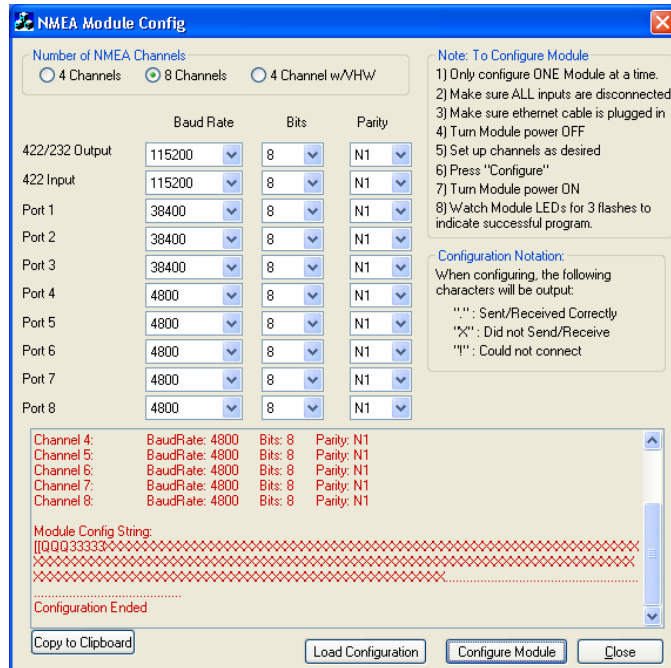


Figure 10-5 - Configuration Utility Reboot Sequence

11. Press the “Stop” button at the bottom of the Configuration window once the first three (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.



NOTE: AIS data *must* be connected on **Channel 1 at 38,400 baud**, and the **RS422 output baud rate should be set to 38,400**.

10.5.3 NMEA Module ID (MUX ID) – DIP Switch Settings

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 10-3- MUX ID jumper configuration

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

10.5.4 VDRPARAMS.ini

Parameter	Typical Value	Remarks
transferRate	1000	500 to 1000 ms, default is 1000
blocks	60	
TimeSourcePort	3	Port that time signal is on, 3 = UDP, 1 or 2 = Serial Port
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	Port where AIS data is input; 3 = UDP, 1 or 2 = Serial Port; default is 3
EnableAISParsing	0	1 = no AIS data to FRM; default is 0
AISMuxID	11	Mux ID where AIS data is input
NumNMEAModules	0	Number of NMEA modules connected. Default value is 0, Maximum value is 9.
NMEAModule1IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 1; i.e. 11
NMEAModule2IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 2; i.e. 22
NMEAModule3IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 3; i.e. 32
NMEAModule4IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 4; i.e. 42
NMEAModule5IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 5; i.e. 52
NMEAModule6IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 6; i.e. 62

Table 10-4 - Editing NMEA Parameters

Refer to **Appendix VDRPARAMS.INI File** for more information on the parameters of the [NMEA] section of the vdrparams.ini file.

10.5.4.1 NMEA Self Test

The VDR Record application automatically performs NMEA self tests during normal VDR data recording. The NMEA self test monitors incoming data from the configured NMEA modules connected to the VDR/SVDR for missing channel IDs. If an error is found during the NMEA self test then an audible alarm will sound and a “Serial Error” is displayed on the OAU LCD display. Refer to *Chapter 14 – General and Corrective Maintenance, section 14.2: Corrective Maintenance* for more information on alarm code descriptions. Also, during an error condition, the VDR Record application will log the NMEA module at fault to the <error.log>. The error log is stored in the root of the E: drive of the VDR DMM hard drive.

If the NMEA test detects data coming from the failed NMEA module, the “Serial Error” is cleared, unless there is another error condition that will cause the “Serial Error” to remain on the OAU LCD display.

The NMEA self test is disabled by default in the <vdrparams.ini>. To enable the NMEA self test the **NumNMEAModules** key should be set to the value which represents the number of NMEA modules connected to the VDR/SVDR. A maximum of 9 NMEA modules can be connected to a VDR/SVDR.

The **NMEAModule"X"IDStart** key (where **X** is the position of the NMEA module as it is in the array of NMEA modules, if applicable) specifies the first channel ID for NMEA module **X**.

EXAMPLES

- **NMEAModule1IDStart** is the first channel ID for NMEA module 1—under normal circumstances this is the NMEA module connected to the VDR via the Ethernet connection,
- **NMEAModule2IDStart** is the first channel ID for NMEA module 2,
- **NMEAModule3IDStart** is the first channel ID for NMEA module 3, etc.

10.5.4.2 AIS Data Parsing

The NMEA Module is capable of accepting AIS data. The **AISLocation** parameter in the `vdparams.ini` specifies the port on which AIS data is being received. (Refer to Table 10-4 - Editing NMEA Parameters for the available options).

AIS data received by the NMEA module is automatically recorded by the VDR Record application to the internal hard drive. The VDR Record application will not send AIS data to the FRM unless the **EnableAISParsing** parameter is set to zero (0). The default is "0". If **EnableAISParsing** is set to "0" the VDR Record application will look at the **AISMuxID** parameter for the location of where the AIS data is being input. Otherwise, if **EnableAISParsing** is not enabled the **AISMuxID** is ignored.

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 NMEA Module.

10.5.5 Verification of NMEA Recording

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** from the **Tests** menu.
3. Select **NMEA Test** from the **Tests menu**.

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

4. Ensure that data from the time source is present in the NMEA data window. One of the following strings must be present: \$GPZDA, \$GPGGA or \$GPGLL NMEA. 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. Ensure that valid data from each NMEA source is present in the NMEA data window.
6. Make note in the configuration file (vdr-cfg.txt) the identity of the NMEA source and the relevance of the information. Refer to APPENDIX 2 - System Configuration for guidance on editing the configuration file.

NOTE: For information on testing DataAnalog and DataDiscrete Inputs refer to APPENDIX 6.

10.5.6 NMEA Error Codes

The error codes in the NMEA data from the NMEA Module identify the NMEA module and its 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	N/A
SB	Input Port 4	N/A
SC	Input Port 5	N/A
SD	Input Port 6	N/A
SE	Input Port 7	N/A
SF	Input Port 8	N/A

Table 10-5 - 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.

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Rutter VDR-100G3/G3S Installation Manual

Chapter 11: OPERATION & ALARM UNIT TEST & USER GUIDE

Rev. 1.1

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11 OPERATION AND ALARM UNIT TEST AND USER GUIDE

OAU System Overview

The **Operation & Alarm Unit** (OAU) provides a visible and audible alarm when it receives an error message from the VDR-100G3. This visual and audible alarm alerts the ship's officer on watch of any detected failure.

- In an emergency incident, the OAU allows the operator to secure the previous 12 hours of recorded data.



NOTE: *The user should secure this data within 12 hours of any incident to ensure the recording is not deleted or overwritten.*

- The OAU also copies secured data, archived data or current data from the VDR's internal hard drive to the USB Memory Stick (or optional RSM).

The OAU also features:

- Visual and audible alarm indicators.
- 12-button keypad.
- 4 line x 20 character LED
- Option to copy recorded data to the USB Memory Stick (or optional RSM)
- Option to eject the USB Memory Stick (or optional RSM)

11.1 Planning the OAU

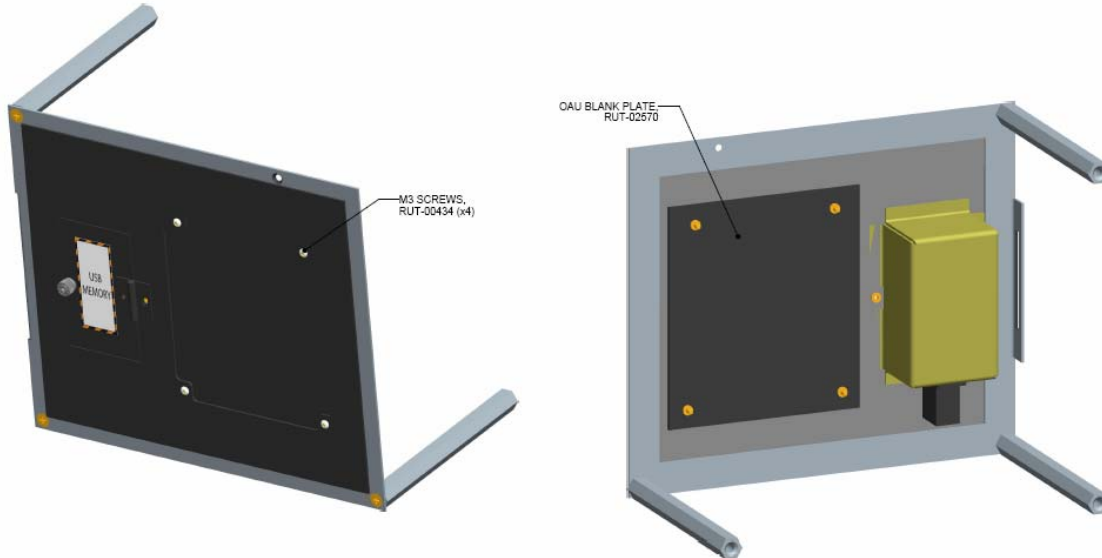
The OAU module connects to the DPU using a three-pair cable. The OAU provides a VDR alarm signal via a dry contact, active upon a VDR alarm. The OAU alarm signal connects to the bridge alarm panel via a one-pair cable.

The OAU is integrated into the DPU of the VDR-100G3. However, if the DPU is mounted away from the navigation bridge, or is in a location that is not easily accessible by the officer on watch, then the OAU must be separated from the DPU and installed in an accessible location on the navigation bridge.

11.2 Remotely Installing the OAU

The **OAU** can be either surface or flush mounted. First the OAU must be removed from the DPU.

Remove OAU Assembly from DPU and install OAU Blank Plate, RUT-02570, using M3 screws, RUT-00434 (x4). Install according to diagrams below.



See *Section 11.2.1* for surface mounting instructions and see *Section 11.2.2* for flush mounting instructions.

11.2.1 Surface Mounting the OAU

To **surface** mount the revised OAU, the mounting bracket and bracket screws must be removed. The unit can then be mounted using the 2 vacant screw holes at the rear of the unit.

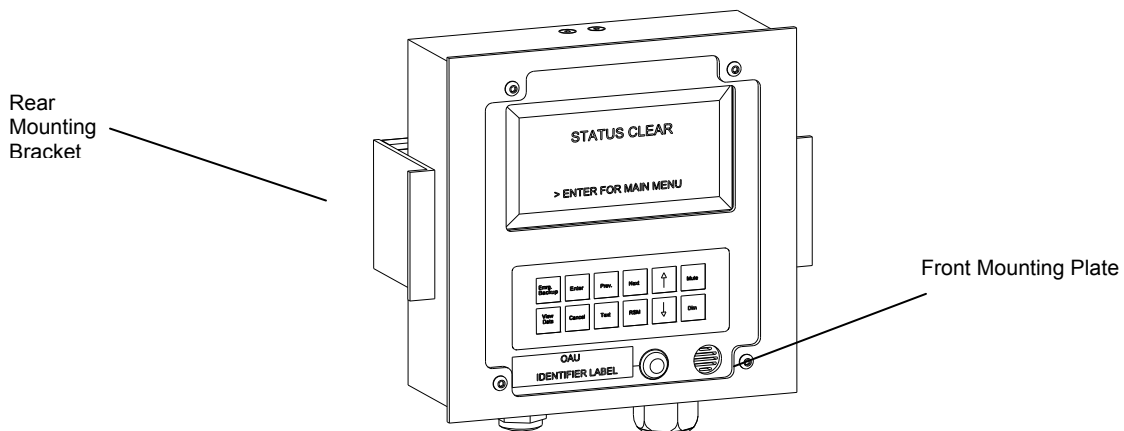


Figure 11-1 – Operation and Alarm Unit

Depending on the routing of the cables, they can be connected to the OAU:

- Through the glands installed in the bottom of the unit; or
- Through the back of the OAU by moving the glands to the back of the unit.

To move the cable entry location from the bottom to the back of the unit, remove the glands in the bottom and the silver hole-caps on the back cover plate of the unit. Re-install the glands in the back plate holes and insert the silver hole-caps into the holes in the bottom.

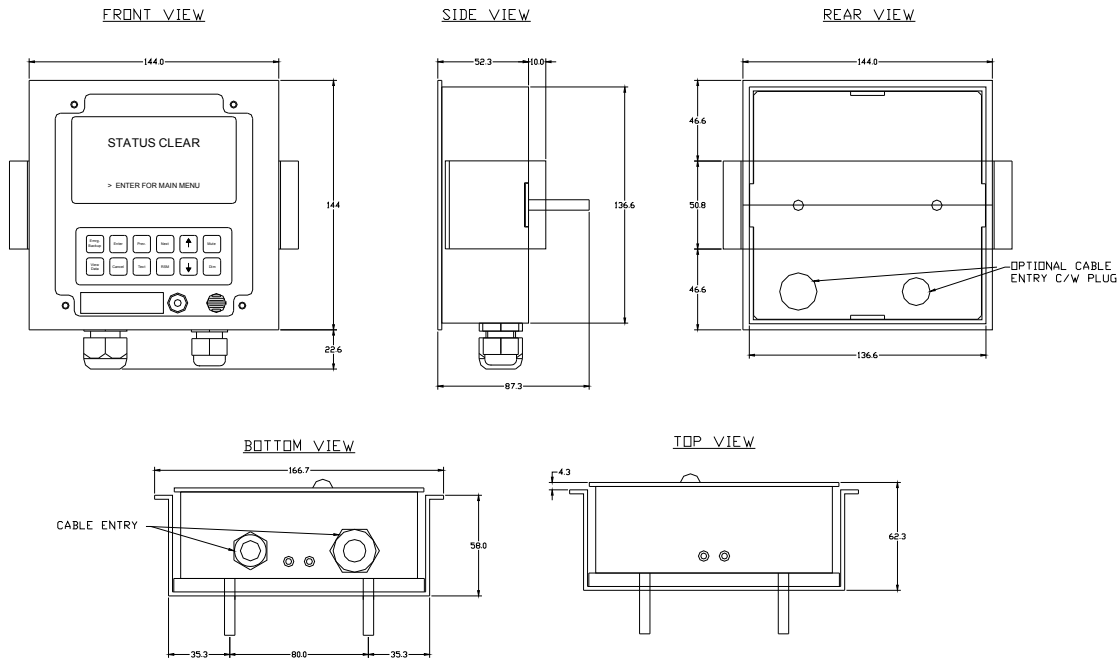


Figure 11-2 - OAU Dimensions (See Appendix 7: Drawing Details)

Follow the steps below to surface mount the OAU:

1. Remove the back plate of the OAU by unscrewing the 4 hex screws (2 in the top and 2 in the bottom);
2. Secure the back plate to the surface using 2 screws through the 2 visible screw holes in the back plate;
3. Complete the wiring of the OAU to the VDR; and
4. Re-attach the OAU to the back plate.

11.2.2 Flush Mounting the OAU

To flush mount the OAU a correct sized hole must be cut in the console—in accordance with Figure 11-3 - OAU Mounting Assembly—the mounting bracket must be positioned against the inside of the hole; and the unit must be mounted and tightened to the bracket. The steps below provide a procedure for flush mounting the OAU:

1. Install the front mounting plate to the front face of the OAU;
2. Remove the back plate of the OAU by unscrewing the 4 hex screws—2 in the top and 2 in the bottom);
3. Cut a hole in the panel into which the OAU is to be flush mounted (See Appendix 7: Drawings);
4. Move the glands to the back if necessary;
5. Install the 2 - 35mm hex screws (long bolts) through the 2 visible screw holes in the back cover. *NOTE: The screws should extend out through the back cover of the OAU.*
6. Secure each screw to the back plate with two nuts
7. Complete the wiring of the OAU to the VDR.

8. Re-install the back cover.
9. Insert the OAU through the mounting hole cut in the bridge console.
10. 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.
11. Install washers and nuts on each bolt and tighten to secure the OAU. **DO NOT** over-tighten, this will bend the back cover.

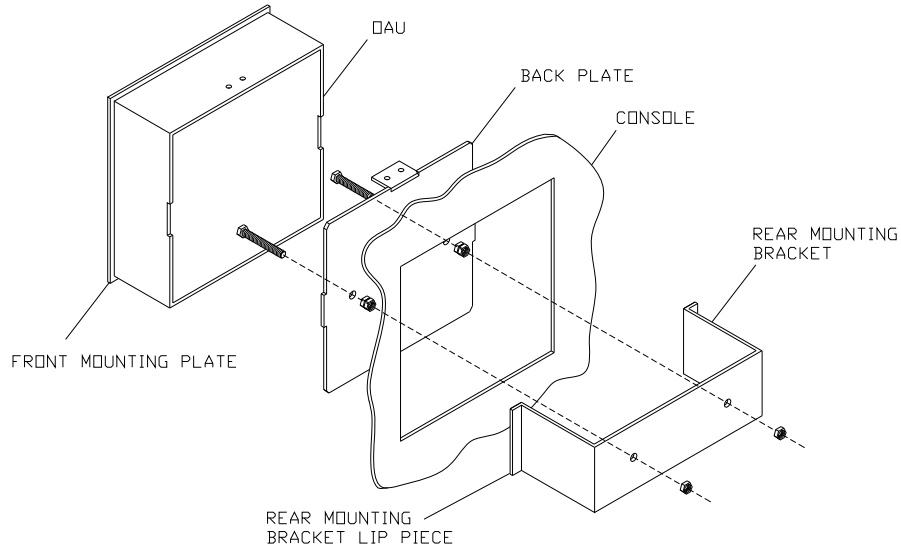
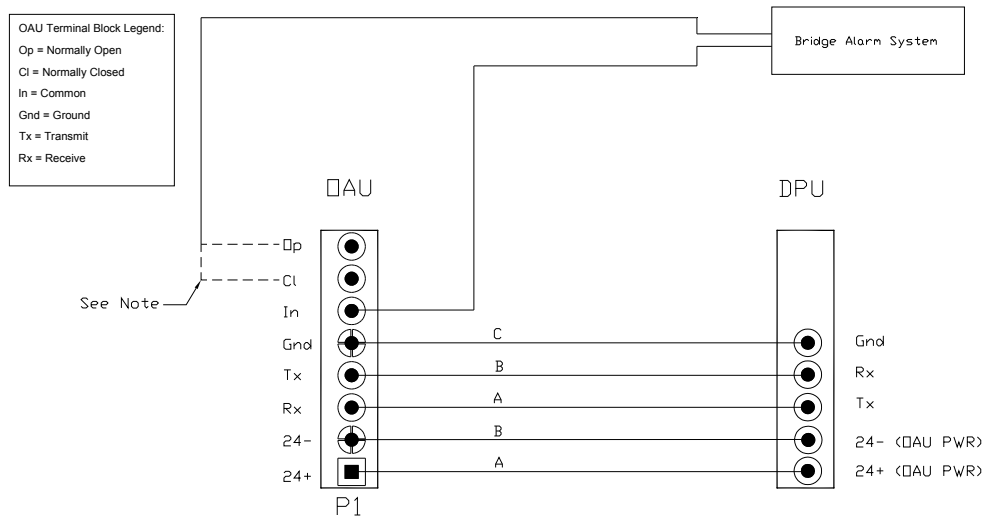


Figure 11-3 - OAU Mounting Assembly

11.3 Connecting the OAU

The OAU connects via 2 cable entry glands. To connect the OAU use:

- A three-pair cable for the DPU connection; and
- A one-pair cable to send the OAU alarm signal to the bridge alarm panel.



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 11-4 - OAU to DPU Terminal Block Connections.



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

11.4 Configuring the OAU

The functionality of these features shall be verified during installation.

1. The VDR_Record application should be loaded and in the record mode;
2. Verify that the OAU indicates "Recording";
3. Cut the power to the VDR by opening the ship's dedicated VDR circuit breaker;
4. Observe a "Power Failure" message is reported on the LCD and audible alarm is sounded;
5. Push the 'Mute' button to silence the audible alarm;
6. Initiate a securing of data in the DMM internal drive by pressing the "Emergency Backup" button on the OAU (see Section 11.8 - **Error! Reference source not found.**);
7. Observe that the OAU indicates "Download Complete" immediately after pressing "Enter" to initiate the process;
8. Restore the ship's power to the VDR; and
9. Observe the "Power Failure" message is cleared on the OAU.

11.5 OAU User Guide

This section provides a user guide for operating the VDR-100G3/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.

11.6 OAU Display

The OAU presents the following information, when in normal operational mode, at a 4 line alphanumeric illuminated display:

(Line 1)	(This line blank unless required to display longer messages)
(Line 2)	Status: Recording
(Line 3)	(This line blank unless required to display longer messages)
(Line 4)	USB: Rec

11.7 OAU Keypad

The VDR is operated by the illuminated keypad of the OAU and associated information presented on its display:

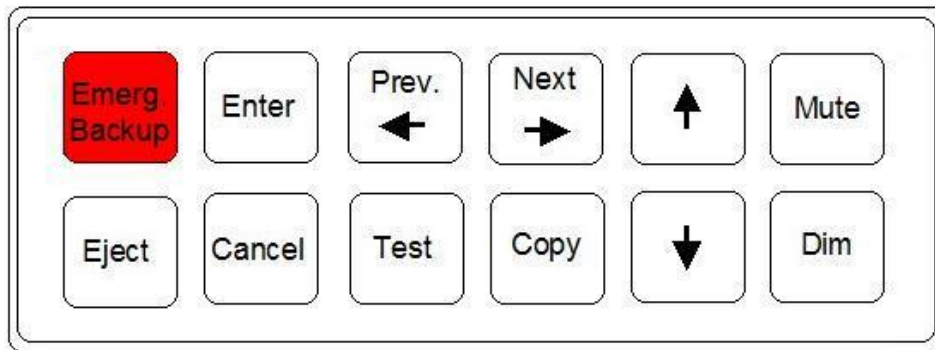
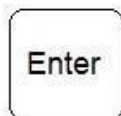


Figure 11-5 – OAU Keypad

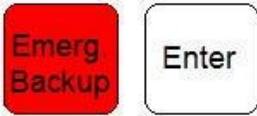


Press “Enter” to execute a command



Press “Cancel” to undo an initiated operation, if not otherwise instructed by the display menu.

11.8 Securing Data



To secure data to the DMM, complete the following steps:

1. Press the “Emerg Backup” button on the OAU keypad. 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 keypad. The following message will appear:

“Download Complete”
“<Enter” to Return>”

Note: This process will secure the current 12 hour data set; or all data since the last time the Emergency Backup button was pressed if this was less than 12 hours ago.

11.9 Muting Audible Alarm



To mute the audible alarm, press the “Mute” key on the OAU keypad.

For a list of alarm messages which appear on the OAU display, please see Section 11.18 Status and Alarm Messages

The alarm message will remain on the display until the cause of the alarm is resolved. Make note of all alarm messages to inform the technical support provider.

11.10 Dimming the Display



To dim or brighten the LCD display press the “Dim” key on the OAU keypad and toggle to any 1 of the 4 brightness levels.

11.11 Test Screen



To get the VDR Record software version number or the unique DMM Hardware ID, press the “Test” key on the OAU keypad.

An example of the information provided via the “Tests” menu, is as follows:

```
**Test Screen**  
Version: 6.0X.00  
ID: 55N5SS5S55X21
```

Press the “Cancel” button to return to the main screen.

11.12 Viewing Recorded Data on the DMM Internal Hard Drive

The VDR-100G3 stores all data on the internal hard drive in 3 different locations:

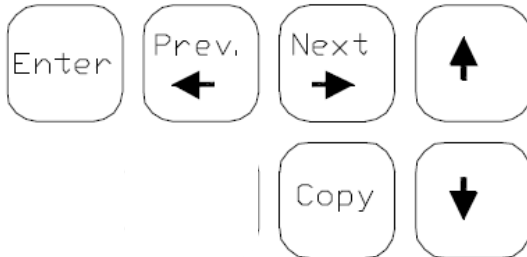
- **Current Data:** 12 hours of the most recently recorded data,
- **Secured Data:** There may be several secured data sets in the overwrite-protected memory space, see 11.1., and
- **Archived Data:** Up to 30 days of data, archived by up to 60 sets of 12 hours each.

Note: Unlike the FRM, which may contain only the data required by IMO regulations, the internal storage locations typically contain a much larger and more detailed data set. This data set includes all AIS/NMEA, and all audio and video data channels collected by the VDR-100G3. If the VDR records more than the minimum data required by IMO, the timeframe recorded may be shorter than the times listed above.

To view a list of recorded data on the OAU display by date and time (To copy selected data sets to a removable USB storage device, see Section 11.13 - Copying Data to a USB Memory Stick (or optional RSM)) proceed as follows:



Important! If you do not intend to copy data, do not press “Enter” when date/time indications of data sets are displayed, otherwise you will immediately initiate a copy process and you may overwrite data on the connected removable storage device, subject to its status, see below!



1. Press the “Copy” button on the OAU keypad. To leave the “View Data” function press “Cancel”.
2. To use the view data function press the “↓↑” keys to move the OAU cursor to “**Copy Data**”, “**Copy Secured**”, or “**Copy Archived**”, then press the “Enter” button on the OAU keypad.
3. When “**Copy Data**” is selected the OAU LCD displays:
 - “**Copy Current Data**” (the current 12 h data set), or
 - “**Copy All Data**” (the current 12 h of the most recently recorded data, all secured data sets, and all archived data sets).
4. When “**Secured Data**” is selected the OAU will display secured data sets of 2 per page.
 - a. Use the ← → keys to navigate through the data sets by pages, or the “↓↑” keys to navigate through the data sets one at a time.
 - b. Data sets appear from oldest to newest and are recorded with the following time format: **yyyy-mm-dd-hh-mm** (where yyyy=year, mm=month, dd=day, hh=hour, and mm=minute).

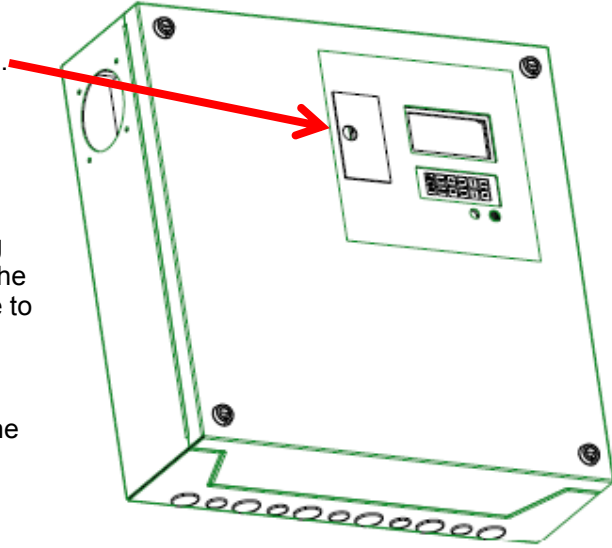
5. When “**Archived Data**” is selected the operation is the same as for “Secured Data” except the may be a greater number of pages from which to select data sets.

11.13 Copying Data to a USB Memory Stick (or optional RSM)

Normally when the G3 is installed the USB Memory Stick is connected to the USB port located in the front compartment of the DPU.

For copying data to the removable USB Memory Stick (or RSM), press “Enter” after you have selected the desired data set. See Section 11.13 - Copying Data to a USB Memory Stick (or optional RSM). Depending on the amount of data to be copied, and of the free memory space available, you may have to acknowledge a display prompt.

The USB Memory Stick will typically hold 2 data sets of 12 hours each (dependant on the data set size).



Warning: Before performing a **Copy** function, make sure the USB Memory Stick (or RSM) does not contain data which you want to keep. Before copying it is recommended that the operator:

1. “Eject” the USB Memory Stick using the OAU keypad,
2. Physically remove the USB Memory Stick from the DPU,
3. Copy the USB Memory Stick contents to an external computer,
4. Return the USB Memory Stick to the DPU compartment.



Warning: Before performing a **Copy All** operation, the USB Memory Stick should be replaced with the RSM having sufficient storage capacity to copy all the contents of the DMM hard drive. This could be as much as 160GB.

Note: The copy process **may take from several minutes to several hours**, depending on the amount of data to be copied. The progress of the recording is displayed on the OAU LCD as a percentage.

If the copy process has finished, failed or been cancelled manually, the OAU LCD will display “**USB: Stby**”. **The USB Memory Stick will not immediately resume normal operation.** After one hour, if the USB Memory Stick has not been ejected from the system, the system will delete all data on it and resume the data recording process to it.

If the system has no Memory Stick nor other USB storage device with sufficient free space connected, the display will show the error message “**Removable Storage Drive Absent.**”

Warning: The following situations will result in all data being deleted from the USB Memory Stick:



1. When the USB Memory Stick is ejected and physically removed from the system, and then re-connected, the VDR will erase all the data on the USB Memory Stick and begin recording data to it again;
2. When data is downloaded or copied to the USB Memory Stick, if the drive is NOT ejected and physically removed within 1 hour after the download is complete, then the VDR will erase all data on the USB Memory Stick and begin recording data to it again;
3. When the USB Memory Stick is unplugged from the system, without first ejecting it, and then it is re-connected, then the VDR will erase all data on the USB Memory Stick and begin recording data to it again;
4. When attempting to download or copy a data set to the USB Memory Stick, if there is insufficient memory, then the VDR will erase all data on the USB Memory Stick in an attempt to free enough memory for the download to succeed.

11.14 Connecting the USB Memory Stick

To connect the USB Memory Stick, insert it into the available USB port. The system will detect the drive and the OAU will display a USB Memory Stick status of "USB: STBY". After at least 10 seconds, the system will begin recording to the USB Memory Stick and the OAU will display a USB Memory Stick status of "USB: REC".



Once the USB Memory Stick RSM is physically connected, the DMM will automatically detect it and begin the recording process to it. As part of this process, all data on the USB Memory Stick will be deleted.

11.15 Connecting the RSM

To connect the RSM, once the USB Memory Stick has been properly ejected and physically removed, complete the following steps:

1. Attach the USB 2.0 cable from the RSM to the USB 2.0 port in the compartment in the front panel of the DPU;
2. Connect the AC power cable to the RSM;
3. Power on the RSM (switch RSM Power to "On" position);

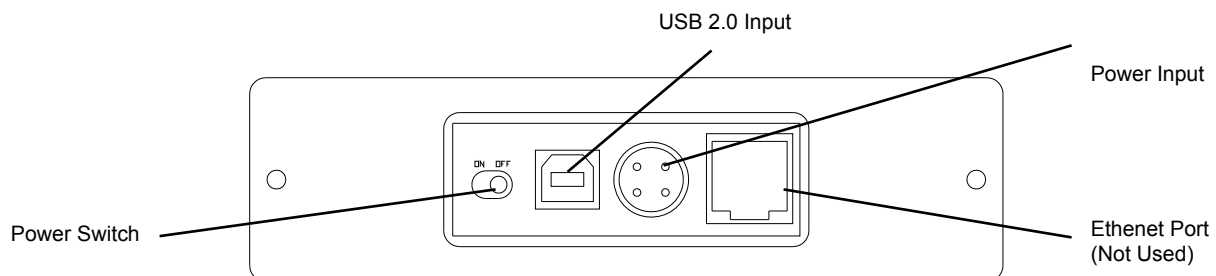


Figure 11-6 - Rear View of RSM Unit

The system will auto-detect the RSM and the OAU will display the status as “USB: STBY”.



Once the RSM is physically connected, the DMM will automatically detect it. As part of this process, all data on the RSM will be deleted.

11.16 Disconnecting the USB Memory Stick or RSM

The process to disconnect/eject the USB Memory Stick or RSM must be performed prior to physically disconnecting the unit from the system.



Important! Do not physically disconnect the USB Memory Stick or RSM before ejecting it from the system via the OAU. Failure to eject the drive properly will trigger a “REMOTE ERROR” on the OAU. This error can be cleared only by re-connecting the improperly removed drive (See Section 11.14 - Connecting the USB Memory Stick and 11.15 - Connecting the RSM).

Warning: failure to properly eject the drive may result in disk corruption.

It is recommended to **POWER OFF** the RSM **BEFORE** physically disconnecting it.

To disconnect the USB Memory Stick (USB) or RSM, the following steps must be completed:



1. Press the “**Eject**” button on the OAU menu pad;
2. Press “**Enter**” to select the “**USB**” option on the OAU display;
3. The OAU will display the message “**Disconnecting**” indicating that the operator should wait while the USB Memory Stick or RSM is disconnected.
4. The OAU will then display a message “**USB Archiving has been disabled for 1 hour**”, meaning that which indicated it is safe to remove the external device;
5. After approximately 10 seconds the OAU will display the message “**USB: Stby**” for up to 1 hour, until the device is removed or disconnected;
6. To remove the USB Memory Stick open the USB compartment cover on the DPU and unplug the USB Memory Stick;
7. To disconnect an RSM, turn off RSM power and unplug the RSM cable from the USB compartment on the DPU.



NOTE: After the OAU LCD displays “**USB: STBY**” then the USB Memory Stick should be removed immediately. If the USB Memory Stick is NOT unplugged within 1 hour after the eject operation the VDR – 100G3 will erase all data on the USB Memory Stick and begin recording data to it again.

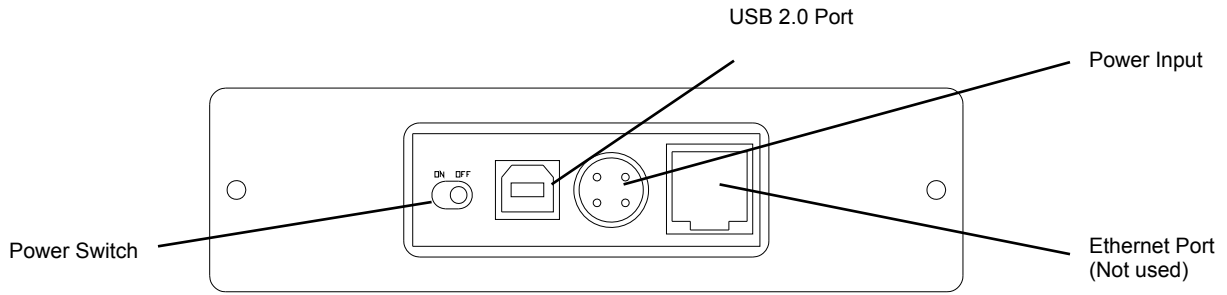


Figure 11-7 - Rear View of RSM Unit

11.17 Re-connecting the USB Memory Stick or RSM

To connect the USB Memory Stick, insert it into the USB compartment of the DPU or connect the power and data cables to the RSM.

The system will detect the drive and the OAU will display “**USB: Stby**” If connecting a USB Memory Stick, after at least 10 seconds the system will begin recording to the USB Memory Stick and the OAU will display a “**USB: Rec**”



Once the USB Memory Stick is physically connected, the VDR will automatically detect it and begin the recording process to it. As part of this process, all data on the USB Memory Stick will be deleted.

Once the RSM is physically connected, the VDR will automatically detect it. As part of this process, all data on the RSM will be deleted.

11.18 Status and Alarm Messages

Listed below are the alarm codes that may appear on the OAU 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 RSM or the USB Memory Stick
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 write data to the DMM internal hard drive
GPS Error	Failure to record GPS data

Table 11-1 - Alarm Code Description



NOTE: Pressing the “Mute” button acknowledges the alarm code and silences the alarm. The alarm message will be displayed as long as the condition causing the alarm exists.

USB Memory Stick and RSM OAU Status Messages'				
	Drive Absent	Drive Present, Not Recording	Drive Present, Recording	Drive Error Detected*
USB	NONE	STBY	REC	ERR
RSM	NONE	STBY	Not Applicable	ERR

*** When an error is detected with either the USB Memory Stick and/or the RSM, the OAU will also display a “REMOTE ERROR” alarm.**

Table 11-2 - USB Memory Stick and RSM OAU Status'

11.19 Connecting the Client PC to the USB Memory Stick

To retrieve data from the USB Memory Stick using the client PC complete the following steps:

1. Plug the USB Memory Stick in to an available USB 2.0 port on the client PC.
2. The USB Memory Stick will be visible on the Client PC as a connected USB drive.

Note: A USB 1.1 port may also be used but it takes much longer to transfer the data than a 2.0 port.

The VDR - 100G3 Playback Application may be used to view the data. Refer to Appendix 5 – Playback Software.

11.20 Connecting Client PC to RSM

To retrieve data from the RSM using the Client PC, complete the following steps:

1. Connect the RSM to an available USB 2.0 port on the client PC using an “A to B” USB cable;
2. The RSM will be visible on the Client PC as a connected USB drive.

The VDR - 100G3 Playback Application may be used to view the data. Refer to Appendix 5.

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Rutter VDR-100G3/G3S Installation Manual

Chapter 12: Final Recording Medium Setup

Rev. 1.5

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12 FINAL RECORDING MEDIUM SETUP

12.1 FRM System Overview

The **Final Recording Medium (FRM)** is a solid-state storage unit capable of storing a minimum of 12 hours of VDR-100G3/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 recorded by the VDR. This data will be used, in the event of an incident or accident by an 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.

The VDR-100G3 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 1 – 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.

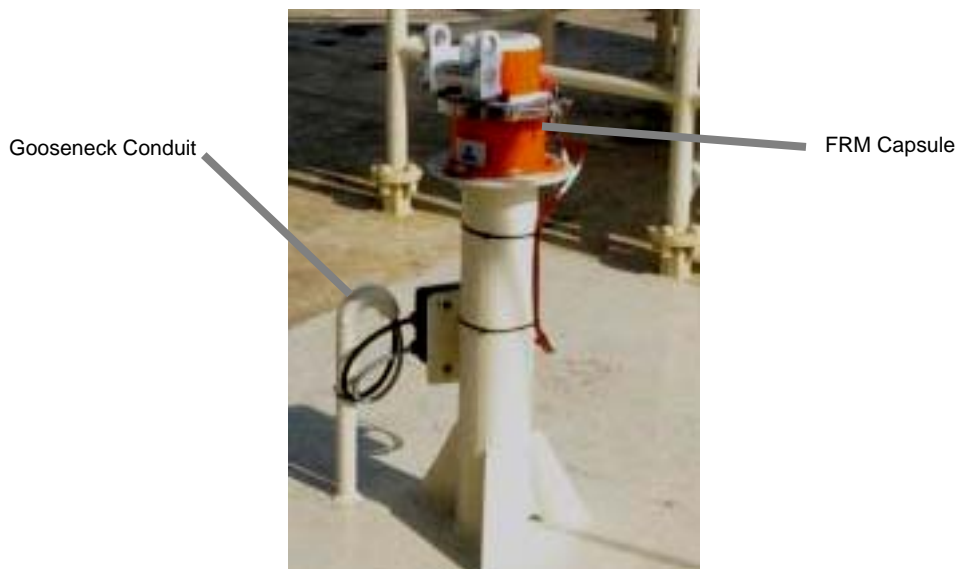


Figure 12–1 - Sample VDR-100G3S FRM Installation

12.1.1 General Setup

This section will cover the basics of preparing the VDR Record application to record data to the FRM or SFRM.

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
```

hardenedStorage	
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 12-1 - 'hardenedStorage' enables recording to the FRM.

hardenedFormat	
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 always 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.

Table 12-2 - 'hardenedFormat' indicates the manufacturer of the primary FRM.

secondaryHardenedFormat	
<p>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 always set as the primary FRM. If the VDR is operating in a single FRM configuration, this value is ignored.</p>	
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 12-3 – 'secondaryHardenedFormat' indicates the manufacturer of the secondary FRM.

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) Fixed 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
```

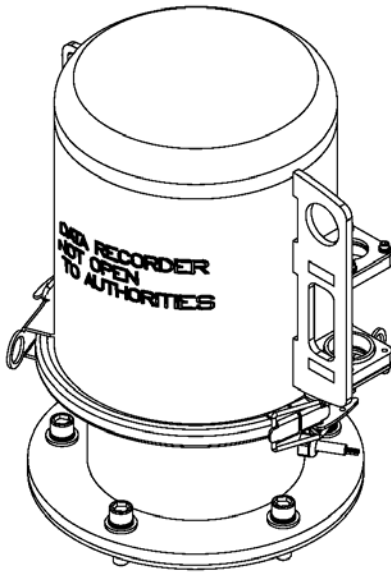
12.2 Fixed Capsules

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;

12.2.1 Rutter FRM (RUT-02447) Fixed Capsule



VIEW NOT TO SCALE

Figure 12–2- Rutter FRM (RUT-02447) Fixed Capsule

The Rutter FRM (RUT-02447) Fixed Capsule is an armoured stainless steel (A316) capsule, connected to other system components via two cables (Ethernet and Power cables).

The Rutter FRM (RUT-02447) Fixed Capsule is the “Black Box” storage medium for ships. It is coloured bright orange for ease of location in the event of an incident.

The Rutter FRM (RUT-02447) Fixed Capsule is approved to be used with both VDRs and SVDRs

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 unit is designed to meet the requirements of the IEC Performance standard which are the same as those enforced by the maritime and aerospace authorities.

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.

With a 4 GB storage capacity, the Rutter FRM (RUT-02447) Fixed Capsule has the capacity to store audio, radar video and serial data for 12 hours as defined in the regulations. When the power supply is removed the Rutter FRM (RUT-02447) Fixed Capsule will retain the data for more than 10 years.

The Rutter FRM (RUT-02447) Fixed 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) Fixed 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.

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

The Rutter FRM (RUT-02447) Fixed Capsule is supplied with interconnect cables. These cables must connect to the VDR-100G3/S through a junction box (**not provided with VDR-100G3/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-100G3/S**).

Plan to mount the Rutter FRM (RUT-02447) Fixed 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:

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

12.2.1.2 Mounting the Rutter FRM (RUT-02447) Fixed 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) Fixed Capsule is supplied with interconnect cables (3 meters of Ethernet cable and 3 meters of Power cable. These cables must connect to the VDR-100G3/S through a junction box (not provided with VDR-100G3/S). The junction box must be shielded and connected to the hull of the vessel.

The Rutter FRM (RUT-02447) Fixed 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.**

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.**

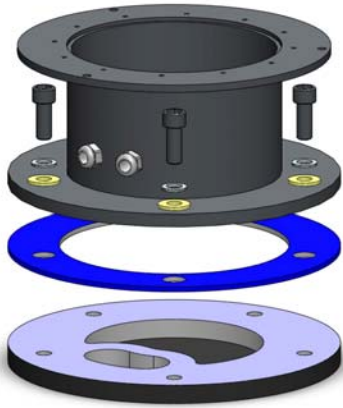


Figure 12–3- Fastening the deckmount assembly to the deck.

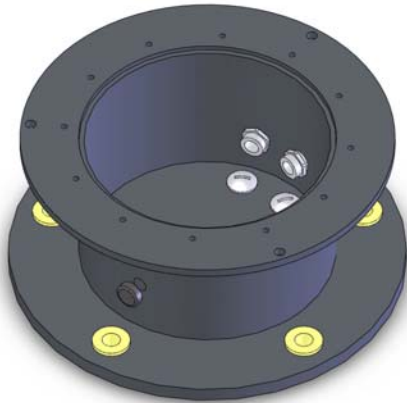


Figure 12–4 - When feeding the cables (through the deck) from the bottom, alternative cable entries may be used by interchanging the cable glands and blind plates.

12.2.1.3 Connecting the Rutter FRM (RUT-02447) Fixed Capsule



NOTE: It is **highly** recommended that cables connecting the Rutter FRM (RUT-02447) Fixed Capsule to the VDR-100G3/S is installed through a gooseneck conduit (see Figure 12–1 - Sample VDR-100G3S FRM Installation for a sample FRM installation.)

Communication connections between the VDR-100G3 and the Rutter-FRM (RUT-02447) Fixed Capsule is via the RJ45 connectors (See Figure 12–12 - RJ45 Connector). The Rutter (RUT-02447) Fixed Capsule requires no setup or partitioning. It will function correctly when properly connected. Connection is made as per drawing entitled **Rutter FRM (RUT-02447)**

Connections found in the Drawing Appendix section of the VDR-100-G3 Approval Drawing package at the back of the VDR-100-G3 Installation Manual.

The junction box adjacent to the FRM on the vessel's outside deck **is not** supplied with the VDR-100G3/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G3/S. The J-Box is where the Ethernet Crossover connection is made.

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. Wiring of the Rutter FRM (RUT-02447) Fixed Capsule is summarized as follows:

Rutter Fixed Capsule J-Box Wiring					
DMM RJ-45 Plug		VDR Side	Terminal Block Number	FRM Side	Signal
WHITE/ORANGE	1	ORANGE	1	BLUE	Rx+
ORANGE	2	WHITE/ORANGE	2	WHITE	Rx-
WHITE/GREEN	3	GREEN	3	ORANGE	Tx+
GREEN	6	WHITE/GREEN	4	YELLOW	Tx-
PCC/FRM-PWR+		BROWN	5	BLUE	+24 VDC
PCC/FRM-PWR-		WHITE	6	WHITE	24 VDC RET.

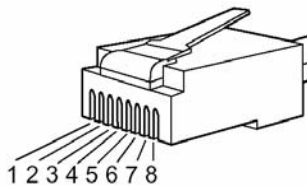
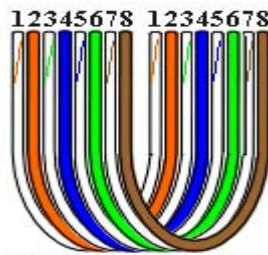
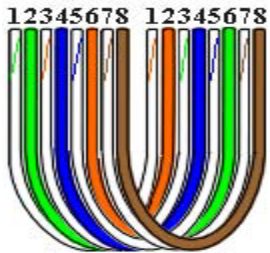


Figure 12-5 - RJ45 Connector

--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-THRU 568B



CROSSOVER

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	

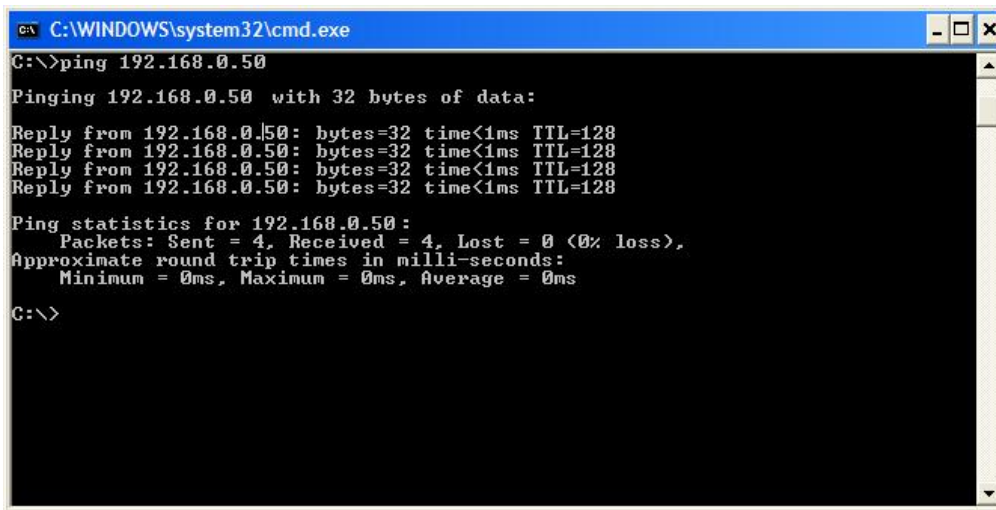
Table 12-4 Straight-through Ethernet cable set ups

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 12-5 – Cross-over Ethernet cable set ups

12.2.1.4 Testing the Rutter FRM (RUT-02447) Fixed Capsule Physical Connection

1. Confirm the cable connections between the Rutter FRM (RUT-02447) Fixed Capsule and the VDR;
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) Fixed Capsule.
7. If the request times out, check Rutter FRM (RUT-02447) Fixed Capsule cable connections; and see paragraph 12.2.1.5



```

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
Reply from 192.168.0.50: bytes=32 time<1ms TTL=128
Reply from 192.168.0.50: bytes=32 time<1ms TTL=128
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 12–6 - Pinging the Rutter FRM (RUT-02447) Fixed Capsule

8. Once communications has **been verified**, close the Command Prompt window and go to Section 12.2.1.6. If communications **cannot be verified** go to Section 12.2.1.5.

12.2.1.5 How to Check the FRM Ethernet port IP Address for 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 configured, communication between the VDR and the Rutter FRM (RUT-02447) Fixed Capsule will not be possible. The FRM port must be in the same range as the Rutter FRM (RUT-02447) Fixed Capsule, with the last segment different than the VDR (as shown below.). To check and/or 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 2 to 254, **except 50.**)
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.

12.2.1.6 Configuring the Rutter FRM (RUT-02447) Fixed Capsule

To begin setting up a Rutter FRM (RUT-02447) Fixed/SFRM Capsule support:

1. Open Notepad;
2. Locate the file <C:\Windows\vdrparams.ini>;
3. Open the file using Notepad;
4. Locate the [STORAGE] section of the open file; and
5. Set the entries that must be 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
```

12.2.1.7 Start Recording to the Rutter FRM (RUT-02447) Fixed Capsule

1. Start the VDR_Record application from the desktop.
2. Observe the following messages are presented in the Log Window.
 - a. The Rutter FRM (RUT-02447) Fixed Capsule is ready
 - b. Successfully saved vdrparams.ini to the Rutter FRM (RUT-02447) Fixed Capsule
 - c. Successfully saved vdr-cfg.txt to the Rutter FRM (RUT-02447) Fixed Capsule
3. Allow the VDR to record for 12 continuous hours

12.2.1.8 Confirm the Rutter FRM (RUT-02447) Fixed Capsule Recording

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. Disconnect the Rutter FRM (RUT-02447) Fixed 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 Rutter FRM (RUT-02447) Fixed 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 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 192.168.0.10 (the last number can be any number from 2 to 254, **except 50.**)
 - f. Click the "OK" button in the Internet Protocol (TCP/IP) Properties and the Local Area Connection Properties.
 - g. The connection should now be established.
3. Launch the FRM Download application and use it to download the recorded data from the Rutter FRM (RUT-02447) Fixed Capsule. When the download is completed, exit the FRM Download application.
4. Open the Playback application on the technician PC and select the downloaded FRM data set to playback.

5. 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.
6. Select the beginning of the data set to start playback and observe that video, audio and NMEA have been recorded and that the start time of each stream is in fact 12 hours previous to the end time. Stop playback.
7. Select the middle of the data set to playback and observe that video, audio, and NMEA have all been recorded.
8. Select the end of the data set to start playback and observe that video, audio and NMEA have all been recorded for 12 hours.
9. Stop playback and exit the application.

12.2.2 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* and the *MSC.163(78)* performance standards

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 *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.

12.2.2.1 Planning for the SVR-02 Fixed SFRM Capsule

The FRM/SFRM is supplied with an interconnect cable. This cable must connect to the VDR-100G3/S through a junction box (**not provided with VDR-100G3/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-100G3/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-02, or SVR-03.

12.2.2.2 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-02 Fixed FRM Capsule
2. L3 SVR-03 Fixed SFRM Capsule



NOTE: The SVR-03 and HVR-02 are physically distinct, but share the same setup processes. 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..

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-02	15990	131072	9413	5636	941
SVR-03	15990	131072	9413	5636	941

Table 12-6 – 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).

12.2.2.3 Mounting L3 HVR/SVR Fixed FRM/SFRM Capsules

Plan to mount the L3 HVR/SVR Fixed FRM/SFRM 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.**



NOTE: Refer to diagrams in the Appendix 7: Approved Drawings 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:

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

The L3 HVR/SVR Fixed FRM/SFRM Capsule is supplied with interconnect cable. These cables must connect to the VDR-100G3/S through a junction box (not provided with VDR-100G3/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-100G3/S).

12.2.2.4 Connecting the L3 HVR/SVR Fixed FRM/SFRM Capsule Fixed SFRM

The wiring of the connections between the VDR-100G3 and the L3 HVR/SVR Fixed FRM/SFRM Capsule is via the RJ45 connector (illustrated in Figure 12–7 - RJ45 Connector).

The junction box adjacent to the FRM/SFRM on the vessel’s outside deck **is not** supplied with the VDR-100G3/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G3/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.

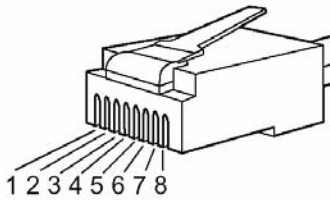


Figure 12–7 - RJ45 Connector

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 12-7 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 12-8 – Cross-over Ethernet cable set ups



STRAIGHT-THRU 568B



CROSSOVER



NOTE! It is **highly** recommended that cabling connecting the FRM/SFRM to the VDR-100G3/S is installed through a gooseneck conduit (see Figure 12–1 - Sample VDR-100G3S FRM Installation for a sample FRM installation.)

12.2.2.5 VDR-100G3 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-02 Fixed FRM Capsule partition sizes, refer to *Section 12.2.2.2: L3 HVR/SVR Fixed FRM/SFRM Capsule Partitions Overview.*):

1. Open Internet Explorer from the VDR desktop;
2. Under 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.

12.2.2.6 VDR-100G3S with L3 SVR-03 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 12.2.2.5: VDR-100G3 with L3 HVR 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).

12.2.2.7 Mounting L3 HVR/SVR Fixed FRM/SFRM Capsules

Plan to mount the L3 HVR/SVR Fixed FRM/SFRM 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.

NOTE: Refer to diagrams in the Appendix 7: Approved Drawings 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 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) Fixed Capsule beacon operates correctly.

The L3 HVR/SVR Fixed FRM/SFRM Capsule is supplied with interconnect cable. These cables must connect to the VDR-100G3/S through a junction box (not provided with VDR-100G3/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-100G3/S).

12.2.2.8 Connecting the L3 HVR/SVR Fixed FRM/SFRM Capsule Fixed SFRM

The wiring of the connections between the VDR-100G3 and the L3 HVR/SVR Fixed FRM/SFRM Capsule is via the RJ45 connector (illustrated in Figure 12-7 - RJ45 Connector).

The junction box adjacent to the FRM/SFRM on the vessel's outside deck is not supplied with the VDR-100G3/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G3/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.

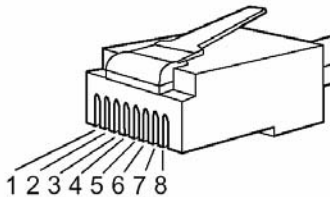


Figure 12-8: RJ45 Connector

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 12-7 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 12-8 – Cross-over Ethernet cable set ups



CROSSOVER

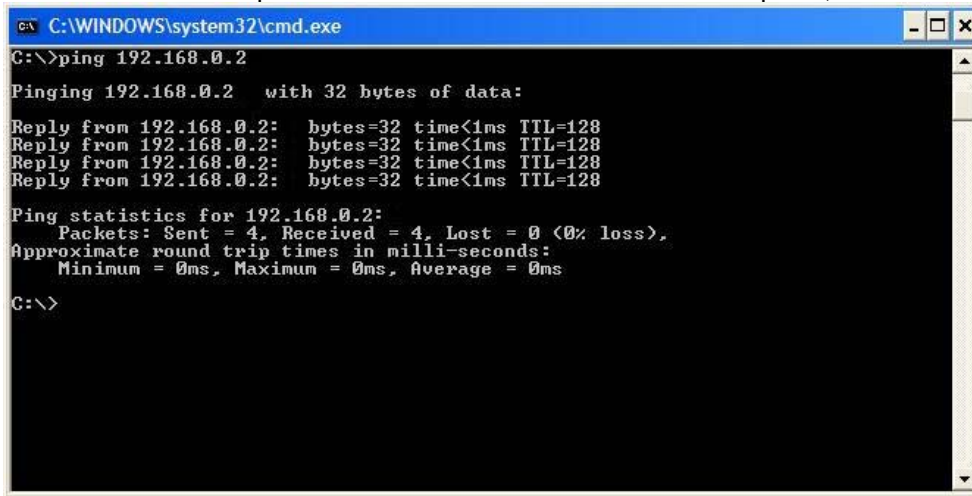


NOTE! *It is highly recommended that cabling connecting the FRM/SFRM to the VDR-100G3/S is installed through a gooseneck conduit (see Figure 12-1 - Sample VDR-100G3S FRM Installation for a sample FRM installation.)*

12.2.2.9 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
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
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 12–9 - Pinging the L3 HVR-02 or SVR-03 Fixed FRM/SFRM Capsule

6. If the request times out, check the HVR-02 Fixed FRM Capsule cable connections; and
7. Close the Command Prompt window when communication **is verified** and go to Section 12.2.2.11. If communications **cannot be verified** go to Section 12.2.2.10

12.2.2.10 How to Check FRM Ethernet Port IP Address for 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 configured, 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 check and/or 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.

12.2.2.11 Configuring L3 HVR/SVR Fixed FRM/SFRM Capsules

To begin setting up an L3 HVR/SVR Fixed FRM/SFRM Capsule support:

1. Open Notepad;
2. Locate the file <C:\Windows\vdrparams.ini>;
3. Open the file using Notepad;
4. Locate the [STORAGE] section of the open file; and
5. Set the entries that must be set as shown below:

[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
```

```
L3HVR-compressNMEA = 1           // 0 = disable, 1=enable; default is 1
```

12.2.2.12 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;
6. Allow the VDR to record to the L3 HVR/SVR Fixed FRM/SFRM Capsule for 12 continuous hours.

12.2.2.13 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 the "Download Audio" stream option checked. If all 3 options are checked, all 3 streams will be downloaded.

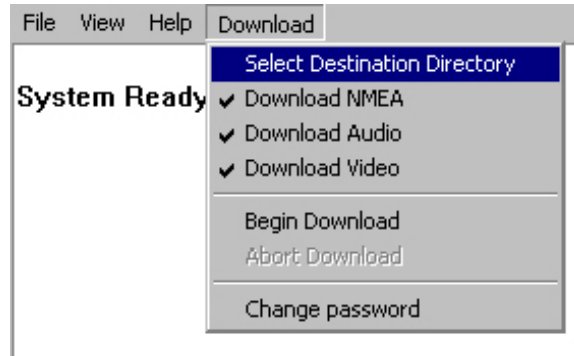


Figure 12–10 - Download Stream Options

6. Select “Begin download” under the Download menu.
7. Enter uppercase VDR for the password;
8. Select a location to save the downloaded files.



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.
21. Exit the application.

12.3 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.

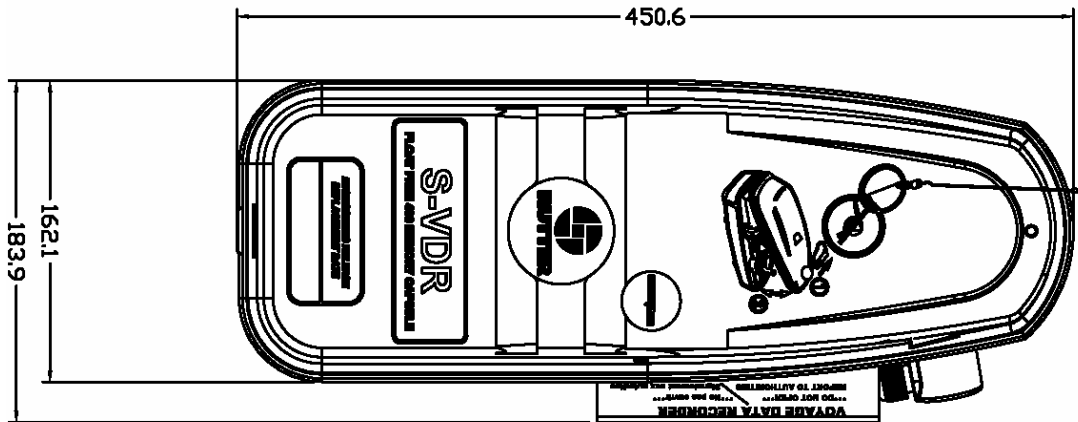
12.3.1 Rutter-ACR Float-free SFRM Capsule Setup

The Rutter-ACR Float-free SFRM Capsule includes an inner memory capsule and the yellow exterior mounting bracket SeaShelter2. The memory 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-100G3 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.

Rutter-ACR Float-free SFRM Capsules shipped with VDR-100G3\S serial numbers 30108110376 and later, include a set of mounting plates with predrilled holes that are attached to the exterior of the SeaShelter2 mounting bracket. This allows the technician to mount the Rutter ACR Float free capsule without removing the protective cover of the SFRM.



Rutter ACR Float-free capsule

12.3.1.1 Planning for the Rutter-ACR Float-free SFRM Capsule

The Rutter-ACR Float-free SFRM Capsule is connected via an Ethernet interface cable to the VDR-100G3/S. All hull penetrations for cables must be fitted with waterproof glands.

This Ethernet connection is through a PoE Ethernet connect box (PS-100) which is connected to the FRM port of the VDR-100G3/S DMM.

- For VDR serial numbers prior to 30108110376 the connection at the ACR capsule is made via an RJ45/cable gland;
- For VDR serial numbers 30108110376 and up, the connection to the PS-100 is made via a junction box. This junction box is normally mounted on the exterior deck near the FRM and positioned within range of the interconnect cable.

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.

NOTE: For VDR serial number 30108110376 and up this connection is made inside a junction box.

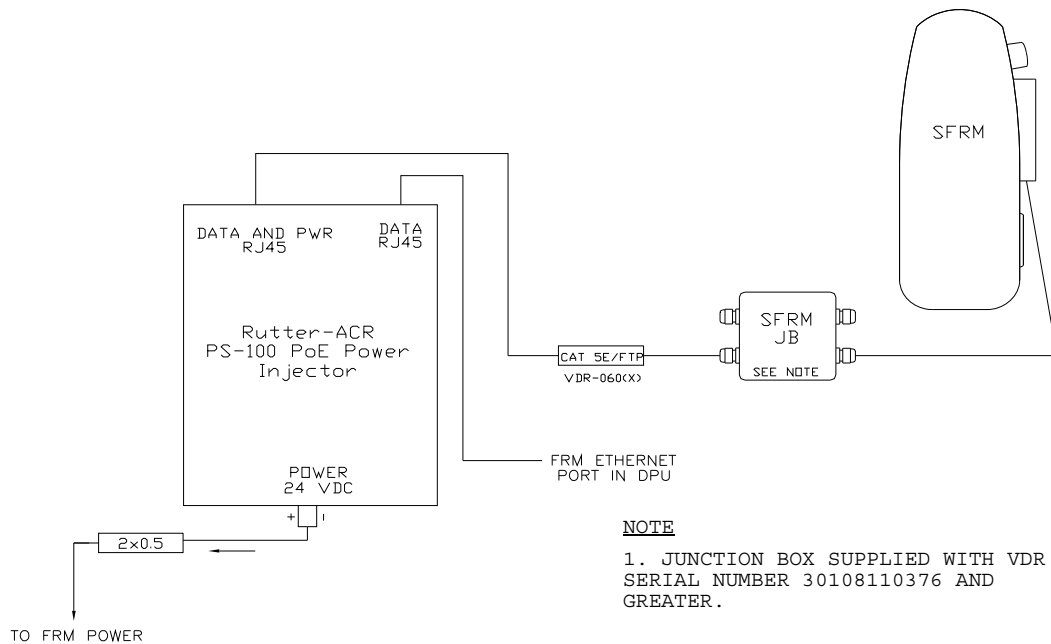


Figure 12-11 - Rutter-ACR Float-free SFRM Capsule Cable Connections

12.3.1.2 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 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 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-100G3 DPU: The maximum distance allowed for PoE is 75 metres

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 Ethernet RJ45's connections at the top.

For VDR-100G3\S serial numbers 30108110375 and later:

- The Rutter-ACR Float-free SFRM Capsule is supplied with a 5m Ethernet cable intended to connect the capsule to a junction box. The junction box must be shielded and connected to the hull of the vessel. All cables extending through a ship hull must be fitted with waterproof glands (not provided with VDR-100G3/S) and, if extending through a deck, must be protected by gooseneck conduit.
- Rutter-ACR Float-free SFRM Capsules are shipped with a set of mounting plates with predrilled holes that are attached to the exterior of the SeaShelter2 mounting bracket. This allows the technician to mount the Rutter ACR Float free capsule without removing the protective cover of the memory capsule.

12.3.1.3 Connecting the Rutter-ACR Float-free SFRM Capsule

The Rutter-ACR Float-free SFRM Capsule requires no setup or partitioning. It will function correctly when properly connected. Communication and Power connections between the VDR-100G3/S and the Rutter-ACR Float-free SFRM Capsule is via Ethernet cable and connections.

For VDR serial numbers prior to 30108110376: Mount the capsule and connect the cables to the capsule and the PS-100 to complete the installation. Connection is made as per drawing entitled **ACR Capsule Connections (See Note 2)** found in the Drawing Appendix section of the VDR-100-G3 Approval Drawing package at the back of the VDR-100-G3 Installation Manual.

For VDR serial numbers 30108110376 and up: Mount the capsule and connect the cables to the junction box and the PS-100 to complete the installation. Connection is made as per drawing entitled **ACR Capsule Connections (See Note 1)** found in the Drawing Appendix section of the VDR-100-G3 Approval Drawing package at the back of the VDR-100-G3 Installation Manual.

The junction box can be located inside the ship, 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.

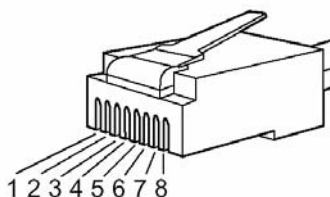


Figure 12-12 - RJ45 Connector

- 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	

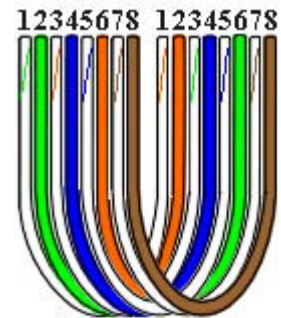
Table 12-9 Straight-through Ethernet cable set ups

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 12-10 – 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-100G3 is installed through a gooseneck conduit if extending through a deck.

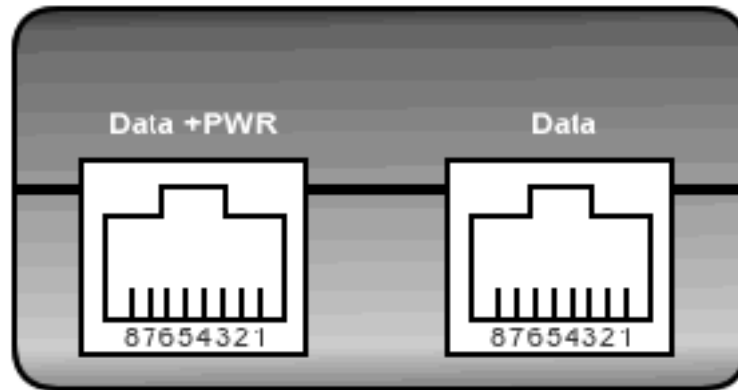


Figure 12–13 – Rutter-ACR Float-free SFRM Capsule Data and Power ports on the PS-100

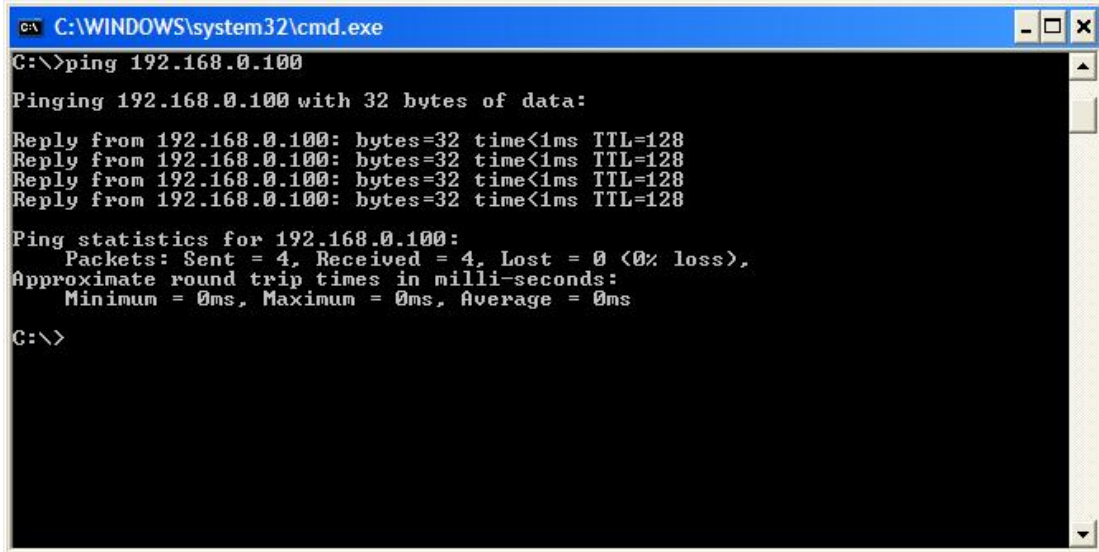
12.3.1.4 Rutter-ACR Float-free SFRM Capsule Power

PoE technology brings power, as well as data transfer, to the capsule via a standard twisted-pair Ethernet cable. The industry standard is 48VDC 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

12.3.1.5 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, type ping 192.168.0.100
4. Hit the Enter key on the keyboard;
5. Observe that 4 replies are received from the Rutter-ACR Float-free SFRM Capsule;
6. If the request times out, check Rutter-ACR Float-free SFRM Capsule cable connections; and see paragraph 12.3.1.6



```

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
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
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 12–14 - Pinging the Rutter-ACR Float-free SFRM Capsule

7. Once communications **has been verified**, close the command prompt window and go to Section 12.3.1.7. If communications **cannot be verified** go to Section 12.3.1.6.

12.3.1.6 How to Check FRM Ethernet Port 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 correctly configured, communication between the VDR and the Rutter ACR Float Free SFRM Capsule will not be possible. The FRM port must be in the same range as the Rutter ACR Float Free SFRM Capsule with the last segment different that the VDR (as shown below).

To check and/or 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 (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.

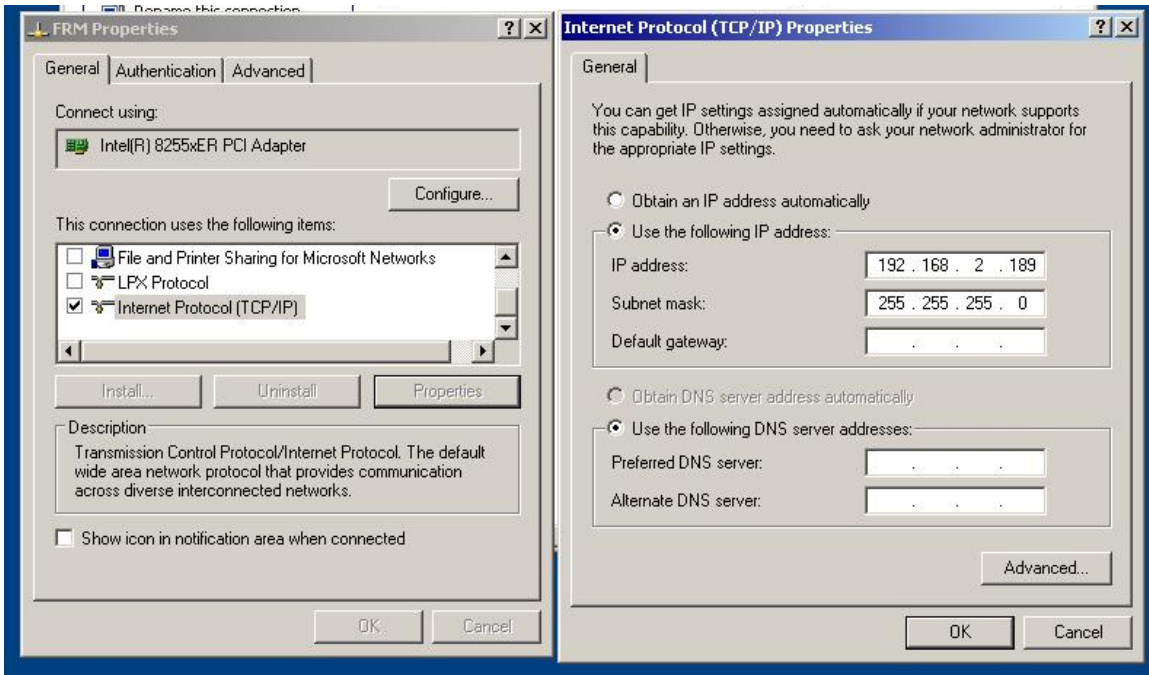


Figure 12–15 - Establishing TCP/IP Address

12.3.1.7 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 begin setting up the Rutter-ACR Float-free SFRM Capsule support:

1. Open Notepad;
2. Locate the file <C:\Windows\vdrparams.ini>;
3. Open the file using Notepad;
4. Locate the [STORAGE] section of the open file; and
5. Set the entries that must be set 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
```

12.3.1.8 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. 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;
5. Allow the VDR to record for 12 continuous hours.

12.3.1.9 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.
2. Recording will stop.
3. Disconnect the Rutter-ACR Float-free SFRM Capsule from the VDR;
4. Connect the Rutter-ACR Float-free SFRM Capsule to a free Ethernet port on the Technician PC.
5. 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.
6. 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 (the last number can be any 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.
7. Launch the FRM Download application.
8. Use the FRM Download application to download the recorded data from the Rutter-ACR Float-free SFRM Capsule.
9. The application will indicate when the download is completed.
10. Exit the FRM Download application.
11. Open the Playback application on the Technician PC.
12. Select the downloaded FRM data set to playback.
13. 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.
14. Select the beginning of the data set to start playback.
15. 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.
16. Stop playback.
17. Select the middle of the data set to playback.
18. Observe that video, audio, and NMEA have all been recorded.
19. Select the end of the data set to start playback.
20. Observe that video, audio and NMEA have all been recorded for 12 hours.
21. Stop playback.
22. Exit the application.

12.3.2 JoTron Float-free SFRM Capsule Set-Up

The JoTron Float-free Capsule is a combined SFRM and EPIRB approved for use with the VDR-100G3S.

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.

12.3.2.1 Planning for the JoTron Float-free SFRM Capsule

The SFRM is supplied with an interconnect cable. This cable must connect to the VDR-100G3/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 FRM cables. It must also be fully screened and connected to the vessel's hull. If mounted outside, it must also be waterproof.



Note! It is **highly** recommended that cabling connecting the SFRM to the VDR-100G3/S is installed through a gooseneck conduit (see Figure 12–1 - Sample VDR-100G3S FRM Installation for a sample SFRM installation.)

The JoTron Float-free, final recording medium capsule is connected to the VDR-100G3/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.**

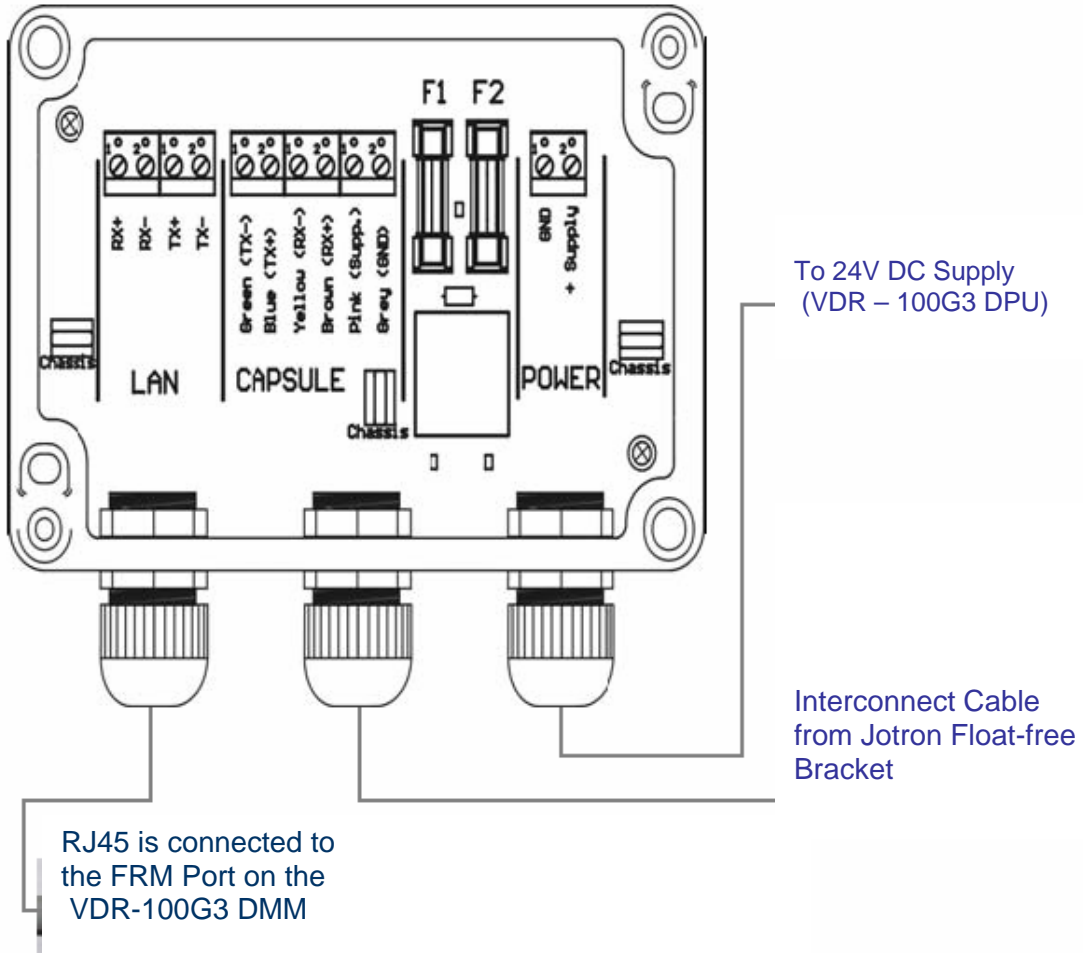


Figure 12-16 - JoTron Float-free SFRM Capsule Junction Box Connections

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 12-11 - JoTron Float-free SFRM Capsule Data and Power Connection

Refer to the FRM manufacturer's installation manual to confirm all FRM installation information.

12.3.2.2 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. 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.”

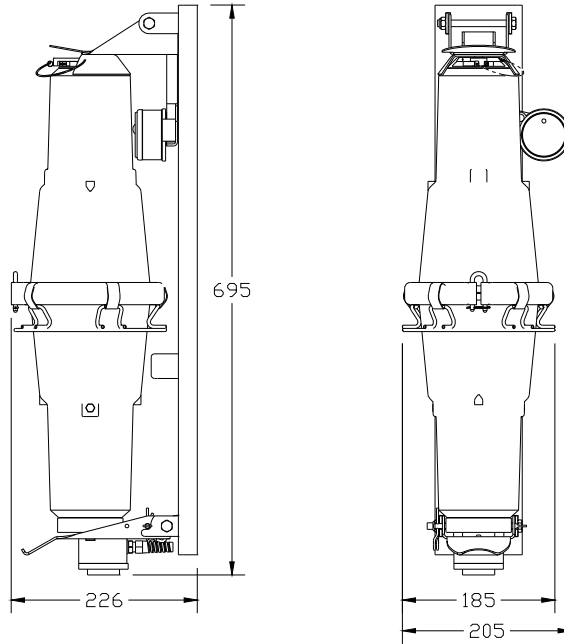


Figure 12–17 - JoTron Float-free SFRM Capsule



NOTE! *The mounting pattern provided in Figure 12–17 - JoTron Float-free SFRM Capsule above, is applicable to the **VDR-100G3S 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-100G3/S through a junction box that is supplied with the JoTron float free capsule.

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-100G3/S**) and should be protected by a gooseneck conduit.

12.3.2.3 Connecting the JoTron Float-free SFRM Capsule

The wiring of the data connection between the VDR-100G3 and the FRM is via the RJ45 connector (illustrated in Figure 12–18 - 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-100G3/S.

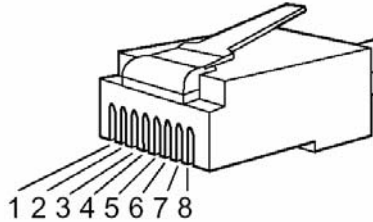


Figure 12–18 - RJ45 Connector

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

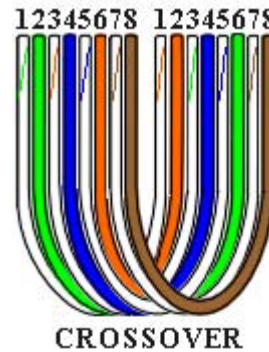
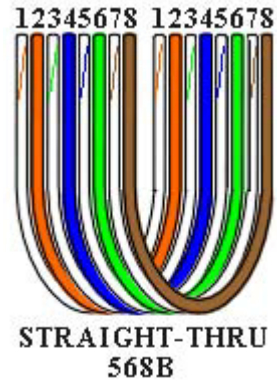
Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

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 12-12 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 12-13 – Cross-over Ethernet cable set ups



NOTE! It is **highly** recommended that cabling connecting the JoTron Float-free SFRM Capsule to the VDR-100G3 is installed through a gooseneck conduit.

12.3.2.4 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;

4. If the request times out, check the JoTron Float –free SFRM capsule cable connections (see Figure 12–19 - 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
Reply from 192.168.0.37:  bytes=32  time<1ms  TTL=128
Reply from 192.168.0.37:  bytes=32  time<1ms  TTL=128
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 12–19 - Pinging the JoTron Float-free SFRM Capsule

5. Once communications **has been verified**, close the command prompt window and go to Section 12.3.2.6. OR, if communications **cannot be verified** go to Section 12.3.2.5.

12.3.2.5 How to Check the FRM Ethernet Port IP Address for the 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 configured, 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 check and/or 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.

12.3.2.6 Configuring the JoTron Float-free Capsule

To begin setting up the JoTron Float-free Capsule support:

1. Open Notepad;
2. Locate the file <C:\Windows\vdrparams.ini>;
3. Open the file using Notepad;
4. Locate the [STORAGE] section of the open file; and

Set the entries that must be set 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*.

12.3.2.7 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
5. Allow the VDR to record for 12 continuous hours.

12.3.2.8 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 Playback application. To download data recorded see 12.3.2.8.1 Downloading Jo-Tron Data

12.3.2.8.1. Downloading Jo-Tron Data

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. 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;
3. Launch the FRM Download application;
4. Use the FRM Download application to download the recorded data from the Rutter-ACR Float-free SFRM Capsule.
5. The application will indicate when the download is completed;
6. Exit the FRM Download application;
7. Open the Playback application on the Technician PC;
8. Select the downloaded FRM data set to playback;
9. 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.
10. Select the beginning of the data set to start playback;
11. 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;
12. Stop playback;
13. Select the middle of the data set to playback;
14. Observe that video, audio, and NMEA have all been recorded.
15. Select the end of the data set to start playback;
16. Observe that video, audio and NMEA have all been recorded for 12 hours;
17. Stop playback; and
18. Exit the application.

12.4 Dual Capsule FRM/SFRM

The Rutter Technologies VDR100-G3 will support the simultaneous use of 2 FRM devices. This configuration currently supports the use of the L3 HVR-/02 Fixed FRM Capsule or Rutter FRM (RUT-02447) Fixed 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 anticipated.

12.4.1 Planning for Dual Capsule Setup

Refer to the planning section given in the appropriate section for the FRM and SFRM to be mounted.

12.4.2 Install Capsule on Download Hub

When using a secondary capsule, a second hub must be provided in the DPU cabinet. The hub is mounted wherever it is best accessible and 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.

12.4.2.1 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 12.3.1: Rutter-ACR Float-free SFRM Capsule Setup and Section 12.3.2: JoTron Float-free SFRM Capsule Set-Up

12.4.3 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.

12.4.4 Set up Secondary Capsule

There are several steps to configuring the capsule to function as a secondary unit. These steps are described in the following sections.

12.4.4.1 Configuring the VDR For Dual FRM Operation

To begin setting up Dual FRM Capsule support:

1. Open Notepad;
2. Locate the file <C:\Windows\vdrparams.ini>;
3. Open the file using Notepad;
4. Locate the [STORAGE] section of the open file; and
5. Set the entries that must be set as shown below:

To configure an L3 HVR-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) Fixed 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.

12.4.4.2 Changing the IP of the Rutter-ACR Float-free SFRM Capsule

The secondary FRM is installed on the download hub. 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;
8. Once the IP is changed, communication is no longer be possible from the FRM port;
9. Recycle the power on the Rutter-ACR Float-free SFRM Capsule.

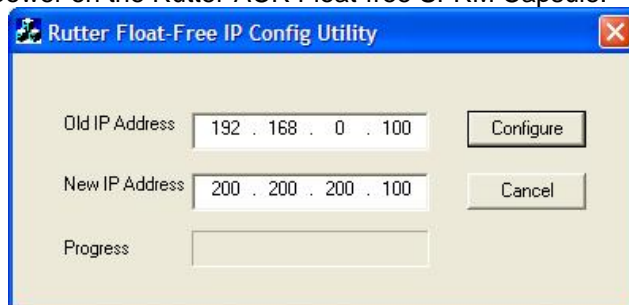


Figure 12-20 - Rutter Float-free IP Config Utility

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.

12.4.4.3 Changing the IP of the JoTron Float-free SFRM Capsule

The IP address on the JoTron 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 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;
3. Connect the JoTron Float-free SFRM Capsule to the FRM Ethernet port and confirm that communication is available via the ping command. Refer to *Section 12.3.2.3: Connecting the JoTron Float-free SFRM Capsule*;
4. Press Enter;
5. From Windows Internet Explorer, type in the address *http://192.168.0.37* and select 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 12–21 - 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.

12.5 Using the FRM Download Application

12.5.1 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:

1. Logon as Administrator on the VDR-100G3 and start 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-100G3 <C:\VDRApps\> folder, and double-click to start the application.)

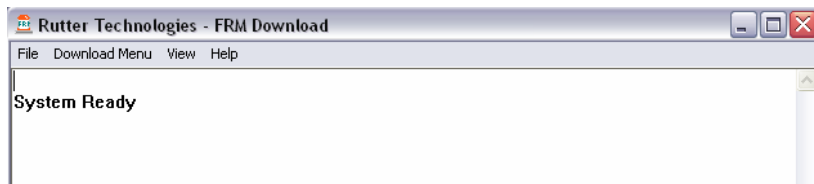


Figure 12–22 – VDR FRM Download Application

3. Select Download Menu>Download Wizard>FRM/SFRM type;

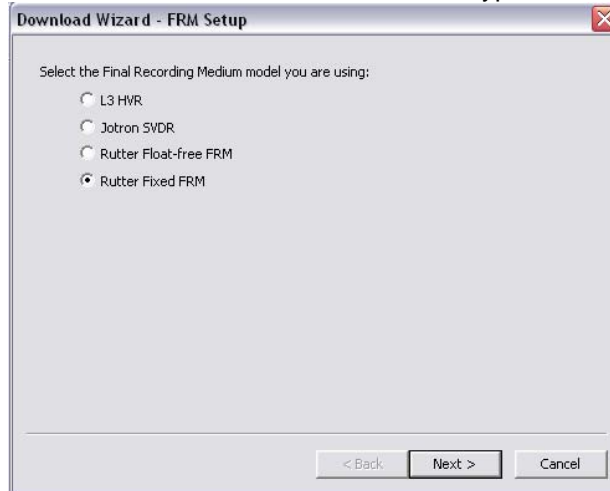


Figure 12–23 – Download Wizard FRM Setup Page

4. Select “Use default settings to connect to FRM” and click next.

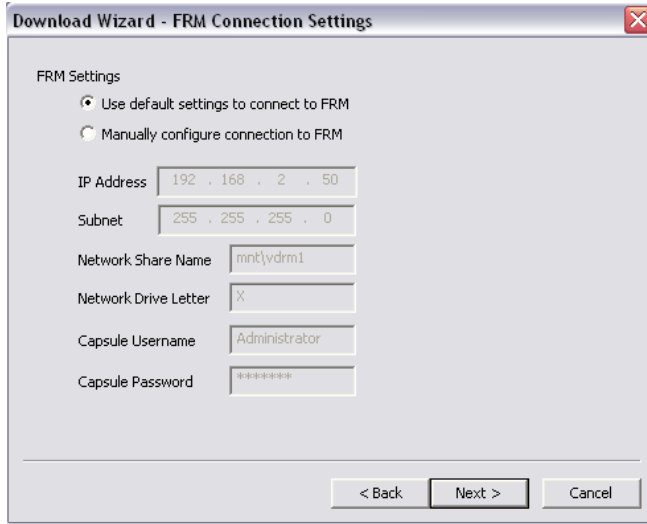


Figure 12–24 Download Wizard FRM Connection Settings Page

5. Select the data types you wish to download (Ensure all are selected).
6. Use the 'Browse' button to select a suitable location to extract the contents of the FRM/SFRM to. When downloading directly to the VDR-100G3, 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-100G3. 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/SFRMs, 4GB of free memory space may be required.

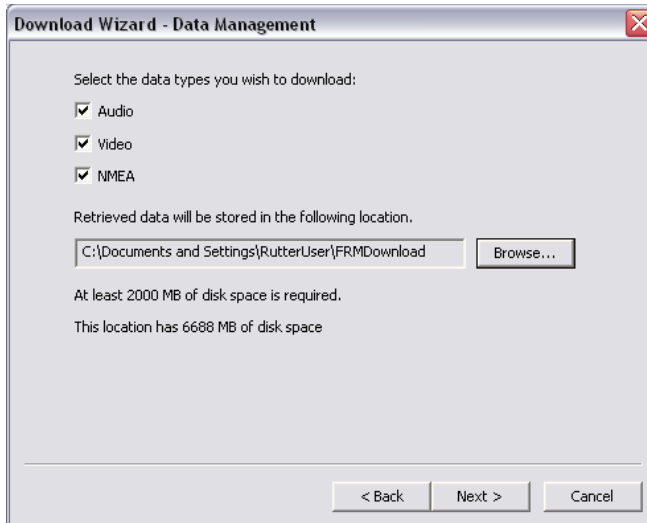


Figure 12–25 - Download Wizard Data Management Page

7. 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 minutes to 4 hours.

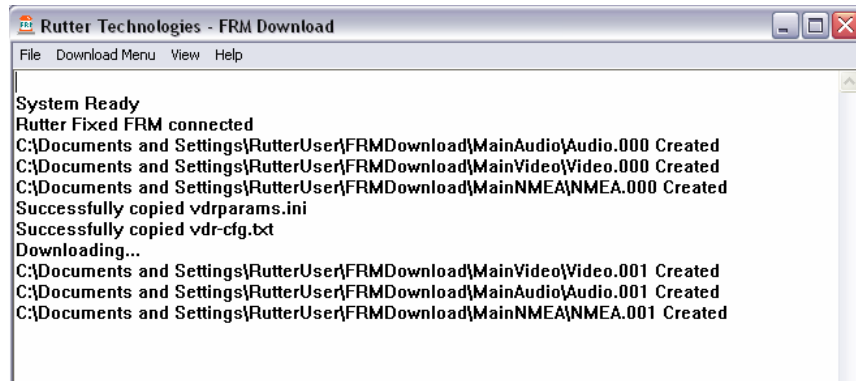


Figure 12–26 – Download in Progress

8. 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.

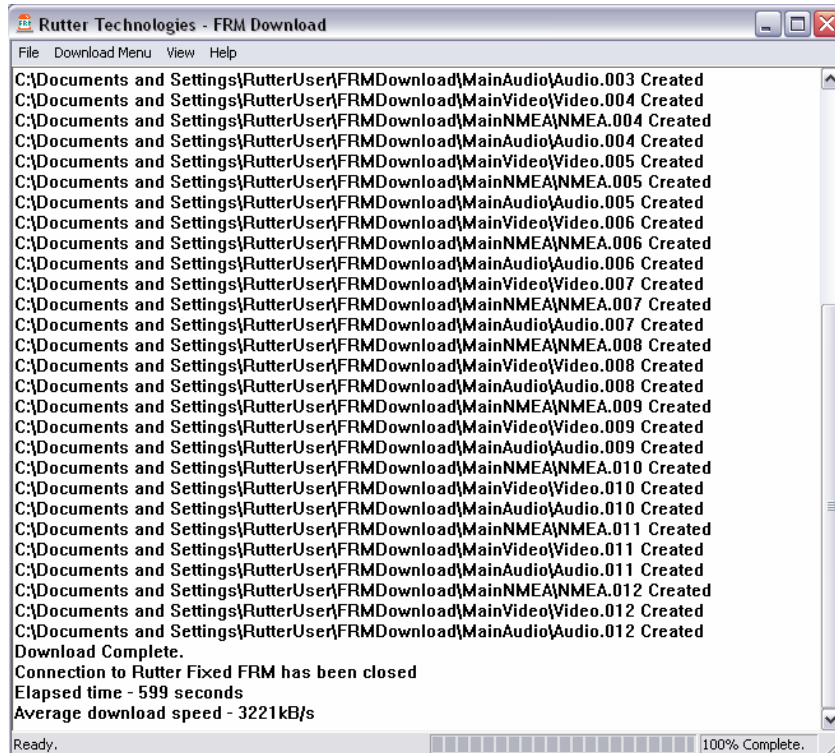


Figure 12–27 – Download Complete.

9. When the download is complete, disconnect from the FRM/SFRM by selecting “File Menu” and then clicking “Exit”;
10. The downloaded data may now be moved to a Playback PC running the Rutter Playback software for review. See Section 12.5.2: Copying the Downloaded Data to a Playback PC for details.

12.5.2 Copying the Downloaded Data to a Playback PC

Data may be moved to a Playback PC running the Rutter Playback Application for review. See Appendix 5 – Playback Software for details of installing and using the Rutter Playback software.

12.5.2.1 Copying the Downloaded Data via Drive Mapping

With data downloaded to the VDR-100G3's hard drive, connect the Playback PC to the VDR-100G3'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-100G3's Download Ethernet port. The VDR-100G3'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-100G3 (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.

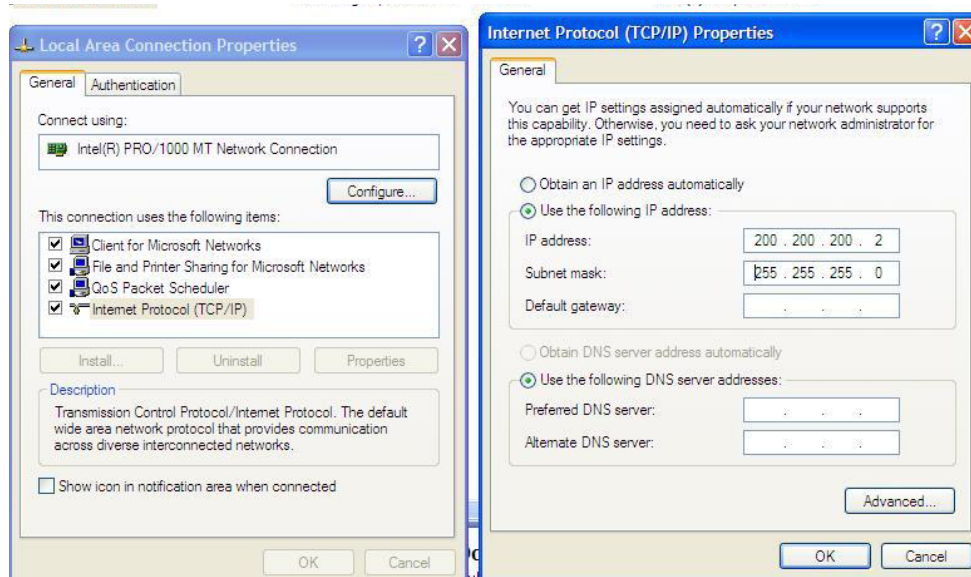


Figure 12–28- Establishing TCP/IP Address

2. Locate the VDR Data Port, a RJ45 wall jack,
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..

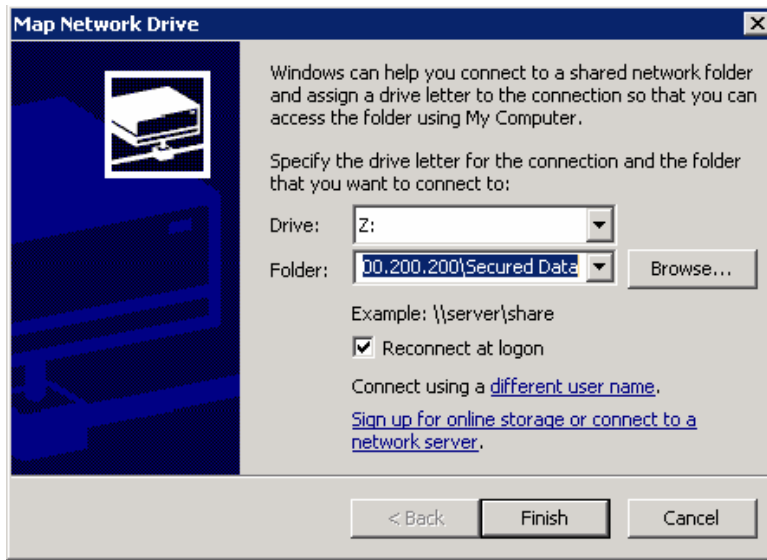


Figure 12-29 – Mapping the Secured Data Drive

10. At the prompt, enter "MyUser" for the user name and 'Rutter' for the password.



NOTE: These entries are case-sensitive. Capitals and lower case letters must be repeated exactly

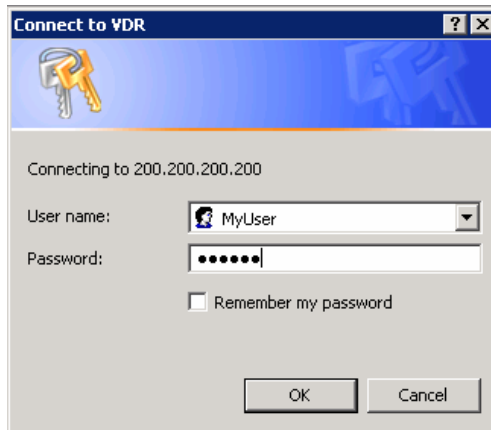


Figure 12-30 – Enter Password and User name



NOTE: When the Playback PC connects to the 'Secured Data' drive on the VDR-100G3, it will appear in Windows Explorer.

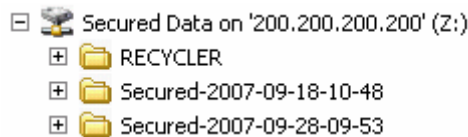


Figure 12-31 – The Mapped Secured Data Drive

11. Select the downloaded data set of interest, and copy it to the Playback PC.

12.5.2.2 Copying the Downloaded Data Via RSM/Download USB Drive

If data was downloaded to the VDR-100G3'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-100G3, 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 *Chapter 13: RSM and USB Memory Stick* for details on disconnecting the RSM from the VDR-100G3 and connecting it to the Playback PC.

12.5.2.3 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-100G3. 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) Fixed 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.

12.5.2.4 Connecting to a Rutter FRM (RUT-02447) Fixed 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.

12.5.2.5 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-100G3. 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.

12.5.2.6 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.

12.5.2.7 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.

NOTE: A shortcut will be 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 12–32 – Installation Executable File

3. Read the information on the welcome page of the setup wizard and click 'next'.



Figure 12–33 – Setup Wizard Welcome Page

4. 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;

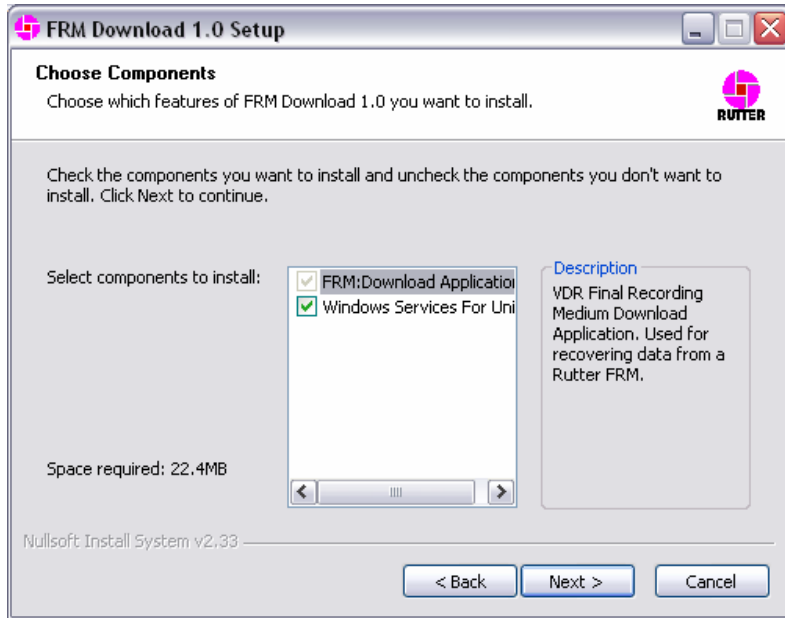


Figure 12–34 - Setup Wizard Component Selection Page

5. 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.

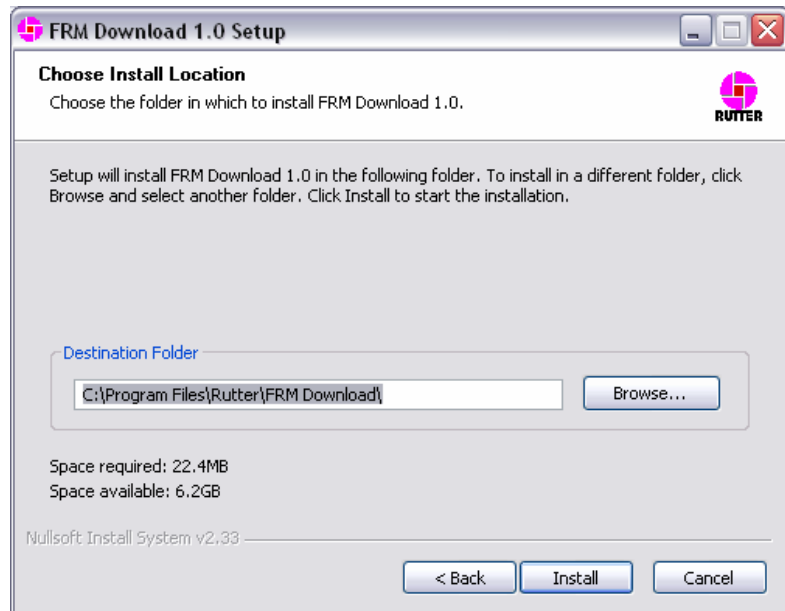


Figure 12–35 – Setup Wizard Install Location Page

- Installation will proceed until the process is completed

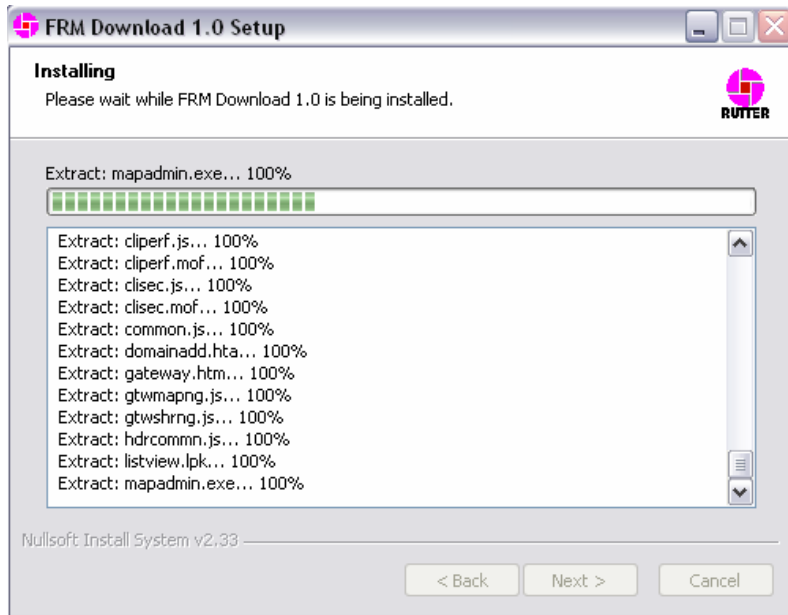


Figure 12–36 – Installing the Application Files

- Once the FRM Download Application setup wizard has completed, click 'Finish' to complete the installation process.

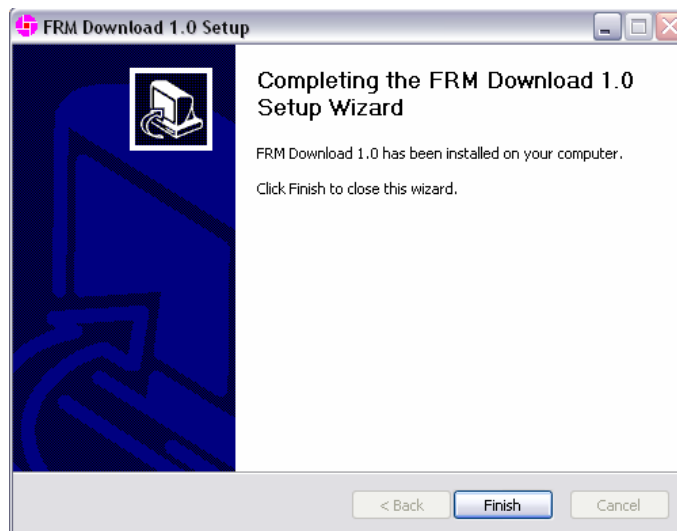


Figure 12–37 – Setup Completed

12.5.2.8 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.

12.5.2.9 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).

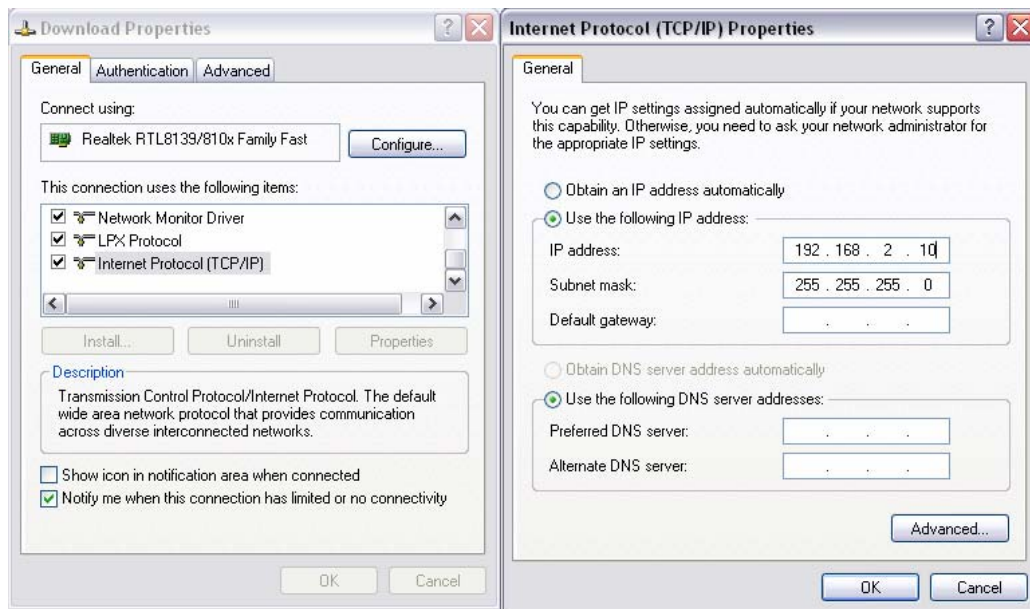


Figure 12–38 – TCP/IP Configuration

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Rutter VDR-100G3/G3S Installation Manual

Chapter 13: Remote Storage Module (Optional) and USB Memory Stick, Rev. 1.1

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13 REMOTE STORAGE MODULE (OPTIONAL) AND USB MEMORY STICK

The primary devices used to retrieve recorded data from the internal hard drive of the DMM is either the USB Memory Stick or the optional RSM. Copying data to the USB Memory Stick or RSM does not affect the normal recording by the VDR-100G3.



NOTE: *The USB memory stick must be removed and the optional RSM, if purchased, must be connected before data can be saved to the RSM.*

The OAU initiates copying of data to the USB Memory Stick (or RSM) for retrieval and analysis. Refer to Section 11.13 - Copying Data to USB Memory Stick (or Optional RSM).

Independent of copying data to the USB Memory Stick (or RSM), the VDR-100G3 automatically records the most recent 4 GB of recorded data to the USB Memory Stick. The OAU displays the status of the USB Memory Stick device during recording. See Table 11.1 – OAU Status of USB Memory Stick (or optional RSM).

Unlike the FRM, which contains only data required by IMO regulations, the USB Memory Stick may contain a much larger and more detailed data set. This data set includes all AIS/NMEA, audio and video data collected by the VDR-100G3.

During normal operation, the DMM will store the most recent 4 GB of collected data to the USB Memory Stick. During this time of recording, the OAU status for the USB Memory Stick will display “USB: REC”. In typical installations this gives approximately 24-28 hours of recording time. When the USB Memory Stick becomes full, the oldest data contained on it is overwritten with the new data. This process continues until, via the OAU, an operator either ejects the USB Memory Stick from the VDR, or selects to copy a data set to it.



Warning: *The following situations will result in all data being deleted from the USB Memory Stick:*

- 1. When the USB Memory Stick is ejected and physically removed from the system, and then re-connected, the VDR will erase all the data on the USB Memory Stick and begin recording data to it again; When data from the USB Memory Stick is downloaded or copied, if the drive is NOT ejected and physically removed within 1 hour after the download is complete, then the VDR will erase all data on the USB Memory Stick and begin recording data to it again;*
- 2. When the USB Memory Stick is unplugged from the system, without first ejecting it, and then it is re-connected, then the VDR will erase all data on the USB Memory Stick and begin recording data to it again;*
- 3. When attempting to download or copy a data set to the USB Memory Stick, if there is insufficient memory, then the VDR will erase all data on the USB Memory Stick in an attempt to free enough memory for the download to succeed.*

NOTE! *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.*

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 RSM/USB Memory Stick, a PC will require the following:

- The minimum requirements for a PC outlined in *Chapter 1: System Overview*
- Rutter Technologies' playback software.

13.1 Connecting the RSM

To connect the RSM, once the USB memory stick has been properly ejected and physically removed, complete the following steps:

1. Attach the USB 2.0 cable from the RSM to the USB 2.0 port in the compartment in the front panel of the DPU;
2. Connect the AC power cable to the RSM;
3. Power on the RSM (switch RSM Power to “On” position);

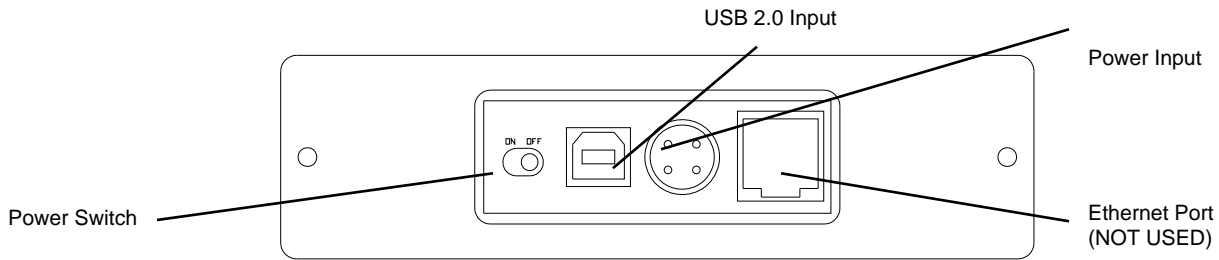


Figure 13-1 - Rear View of RSM Unit

The system will auto-detect the RSM and the OAU will display the status as “USB: STBY”.



Once the RSM is physically connected, the DMM will automatically detect it. As part of this process, all data on the RSM will be deleted.

13.2 Disconnecting the USB Memory Stick or RSM

The process to disconnect/eject the USB Memory Stick or RSM must be performed prior to physically disconnecting the unit from the system.



Important! Do not physically disconnect the USB Memory Stick or RSM before ejecting it from the system via the OAU. Failure to eject the drive properly will trigger a “REMOTE ERROR” on the OAU. This error can be cleared only by re-connecting the improperly removed drive (See Section 11.14 – Connecting the USB Memory Stick and Section 13.1 – Connecting the RSM).

Warning: Failure to properly eject the drive may result in disk corruption.

It is recommended to POWER OFF the RSM BEFORE physically disconnecting it.

To disconnect the USB Memory Stick (USB) or RSM, the following steps must be completed:



1. Press the “**Eject**” button on the OAU menu pad;
2. Press “**Enter**” to select the “**USB**” option on the OAU display;
3. The OAU will display the message “**Disconnecting**” indicating that the operator should wait while the USB memory stick or RSM is disconnected.

4. The OAU will then display a message “**USB Archiving has been disabled for 1 hour**”, meaning that which indicated it is safe to remove the external device;
5. After approximately 10 seconds the OAU will display the message “**USB: Stby**” for up to 1 hour, until the device is removed or disconnected;
6. To remove the USB Memory Stick open the USB compartment cover on the DPU and unplug the USB Memory Stick;
7. To disconnect an RSM, turn off RSM power and unplug the RSM cable from the USB compartment on the DPU.



*NOTE: After the OAU LCD displays “**USB: STBY**” then the USB Memory Stick should be removed immediately. If the USB Memory Stick is NOT unplugged within 1 hour after the eject operation the VDR – 100G3 will erase all data on the USB memory stick and begin recording data to it again.*

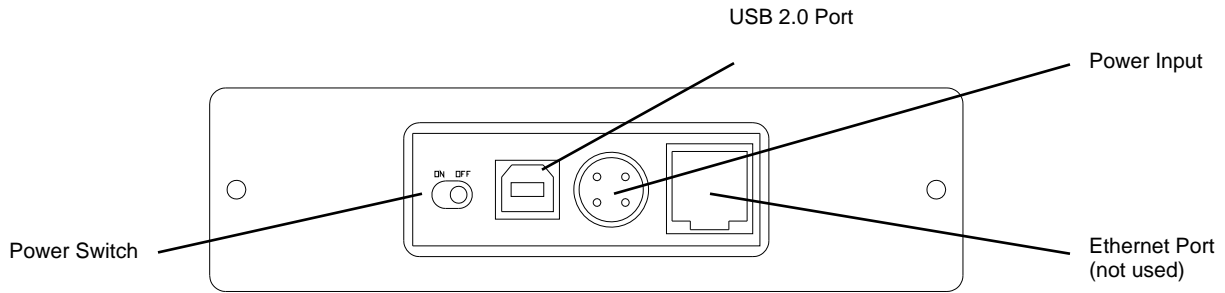


Figure 13-2 - Rear View of RSM Unit

13.3 Re-connecting the USB Memory Stick or RSM

To connect the USB Memory Stick, insert it into the USB compartment of the DPU or connect the power and data cables to the RSM.

The system will detect the drive and the OAU will display “**USB: Stby**” If connecting a USB Memory Stick, after at least 10 seconds, the system will begin recording to it and the OAU will display a “**USB: Rec**”



Once the USB Memory Stick is physically connected, the VDR will automatically detect it and begin the recording process to it. As part of this process, all data on the USB Memory Stick will be deleted.

Once the RSM is physically connected, the VDR will automatically detect it. As part of this process, all data on the RSM will be deleted.

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Rutter VDR-100G3/G3S Installation Manual

Chapter 14: General and Corrective Maintenance, Rev. 1.2

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14 GENERAL AND CORRECTIVE MAINTENANCE

The VDR-100G3 is designed to require a very little 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.

14.1 General Inspection Procedures

1. It is necessary to inspect the VDR-100G3 and all of its peripheral devices. This includes:
 - Data Processing Unit (DPU);
 - Data Acquisition Unit (DAU – if applicable);
 - Operation and Alarm Unit (OAU);
 - Remote Storage Module (RSM - if applicable) and Interfaces (if applicable); and
 - Microphones.
2. 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 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 position; and
 - DPU fan is working. The air filter should be inspected and replaced if necessary.
3. Take out the six screws attaching the DAU cover and remove it. Inside the unit:
 - The Audio, Video, and NMEA modules (and the Hub) should have power and blinking LEDs to indicate data processing;
 - All modules should be firmly attached to the DAU DIN-Rail; and
 - All cables should be firmly attached.

(If the DAU is not installed then the Audio and NMEA modules—and the Video Module if installed—should be firmly mounted, have all cables securely attached and have power and blinking LEDs to indicate data processing.

4. The OAU should have no alarms, and should show “Status: Clear”.
 - Run a test to verify that the display, LED, and buzzer function normally
 - press the OAU's “TEST” button, then
 - after verification, press the “CANCEL” button.

(For alarm code descriptions, refer to *Section 14.2.1 - Alarm Code Description*.)

5. The RSM and Interfaces (if applicable):
 - Should be firmly mounted;
 - All cables must be securely attached; and
 - LEDs should be blinking.
6. All Microphones should be securely attached and functional.

14.1.1 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 opposite the intake fan and expels warm air away from the unit.

14.1.2 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 labelling are fully visible and in excellent condition. There should be **no** signs of chipping or flaking.

14.1.2.1 For Additional FRM Service and Annual Certification

Refer to the latest version of Rutter's Annual Recertification Guide, Doc # RUT-TD-01-005. Refer also to the FRM manufacturer's manual for additional test and unit verification information.

14.2 Corrective Maintenance

14.2.1 Alarm Code Descriptions

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 14-1: Alarm Code Description

NOTE: Pressing the “Mute” button acknowledges the alarm code and silences the alarm. The red alarm indicator lamp will stay illuminated until all alarm conditions are cleared. If there is more than one alarm condition, the OAU display will cycle through the current alarm messages.

SYSTEM ERROR: Turn the ship breaker for the VDR/SVDR power OFF. Wait 2 hours and 15 minutes. Turn the VDR/SVDR power breaker back on and see if this has cleared the error. If error returns, arrange service to have the error investigated and repaired.

VIDEO ERROR: Open Data Processing Unit (DPU) (the VDR/SVDR’s main cabinet) and ensure that the 2 AMP DC breaker inside marked **Video/NMEA** is closed. Make sure the Ethernet cable plugged into the VDR/SVDR’s computer port marked **Video/NMEA** is pressed all the way into this port. There should be a solid green link light and a flashing yellow light associated with this port. Locate the video module and ensure it’s red LED power lights are lit and that its Ethernet cable is securely inserted in the modules Ethernet port. If error returns, arrange service to have the error investigated and repaired.

AUDIO ERROR: Open Data Processing Unit (DPU) (the VDR/SVDR’s main cabinet) and ensure that the 2 AMP DC breaker inside marked **Audio/Alarm** is closed. Make sure the Ethernet cable plugged into the VDR/SVDR’s computer port marked **Audio** is pressed all the way into this port. There should be a solid green link light and a flashing yellow light associated with this port. Locate the audio module and ensure it’s red LED power lights are lit and that its Ethernet cable is securely inserted in the modules Ethernet port. If error returns, arrange service to have the error investigated and repaired.

FRM ERROR: Open Data Processing Unit (DPU) (the VDR/SVDR’s main cabinet) and ensure that the 2 AMP DC breaker inside marked **FRM** is closed. Make sure the Ethernet cable plugged into the VDR/SVDR’s computer port marked **FRM** is pressed all the way into this port. There should be a solid green link light and a flashing yellow light associated with this port. If problem still exists; open the FRM 2-AMP breaker by pressing its *Red Button*, wait 5 seconds and close this breaker by pressing its *Black and White Button marked with the number 2*. If error returns, arrange service to have the error investigated and repaired.

PCM ERROR: Open Data Processing Unit (DPU) (the VDR/SVDR’s main cabinet) and ensure that the two serial connectors on the back of the computer are still firmly in place. If problem persists turn the ship breaker for the VDR/SVDR power OFF. Wait 2 hours and 15 minutes. Turn the VDR/SVDR power breaker back on and see if this has cleared the error. If error returns, arrange service to have the error investigated and repaired.

REMOTE ERROR: If your system has a Remote Storage Module (RSM), check that the power cable is connected and the power switch on the RSM is in the ON position. Check that either the USB or Ethernet data cable (but not both) is connected. If connected with an Ethernet cable, confirm that the Green LED is lit and the Orange LED is flashing. Remove RSM from VDR/SVDR and connect to playback computer with the USB cable. Verify the latest data is saved to the RSM. If all the current data is not present, arrange service to have the error investigated and repaired.

If your system has a USB memory stick, check that it is present. 'Eject' the USB memory stick and remove it from the VDR/SVDR. After waiting 30 seconds, re-connect the USB memory stick to the VDR/SVDR. Verify that the Remote Error clears. If it does not clear, arrange service to have the error investigated and repaired.

SERIAL ERROR: Open Data Processing Unit (DPU) (the VDR/SVDR's main cabinet) and ensure that the 2 AMP DC breaker inside marked **Video/NMEA** is closed. Make sure the Ethernet cable plugged into the VDR/SVDR's computer port marked **Video/NMEA** is pressed all the way into this port. There should be a solid green link light and a flashing yellow light associated with this port. Locate the NMEA module and ensure its red LED power light is lit and that its Ethernet cable is securely inserted in the modules Ethernet port. If error returns, arrange service to have the error investigated and repaired.

MIC ERROR: Check that the indicated microphone is not damaged. If it looks good, turn OFF the ship breaker for the VDR/SVDR power. Wait 2 hours and 15 minutes. Turn ON the VDR/SVDR power breaker. If there is a microphone problem it will take more than 12 hours for the error message to reappear. Continue to monitor the system to see if the error returns. If it does, get service to find and repair the error.

DISK ERROR: If your system has a USB memory stick or an RSM, copy the current data set to that device. If your system does not have a USB memory stick or RSM, then connect the download/playback computer to the VDR/SVDR and download the current data set. If the copy fails, arrange service to have the error investigated and repaired.

GPS ERROR: If your system has a USB memory stick or an RSM, copy the current data set to that device. If your system does not have a USB memory stick or RSM, then connect the download/playback computer to the VDR/SVDR and download the current data set. Review the data with the playback software and verify that the GPS time and date information is present. If not present, contact the GPS service supplier to correct the GPS problem. If it is present in playback, arrange service to have the error investigated and repaired.

14.2.2 Log Window Error Code Descriptions

The following table provides a list of error codes and descriptions that may be observed in the Log Window of the VDR 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 14-2 - Error Codes - 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 must then be interpreted.

Example:

The error code 99\$17 converts to a binary string of 0000010001, representing a simultaneous Storage and Power error.

14.2.3 NMEA Error Code Descriptions

The error codes in the NMEA data from the NMEA Module identify the NMEA module and its 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 14-3 - NMEA Error Codes

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.

14.2.4 Retrieving Secured Data via Remote Desktop

Refer to *Appendix 4: Data Retrieval* for instructions on retrieving data from the secured directory using a Remote Desktop connection.

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VDR Installation & Commissioning Checklist, Rev. 1.2

Ship Name: _____

IMO No: _____

Class Society: _____

VDR Model: _____

VDR Serial No: _____

FRM Model: _____

FRM Serial No: _____

Service Supplier: _____

Commissioning Date: _____

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Rutter Technologies Inc.
VDR-100G3 / G3S Installation & Commissioning Checklist

Document N°: S-PS-06121

Revision No. 1.2

Revision Issue Date: 06 October 2008

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Appendix 1: VDR Installation and Commissioning Checklist, Rev. 1.2

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1 Installation

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: _____

Test Conditions

- None Applicable

1a. VDR & Component Mounting

	YES	NO	N/A
All bolts are tightened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is easy access to cable entries and hatches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is space from all sides of the DPU (as outlined in Rutter Technologies <i>VDR-100G3/G3S Installation & Maintenance Manual</i>).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is space from all sides of the DAU if applicable (as outlined in Rutter Technologies <i>VDR-100G3/G3S Installation & Maintenance Manual</i>).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OAU is mounted correctly in an easily accessible position at the bridge.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VDR Data Port is mounted in proximity to a computer workspace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Microphones are oriented to provide best audio coverage of all work spaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

1b. Mounting of FRM Capsule

Capsule is installed in accordance with IEC requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All bolts are tightened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables are connected securely and are watertight.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

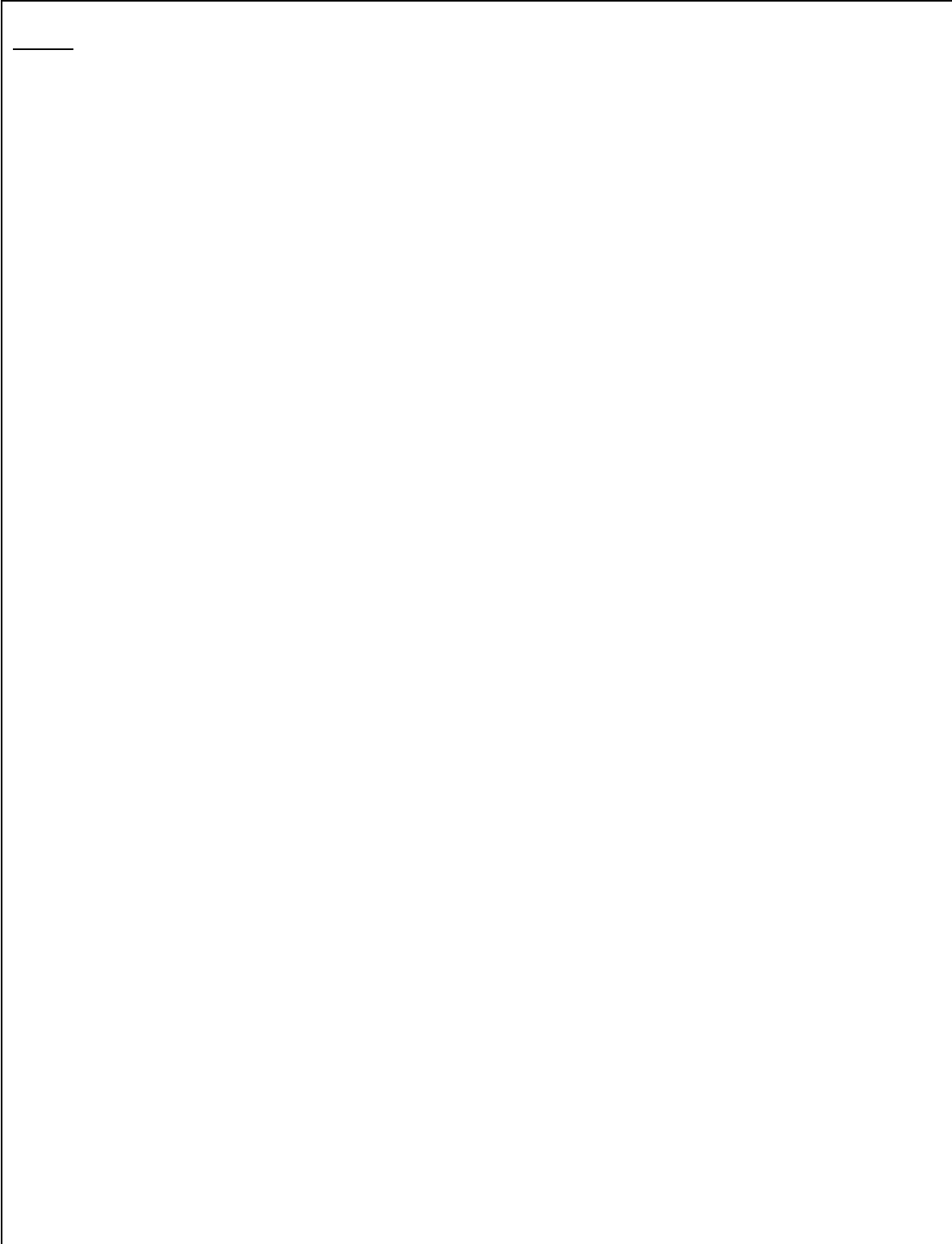
1c. Cable Installation

VDR Installation & Commissioning Checklist, Rev 1.2

Cables from each Audio Junction Box to Audio Module are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables from each external interface (i.e., DataAnalog, DataGyro, etc) are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables from each NMEA source are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables from the radar/video source (if applicable) are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables from the FRM are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ship's emergency power cable is installed to and connected inside the DPU.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cable from OAU is installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any optional cables are installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cables are marked with number and/or source designation according to the cable plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure for each cable terminated at the VDR that the source end is connected to the proper output.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure that each interface power cable is connected to the required power supply terminal of the VDR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The power cable from the FRM capsule is connected to the DPU's 24VDC power supply.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure the ship's breaker is switched off.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

Additional Comments / Observations:



Please strike out any lines left empty above.

2 Set to Work & Commissioning

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: _____

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 thresholds have been set for all microphones.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Microphone test is passing successfully for all microphones.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio is clear during data playback on all recorded channels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Both transmit and receive of VHF is being recorded properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VHF audio is clear upon playback of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2b. Video sources are configured for recording

Video Channel 1 appears correctly in video test mode.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 1 appears correctly during playback.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 2 appears correctly in video test mode.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 2 appears correctly during playback.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 3 appears correctly in video test mode.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Video Channel 3 appears correctly during playback.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 4 testing is passing successfully.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video Channel 4 appears correctly during playback.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2c. All NMEA data sources are available and configured

Ensure breakers in DPU are switched ON.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ensure that the following NMEA data is being recorded and configuration is reflected correctly (mark the applicable 'YES', 'NO', or 'N/A' box):				
Data	Notes	YES	NO	N/A
Date and time		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ship's position and datum used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speed (water and/or ground)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heading (true)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depth (echo sounder)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All IMO-mandatory Bridge Alarms		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AIS		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rudder Order/Response		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine Order/Response		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thruster Order/Response		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hull openings / watertight doors		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accelerations and hull stresses		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wind speed and direction		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2d. OAU is functioning properly

Audible alarm is functioning correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All keypad buttons are functioning correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LCD Display is displaying appropriate alarms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alarm display shows status clear when alarm clears.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Download to DMM internal drive is working via appropriate keypad press and confirmation of the download.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2e. FRM Recording is configured

Check that breaker is switched on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The FRM is formatted as described in the Installation manual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The FRM is enabled and set to correct capsule type in the VDRPARAMS.INI file.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Configuration file is being sent to the capsule.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data can be downloaded from the capsule using the download software.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All 12 hours of required IMO data is present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2f. Second FRM Recording is configured (Dual Capsule configuration)

Check that breaker is switched on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The FRM is formatted as described in the Installation manual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The FRM is enabled and set to correct capsule type in the VDRPARAMS.INI file.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Configuration file is being sent to the capsule.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data can be downloaded from the capsule using the download software.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All 12 hours of required IMO data is present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2g. Power Subsystem is functioning properly

All devices powered from Power Supply are operating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When power is removed a power failure alarm is generated in the log window.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When power is restored a power restore message will appear in the log window.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activate an "Emergency Download" to secure the data for later inspection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2h. VDR Data Port and RSM (if installed) is functioning properly

Connect laptop PC to VDR Data Port to check for confirm communication with VDR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If applicable, download to the RSM from OAU functions correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2i. VDRPARAMS.INI Configuration Test

The STORAGE section has correct video channel being sent to the capsule.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The AUDIO section should have proper number of mixers, microphones, and VHF set.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The VIDEO section should have the number of sources, the transfer rate and the number of blocks set correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2j. Final Pre-Commissioning Steps

VDR-CFG.TXT is edited to reflect installation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Five (5) minutes of data consisting of information from all source equipment connected to VDR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Download client computer, if provided, is configured for download and playback.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

2k. Commissioning Complete

Commissioning Form is complete.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All papers have been signed by Service Supplier.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Copies of Type Approval Certificate(s) have been provided to Ship.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Operation manual(s) are provided to Ship.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keys provided to Owner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

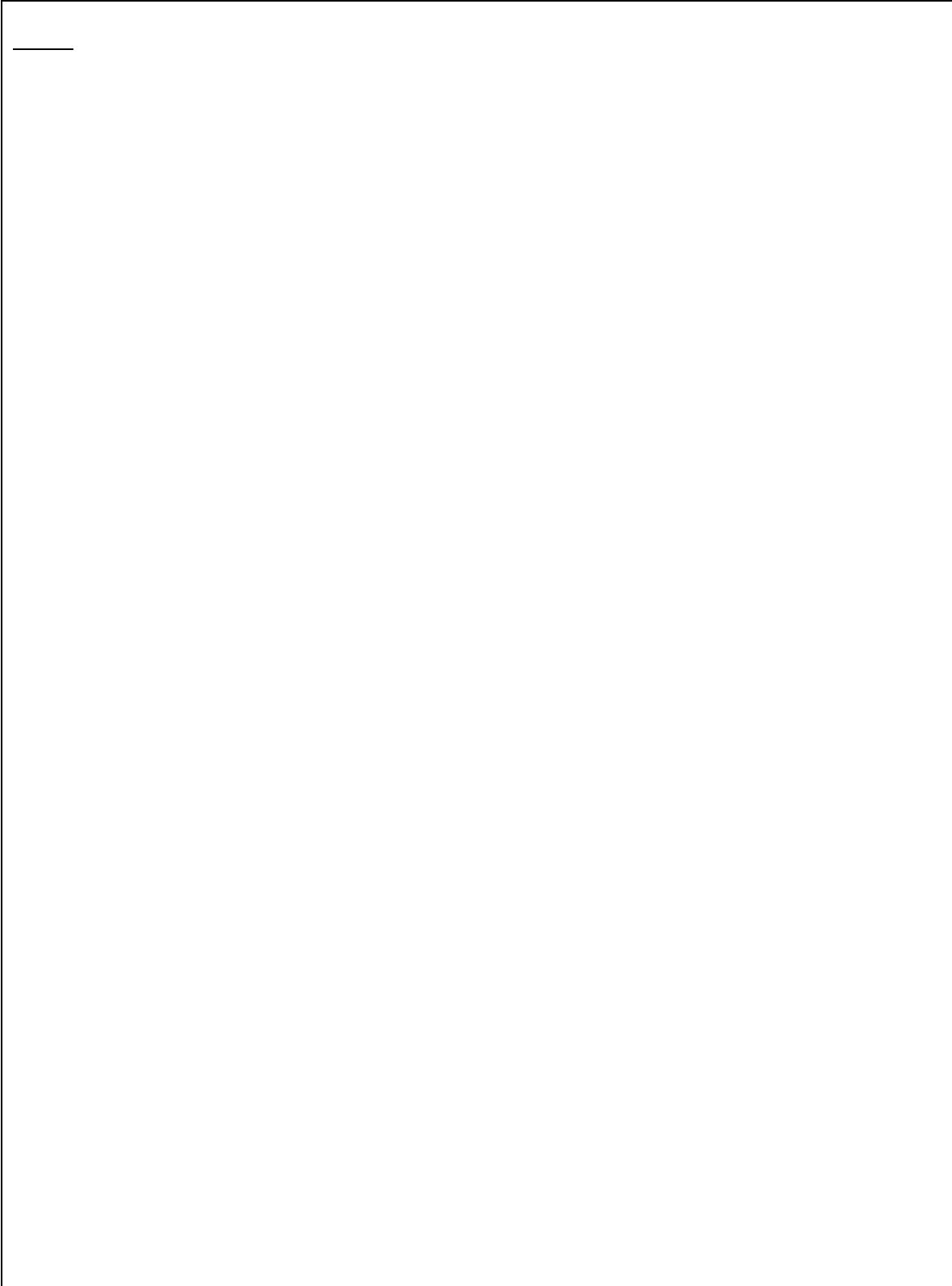
Technician Initialed: _____ Date: _____

21. Final Preparations for Recording

Windows OS Recycle Bin is empty.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Copy of vdr-cfg.txt file, vdrparams.ini file and VidChanX.ini files to be sent to Rutter Technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample 5 minute data capture has been sent to Rutter Technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VDR is set to normal operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technician Initialed: _____ Date: _____

Additional Comments / Observations:



Please strike out any lines left empty above.

3 Component Installation Location

The installing technician must indicate the installation locations for VDR-100G3/G3S components in the applicable areas below.

VDR-100G3/G3S Component Installation Location	
Data Processing Unit (DPU)	
Data Acquisition Unit (DAU) *	
Operation and Alarm Unit (OAU)	
Audio Module *	
NMEA Module *	
Video Module *	
Inside Microphones **	<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6.
Outside Microphones *, **	<ol style="list-style-type: none"> 1. 2.
Final Recording Medium (FRM)	
Remote Storage Module (RSM) * (Optional)	
Client PC *	

* If not installed, simply indicate "N/A" in the "Installation Location" column.

** Indicate the installation location for each microphone on the corresponding number line. If there are less than six microphones, indicate "N/A" on the corresponding line (i.e., if there are only four indoor microphones installed, write "N/A" next to numbers "5." and "6.".

Comments

Please strike out any space left empty in the "Comments" section above.

5 FRM Maintenance Sheet

The following items should be completed (where applicable) for the Final Recording Medium (FRM) unit installed during the installation.

1. Main FRM

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		

2. Second FRM (Dual Capsule Configuration)

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		



VDR-100G3 / G3S 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)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ship's position (A.861/5.4.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Speed (A.861/5.4.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Heading (A.861/5.4.4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bridge audio (A.861/5.4.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Communications audio (A.861/5.4.6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Radar data (A.861/5.4.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Echo sounder (A.861/5.4.8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Main alarms (A.861/5.4.9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rudder order & response (A.861/5.4.10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Engine order & response (A.861/5.4.11)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hull openings (doors) status (A.861/5.4.12)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Watertight & fire door status (A.861/5.4.13)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wind speed & direction (A.861/5.4.15)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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

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* 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		

Rutter VDR-100G3/G3S Installation Manual

Appendix 2: System Configuration File, Rev. 1.1

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APPENDIX 2: SYSTEM CONFIGURATION FILE

Rutter Technologies' VDR-100G3 Configuration Utility (VDRConfig Utility) is an application tool to help create configuration and parameter files. It is used when installing the Rutter Voyage Data Recorder (VDR-100G3). When the correct installation parameters are entered into the fields provided, the configuration utility will produce a <vdrcfg.txt> file. This file is used to document the ship's configuration and to customize the VDR Playback for data playback.

The utility uses standard Windows screens. A menu bar and tool bar help the user carry out all basic program functions including file saving.

A2.1 Installation

There is no installation process for this utility. To open the VDR Config Utility locate and double-click the <VDRConfig.exe > file. This executable is usually found in <C:\VDRApps> on the DMM local hard drive.

The program will open with the contents of the 'General' tab visible (see Figure A2- 1 - General below). Before information has been saved, the title bar will read "Untitled – VDR Configuration Utility vx.x" (where x.x is the versions number). After it has been named and saved, the saved file name will appear in place of "Untitled."

A2.2 General

The 'General' tab accepts general information about 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 A2- 1 - General

The following fields must be completed in the General tab window:

A2.2.1 Software Version & Software Date

Enter the version number and date of the VDR Record application software as shown in the VDR Record software interface.

A2.2.2 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,
- VDR-100G3,
- VDR-100G3S,
- Simplified VDR, and
- DRS.

A2.2.3 VDR S/N

Enter the VDR serial number 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

A2.2.4 Ship

Enter the name of the ship where the VDR is being installed.

A2.2.5 Customer

Enter the name of the customer for whom the VDR is being installed.

A2.2.6 Installer

Enter the name of the person carrying out the VDR installation.

A2.2.7 IMO Vessel ID#

Enter the International Maritime Organization (IMO) identification number specific to the vessel where the VDR is being installed.

A2.2.8 MMSI#

Enter the Maritime Mobile Service Identity (MMSI) radio identification number specific to the vessel where the VDR is being installed.

A2.2.9 Call Sign

Enter the Call Sign specific to the vessel where the VDR is being installed.

A2.2.10 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**. It may be necessary to select one of the other 6 options available depending on the instructions of the Classification Society that is certifying the installation.

A2.2.11 Classification Society

Enter the name of the Classification Society responsible for final inspection of the VDR installation.

A2.2.12 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 A2- 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 A2- 2 – EPFS

For each EPFS present the user must:

1. Enter its “Distance from Bow” in meters;
2. Enter its “Distance from Centerline” in meters;
3. Select either the *Port* or *Starboard* radio button to indicate its “Direction from Centerline”;
4. Enter the *Deck* number and, if necessary, the name of the deck on which it is located.

A2.2.13 Other Comments

This text field allows the user to enter any additional information necessary to complete the configuration file.

A2.3 Primary Storage

The 'Primary FRM' tab requires the input of information about the Final Recording Medium (FRM) unit (see Figure A2- 3 – Primary Storage below).

Final Recording Medium

Type:

Part Number: Serial Number:

Date of Manufacture: Model:

Beacon Serial Number and Battery Expiry Date:

Distance from Bow:

Distance from Centerline:

Direction from Centerline:
 Port Starboard

Deck:

FRM IP Address:

FRM Subnet Address:

Default Gateway IP:

Memory Partition Information

Total Bytes in Crash Module:

Number of Bytes per Granule:

Currently Unassigned Granules:

Unit Allocations And Steam 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 A2- 3 – Primary Storage

The following fields must be completed in the Primary Storage window:

A2.3.1 Type

From the accompanying drop-down box, select the FRM model and manufacturer applicable to the installation. Options available are:

- L3 HVR (default),
- Jotron SVDR ,
- Rutter Fixed (RUT-02447),
- Rutter-ACR Float-Free or
- Not Installed.

A2.3.2 Part Number

Enter the FRM's part number.

A2.3.3 Serial Number

Enter the FRM's serial number.

A2.3.4 Date of Manufacture

Enter the FRM's date of manufacture.

A2.3.5 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.

A2.3.6 Distance from Bow

Enter the distance of the FRM unit from the ship's bow.

A2.3.7 Distance from Centerline

Enter the distance of the FRM unit from the ship's centerline.

A2.3.8 Direction from Centerline

Select either Port or Starboard radio button to show FRM unit's direction from ship's centerline.

A2.3.9 Deck

Enter the *Deck* number and, if necessary, name on which the FRM unit is located.

A2.3.10 FRM IP Address

Enter the IP address of the FRM unit.

A2.3.11 FRM Subnet Address

Enter the subnet address of the FRM unit.

A2.3.12 Default Gateway IP

Enter the default gateway IP of the FRM unit.

A2.3.13 Memory Partition Information



Note! 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:

1. Open an Internet Explorer browser on the VDR desktop.
2. In the address bar at the top of the browser interface type **192.168.0.2/hvrhome.htm** and press the **Enter** key.
3. Select the "Flash Setup" button located on the left side of the screen.
4. Enter **L3HVR** as the password.

A2.3.14 Unit Allocations and Stream Names

Enter the **Number of Granules** and **Stream Name** for each applicable position (see Figure A2- 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	78393	AUDIO	3	0	
1	5600	NMEA	4	0	
2	27997	VIDEO	5	0	

Figure A2- 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.

A2.3.15 Other Comments

Enter any additional comments relevant to the storage aspect of the configuration/installation.

A2.4 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 *Error! Reference source not found.*).

Figure A2- 5 - Secondary Storage

The following fields must be completed in the Secondary Storage tab window:

A2.4.1 Type

From the accompanying drop-down box, select the FRM model and manufacturer applicable to the installation. Options available are:

- L3 HVR,
- Jotron SVDR,
- Rutter FRM (RUT-02447) Fixed,
- Rutter-ACR Float-Free or
- Not Installed (default).

A2.4.2 Part Number

Enter the FRM's part number.

A2.4.3 Serial Number

Enter the FRM's serial number.

A2.4.4 Date of Manufacture

Enter the FRM's date of manufacture.

A2.4.5 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.

A2.4.6 Distance from Bow

Enter the distance of the FRM unit from the ship's bow.

A2.4.7 Distance from Centerline

Enter the distance of the FRM unit from the ship's centerline.

A2.4.8 Direction from Centerline

Select either the Port or Starboard radio button to indicate the FRM unit's direction from the ship's centerline.

A2.4.9 Deck

Enter the *Deck* number and, if necessary, name on which the FRM unit is located.

A2.4.10 FRM IP Address

Enter the IP address of the FRM unit.

A2.4.11 FRM Subnet Address

Enter the subnet address of the FRM unit.

A2.4.12 Default Gateway IP

Enter the default gateway IP of the FRM unit.

A2.4.13 Memory Partition Information for the L3 HVR



Note! 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:

1. Open an Internet Explorer browser on the VDR desktop;
2. In the address bar at the top of the browser interface type **192.168.0.2/hvrhome.htm** and press the **Enter** key;
3. Select the “Flash Setup” button located on the left side of the screen; and
4. Enter **L3HVR** as the password.

A2.4.14 Unit Allocations and Stream Names

Enter the **Number of Granules** and **Stream Name** for each applicable position (see Figure A2- 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 A2- 6 - 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.

A2.4.15 Other Comments

Enter any additional comments relevant to the secondary storage aspect of the configuration/installation.

A2.5 Video

The 'Video' tab requires the input of information specific to the video configuration (see Figure A2- 7 - Video below).

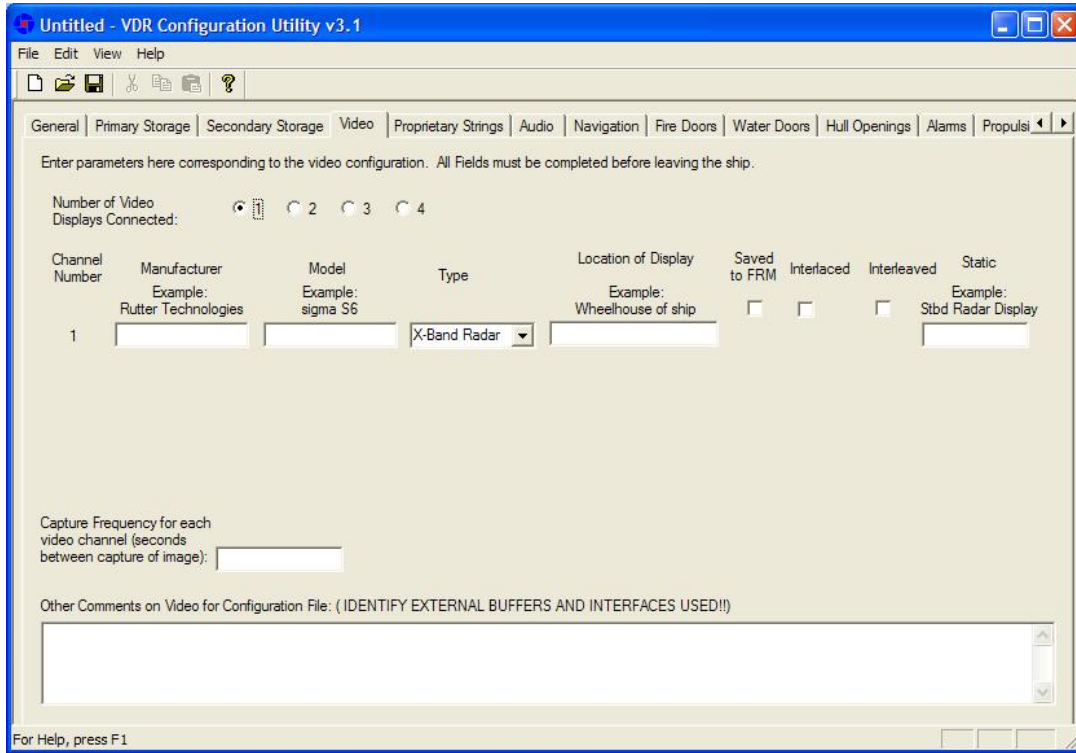


Figure A2- 7 - Video

The followings fields must be completed in the Video tab window:

A2.5.1 Number of Video Displays Connected

Select the radio button (1, 2, 3, or 4) applicable 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 A2- 8 - Video Channel Information below).

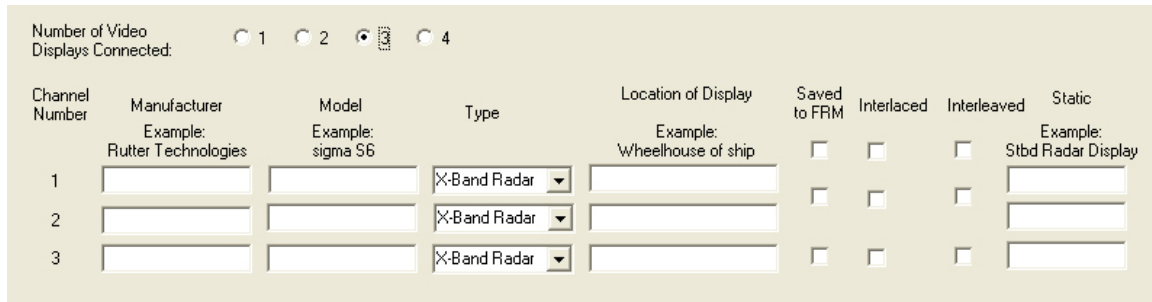


Figure A2- 8 - Video Channel Information

A2.5.2 Manufacturer

Enter the name of the video capture component's manufacturer.

A2.5.3 Model

Enter the model name of the video capture component.

A2.5.4 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.

A2.5.5 Location of Display

Enter the location of the video capture component on the ship.

A2.5.6 Saved to FRM

If the video capture is saved to the FRM, this checkbox must be checked.

A2.5.7 Interlaced or Interleaved

Selecting the “Interlaced” checkbox disables the “Interleaved” checkbox. Selecting the “Interleaved” checkbox disables the “Interlaced” checkbox. Depending on which checkbox is selected, the corresponding Image “Start” text box appears. These “Start” fields correspond to the start point of the odd and even lines of an interlaced OR an interleaved image. This information is available via the Rutter Technologies Video Configuration software (see *Chapter 9: Video Module* for further information on this software).



Figure A2- 9 - Image Start Points

A2.5.8 Static

Enter the onscreen name of the video capture component.

A2.5.9 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:

- 1 source has a capture interval of 15 seconds,
- 2 sources have a capture interval of 7.5 seconds,
- 3 sources have a capture interval of 5 seconds, and
- 4 sources have a capture interval of 3.75 seconds.

A2.5.10 Other Comments

Enter any additional comments relevant to the video capture aspect of the configuration/installation.

A2.6 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.

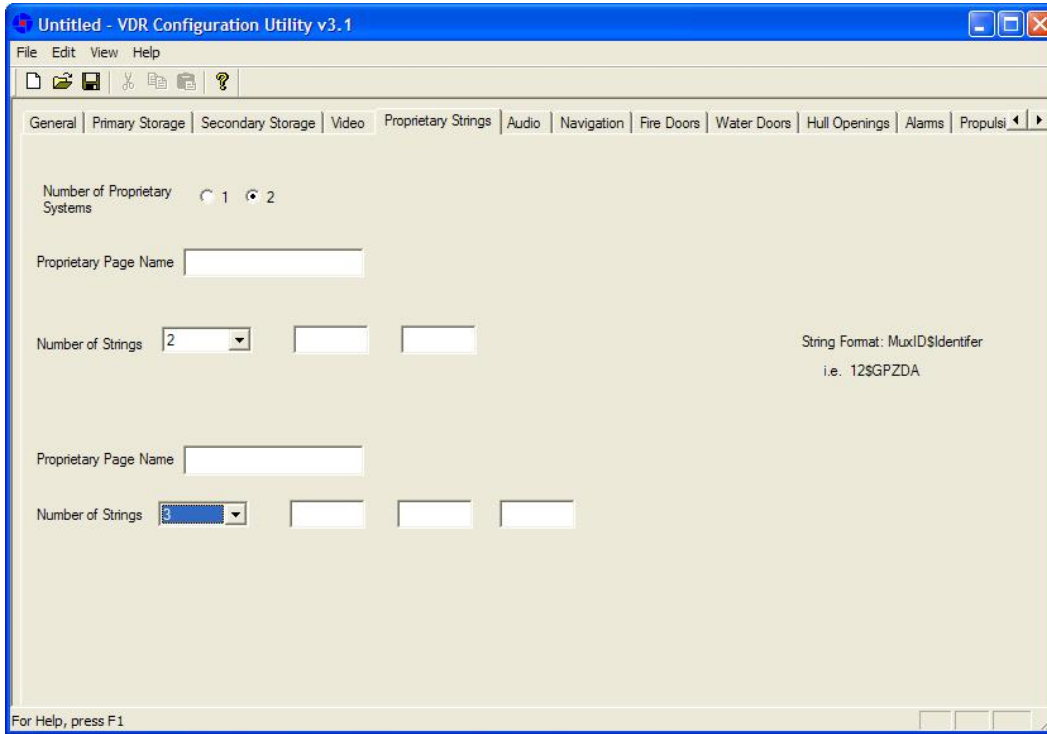


Figure A2- 10 - Proprietary Strings

If proprietary strings are entered, the following fields in the Proprietary Strings tab window must be completed:

A2.6.1 Number of Proprietary Systems

Select the radio button (1 or 2) which represents the number of Proprietary Systems for which strings will be entered.

A2.6.2 Proprietary Page Name

Enter a name for the tab that will be created for each Proprietary system. It is necessary to enter 2 names if 2 systems are specified.

A2.6.3 Number of Strings

Use the available drop-down menu 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). Observe the example below in Figure A2- 11 - Proprietary String Format which displays how the user would enter the proprietary string format.



Figure A2- 11 - Proprietary String Format

A2.7 Audio

The 'Audio' tab requires the input of information specific to the audio configuration (see Figure A2- 12 – Audio below).

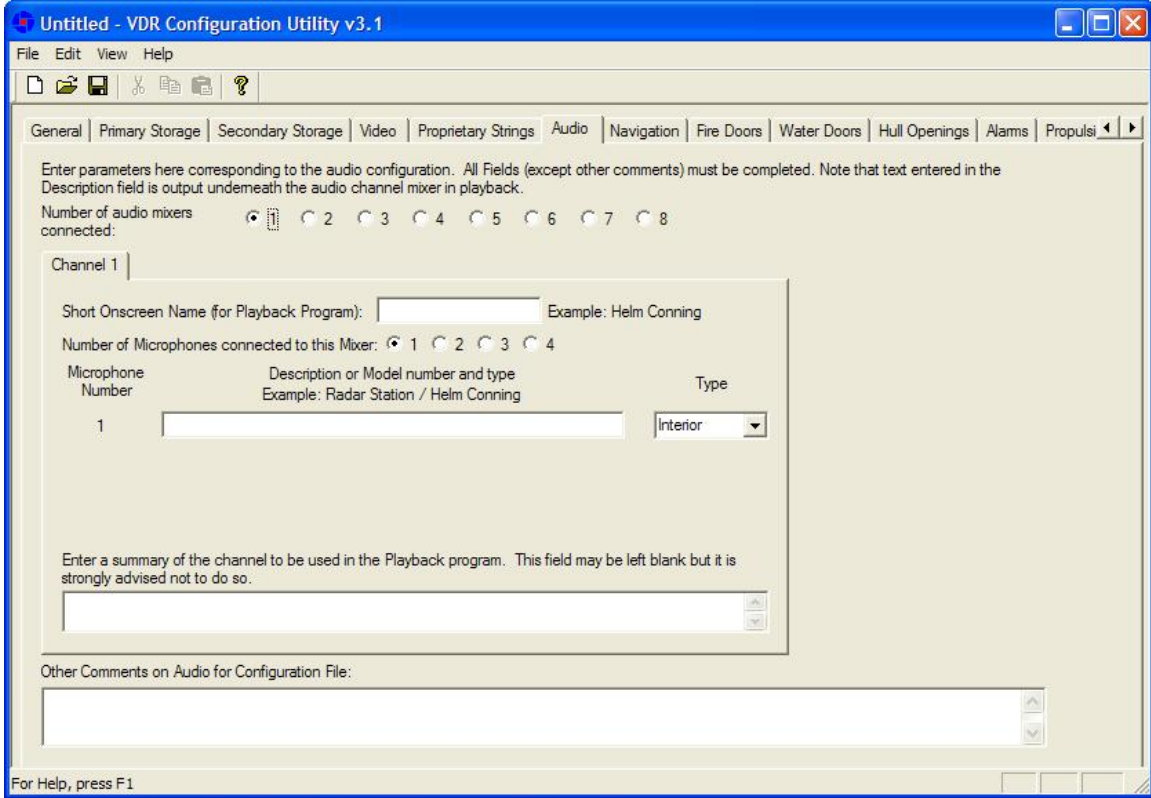


Figure A2- 12 – Audio

The followings fields in the Audio tab window must be completed:

A2.7.1 Number of Audio Output Channels

Select the radio button (1, 2, 3, 4, 5, 6, 7, or 8) applicable to the number of audio channels (where above figure references 'audio mixers') connected to the VDR. If more than one Audio Channel is selected, the software will create the appropriate number of Channel tabs available for data entry (see Figure A2- 13 - Audio Channel Information below).

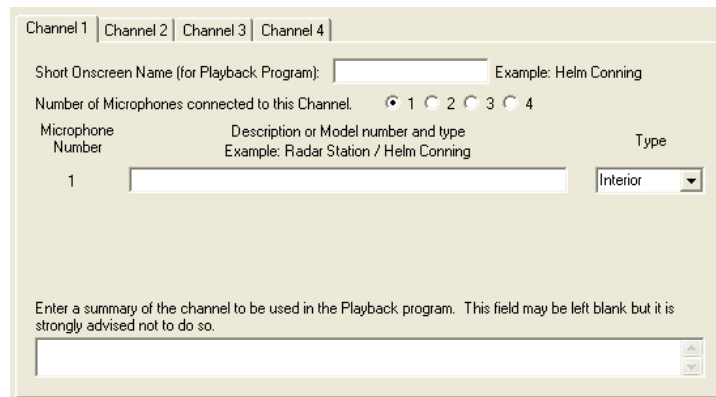


Figure A2- 13 - Audio Channel Information

The following fields are contained within individual Audio Channel tabs. After entering all relevant information for the first Channel, click the 'Channel 2' tab and complete all fields.



Note! This information will have to be entered for each Audio Channel connected.

A2.7.2 Short Onscreen Name

Enter a name for the audio channel which will be utilized by the Playback program. It is recommended to use a name that denotes the general location of the microphones associated with the audio channel.

A2.7.3 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 create the appropriate number of "Microphone Number" rows available for data entry (see Figure A2- 13 - Audio Channel Information above).

A2.7.4 Location of Microphone

Enter a brief description of the microphone.

Recommended: include such descriptors as location and type.

A2.7.5 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.

A2.7.6 Enter a Summary

Enter a complete description of the Channel and all connected microphones.

A2.8 Navigation

The Navigation tab requires the input of configuration information for the following:

- D/GPS,
- Wind,
- Autopilot,
- Depth,
- Heading,
- Rate of Turn,
- Speed, and
- AIS.

Each device has its own tab/button (see Figure A2- 14 – Navigation below). To enter configuration information, the user must press the appropriate tab to open a data entry window.

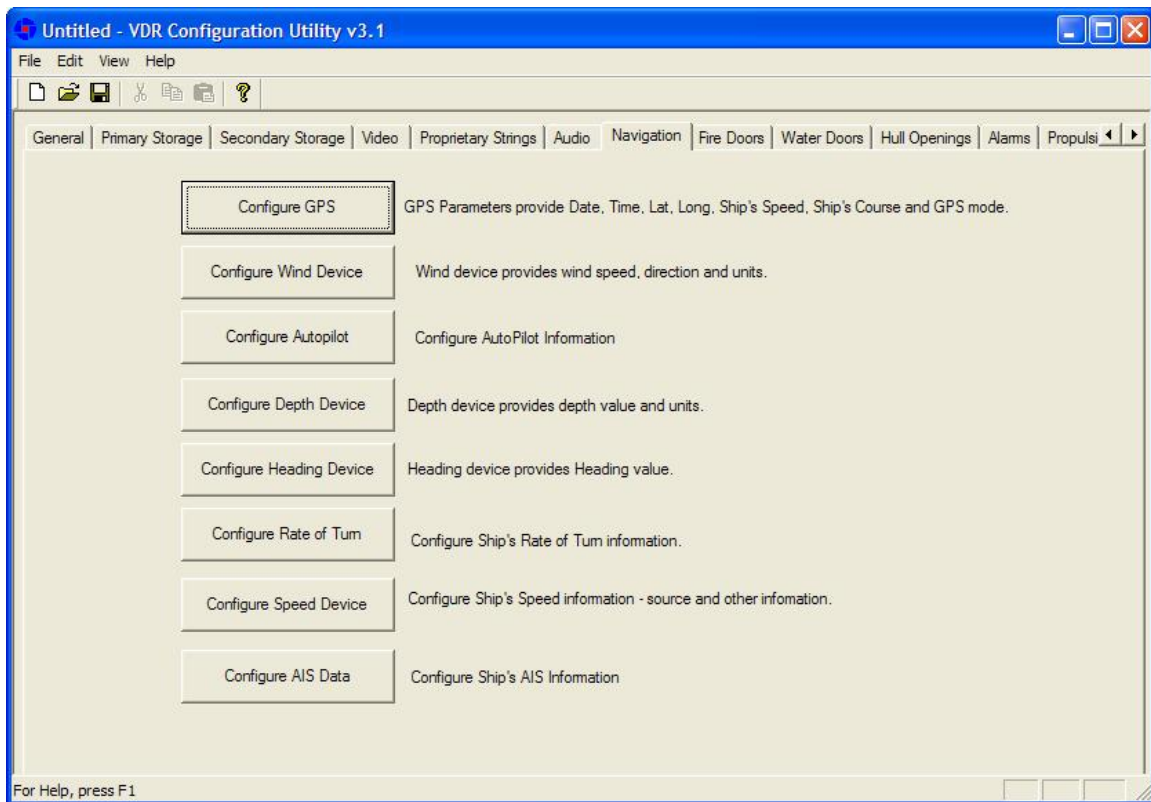


Figure A2- 14 – Navigation

A2.8.1 Configure GPS Device

Clicking the Configure GPS tab opens the Configure GPS Device data entry window (see Figure A2- 15 - Configure GPS Device below). This window requires the input of GPS parameters including date, time, latitude, longitude, ship's course, GPS mode and datum.

A2.8.1.1 GPS Manufacturer

Enter the name of the manufacturer of the configured GPS device.

A2.8.1.2 GPS Model

Enter the model name/number of the configured GPS device.

A2.8.1.3 GPS Location

Enter the location of the configured GPS device onboard the ship.

A2.8.1.4 Talker ID

The first two alphanumeric (letters and numbers) characters of the NMEA sentence 'Address Field' identify the Talker.



Note! When entering the Talker ID for a GPS device, these two letters will always be "GP".

A2.8.1.5 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.

A2.8.1.6 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.

Figure A2- 15 - 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>
- **Other**

A2.8.1.7 Sample String

Enter a sample string related to each NMEA sentence specified in the above configurations.

A2.8.2 Configure Wind Device

Clicking the Configure Wind Device tab opens the Configure Wind Device data entry window (See Figure A2- 16 - Configure Wind Device below). This window requires information for recording wind speed and direction.

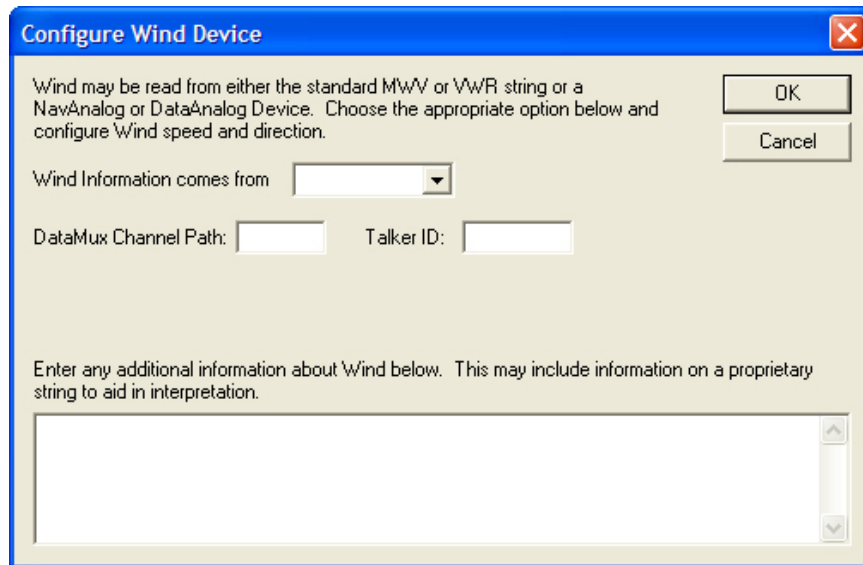


Figure A2- 16 - Configure Wind Device

A2.8.2.1 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>
- **MWD** – Wind Direction and Speed
 - \$-MWD,x.x,T,x.x,M,x.x,N,x.x,M*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>
- **Other**

A2.8.2.2 DataMux Channel Path

Enter the Mux channel that the Wind device is connected to.

A2.8.2.3 Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker.



NOTE: When entering the Talker ID for a weather device, these two letters will typically be "WJ".

A2.8.3 Configure Autopilot Device

Clicking the Configure Autopilot tab opens the Configure Autopilot data entry window (See Figure A2- 17 - Configure Autopilot below). This window requires information for recording the ship's autopilot. The information entered here will enable the VDR Playback to display the ON/OFF status of the Autopilot.

Figure A2- 17 - Configure Autopilot

A2.8.3.1 Mux Channel

Enter the MUX channel that the Autopilot is connected to.

A2.8.3.2 NMEA Identifier

Enter the Talker ID and sentence formatter output by the ship's Autopilot.



Note! The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker, and the latter three characters define the data format and type. Refer to the example that follows.

A2.8.3.3 Field Containing Autopilot Info

Enter the field of the autopilot NMEA sentence that contains the information required to determine the autopilot status. Refer to the example below.

A2.8.3.4 Character in Field

Enter the position of the character in the field that identifies the autopilot status. This is a numeric value that represents the place of the character in the field beginning to the left of the field. See example below.

A2.8.3.5 Activation Value

Enter the activation value of the character that sets the autopilot status to ON. Refer to example that follows.

EXAMPLE: 11\$DIS02, 000000,000000,000001,000000*5C

In this example a DataDiscrete is being used. The autopilot status is present in the third (3) field, sixth (6) position of the NMEA sentence. The autopilot is active when a one (1) is present. Below is a sample of how to configure the VDR Playback to display the autopilot status based on the information provided.

Mux Channel: 11
 NMEA Identifier: DIS02
 Field Containing Autopilot Info: 3
 Character in Field: 6
 Activation Value: 1

A2.8.4 Configure Depth Device

Clicking the Configure Depth Device tab opens the Configure Depth Device data entry window (see Figure A2- 18 - Configure Depth Device below). The information entered here will enable VDR Playback to display Ship’s depth during playback of recorded data.

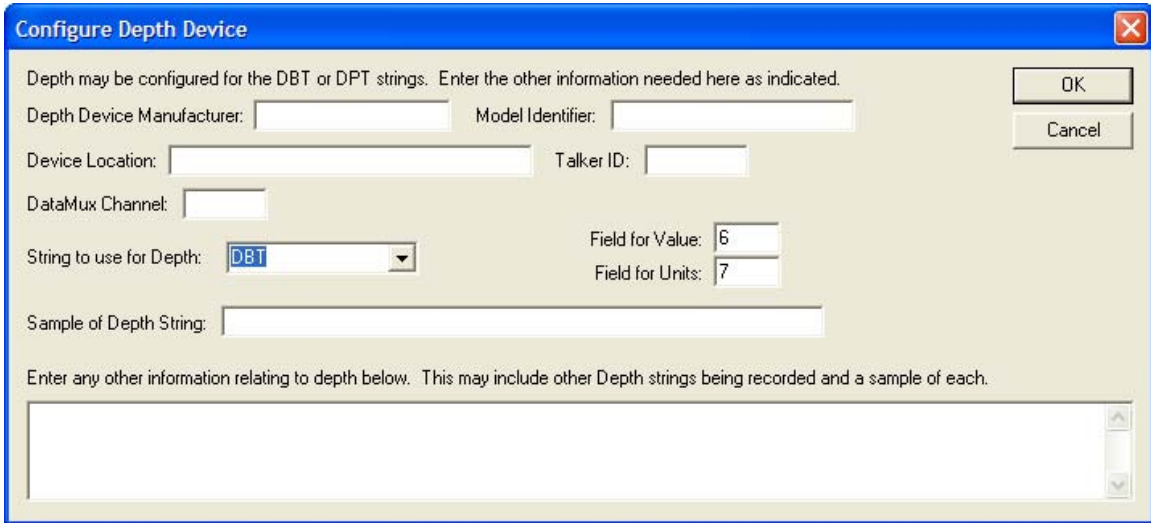


Figure A2- 18 - Configure Depth Device

A2.8.4.1 Depth Device Manufacturer

Enter the name of the manufacturer of the depth device.

A2.8.4.2 Model Identifier

Enter the model of the depth device.

A2.8.4.3 Device Location

Enter the location of the depth device onboard the ship.

A2.8.4.4 Talker ID

The first two alphanumeric characters of the NMEA sentence 'Address Field' identify the Talker.



Note! When entering the Talker ID for a depth device, these two letters will typically be "SD".

A2.8.4.5 DataMux Channel

Enter the DataMux channel that the depth device is connected to.

A2.8.4.6 String to Use for Depth

From the drop down box select the string that depth information is collected from. 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>
- **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>

A2.8.4.7 Sample of Depth String

Enter a sample of the depth string. See example DBT and DPT string formats provided in **String to Use for Depth** provided above.

A2.8.5 Configure Heading Device

Clicking the Configure Heading Device tab opens the Configure Heading Information data entry window (see Figure A2- 19 - Configure Heading Device below). This window requires the input of information relevant to the ship's heading.

Figure A2- 19 - Configure Heading Device

A2.8.5.1 Heading Device Manufacturer

Enter the name of the manufacturer of the heading device.

A2.8.5.2 Model

Enter the model of the heading device.

A2.8.5.3 Device Location

Enter the location of the heading device onboard the ship.

A2.8.5.4 Talker ID

The first two alphanumeric characters of the NMEA sentence 'Address Field' identify the Talker.



Note! When entering the Talker ID for a heading device, these two letters will typically be "HE".

A2.8.5.5 DataMux Channel

Enter the DataMux channel to which the heading device is connected.

A2.8.5.6 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>
- **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>

A2.8.5.7 Sample of Heading String

Enter a sample of the heading string. See example HDT and HDG string formats provided in **String to Use for Heading** provided above.

A2.8.6 Configure Rate of Turn (ROT)

Clicking the Configure Rate of Turn tab opens the Rate of Turn data entry window (see Figure A2- 20 - Rate of Turn below). This window requires the input of information relevant to the ship's rate of turn device.

Figure A2- 20 - Rate of Turn

A2.8.6.1 Rate of Turn Device Manufacturer

Enter the name of the manufacturer of the rate of turn device.

A2.8.6.2 Model

Enter the model of the rate of turn device.

A2.8.6.3 Device Location

Enter the location of the rate of turn device onboard the ship.

A2.8.6.4 Talker ID

The first two alphanumeric characters of the NMEA sentence 'Address Field' identify the Talker. When entering the Talker ID for a rate of turn device, these two letters will typically be "TI" or "HE".

A2.8.6.5 DataMux Channel

Enter the DataMux channel to which the rate of turn device is connected.

A2.8.6.6 String to Use for Rate of Turn

From the drop down box select the string from which rate of turn information is collected. ROT (Rate of Turn) is the only option available.

- ROT – Rate of turn and direction of turn
 - \$--ROT,x.x,A*hh<CR><LF>

A2.8.6.7 Sample of Rate of Turn String

Enter a sample of the rate of turn string. See example ROT string format provided in **String to Use for Rate of Turn** provided above.

A2.8.7 Configure Speed Device

Clicking the Configure Speed Device tab opens the Configure Speed Source data entry window (see Figure A2- 21 - Configure Speed Device below). This window requires information relevant to the ship's speed device.

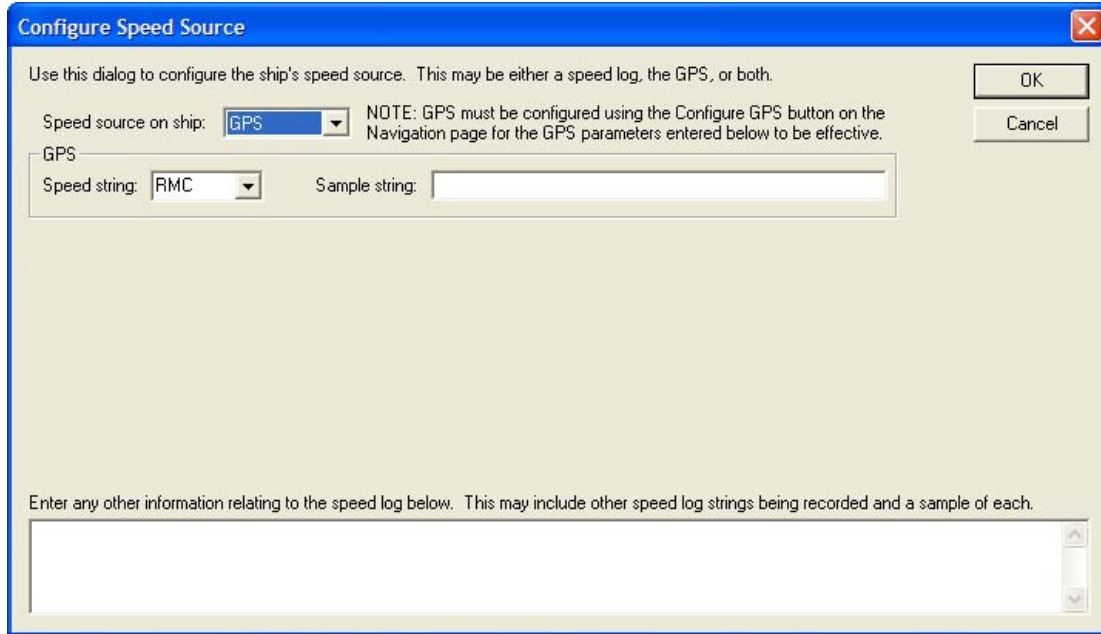


Figure A2- 21 - Configure Speed Device

A2.8.7.1 Speed Source on Ship

From the drop-down menu select the device from which ship speed information is collected. Options available for selection are: GPS, Speed Log, or both GPS and Speed Log. The option selected determines the information that must be entered in this window.

A2.8.7.2 GPS

GPS is the default selection and will require the following information:

A2.8.7.2.1. 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,yyyyy.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>
- **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>

A2.8.7.2.2. Sample String

Enter a sample of the speed string. See example RMC, VBW, VDR, VHW, and VTG string formats provided in **Speed String** provided above.

A2.8.7.3 Speed Log

If **Speed Log** is chosen from the 'Speed Source' drop-down menu, a Speed Log data entry window opens in the Configure Speed Source data entry window (see Figure A2- 22 - Speed Log below).

Figure A2- 22 - Speed Log

The following information must be entered in the Speed Log data entry window:

A2.8.7.4 Speed Log Manufacturer

Enter the name of the speed log manufacturer.

A2.8.7.5 Model

Enter the model of the speed log device.

A2.8.7.6 Speed Log Location

Enter the ship location of the speed log device.

A2.8.7.7 Talker ID

The first two alphanumeric characters of the NMEA sentence 'Address Field' identify the Talker.



Note! When entering the Talker ID for a speed log device, these two letters will typically be "VD", "VM", "VW", or "VR".

A2.8.7.8 DataMux Channel

Enter the DataMux channel to which the speed log device is connected.

A2.8.7.9 String to Use for Speed

From the drop down menu select the string from which speed log information is collected. Options available for selection are VDR, VTG, VBW, VHW, or RMC (See A2.8.7.2.1: Speed String above for format information on each of these strings).

A2.8.7.10 Sample of Speed String

Enter a sample of the speed string. See example RMC, VBW, VDR, VHW, and VTG string formats provided in **Speed String** provided above.



Note! 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.

A2.8.8 Configure AIS Data Device

Clicking the Configure AIS Data tab opens the AIS Configuration data entry window (see Figure A2- 23 - AIS Configuration below). This window requires the input of information relevant to the ship's AIS Receiver.

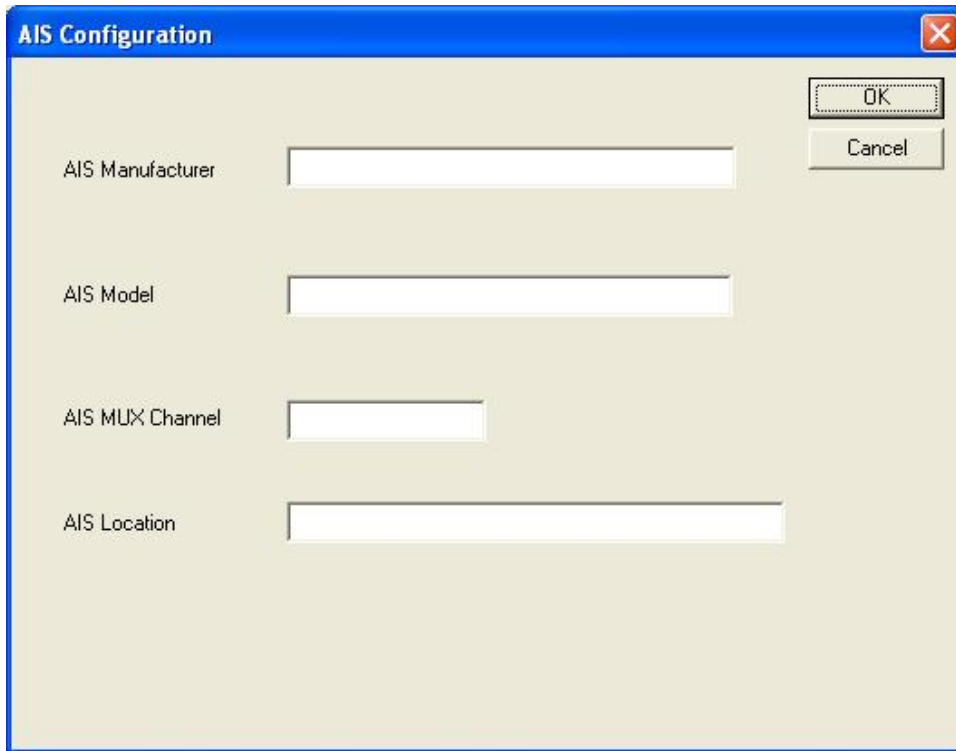


Figure A2- 23 - AIS Configuration

A2.8.8.1 AIS Manufacturer

Enter the name of the AIS manufacturer.

A2.8.8.2 AIS Model

Enter the model of the AIS device.

A2.8.8.3 AIS MUX Channel

Enter the Mux channel that the AIS device is connected to.

A2.8.8.4 AIS Location

Enter the location of the AIS receiver onboard the ship.

A2.9 Fire Doors Device

The Fire Doors tab requires configuration information for the ship's Fire Doors (see Figure A2- 24 - Fire Doors below).

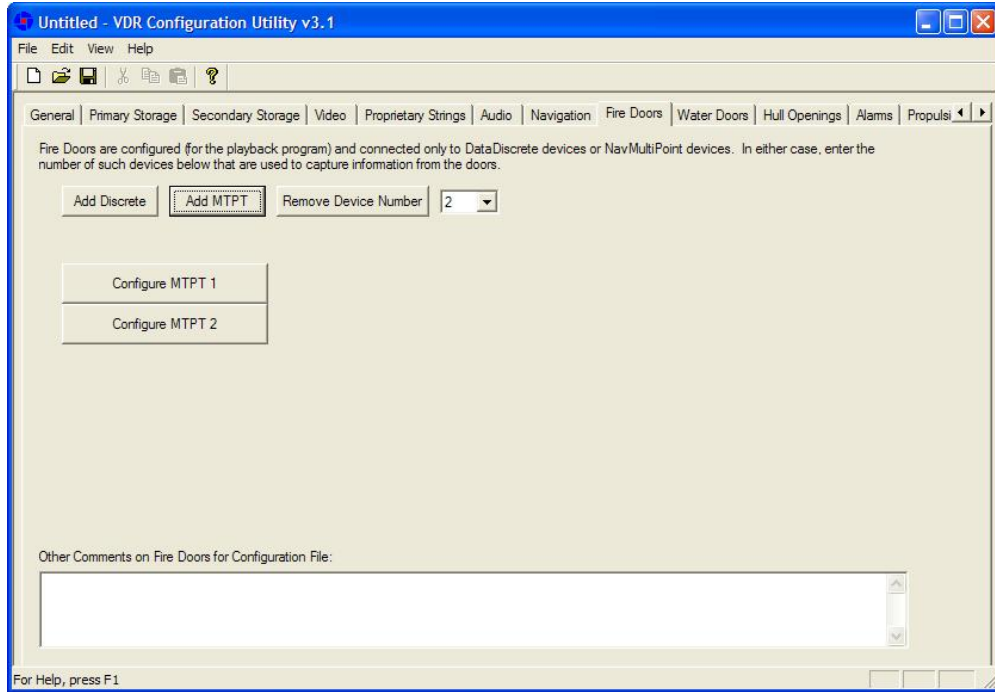


Figure A2- 24 - Fire Doors

A2.9.1 Add Discrete or Add MTPPT

To add a Discrete or MultiPoint (MTPPT) device:

1. Click the appropriate toggle button provided (**Add Discrete** or **Add MTPPT**). When clicked the appropriate **Configure** device button becomes available.

Each time the Add Discrete or Add MTPPT toggle button is pressed another **Configure** device button will appear.

2. To configure each device, press the related **Configure** button.



Note! If a Discrete or MultiPoint button is mistakenly added, it can be removed. Select the number of the device to be removed from the drop down box next to the “Remove Device Number” button and then click the “Remove Device Number” button to remove the device.

Example: In Figure A2- 24 - Fire Doors above, device number 2 (MTPPT 2) has been selected in the drop-down box for removal. Clicking the “Remove Device Number” button will remove the “Configure MTPPT 2” button.

A2.9.2 Configure Fire Doors Device

Enter information specific to the DataDiscrete or NavMultiPoint device selected (See Figure A2-25 - 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 A2- 25 - Configure DataDiscrete Device

A2.9.2.1 MUX Channel

Enter the MUX channel to which the DataDiscrete or NavMultiPoint is connected.

A2.9.2.2 Full NMEA Identifier

Enter the NMEA identifier for the device being configured. For example, the first DataDiscrete would have a *DIS01* identifier.



Note! The '\$' should **NOT** be entered as a part of the identifier into these text fields. It is added automatically in the *<.ini>* file.

A2.9.2.3 Field(s) to be Configured

Check the appropriate number of boxes to indicate which fields must be configured (connected to fire doors).

A2.9.2.4 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.

A2.9.2.5 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**.

A2.9.2.6 Type of Control

From the drop down box select the type of control associated with the appropriate field. Options available for selection are:

1. ON/OFF (ON=0), ON/OFF (ON=1),
2. 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.



Note! 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.

A2.10 Water Doors

The Water Doors tab requires configuration information for the ship’s Watertight Doors (See Figure A2- 26 - Water Doors below).

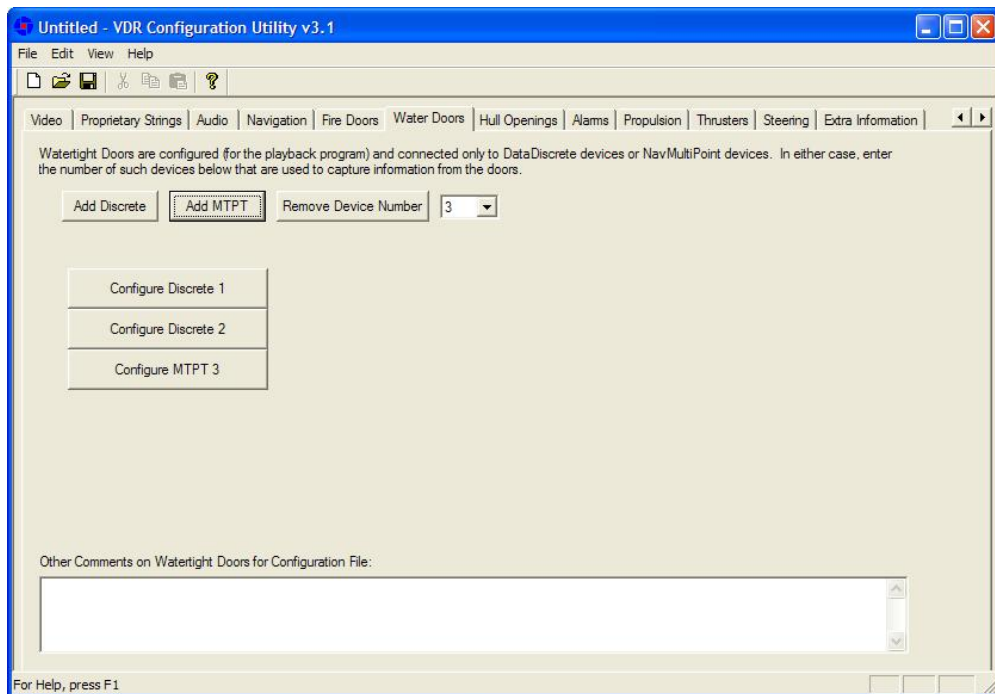


Figure A2- 26 - Water Doors

A2.10.1 Add Discrete or Add MTPT

To add a Discrete or MultiPoint (MTPT) device:

1. Click the appropriate toggle button provided ('Add Discrete' or 'Add MTPT');
2. Once the appropriate device has been added a **Configure** device button becomes visible;
3. Each time the Add Discrete or Add MTPT toggle button is pressed another Configure device button will appear;
4. To configure each device, press the related Configure button.



Note! If a Discrete or MultiPoint button is mistakenly added, it can be removed. Select the number of the device to be removed from the drop down box next to the "Remove Device Number" button and then click the "Remove Device Number" button to remove the device.

Example: In Figure A2- 26 - Water Doors *above*, device number 3 (MTPT 3) has been selected in the drop down menu for removal. Clicking the "Remove Device Number" button will remove the "Configure MTPT 3" button.

A2.10.2 Configure Water Doors Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see Figure A2- 25 - Configure DataDiscrete Device *above*). For a description of the information to be entered in the device configuration window, refer to Section A2.9.2: *Configure Fire Doors Device* *above*.

A2.11 Hull Openings

The 'Hull Openings' tab requires configuration information for the ship's Hull Openings (see Figure A2- 27 - Hull Openings *below*).

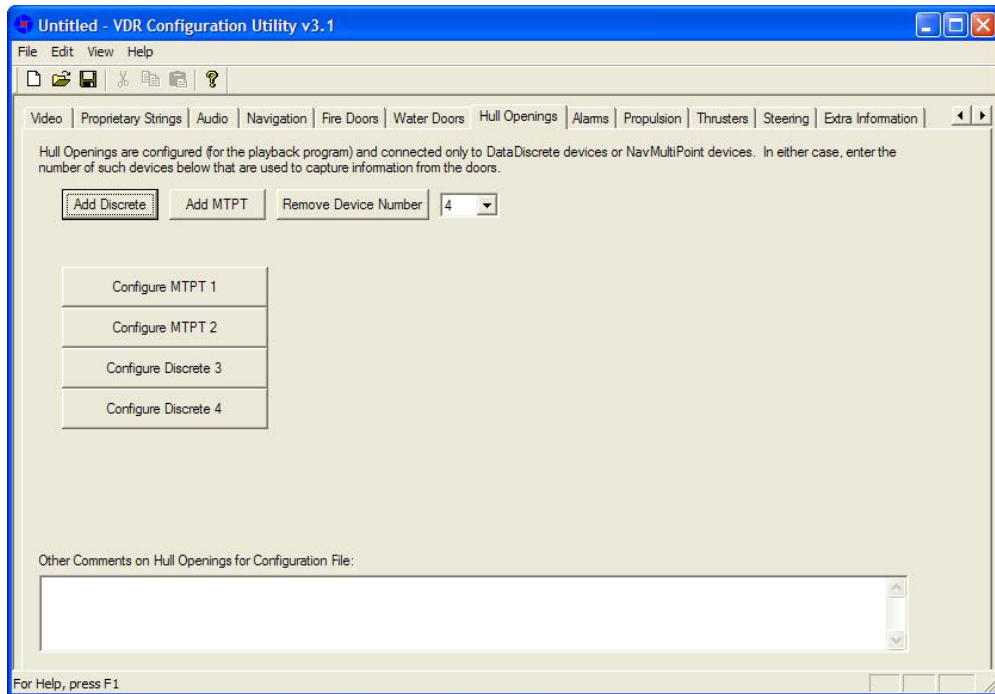


Figure A2- 27 - Hull Openings

A2.11.1 Add Discrete or Add MTPT

To add a Discrete or MultiPoint (MTPT) device:

1. Click the appropriate toggle button provided ('Add Discrete' or 'Add MTPT');
2. Once the appropriate device has been added a **Configure** device button becomes visible;
3. Each time the Add Discrete or Add MTPT toggle button is pressed another Configure device button will appear;
4. To configure each device, press the related Configure button.



Note! If a Discrete or MultiPoint button is mistakenly added, it can be removed. Select the number of the device to be removed from the drop down box next to the "Remove Device Number" button and then click the "Remove Device Number" button to remove the device.

Example: In Figure A2- 27 - Hull Openings above, device number 4 (Discrete 4) has been selected in the drop down menu for removal. Clicking the "Remove Device Number" button will remove the "Configure Discrete 4" button.

A2.11.2 Configure Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see Figure A2- 25 - 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.

A2.12 Alarms

The 'Alarms' tab requires configuration information for ship's alarms (Figure A2- 28 – Alarms).

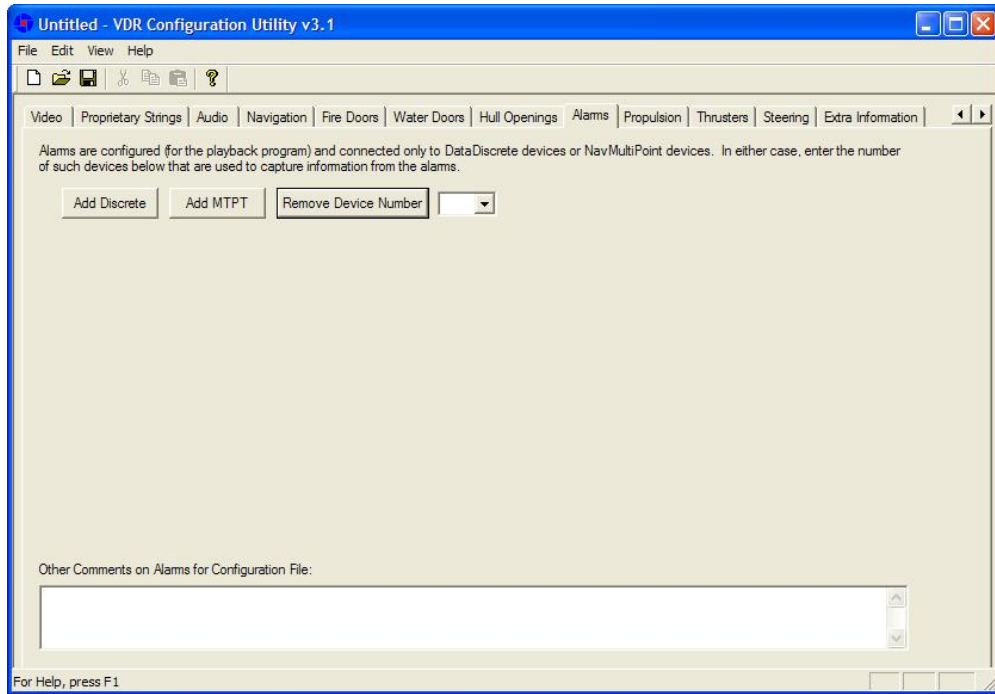


Figure A2- 28 – Alarms

A2.12.1 Add Discrete or Add MTPT

To add a Discrete or MultiPoint (MTPT) device:

1. Click the appropriate toggle button provided ('Add Discrete' or 'Add MTPT');
2. Once the appropriate device has been added a **Configure** device button becomes visible;
3. Each time the Add Discrete or Add MTPT toggle button is pressed another Configure device button will appear;
4. To configure each device, press the related Configure button.



Note! *If a Discrete or MultiPoint button is mistakenly added, it can be removed. Select the number of the device to be removed from the drop down box next to the "Remove Device Number" button and then click the "Remove Device Number" button to remove the device.*

A2.12.2 Configure Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see Figure A2- 25 - Configure DataDiscrete DeviceAlarms above). For a description of the information to be entered in the device configuration window, refer to Section A2.9.2 *Configure Fire Doors Device* above.

A2.12.3 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.

A2.13 Propulsion

The Propulsion tab opens a data entry window for configuration information on the ship's propulsion system (see Figure A2- 29 - Propulsion below). The possible configurations available are shafts, azipods, and water jets.

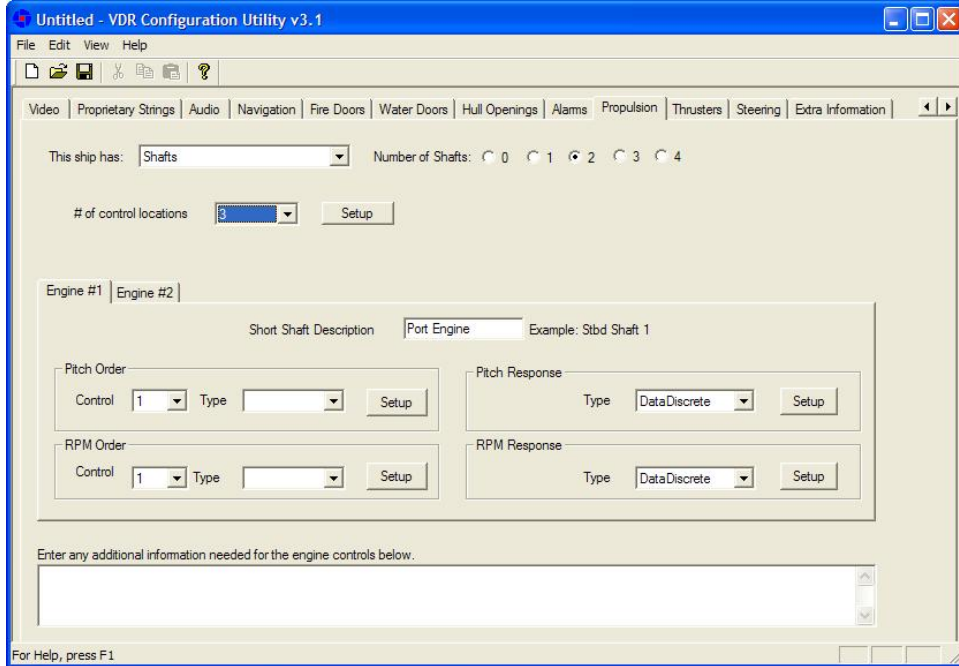


Figure A2- 29 - Propulsion

A2.13.1 “This Ship Has” Drop-down Box

From the drop-down box 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 on the lower half of the Propulsion Tab.

A2.13.2 # of Control Locations Drop-down Box

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 should be specified. If the engine order is taken from the same field for all locations, then only a single control location is required. If this dropdown box is not used, then it is assumed that there is only a single signal representing 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 this example, 3 locations are needed. The control location is normally specified using a DataDiscrete and is setup by clicking on the “Setup” button found to the right of the drop-down box used to specify the number of control locations.

Click the “Setup” button located next to the “# of Control Locations” drop-down box and enter the discrete information for the control locations. Presently, 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 A2- 25 - Configure DataDiscrete Device). Refer to section A2.9.2 Configure Fire Doors Device to add configuration details for the 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.

A2.13.3 Engine Description

In the tabbed sections, enter propulsion system information (for example, Order and Response). Provide a descriptive name for the engine to be displayed in VDR Playback during playback of recorded data. For example, name the first Starboard Engine Stbd Engine 1.

A2.13.3.1 Example 1 – NMEA Engine Data on Conditional Sentence

The following example illustrates a sample setup for a ship with engines that broadcast NMEA data sentences. This 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 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 (“no”). 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 A2- 1 - \$PRRS String Values – Example 1

1. In the “Pitch Order” section, choose **NMEA data** from the **Type** drop-down box.

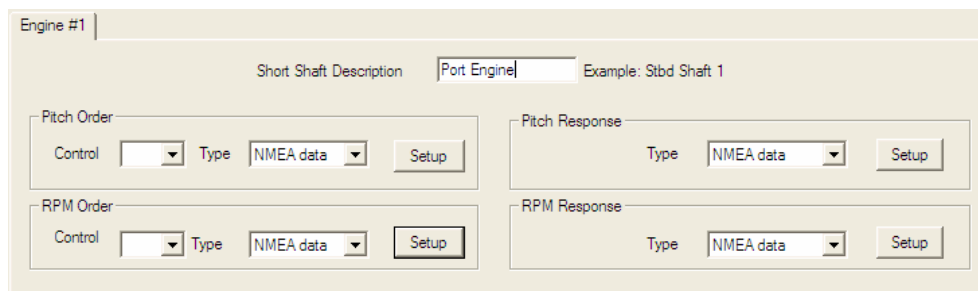


Figure A2- 30 - Engine Description – Example 1

2. Click the adjacent “Setup” button and enter the values as shown in Figure A2- 31 - Lever Command Setup – Example1 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.
3. Press the “OK” button to save and close the **Configure NMEA Device** window.
4. Repeat steps 1-3 to configure the RPM Order, Pitch Response, and RPM Response similar to “Pitch Order” in the steps above.

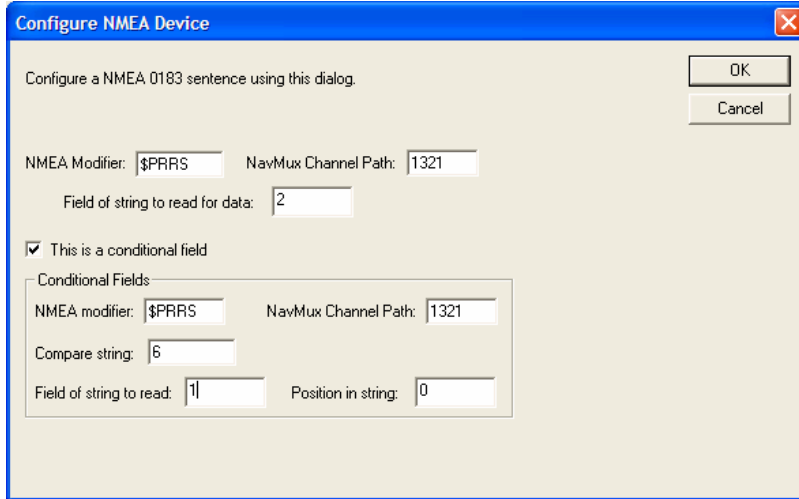
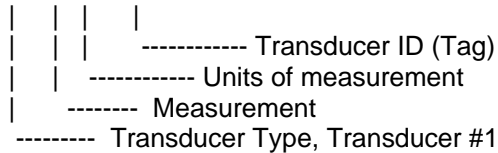


Figure A2- 31 - Lever Command Setup – Example 1

A2.13.3.2 Example 2 – NMEA Data from XDR Sentence

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 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>



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).

In the sample XDR string above a second measurement appears in the second group of 4 fields, possibly indicating engine ordered RPM.

The following example is similar to the example in *Section A2.13.3.1 – Example Example 1 – NMEA Engine Data on Conditional Sentence* in that NMEA data is also specified.

Click the **Setup** button to configure the NMEA device and enter the information as illustrated in Figure A2- 32 - XDR String – Example 2. 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.

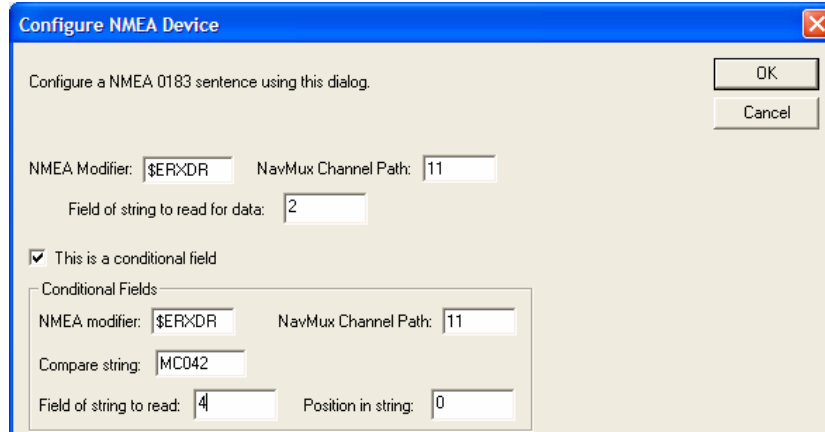


Figure A2- 32 - XDR String – Example 2

A2.14 Thrusters

The ‘Thrusters’ tab requires the input of configuration information for the ship’s thrusters (see *figure* below). If there are no thrusters in use on the vessel, select the ‘0’ radio button adjacent the ‘Number of Thrusters’.

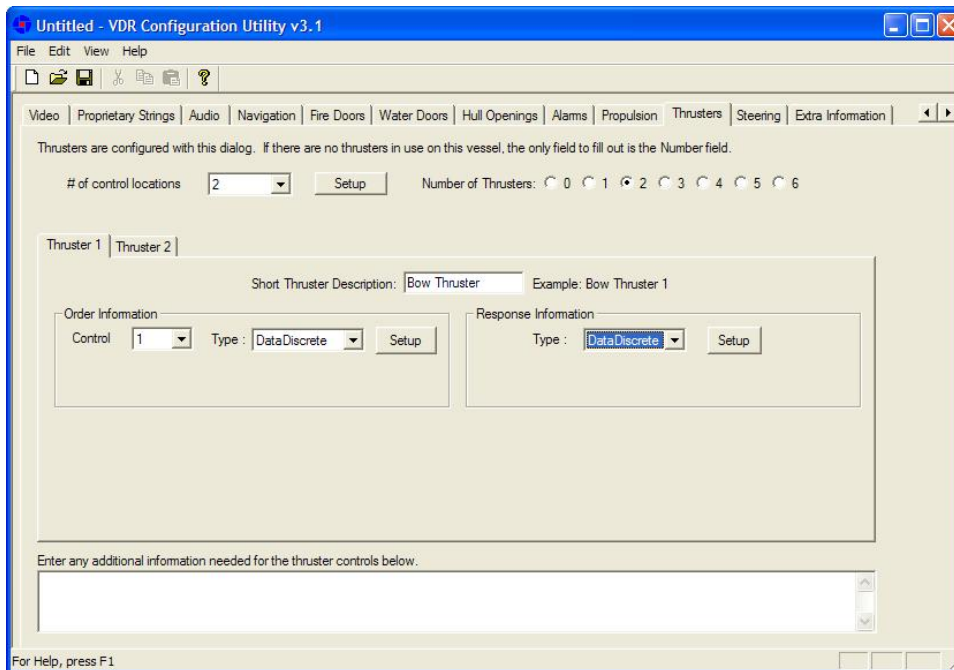


Figure A2- 33 - Thrusters

A2.14.1 Number of Thrusters

Dependant on the number of thrusters selected (via the “Number of Thrusters” radio buttons), an equivalent number of tabs will appear for each thruster specified. Enter information for each thruster in the tabbed sections in the bottom half of the Thruster Tab window.

A2.14.2 # 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.

A2.14.3 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 user to recognize it in the VDR Playback application, i.e. 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 configure the entered input device. Click the ‘Setup’ button and enter the relevant information in the configure device window.

Where more than 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 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 each additional thruster.

A2.15 Steering

The ‘Steering’ tab requires the input of configuration information for the ship’s steering system (see *figure* below).

A2.15.1 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.

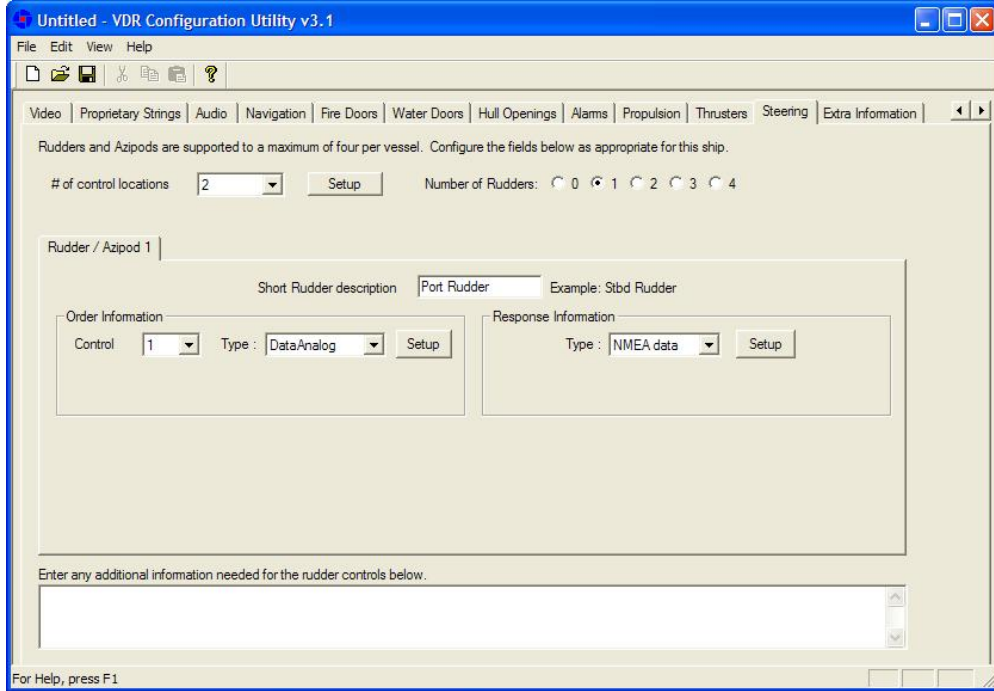


Figure A2- 34 – Steering

A2.15.2 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.



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 used to specify a single rudder order, and the Discrete interfaces specified are used to determine which signal is the correct one to use.

A2.15.3 Two Rudders with Two Steering Locations – Example 1

This example is for a ship that has 2 rudders controlled from 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 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.

- Press the setup button to open a data discrete setup window.

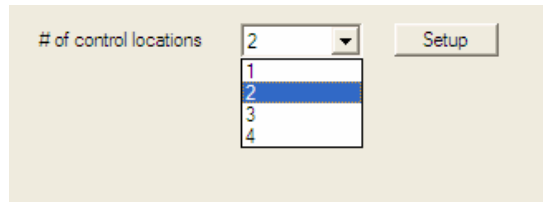


Figure A2- 35 - Control Locations – Example 1

- 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.

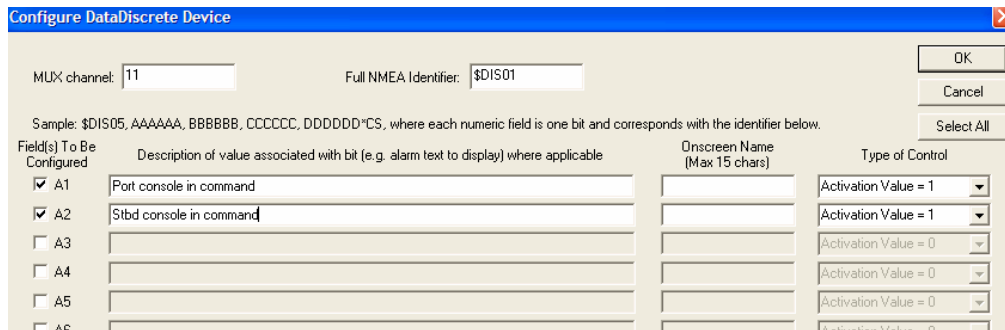


Figure A2- 36 - DataDiscrete Configuration – Example 1

- It is now necessary to set the number of rudders. Select the number of rudders using the available “Number of Rudders” radio buttons.
- 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).
- 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.

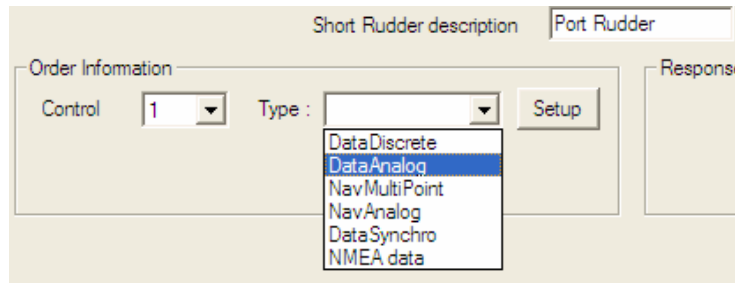


Figure A2- 37 - Control Type – Example 1

- 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.
- 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.
- 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.

Appendix 2: System Configuration File, Rev. 1.1

Use this dialog to configure a DataAnalog device. You may select any existing DataAnalog device or configure information for an additional device. NOTE THAT CHANGES WILL ONLY BE SAVED FOR THE FIELD THIS BOX WAS LAUNCHED TO MODIFY.

MUX channel for device: Example: 12

Full NMEA Identifier: Example: ANL03

DataAnalog Sample: 12\$ANL03,890,2890,-1644,3114,2641,0,1534,0*5D

This sample indicates that ANL03 is on channel 2 of DataMux 2, which is connected to DataMux 1. The numeric values are the values from the DataAnalog device. Field 1 of this string is the field filled with 890 above.

Field(s) To Be Configured	Type of Field	This Field represents	
<input type="checkbox"/> 1	Port / Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input checked="" type="checkbox"/> 2	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 3	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 4	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 5	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 6	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 7	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>
<input type="checkbox"/> 8	Port/Starboard	degrees	<input type="button" value="Configure Data Points"/>

Other Comments for this Device:

Figure A2- 38 - DataAnalog Configuration – Example 1

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 A2- 39 - Analog Field Values – Example 1

A2.16 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.

Rutter VDR-100G3/G3S Installation Manual

Appendix 3: VDRPARAMS.INI File, Rev. 1.2

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Appendix 3: VDRPARAMS.INI File

The <vdrparams.ini> file is a text file containing basic operating parameters for the VDR-100G3. The <vdrparams.ini> file is customized for each ship and the VDR-100G3 unit fitted. The <vdrparams.ini> file is loaded at start-up and various sections are checked periodically during the recording process to ensure that the VDR functions correctly.



Note! This file shall only be modified by an authorized service technician from Rutter Technologies Inc. or other authorized service personnel.

A3.1 General Parameters

Parameter	Typical Value	Remarks
autoStart	1	0= disable; 1=enable; default is 1
Last Modified	02/27/2008 18:18 (example)	Date that vdrparams.ini file was last modified

Table A3- 1- General Parameters

A3.2 Common Parameters

Parameter	Typical Value	Remarks
totalDuration	720	nominal length of archive, in minutes
directoryCountGAP	10	declare extra directories to simplify logic (1 to 20; default is 10)
dirInterval	60	time duration of a directory, in minutes (30 to 1440; default is 30)
upperLimit	2	threshold to stop deleting extra data, in disk space percentage (default is 2)
lowerLimit	1	threshold to start deleting extra data, in disk space percentage; default is 1
listenToModem	0	0=disabled; 1=enabled; default is 0
startLyngso	0	0=disabled; 1=enabled; default is 0
LyngsoPath	\\ows1\c\vdr	

Table A3- 2- Common Parameters

A3.3 UPS Parameters

Parameter	Typical Value	Remarks
powerFailRecordTime	120	time, in minutes, to continue recording after a power failure; 1-180 minutes ** MUST BE AT LEAST 120 FOR IMO COMPLIANT VDR**
COMPort	"COM2"	UPS communications port; default=COM2

Table A3- 3 - UPS Parameters

The VDR-100 monitors the status of the UPS by reading the UPS log file created during installation of the UPS monitoring software.

A3.4 Storage Parameters

Parameter	Typical Value	Remarks
primaryLoc	"D:\VDR_DATA"	Primary recording directory.
mirrorLoc	"E:\VDR_DATA_MIRROR"	Mirror directory recording.
archiveLoc	"F:\VDR_DATA_ARCHIVE"	Archived data directory.
tmpDrive	"D:\"	
fullDownloadEnabled	1	0=disabled, 1=enabled; default is 1
VideoToFRM	1	0 to 4; default is 1; 0=all video to FRM
hardenedStorage	1	0=disable; 1=enable; 2=Dual; default is 1
hardenedFormat	5	1=L3 HVR; 2=Unused; 3=Jotron; 4=Rutter-ACR Float-Free, 5=Rutter Fixed; default is 5
secondaryHardenedFormat	4	1=L3 HVR; 2=Unused; 3=Jotron; 4=Rutter-ACR Float-Free, 5=Rutter Fixed; default is 4
L3HVR-serverPort	5000	default port is 5000
L3HVR-IP	192.168.0.2	default IP is 192.168.0.2
L3HVR-numStreams	3	default is 3
L3HVR-streamName1	"AUDIO"	
L3HVR-streamName2	"NMEA"	
L3HVR-streamName3	"VIDEO"	
L3HVR-errorChecking	1	0=disable; 1=enable; default is 1
L3HVR-compressNMEA	1	0=disable; 1=enable; default is 1
L3HVR-streamType1	"AUDIO"	stream type may be AUDIO, VIDEO or NMEA;
L3HVR-streamType2	"NMEA"	stream type may be AUDIO, VIDEO or NMEA;
L3HVR-streamType3	"VIDEO"	stream type may be AUDIO, VIDEO or NMEA;
NetworkHVR-IP	"192.168.0.37"	Default is 192.168.0.37; if secondary FRM=200.200.200.37
NetworkHVR-compressNMEA	0	0 = disable, 1=enable; default is 0
NetworkHVR-DriveLetter	"X"	
NetworkHVR-DataLocation	"VDR_DATA"	
CACRFFMC-IP	"192.168.0.100"	Default is 192.168.0.100; if secondary FRM=200.200.200.100
CACRFFMC-compressNMEA	0	0 = disable, 1=enable; default is 0
RutterFixed-IP	192.168.0.50	Default is 192.168.0.50
RutterFixed-DriveLetter	"Z"	
RutterFixed-compressNMEA	0	0 = disable, 1=enable; default is 0

Table A3- 4- Storage Parameters

The location of the local data storage is read from the **primaryLoc** field. If **fullDownloadEnabled** is set, all data will be copied. Otherwise, only the basic IMO-required data will be copied. The **tmpDrive** field is used by the PMC storage module. It should be set to one of the VDR-100G3 internal fixed disks.

mirrorLoc (E:) specifies the location of where the most current 12 hours (0-12 hours old) of data is stored. **archiveLoc (F:)** is the location of the auto archived data.

If a hardened memory capsule is connected to the VDR-100G3, the **hardenedStorage** field must be set to 1 to enable support. Use **Dual** if there is a secondary FRM connected to the system, such as an Rutter-ACR Float-Free capsule. Four types of capsules are supported by the system – the **hardenedFormat** field specifies which one is to be used.

L3 HVR/SVR Fixed Capsule

If the capsule is an L3 HVR/SVR Fixed capsule, the configuration information is read from the following fields: **L3HVR-serverPort**, **L3HVR-IP**, **L3HVR-numStreams** and **L3HVR-streamNameX**, where X varies from 1 to L3HVR-numStreams.

The data types to be written to each stream are defined in **L3HVR-streamTypeX**, where X varies from 1 to L3HVR-numStreams.

To report internal capsule errors to the alarm unit, enable the **L3HVR-errorChecking** field. To compress the NMEA data prior to sending it to the capsule, enable the **L3HVR-compressNMEA** field.

Jotron Float-Free Capsule

For a Jotron Float-Free capsule, the configuration information is read from the following fields: **NetworkHVR-IP**, **NetworkHVR-compressNMEA**, **NetworkHVR-DriveLetter**, and **NetworkHVR-DataLocation**.

The VDR_Record application will map a drive to the Jotron Float-Free internal hard disk using the letter specified by **NetworkHVR-DriveLetter** and create a folder name described by **NetworkHVR-DataLocation** to store the VDR data. To compress the NMEA data prior to sending it to the capsule, enable **NetworkHVR-compressNMEA** field.

The Jotron Float-Free capsule may also be configured as a secondary FRM, in which case the **NetworkHVR-IP** would be configured as 200.200.200.37.

Rutter-ACR Float-Free Capsule

The Rutter-ACR Float-Free SFRM capsule is configured based on the following fields: **CACRFFMC-IP**, **CACRFFMC-serverWritePort**, **CACRFFMC-serverReadPort**, and **CACRFFMC-serverConfigPort**. The Rutter-ACR Float-Free capsule may also be configured as a secondary FRM, in which case the **CACRFFMC-IP** would be configured as 200.200.200.100.

Rutter Fixed Capsule

For a Rutter_capsule the IP configuration information is read from the **RutterFixed-IP** field of the vdrparams.ini file.

The VDR_Record application will map a drive to the Rutter internal hard disk using the letter specified by **RutterFixed-DriveLetter**. To compress the NMEA data prior to sending it to the capsule, enable **RutterFixed-compressNMEA**.

A3.5 Audio Parameters

Parameter	Typical Value	Remarks
Blocks	60	number of capture intervals per file
ChannelEnabled1	1	0=disabled; 1=enabled; default=1
ChannelEnabled2	1	0=disabled; 1=enabled; default=1
ChannelEnabled3	1	0=disabled; 1=enabled; default=1
ChannelEnabled4	1	0=disabled; 1=enabled; default=1
ChannelEnabled5	0	0=disabled; 1=enabled; default=0
ChannelEnabled6	0	0=disabled; 1=enabled; default=0
ChannelEnabled7	0	0=disabled; 1=enabled; default=0
ChannelEnabled8	0	0=disabled; 1=enabled; default=0
numOutputChannels	4	
OutputChannel1	1	Use comma if 2 channels are mixed, i.e. 1,2
OutputChannel2	2	
OutputChannel3	3	
OutputChannel4	4	
OutputChannel5	5	
OutputChannel6	6	
OutputChannel7	7	
OutputChannel8	8	
numVHFChannels	1	default is 1
VHF-Channel1	1	default is 1
VHF-Channel2	5	default is 5
MikesOnMixer1	2	default is 2
MikesOnMixer2	2	default is 2
MikesOnMixer3	2	default is 2
MikesOnMixer4	0	default is 0
MikesOnMixer5	0	default is 0
MikesOnMixer6	0	default is 0
MikesOnMixer7	0	default is 0
DetectionThreshold1	500	test signal RMS must exceed this to be detected
DetectionThreshold2	500	test signal RMS must exceed this to be detected
DetectionThreshold3	500	test signal RMS must exceed this to be detected
DetectionThreshold4	500	test signal RMS must exceed this to be detected
DetectionThreshold5	500	test signal RMS must exceed this to be detected
DetectionThreshold6	500	test signal RMS must exceed this to be detected
ChirpLength	30	mike self-test signal length, in ms (100 ms max)
MikeRetryInterval	3600	in seconds
MaxMikeRetrys	11	retry this many times before declaring failure

Table A3- 5 - Audio Parameters

The number of channels sampled by the VDR-100G3 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.

A3.5.1 Bridge Audio Self-Testing

For the bridge audio self-testing, the system will generate a tone on the speaker and detect this tone in the captured data block. Numerous entries in the INI file are used to configure this process. The VDR-100G3 can perform self-testing on up to three mixers and up to four mikes on each mixer. The number of mikes to test on each mixer is set in the INI file – the **MikesOnMixer1**, **MikesOnMixer2**, and **MikesOnMixer3** fields. One mike on each mixer is tested simultaneously.



Note! *If there are three mixers incorporated in the VDR for bridge audio, **the physical connections for the VHF will be on mixer 3.** The third bridge audio mixer is physically connected as mixer 4. Therefore in the <vdrparams.ini> file the microphones which are physically connected on mixer 4 will be set as **MikesonMixer3**.*

VHF channels do not support self-testing. The number of VHF channels and the corresponding channel index are loaded from the INI file – the **numVHFChannels** and the **VHF-ChannelX** fields, where X varies from 1 to numVHFChannels. The VHF channels do not have to be assigned to the highest channels, but it is good practice to configure the system this way because the hardened storage module stores only the first four captured channels (hence, it assumes that three of these channels are bridge audio).

Each mixer has its own detection threshold, which is loaded from the INI file – the **DetectionThreshold1**, **DetectionThreshold2**, and **DetectionThreshold3** fields.

The microphone self-test is performed as follows:

1. The speaker for one mike on each mixer is turned on for the period specified in the INI file – the **ChirpLength** field.
2. The RMS for the entire data record (1 second) is computed.
3. If the RMS value is greater than $0.707 \times \text{detection threshold}$, the test is aborted. If this happens, the background level is assumed to be too high to reliably pick out the speaker chirp.
4. An RMS value is computed for each sub-interval; each sub-interval is the same length as the speaker chirp duration.
5. If the RMS for any sub-interval exceeds the threshold, the chirp is declared detected and the microphone operational.
6. When all three speakers have been sounded, the detection results are reviewed. Any mike that has failed the test will be retried. The VDR-100G3 will wait 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 mike has failed all attempts, an alarm will be generated. The alarm will not clear until all mikes have been successfully tested.

A3.6 Video Parameters

Parameter	Typical Value	Remarks
numSources	1	1 to 4; default is 2
transferRate	15000	1 video=15000; 2=7500; 3=5000; 4=3750
blocks	4	Number of capture intervals per file. This number should be equal to 60000ms/transferRate
maxColors	256	Maximum number of colours in output image
enhancedCompression	0	1=enable; 0=disable; default is 0
noiseClipping	0	1=enable; default is 1; ignored if enhancedCompression is disabled
recordDuringPowerFail	0	To record Video during a power fail, set to 1; default is 0

Table A3- 6 - Video Parameters

The video capture module captures a 24-bit image, converts it to an 8-bit image and compresses it. The capture and conversion components can be configured depending on the data source.

The number of sources connected to the VDR-100G3 is read from the INI file – the **numSources** field. Up to four sources are supported. The capture interval is also read from the INI file – the **transferRate** field. The capture interval for each input channel is equal to $\text{numSources} * \text{transferRate}$ (if two sources are present and the transferRate is 7.5 seconds, each channel will be sampled every 15 seconds).

The conversion of the captured image from 24 to 8 bits has several settings that affect the process. Normally the conversion will generate a palette with 256 entries. This typically results in an image that compresses least. If the source has less than 256 colours, the number of colours generated by the conversion routine can also be limited.

In some instances even greater compression can be achieved by setting the **enhancedCompression** field in the INI file. This feature will pre-process the data prior to conversion, resulting in fewer colours. If the image is labelled RADAR format (which is the default, unless an external indicator is provided), the number of output colours is restricted to 64; otherwise it is 256.

If the captured image has a primarily black background, any noise at the low end of the captured signal can be removed by setting the **noiseClipping** field in the INI field. 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.

A3.7 NMEA Parameters

Parameter	Typical Value	Remarks
transferRate	1000	500 to 1000 ms; default is 1000
blocks	60	number of capture intervals per file
TimeSourcePort	3	port that time signal is on, 3=UDP; 1 or 2 =serial port
timeString	"ZDA"	PC, ZDA, GGA, GLL, RMC
timeMuxID	12	NMEA module channel ID – used for time synchronization and GPS Error.
EnableAISParsing	0	1=no AIS data to FRM; default is 0
AISLocation	3	1=COM1; 2=COM2; 3=UDP; default is 3
AISMuxID	11	NMEA module channel ID where AIS data is located; only read if AISLocation is 3.
recordDuringPowerFail	0	To record Video during a power fail, set to 1; default is 0
NumNMEAModules	0	Number of NMEA modules connected. Default value is 0, Maximum value is 9.
NMEAModule1IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 1; i.e. 11
NMEAModule2IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 2; i.e. 22
NMEAModule3IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 3; i.e. 32
NMEAModule4IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 4; i.e. 42
NMEAModule5IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 5; i.e. 52
NMEAModule6IDStart	0	NMEA Module Channel ID of the first channel, for NMEA Module 6; i.e. 62

Table A3- 7 NMEA Parameters

The VDR-100G3 can synchronize its system clock to an external clock source. The VDR-100G3 is configured so that the clock source has a dedicated input port, in order to minimize any delays between the generation of the signal and the comparison to the system clock. The port on which the clock signal is expected is read from the INI file – the **TimeSourcePort** field. The VDR-100G3 system clock will be compared to the external clock source. If the difference is more than 2.0 seconds, the VDR-100G3 system clock will be set to the external clock source. The NMEA module channel on which the time source is read is identified by the **timeMuxID** field of the INI file. The **timeString** parameter specifies the NMEA sentence of the external clock source that provides time information to the VDR-100G3 for time synchronization.

NOTE: If the VDR-100G3 is recording AIS data, there is an **option to NOT** record the data to the FRM. When the option to NOT record AIS data to the FRM is chosen, then AIS data will only be stored to the internal hard drive of the VDR DMM. To **NOT** record AIS data to the FRM, the **EnableAISParsing** parameter must be set to 1.

If **EnableAISParsing** is set to 1, then the operator must specify the communications port from which the AIS signal can be read. To do this the operator must specify the port in the **AISLocation** of the INI file. Also, if the **AISLocation** is set to UDP(3), the **AISMuxID** must specify the NMEA module channel ID receiving the AIS data.

The VDR-100G3 automatically performs NMEA self tests during normal VDR data recording. The NMEA self test monitors incoming data from the configured NMEA modules connected to the VDR-100G3 for missing channel IDs.

The NMEA self test is disabled by default. To enable the NMEA self test the **NumNMEAModules** parameter should be set to the value which represents the number of NMEA modules connected to the VDR-100G3. A maximum of nine NMEA modules can be connected to the VDR-100G3 at any one time.

The parameter **NMEAModule"X"IDStart** (where **X** is the position of the NMEA module as it is in the array of NMEA modules, if applicable) specifies the first channel ID for NMEA module **X**. **NMEAModule1IDStart** is the first channel ID for NMEA module 1, this is usually the NMEA module connected to the VDR via the Ethernet connection, **NMEAModule2IDStart** is the first channel ID for NMEA module 2, **NMEAModule3IDStart** is the first channel ID for NMEA module 3, etc.

A3.8 Alarm Parameters

Parameter	Typical Value	Remarks
Port	"COM1"	Alarm communication port
Baudrate	4800	Baud rate on com port; default is 4800

Table A3- 8 Alarm Parameters

The external alarm module communicates with the DMU through a serial communications port. The port and baudrate are set by the **Port** and **Baudrate** fields.

The **enabled** field is used to control if this function is present. The length of the extended NMEA archive is set by the **totalDuration** field, which can be from 1 to 185 days.

A3.9 Sample VDRPARAMS.INI File

```
[GENERAL PARAMS]
//Released with VDR-100G3 Record Application version 6.01.00
autoStart = 1 // 0=disable, 1=enable
Last Modified=02/27/2008 16:41:00

[COMMON PARAMS]
totalDuration =720 // time duration of a dataset
directoryCountGAP=10 // declare extra directories to simplify logic (1 to 20)
dirInterval = 60 // time duration of a directory, in minutes (30 - 1440)
upperLimit = 2 // threshold to stop deleting extra data, in disk space percentage
lowerLimit = 1 // threshold to start deleting extra data, in disk space percentage
listenToModem = 0 // 0 = disabled, 1 = enabled; default is 0
startLyngso = 0 // 0 = disabled, 1 = enabled; default is 0
LyngsoPath = \\ows1\c\vdr

[UPS]
powerFailRecordTime = 120 // time, in minutes, to continue recording after a power failure; 1-180 minutes
COMPort = COM2

[STORAGE]
primaryLoc=D:\VDR_DATA
mirrorLoc=E:\VDR_DATA_MIRROR
archiveLoc=F:\VDR_DATA_ARCHIVE
tmpDrive = "D:\"
fullDownloadEnabled = 1 // 0 = disabled, 1 = enabled; default is 1
VideoToFRM = 1 // 0 to 4; default is 1, 0 = all video to FRM

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

// If using an L3 HVR/SVR Fixed Capsule as the primary FRM, use IP "192.168.0.2"
L3HVR-serverPort = 5000
L3HVR-IP = "192.168.0.2"
L3HVR-numStreams = 3 // default is 3
L3HVR-streamName1 = "AUDIO"
L3HVR-streamName2 = "NMEA"
L3HVR-streamName3 = "VIDEO"
L3HVR-errorChecking = 1 // 0 = disable, 1 = enable; default is 1
L3HVR-compressNMEA = 1 // 0 = disable, 1 = enable; default is 1
// stream type may be AUDIO, VIDEO or NMEA; default is AUDIO
L3HVR-streamType1 = "AUDIO"
L3HVR-streamType2 = "NMEA"
L3HVR-streamType3 = "VIDEO"

// If using a Jotron Float-Free Capsule as the primary FRM, use IP "192.168.0.37":
// If using a Jotron Float-Free Capsule as the secondary FRM, use IP "200.200.200.37".
NetworkHVR-IP = "192.168.0.37"
NetworkHVR-compressNMEA = 0 // 0 = disable, 1=enable; default is 0
NetworkHVR-DriveLetter = "X"

// If using a Rutter-ACR Float-Free Capsule as the primary FRM, use IP "192.168.0.100".
// If using a Rutter-ACR Float-Free capsule as the secondary FRM, use IP "200.200.200.100".
CACRFFMC-IP = "192.168.0.100"
CACRFFMC-compressNMEA = 0 // 0 = disable, 1=enable; default is 0

// If using a Rutter Fixed Capsule as the primary FRM, use IP "192.168.0.50".
RutterFixed-IP="192.168.0.50"
RutterFixed-DriveLetter="Z"
RutterFixed-compressNMEA = 0 // 0 = disable, 1=enable; default is 0
```

```

[AUDIO]
blocks =60

// VDR-100G3
ChannelEnabled1 = 1 // 0 = disabled, 1 = enabled
ChannelEnabled2 = 1
ChannelEnabled3 = 1
ChannelEnabled4 = 1
ChannelEnabled5 = 0
ChannelEnabled6 = 0
ChannelEnabled7 = 0
ChannelEnabled8 = 0

// Software mixing - provide list of channels to mix (max. 2 per channel)
// Use comma for OutputChannelx if 2 channels are mixed i.e. 1,2
NumOutputChannels = 4
OutputChannel1 = 1
OutputChannel2 = 2
OutputChannel3 = 3
OutputChannel4 = 4
OutputChannel5 = 5
OutputChannel6 = 6
OutputChannel7 = 7
OutputChannel8 = 8

numVHFChannels = 1 // default is 1
VHF-Channel1 = 1 // default is 1
VHF-Channel2 = 5

MikesOnMixer1 = 2 // 0 to 2; first non-VHF channel
MikesOnMixer2 = 2
MikesOnMixer3 = 2
MikesOnMixer4 = 0
MikesOnMixer5 = 0
MikesOnMixer6 = 0
MikesOnMixer7 = 0

DetectionThreshold1 = 500 // test signal RMS must exceed this to be detected
DetectionThreshold2 = 500 // test signal RMS must exceed this to be detected
DetectionThreshold3 = 500 // test signal RMS must exceed this to be detected
DetectionThreshold4 = 500 // test signal RMS must exceed this to be detected
DetectionThreshold5 = 500 // test signal RMS must exceed this to be detected
DetectionThreshold6 = 500 // test signal RMS must exceed this to be detected

ChirpLength = 30 // mike self-test signal length, in ms (100 ms max)
MikeRetryInterval = 3600 // in seconds
MaxMikeRetrys = 11 // retry this many times before declaring failure

[VIDEO]
numSources = 1 // 1 to 4, default is 2
transferRate = 15000 // 1 video = 15000, 2=7500, 3=5000, 4=3750
blocks = 4
maxColors = 256 // maximum number of colors in output image;
// ignored if enhancedCompression is enabled
enhancedCompression = 0 // 1 = enable, default is 0
noiseClipping = 0 // 1 = enable, default is 1; ignored if enhancedCompression is disabled
recordDuringPowerFail = 0 // To record Video during a power failure, set value to 1; default = 0

[NMEA]
transferRate = 1000 // 500 to 1000 ms, default is 1000
blocks =60
TimeSourcePort = 3 // port that time signal is on, 3 = UDP, 1 or 2 = Serial Port
timeString = ZDA // PC, ZDA, GGA, GLL, RMC
timeMuxID = 12 // GPS mux channel - used for GPS Error
AISLocation = 3 // 1 = COM1, 2 = COM2, 3 = mux, default = 3
EnableAISParsing = 0 // 1 = no AIS data to FRM, default is 0
AISMuxID = 11 // MUX ID where AIS data is located; only read if AISLocation is 3
recordDuringPowerFail = 0 // To record NMEA during a power failure, set value to 1; default = 0

[ALARM]
Port = COM1
Baudrate = 4800 // default is 4800

```

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Appendix 4: DATA RETRIEVAL

The VDG-100G3 is supplied with several options for retrieving and playing recorded voyage data:

1. The primary method of retrieving data is via the 4 GB USB Memory Stick. The downloading of data to the USB memory stick is initiated at the OAU via the 'Copy' button (see *Chapter 11 – Operation and Alarm Unit and User Guide*).
2. Alternatively, the Remote Storage Module (RSM) may be used to retrieve recorded data from the VDR. The downloading of data to the RSM is initiated at the OAU via the 'Copy' button (see *Chapter 13: Remote Storage Module (optional)*).
3. A third method is to download data via a Client PC connected to the VDR by a LAN connection. All necessary software is provided and must be installed on the Client PC (see below *Section 2A4.2 - Installation of Download Software on Client PC*).

A4.1 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:

1. Pentium III or higher processor
2. 256 MB of memory
3. 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)
4. Audio hardware with PC speakers or headphones
5. 100 Base-TX Ethernet Interface
6. USB 2.0 Port
7. Serial data port (if external ECDIS display support is required)
8. 16X DVD-R/DVD-RW drive
9. 80 GB or larger internal Hard Disk Drive
10. USB, AT or PS/2 mouse and keyboard
11. English O/S Edition: Windows 2000 or Windows XP (recommended)

A4.2 Installation of Download Software on Client PC

There are 2 steps 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 VDG-100G3 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:
 - 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.**)
- f. Click the “OK” button in the Internet Protocol (TCP/IP) Properties and the Local Area Connection Properties.

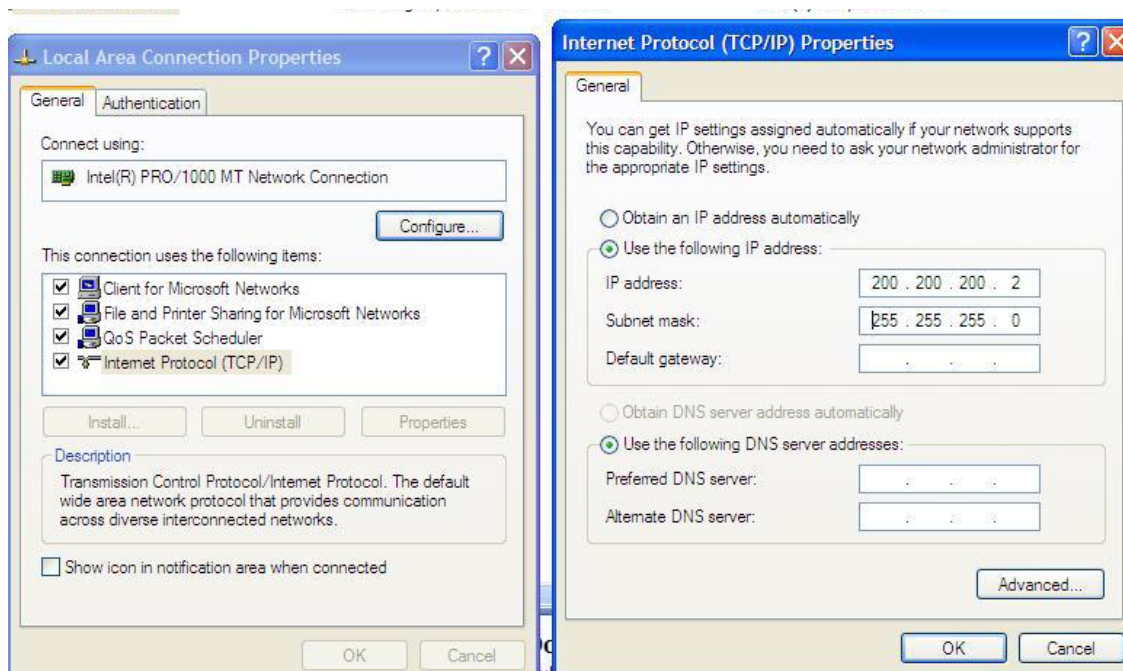


Figure A4 - 1 - Establishing TCP/IP Address

A4.3 Complete vs. Partial Download

A ‘complete’ download is the process of downloading a full 12-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 A4 - 4 - Download Settings Window to download the desired data set).

A4.4 Starting the Download Process

Start the download utility by double-clicking the download.exe icon located on the Windows desktop. (See Figure A4 - 2 - Download Software Main Screen for an example of the download utility).

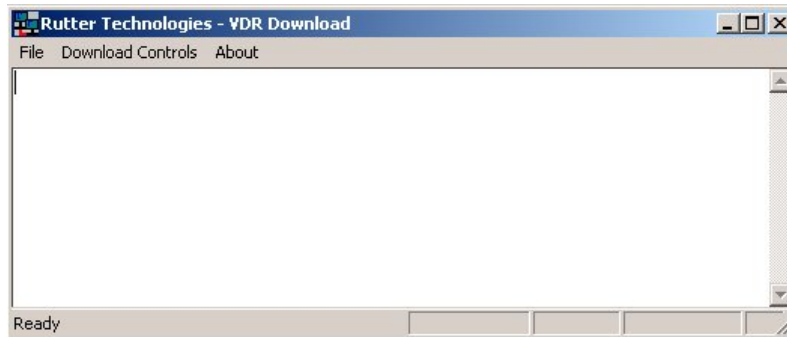


Figure A4 - 2 - Download Software Main Screen

A4.4.1 Download the Current Data Set

Complete the following steps to begin the download of the current data set:

1. Select 'Download Current Dataset' from the 'Download Controls' menu.



Figure A4 - 3 - Download Controls Menu

2. Enter the password when prompted.
3. Once prompted with the 'Download Settings' window (See Figure A4 - 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.

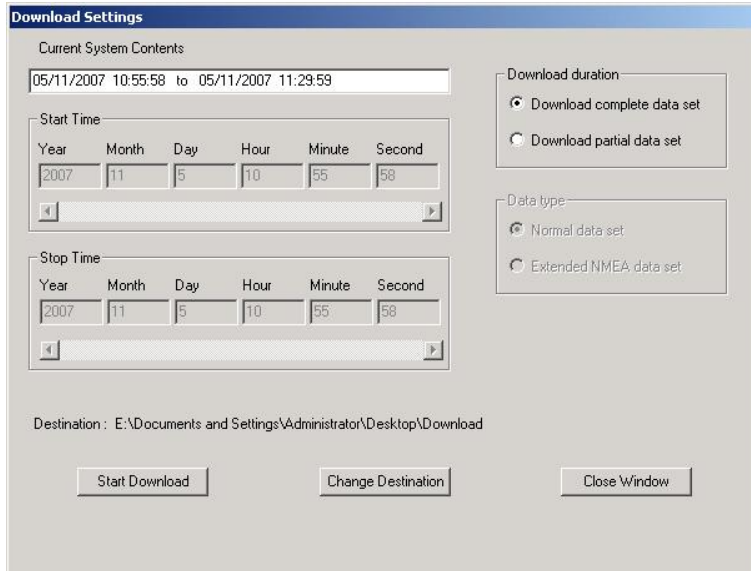


Figure A4 - 4 - Download Settings Window

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.

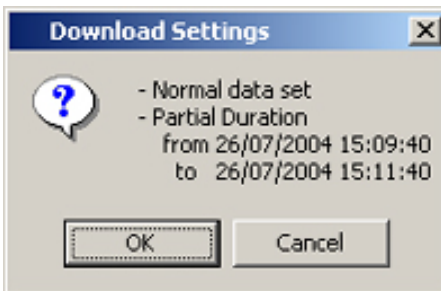


Figure A4 - 5 – Confirm Download Settings

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
Folder MainAudio		File Folder	8/23/2005 10:14 AM
Folder MainNMEA		File Folder	8/23/2005 10:12 AM
Folder 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 A4 - 6 - 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 A4 - 6 - Sample Download Directory* for an example of a typical download directory.

A4.4.2 Download a Secured Data Set

Complete the following steps to download 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.
3. In the subsequent 'Download Secured Datasets' window, all available secured data sets will be visible. Each data set shows the date it was initially secured, file size, and start and end time.

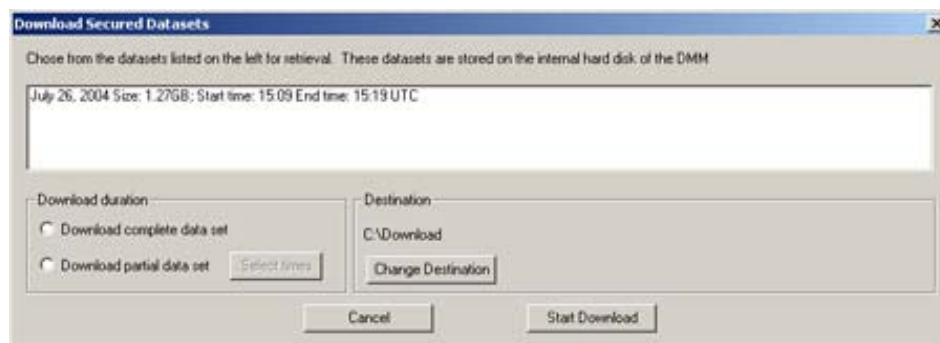


Figure A4 - 7 - Download Secured Data Sets

4. Select the appropriate data set from the list.
5. To download a complete data set, choose the “Download complete data set” radio button under ‘Download duration’. To download a partial data set, choose “Download partial data set”.
6. If choosing to download a partial data set, 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.)

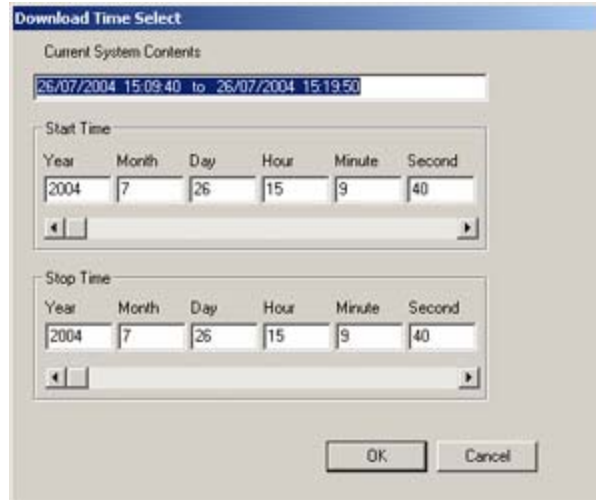


Figure A4 - 8- Partial Download Window

7. To choose a directory to which the data sets 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 data set to be downloaded. If all information is correct, press 'OK' to begin the download.

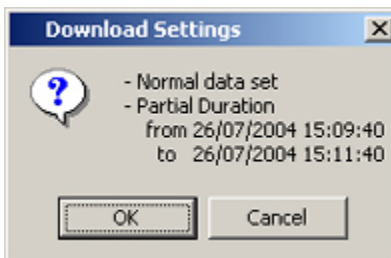


Figure A4 - 9 - Confirm Download Settings

A4.4.3 Download an Archived Data Set

Complete the following steps to download 1 of multiple archived data sets from the DMM's internal hard drive:

1. Select 'Download Archived Dataset' from the 'Download Controls' menu.
2. A download progress window will appear indicating that the application is receiving information from the DMM. This operation may take several minutes to complete.
3. In the subsequent 'Download Archived Datasets' window, all available archived data sets will be visible. Each data set shows the date it was initially archived, file size, and start and end time.

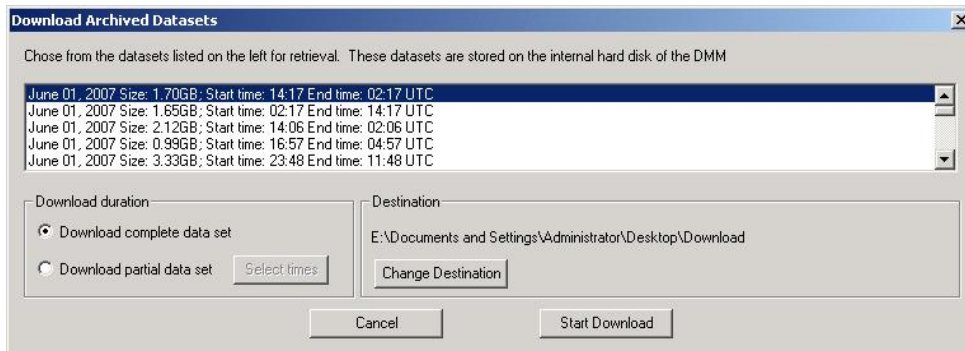


Figure A4 - 10 - Download Archived Data Sets

4. Select the appropriate data set from the list.
5. To download a complete data set, choose the "Download complete data set" radio button under 'Download duration'. To download a partial data set, choose "Download partial data set".
6. If choosing to download a partial data set, 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 A4 - 11 - Partial Download Window

7. To choose a directory to which the data sets 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 data set to be downloaded. If all information is correct, press 'OK' to begin the download.

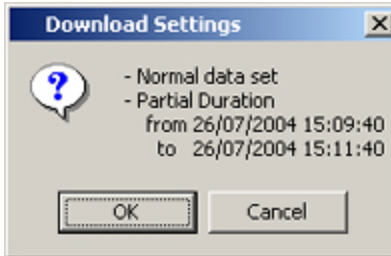


Figure A4 - 12 - Confirm Download Settings

A4.4.4 Download All Current, Secured And Archived Data Sets

The VDR Download Application allows the user to select the option to download all Current, Secured and Archived data sets from the G3/G3S in one operation. To achieve this, the destination drive for the data must have sufficient capacity and free drive space to accommodate up to 160GB of VDR data. If there is insufficient available drive space, the operation will terminate before all data is copied off of the VDR.

NOTE: As this is can be a large copy operation (up to 160 GB), please allow sufficient time for the operation to complete. In the case of 160GB of data to copy, it could take up to 2.5 to 3 hours to complete.

Complete the following steps to download all of the current, secured and archived data sets from the DMM's internal hard drive:

1. Select 'Download All secured And Archived Datasets' from the 'Download Controls' menu.
2. A download progress window will appear indicating that the application is receiving information from the DMM. This operation may take several minutes to complete. When complete, the VDR Download Application will display the total number of Secured and Archived data sets available for download in the main log window.



Figure A4 - 13 - Download All Secured and Archived Data Sets

3. To choose a directory to which the data sets 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.
4. Once the destination is correct, press 'Start Download'.
5. Enter a password and press 'OK' to begin the download.

The download begins by downloading all available Secured data sets, in order of date and time secured, beginning with the oldest and ending with the most recent. Following the download of the most recent Secured data set, the download of all available Archived data

sets commences. The download of the Archived data sets also occurs in order of date and time archived, beginning with the oldest and ending with the most recent.

A4.4.5 Get Current Data Set Contents

This option allows the user to verify the contents of the current data on the VDR internal Hard Drive. It displays the time range of the Video, Audio and NMEA data contained in the VDR_DATA folder.

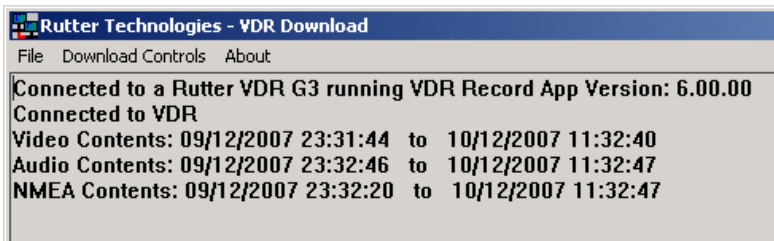


Figure A4 - 14 - Current Data Set Contents

A4.4.6 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. The system will prompt the user to select a location to save the log file.

A4.5 Disconnecting from the VDR

To disconnect, simply choose 'Exit' from the 'File' menu.

A4.6 Retrieving Secured or Archived Data via Download Port

To retrieve data from the secured or archived directories, the retrieval PC must, as a minimum, conform to the following features/settings:

1. XP Professional Operating System or higher
2. Computer name **must not** be "VDR"
3. Within the IP range of 200.200.200.x (where 'x' can be any IP EXCEPT 200)
4. Workgroup name must be **WORKGROUP**

Once the above listed conditions have been met, the data download can begin:

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" or the "Archived Data" directory icon which appears in the "VDR" window.

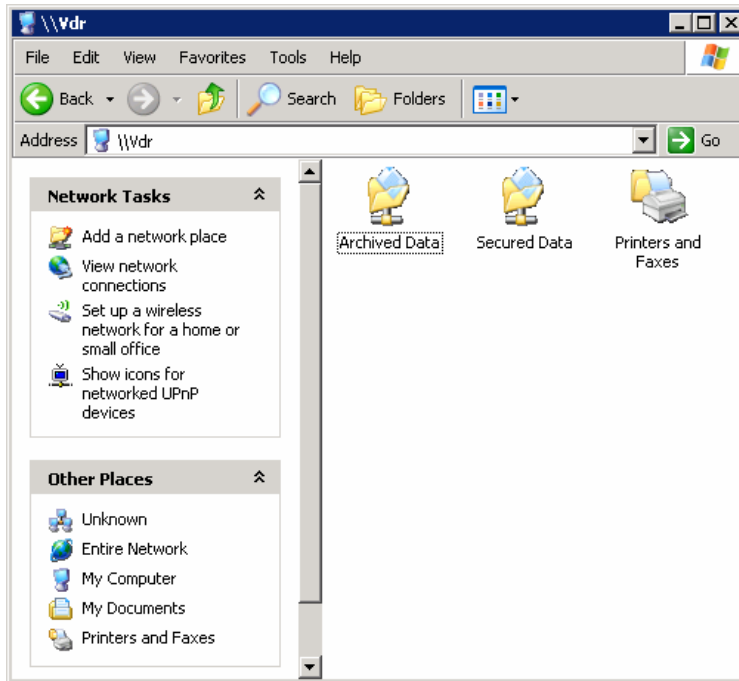


Figure A4 - 15 – “Secured Data and Archived Data” Directory Icons

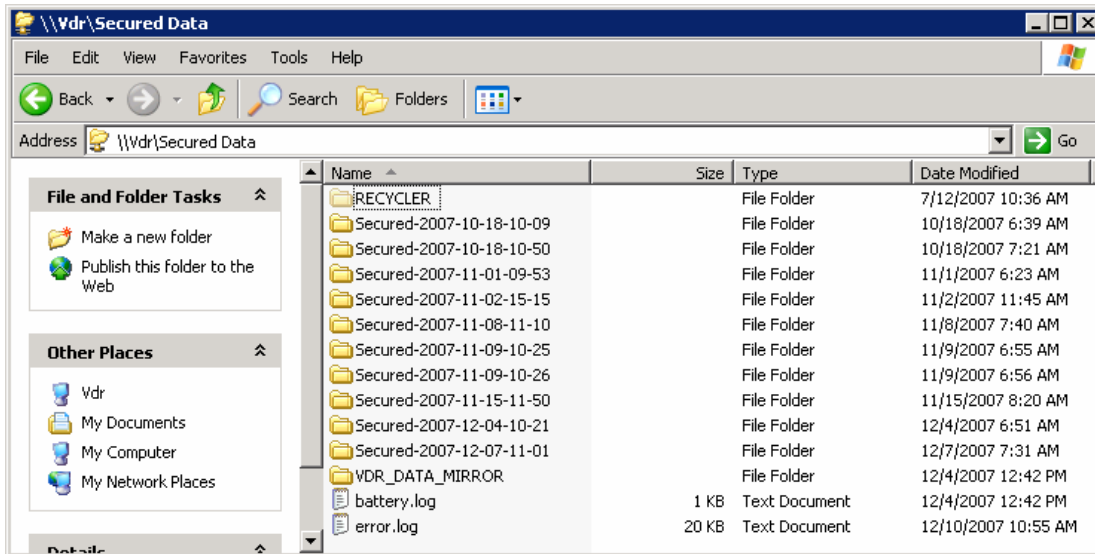


Figure A4 - 16 - Secured Data

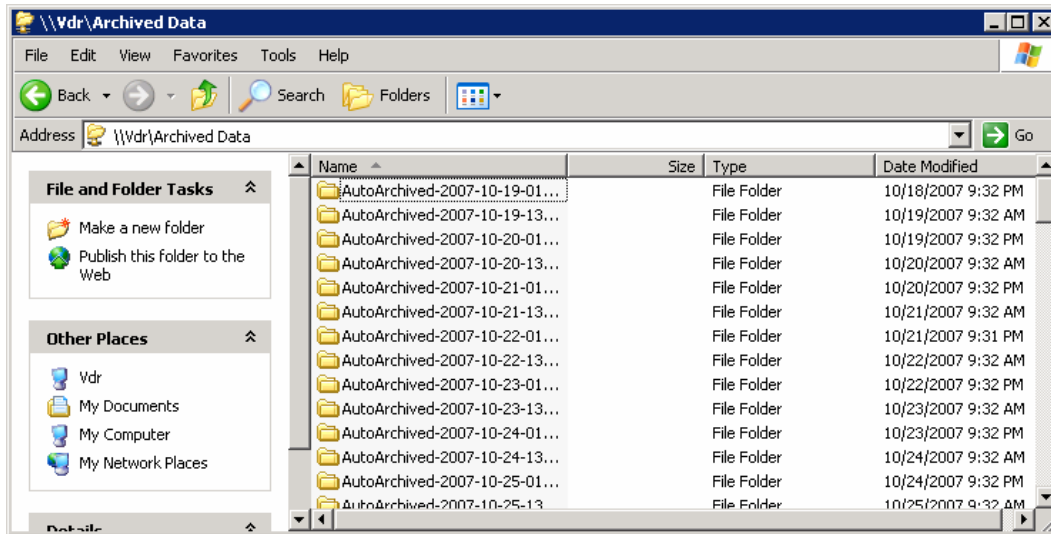


Figure A4 - 17 - Archived Data

Select all data sets of interest and copy them directly to the retrieval PC.

Appendix 4: Data Retrieval, Rev. 1.1

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APPENDIX 5: PLAYBACK SOFTWARE, Rev 1.1

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APPENDIX 5: PLAYBACK SOFTWARE

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.

A5.1 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 1 - Installation Executable File

2. Choose the directory to which the executable will be installed.



Figure 2 - Choose Installation Directory

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.

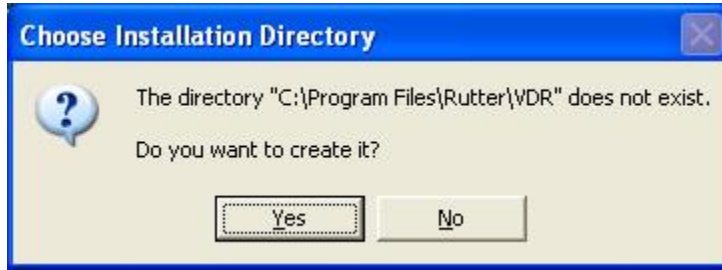


Figure 3 - Choose Installation Directory

After clicking "yes" to create the installation directory the following prompt will appear indicating the status of the installation.

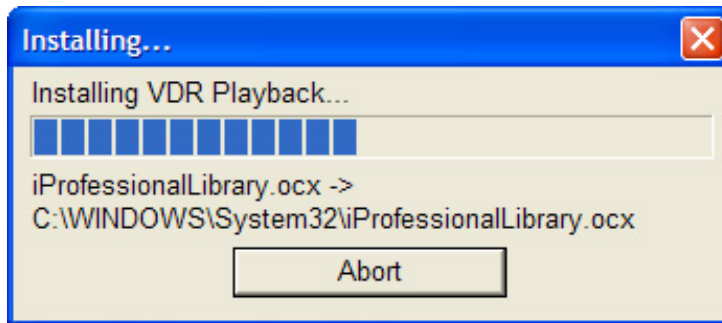


Figure 4 - Installing Message Window



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.

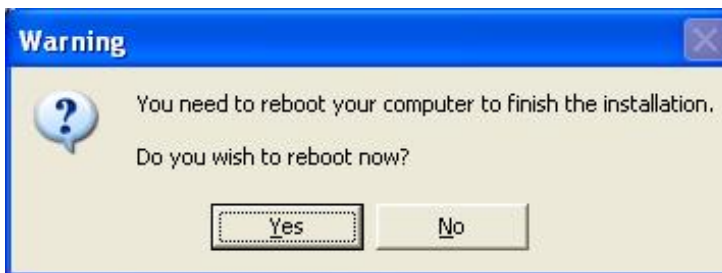


Figure 5 - Reboot warning

When the installation is complete, a shortcut to VDR Playback will be placed on the Windows desktop.

A5.2 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 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.

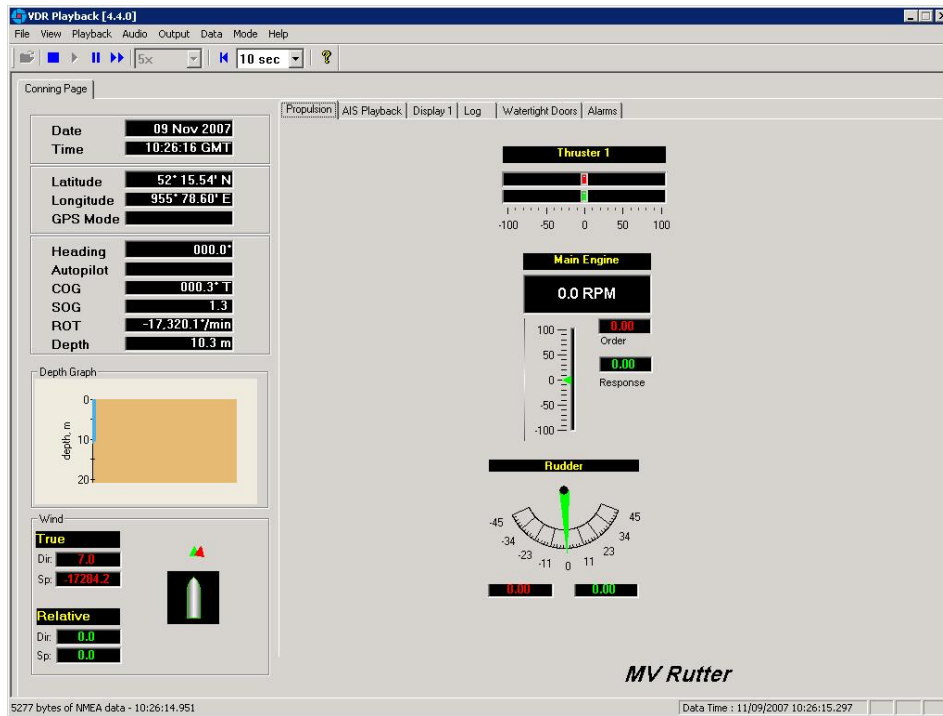


Figure 6- Playback Software

A5.2.1 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.



Figure 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 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 8 - Restart Warning

With the VDR-100G3, 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.

A5.3 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.

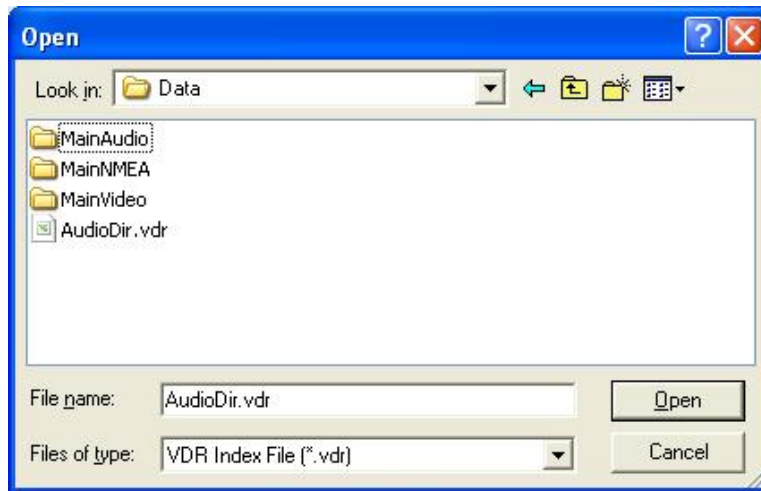


Figure 9 - Locating downloaded data

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;

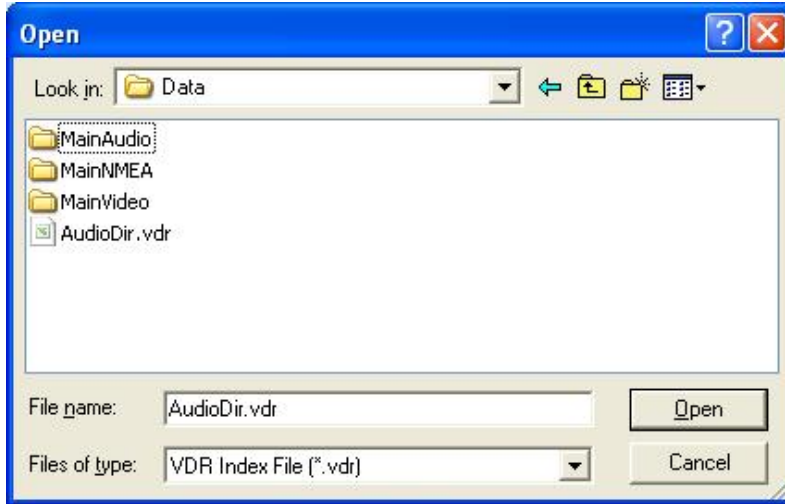


Figure 10 - Choose a .vdr File

If Playback cannot locate the vdr-cfg.txt file a prompt will appear as seen in Figure 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.

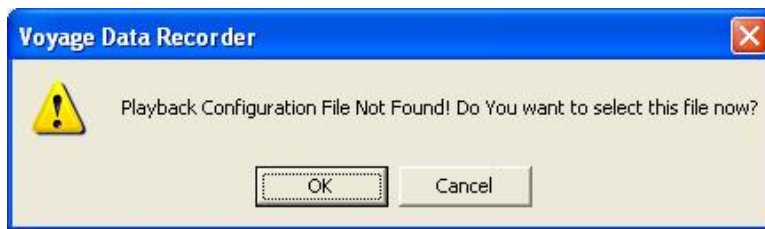


Figure 11 - Playback Configuration File Not Found

A5.3.1 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 using the **File | Unarchive Extracted Data** file menu option.

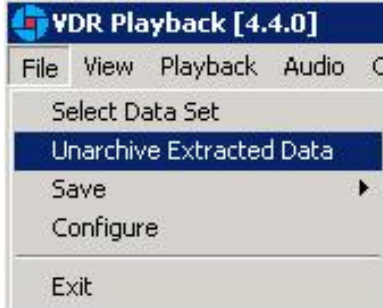


Figure 12 - Unarchive Extracted Data

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.

A5.4 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.

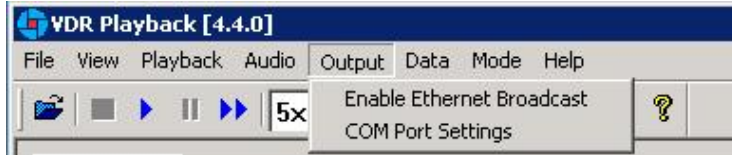


Figure 13 - Enabling Ethernet Broadcasting

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.

A5.5 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.

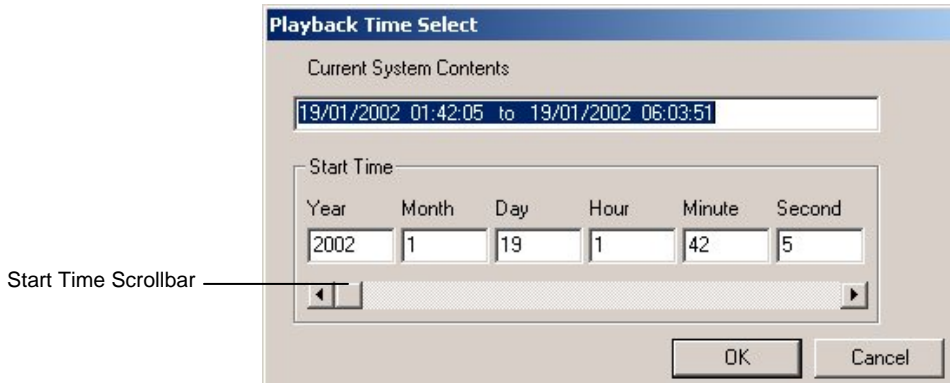


Figure 14 - Choose Start Time For Playback

A5.6 Configuring the Client to Receive Real Time Data

Configure the Client PC for the VDR Playback application to connect to the VDR-100G3 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.

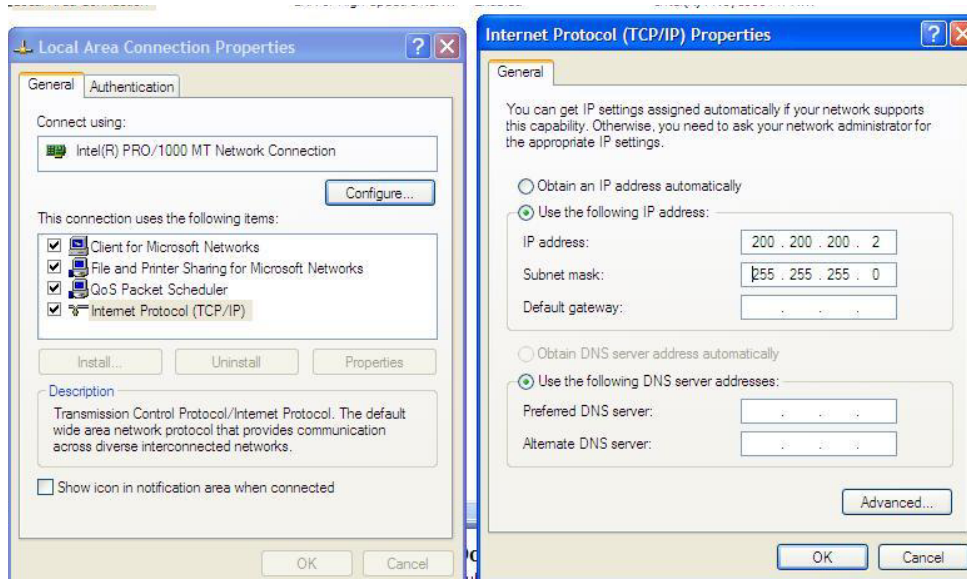


Figure 15 - Establishing TCP/IP Address

A5.7 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 A5.6

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.

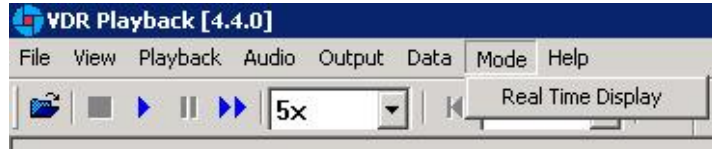


Figure 16 - Enabling Real Time Display Mode

When Real Time Display mode is enabled, a pop-up window will appear indicating that Real Time Display has been enabled.



Figure 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.

A5.8 Starting the Playback in Real Time Display Mode

To start the playback of real time data, complete the following steps:

1. Refer to Section A5.2.1 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.



Figure 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.

A5.9 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).

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 19 - Change Password

A5.10 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). Figure 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.

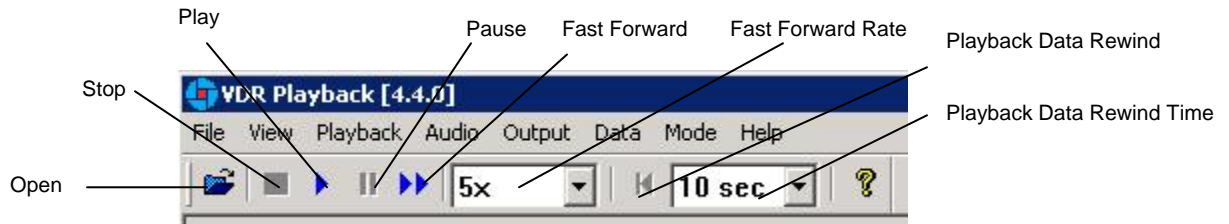


Figure 20 - Controls Toolbar

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.

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 dropdown menu.

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 21 - Set Fast Forward Rate*).

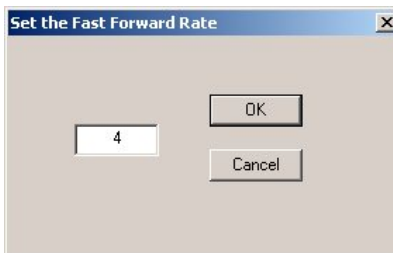


Figure 21 - Set Fast Forward Rate

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.

A5.11 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.

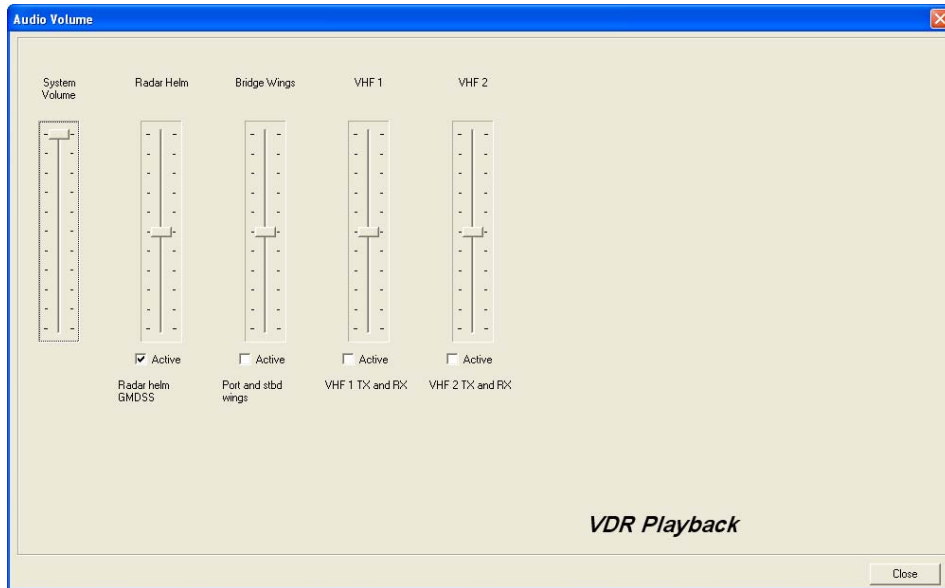


Figure 22 - Audio Interface

To activate the audio portion of a playback, choose **Unlock Audio** from the **Audio** menu (see *Figure 23 – Audio Menu*). A prompt will appear requiring a password. The default password supplied with the VDR-100G3 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 22 - Audio Interface*) via the “Audio Volume” option from the **Audio** menu.

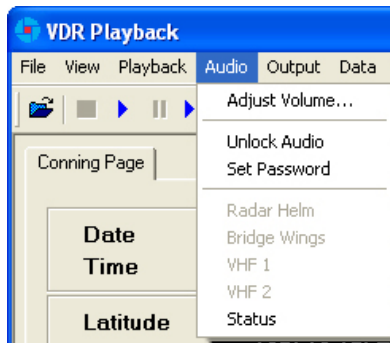


Figure 23 – Audio Menu

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.

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.

A5.12 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 Appendix2: 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

A5.12.1 Depth Graph

The Depth Graph provides an illustration, in meters (m), of the ship's depth.

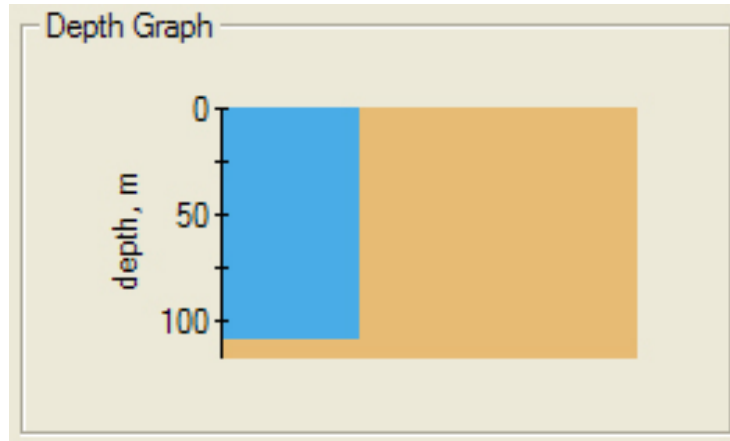


Figure 24 - Depth Graph

A5.13 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.

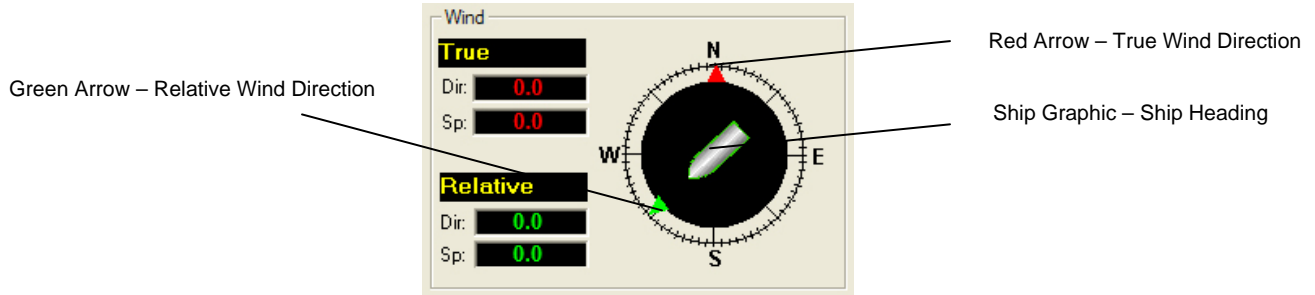


Figure 25 - Wind Information

A5.14 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.

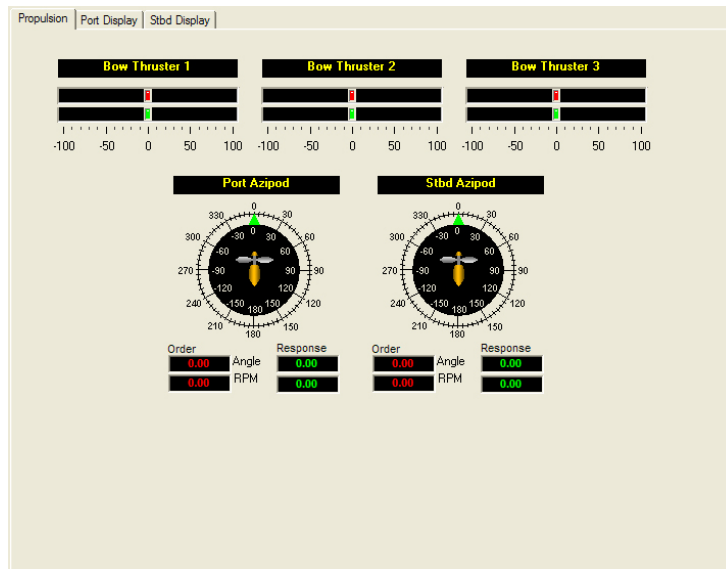


Figure 26 – Sample Propulsion Tab

A5.15 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.

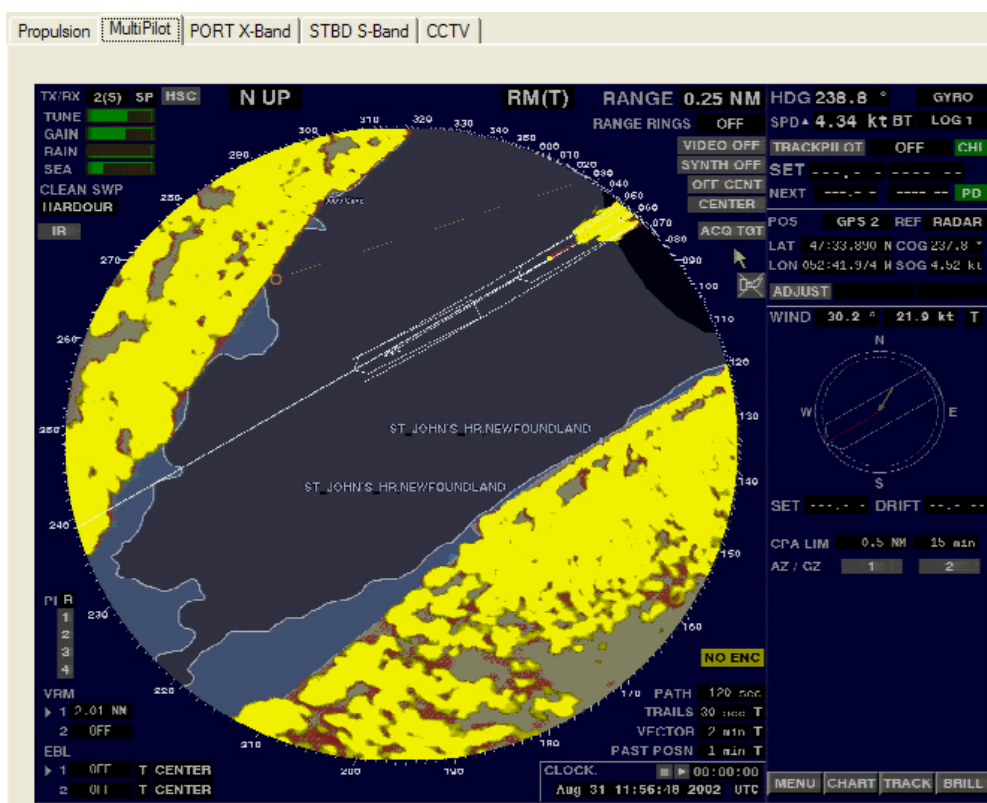


Figure 27 – MultiPilot Tab

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.

A5.16 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.

A5.17 AIS Playback Tab

The 'AIS Playback' Tab Screen displays information captured from the ship's AIS.

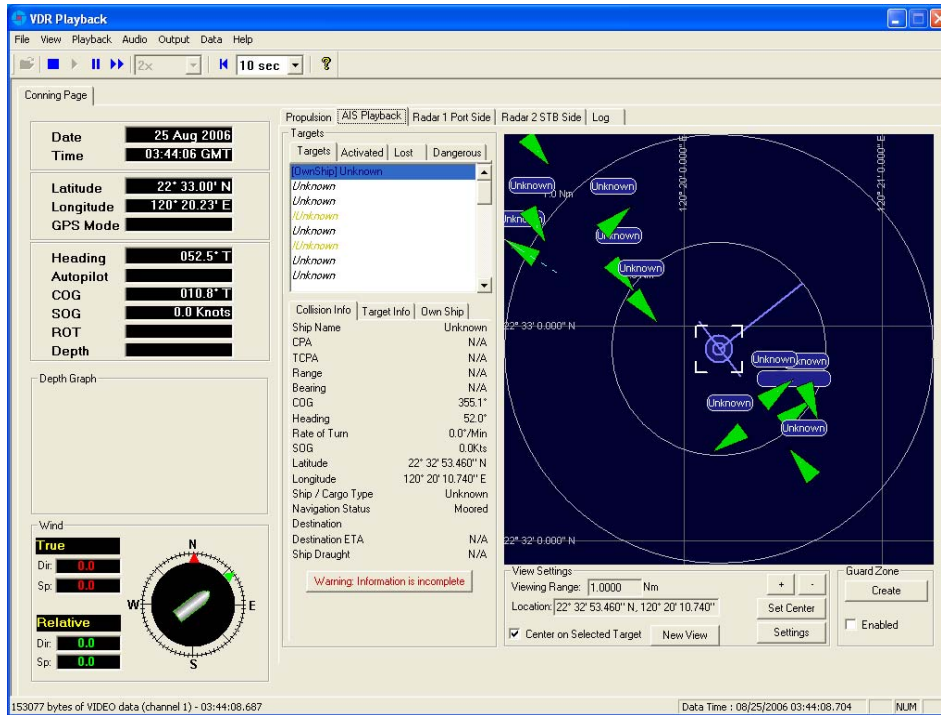


Figure 28 - AIS Playback Tab

There are a number of features available within the AIS Playback tab screen that allows a user to better interpret the downloaded information.

A5.17.1 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.

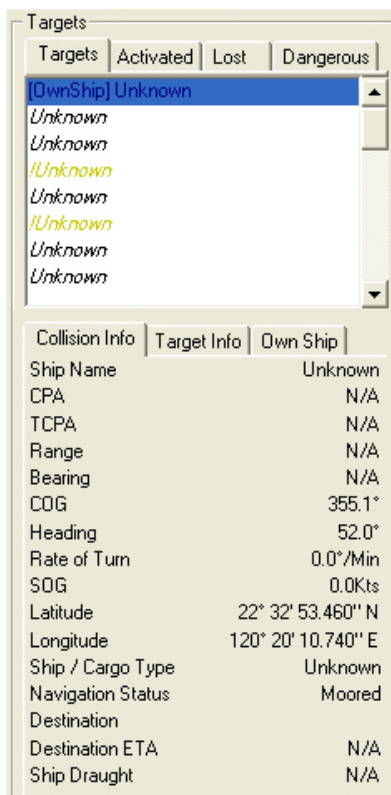


Figure 29 - Targets Information Section

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.

A5.17.2 View Settings

The View Settings section allows a user a high level of control over the AIS playback view screen.

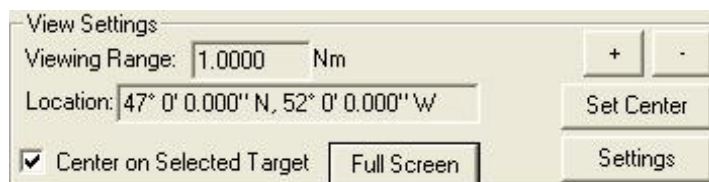


Figure 30 - View Settings Section

- **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 OR 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.
- **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.

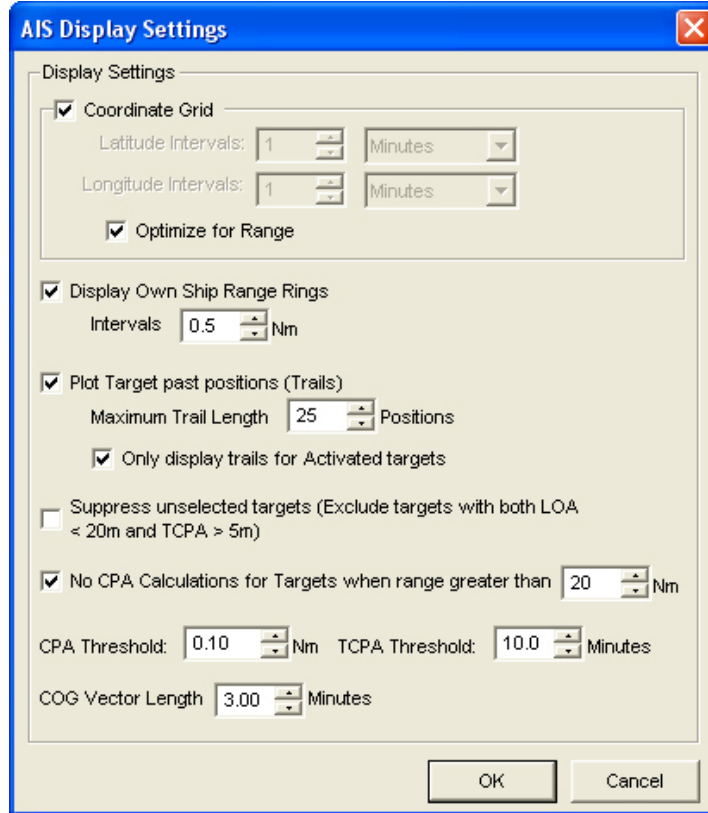


Figure 31 - AIS Display Settings Window

- CPA (Closest Point of Approach)
- TCPA (Time to Closest Point of Approach)
- COG (Course Over Ground)
- LOA (Length Over All)

A5.17.3 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 32 – GuardZone enable/disable

A5.18 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.

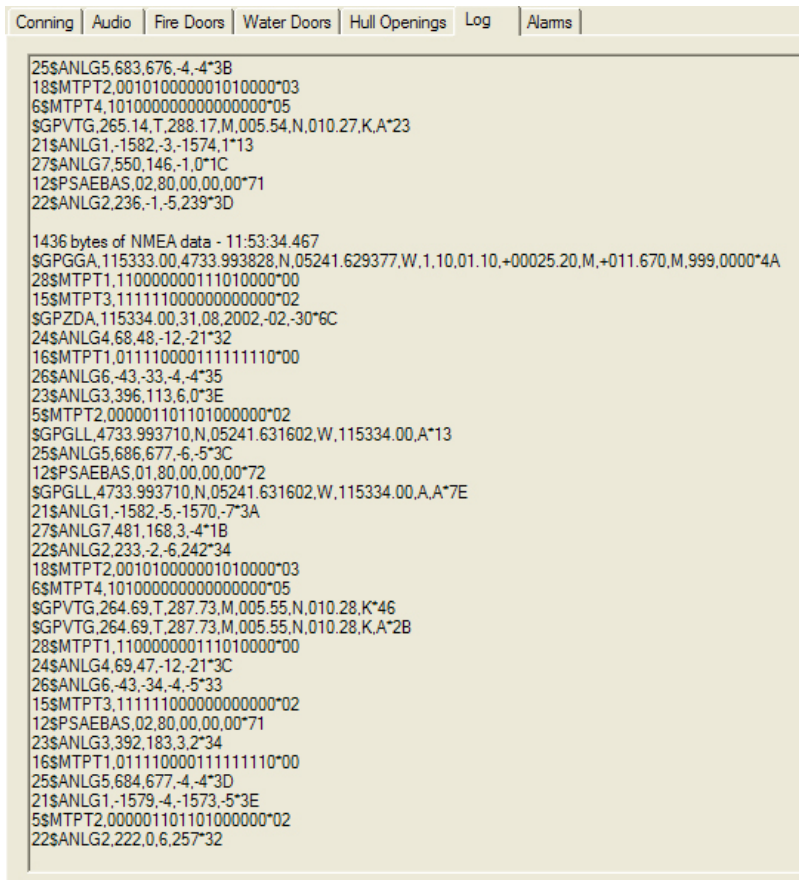


Figure 33 - Log Window

A5.18.1 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 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.

A5.19 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.

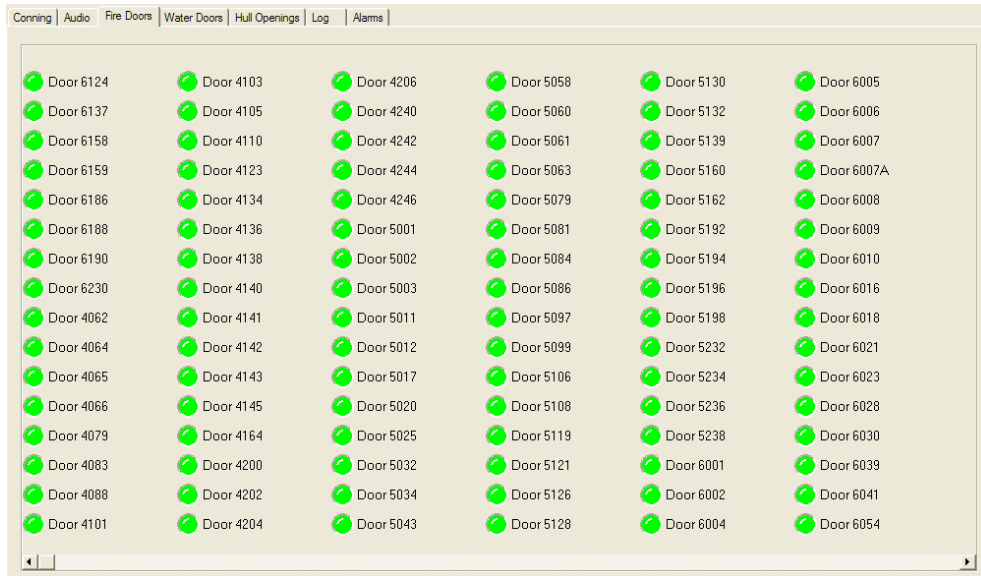


Figure 34 - Fire Doors Tab

A5.20 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.

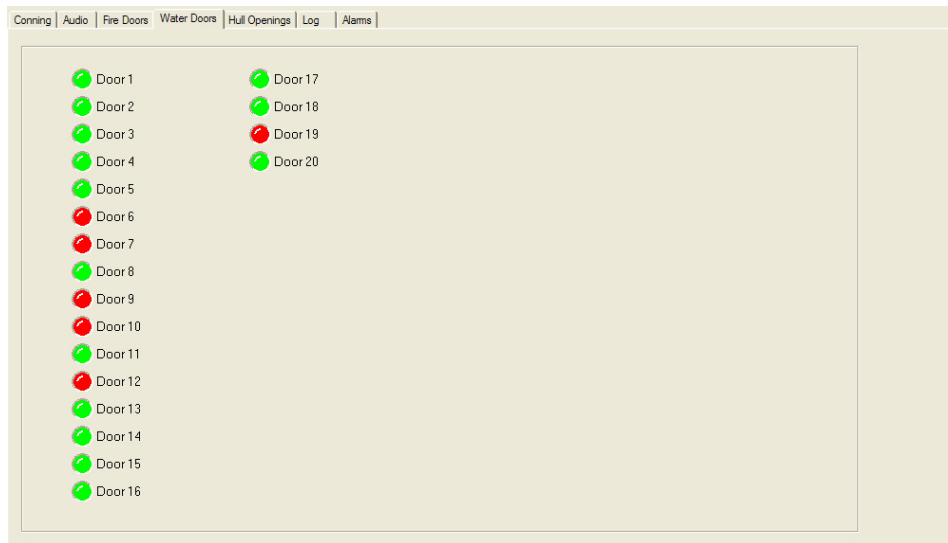


Figure 35 - Water Doors Tab

A5.21 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.

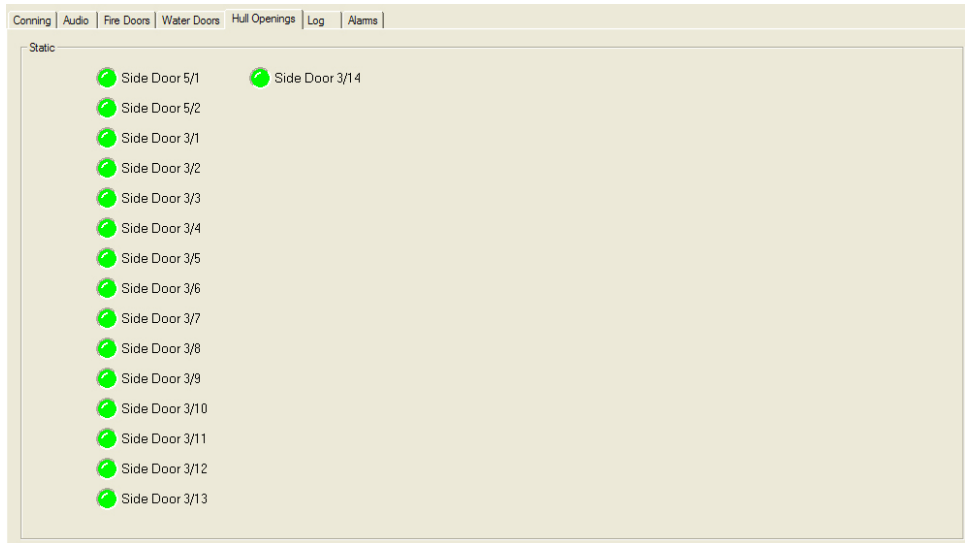


Figure 36 - Hull Openings Tab

A5.22 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.

A5.23 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.

A5.23.1 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 37 - Data Extraction Option

The Data Extraction window will open (see *Figure 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.

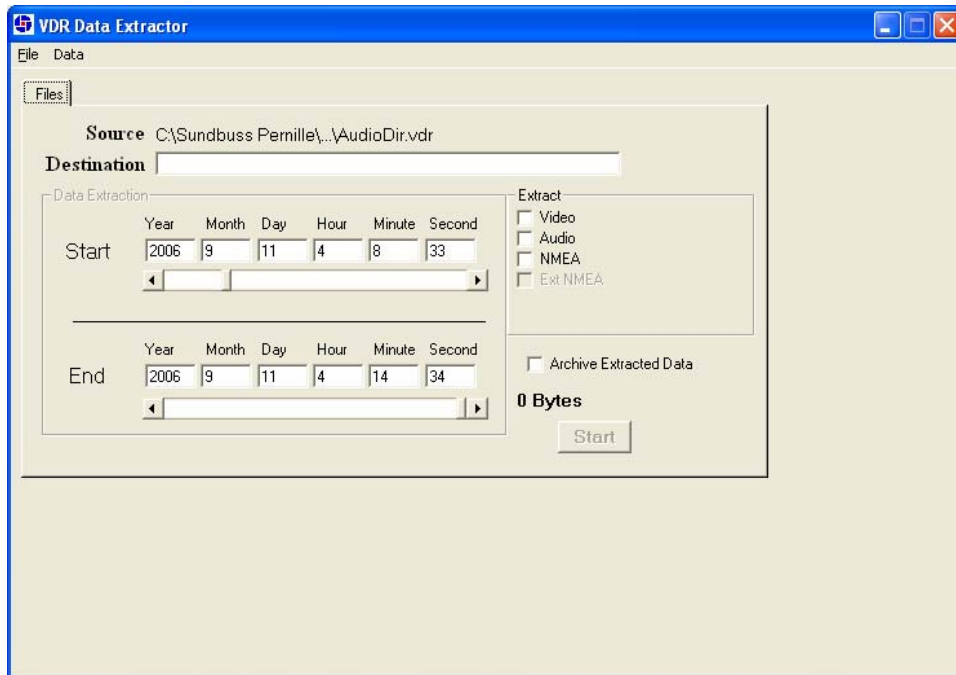


Figure 38 - Data Extraction Window

A5.23.2 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.

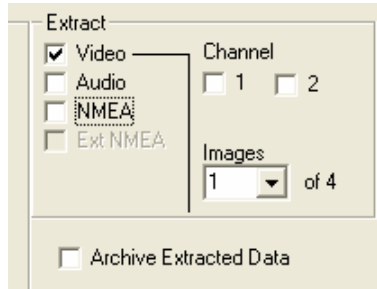


Figure 39 – Available data Streams

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.

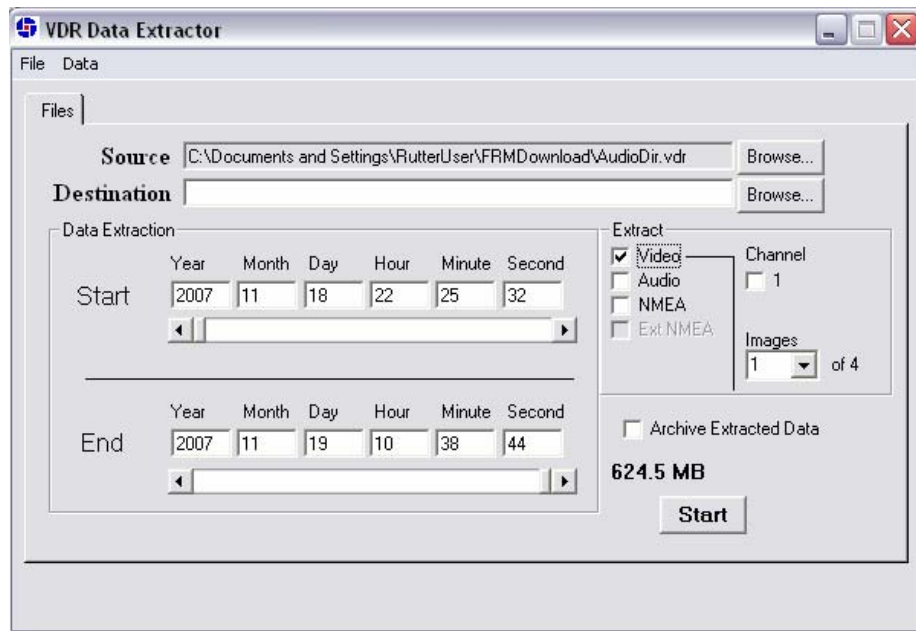


Figure 40 - Data Stream Options w/ Video Selected

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.**

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.

A5.24 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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APPENDIX 6 : External Interface Modules, Rev. 1.1

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APPENDIX 6: 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 A6 -1 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.

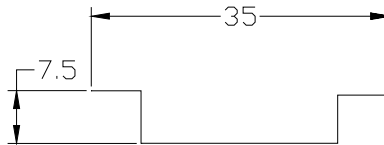


Figure A6 - 1 DIN Rail

A6.1 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 1 of the following interfaces:

A6.1.1 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, Engine RPM Order/Response, Pitch Order/Response, Bow Thruster Order and Response).

A6.1.2 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 “dry” 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-100G3 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 4 banks of 6 (with each bank having its own common return).

A6.1.3 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, Engine 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 IDs);
- 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.

A6.1.3.1 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)

A6.1.3.2 Connection Information

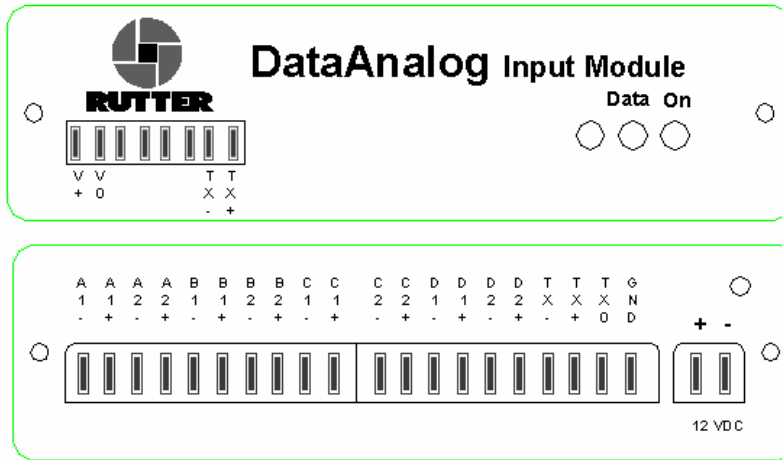


Figure A6 - 2 DataAnalog Front (Top) and Back (Bottom) view

A6.1.3.3 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)

Table A6 - 1 - Front panel connection information

A6.1.3.4 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

Table A6 - 2 - Back panel connection information



*** 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.**

A6.1.3.5 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.

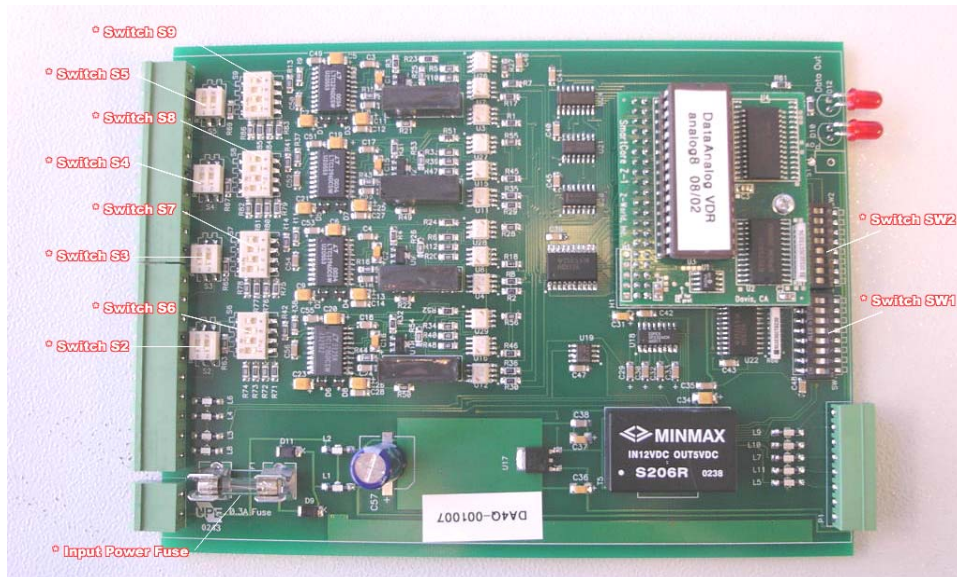


Figure A6 - 3 DataAnalog PCB

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.

A6.1.3.6 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. Channel B may be set for +/-10V (low impedance).



NOTE! *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.

	Channel A1				Channel A2			
	SW2 ₁	S5 ₁	S9 ₄	S9 ₃	SW2 ₁	S5 ₂	S9 ₂	S9 ₁
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 ₂	S4 ₁	S8 ₄	S8 ₃	SW2 ₂	S4 ₂	S8 ₂	S8 ₁
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 ₃	S3 ₁	S7 ₄	S7 ₃	SW2 ₃	S3 ₂	S7 ₂	S7 ₁
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 ₄	S2 ₁	S6 ₄	S6 ₃	SW2 ₄	S2 ₂	S6 ₂	S6 ₁
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

Table A6 - 3 - Switch settings and range

* HI represents high impedance settings.



Warning! Incorrect switch settings and exceeding the selected range can damage the DataAnalog.

Output Format

DataAnalog:

\$ANLXX,[A₁],[A₂],[B₁],[B₂],[C₁],[C₂],[D₁],[D₂] *AA

where:

- XX is set between 00 to 63 (see NMEA-0183/IEC 61162 String Identifier Configuration section below)
- A₁₋₂, B₁₋₂, C₁₋₂, D₁₋₂ 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

A6.1.3.7 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 ₇	SW1 ₈
4800	OFF	OFF
9600	ON	OFF
19200	OFF	ON
57600	ON	ON

Table A6 - 4 - Output Baud Rate

A6.1.3.8 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:

1. Unplug the front panel input connector(s);
2. Unscrew the two screws located on the front panel of the DataAnalog enclosure in order to remove the panel;
3. 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). Table A6 – 5 on the next page gives the switch settings necessary for programming the DataAnalog String Identifier:

Appendix 6: External Interface Modules, Rev. 1.1

ID	SW1 ₆	SW1 ₅	SW1 ₄	SW1 ₃	SW1 ₂	SW1 ₁
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

Table A6 - 5 -Switch settings necessary for programming the DataAnalog String Identifier:

A6.1.3.9 Test Analog Sources

1. Prior to connecting the inputs to the Analog device, the source voltage levels should be verified:
 - Maximize the source level (i.e., place a 100% order to Stbd on the bow thrusters).
 - 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 6 – External Data Interface Modules 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 the bow thrusters).
7. Repeat step 3.
8. Repeat steps 1 through 7 for the remaining analog sources.

A6.1.3.10 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.

A6.2 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 IDs);
- 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 0.5mm²);
- Power and data output connectors on both front and back panels.

A6.2.1 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)

A6.2.1.1 Connection Information

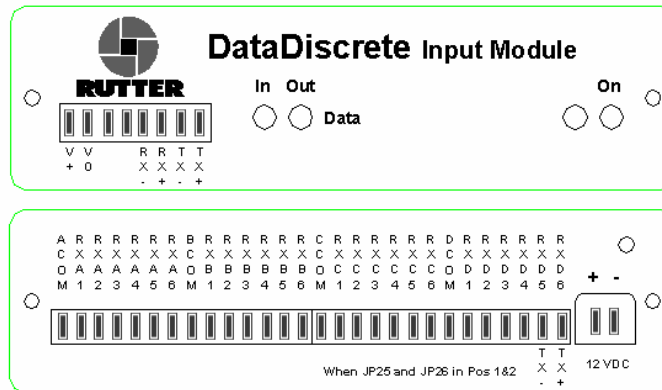


Figure A6 - 4 DataDiscrete Front (Top) and Back (Bottom) View

A6.2.1.2 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)

Table A6 - 6 - Front Panel Connection Information

A6.2.1.3 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

Table A6 - 7 - Back Panel Connection Information



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 in Table A6-7 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+.

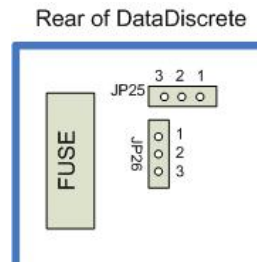


Figure A6 - 5 Jumper Positions

A6.2.1.4 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.

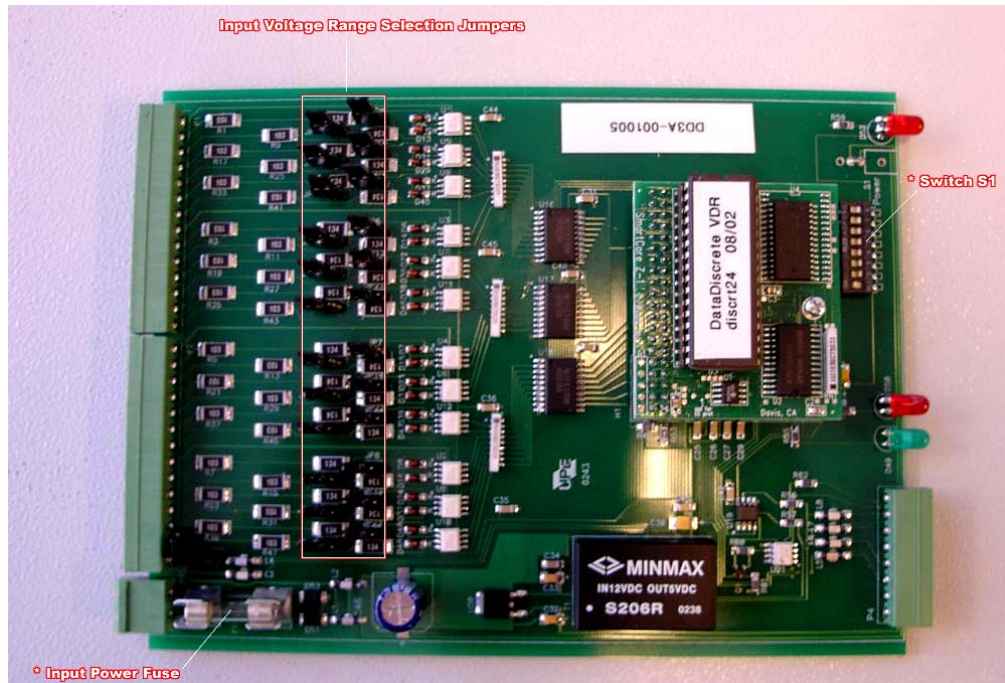


Figure A6 - 6 -DataDiscrete PCB

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.

A6.2.1.5 Output Format

The format of the NMEA-0183/IEC 61162 output sentence is as follows:

\$DISXX,A₁A₂A₃A₄A₅A₆,B₁B₂B₃B₄B₅B₆,C₁C₂C₃C₄C₅C₆,D₁D₂D₃D₄D₅D₆*AA
 where:

- XX is set between 00 to 63 (see *NMEA-0183/IEC 61162 String Identifier Configuration* below);
- A₁₋₆, B₁₋₆, C₁₋₆, D₁₋₆ indicate the status of input channels (1 for 'ON', 0 for 'OFF');
- AA is the checksum.

Example: **\$DIS12,000100,111101,000000,001100,*F7**

A6.2.1.6 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

Table A6 - 8 - Onboard DIP-switch settings

- 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.

A6.2.1.7 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

Table A6 - 9 - Discrete Input Voltage Levels

A6.2.1.8 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+

Table A6 - 10 Front 8-Pin Phoenix Connector Pin-Out

A6.2.1.9 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 following table on the next page provides information on the switch settings necessary for programming the DataDiscrete String Identifier:

ID	S1 ₆	S1 ₅	S1 ₄	S1 ₃	S1 ₂	S1 ₁
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
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25	OFF	ON	ON	OFF	OFF	ON
26	OFF	ON	ON	OFF	ON	OFF
27	OFF	ON	ON	OFF	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
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45	ON	OFF	ON	ON	OFF	ON
46	ON	OFF	ON	ON	ON	OFF
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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

Table A6 - 11 - switch settings necessary for programming the NMEA-0183/IEC 61162 DataDiscrete String Identifier.

A6.2.1.10 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.

A6.2.1.11 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.
3. Repeat steps 1 and 2 for the remaining Discrete inputs.

A6.2.1.12 Replacing the Input Power Fuse

To access the DataDiscrete's circuit board:

- Unplug the front panel input connectors;
- Unscrew the 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.

A6.2.2 NMEA Input Module

For information on the NMEA Input Module (Navigation Sensor Multiplexor) see *Chapter 10: NMEA Module*. **Error! Reference source not found.**

VDR-100G3
Approval Drawings
Revision 1.3



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VDR-100G3

Approval Drawings	
Project:	NB XXXX
Rev:	1.2
Date:	08 December 2008

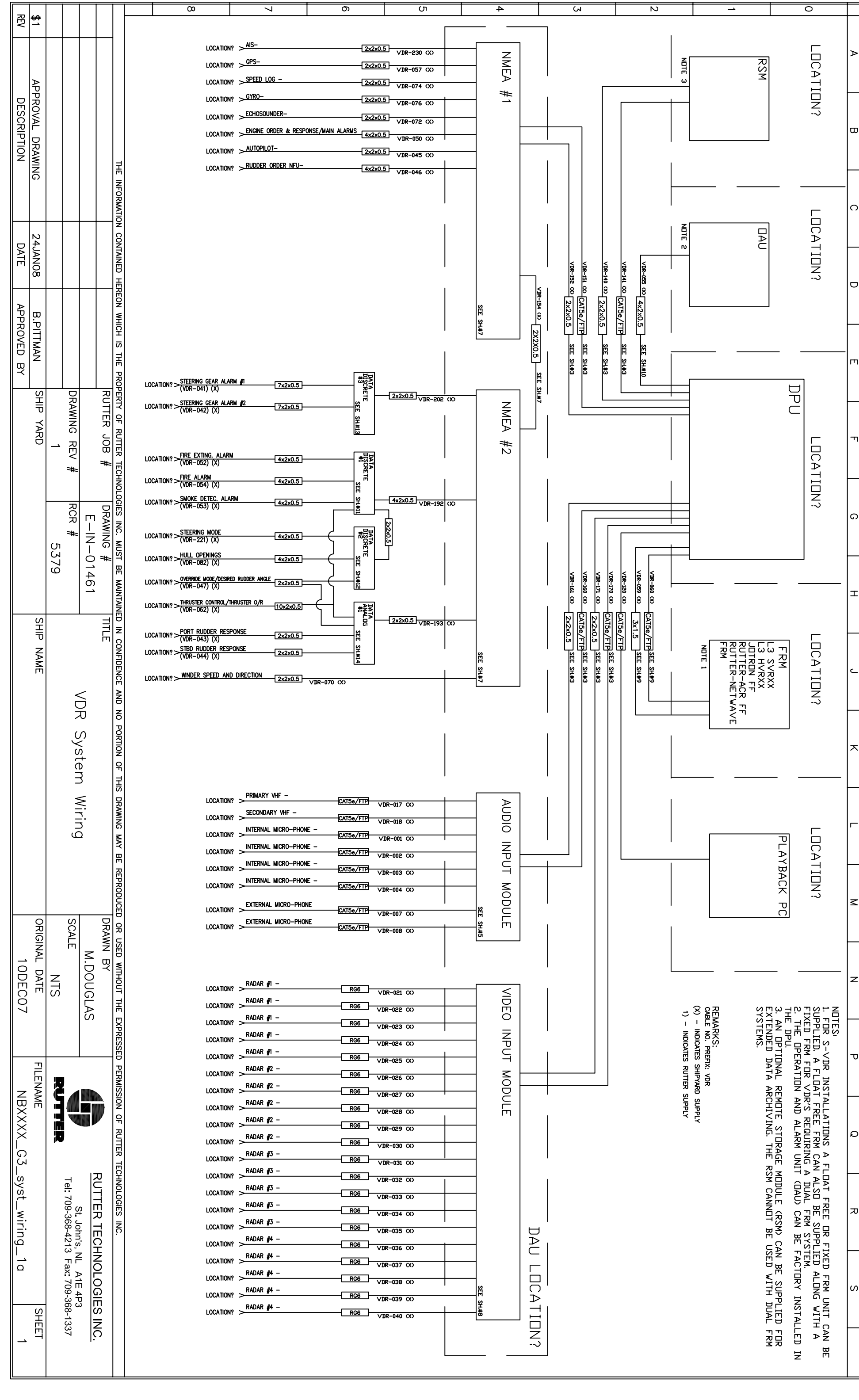
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No.	Title	File	Rev
1	VDR System Wiring	NBXXXX_G3_syst_wiring_1a	1
2	PCC/DAU Power Connections	NBXXXX_sys_wiring_PCC_DAU_3A	1
3	Audio Connections	NBXXXX_audio_system_4A	1
4	Audio Module Connections	NBXXXX_audio_wiring_5A	13
5	NMEA/Video Connections	NBXXXX_NMEA_vid_system_6A	2
6	NMEA Connections	NBXXXX_NMEA_wiring_7A	13
7	Video Connections	NBXXXX_vid_wiring_8A	14
8	L3 HVR03/SVR03 FRM Connections	NBXXXX_FRM_L303_sys_9A	13
9	Alarm Module Connections	NBXXXX_alarm_system_10A	1
10	DataDiscrete # 1 Connections	NBXXXX_interface_wiring_11A	13
11	DataDiscrete # 2 Connections	NBXXXX_interface_wiring_12A	13
12	DataDiscrete # 3 Connections	NBXXXX_interface_wiring_13A	13
13	DataAnalog # 1 Connections	NBXXXX_interface_wiring_14A	13
14	Data Processing Unit (DPU)	VDR-401_DPU	1
15	Data Acquisition Unit (DAU)	VDR-201_DAU	4
16	DAU Mounting Arrangement	VDR-005_DAU_Mounting	4
17	DPU Power Distribution Diagram	VDR-006A_DPU_power_dist	2
18	DAU Internal Layout	VDR-203a_DAU_internal	3
19	NMEA Input Module	VDR-206-A_NMEA_Module	1
20	Video Input Module	VDR-207a_Video_Module	2
21	Audio Input Module	VDR-208a_Audio_Module	2
22	Audio Enclosure	VDR-209A_Audio_Encl	1
23	Remote Storage Module	VDR-301_RSM	3
24	L3HVR03	VDR-303C_HVR_FRM	2
25	FRM Junction Box	VDR-304c_FRM_JB	3
26	Indoor Microphone-Dimensional	VDR-305a_indoor_mic	4
27	Indoor Microphone Internal Connection	VDR-306a_Indoor_mic_connection	3
28	Operation and Alarm Unit	VDR-312B_OAU	1

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29	Alarm Module Mounting Options	VDR-313B_OAU_Mounting	1
30	Outdoor Mic-Dimensional	VDR-315a_Outdoor_mic	2
31	Outdoor Mic Internal Connection	VDR-310b_Outdoor_mic_connection	2
32	DataAnalog	VDR-137_DataAnalog	1
33	DataDiscrete	VDR-138_DataDiscrete	1
34	Drawing Appendix	Appendix	1
35	DPU Power Connection	NBXXXX_system_wiring_DPU_SDS_3A	1
36	L3-SVR03	VDR-303A-3	1
37	FRM Junction Box - ABS	VDR-304D_FRM_JB	1
38	Jotron Float Free Capsule in Bracket	VDR-330_Jotron_S-VDR_Capsule	1
39	Jotron FRM Connections	NBXXXX_FRM_JT_SYS_9A	1
40	Jotron Float Free Bracket	VDR-331_Jotron_Bracket	1
41	Jotron Junction Box	VDR-332_Jotron_JB	1
42	ACR Float Free Capsule	VDR-341_ACR_FloatFree	2
43	ACR Capsule Connections	NBXXXX_FRM_ACR_SYS_9B	1
44	Rutter FRM	VDR-501_RUTTER_FRM	2
45	Rutter FRM Connections	NBXXXX_FRM_RUT_SYS_9A	4

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NOTES:
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 2. THE OPERATION AND ALARM UNIT (DAU) CAN BE FACTORY INSTALLED IN THE DPU.
 3. AN OPTIONAL REMOTE STORAGE MODULE (RSM) CAN BE SUPPLIED FOR EXTENDED DATA ARCHIVING. THE RSM CANNOT BE USED WITH DUAL FRM SYSTEMS.

REMARKS:
 CABLE NO. PREFIX: VDR
 (X) - INDICATES SHIPYARD SUPPLY
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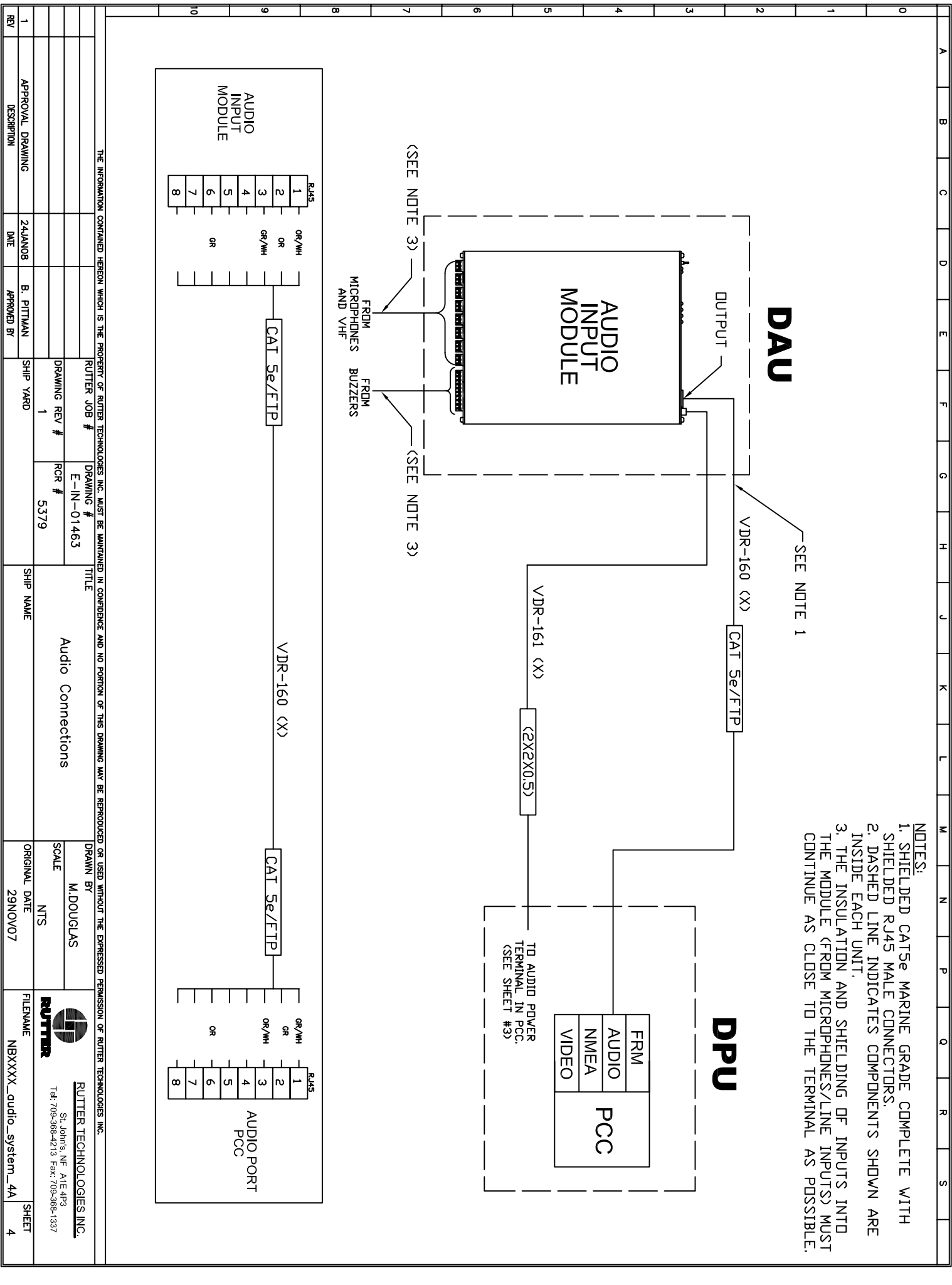
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DRAWING REV #	RCR #	DRAWN BY	SCALE
1	5379	M.DOUGLAS	NTS

ORIGINAL DATE	10DEC07
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 RUTTER TECHNOLOGIES INC. St. John's, NL A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337



- NOTES:**
1. SHIELDED CAT5e MARINE GRADE COMPLETE WITH SHIELDED RJ45 MALE CONNECTORS.
 2. DASHED LINE INDICATES COMPONENTS SHOWN ARE 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.

DAW

DPU

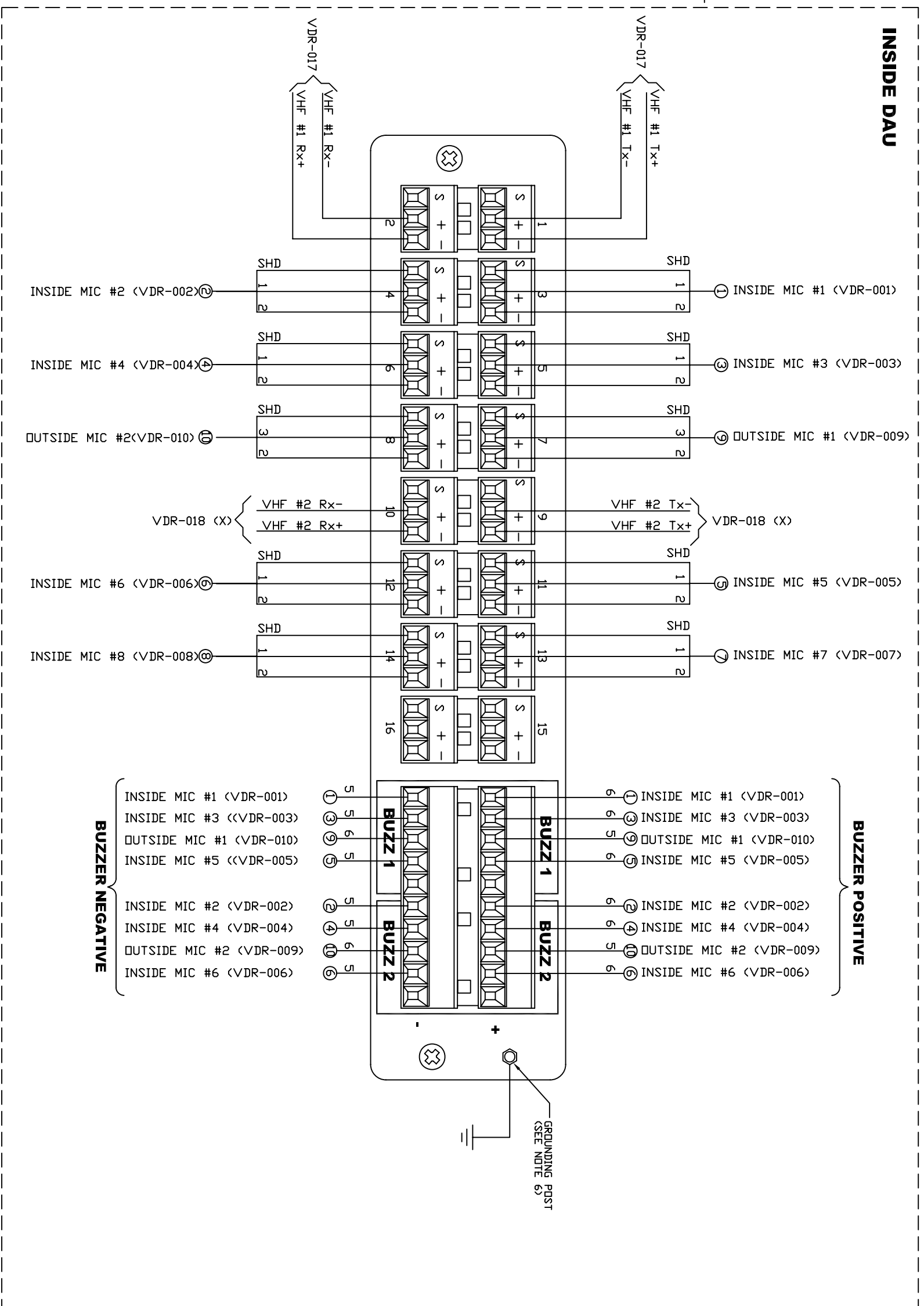
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DRAWING REV #	RGR #	
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APPROVAL DESCRIPTION	DATE	APPROVED BY
SCALE	ORIGINAL DATE	FILENAME
NTS	29NOV07	NBXXXX_audio_system_4A
<p>RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337</p>		

- 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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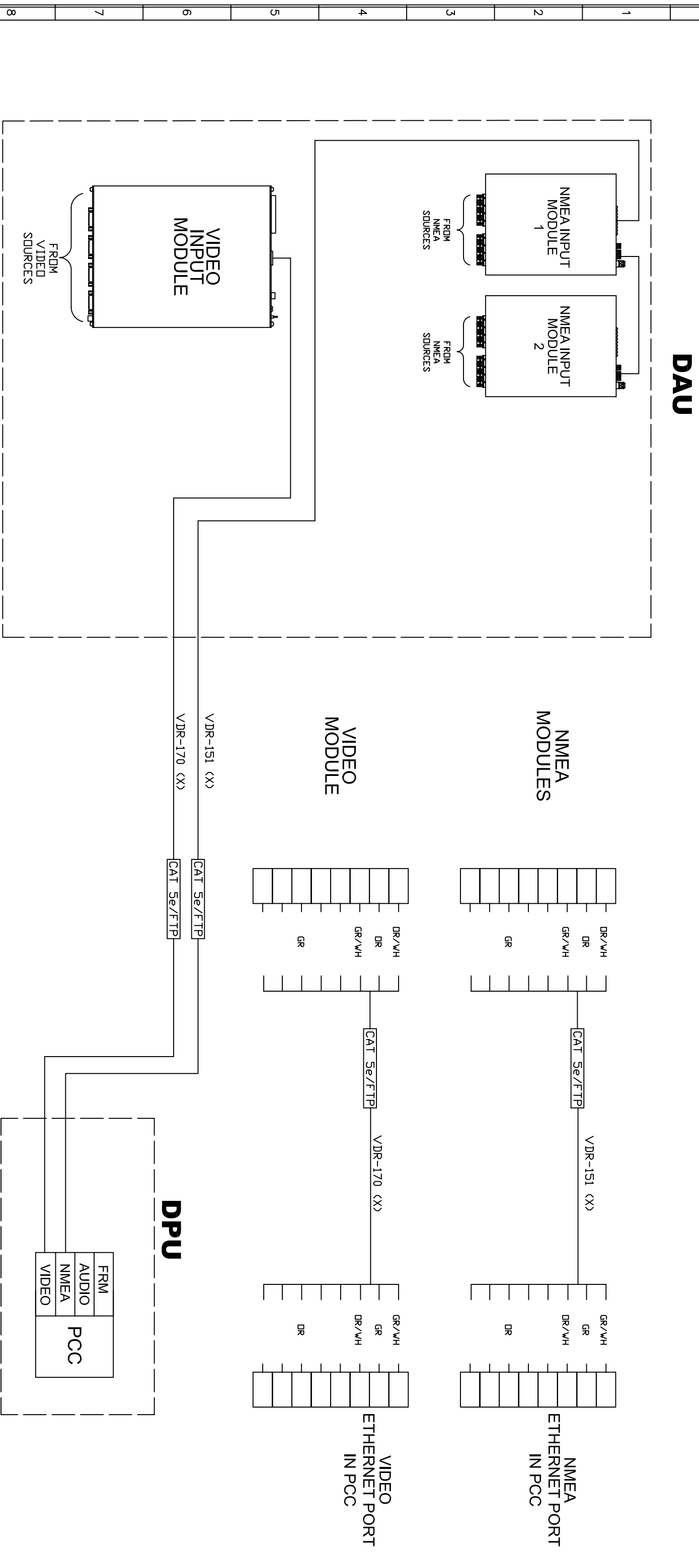
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DRAWING REV #	RCR #	SCALE	ORIGINAL DATE
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NOTES:
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			ORIGINAL DATE	
			29NOV07	

INSIDE DAU

TO ETHERNET
PORT IN DPU
(SEE SHEET #6)

TO NMEA POWER
TERMINAL IN DPU
(SEE SHEET #3)

VDR-151 (X)

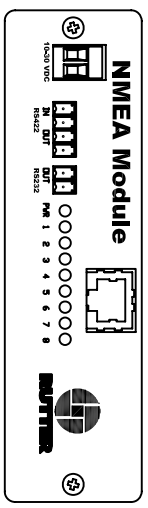
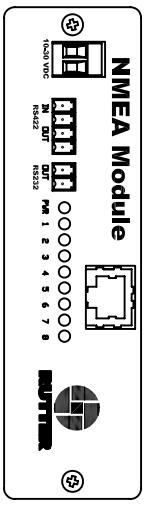
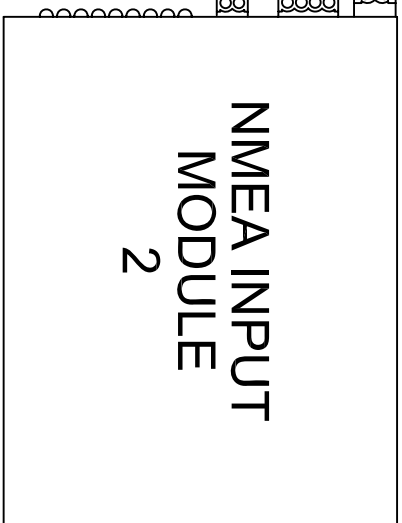
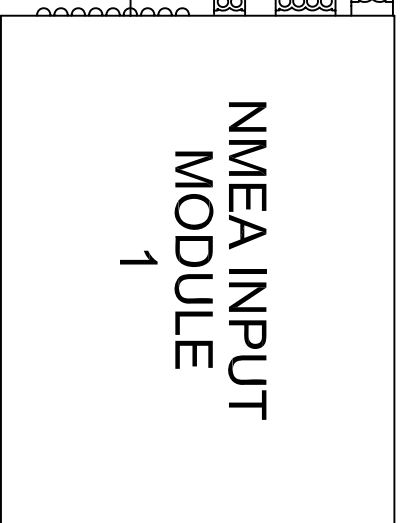
CAT Se/FTP

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(2X2X0.5)

VDR-154 (X)

(2X2X0.5)



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- 4x2x0.5 ENGINE ORDER & RESPONSE/MAIN ALARMS (VDR-050)
- 2x2x0.5 ECHOSOUNDER (VDR-072)
- 2x2x0.5 GYRD (VDR-076)
- 2x2x0.5 SPEED LDG (VDR-074)
- 2x2x0.5 GPS (VDR-057)
- 2x2x0.5 AIS (VDR-230)

- 2x2x0.5 WIND SPEED AND DIRECTION (VDR-070)
- 2x2x0.5 DATAANALG 01 (VDR-193)
- 2x2x0.5 DATADISCRETE 03 (VDR-202)
- 4x2x0.5 DATADISCRETE 01, 02 (VDR-192)

- 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.

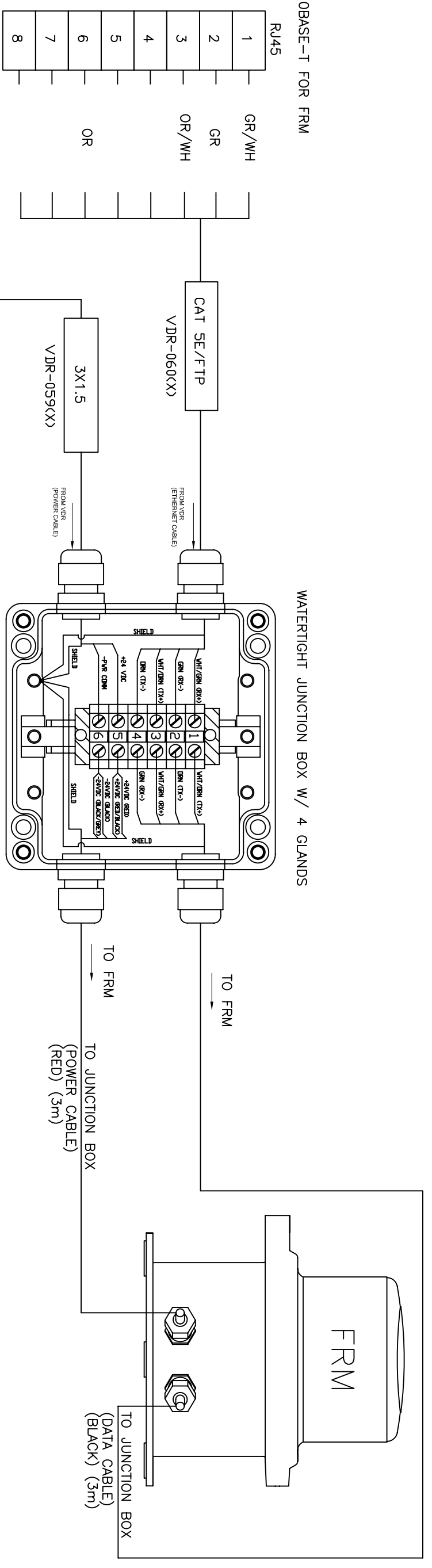
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

RUTTER JOB #		DRAWING #		TITLE	
		E-IN-01105		NMEA Connections	
DRAWING REV #		RCR #		DRAWN BY	
13		5490		M. DOUGLAS	
SHIP YARD		SHIP NAME		SCALE	
B. PITTMAN				NTS	
APPROVAL DATE		APPROVED BY		ORIGINAL DATE	
17NOV06		B. PITTMAN		23JAN08	
DESCRIPTION		DATE		FILENAME	
APPROVAL DRAWING		24JAN08		NBXXXX_NMEA_wiring_7A	
APPROVAL DRAWING		17NOV06		SHEET	
REV		DATE		7	



RUTTER TECHNOLOGIES INC.
St. Johns, NL 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.
 2. REFER TO INSTALLATION AND MAINTENANCE MANUAL



LAN 10BASE-T FOR FRM

WATERTIGHT JUNCTION BOX W/ 4 GLANDS

TO FRM POWER
(SEE SHEET #3)

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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		DATE		APPROVAL DRAWING DESCRIPTION		DATE		APPROVED BY	
B. PITTMAN		20FEB08		20FEB08		B. PITTMAN		20FEB08		B. PITTMAN	

DEPARTION AND ALARM UNIT



LOCATION:

NOTE:
1. SOURCE OF Tx,Rx,Gnd DEPENDS ON DAU LOCATION.

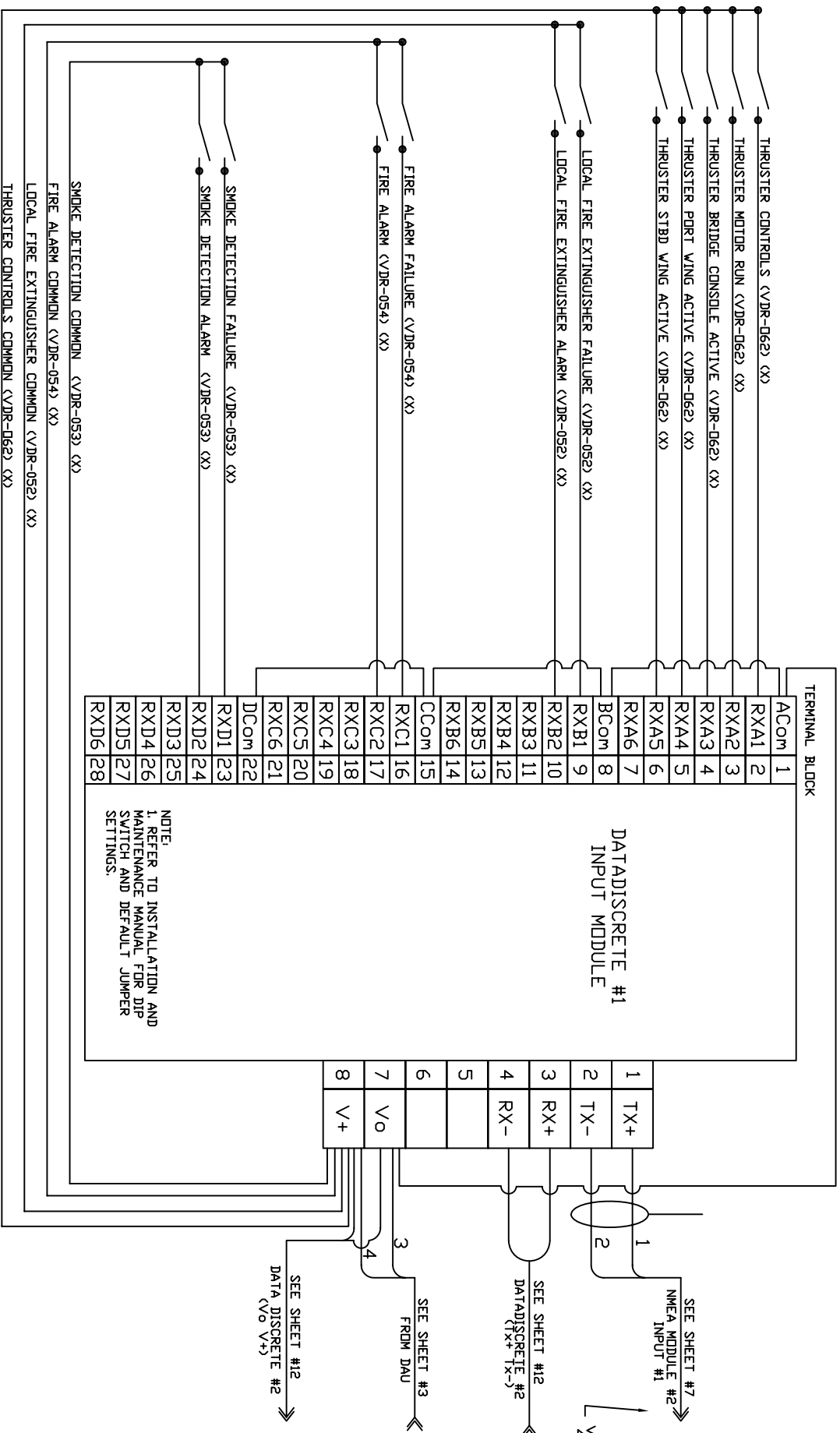
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD								
1	APPROVAL DRAWING	24JAN08	B. PITTMAN									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">RUTTER JOB #</td> <td style="width: 50%;">DRAWING #</td> </tr> <tr> <td></td> <td>E-IN-01468</td> </tr> <tr> <td>DRAWING REV #</td> <td>ROR #</td> </tr> <tr> <td>1</td> <td>5379</td> </tr> </table>					RUTTER JOB #	DRAWING #		E-IN-01468	DRAWING REV #	ROR #	1	5379
RUTTER JOB #	DRAWING #											
	E-IN-01468											
DRAWING REV #	ROR #											
1	5379											
				SHIP NAME								
				Alarm Module Connections								
		DRAWN BY										
		M.DOUGLAS										
		SCALE										
		NTS										
		ORIGINAL DATE										
		29NOV07										
		FILENAME										
		NBXXXX_alarm_system_10a										
				SHEET								
				10								

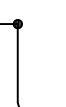


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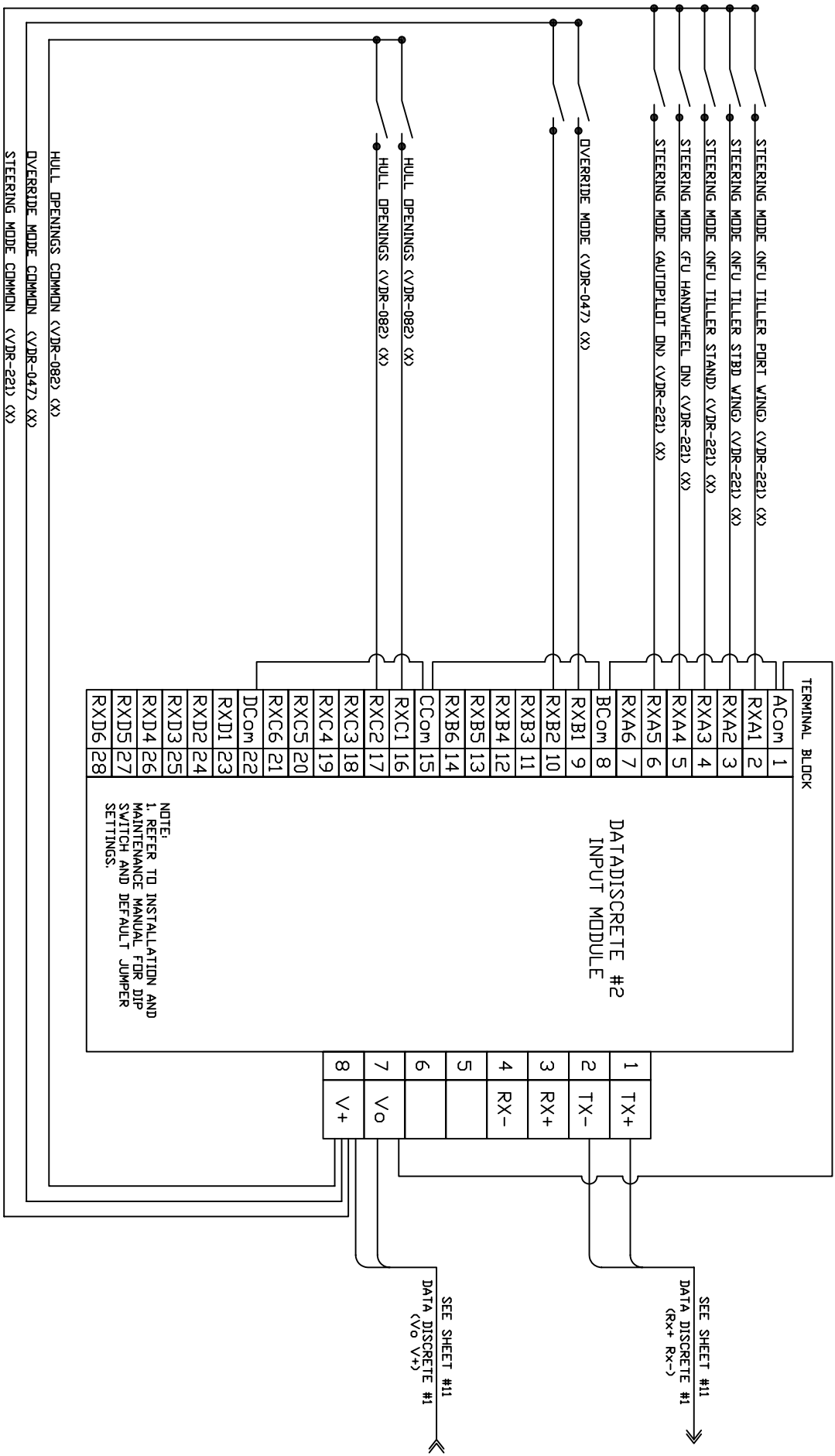
NOTES:
1. TO BE SUPPLIED IF NEEDED.



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RUTTER JOB #	DRAWING #
ROUTER	E-IN-01109
DRAWING REV #	RCR #
13	5493
APPROVAL DRAWING	B. PITTMAN
17NOV06	B. PITTMAN
DATE	APPROVED BY
TITLE	
DataDiscrete #1 Connections	
DRAWN BY	
M.DOUGLAS	
SCALE	
NTS	
ORIGINAL DATE	
16JAN08	
FILENAME	
NBXXXX_interface_wiring_11A	
SHEET	
11	


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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-)

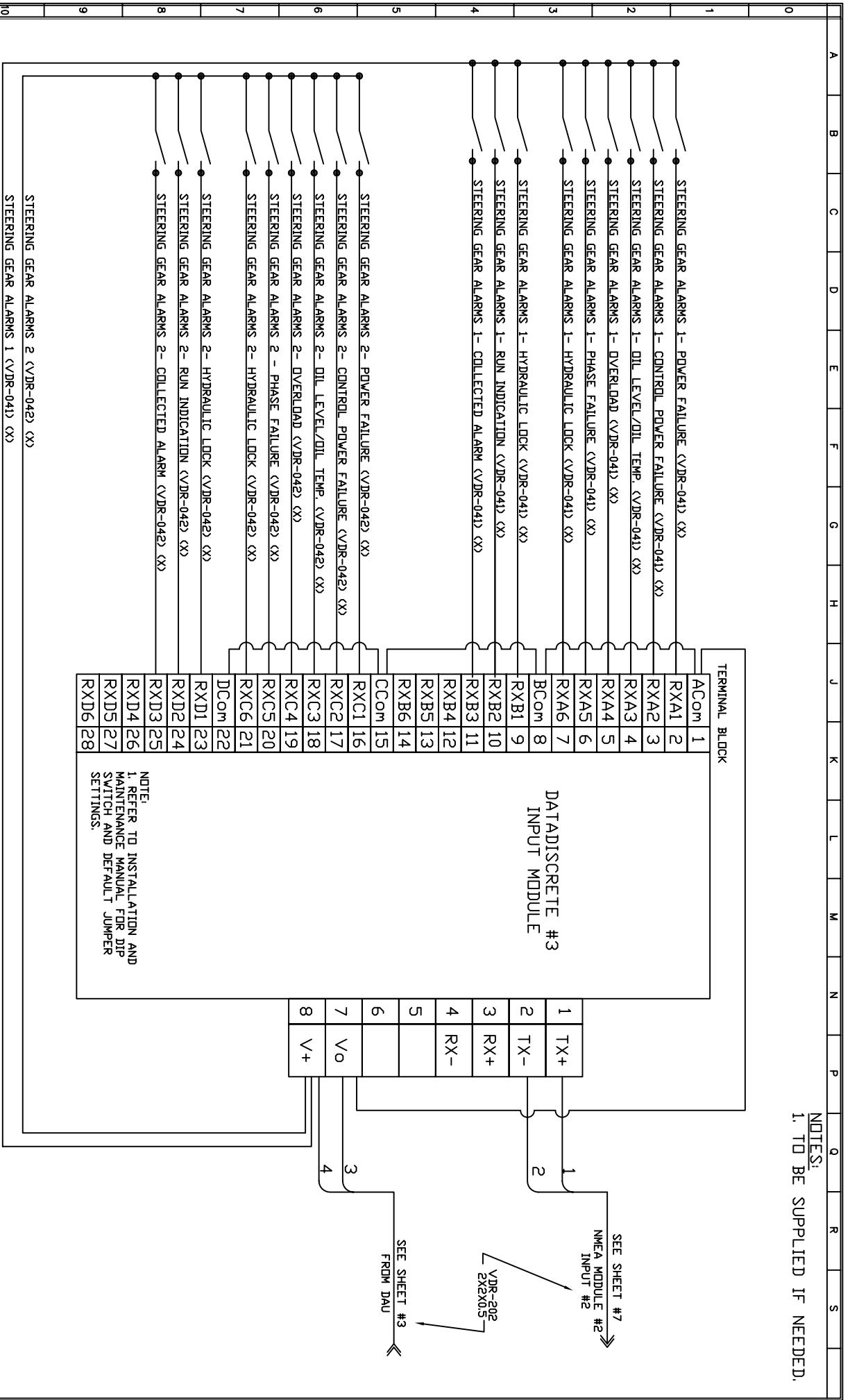
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

DRAWING REV #		DRAWING #		TITLE	
RUTTER JOB #		E-IN-01110		DataDiscrete #2 Connections	
DRAWING REV #		RCR #		SHIP NAME	
13		5492		SHIP YARD	
APPROVAL DRAWING		APPROVED BY		SCALE	
24JAN08		B. PITTMAN		M.DOUGLAS	
17NOV06		B. PITTMAN		NTS	
DESCRIPTION		DATE		ORIGINAL DATE	
APPROVAL DRAWING		17NOV06		16JAN08	
DESCRIPTION		DATE		FILENAME	
APPROVAL DRAWING		17NOV06		NBXXXX_interface_wiring_12A	
DESCRIPTION		DATE		SHEET	
APPROVAL DRAWING		17NOV06		12	




RUTTER TECHNOLOGIES INC.
St. John's, NF A1E 4P3
Tel: 709-368-4213 Fax: 709-368-1337

NOTES:
1. TO BE SUPPLIED IF NEEDED.



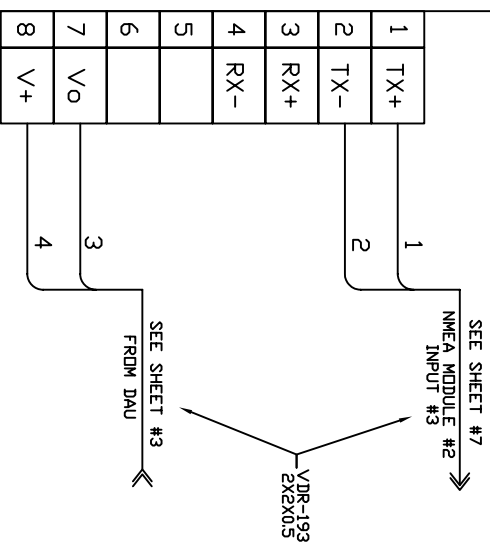
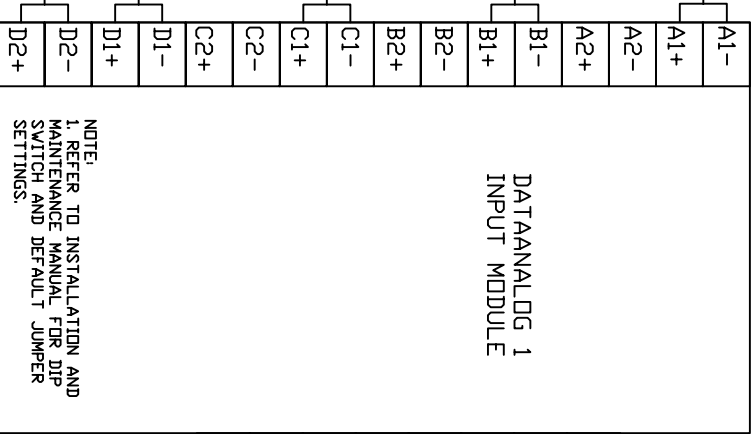
STEERING GEAR ALARMS 2 - (VDR-042) (X)
STEERING GEAR ALARMS 1 (VDR-041) (X)

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DRAWING JOB #				DRAWING #				TITLE			
RUTTER JOB #				E-IN-01111				DataDiscrete #3 Connections			
DRAWING REV #				RCR #				SHIP NAME			
13				5494				SHIP YARD			
APPROVAL DRAWING				24JAN08				B. PITTMAN			
APPROVAL DRAWING				17NOV06				B. PITTMAN			
DESCRIPTION				DATE				APPROVED BY			
REV											


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 St. Johns, NF A1E 4P3
 Tel: 709-368-4213 Fax: 709-368-1337

FILENAME: NBXXXX_interface_wiring_13A SHEET 13

NOTES:
1. TO BE SUPPLIED IF NEEDED.



REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	SCALE	ORIGINAL DATE	FILENAME	SHEET
2	APPROVAL DRAWING	24JAN08	B. PITTMAN			SCALE	16JAN08		14
1	APPROVAL DRAWING	17NOV06	B. PITTMAN			NTS		NBXXXX_interface_wiring_14A	14

REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	SCALE	ORIGINAL DATE	FILENAME	SHEET
2	APPROVAL DRAWING	24JAN08	B. PITTMAN			SCALE	16JAN08		14
1	APPROVAL DRAWING	17NOV06	B. PITTMAN			NTS		NBXXXX_interface_wiring_14A	14

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DataAnalog #1 Connections

RUTTER JOB #
DRAWING #
E-IN-01112

DRAWING REV #
RCR #
13 5495

SHIP YARD

SHIP NAME

DATE

APPROVED BY

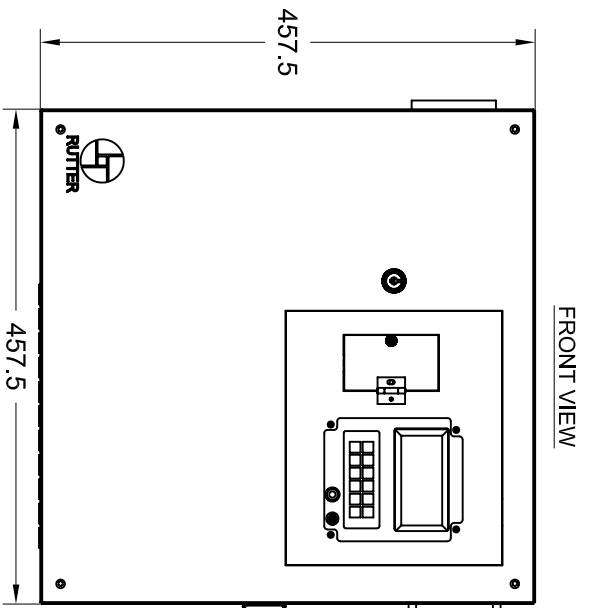
DRAWN BY
M. DOUGLAS

SCALE
NTS

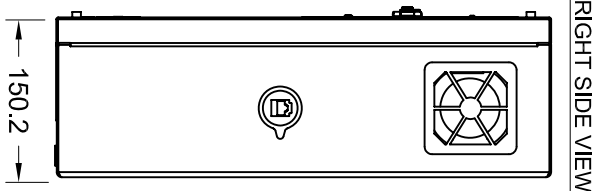
ORIGINAL DATE
16JAN08

RUTTER TECHNOLOGIES INC.
St. Johns, NF A1E 4P3
Tel: 709-368-4213 Fax: 709-368-1337

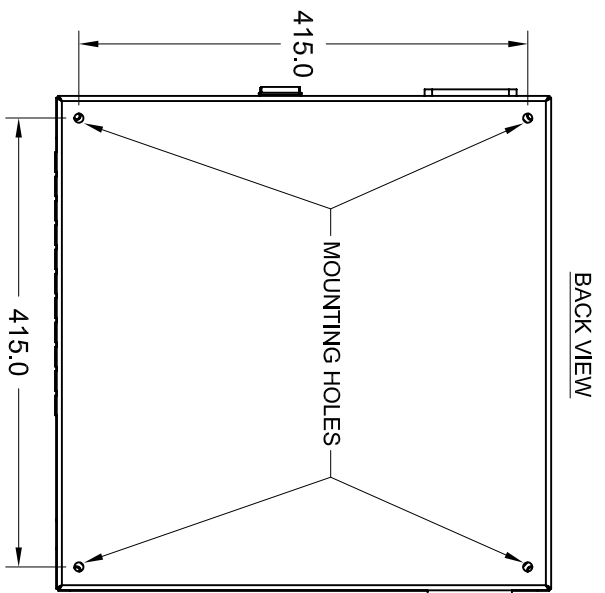




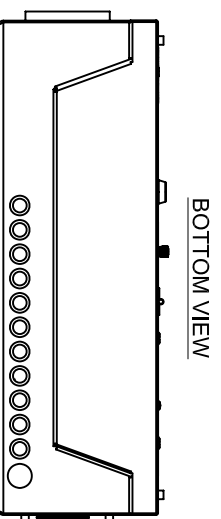
FRONT VIEW



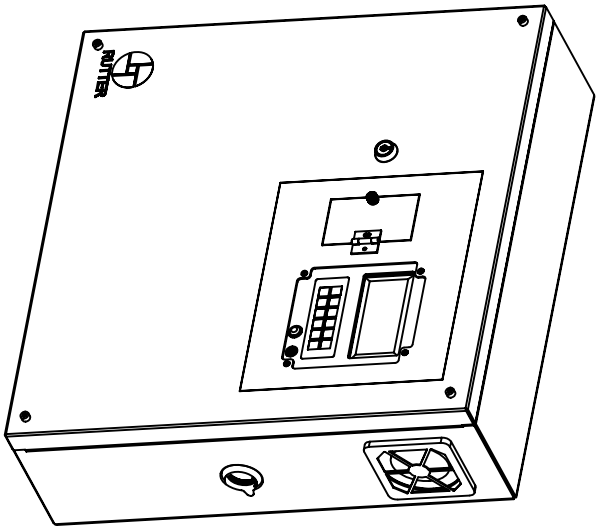
RIGHT SIDE VIEW



BACK VIEW



BOTTOM VIEW



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TITLE

Data Processing Unit (DPU)

REV	DESCRIPTION	RCR	DATE	APPROVED BY
\$1	APPROVAL DRAWING	5379	8FEB08	T. BARKER
\$1	APPROVAL DRAWING	5379	7FEB08	B. PITTMAN

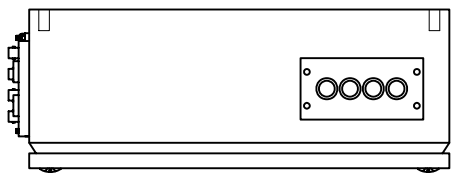
DRAWN BY		M. DOUGLAS
ORIGINAL DATE		10DEC07
SCALE	DRAWING #	E-IN-01474
NTS		

		RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337
FILENAME VDR-401_DPU		

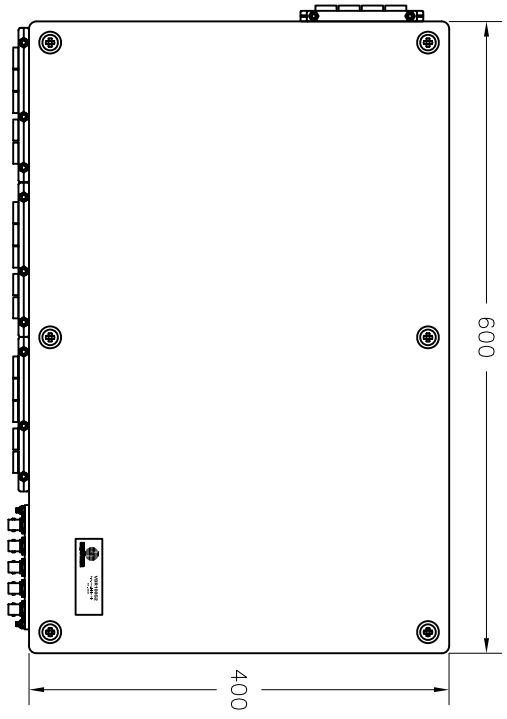
A B C D E F G H J K L M N P Q R S

NOTES:
1. ALL DIMENSIONS ARE IN mm.

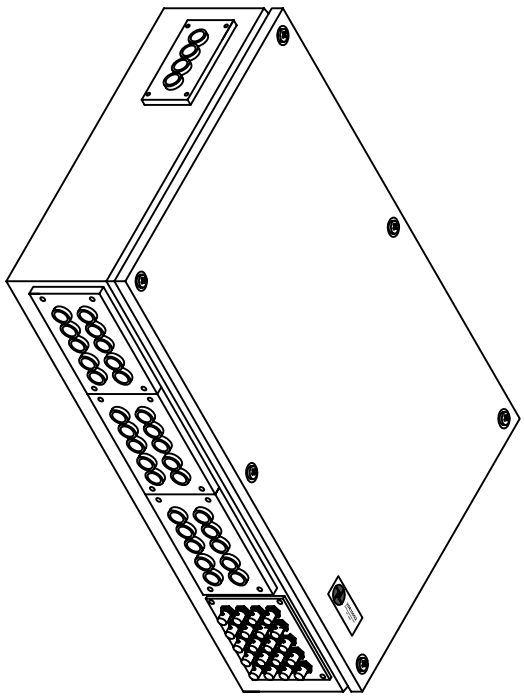
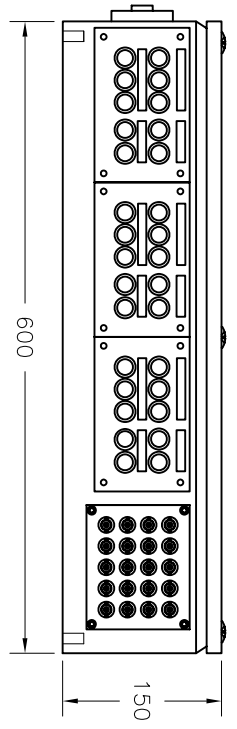
LEFT SIDE VIEW



FRONT VIEW



BOTTOM VIEW

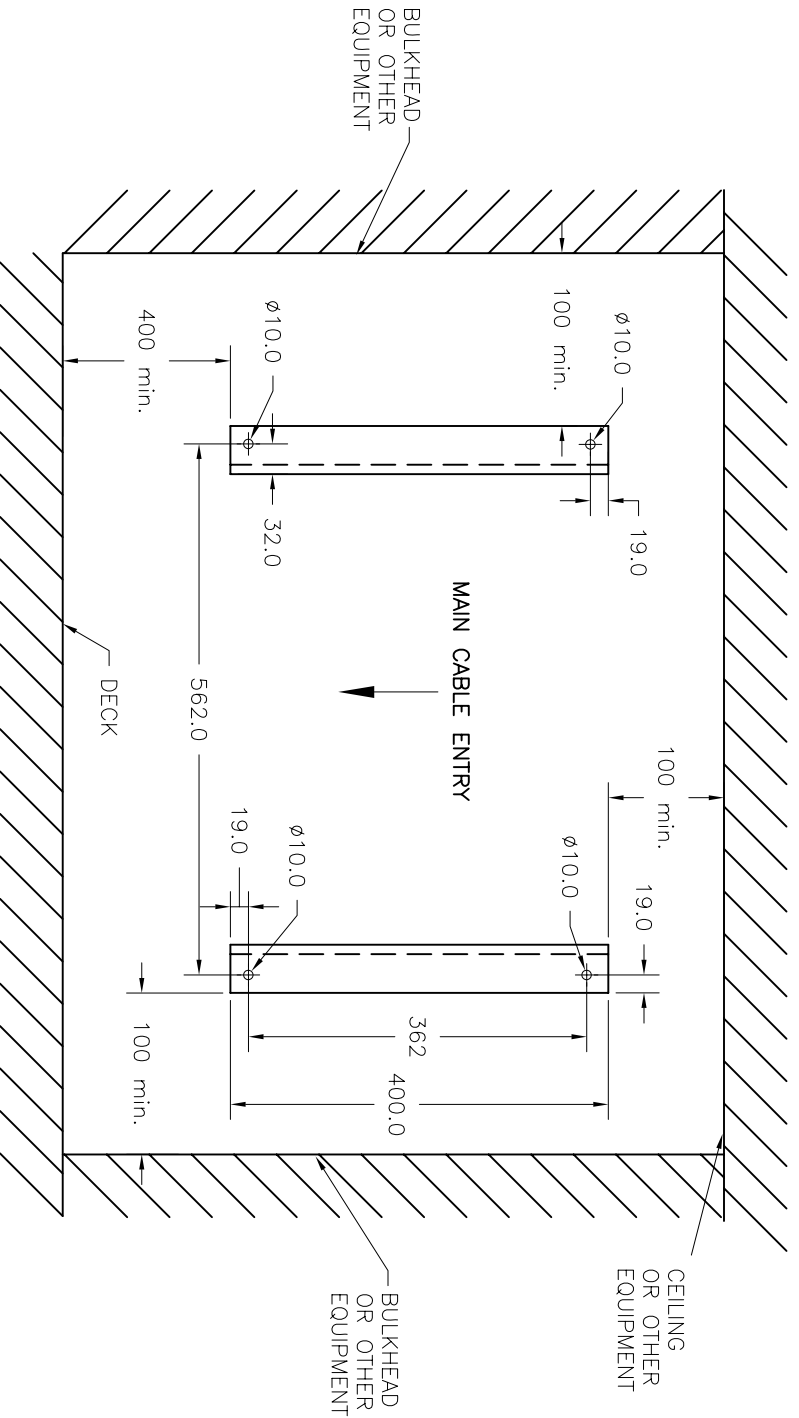


WEIGHT
16.8 kg

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TITLE		Data Acquisition Unit (DAU)	
APPROVAL DRAWING	5449	14JAN08	B.PITTMAN
APPROVAL DRAWING		21JULY04	T. BARKER
REV	DESCRIPTION	RCR	DATE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE	DRAWING #	FILENAME	
NTS	E-IN-00801	RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-968-4213 Fax: 709-368-1337	
		VDR-201_DAU	

DAU MOUNTING

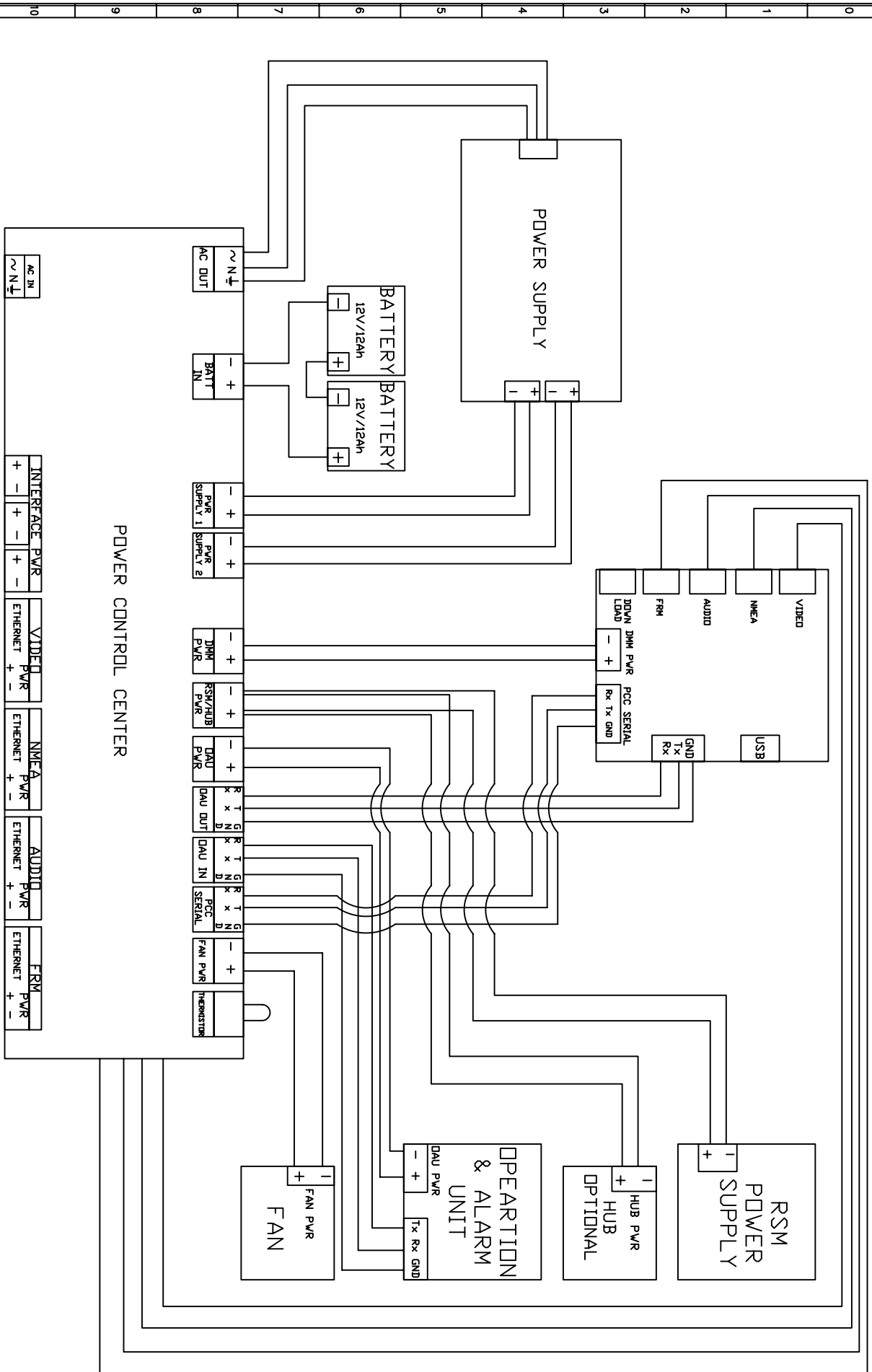


- NOTES:**
1. ALL DIMENSIONS ARE IN mm.
 2. REASONABLE SERVICE SPACE AROUND UNIT IS TO BE MAINTAINED AT ALL TIMES.

MATERIALS
 MOUNTING RAILS: 51 x 51 x 3.2mm MILD STEEL ANGLE

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TITLE		DAU Mounting Arrangement	
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		NTS	
DRAWING #		E-IN-00802	
FILENAME		RUTTER	
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3 Tel: 709-568-4213 Fax: 709-368-1337	
REV		DESCRIPTION	
1	APPROVAL DRAWING	ROR	DATE
2	APPROVAL DRAWING	5447	14JAN08
APPROVED BY		I. ROBBINS	
APPROVED BY		B. PITTMAN	



POWER CONTROL CENTER

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REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	SCALE	ORIGINAL DATE	FILENAME	SHEET
\$2	APPROVAL DRAWING	29FEB08	T. BARKER	2	DPU POWER DISTRIBUTION	M. DOUGLAS	NTS	VDR-006A_DPU_Power_Dist	
\$1	APPROVAL DRAWING	8FEB08	T. BARKER						
\$1	APPROVAL DRAWING	7FEB08	B. PITTMAN				29FEB08		



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St. Johns, NF A1E 4P3
Tel: 709-369-4213 Fax: 709-366-1337

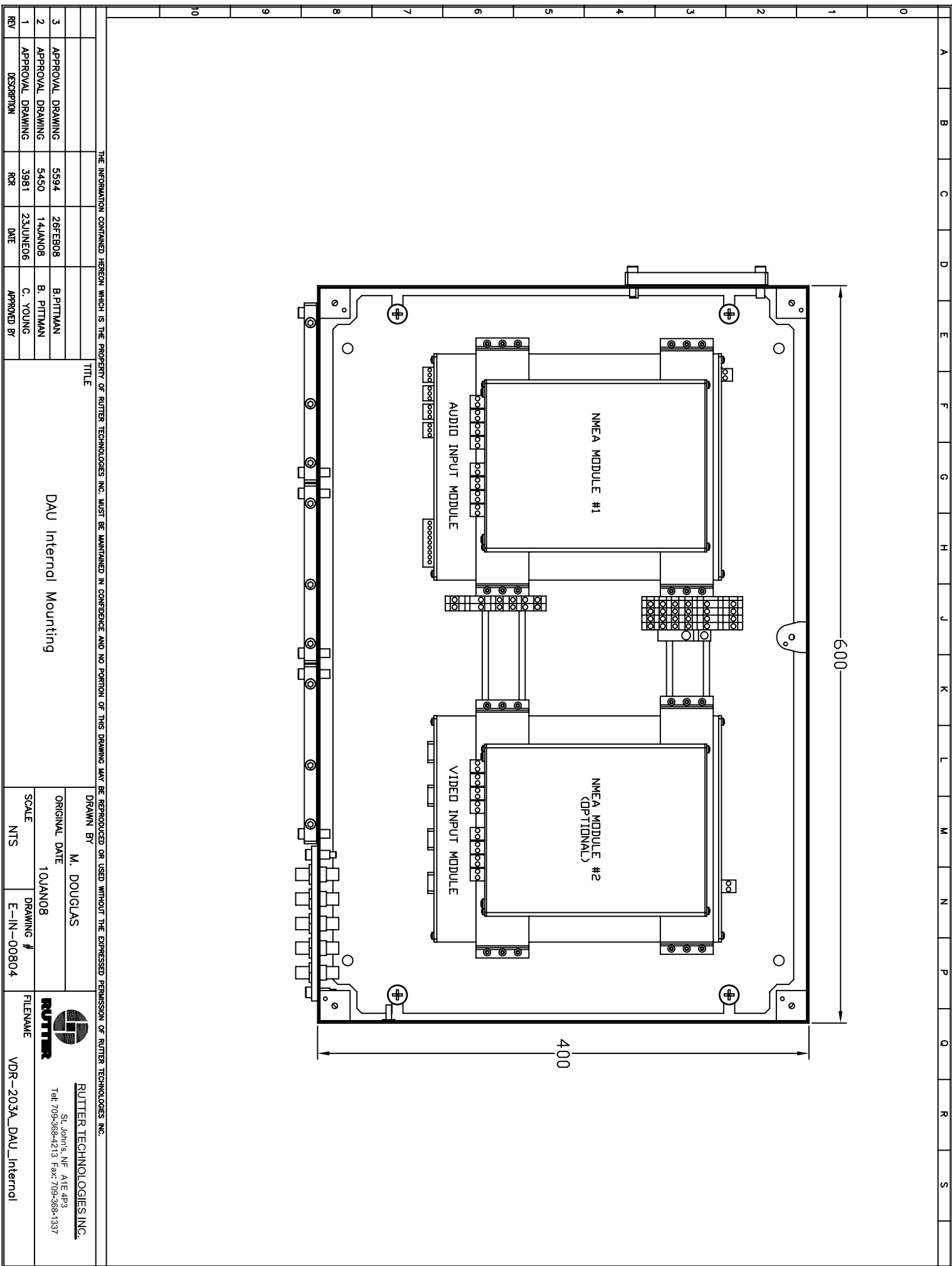
DRAWN BY M. DOUGLAS

SCALE NTS

ORIGINAL DATE 29FEB08

FILENAME VDR-006A_DPU_Power_Dist

SHEET



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REV	DESCRIPTION	ROR	DATE	APPROVED BY	TITLE	SCALE	FILENAME
3	APPROVAL DRAWING	5594	26FEB08	B. PITTMAN	DAU Internal Mounting	NTS	VDR-203A_DAU_Internal
2	APPROVAL DRAWING	5450	14JAN08	B. PITTMAN			
1	APPROVAL DRAWING	3981	23JUNE06	C. YOUNG			

DRAWN BY M. DOUGLAS

ORIGINAL DATE 10JAN08

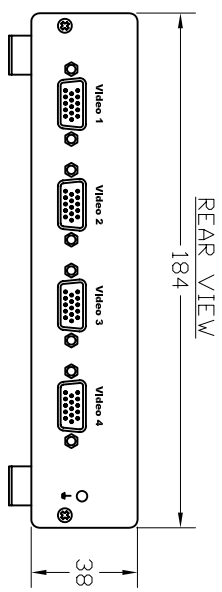
SCALE NTS

DRAWING # E-IN-00804

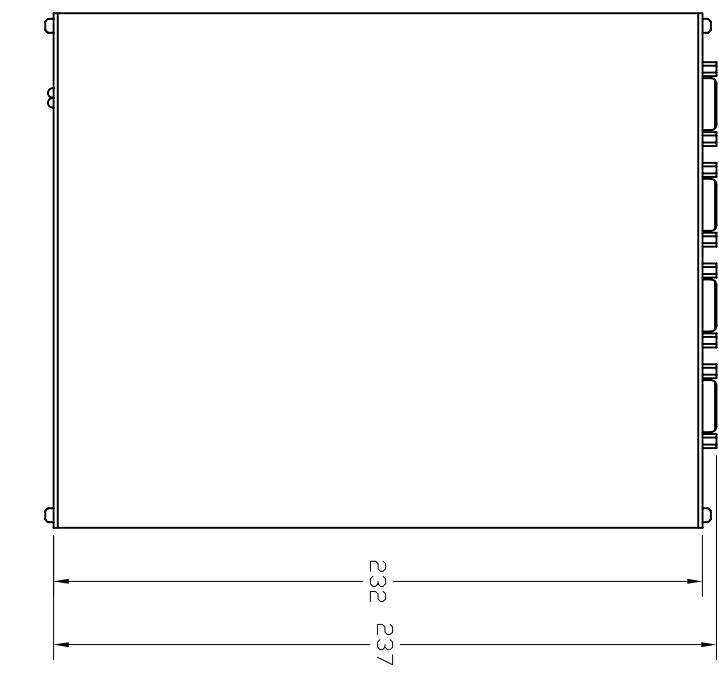
RUTTER

St. John's, NE A1E 4P3
Tel: 709-568-4213 Fax: 709-568-1337

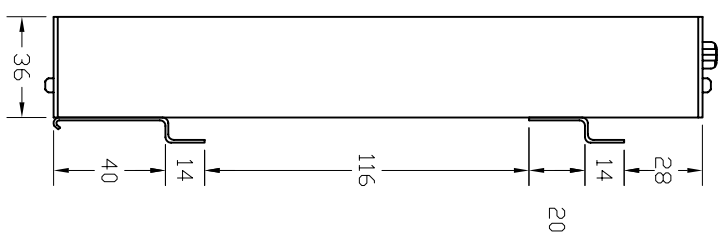
NOTES:
1. ALL DIMENSIONS ARE IN mm.



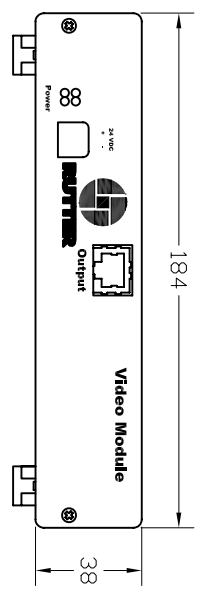
REAR VIEW



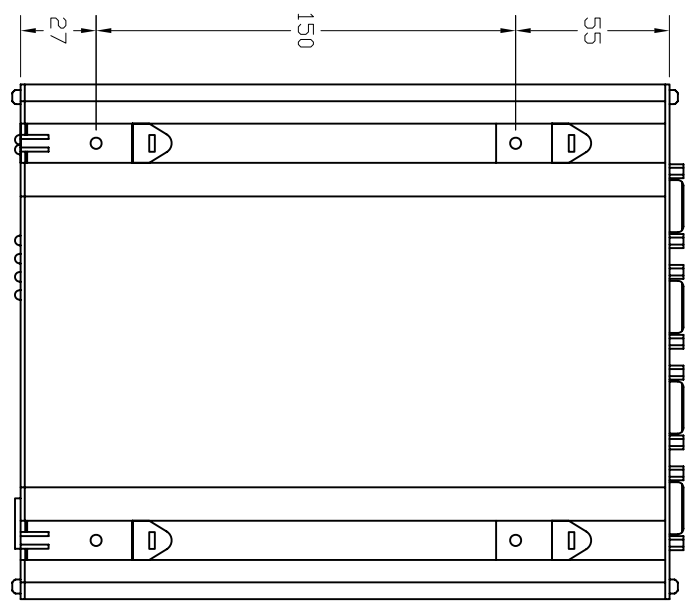
TOP VIEW



SIDE VIEW



FRONT VIEW

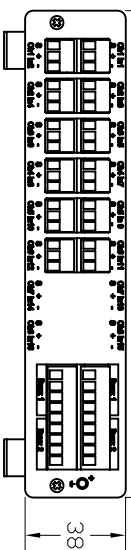


BOTTOM VIEW

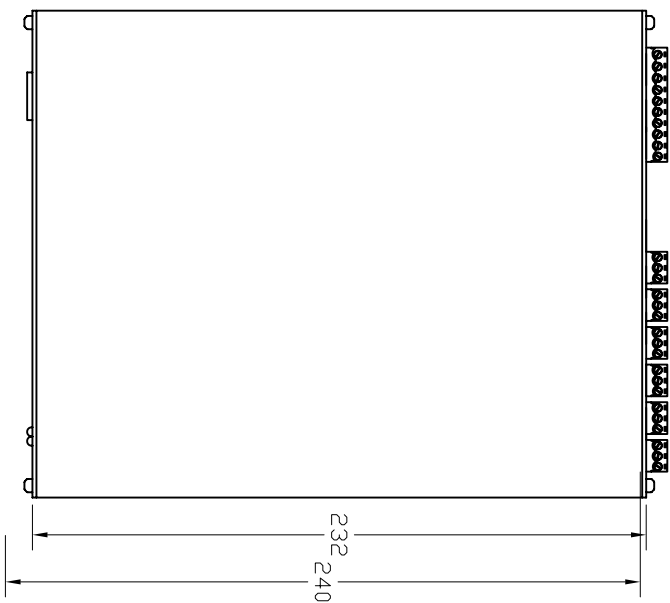
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3	APPROVAL DRAWING	5453	14JAN08	B. PITTMAN	Video Module
2	APPROVAL DRAWING		09AUG06	G. BREEN	
1	APPROVAL DRAWING		17JULY06	C. YOUNG	
REV	DESCRIPTION	ROR	DATE	APPROVED BY	
DRAWN BY					M. DOUGLAS
ORIGINAL DATE					10JAN08
SCALE					NTS
DRAWING #					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					

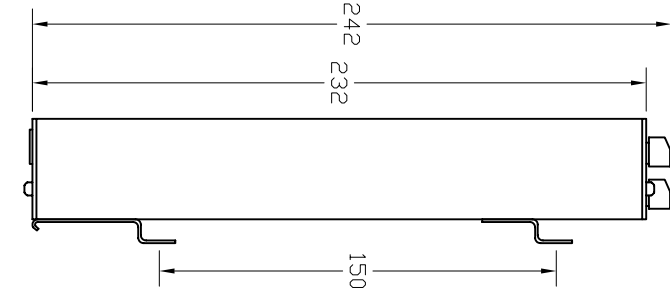
REAR VIEW
184



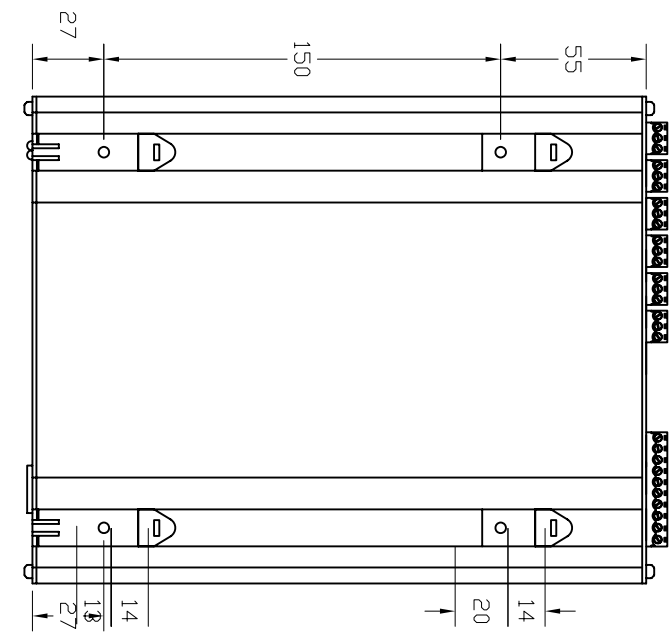
TOP VIEW



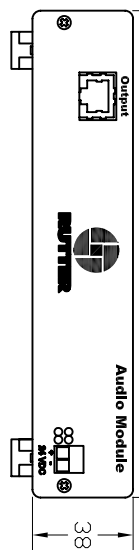
SIDE VIEW



BOTTOM VIEW



FRONT VIEW

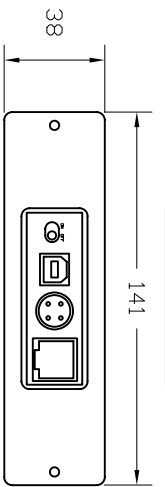


NOTES:
1. ALL DIMENSIONS ARE IN mm.

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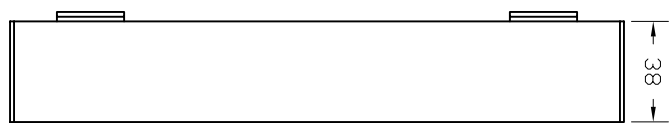
REV		DESCRIPTION	RCR	DATE	APPROVED BY
3	APPROVAL DRAWING	5454		14JAN08	B.PITTMAN
2	APPROVAL DRAWING			09AUG06	G. BREEN
1	APPROVAL DRAWING			21JULY04	T. BARKER
TITLE					
Audio Input Module					
DRAWN BY			M. DOUGLAS		
ORIGINAL DATE			10JAN08		
SCALE			DRAWING #		
NTS			E-IN-00809		
RUTTER TECHNOLOGIES INC.			RUTTER		
St. John's, NF A1E 4P3			Tel: 709-368-4213 Fax: 709-368-1337		
VDR-208_AUDIO_MODULE					

NOTES:
 1. ALL DIMENSIONS ARE IN mm.
 2. **3M™** MUSHROOM LOCK.

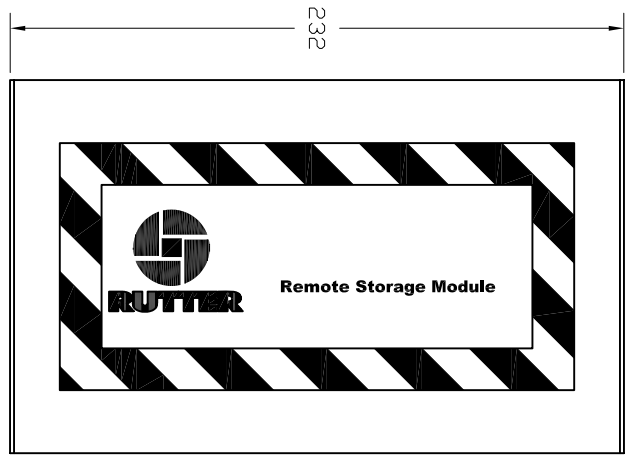


BACK VIEW

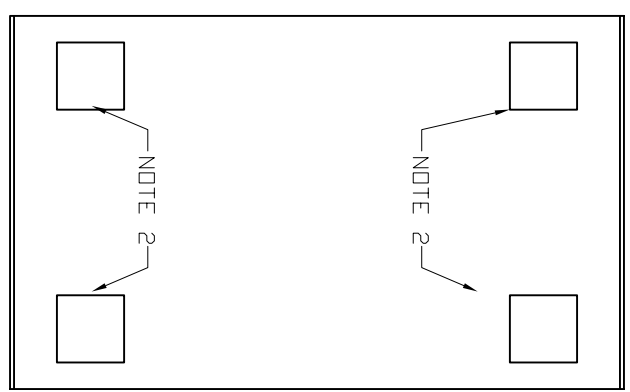
SIDE VIEW



TOP VIEW



BOTTOM VIEW



FRONT VIEW

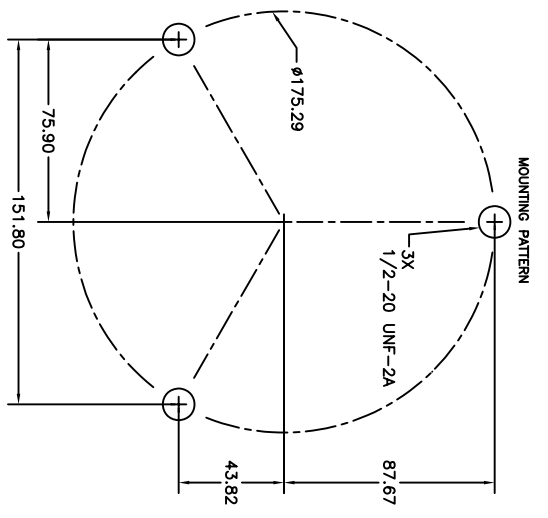
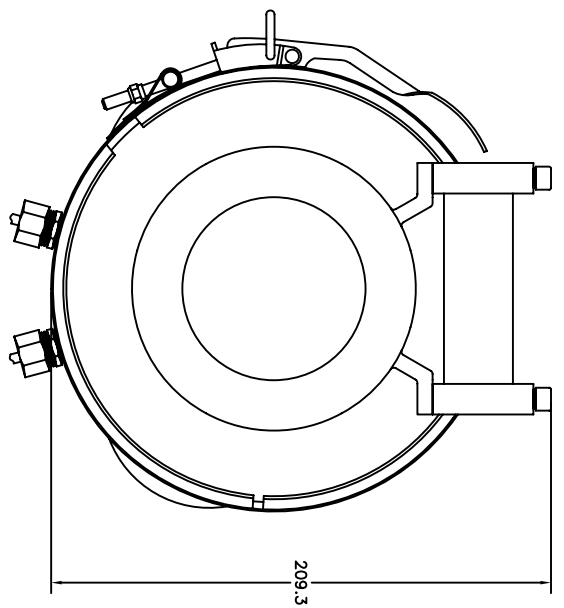


WEIGHT

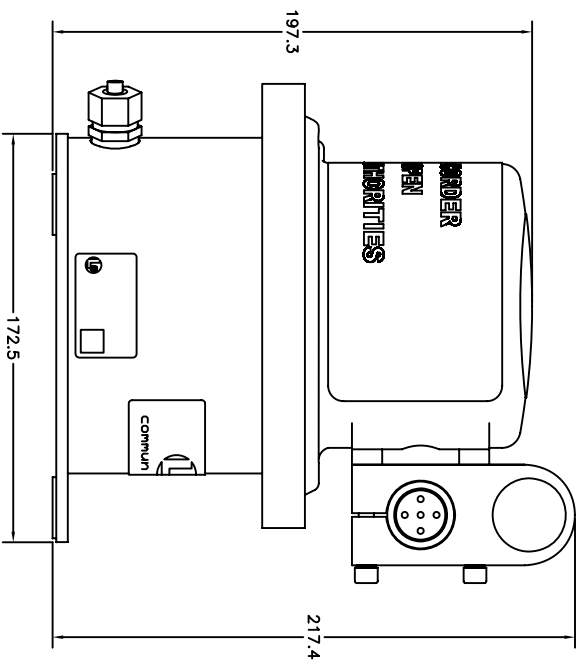
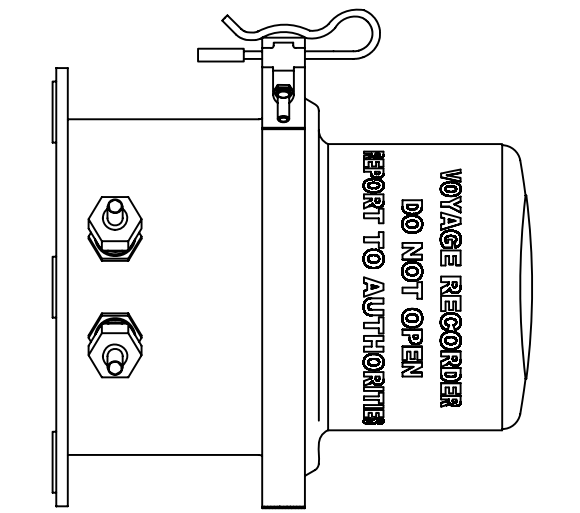
12 kg

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		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	



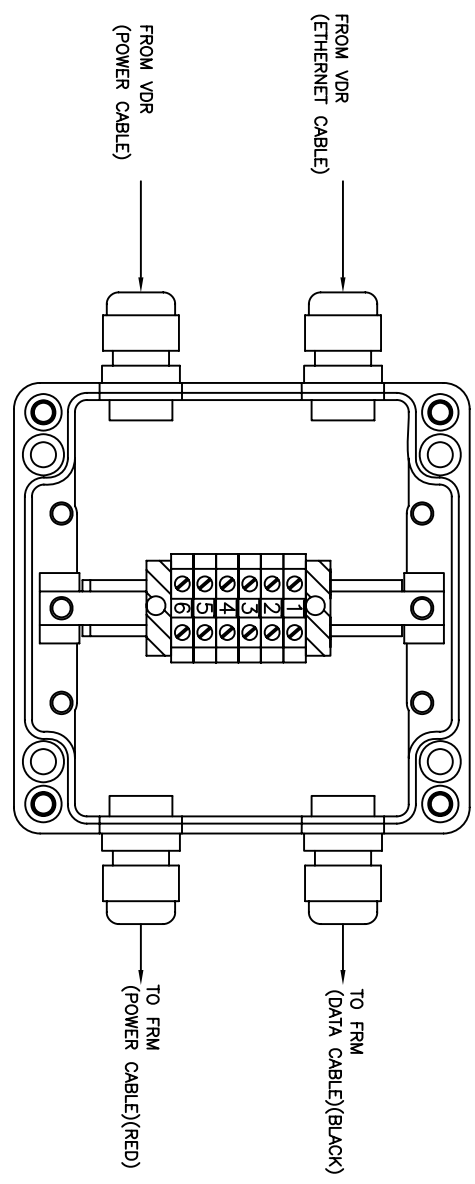
- NOTES: UNLESS OTHERWISE SPECIFIED
1. RETRIEVABLE PORTION OF RECORDER HAS A BANNER OF FLUORESCENT ORANGE. LABELS ARE REFLECTIVE WHITE BACKGROUND WITH BLACK LETTERING.
 2. DO NOT MOUNT HVRO2 WITHIN 59 CENTIMETERS OF OTHER STRUCTURES. KEEP AREA AROUND UNIT CLEAR.
 3. ETHERNET CABLE SHALL BE SHIELDED TWISTED PAIR CATEGORY 5, IEA/TIA 568 OR IEEE 802.3. MAX CABLE LENGTH FROM HVRO2 TO PC IS 75 METERS.
 4. MAX CABLE LENGTH FOR DC POWER IS 75 METERS.
 5. ALL CABLES ARE TO BE COMPLIANT WITH IEC 92.
 6. ALL DIMENSIONS ARE IN mm.



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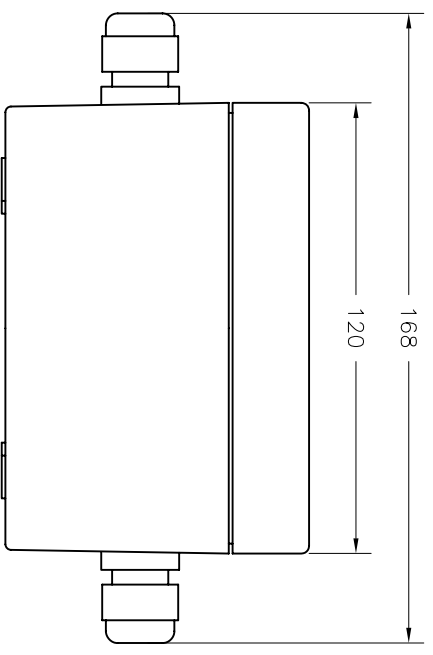
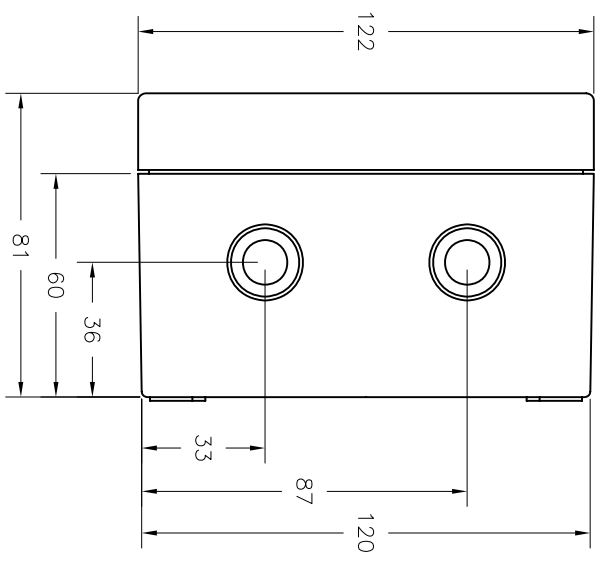
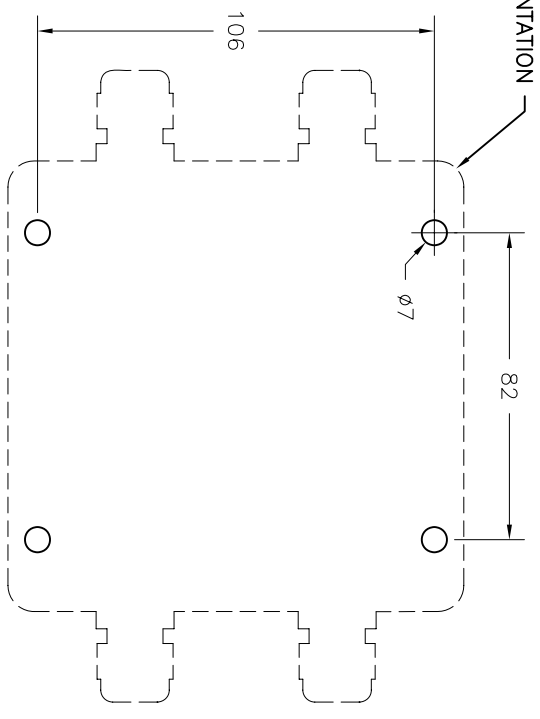
REV	DESCRIPTION	ROR	DATE	APPROVED BY	TITLE	SCALE	DRAWING #	FILENAME	
1	APPROVAL DRAWING	5563	15FEB08	B. PITTMAN	L3-HVRO3	NTS	E-IN-01543	RUTTER	
						DRAWN BY		M. DOUGLAS	
						ORIGINAL DATE		15FEB08	
						SCALE		E-IN-01543	
						DRAWING #		RUTTER	
						FILENAME		VDR-303C_HVR_FRM	
						RUTTER TECHNOLOGIES INC.		St. Johns, NE A1E 4P3	
						Tel: 709-968-4213 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

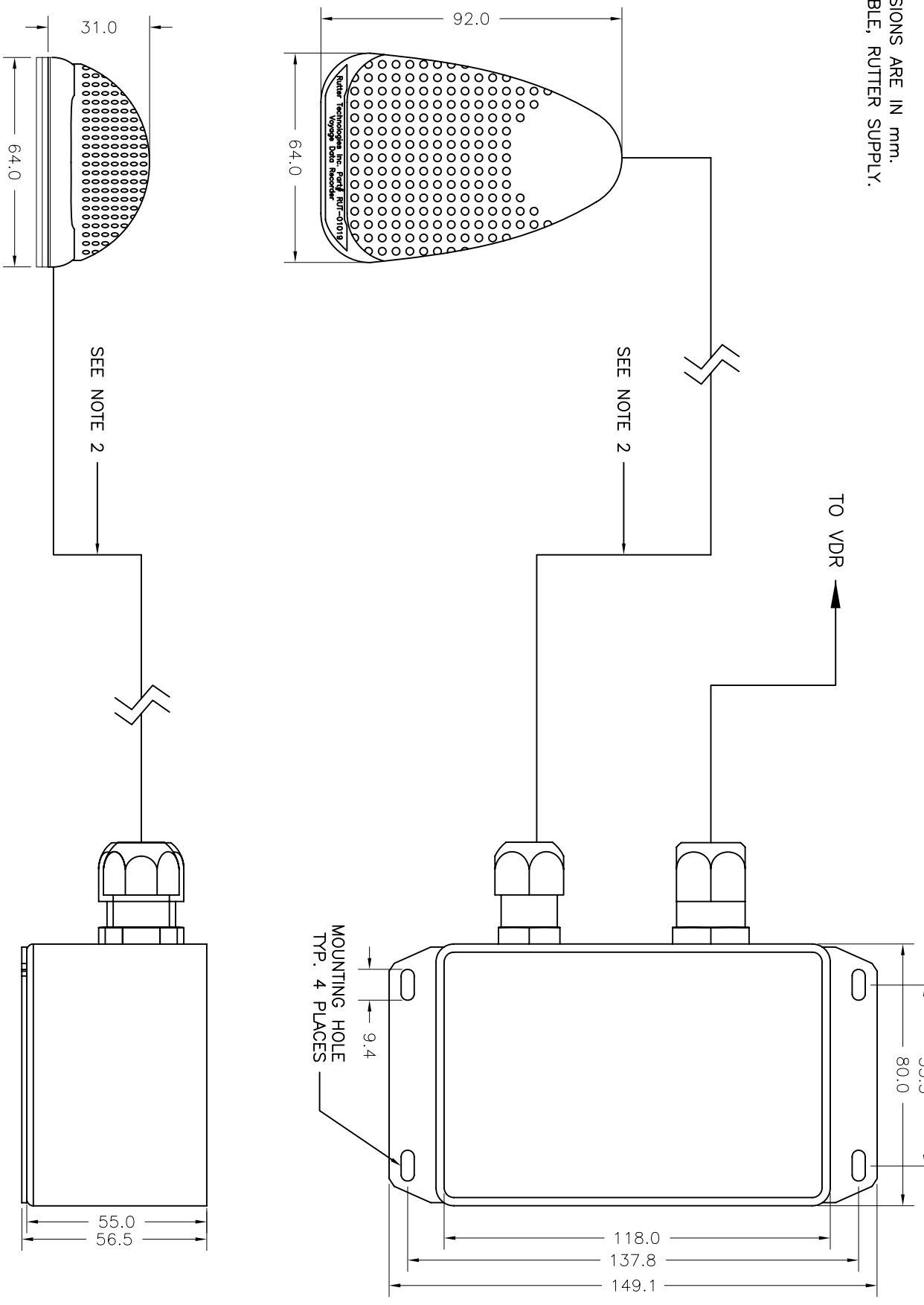


NOTES:
1. ALL DIMENSIONS ARE IN mm.


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		FRM Junction Box	
DRAWN BY	M. DOUGLAS	FILENAME	VDR-304C_FRM_JIB
ORIGINAL DATE	10JAN08	RUTTER TECHNOLOGIES INC.	St. John's, NF A1E 4P3 Tel: 709-568-4213 Fax: 709-368-1337
SCALE	NTS	DRAWING #	E-IN-00813
REV	DESCRIPTION	RDR	DATE
1	APPROVAL DRAWING		17JULY06
2	APPROVAL DRAWING		14JAN08
APPROVAL BY		APPROVED BY	
B. PITTMAN		C. YOUNG	

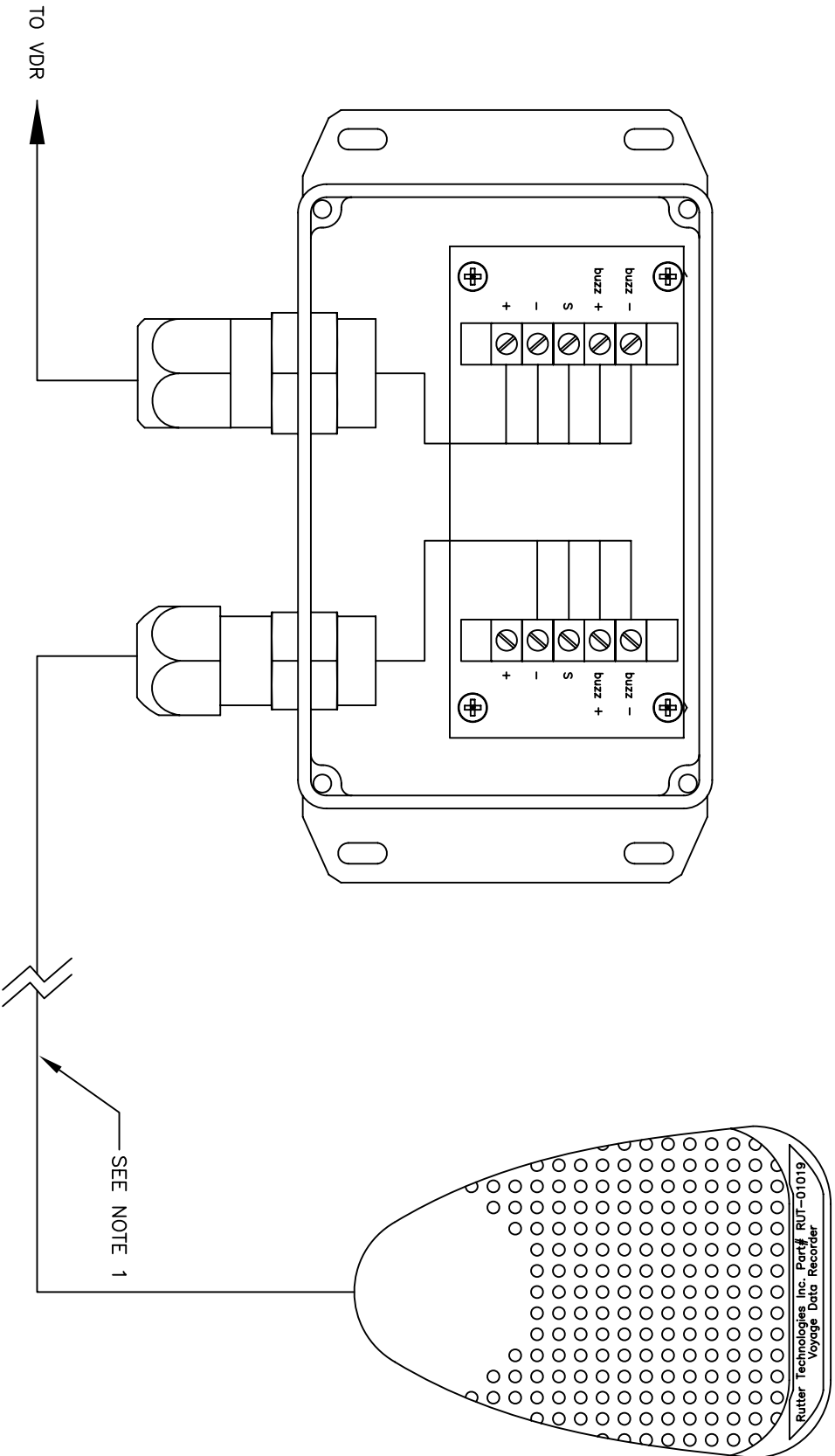
- NOTES:**
1. ALL DIMENSIONS ARE IN mm.
 2. 2m OF CABLE, RUTTER SUPPLY.



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	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	 RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337
1	APPROVAL DRAWING	3860	18MAY06	B. PITTMAN						

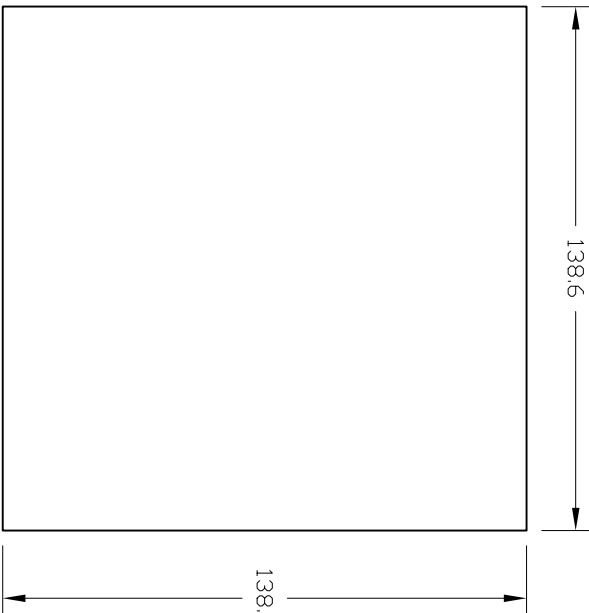
- NOTES:**
1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.



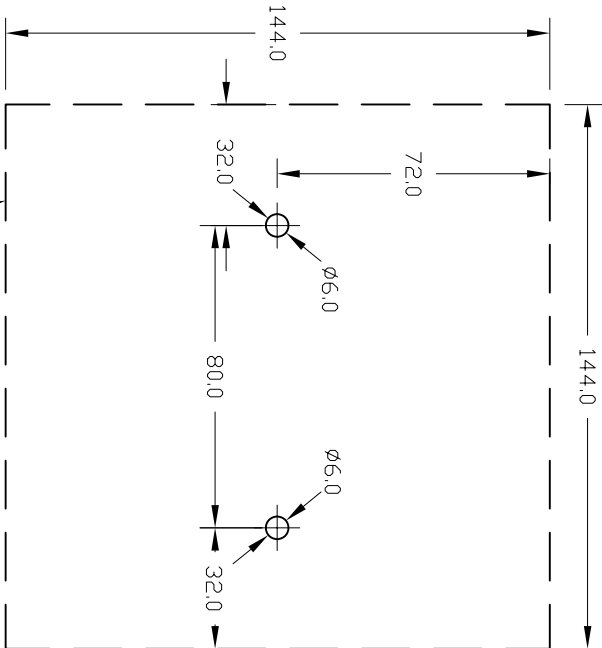
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.				
TITLE				
Indoor Microphone Internal Connection				
3	APPROVAL DRAWING	5464	14JAN08	B. PITTMAN
2	APPROVAL DRAWING	4193	29AUG06	G. BREEN
1	APPROVAL DRAWING	3860	03MAY06	B. PITTMAN
REV	DESCRIPTION	RGR	DATE	APPROVED BY
DRAWN BY		M. DOUGLAS		
ORIGINAL DATE		10JAN08		
SCALE		NTS		
DRAWING #		E-IN-00961		
FILENAME		VDR-306c_Indoor_Mic_Connection		
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3		
		Tel: 709-368-4213 Fax: 709-368-1337		

NOTES:
1. ALL DIMENSIONS ARE IN MM.

FLUSH MOUNT CUTOUT



SURFACE MOUNT DRILL HOLE PATTERN



REQUIRED AREA AROUND
MOUNTING HOLES FOR
OBSTRUCTION FREE MOUNTING

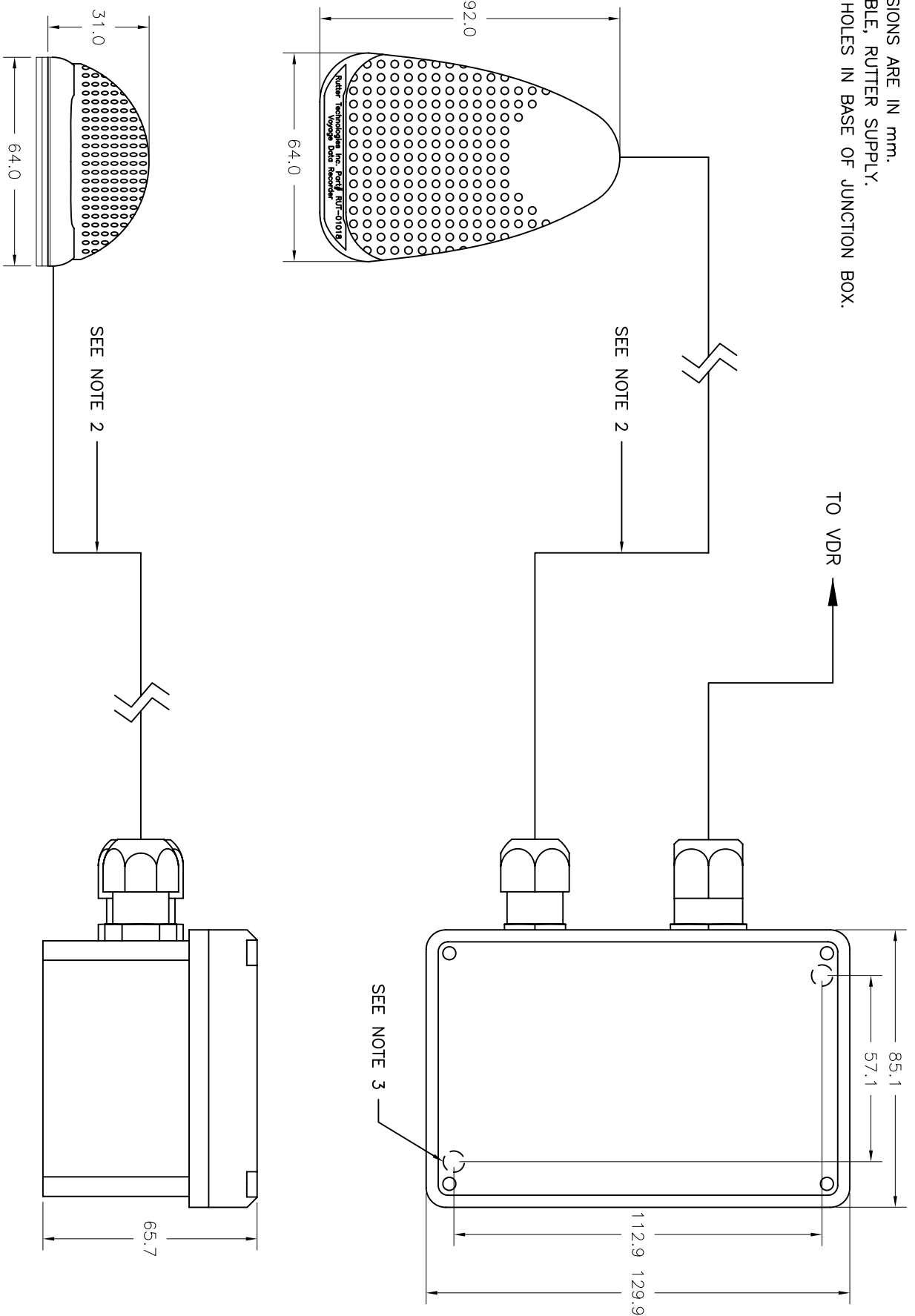
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

REV	DESCRIPTION	RCR	DATE	APPROVED BY	TITLE	DRAWN BY	ORIGINAL DATE	SCALE	DRAWING #	FILENAME
2	APPROVAL DRAWING	5467	14JAN08	B.PITTMAN	Alarm Module Mounting Options	M. DOUGLAS	10JAN08	NTS	E-IN-00817	RUTTER
1	APPROVAL DRAWING		04MAY05	I. ROBBINS						

RUTTER TECHNOLOGIES INC.
St. John's, NF A1E 4P9
Tel: 709-368-4213 Fax: 709-368-1337

VDR-313B_OAU_Mounting

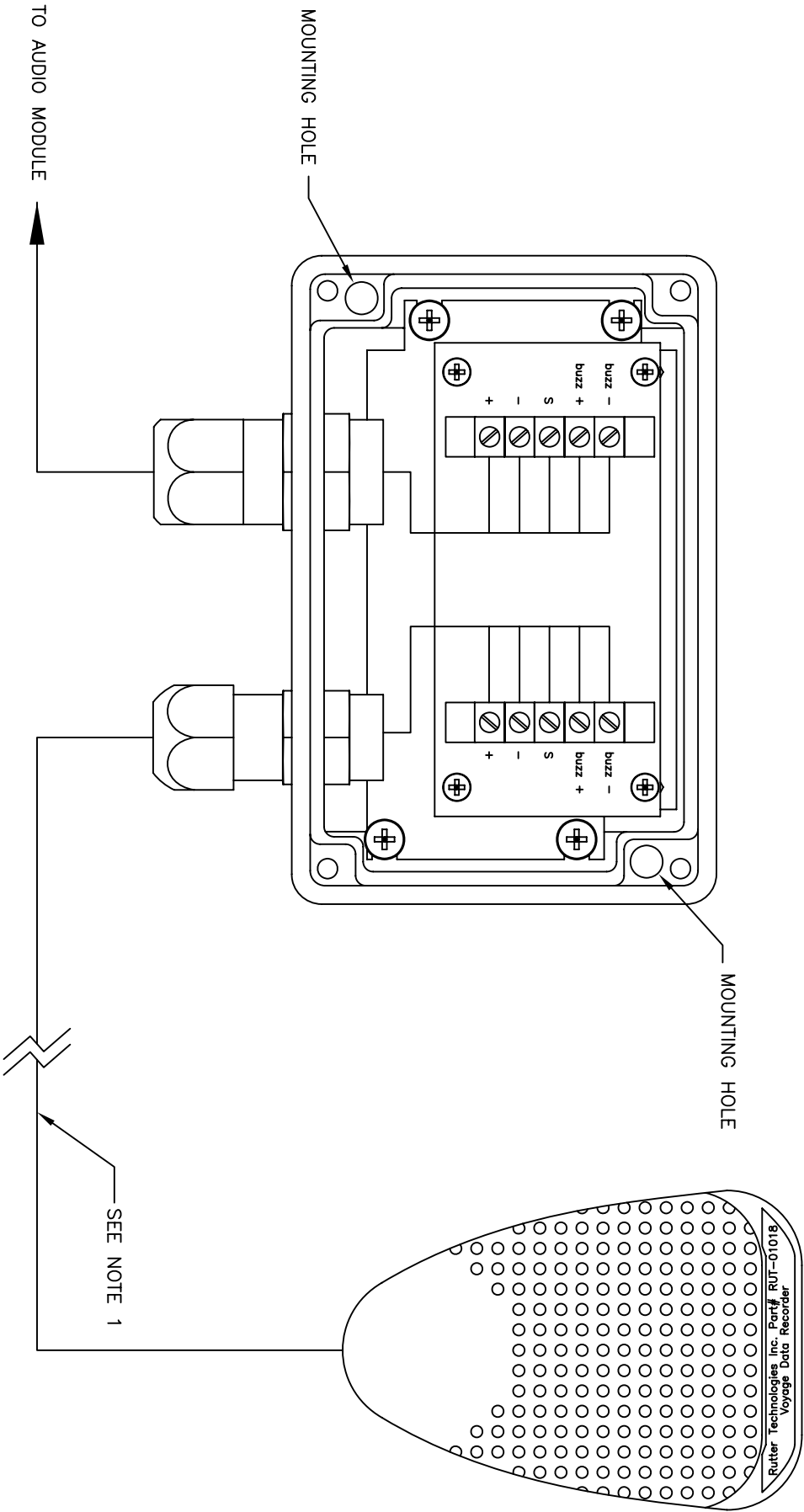
- NOTES:**
1. ALL DIMENSIONS ARE IN mm.
 2. 2m OF CABLE, RUTTER SUPPLY.
 3. MOUNTING HOLES IN BASE OF JUNCTION BOX.



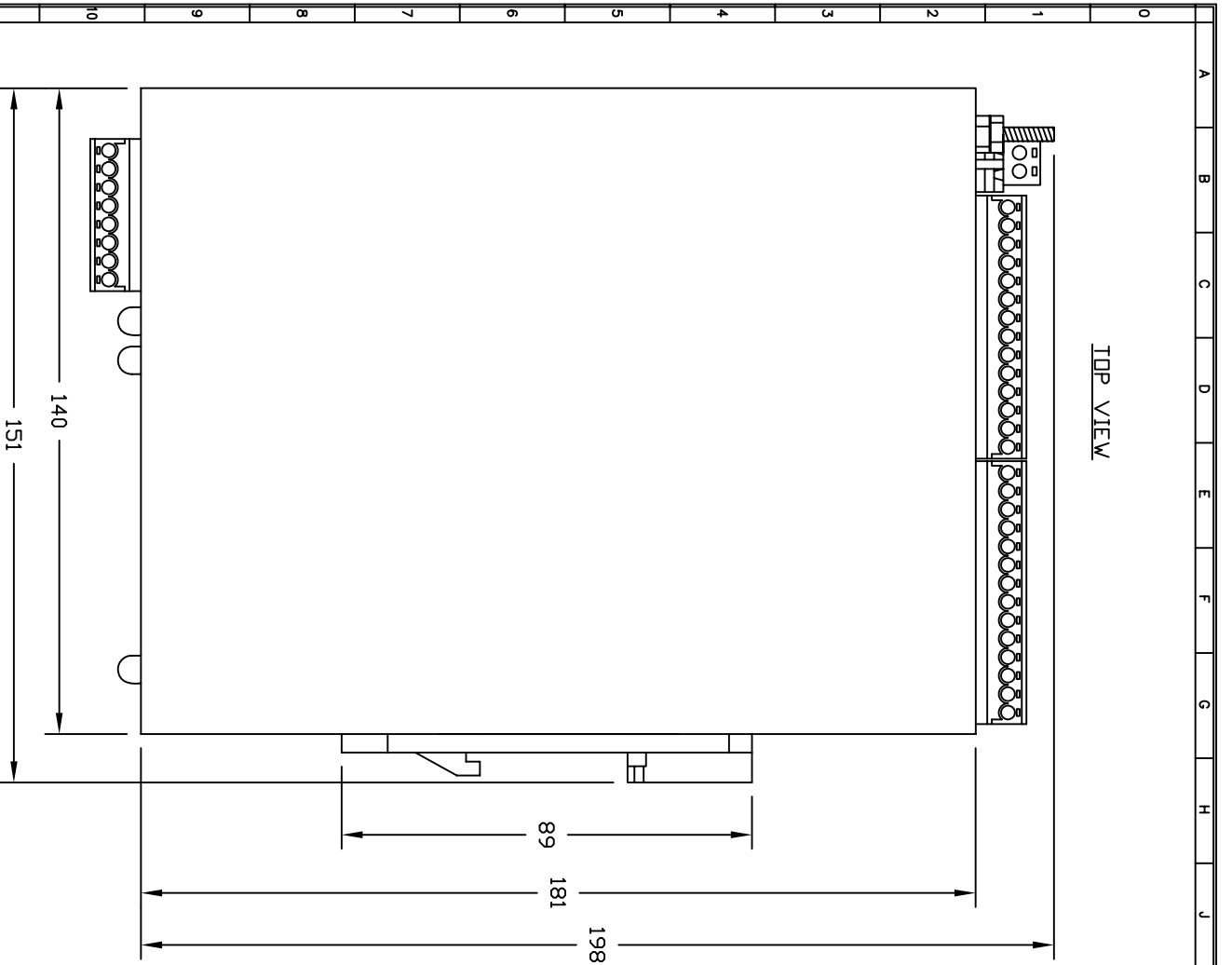
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

REV	DESCRIPTION	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		RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337				

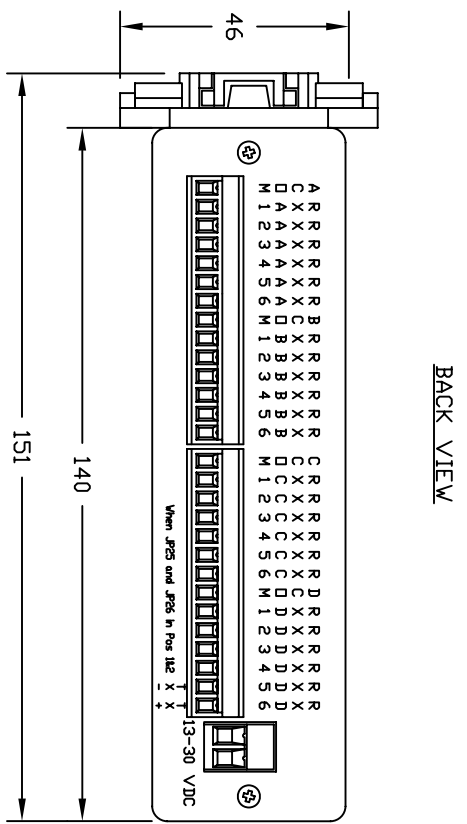
- NOTES:
1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.



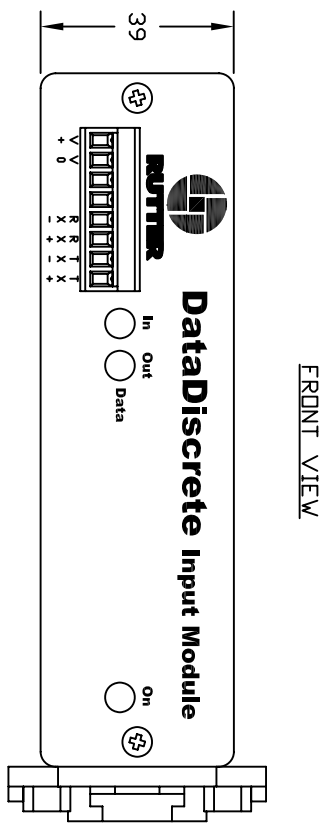
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.			
TITLE		Outdoor Microphone Internal Connection	
REV	DESCRIPTION	RCR	DATE
\$2	APPROVAL DRAWING	5465	14JAN08
\$1	APPROVAL DRAWING	3660	09AUG06
			APPROVED BY
			B. PITTMAN
			G. BREEN
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		DRAWING #	
NTS		E-IN-00962	
FILENAME		VDR-310b_Outdoor_Mic_Connection	
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3	
Tel: 709-968-4213		Fax: 709-368-1337	



TOP VIEW



BACK VIEW



FRONT VIEW

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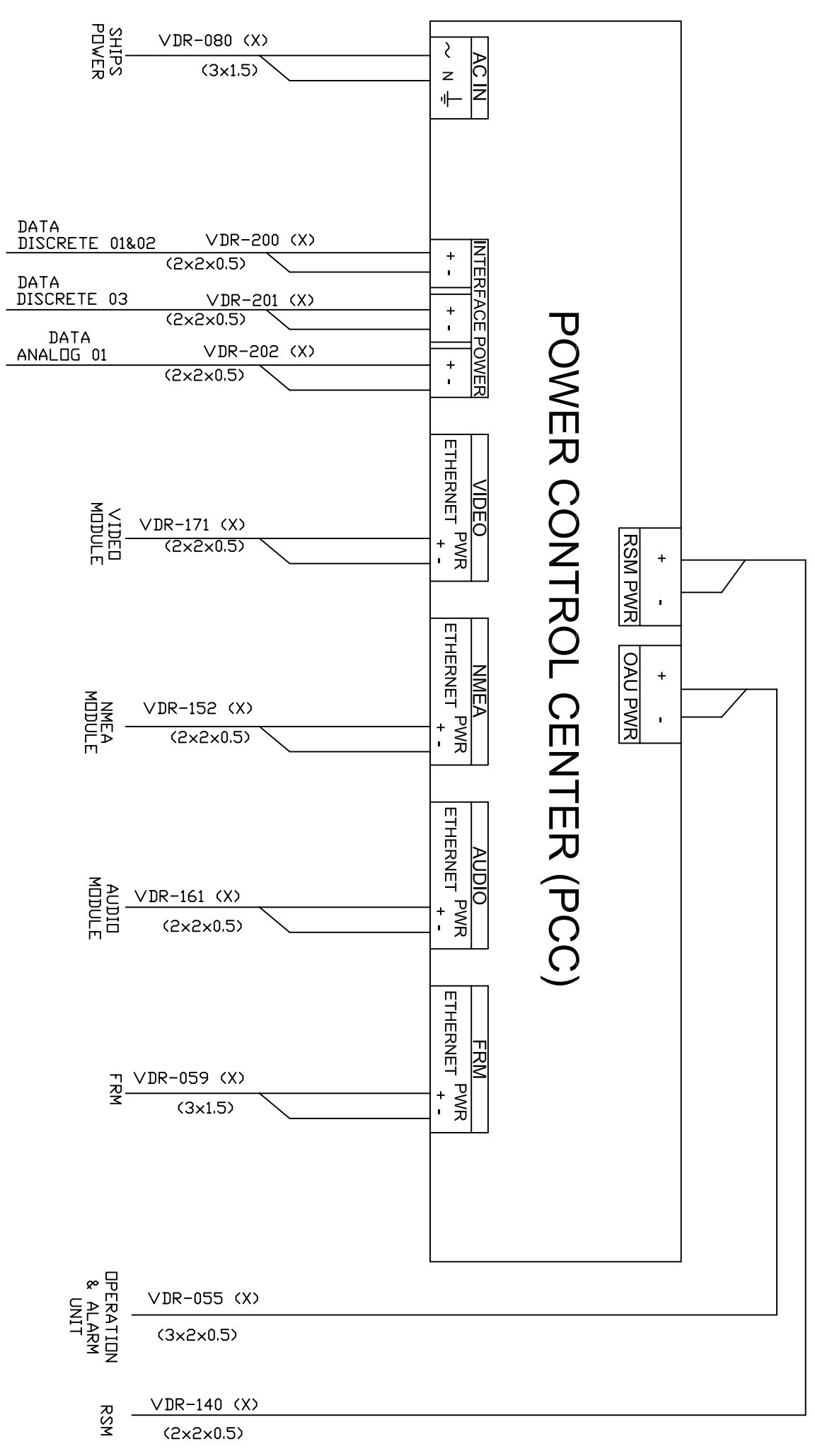
REV				DESCRIPTION				ROR				DATE				APPROVED BY							
1	APPROVAL DRAWING	5671		3628	04FEB04	I. ROBBINS																	
2	APPROVAL DRAWING	5671																					
TITLE																							
Data Discrete																							
DRAWN BY				M. DOUGLAS				ORIGINAL DATE				14MAR08				SCALE				NTS			
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				RUTTER															

Drawing Appendix

A B C D E F G H J K L M N P Q R S

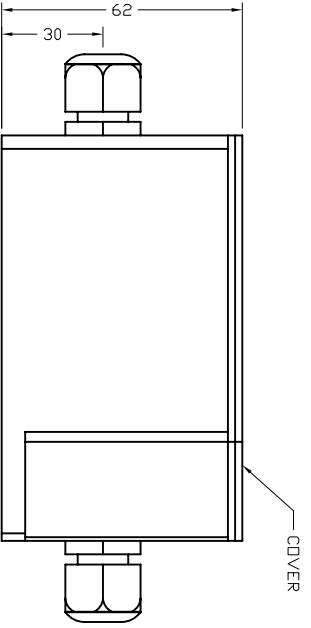
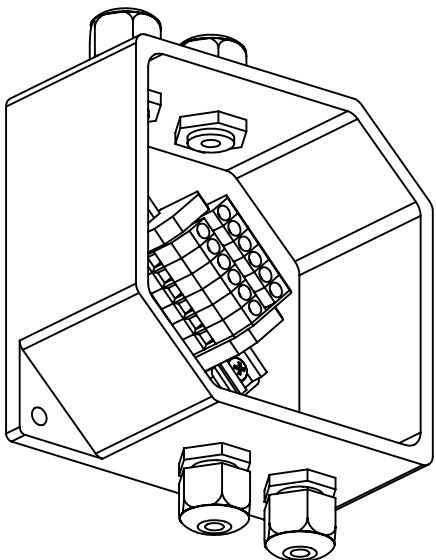
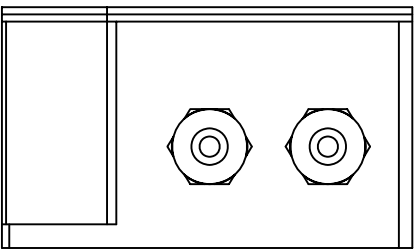
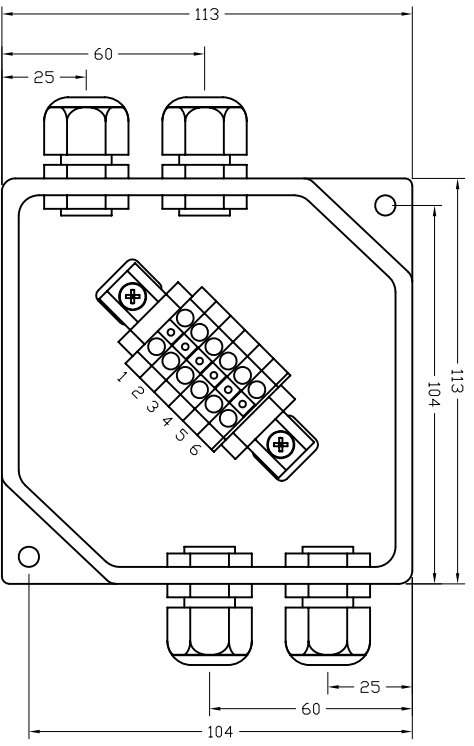
NOTES:
1. INDICATES THAT THESE CONNECTIONS ARE MADE DURING ASSEMBLY.

POWER CONTROL CENTER (PCC)



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RUTTER JOB #		DRAWING #		TITLE	
		E-IN-01498		DPU Power Connections	
DRAWING REV #		RCR #		DRAWN BY	
1		5379		M. DOUGLAS	
SHIP YARD		SHIP NAME		ORIGINAL DATE	
24JAN08				29NOV07	
APPROVAL DESCRIPTION		APPROVED BY		FILENAME	
DATE		DATE		NBXXXX_system_wiring_DPU_SDS_3A	
24JAN08		B. PITTMAN		RUTTER TECHNOLOGIES INC.	
				St. John's, NL A1E 4P3	
				Tel: 709-368-4213 Fax: 709-368-1337	
				SHEET	
				3	



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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

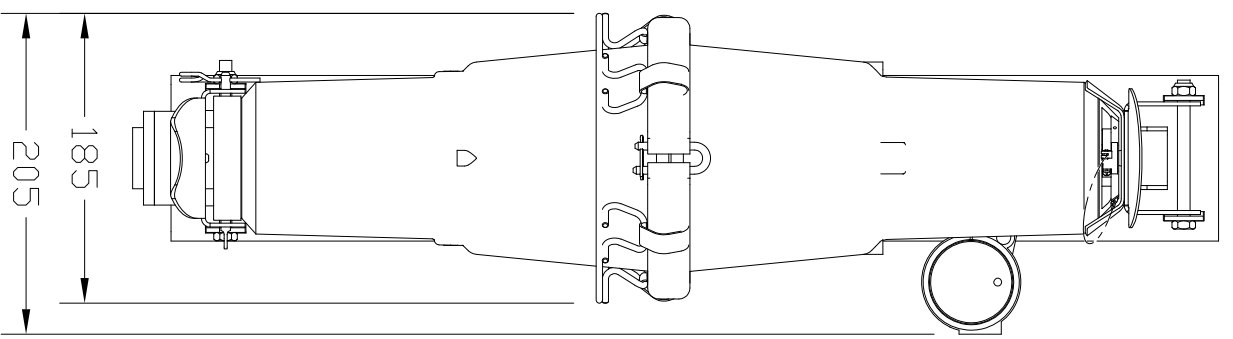
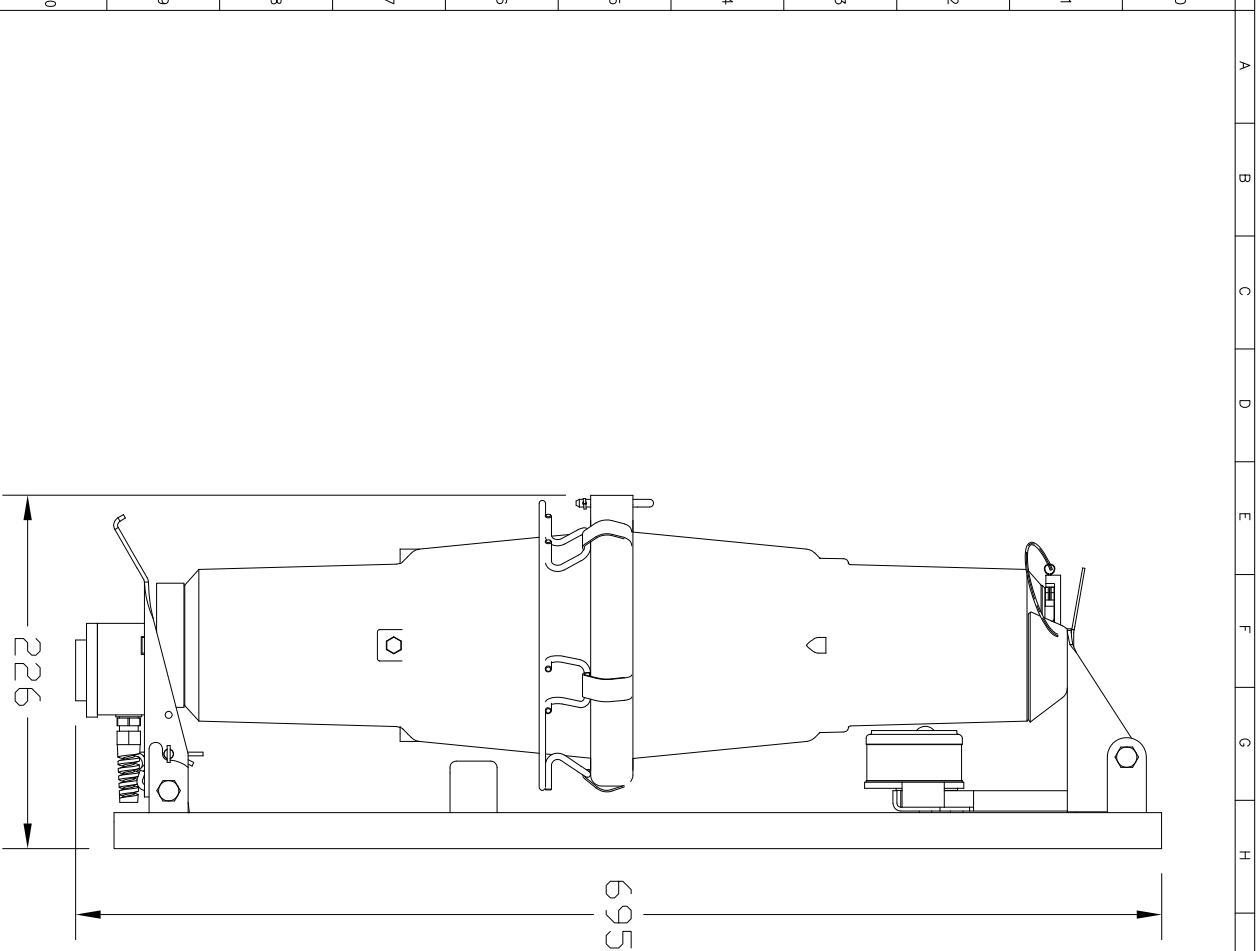
SCALE
NTS

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



REV	DESCRIPTION	ROR	DATE	APPROVED BY
2	APPROVAL DRAWING	5471	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	3987	23JUN06	C. YOUNG

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TITLE
Jotron Float Free Capsule in Bracket

DRAWN BY
M. DOUGLAS

ORIGINAL DATE
10JAN08

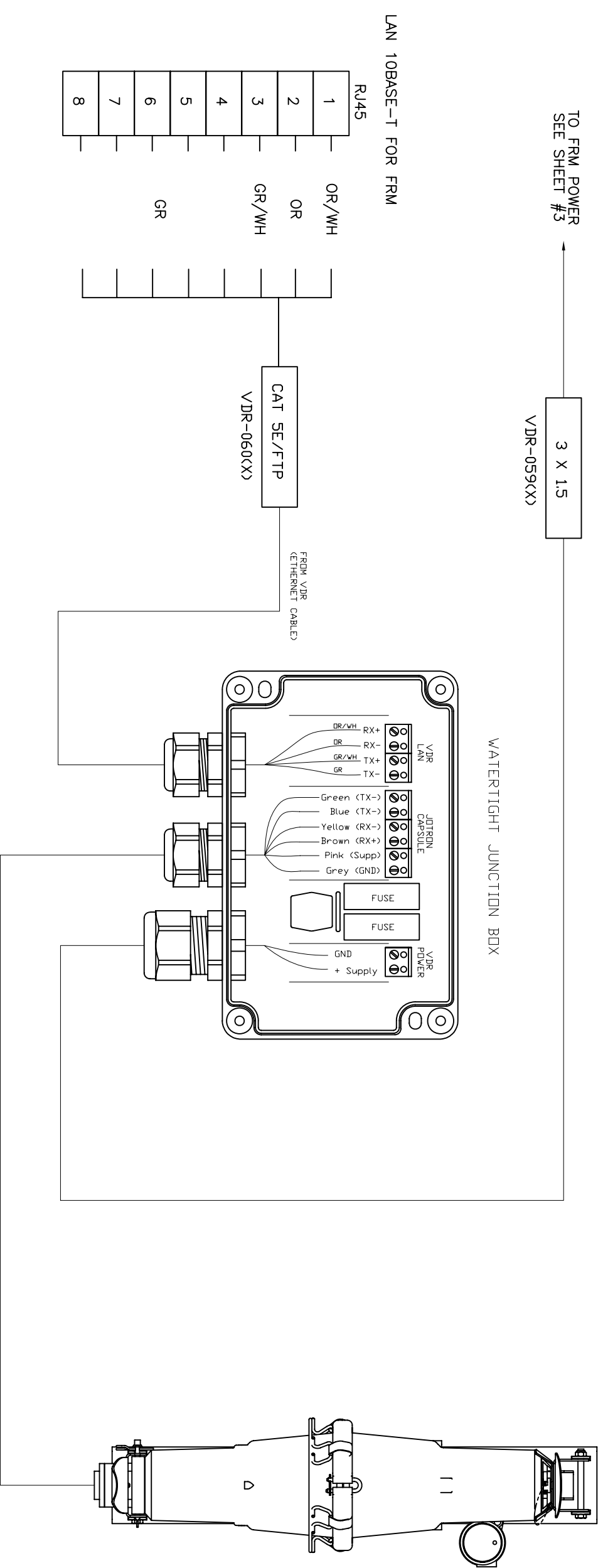
SCALE
NTS

DRAWING #
E-IN-01006

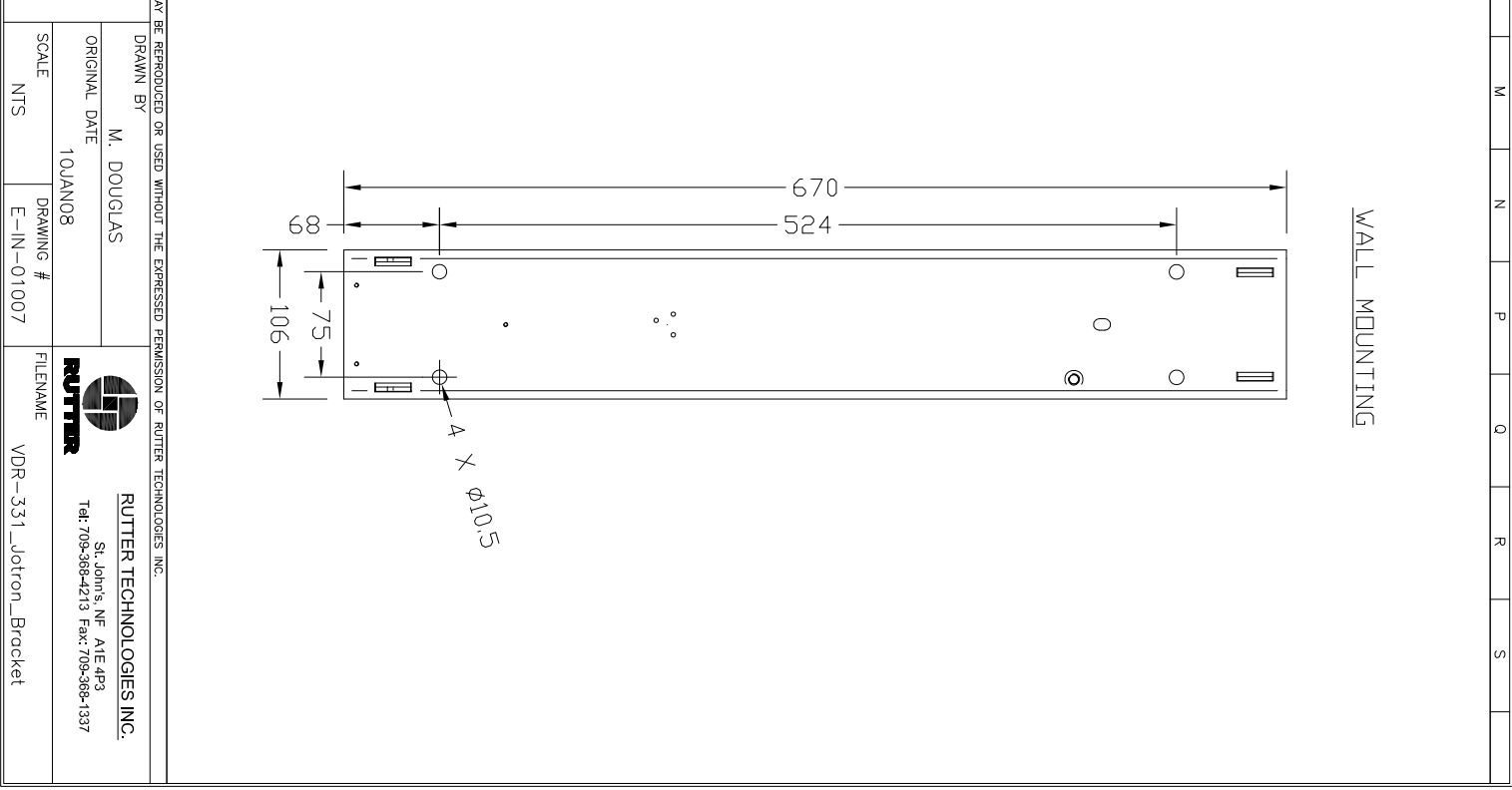
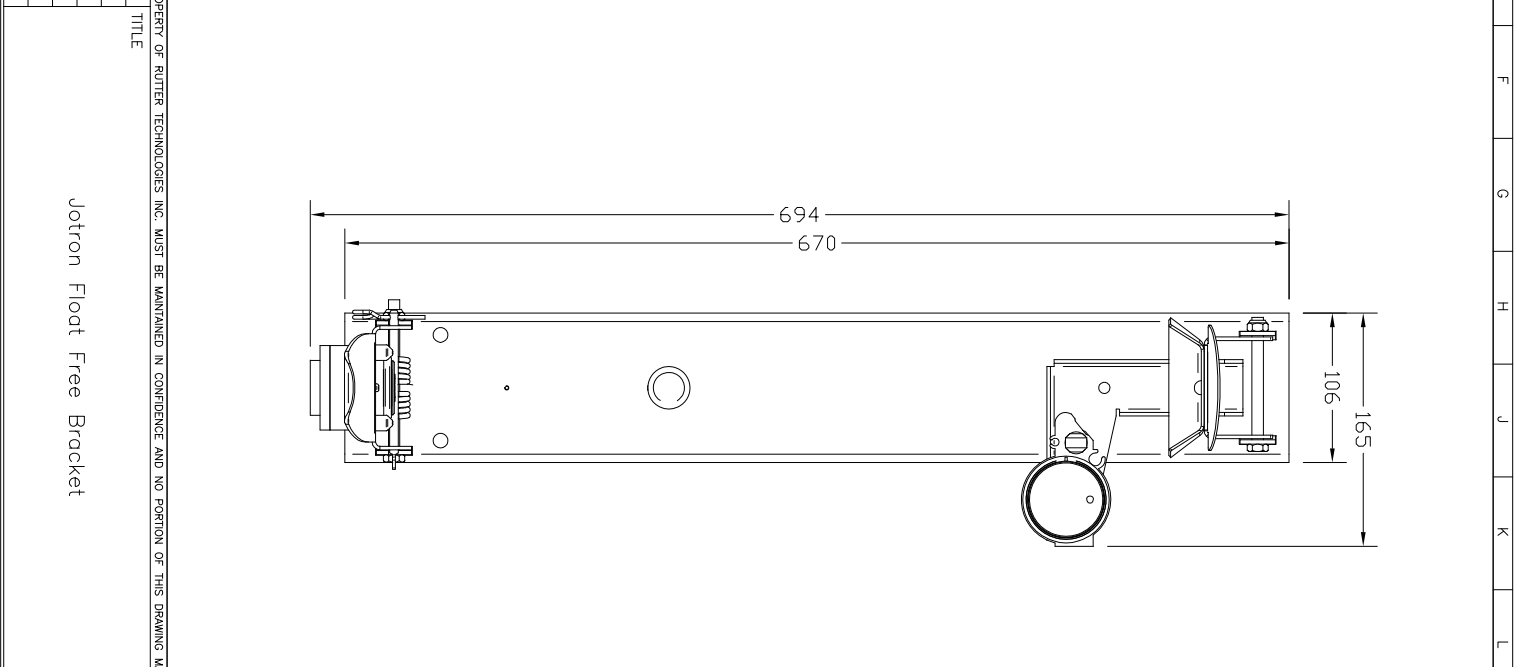
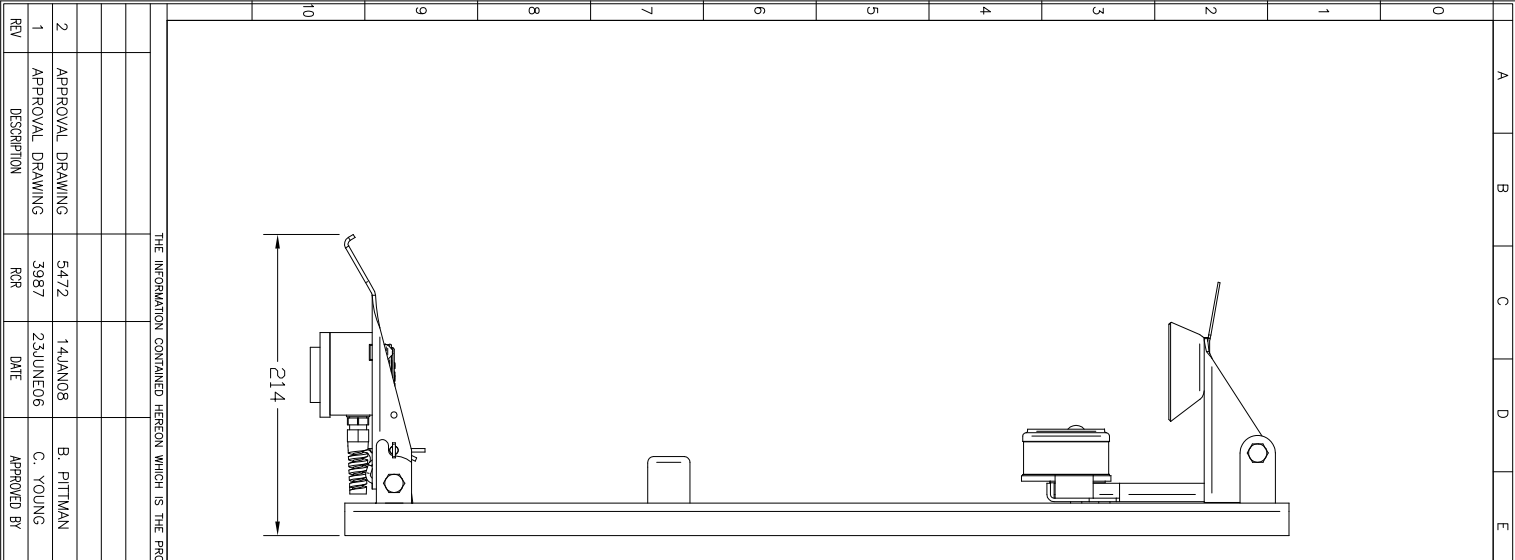
RUTTER TECHNOLOGIES INC.
 St. John's NF A1E4P3
 Tel: 709-366-4213 Fax: 709-366-1337

RUTTER
 VDR-330_Jotron_S-VDR_Capsule

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			

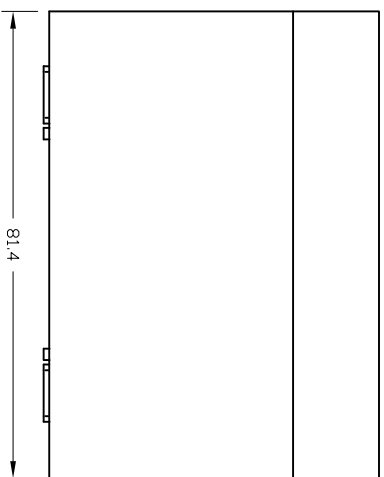
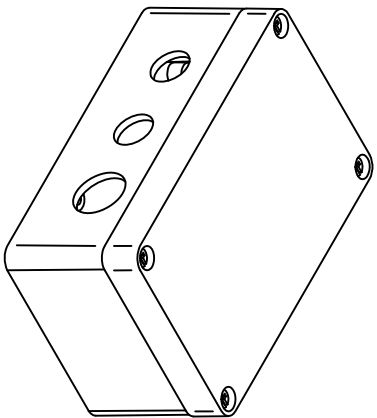
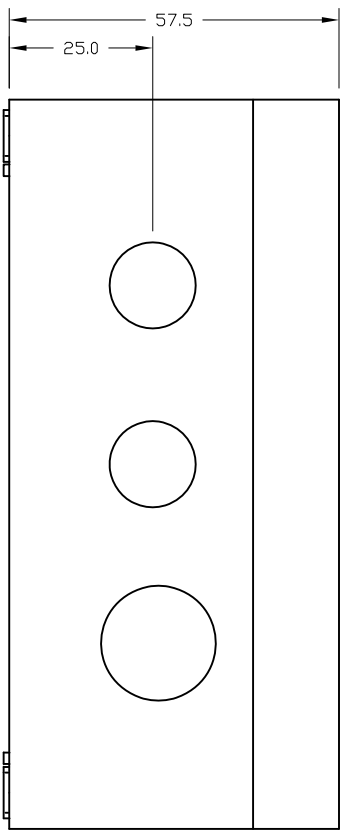
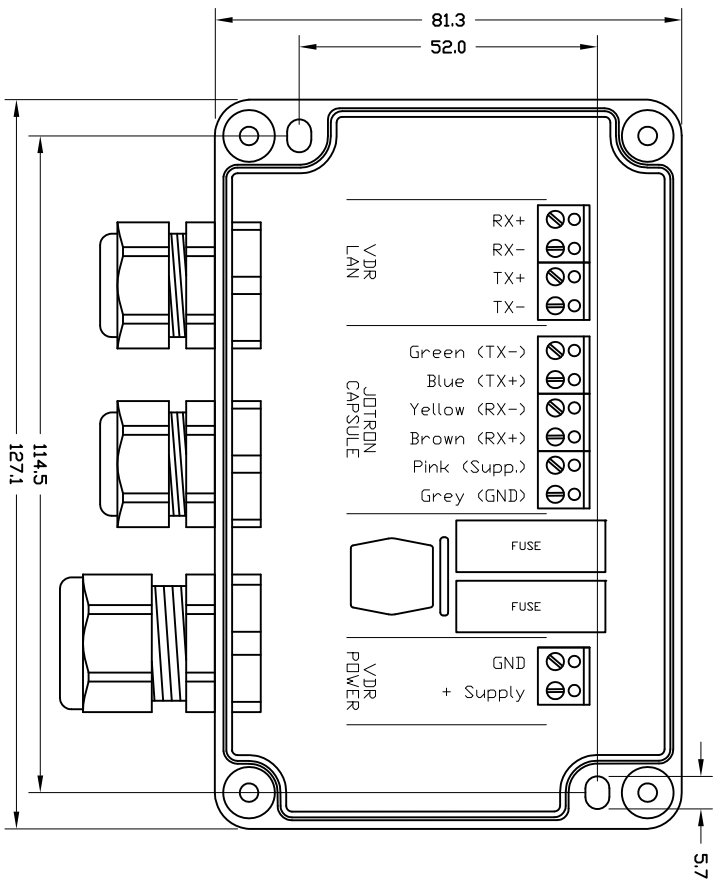


REV	DESCRIPTION	ROR	DATE	APPROVED BY
2	APPROVAL DRAWING	5472	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	3987	23JUN06	C. YOUNG

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TITLE
Jotron Float Free Bracket

DRAWN BY M. DOUGLAS		RUTTER TECHNOLOGIES INC. St. John's NF A1E4P3 Tel: 709-566-4213 Fax: 709-566-1337	
ORIGINAL DATE 10JAN08		FILENAME VDR-331_Jotron_Bracket	
SCALE NTS		DRAWING # E-IN-01007	



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TITLE

Jotron Junction Box

REV	DESCRIPTION	RCR	DATE	APPROVED BY
1	APPROVAL DRAWING	4565	16JAN07	B. PITTMAN
2	APPROVAL DRAWING	5473	14JAN08	B. PITTMAN

DRAWN BY

M. DOUGLAS

ORIGINAL DATE

10JAN08

SCALE

NTS

DRAWING #

E-IN-01153

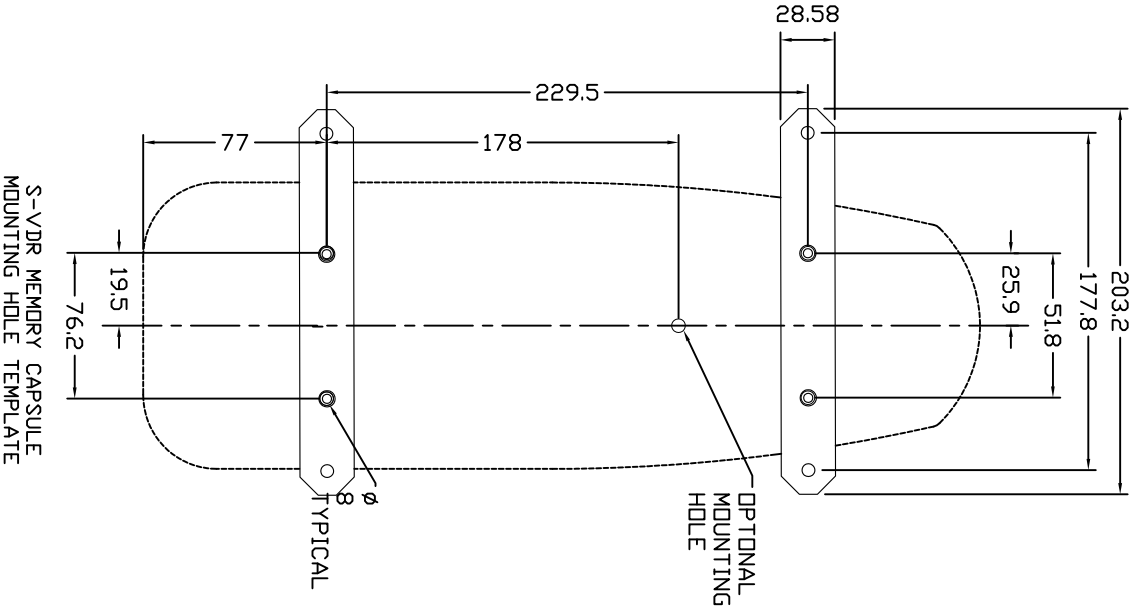
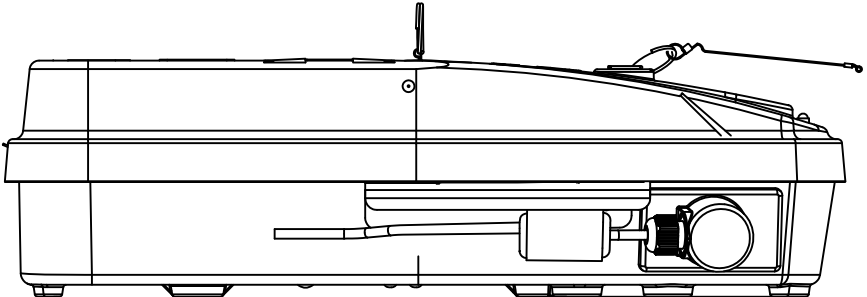
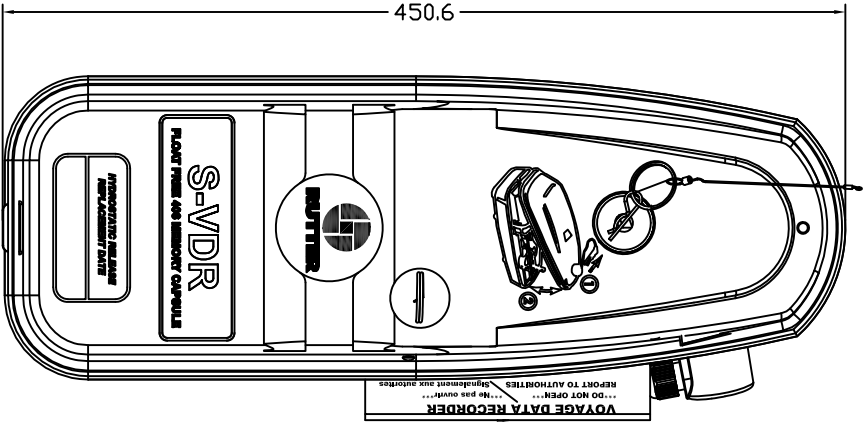
FILENAME

VDR-332_JOTRON_JIB



RUTTER TECHNOLOGIES INC.

St. John's, NF A1E 4P3
Tel: 709-368-4213 Fax: 709-368-1387



WEIGHT OF COMPLETE UNIT
WITH SEA SHELTER: 2690g ±50g

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REV	DESCRIPTION	ROR	OSDEC08 DATE	B. PITTMAN APPROVED BY
1	APPROVAL DRAWING			

TITLE
ACR Float Free


DRAWN BY
R. ANTLE-KING

ORIGINAL DATE
OSDEC08

SCALE
NTS

DRAWING # **E-IN-01721**

FILENAME **VDR-341_ACR_FLOATFREE**

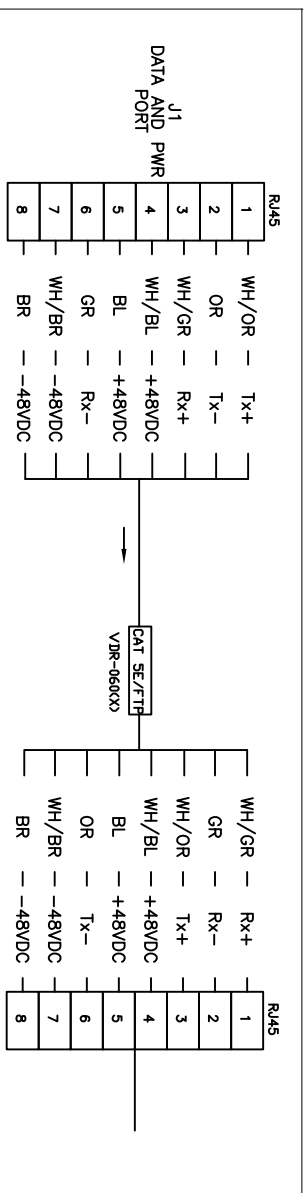
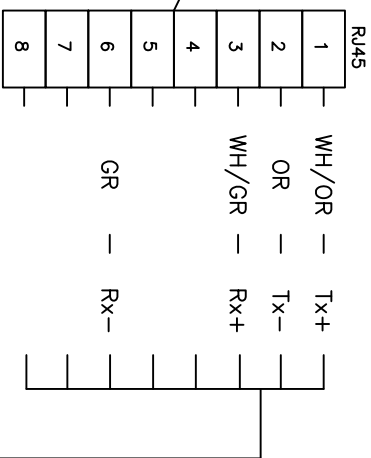
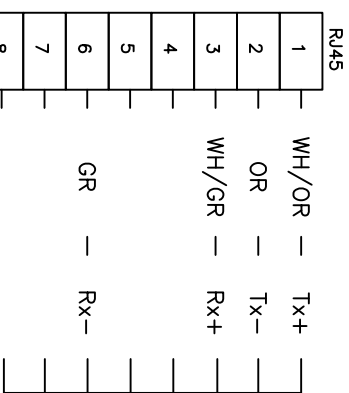
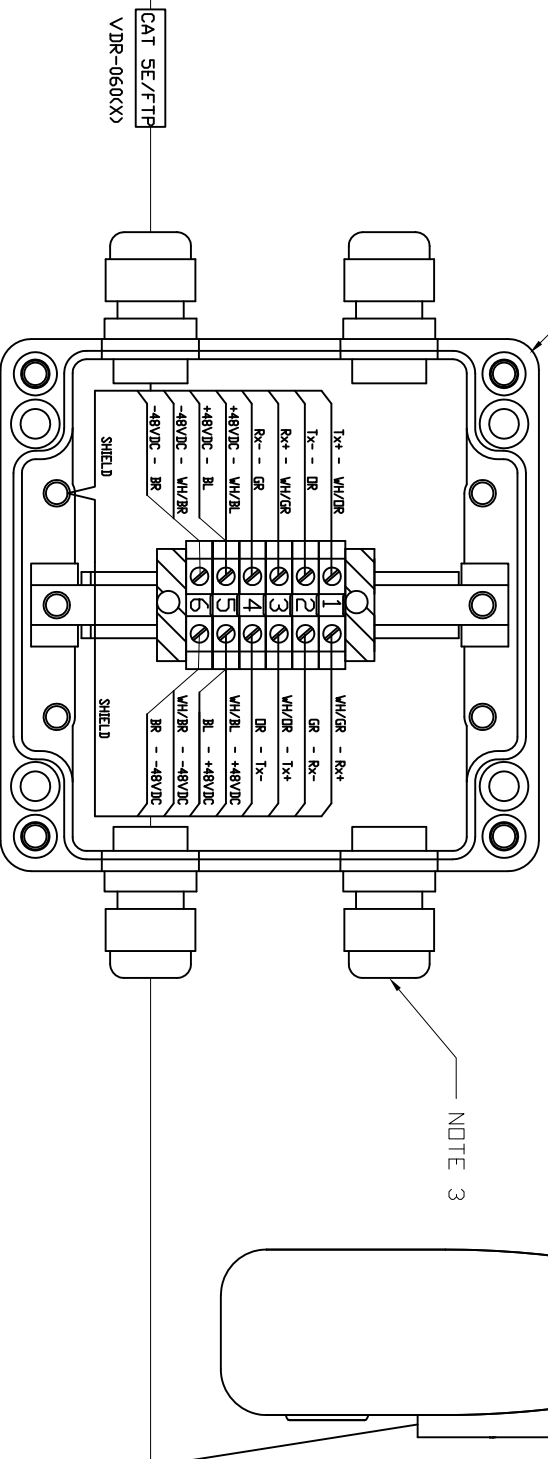


RUTTER TECHNOLOGIES INC.
St. John's, NF A1E 4P9
Tel: 709-368-4213 Fax: 709-368-1337

ACR PS-100 POWER SUPPLY BOX
TO BE MOUNTED INSIDE DPU

NOTE 1
JUNCTION BOX
(RUTTER SUPPLIED)

RUTTER FLOAT FREE
CAPSULE



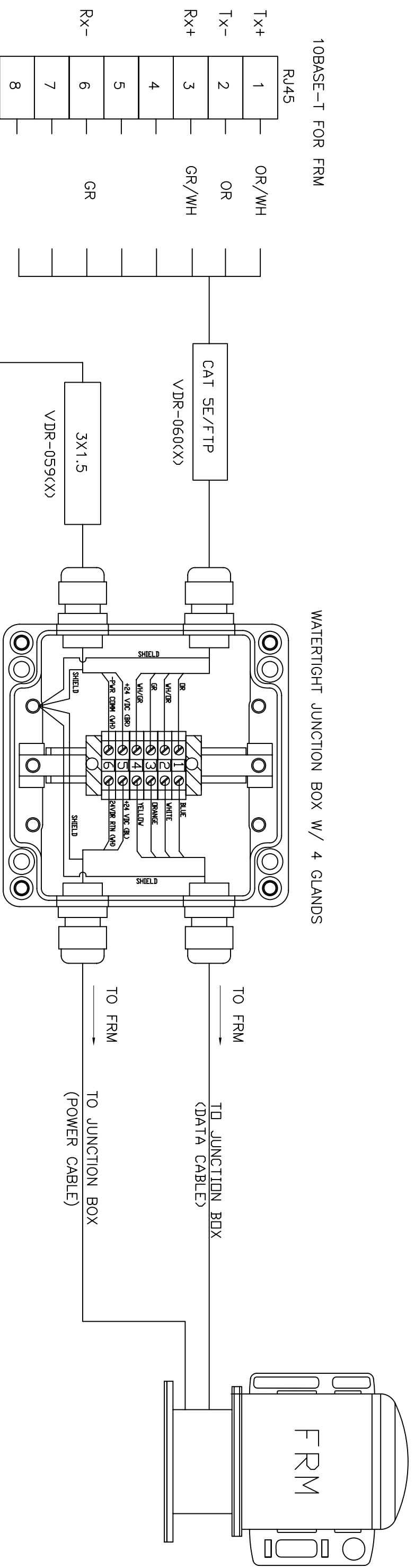
- NOTES:
1. VDR S/N 30108110376 AND ABOVE ARE SUPPLIED WITH A JUNCTION BOX.
 2. PREVIOUS TO VDR S/N 30108110376 ACR CAPSULES DID NOT REQUIRE A JUNCTION BOX. CONNECTIONS WERE MADE BY AN RJ45/CABLE GLAND ARRANGEMENT.
 3. UNUSED CABLE GLANDS ARE TO BE FILLED WITH ABS ROD (RUTTER SUPPLIED).

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REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	ORIGINAL DATE	FILENAME	SHEET
\$1	APPROVAL DRAWING	05DEC08	B. PITTMAN	1		20FEB08	NBXXXX_FRM_ACR_SYS_9B	9
				DRAWING #	TITLE	DRAWN BY	RUTTER TECHNOLOGIES INC.	
				E-IN-01722	ACR Capsule Connections	R. ANTLE-KING	St. John's, NL A1E 4P3	
				DRAWING REV #		NTS	Tel: 709-368-4213 Fax: 709-368-1337	
				1				
				RCR #				
				5477				

A B C D E F G H J K L M N P Q R S

NOTES:
 1. WATERTIGHT JUNCTION BOX IS TO BE USED IF FRM JUNCTION BOX IS MOUNTED OUTSIDE.



TO FRM POWER TERMINAL
 (SEE DRAWING #3)

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4	APPROVAL DRAWING	07OCT08	B. PITTMAN	RUTTER JOB #	DRAWING #	TITLE	DRAWN BY	FILENAME	SHEET
3	APPROVAL DRAWING	20MAY08	B. PITTMAN		E-IN-01526	Rutter FRM(RUT-02447) Connections	R. ANTLE-KING	NBXXXX_FRM_RUT_SYS_9A	9
2	APPROVAL DRAWING	14MAR08	B. PITTMAN	DRAWING REV #	RCR #		SCALE		
1	APPROVAL DRAWING	20FEB08	B. PITTMAN	4			NTS		
1	APPROVAL DRAWING	10JAN08	T. BARKER	SHIP YARD		SHIP NAME	ORIGINAL DATE		
REV	DESCRIPTION	DATE	APPROVED BY				30JUNE08		



**VDR-100G3/G3S Installation Manual
RUT-TD-10-001, Rev. 1.4
Revision Issue Date: 15 January 2009**

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