

# **BLUE OCEAN VDR / S-VDR**

## **Chapter 4 Installation**

## Purpose of this document

This document is a general description of the installation procedure and must be used as a guideline for the proper and more efficient installation of the BlueOcean VDR/S-VDR system. It provides the technician / engineer with detailed steps about the procedure but it does not go into technical details or datasheets. Instead, there are references to the additional documentation that accompanies the BlueOcean system.

The purpose of this document is to speed up the installation process and help the installers to avoid usual drawbacks and delays that are caused by minor errors in the installation sequence. For example, a misconnected cable or a badly positioned microphone will be easily handled when discovered at the right time. On the other hand, if such an error is missed it might cause the installers serious trouble both in time and effort in discovering and replacing it. At the end of their work the installers should present not only a fully functional, but also a well documented, well organized system that will be easily maintained and updated.

## Document Revisions

Revision No	Date	Description	Approved by
-	28/9/2006	Initial Document	H. Koukoutos
Rev. 1	16/12/2006	Capsule installation clarified	H. Koukoutos
Rev. 2	7/2/2007	Default Configuration added	H. Koukoutos
Rev. 3	9/7/2007	Changes needed for – plus models	H. Koukoutos

## 4.1 Pre-installation tasks

The first task is to open the BlueBox and identify that the necessary materials are all available.

### 4.1.1 BlueOcean Box contents

a BlueOcean rack with pre-installed software and hardware, consisting of the following:

#### Hardware

- a metal rack containing:
- the main unit with the monitor,
- the audio Mixer,
- the NMEA adapter(s),
- the microphone connection strip
- all the power and signal wiring connecting the above items, already installed,
- the Batteries,
  
- the Capsule,

#### Software

- the BlueOcean Software,
- the Siemens System Guard,
- a variety of helpful utilities to assist the installation and service of the system,
- the Acrobat Reader and the BlueOcean manuals in electronic form.

Interfacing to the various sensors required shall be in accordance with the relevant international interface standard, IEC 61162 series, where possible (see annex A). If ship's signals are not IEC61162, any interface units which may be required to convert non-IEC 61162 signals, shall conform to the requirements of IEC 60945. In all cases, any connection to any item of the ship's equipment shall be such that the operation of that equipment suffers no deterioration, even if the VDR system develops faults. All included interfaces conform to this requirement. Care should be taken when using third party interfaces and to cabling quality.

### 4.1.2 Tools

including:

- a Laptop with network + serial port or usb - serial converter,
- Cables,
- Spare parts,
- UHF transceivers,
- Digital camera for pictures of the installation,
- Mobile phone with GPRS connection for access to the internet.
- GSM modem

Check that the content of the Box agrees with the list above. In case of shortage of materials contact the COMAS offices immediately.

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#### **4.1.3 Pre-Installation Details**

In the documents accompanying the BlueOcean Box, there is a set of Forms that the installer must update during the installation process. At the end, they will provide all the necessary information about the specific elements of the systems configuration. Many of these forms will be filled with any available information up to the moment of the Box compilation. In this information you will find useful details about the specific vessel, the number and type of signals that need to be recorded and the type of electronic equipment that the vessel has.

## 4.2 Preparation

### 4.2.1 Signal Enumeration.

After getting familiar with the vessel and its areas you can go forward with the next step of the installation. The recorded signals have to be correctly enumerated and all the devices providing these signals have to be located and registered in the appropriate forms. Find the best sources for the mandatory signals depending on their functionality, timing, accuracy etc.

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Within the set of installation Forms find and update the forms containing:

- information about the Vessel,
  - a Preliminary list of recorded items for the specific installation.
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#### References:

*NMEA devices and signals: Hardware manual, 3.4 NMEA Concentrator, p3.18, 3.19.*

### Default configuration

The following tables show the default connections of the field signals. Start with this and modify only if necessary.

#### Serial Ports

Serial Port	Use	Configuration	Comments
Port 1	PLC		
Port2	unconnected		
Port5	USB, NMEA	19200	From NMEA signals, 7x4800
Port4	USB, NMEA	38400	For AIS
Port6	USB, NMEA	19200	If second NMEA is present

#### NMEA channels

Channel	Device	Data	Comment
Channel1	GPS	Date and time Ship's position	
Channel2	Gyro	Heading	
Channel3	Speedlog	Speed	If no speed log available use GPS (not really recommended)
Channel4	Echo Sounder	Depth	
Channel5	Anemometer	Wind speed and direction	
Channel6	Ruder controller	Ruder order	

		Ruder response	
Channel7	Engine Controller	Engine order Engine response	
Channel8	do not use	used for converter testing	
Channel9	AIS	AIVDO, AIVDM	port4, logical channel 9

#### 4.2.2 Capsule Installation

The next task is to locate a suitable location for the free-floating-capsule in accordance with the maritime regulations, the vessel's officers and the capsule's installation manual, and install it.

Please observe the following installation guidelines:

a) Sitting of the protective capsule:

The protective capsule shall be sited in the vicinity of the bridge on the external deck area of the vessel so as to maximise the probability of its survival and recovery following an incident. The capsule shall be positioned clear of rigging and other potential obstructions and as near to the centreline of the ship as practically possible.

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

- 1) Separation from fuel or other potential fire sources;
- 2) Separation from probable sources of mechanical damage;
- 3) Operational environment for continued serviceability;
- 4) Accessibility for copying of recorded data and for routine maintenance;
- 5) Facilitation of underwater removal and retrieval by both divers and ROVs. There shall be a clear unobstructed space in the vicinity of the capsule to allow an ROV or diver to work;
- 6) In the case of float-free configuration, minimisation of the risk of obstruction after release;

- 
- Install the capsule,
  - Find the appropriate Forms and fill them up with the requested info.
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References:

*Fixed capsule manual: L3 165M044820.pdf, L3 install.pdf*

*Free-Floating Capsule Manual: McMurdo C1 manual.*

#### 4.2.3 BlueBox Installation

Choose a proper location for the BlueOcean rack and its power supply. The basic requirements are:

- Sufficient space for handy installation and service.
- Suitable environmental conditions.
- In some cases the distance to the system's auxiliary units has to be taken into consideration (PLC boards, the capsule, the magnetic compass).

- Keep in mind that a considerable amount of cables will be connected to the BlueBox. The location you choose should offer the easiest possible access to the rear of the BlueBox and also the cable layout must be taken under consideration.
- be sure adequate illumination is provided in installation site, adjustable for night use. If not install proper light. This should have adjustable dimming from full brightness as it is to be used in conditions of varying ambient illumination.

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- Install the BlueBox,
  - Install its Power Supply,
  - Find the appropriate Forms and fill them up with the requested info.
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References:

*Hardware manual: BlueBox Main unit (3.1), Power Supply (3.2).Schematics: BlueBox.pdf, PowerSupplyBlock\_1.pdf.*

#### **4.2.4 Microphone Installation**

Choose location and number of microphones that are needed for a reliable sound recording in all designated areas. All the main command stations must be covered. Particularly, be sure that all the following are covered is present:

- centre line conning
- bridge wing(s)
- main radar
- chart table
- helmsman
- communication

Use the microphone phantom power supply that comes from the VDR (12V) to supply the microphones and then connect their output to mini-jacks and plug them into your laptop to conduct performance tests, before connecting to the VDR.

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- Install the Microphones,
  - Use FFT.exe or soundRecorder.exe to check microphones performance.
  - Relocate them if needed and repeat.
  - Find the appropriate Forms and fill them up with the requested info.
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References:

*Hardware manual:3.5 Mixer, microphone datasheet or wiring instructions, FFT utility manual: Software Setup, 5.4.3 Fast Fourier Transform Analysis.*

#### **4.2.5 BlueOcean Setup GUI configuration**

At this point the basic elements for the configuration of the system are known so run the program called SetupGUI. This program will assist in creating the system database and configuring it more easily and reliably.

Use the forms that you filled in the previous steps as references and transfer all the data into the program. Then you can attempt a test installation to double-check that the number of inputs of the PLC units is sufficient for the recorded signals.

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- Put the information into SetGUI
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- Check the system sufficiency by attempting a test Data Items connection.
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References:

[C5 - Software SetUp Manual](#)



## 4.3. Wiring

### 4.3.1 Laying out cables

Laying out the necessary cables is the most time consuming process of all. Attention has to be taken when choosing the cable routes. Try to avoid locations with increased electromagnetic noise to protect signal integrity. Use signal conditioners or signal repeaters when necessary to improve signal to noise ratio. Always consult with the vessel engineers to figure out the best possible routes for the system cables.

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The following sets of cables must be laid out:

- Cables for the digital and analog I/O.
- Communication and power cables for the capsule.
- Signal and power cables for the microphones.
- VGA cable from the radar.
- BlueOcean power connections.
- Put tags on the cables

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References:

*Hardware manual: BlueBox Main unit (3.1), Power Supply (3.2).Schematics: BlueBox.pdf, PowerSupplyBlock\_1.pdf.*

### 4.3.2 Initial Check of cables and connections

The purpose of this check is to make sure that the right cables are coming from the right places and that signal distortion is minimal or none and does not effect the integrity of the signal. Do not skip this procedure because it will be many times more time consuming to fix an error later on.

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- Confirm wiring is correct for the power, analog and digital cables.
  - Analog inputs might need voltage dividers or signal conditioners.
  - Use the laptop to check NMEA or serial signals and then connect to the VDR.
  - Check communication with the capsule.
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References:

*C5 - Software SetUp Manual: see description of utility blocks*

## 4.4 BlueOcean Hardware connections - Initial Settings

### 4.4.1 Switching BlueOcean to Service Configuration

At this point the BlueBox should be able to be powered and operate in Service configuration.

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The default configuration for security reasons will be the Normal configuration so the installer must switch to configuration mode, following the instructions in the *Boot-up procedure* Manual.

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References:

[Boot-up Procedure \(5.1\) in Software Setup Manual](#)

The default IP address of the BlueOcean is 192.168.10.111. Set the laptop's IP to a suitable value in the same sub-class (eg. 192.168.10.1) and connect it to the BlueOcean with a crossed network cable for peer-to-peer connection.

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- Transfer all electronic documents including the SetupGUI files, from the laptop into the BlueOcean. Use the directory "*C:/BlueOcean*" to store these files.
  - Run the SetupGUI program, already installed in VDR main unit.  
Make sure that all custom or optional signals are present,
  - Attempt a test configuration to make sure that the number of I/Os is sufficient. If not add PLC units, reconfigure and retest.
  - Update configuration along with the connection procedure.
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References:

[C5 - Software SetUp Manual](#)

### 4.4.2 Rack Connections

If, for some reason, it is more convenient to connect the signals in positions other than the ones defined in the SetupGUI then connect where it is more convenient and update the program definitions.

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Make Connections to the BlueOcean rack accordingly.

Keep record of the connections in SetupGUI and the installation forms.

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References:

[Hardware manual: see paragraph referencing each part](#)

### 4.4.3 System Database

The SVDR Recorder gets its settings from the system database "Blue.mdb". Unless this database exists and it is properly configured, the BlueOcean software will not work properly. Remember that the SetupGUI will require ALL mandatory signals to be interfaced in order to proceed to the system database creation.

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Check that all mandatory signals are connected.

Update the configuration in SetupGUI and create the system database.

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References:

[C5 - Software SetUp Manual](#)

## 4.5. Detailed System Configuration and debugging.

### 4.5.1 Test Signals and Connections

Before starting up the BlueOcean software for the first time the connections' integrity has to be checked once more.

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Use auxiliary programs like PLCcomms.exe, EvalSerData.exe, FFT.exe to check signals and connections.

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#### References:

*C5 - Software Setup Manual: see description of utility blocks: PLC, NMEA, FFT, Sound and Mixer, Video.*

At this point all the hardware connections and settings should be successfully completed. The BlueOcean rack may be closed. The rest of the work will be done through the BlueOcean software.

### 4.5.2 System Setup

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Update the system configuration with SetupGUI. The following items need detailed configuration:

- Digital I/O active state, ( Active High or Low )
- Analog input normalization, ( Ax + B )
- NMEA input check, (if the specific source does not meet the requirements use another source containing the same information).
- Video module setup,
- Sound module setup,
- NMEA modules' setup.

It is time to start the BlueOcean software for the first time. The proper way to do this is indirectly by starting-up the BlueOcean WatchDog.exe. Then you must provide the necessary password to gain administrator (Service) rights and be able to access the main unit environment. Once the SVDR Recorder form appears on the monitor the system is recording sound, video and all serial, analog or digital signals reaching its inputs. All that information is saved in two locations, the capsule (directory "E:/SVDR" or "E:\SVDR" and "F:/SVDR" in case of C1 capsule with 4 GByte capacity) and the man unit hard disk (directory "C:/SVDR"). The system log file is a text file located in the "C:/BlueOcean" directory and will be named in the form "yyyyMMdd.txt" where -yyyy- is the year, -MM- the month and -dd- the day of the current date.

A good practice from this moment and on is to have the SVDR Recorder up and playing as much as possible to have a good record of its state and functionality. This will probably be very useful in case you need to debug some kind of system error.

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Check the system date and time.

- Make test recordings.
  - Use the Player.exe to discover possible errors in the recorded data.
  - Make corrections and repeat.
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#### References:

[Software Setup Manual, 5.7 Player.](#)

### **4.5.3 Microphones' test Setup**

After the verification that the system is recording all the necessary data properly, it is time to setup the microphone testing unit. The BlueOcean software has a Fast Fourier Transform module that is capable of recognizing the microphones internal buzzer even when the surrounding environment is very noisy. With the proper settings as described in the manuals listed below the program should have no problem going through the microphone tests with no errors.

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- Perform the Microphone test.
  - Setup the microphone settings accordingly so that the test passes successfully in all cases.
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#### References:

[Software Setup, 5.4.3 Fast Fourier Transform Analysis.](#)

### **4.5.4 Remote Connection Setup**

The BlueOcean system can be accessed remotely for maintenance and service through a GSM modem connection or a Satellite phone. This is a very important functionality because it speeds up system maintenance and repair.

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- Place the SIM card into the GSM modem and check the remote connection. This can either be done through a mobile phone connected to the laptop or by the service team in the Comas offices.
- or  
Use the Ship's satellite phone after consulting the officers

Remote connection uses Microsoft Remote Desktop, documented in Windows XP Help.

### **4.5.5 Test Run**

At this point the system is fully configured. The best way to reveal possible malfunctions or configuration errors is by running the program for some hours before going ahead handing in it over to the ship's administration.

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- Test Run the program for a few hours and check the error log file.
- Use the maintenance forms available in VDR recorder form to check the system settings.
- Use the Player.exe to confirm reliable reception and recording of signals.

## **4.6. Run the system**

### **4.6.1 Switch to Normal configuration**

In order to guarantee system and data integrity the system must be switched back to Normal configuration before handed over to the captain. In normal configuration it is not possible for any user to change (intentionally or not) the system settings or recorder data. Remember to delete any temporary or test files and folders as well as any kind of assistance software that you may have used.

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Switch the BlueOcean software to Normal configuration. The system is ready for activation. Restart it. Once in Normal configuration the BlueOcean software will run automatically.

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#### References:

[Boot-up Procedure \(5.1\) in Software Setup Manual](#)

### **4.6.2 Personel training**

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Explain to authorized personnel the contents of Normal Operation manual. Demonstrate all functions.

Explain to the officers that could stand watch the User's Manual. Explain action to be taken on alarms.

## **4.7 Hand over**

Fill the "Ship Data" configuration sheet used in SVDR installation. A copy should be left in the documentation remaining in the ship and a second should be returned to the company.

Sign the form and hand to the ship's master. Ask him to sign the acceptance form – the copy of Ship's Data to be returned to the company.

Be sure that you have recorded all the setup information in paper or electronic form. That is crucial for the maintenance.

Hand over the manuals to the designated officer.

Hand over the passwords to the captain or to the officer he instructs to. Record the names of all officers responsible for the operation of the system: thus we will avoid giving sensitive information to the wrong persons.

## McMurdo capsules – installation and programming

### Hardware installation

Please refer to the capsule manual!

Install the capsule on an appropriate position on the deck.  
Connect the cables, as shown in the diagrams in the manual.

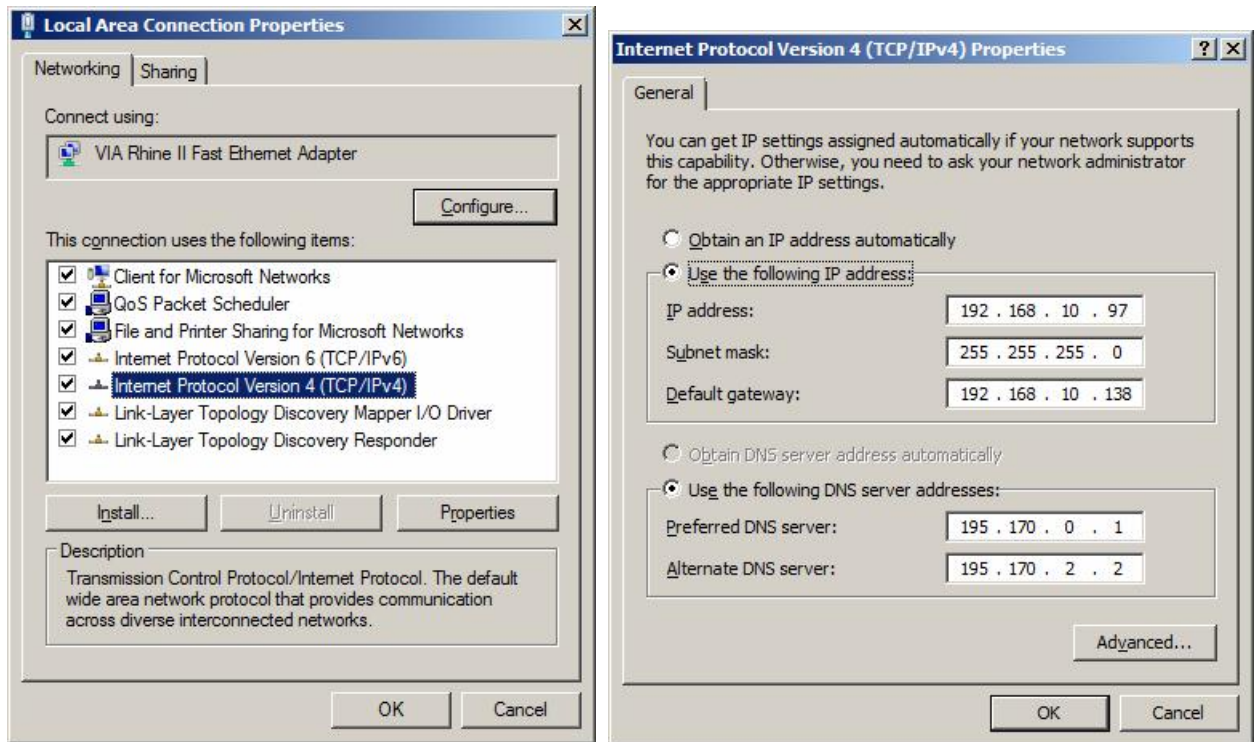
Connect the capsule supply cable and the Ethernet cable to the SVDR. See relevant photos.

- McMurdo as a network drive

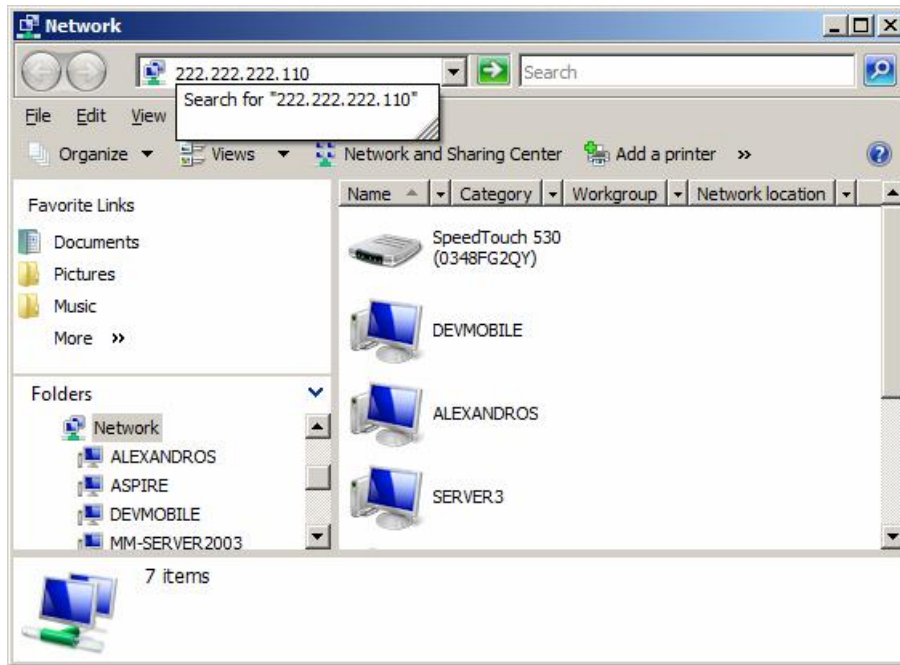
The McMurdo capsule looks to the system as a network drive. The Blue Ocean SVDR is set to automatically detect a McMurdo drive. If a need arises to change or test the configuration:

This is the way to test a McMurdo Capsule:

a. Check the PC IP address. If it not in the 222.222.222.xxx range, set the IP address of the PC to 222.222.222.38 (Control Panel->Network->TCP/IP properties)



b. Open Windows explorer. Set address to look at 222.222.222.110. This is the McMurdo address. You should see a server named s-cdr\_ffc with one (2 GByte capsule) or two drives(4 Gbyte capsule), disk1 and disk2



- c. Map e:\ to disk1 and f:\ to disk2 (or to disk1 if there is no disk2)
  - d. create an SVDR directory to all available drives
- If all above work without problems you have a good capsule installation!

After successful installation the capsule **MUST** be programmed with ship data.  
Never program a McMurdo capsule under the sun. The light blinds the photodiode.  
Following are the McMurdo instructions:

## Capsule Programming

### Important

Install the EPROG5 program only from a Windows user 'Administrator' account. Install the USB light pen driver and pen hardware, as detailed in annex 1.

Run the Capsule programming software from the desk top icon.

**Stage 1**, set the Beacon programming information;

- 1/ Serial number must start 300
- 2/ Serial number second part must be taken from the label on the top cone of the Capsule, in this example serial number 00192
- 3/ Enter vessel name
- 4/ Select appropriate country code according to vessels MMSI number / flag
- 5/ Enter remaining 6 numbers of vessels MMSI
- 6/ Set ID number of Beacon, (2 if the vessel already has 1 EPIRB)
- 7/ Leave protocol set as 'Standard' unless otherwise requested by vessel flag state authority.
- 8/ Enter the battery expiry date indicated on the lower capsule body

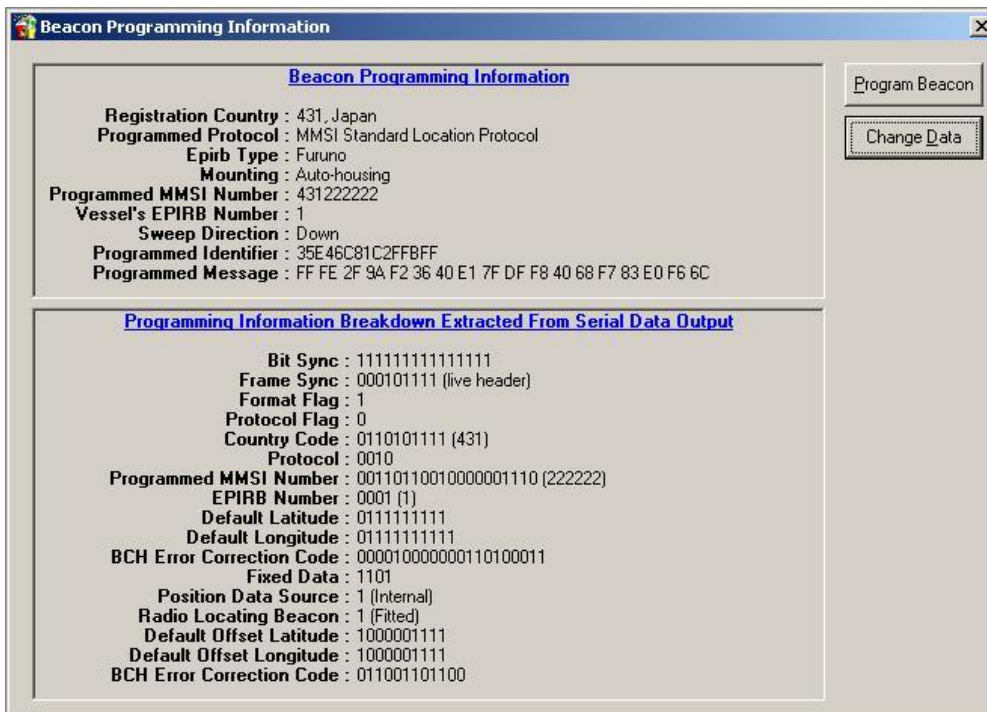


**Stage 2,** Use the options menu to select the COM port allocated by the PC to the USB programming pen.



Note. Advanced options should be left un-ticked

**Stage 3,** Select 'Program Beacon' to verify the data is correct.

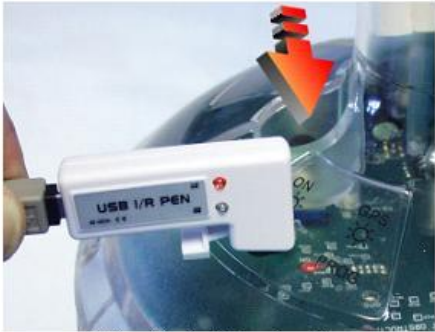


Review the information provided, if correct select 'Program Beacon' and follow the information on screen. Or 'Change data' to return to the previous menu.

**Stage 4**, follow the on screen programming instructions (below).

**Beacon Programming Instructions**

### PROGRAMMING INSTRUCTIONS

1. Hold the programming pen over the programming window on the beacon top cover as shown below.  


Click and drag handles to resize picture
2. Press and hold the 'Test/Off' button (arrowed above) for at least 4 seconds. The **RED** LED will come on.
3. Programming is complete when the **RED** LED starts flashing, and remains flashing for more than 10 seconds with the white strobe light **OFF**.
4. Click on the '**Pass**' button to indicate to the software that the programming was successful.
5. Programming has failed if the **RED** LED goes off **or** the white strobe begins to flash.
6. Click on the '**Fail**' button to indicate to the software that the programming failed.

-oOo-

PASS

FAIL

Data I/O  
Tx

Note. Typically, the time period between stage 2 and 3 is very short, once the RED LED starts to flash the programming is successful.

**Stage 5, Select label and document print options**



Print labels and documents directly to paper or were supported by the PC to a PDF file for later printing. Printing by laser printer is recommended to minimize any later water damage.

The capsule programming identity label should be prepared and applied under the clear self adhesive 'Dome clear overstick label' part 36-134 (supplied with Capsule).

Refer to VR-3030 operation manual for further information.

**Anex1.****Instructions for installing the USB Beacon Programming Pen in Windows XP**

The USB programming pen drivers must be installed by an administrator, or a user with administrator privileges.

The installation process is in two steps, the Windows "Found New Hardware" wizard will run twice, once for the interface drivers and once for the programming pen itself.

**Stage 1,** To install the programming pen, connect the USB programming pen to the PC - the Windows "Found New Hardware" wizard should start.

1: When the wizard asks "What do you want the wizard to do ?", select the advanced option labelled "Install from a list or specific location (Advanced)", and then click "Next>".

2: Select the "Search for the best driver in these locations." option.

3: Un-check the "Search removeable media (floppy, CD-ROM...)" check box so that the option is not selected.

4: Check the "Include this location in the search:" check box so that the option is selected.

5: Click "Browse" to find the location of the CD-ROM drive that has this CD in it and then click "OK".

6: Click "Next>". The wizard will begin to copy the drivers.

7: If a message about Windows Logo testing appears, click "Continue Anyway" to finish loading the drivers.

8: Once the drivers are loaded click on "Finish".

Stage 2, The Windows "Found New Hardware" wizard will automatically start.

1: When the wizard asks "What do you want the wizard to do ?", select the advanced option labelled "Install from a list or specific location (Advanced)", and then click "Next>".

2: Select the "Search for the best driver in these locations." option.

3: Un-check the "Search removeable media (floppy, CD-ROM...)" check box so that the option is not selected.

4: Check the "Include this location in the search:" check box so that the option is selected.

5: Click "Browse" to find the location of the CD-ROM drive that has this CD in it and then click "OK".

6: Click "Next>". The wizard will begin to copy the drivers.

7: If a message about Windows Logo testing appears, click "Continue Anyway" to finish loading the drivers.

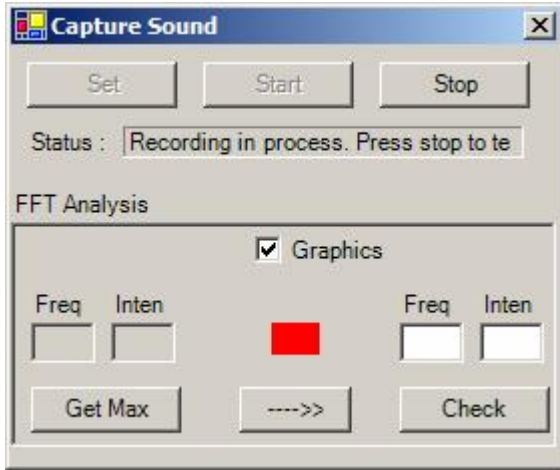
8: Once the drivers are loaded click on "Finish".

THE USB PROGRAMMING PEN IS NOW INSTALLED AND IS READY FOR USE.

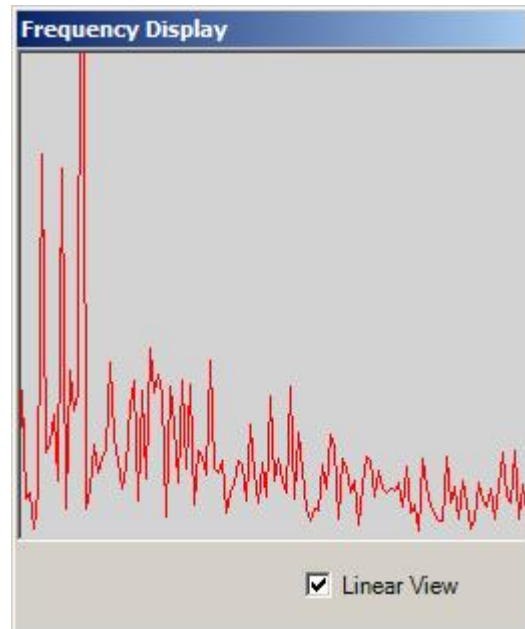
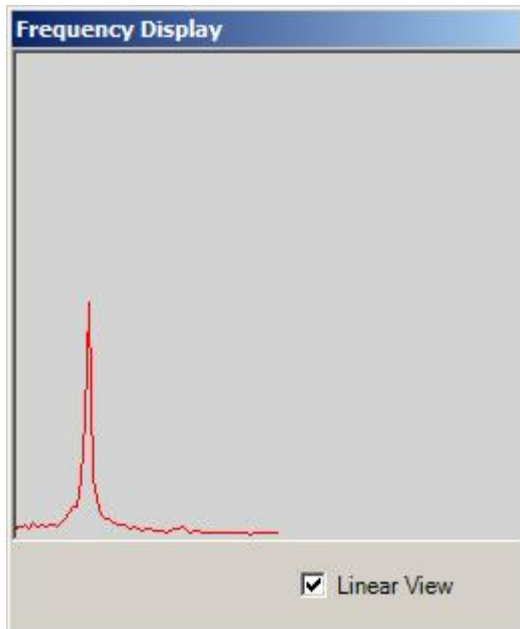
Windows will automatically assign the next available COM: port number to the programming pen. In most PCs this is either COM3 or COM4, however the exact number will depend on how many COM: devices you have installed already.

### Sound Setup

From the Maintenance->Sound menu open sound control and start it, if it not already started. Click graphics.



Speaking with normal but commanding voice observe frequency display. At the right you see the normal display.



This is too low, and at the right is too high.

To adjust the levels, open the mixer cover removing the 4 screws. See next page for a description of the controls.

