BLUE OCEAN VDR / S-VDR

Chapter 5
Software Setup

5.1   BOOT-UP PROCEDURE

The following text describes the proper procedure of starting up the main software modules that control the Blue Ocean VDR / S-VDRsystem.

S-VDR Configurations
There are two different configurations that the S-VDR PC may be configured to:
-         The **Retail** configuration which is the complete-installation-at-the-end-user configuration. In this state, every time the PC reboots, it will automatically log in, then lock itself to become inaccessible for any unauthorized users and then start the PROGRAM. In this configuration the only way to unlock the standard operating system graphical user interface is by providing the correct password to one of the PROGRAM modules called **WatchDog.exe.** (Instructions on how-to-unlock-the-system are given below in the WatchDog.exe description).
-         The **Service** configuration, where the PC will not log in automatically but instead it will display all the available users and demand from the user to make a selection and provide the correct password. The user **Admin** requires no password and may be accessed from any user. After booting the system should be started indirectly by starting the peripheral module **WatchDog.exe.** (Instructions on how-to-unlock-the-system are given below in the WatchDog.exe description).

Switching from Service to Retail configuration.
When the installation or testing of the system has finished it must be put into the fail-safe and intrusion-safe Retail configuration. In order to do that, follow the next steps:
-         Log in as the default user called **Admin**.
-         Delete all other users leaving only the user **Admin**.
-         If Admin has a password, clear it. This way the system whenever it reboots it will immediately load the user Admin and will demand no password.
-         Go to **Start/Run** and execute the OS program called **MMC**.
-         In the MMC/File menu select **Add/Remove Snap-In**, on the following window select **Add,** on the displayed list select **Group Policy Object Editor,** select **Add, Finish, Close**, and **OK** in the remaining windows respectively.
-         In the **Local Computer Policy Tree** go to: **User Configuration/Administrative Templates/System**. Double click on the **Custom User Interface** property and change its state to **Enabled.** In the small edit box labelled **Interface file name** write: **C:/BlueOcean/WatchDog.exe.**

Software System Description
The software is based on three different application programs.
-         **BlueBox.exe**: This is the main program that is responsible and it is providing all the VDR/S-VDR functionality of the system. Needles to say this application is absolutely critical for the system's performance.
-         **RunFolderManipulation.Exe:** This application is handling the free space of the recording devices (hard disk, capsule disk). It scans both disks in regular intervals and cleans up the oldest data files always leaving a minimum free space available for writing. This application is critical to the system's performance.

- **WatchDog.Exe:** This application is an intentionally simple thus steady program that monitors the state of the previous two critical applications. Its purpose is to diagnose their condition and if it decides that one or both of the above applications is not responding properly (or it does not even exist) it will restart it. The activation intervals are the following:

Start up interval for PROGRAM if it not running at all: 20 secs,
Start up interval for RunFolderManipulation if it not running at all: 10 secs,
Restart interval for PROGRAM if it not responding: 30 secs,
Restart interval for RunFolderManipulation if it not responding: 90 secs.

When the **WatchDog** runs in normal mode (default) the Task Manager is locked and no unauthorized user can access the system or its functionality. In order to gain access the service engineer must select the mode **Super User** and provide the proper password to unlock this mode.

Immediately after the program switches to Super User mode the Task Manager will be unlocked and the authorised user may now start the Explorer.Exe through the menu **Start/Run/Explorer.Exe.**

The Super User can prohibit the WatchDog from constantly restarting the critical applications by unselecting the **Respawn S-VDR** label. When exiting, the WatchDog automatically locks the Task Manager. To prohibit that select the **Set Exit Without Locking** label.

5.2   SETUP GUI (Graphical User Interface)   MANUAL

Purpose

The VDR / S-VDR can accommodate a variety of *Data Items* and configurations. All the necessary settings for a specific installation are kept in a separate database allowing the technical staff to update the setup configuration whenever there is change at the ship hardware.

The purpose of the Setup Program is to speed up the configuration of the S-VDR system by speeding up the configuration of the database. It helps build up a graphical description of the physical connections of the system and then configure each item on the graph according to the installation specifics. It is absolutely essential that all the information passed to this program represent the physical connections of the system otherwise the S-VDR will not operate properly. In other words every graphical representation must correspond to an actual physical connection, a cable, a wire or a plug. The program will export all this information to the installation database.

5.2.1 DESCRIPTION OF THE VDR / S-VDR HARDWARE

DATA RECORDER
The term *DataRecorder* is used to represent the S-VDR Main Unit. The setup program displays only the parts of the *DataRecorder* that it is interested in, so do not be puzzled if essential units such as the system screen or the Float-Free Capsule do not appear on the graphical description of the system. Only units that need to be configured separately at every new installation are displayed here. The *DataRecorder* appears in the *Configuration Window* at the root position of the graph and is always drawn in Black color.

Properties *:*
-     *Name*   : This is the mnemonic name of the unit and may be changed freely by the installer.
-     *Comments*   : Any kind of comments for the specific unit may be added here.

These two properties are common for all the graphical items used in this program and have exactly the same meaning wherever met. For this reason the description of these two properties of other items will be skipped.

PORTS
The S-VDR main computing unit communicates with most of its external modules through serial ports which in this text will be called "Ports". When a serial port is presented with black colour it is unconnected and available for connection to a serial device. When it is presented with grey colour the port is already used (as in all cases where an item appears in grey). If all ports are used and more devices need to be connected, more ports have to be added to accept these devices.

Note   To get details about the number and type of the Serial Com ports of your system go to:
           "**Start / Settings / Control Panel / System / Hardware / Device Manager / Ports COM & LPT**".

Ports

To physically install more serial ports to the system consult the S-VDR Technical Manual.
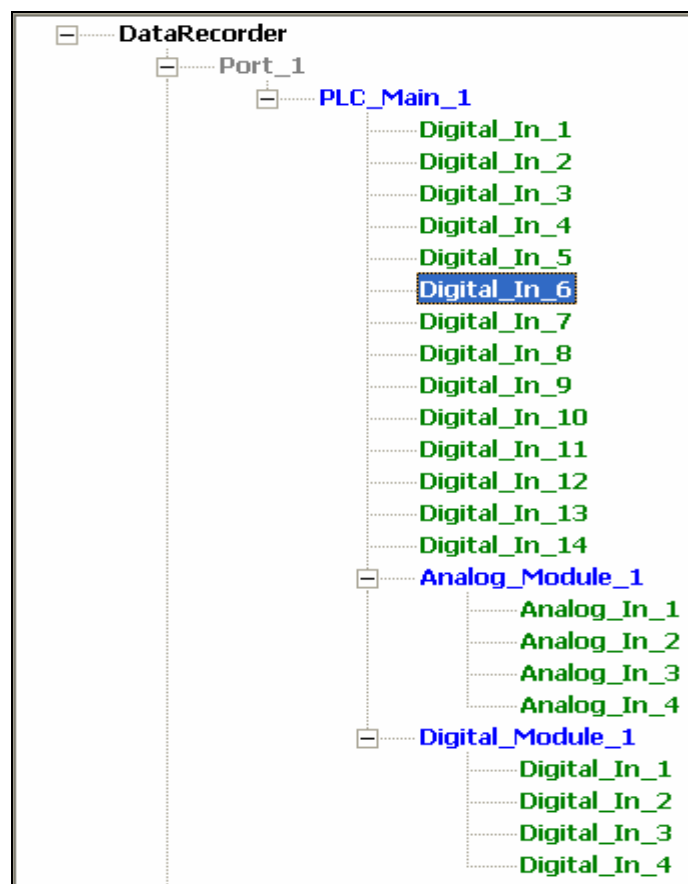
Properties :
-     *Com Port*   : This is the serial com port which this Port represents.
-     *Baud Rate*   : This the desired baud rate of the serial com port. Use the baud rate of the physical device connected to the port to achieve proper communication.

PLC
The PLC (Programmable Logic Controller) is connected directly to the serial port and can accept a variable number of modules according to its type and model. For this reason the number of PLC (or PLC module) inputs may be easily changed from the corresponding property on the property window. All PLC units and their modules are coloured in blue to distinguish them from other items.

Properties :

-	*Address*	: a unique address to identify the PLC.
-	*Analogue Inputs*	: the number of analogue inputs of the PLC. It can be changed at anytime simply by updating the number from the *Properties Window.*
-	*Digital Outputs*	: the number of digital outputs. It may be updated.
-	*Digital Inputs*	: the number of digital inputs. It may be updated.

PLC Module

ANALOG PLC MODULES
This is not a stand-alone unit. It is an add-on to the main PLC and for this reason it appears as a child node of the main PLC. Up to seven modules may be added to the each main PLC unit.

Properties :

-	*Analogue Inputs*	: the number of analogue inputs of the PLC. It can be changed at any time simply by updating this number from the *Properties Window.*

DIGITAL PLC MODULES
This is not a stand-alone unit. It is an add-on to the main PLC and for this reason it appears as a child node of the main PLC. Up to seven modules may be added to the each main PLC unit.
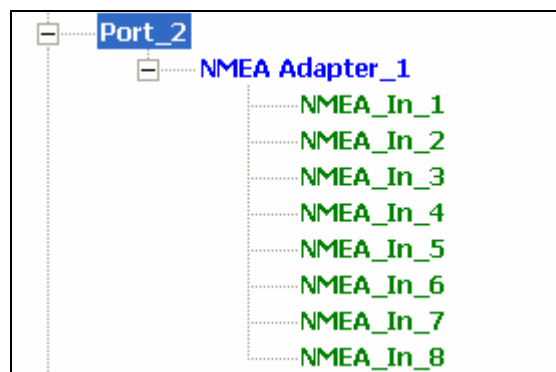*Properties :*
- *Digital Inputs* : the number of digital inputs of the PLC. It can be changed at anytime simply by updating the number.
- *Digital Outputs* : the number of digital outputs of the PLC. It can be changed at anytime simply by updating the number.

NMEA ADAPTER MODULES
The NMEA adapter modules are serial multiplexers with multiple inputs and one output. The data reaching its inputs are grouped and transmitted consecutively through its output. Furthermore this unit will only retransmit the legal NMEA data strings. The single output has to be much faster than the inputs in order to transmit all the incoming data. The output speed of the NMEA Adapter modules is at least 19200bps while the NMEA signals according to their standard are communicating in 4800bps and for this reason NMEA *Data Items* can be perfectly handled by this module. Connect all NMEA data sources or other serial sources with similar baudrates (4800bps) to the NMEA Adapter modules.

**Note** Use the NMEA setup program to observe the incoming data.

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8 - input NMEA Adapter Module

Properties :
- *Channels* : the number of serial inputs. It depends on the type of the NMEA Adapter module and for the moment it cannot be changed.

SERIAL MODULES
A serial module appears to be similar to a port, that is, a serial communication port. In reality though, it is a software module designed to process incoming data and for this reason, it is represented separately by the program. In case a serial device does not use the standard NMEA 4800bps baud rate or does not follow the standard NMEA protocol, connect it to a serial module. Serials modules can have baud rates as high as 1Mbps. For more details check the S-VDR Technical manual.
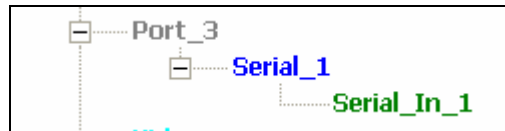
Serial Module

VIDEO

This module represents the software module that is responsible for previewing and capturing the incoming video signal (radar). No other item needs to be connected to this module, the installer must simply update the settings appropriately.

Properties :

- *JPEG Quality* : this is the quality of the compressed video frame. It accepts any number from 0 to 100 and the higher it is the better the quality, the larger the file size also. A good compromise is a number around 70. It really depends on the size of the storage unit and the resolution of the screen.

- *Capture Interval* : This is the time interval in milliseconds at which the module will save a video frame. The default value is 15000 (15 seconds).
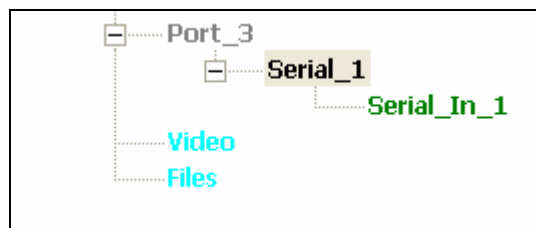
The Video and Files Modules

FILE MANIPULATION

This module represents the software module that cleans up the storage devices regularly. Nothing needs to be connected to this module, the installer must simply update the settings appropriately.

Properties :

- *File Scanning Time* : The time interval at which the module will perform storage clean up.
- *Free Limit 1* : The minimum free space for storage unit 1.
- *Free Limit 2* : The minimum free space for storage unit 2.

Note It is recommended to use the default values for this Module.

INPUTS

The inputs represent the physical connectors where cables or plugs are connected to. They may be serial inputs or PLC analogue or digital inputs etc. They are represented with green colour unless they are already used in which case their colour changes to grey. An input is a slot of a specific type that may accept an object (called *Data Item*) of the same type only. This, of course, in the physical setup is very straightforward since an analogue input naturally accepts an analogue signal. More specifically the inputs are divided into the following categories:

DIGITAL INPUTS

A digital input will accept a digital signal (*Data Item*). Only one *Data Item* is accepted per digital input. For specifications check the S-VDR Technical Manual.
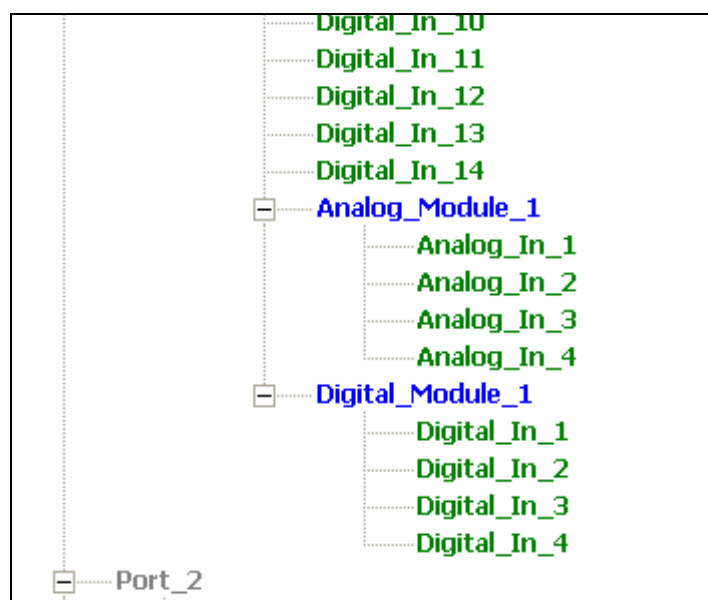
Inputs

ANALOGUE INPUTS

An analogue input will accept an analogue signal (*Data Item*). Only one *Data Item* is accepted per analogue input. For specifications check the S-VDR Technical Manual.

NMEA INPUTS

Several NMEA *Data Items* may connected to the same NMEA input. This is because a single NMEA serial device may transmit several NMEA signals.

SERIAL INPUTS

Several Serial *Data Items* may be connected to the same Serial input. This is because a single Serial device may transmit several Serial signals.
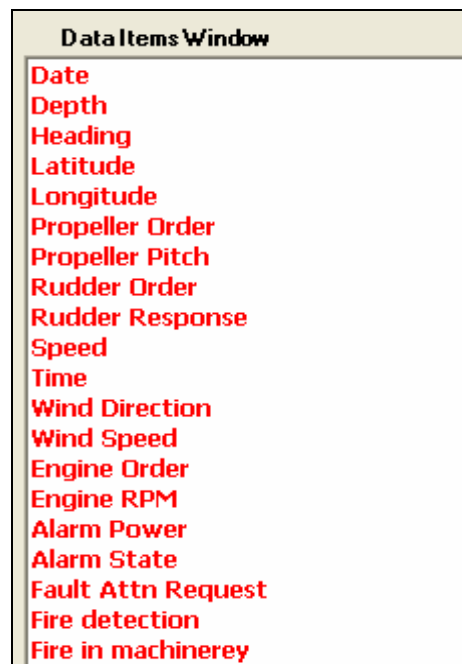
DATA ITEMS

A *Data Item* (**DI**) is a ship signal, a ship property that needs to be recorded.   Physically a *Data Item* may be anything from Engine rpm, to analogue or digital signals, to open or closed doors, wind direction, but technically all these different signals will either be Analogue, Digital, NMEA or Serial *Data Items* (**DIs**). The **DIs** are either **Mandatory**

ones, which are represented in red colour or **Optional** that can be created by the installer and are represented in purple color .

Note	Mandatory **DIs** are required the IMO and **must** be recorded.

All **DIs** initially lay on the right hand side of the Setup Program in the *Data Items Window.*

Note	It is important for the installer to realize the following concept. A Serial Device usually transmits several different Serial *Data Items*. Thus, a physical cable connected from a Serial Device to an NMEA input for example, will usually carry more than one *Data Items*. For this reason a Serial or NMEA input will accept more than one *Data Items*.

Data Items

Properties :

- *Name* : The mnemonic name of the *Data Item*. Only the *Name* of the Optional **DIs** can be changed.
- *Comments* : Installer comments.
- *Channel* : The *channel* is the input index of the module where the *Data Item* is connected. This property is automatically set when the installer places a *Data Item* on an input.
- *Type* : The *Data Item* type property describes its electrical type. It can be *Analogue*, *Digital*, *NMEA* (serially transmitted signal of NMEA standard), *Serial* or *Generic*. The *Generic* type states a *Data Item* which has no default type and can be placed in any type of input. Immediately after placement a *Generic Data Item* will inherit the input's type.

-     *Destination Type*   : This property is only visible for Optional IMO *Data Items*. The installer must select one of three possible choices:
  - IMO,
  - Firedoor,
  - Onening.

DIGITAL DATA ITEMS
Properties :
-     *Active State*   : If -1- active High, if -0- active Low.

ANALOG DATA ITEMS
    The analogue **DIs** are normalized to a range of values with the use of a linear function of the form $A x + B$.
Properties :
-     *A*   :   The A variable of the function,
-     *B*   :   The offset factor of the function.

NMEA DATA ITEMS
    NMEA **DIs** are normalized to a range of values with the use of a linear function of the form $A x + B$.
Properties :
-     *Sentence*   : a five character string where the first two characters are the talker identifier mnemonic for the specific device and the following three characters are a valid NMEA sentence formatter.
-     *Field 1*   : a number holding the index of the first field of the message,
-     *Field 2*   : a number holding the index of the second field of the message,
-     *Length 1*   : the length of the first field of the message,
-     *Length 2*   : the length of the second field of the message,
-     *Delimiter 1*   : the first delimiter between fields,
-     *Delimiter 2*   : the second delimiter between fields.
-     *A*   :   The A variable of the linear function,
-     *B*   :   The offset factor of the linear function.

SERIAL DATA ITEMS
    Serial **DIs** are normalized to a range of values with the use of a linear function of the form $A x + B$.
Properties :
-     *Sentence*   : for Optional serial devices, this is a string of characters that is characteristic of a *Data Item*, so that the system can distinguish it from other *Data Items* coming from the same device.
-     *Field 1*   : a number holding the index of the first field of the message,
-     *Field 2*   : a number holding the index of the second field of the message,
-     *Length 1*   : the length of the first field of the message,
-     *Length 2*   : the length of the second field of the message,
-     *Delimiter 1*   : the first delimiter between fields,
-     *Delimiter 2*   : the second delimiter between fields.
-     *A*   :   The A variable of the linear function,

-       *B*   :   The offset factor of the linear function.

5.2.2 DESCRIPTION OF SHIP RECORDED DATA ITEMS

NMEA DATA ITEMS
The NMEA *Data Items* are signals coming from sources using the NMEA interface and should exist in every ship. They are sent by one or more different ship devices so it is up to the installer to select the device to get each signal from. The NMEA protocol expects a certain format for each signal, so the installer must ensure that the Setup configuration truly follows that format or the system will not recognise it. In such a case the properties of the *Data Item* may be adjusted. In any case if a *Data Item* is transmitted with a baud rate different than 4800 bps, this *Data Item* should be connected to a separate serial port.
        The following *Data Items* are pre-defined and appear in the *Data Items Window*:

-       Date   -   NMEA
-       Time   -   NMEA
-       Latitude   -   NMEA
-       Longitude   -   NMEA
-       Speed   -   NMEA or Analogue
-       Heading   -   NMEA or Analogue
-       Depth   -   NMEA or Analogue
-       Rudder Order   -   NMEA or Analogue
-       Rudder Response   -   NMEA or Analogue
-       Engine Order   -   Analogue or NMEA
-       Engine RPM   -   Analogue or NMEA
-       Propeller Order   -   NMEA or Analogue
-       Propeller Pitch   -   NMEA or Analogue
-       Wind Speed   -   NMEA or Analogue
-       Wind Direction   -   NMEA or Analogue

MANDATORY ALARMS
The following alarms must be recorder according to IMO resolution A.861.   They are pre-defined and appear in the *Data Items Window*:

-       Steering Power   -   Digital
-       Steering Control   -   Digital
-       Steering Low Fluid   -   Digital
-       Propulsion Remote   -   Digital
-       Propulsion Starting Air   -   Digital
-       Propulsion Shutdown   -   Digital
-       Fault Attn Request   -   Digital
-       Alarm Power   -   Digital
-       Alarm State   -   Digital
-       Watertight LowFluid   -   Digital
-       Watertight Low Pressure   -   Digital
-       Watertight Electrical   -   Digital
-       High Water Ararm   -   Digital
-       Shell Door   -   Digital
-       Water Leakage   -   Digital

-	Fire in Machinery	-	Digital
-	Fire Detection	-	Digital
-	Smoke Detection Power	-	Digital
-	Smoke Detection	-	Digital
-	Halon Loss	-	Digital
-	Halon Electric	-	Digital
-	Halon Power	-	Digital
-	Halon Release	-	Digital
-	Personnel Alarm	-	Digital

OPTIONAL DATA ITEMS

Any *Data Item* that is not a standard IMO but needs to be recorded, is called an *Optional Data Item*. An Optional *Data Item* is created by the installer to meet the needs of a specific application

Properties :

-	*Type*	: The type of an Optional Item is automatically assigned to it once it placed on an input. It will inherit the type of the specific input.
-	*Desination Type*	: this property can take three possible values:
	- IMO	:A *Data Item* required by IMO standards which cannot be found in the mandatory alarms.
	- FireDoor	:A *Data Item* capturing the state of a firedoor.
	- Opening.	:A *Data Item* capturing the state of a hull opening.

Mandatory Optional DIs

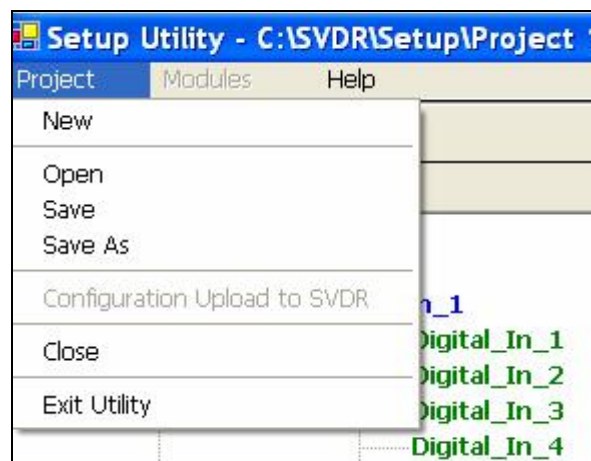## 5.2.3 DESCRIPTION OF THE SETUP WINDOW

MENU BAR
The menu bar lays at the top of the Setup Program window and contains three submenus called "Project", "Modules" and "Help".
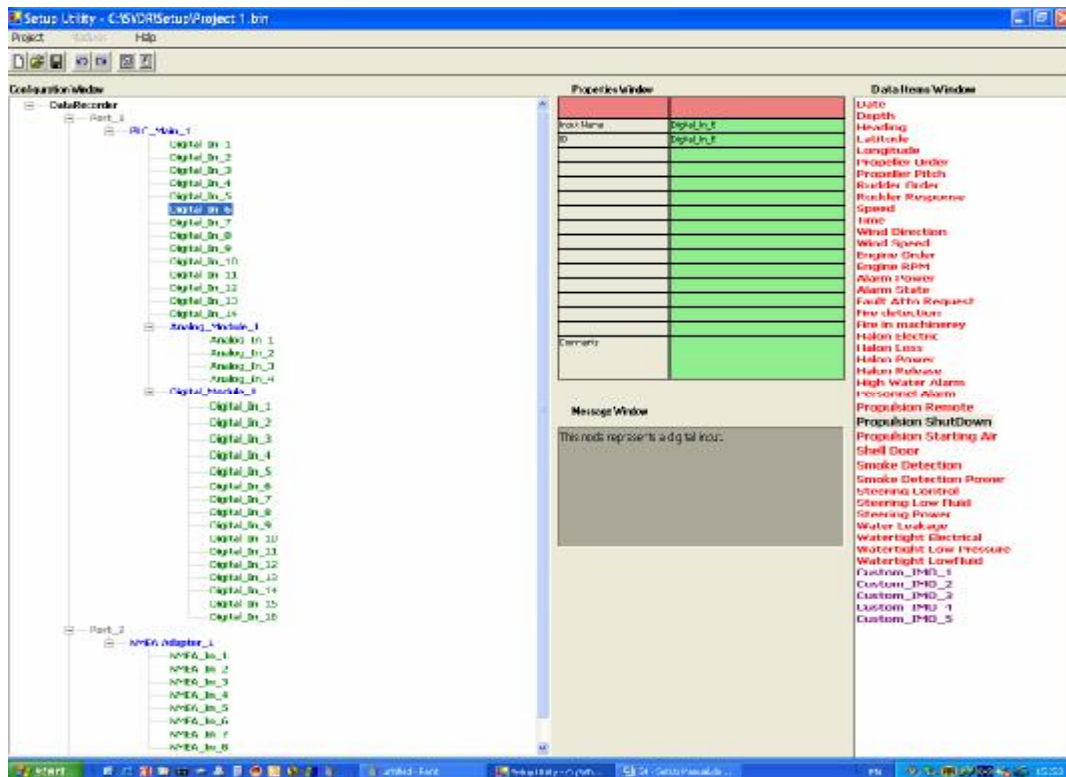
The Setup GUI
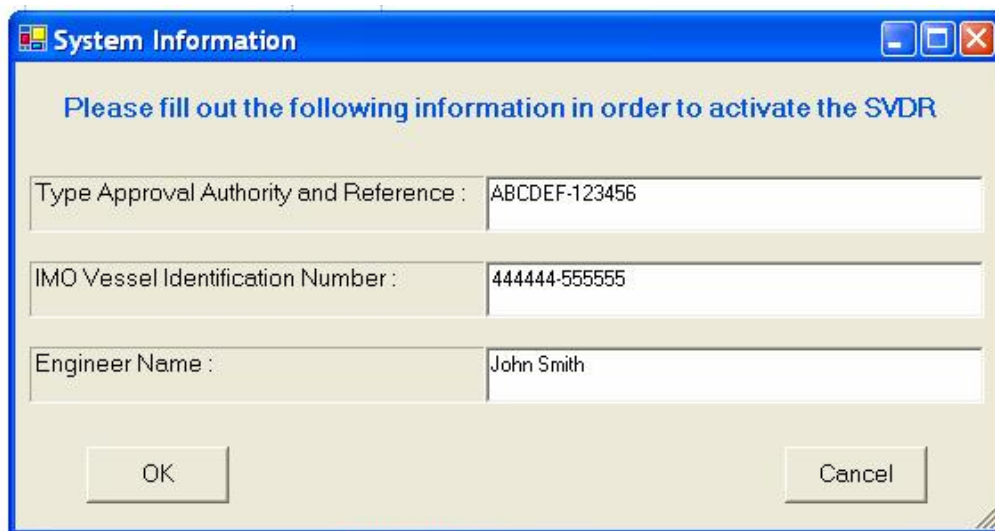
PROJECT submenu
The **Project** submenu contains the following commands:

'Project' Commands

- **New**: Create a new configuration file. This will clear all windows and load a default Configuration tree and a default *Data Items* list.
- **Open**: Open a previously created configuration file.

- **Save**: Save the current configuration file.
- **Save As**: Save the current configuration file under a new name.
- **Configuration Upload to S-VDR:** Once the project is complete the **Setup** will upload it to the Free-Floating Capsule and the S-VDR will use it as its default configuration. This command will NOT appear unless the project is saved with a name other than the default one and all the **DIs** have been connected properly.

  If the above prerequisites are satisfied and the command is clicked the form below will appear. All three fields must be filled for the program to go forward and copy the current project configuration into the Free-Floating Capsule as the active configuration.


Configuration Upload Form

- **Close**: Close the project.
- **Exit Program**: Exit the program after saving the project.

Note   Each configuration project contains two files. A <filename>**.bin** file and a <filename>**.mdb** file, where <filename> is the name of the project. The .**bin** file contains all the project information and the **mdb** file is the extract of the specific project that the **S-VDR** will recognize as a valid configuration. The program provides the basic file handling functions *New, Open, Save, Save As*. In order to move copy or rename configuration projects manually, both configuration files, the .**bin** and the .**mdb**, have to be changed.

MODULES submenu

The **Modules** submenu contains all the available I/O modules that may be added to the S-VDR system. As explained in chapter 3.3, this submenu and/or its items are only enabled when the installer has selected an item in the *Configuration Window* on which a module may be added to.
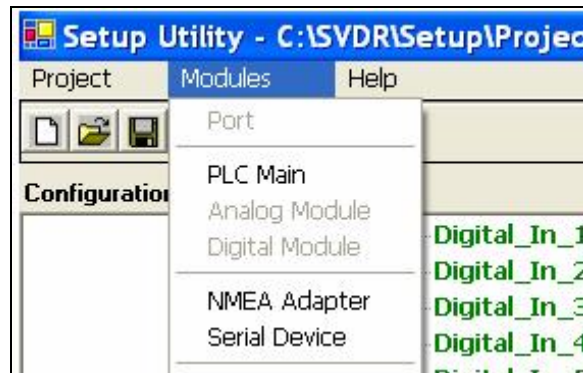
'Modules' Commands

 The submenu contains the following items:
-       Port   : Add a new port to the DataRecorder.
-       PLC Main   : Add a new PLC to a port.
-       Analog Module   : Add a new Analogue module to a PLC.
-       Digital Module   : Add a new Digital module to a PLC.
-       NMEA Adapter   : Add a new NMEA Adapter to a port.
-       Serial Device   : Add a new Serial device to a port.

HELP submenu
      The **Help** submenu contains two options:
-       Manual   : Open this manual.
-       About   : Information about the current program version.

TOOL BAR

      The Tool bar contains the following items:
-    *New project*: a shortcut to the menu command.
-    *Open project*: a shortcut to the menu command.
-    *Save project*: a shortcut to the menu command.
-    *Undo change*: undo the last change. The program keeps a list of up to 65 changes.
-    *Redo change*: redo the last undo operation if there is one.
-    *Auto-place Data Items*: see chapter 3.3.
-   *Semi-Auto-Place Data Items*: see chapter 3.3.

The Tool Bar

CONFIGURATION WINDOW

The *Configuration Window* displays a graphical representation of the physical connections of the S-VDR system. The graph is shown as a tree where the root is on the left hand side and the branches are on the right hand side. To add a new node to the graph

the installer must click on the position where that node must be inserted. This position is the *Parent* node.
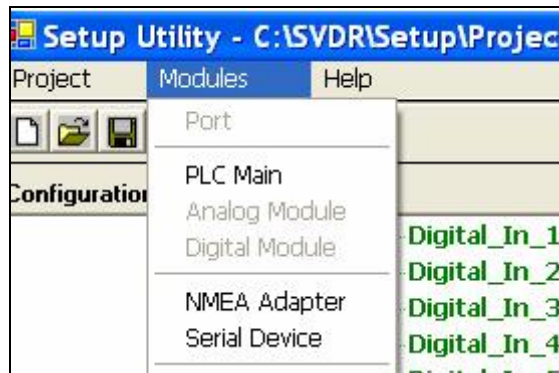
Modules submenu

The submenu labelled "Modules" on the menu bar will be updated and depending on the type of the *Parent,* will allow access to its sub-items or not. This way the system leads the installer to add every node to its proper place. Once the parent node is clicked and a sub-item on the Modules menu is enabled, the installer can select it and this way add a *Child* node to the graph. This way, when the DataRecorder is selected only a Port may be added, when an empty port is selected a PLC main unit or a NMEA Adapter or a Serial Device may be added, when a PLC main is selected either an Analogue or a Digital module may be added.

Whenever a node is clicked on the *Configuration Window* four different items on the form are updated automatically.

-        The *Properties Window* displaying the properties of the selected node,
-        the Message window giving help on the selected node,
-        the Modules menu as explained earlier and
-        the tree pop-up window.
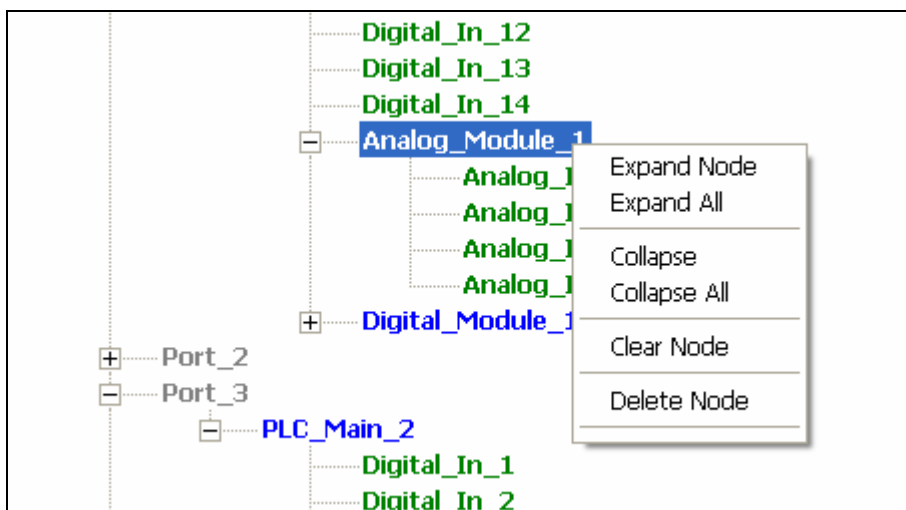
Right-click Popup Window

By right clicking on top of the graph the pop-up window will appear with more commands for manipulating the tree. Through the tree pop-up window the installer can delete nodes (only the ones allowed), expand or collapse the tree and clear a tree branch

from all the *Data Items* that may be connected to it. Navigate through the different nodes of the tree and notice these four groups changing and offering different details for each node.

In order to place a *Data Item* on the tree the installer must drag and drop an item from the *Data Items Window* on top of the appropriate Input. All empty Inputs are marked with green colour while all *Data Items* are marked with red colour. A **DI** must be dragged onto an input and if it is allowed to move to that input the operation will be completed successfully. Optional **DIs** may be placed in any input even though they are initially declared as Digital. Mandatory **DIs** in general must be placed to an input of the same type.

Note   Some mandatory NMEA and Analogue **DIs** do not follow the above rule. This is because they can either be found in NMEA or Analogue form. For example the *Speed* **DI** is as default NMEA but may also be found as an Analogue 0 - 10V signal. Notice that the program will allow this **DI** to be placed either on a NMEA or an Analogue input.

If a **DI** is misplaced or simply needs to be put in a different location it may again be dragged and dropped even within the same window.

Apart from dragging and dropping the Toolbar buttons "AutoPlace" and "SemiAutoPlace" may be used.

- SemiAutoPlace: This function will scan the unconnected **DIs** in the *Data Items Window* one by one and will look for an open Input of the same type. If such an input is found in the configuration, the **DI** will be moved on it. The scanning will begin from the selected **DI** and when it finishes searching it will move the selection to the following object. If the installer wishes to continue the function he must press the button again. This way object by object, if there are enough inputs available, all the **DIs** will move onto the configuration tree.

Note   Only the visible inputs will be looked upon. This way the installer can avoid filling up certain modules simply by hiding their inputs.

- AutoPlace: This function needs to be run only once and it will place all unconnected **DIs** to any visible, empty input it can find. It is faster but the installer has less control on its actions. Feel free to experiment with their use. The "Undo" button is always available for use.

DATA ITEMS WINDOW

The *Data Items* (**DIs**) Window displays the default list of NMEA **DIs** that must be recorder by the system. They are displayed in red colour not simply to differentiate from other objects or groups, but also because it is very important to connect all the **DIs** to appropriate inputs before the system can continue. **DIs** are really important and all of them have to be connected before the system starts operating. When an item on the *Data Items* list is clicked the *Properties Window* displays its properties.

The installer may change these properties before or after placing the object on the configuration tree.

By right-clicking on top of the *Data Items Window* a pop-up window appears with two selections.

- Add an Optional IMO **DI** or,
- Delete the Optional IMO **DI** under the mouse tip.
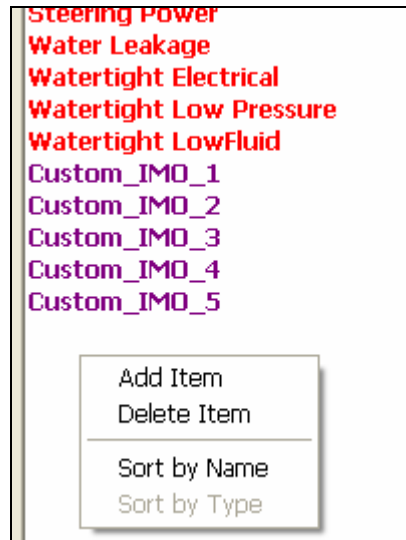
Add / Delete Optional Data Item

- Sort the **DIs** by name,
- Sort the **DIs** by type (Analog, Digital, NMEA etc).

Optional IMO **DIs** appear in purple colour and do not necessarily have to be connected to the configuration tree in order for the S-VDR system to begin operating. For the pre-defined Mandatory *Data Items* there are limitations concerning the **DI**'s type. It is illegal and logically incorrect to try and change an NMEA Latitude **DI** type to Digital so the program will not allow that. On the other hand some NMEA **DIs** could be substituted from Analogue ones (for example engine order could be read from an analogue 0-10V signal). Although the program will not allow changing a predefined **DI** within the *Data Items Window*, it is possible to do this indirectly. Simply drag the **DI** and drop it into an open analogue slot in the *Configuration Window*. Then select the **DI** by clicking on it and notice that its type has changed from NMEA to Analogue.

If you drag the **DI** back to the *Data Items Window* it will regain its initial pre-defined settings. The purpose of this indirect transformation is to discourage the installer from doing unnecessary changes.

Optional *Data Items* on the other hand must be configured according to their source so it is usually expected from the installer to make several changes in their properties.

PROPERTIES WINDOW

The *Properties Window* is responsible for presenting the properties, that is, data that the S-VDR system is interested in, in order to run properly. As the installer selects different items either on the C*onfiguration* or in the *Data Items Window* the *Properties Window*

updates its appearance in order to present the specific properties for each item.   When the user changes the value of a property this value is updated immediately.

You will notice that many properties such as the DI's Channel or any object's ID appear in grey colour and cannot be changed. These are read-only properties and their value is automatically handled from the program. Properties that appear in Dark-Green colour may be changed.

The Properties Window

MESSAGES WINDOW

The messages window displays useful information, about the object most recently selected, on the graph.
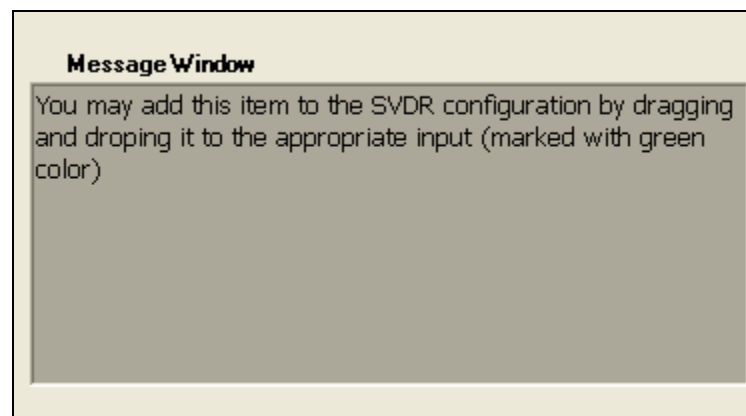
The Messages Window

COLOUR SIGNIFICANCE

-     Grey colour : It informs that the node is already connected and cannot accept another connection. It may appear in several different types of nodes. In general "Grey" suggests something read-only or disabled.
-     Black colour : The Datarecorder and its Ports appear in Black colour,
-     Blue colour : It informs that that the node is a module or sub-module,
-     Green colour : The node is an Input,
-     Red colour   : The node is a *Data Item*,
-     Purple colour : The node is an *Optional Data Item*.

STARTING-UP THE PROGRAM

The program starts up with no project loaded so the *Configuration* and *Data Items Windows* appear empty. Use the **Project** menu commands to define the project you will work on. For example to start a brand new project use the '*New Project'* command and the program will require a new project name. To continue work on a previously defined project use the '*Open Project'* command.

5.2.4 CONFIGURATION PROCEDURE

DATA ITEM ENUMERATION

Firstly the installer must identify all the *Data Items* shown on the *Data Items Window* and the devices that provide them. Once again note that unless all the standard NMEA signals (shown in red colour) are placed on inputs, the S-VDR recorder will not operate properly. Most of the **DI** types will match the default types but some of them may be different so the installer must update these types. If there are *Optional Data Items* that must be recorder the installer has to add them to the *Data Item* list and set them up accordingly. Enumerating and setting up these **DIs** properly is important to estimate the number and type of modules that should be added to the system. Although it is easy to add or remove modules from the *Configuration Window* of the Setup program, this may be a little more inconvenient at the physical setup.

Use the *Comments* property of each **DI** for any kind of remarks that may be useful later on.

SYSTEM MODULES ENUMERATION

Once the *Data Items* list is ready the next step is to add or remove modules accordingly, so that the inputs of each type are enough to accept the **DIs**. The whole idea behind the Setup Program is not just to assist setting up the system but also to record a reliable and simple to use map of the system. For this reason the installer should try and arrange the modules on the *Configuration Window* so that they appear as closer to reality as possible and vice versa.

If the number of the module inputs on the graph does not match the actual ones it is easy to correct it simply by clicking on the specific module and changing its inputs number from the *Properties Window*. The module will be updated and the number of inputs will match the inputs stated on the *Properties Window*. Make sure that all the graphical modules' inputs match the inputs of the actual modules.

CONNECTIONS

The next step is to place the **DIs** on the empty input slots. The program will make sure that **DIs** and inputs of incompatible type cannot be connected to speed up the process and avoid possible errors. Once a **DI** is placed on an input its properties will be updated to coordinate to the input's properties. It is worthwhile arranging the physical connections in a way similar to the graphical representation of the program because it is going to assist a lot when trying to debug the system.

SYSTEM CONFIGURATION

When all the **DIs** have been moved from the *Data Items Window* to the *Configuration Window* the installer must make sure that all of the properties of the items in the configuration tree agree with the physical setup of the system. The program itself has no automated way of presenting these properties so the installer must go through all of the items and update them. It is suggested to go through the tree in layers starting from the

Recorder Ports and then move to the modules, the inputs and the connections. If all the mandatory **DIs** have been on the configuration tree and a name other than the default 'Newfile.bin' has been given to the project, the 'Upload Configuration to S-VDR' command will be active and ready for use. Close the S-VDR main program and update the configuration database. Restart the S-VDR main program with the configuration you just installed.

5.3   RADAR MODULE

The Radar Module's purpose is to capture a video frame coming from an external video source and save it as an image to disk.   Before saving, the image is compressed with JPEG compression.   The compression rate is controlled from a variable available to the user .

The incoming video may be previewed in a separate window so that the user/installer can check the state of the video source and the video connection itself.   In order to save CPU processing time the preview video is only processing 5 frames per second.

5.3.1   VIDEO GRABBER CARD INSTALLATION

The BlueOcean VDR / S-VDR recorder uses the UFG-03 video grabber card by Unigraf.

5.3.1.1   Card Installation

_____

Note   The UFG - 03 is a highly dedicated electronic device that contains ESD sensitive components.   Before opening the anti-static bag and always before touching the card ground yourselves.

_____

The UFG-03 has two version labels attached to it.   They give information about the assembly version of the unit and the versions of the factory configured programmable devices on the unit.   The labels are:
-        Serial number and hardware version label,
-        FPGA code version label.
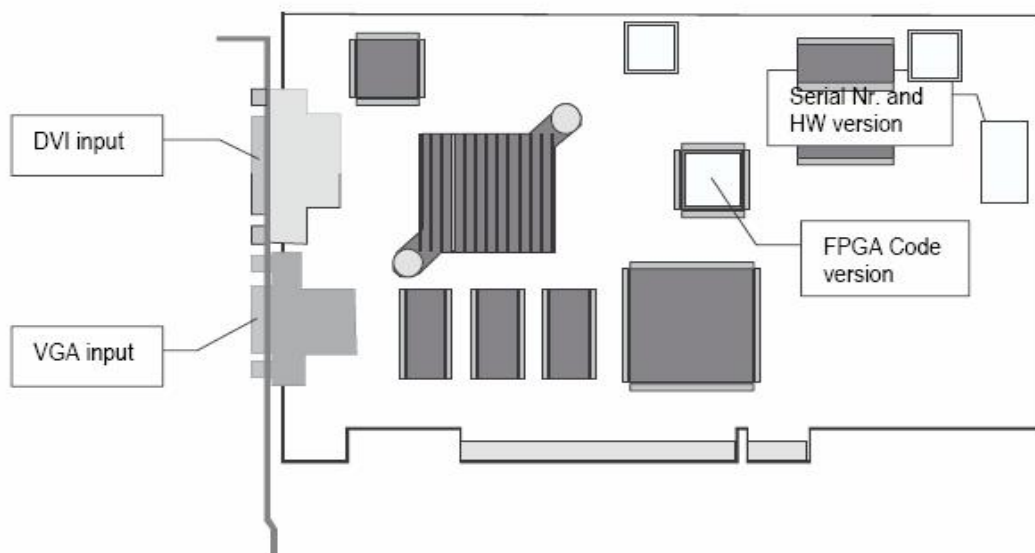
UFG-03 Side View

_____

Note   Whenever contacting Comas for information or help, please have this
                    information available.

_____

-        Switch off the Main Unit and install the UFG-03 card into a free PCI slot.

5.3.1.2   Driver Installation

        For installing the UFG video capture driver on Windows XP, perform the
following steps:
-        Boot the Main Unit,
-        Log in as system administrator.

The Plug and Play subsystem of the Windows WP will detect the newly installed UFG-
03 board.   In this case the "*Found New Hardware Wizard*" launches automatically.   If
for some reason the system did not start the Wizard, do this manually by selecting
Control Panel > Printers and Other Hardware > Add Hardware (or when switched
to the *Classic View* of the Control Panel), by double clicking on the **Add/Remove
Hardware** icon).

When the "*Hardware Wizard*" opens, insert the Flash Disk with the UFG-03 installation
into a free USB port and click **Next.**

When Windows XP has found the driver, click **Continue Anyway** to confirm the
installation of the driver.

After Windows XP has installed the driver, click **Finish**.   The installation is complete.

5.3.2 RADAR SETUP

The radar setup dialog will assists the installer to configure the Radar module properly.

-        **Show** : this button will reveal the Preview Window with the incoming video signal from the radar. The preview window is fully moveable and resizable.
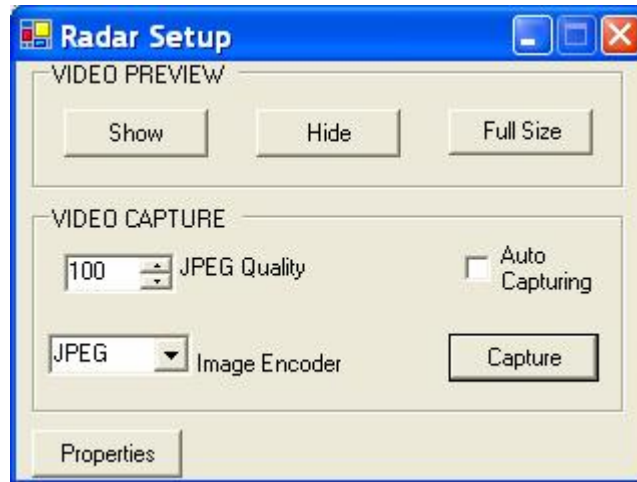

The Radar Setup Form

-   Hide : this button hides the preview window.   The preview window may be re-opened at any time pressing the Show button.

-   Full Size : this button displays the Preview window in Full-Screen mode.   This way the user/installer can check the Radar signal in full resolution.   In order to return back to the Normal-Screen mode simply click any mouse button or keyboard key.
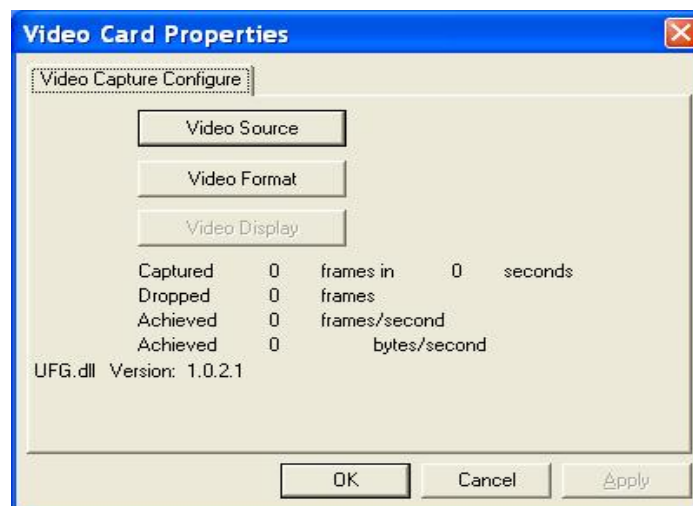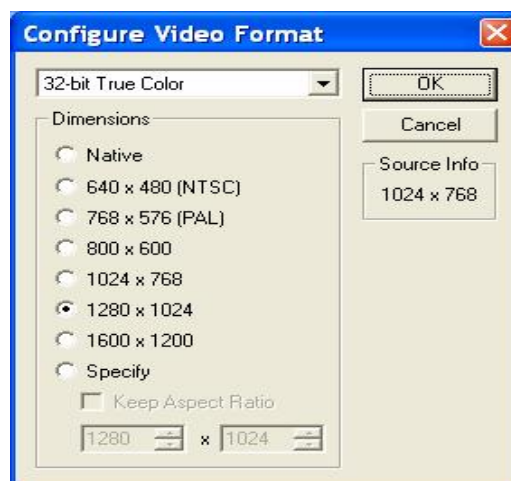

Properties Form

-        **Properties** : this button displays the video card configuration pages.   From these pages the video card input can be configurated to the specific Radar video signal.
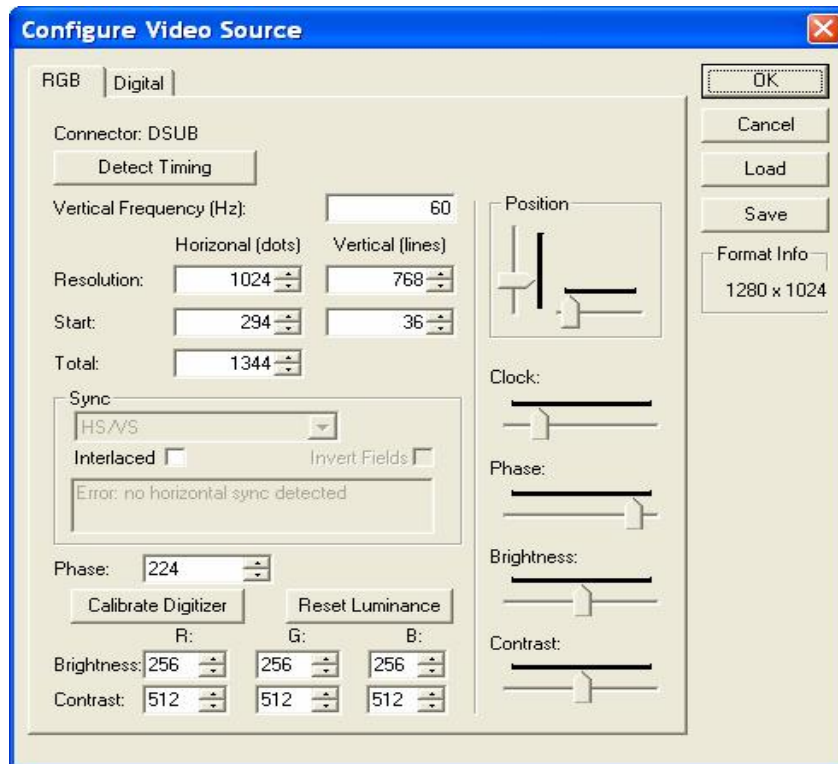
Properties - Video Source

-        **Video Source** : from the video source dialog select the page "RGB" or "Digital" according to the output of the Radar and press the Detect Timing button. A couple of seconds later the system will update the dialog with all the new values discovered in the detection process.   Click "OK" to accept them or manually set the various properties to get the best outcome.

Properties - Video Format

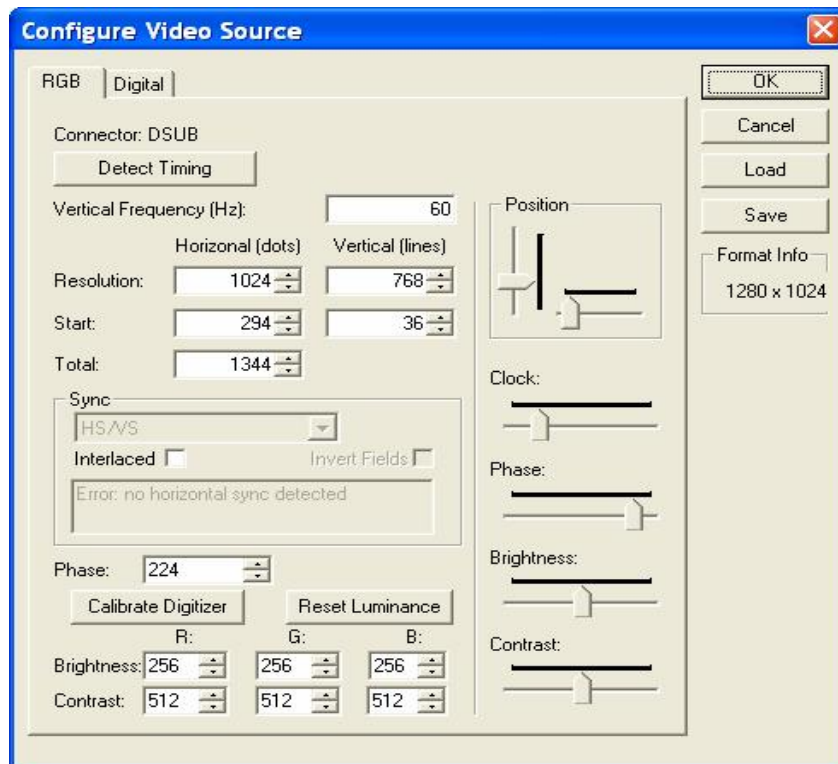-   **Video Format**: select the format of the output of the Radar.

The Radar Setup Form

- **Capture** : this button captures a single frame of the incoming video image.
- **Image Encoder :** Selects which encoder to use (JPEG or PNG). Use PNG type of files. JPEG allowed only in secondary input, if fitted. JPEG quality is not sufficient for main RADAR: use the PNG encoder which is lossless.
- **JPEG Quality** : this is the quality of the video image snapshot that is saved to the disk.   It accepts any number from 0 to 100 where 0 is the lowest image quality and 100 is the highest image quality.   Also note that the higher the quality the much higher the size of data that each image occupies on disk.   A good compromise is to use values between 60 and 80.
- **Auto Capturing** : when selected the Radar module takes snapshots of the video signal at a fixed rate of one every 15 seconds.   The first snapshot is taken immediately after the selection.

5.3.3   VIDEO GRABBER INPUT CONFIGURATION

To achieve the maximum quality in video frame grabbing, the input of the grabber must be configured using the procedure to be described in the following lines. That is necessary because although there is an automatic detection in the "Configure Video Source" form, this detection does not include the value of the "Phase" parameter. This must be done manually.

Properties - Video Source

Step 1.   Connect the output of the radar to the input of the video grabber and make sure that the radar output contains as much information and bright colors as possible. This will assist the auto detection for a more efficient measurement. If the "Auto Capture" option is set then go back to the main form and reset it.
Step 2.   Set the "Phase" to 128 which is the mid value as it may vary from 0 to 255. Click the "Detect Timing" button and the resolution settings should change to display the Radar output resolution.
Step 3.   Click "OK" to accept the settings and close the "Properties" form. At the main form click "Capture" to capture a frame of the radar image with the current settings.
Step 4.   Click the "Full Size" button to go to the full size mode and observe the image closely. If the phase is well tuned you should not see any blinking or drifting at all. Then examine the captured file using an image editor.
Step 5.   Zoom into the image and check the following:
If the auto detection was correct then the horizontal lines should not be shifted a lot.
Check the image limits (up, down) to make sure that no line is clipped or added to the captured image. If a line is clipped then the auto detection probably failed.
Go back to Step 1.

Step 6.   Check the following:

-        Vertical lines, because poor synchronization affects them more. If there is distortion in the neighboring pixels then the phase must be adjusted. If there is an idol of the vertical line drifting to the right then increase the phase and if it is drifting to the left decrease the phase. Use small steps of no more than 10.

-        Check the image limits (left, right) to make sure that no line is clipped or added to the captured image. If a line is clipped from the left side then increase the phase otherwise decrease it. Use large steps (10 – 50).

Go back to Step 3.

Note	Decreasing the phase shifts the captured image to the left. Increasing the phase shifts the image to the right. If the phase value is moved more than it should then the image will be clipped either left or right.

5.3.3 TROUBLESHOOTING

PROBLEM	EXPLANATION
Video preview is grey	The video card is working properly. There is no signal coming on its input. **Possible errors** - Radar is off - Radar output is disabled - Video signal cable is bad or disconnected
Video preview is black	There is a hardware problem with the video card driver. **Possible errors** - Make sure the card is properly plugged into the PCI slot. **-** Go to the Device Manager and check for a problem in the card. If there is a problem reinstall the driver. If the problem is not fixed contact the technical support.

5.4 SOUND MODULE

5.4.1 Purpose of the manual

The VDR/S-VDR system uses this module to record sound coming from the system sound mixer and to conduct microphone tests. The installer can test the module and its peripherals by Starting and Stopping a recording session, as well as to set the parameters of that recording session. The outputs of this module are compressed sound files which are saved in the disk in selected locations. The module makes use of the preinstalled Windows XP sound drivers and codecs (compression decompression drivers).

This manual provides information about some sound parameters that might be new to a user.

5.4.2 Sound Module's Main Window

The Sound module's main window, shown in figure 6.1 is called Capture Sound and it consists of three buttons and a status display. The three buttons are marked as Set, Start and Stop.


Figure 5.4.1: Sound module's main window.

The three buttons implementation is as follows:

Ø **Set Button:** Pressing the Set button will lead the user to another window, shown in figure 6.2, which it is called Audio Setting. In this window the user can change the duration of the recording session, as well as the sampling rate[1] (11.025kHz, 12kHz, 16kHz, 22.050kHz etc.), the bits per sample (8 and 16) and the channels[2] (Stereo and Mono). The Sound Module capture data in MS-PCM format and stores it on the systems hard drive and flash card in MS-ADPCM format. Ideal settings for a good recording session for this system are the following:

   o Sampling Rate: 22.050kHz

   o   Bits per Sample: 16
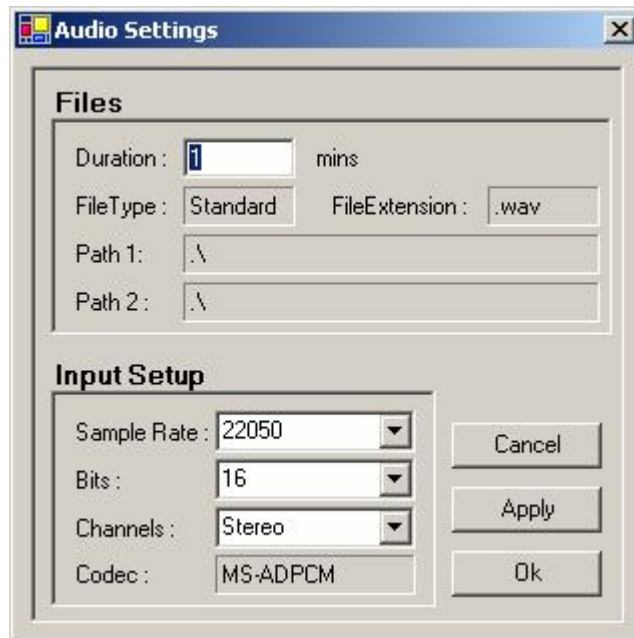
   o   Channels: Stereo.

1 Sampling Rate is the samples of data collected in a second. The sample rate is measured in Hertz.
2 Number of channels in the waveform-audio data. Monaural data uses one channel and stereo data uses two channels.

Figure 5.4.2: Audio Settings window.

   Ø   **Start Button:** Pressing the Start button the application will start recording sound.

   Ø   **Stop Button:** Pressing the Stop button the application will stop recording sound.

5.4.3 Fast Fourier Transform Analysis

The VDR/S-VDR system provides a reliable microphone test that ensures that the system's microphones are functional. To do this every microphone is paired with a small buzzer that has a specific frequency output. The Sound module includes an FFT sub-module that is capable of conducting 22050 sample, 1024 points, FFT analysis of the incoming sound signal resulting in a 5KHz frequency domain output. This output is used to record or recognize signals of a relatively steady frequency and intensity. A buzzer signal for example, will have a certain 'signature' (specific intensity in a specific frequency) in the frequency domain that the FFT analysis will be able to locate even within an extremely noisy environment. The installer must conduct a short test to find the dominant frequency of the buzzer (frequency with the maximum intensity) and then setup the Sound module to look for that intensity in the specific frequency when conducting the microphone tests. During the test the system will initiate a buzzing sound (one for each microphone) and look for its signature in the frequency domain of the incoming signal. If this signature is found then the specific microphone is operating properly.

Ø **Graphics** check box: When selected it reveals an auxiliary window that displays a frequency/amplitude graph of the incoming sound.

Ø **Get Max Button:** This button initiates an FFT analysis procedure where the module is searching for the dominant frequency of the incoming signal. The output value (frequency and intensity) may be used in order to setup the microphone test.
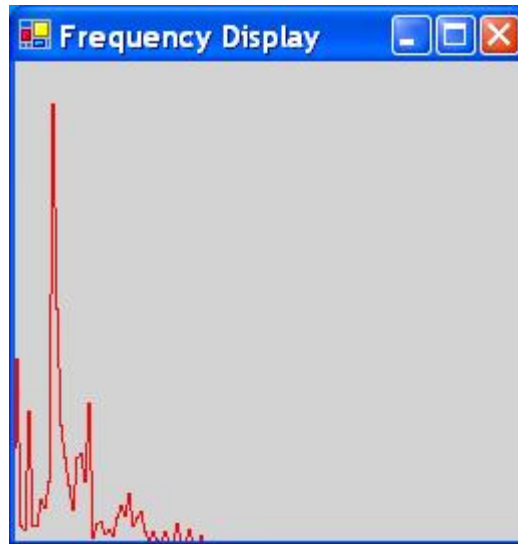

Figure 5.4.3: Incoming sound shown in the Frequency Domain.

Ø **Check Button:** This button initiates an FFT analysis procedure where the module is searching for a specific frequency and intensity (signature) in the incoming signal. If this 'signature' is found the indicator turns from red to green.

5.5   PC – PLC COMMUNICATIONS MODULE

5.5.1 Purpose of the manual

This product (VDR / S-VDR) contains a module called PC - PLC Communications Module. The purpose of that module is to help the user to Start and Stop the serial communications between the system's (S-VDR) computer and the system's PLC and its external modules.

This manual provides the user with a quick introduction to the features of the PC – PLC Communications Module.

5.5.2 Communications Module Main Window

The PC – PLC Communications module's main window, shown in figure 7.1 is called PLC - Communications and it consists of three buttons. The three buttons are marked as Hide, OpenPorts and ClosePorts.

Figure 5.5.1: PC – PLC Communications module's main window.

The three buttons implementation is as follows:

- Ø **Hide Button:** Pressing the Hide button the main window, illustrated in figure 7.1, will disappear. The module will carry working.

- Ø **OpenPorts Button:** Pressing the OpenPorts button will start the communications between the system's computer and the system's PLC and expansion modules.

- Ø **ClosePorts Button:** Pressing the ClosePorts button will pause the communications between the system's computer and the system's PLC and expansion modules.

- Ø **Digital Inputs TextBox:** it lays on the top of the form and displays the state of the digital inputs of the system.

- Ø **Digital Outputs TextBox:** It displays the state of the digital outputs of the system.

- Ø **Digital Output CheckBoxes:** Each CheckBox represents a digital output and its current value. The user can force the state of an output to change by clicking on it.

- Ø **Analog Input Signal TextBoxes :** these TextBoxes display the value (in Volts) of the analogue inputs of the system.

5.6   FOLDER MANIPULATION & DATA STORAGE

5.6.1 Purpose of the manual

This product (VDR / S-VDR) makes use of two additional applications. The one is called Folder Manipulation and the other one is called Save Wizard. The purpose of the first application is to make sure that the free space limits of the hard drive and the flash drive used by the system (S-VDR) are not exceeded. The purpose of the second application is to allow the user to save an incident such as an accident or an emergency signal, which he/she might think that it is worth storing.

This manual provides the user with a quick introduction to the features of the Folder Manipulation and the Save Wizard applications.

5.6.2 Folder Manipulation

The main window of the Folder Manipulation application is shown in figure 3.1. It is called after the applications name. It consists of three buttons, three boxes which can be edited and three status boxes. The three buttons are marked as Cancel, Apply and Exit.
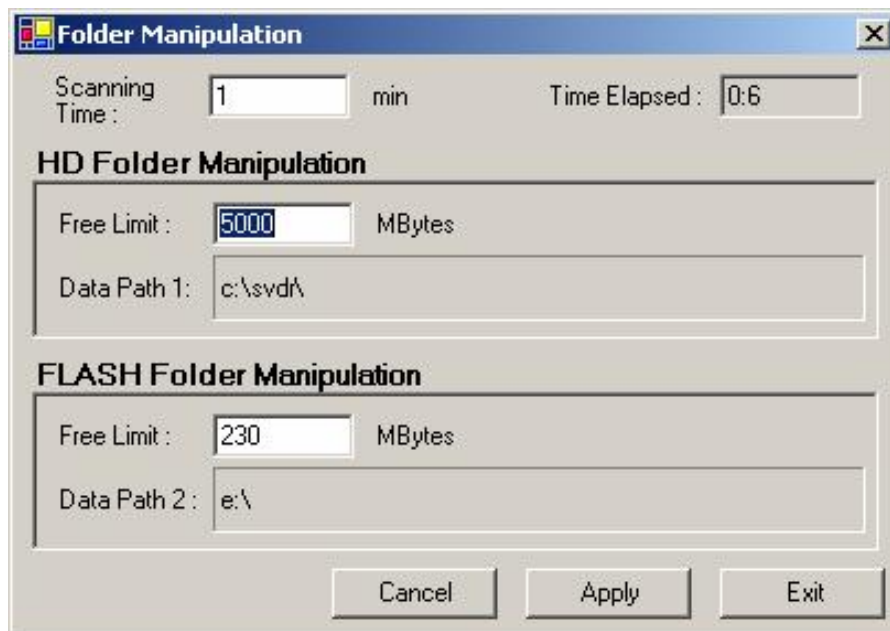

Figure 5.6.1: Main window of the Folder Manipulation application.

The three buttons and six boxes implementations are as followed:

Ø **Cancel Button:** Cancels any changes that the user might have made to the Scanning Time, the hard drive's Free Limit and the flash drive's Free Limit boxes. The original values in the boxes are being displayed again.

Ø **Apply Button:** Pressing the Apply button the application accepts any new changes that the user might have made.

Ø **Exit Button:** Pressing the Exit button the application is being exited.

Ø **Scanning Time Box:** Indicates the time period chosen by the user for the application to check if the HD's and the Flash's Free Limits have been exceeded. If the limits have been exceeded the applications deletes the oldest files.

Ø **Time Elapsed Box:** Indicates the time remaining for the application to check if the HD's and the Flash's Free Limits have been exceeded.

Ø **HD's Free Limit Box:** Indicates the HD's free space limit chosen by the user. This free space (in MBytes) is maintained at all times.

Ø **HD's Data Path Box:** Indicates the directory where the data is being stored on the HD. This is actually the first directory which is being manipulated by the programme.

Ø **Flash's Free Limit Box:** Indicates the Flash drive's free space limit chosen by the user. This free space (in MBytes) is maintained at all times.

Ø **Flash's Data Path Box:** Indicates the directory where the data is being stored on the Flash drive. This is actually the second directory which is being manipulated by the programme.

5.6.3 Data Storage

This application (Save Wizard) consists of three windows, which have been designed to navigate the user step by step to choose the data, in other words the incident, such as an accident or an emergency signal that he/she considers worth saving.

The programme starts with a welcoming window that explains to the user what this application is all about. This window is illustrated in figure 3.2.

Figure 5.6.2: Welcoming window of the Save Wizard application.

As it can be seen from the above picture, on the window they are depicted three buttons. The three buttons are marked as Back, Next and Cancel. The three buttons implementations are as followed:

- Ø **Back Button:** This button is not active.
- Ø **Next Button:** Pressing the Next button the application takes the user to the next step (see Figure 3.3) where he/she decides what data wants to store.
- Ø **Cancel Button:** Pressing the Cancel button the application is being exited.

The picture below (see Figure 3.3) shows the programme can actual do. In the section labelled as "Available data" in the system the user can see the oldest data in the system (indicated by a date and a time), as well as the newest data in the system, also indicated by a date and a time.

In the following two sections labelled as "Beginning of incident" and "End of incident" the user can choose the period in which the incident occurred and he/she wants to save in the system. The period is defined the "form" and "to" dates and times.

Figure 5.6.3: Select Data to save window.

As it can be seen from the above picture, on the window they are also depicted three buttons. The three buttons are marked as Back, Next and Cancel. The three buttons implementations are as followed:

- Ø **Back Button:** Pressing the Back button the application will return to the programmes previous window (Welcoming window).
- Ø **Next Button:** Pressing the Next button the application will start saving the data that was chosen by the user. If the saving procedure was successful then the window illustrated in figure 3.4 will appear.
- Ø **Cancel Button:** Pressing the Cancel button the application is being exited.

If the saving process is successful then the programme will display the window depicted in figure 3.4. On the bottom right hand side corner of window called "End Wizard" there is a Finish buttons. Pressing the Back button the user will exit the application.

5.7 PLAYER

5.7.1 Purpose of the manual

This programme (Player) is a part of the BlueOcean peripheral applications provided with the VDR / S-VDR system. The purpose of the programme is to help the user to playback a recorded session of sound, radar images and emergency alarms that might had happened. This application makes use of the preinstalled Windows XP sound drivers and codecs (compression decompression drivers). The Player can also be run by the actual system (VDR / S-VDR).

5.7.2 Player's Main Window

The Play's main window is shown in figure 4.1 and it has taken its name after the program.
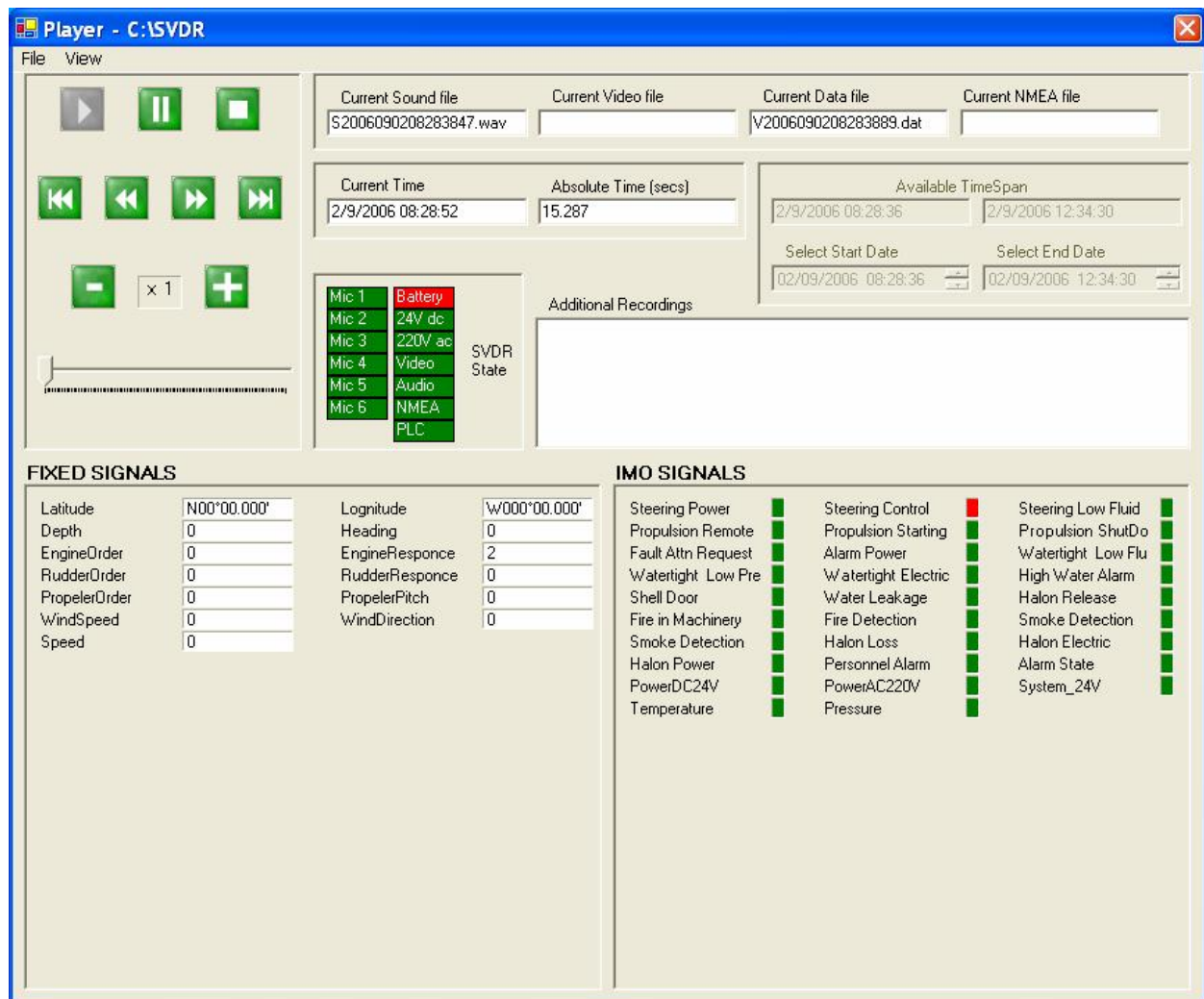

Figure 5.7.1: The Player's main window.

From the Menu bar, through the command View, more windows with additional information may be opened.

The application works as follows:

Ø After opening the Player the user will have to select File→Open on the main bar of the application, so that he/she should choose the directory from which the player will load its data.

Ø One this has been done the "Select Start Date" and "Select End Date" boxes will be filled with the dates and times of available sessions stored in the system (hard drive or flash drive). The user might want to alter these default values.

Ø One the top-left corner there is a control panel with various buttons and a slide bar. All these items can be used to move through the recording as if it where an ordinary multimedia device.
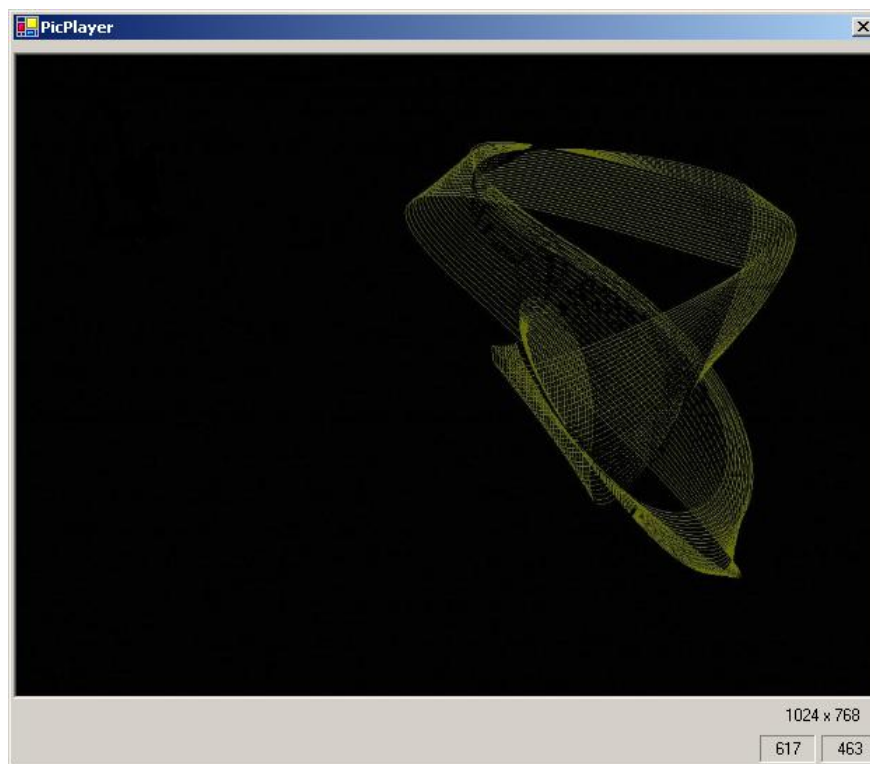

Figure 5.7.2: The Player's radar pictures viewing window.

Ø Selecting View→Video from the main bar the user can view the radar pictures that were recorded during the specified period of time shown in the "Select Start Date" and "Select End Date" boxes. See figure 4.2.

Ø Selecting View→FireDoors from the main bar the user can view the emergency signals that are emitted by the ship's fire doors, which were recorded during the specified period of time shown in the "Select Start Date" and "Select End Date" boxes. See figure 4.3.

Figure 5.7.3: The Player's fire doors emergency signals viewing window.

Ø Selecting View→OpenDoors from the main bar the user can view the emergency signals
that are emitted by the ship's open doors, which were recorded during the specified
period of time shown in the "Select Start Date" and "Select End Date" boxes. See figure
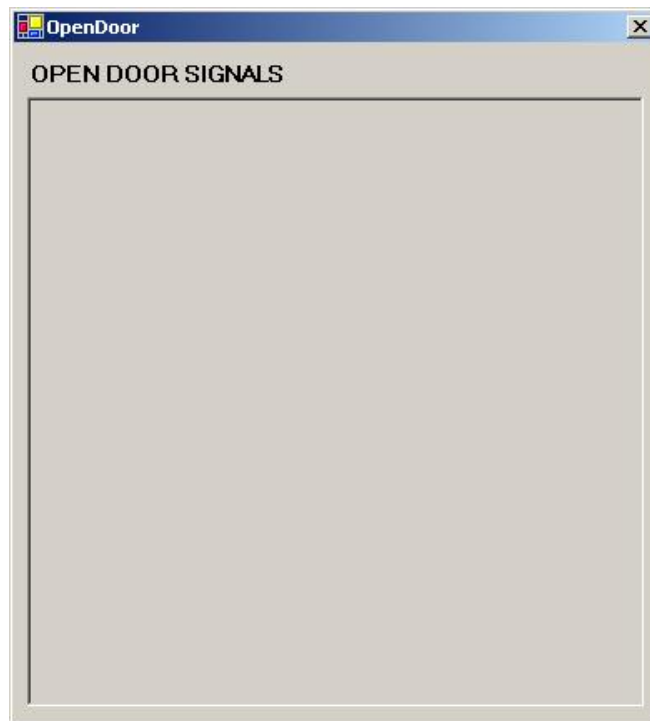4.4.

Figure 5.7.4: The Player's fire doors emergency signals viewing window.

As it was mention above the Player's main window consists of some very helpful buttons and status boxes. Their implementation is being descripted below:

- Ø **Play Button:** After pressing the Play button the application will start reproducing the stored files that were chosen by the user.

- Ø **Stop Button:** After pressing the Stop button the application will stop reproducing the stored files that were chosen by the user. If the user presses the Start button again the application will start reproducing the stored files from the beginning.

- Ø **Pause Button:** The application will pause the reproduction at the current instant. Press pause again to continue.

- Ø **10 minutes forward/backwards Button:** it will jump a 10 minutes space forward or backwards.

- Ø **1 minute forward/backwards Button:** it will jump a one minute space forward or backwards.

- Ø **Plus/Minus Button :** This couple of buttons changes the reproduction speed of the player. The player can go up to 8 times faster the usual time.

- Ø **Slide Bar:** The slide bar shows the progress of the player within the defined time period. The resolution of the bar is one minute portions (wave files) and the user may slide to any part he wants to examine.

- Ø **Current Sound/Video/Data/NMEA Playing Status Boxes:** TheseStatus Boxes display the files that are currently being reproduced.

- Ø **Absolute Time Status Box:** This Status Box displays the time passed since the sound file under reproduction started.

Note: The Player is coordinating its timer with the Sound whenever there is an active WAV file playing. Otherwise the timer is updated from the system clock.

- Ø **Current Time Status Box:** This Status Box displays the time instant that the Player is reproducing.

- Ø **Additional Recordings Text Box:** This text box displays any additional, optional NMEA signals and their time of arrival.

- Ø **SVDR state Panel:** This panel displays a simple graphical representation of the main VDR / S-VDR modules' state. The colour significance is the following one:

Figure 5.7.5: VDR / S-VDR software state.

Green: Module is working properly,

Light Green: Non critical error occurred,

Orange: Critical error occurred but module is still operating,

Red: Module is not working at all and must be restarted.

5.8 Data Transfer and Recovery

5.8.1 Purpose of the manual

In the previous section we described how to see the recorded data. The player works on data stored in a directory in the playback computer hard disk or on the VDR main unit disk.
If the data are in the main unit it is simple to copy and examine them. The situation is different if we wish to read the data from a recovered capsule.

5.8.2 Data transfer from an undamaged capsule

There are two families of storage methods in the capsules. Some capsules exhibit themselves as a normal storage medium and other have proprietary storage and retrieval methods.

In the first case data transfer is simple: connect the capsule according to manufacturer's instructions and copy the data to a directory. Instruct the player to use that directory. No special tools are required. Standard FTP cables and the usual hubs can be used.

In more detail:

You will need:
-         a PC running Windows XP Professional, with a sound card, a network connection (Ethernet) and at least 5 GBytes free space in its hard disk
-         a 24 Vdc power supply capable of providing at least 3A.
-         Support software
-         a COMAS encryption key, if you plan to use the player on the same PC

Contact our company for advice if in doubt.

-         Install the COMAS provided software in the PC: run the Setup program(s) in the root directory. Follow the instructions. Please accept all defaults provided.
-         insert the encryption key in a USB port
-         Find the 2 cables running from the capsule
-         Check the FTP cable. If the connector is damaged replace according to L3 Install manual (or the equivalent for your capsule – YYYY Install, YYYY being the capsule type)
-         Connect the FTP cable to the network connection of the PC
-         Set the PC at a fixed IP address in the 192.168.10.xxx subnet (not the .2, it is reserved for the capsule)
-         Connect the supply cable to the 24 Vdc power supply. Observe polarity.
-         Run the retrieval program.

In the case of a capsule using proprietary storage and retrieval methods, for example as those manufactured by L3, a special program is used:
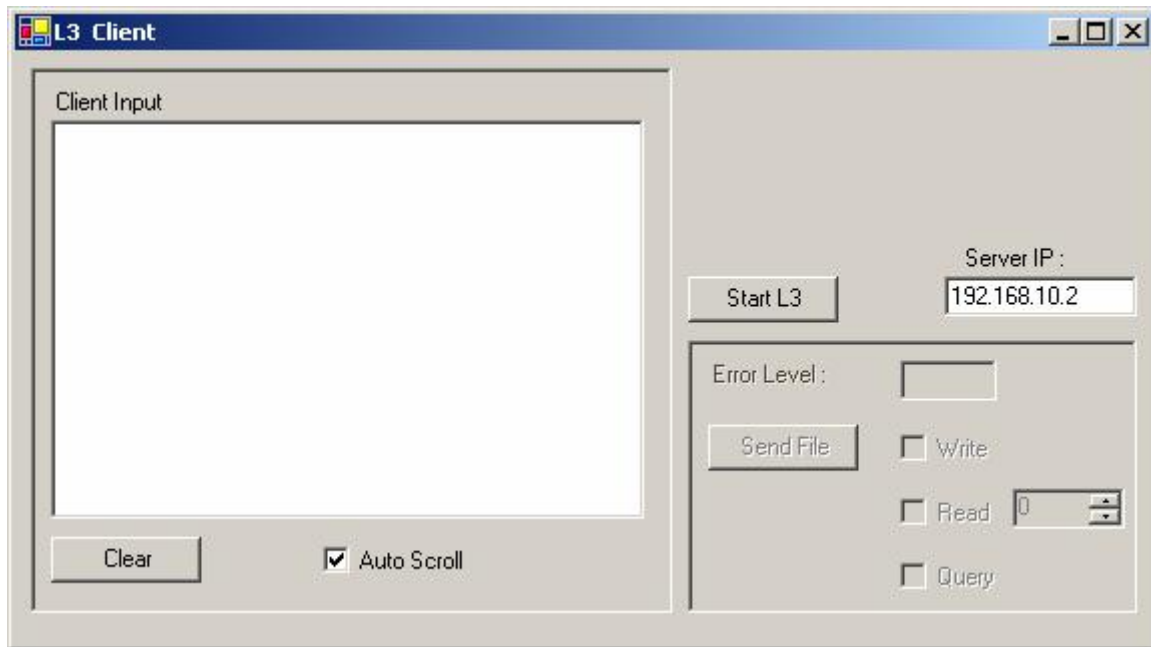
This client program copies all data from a capsule to a directory, regenerating the files and flagging errors. The program is preset to the required parameters, just press the "Start" button. After all files are transferred you can use the Player. Note that the player can use partial data, meaning that even if all data are not retrieved the saved data can be used. Both the client program and the player will flag all errors. If in doubt on the capsule type, ask for help from our support department. The name of the appropriate program is always YYYY client.

All the necessary software is included on the CD named "COMAS SVDR support software" available free of charge to every approved investigation authority on request. Setup instructions are included.

5.8.3 Data transfer from a damaged capsule

Sometimes the retrieved capsule is damaged but the storage medium is intact. It is thus impossible to simply connect the capsule and read the data. In such cases the capsule manufacturer will connect the storage medium and read the data in a file. Regrettably no specific instructions can be given on the repair of a damaged capsule, as the possible conditions after a severe accident are numerous. For more details, see capsule manufacturer documentation.
From this file we will retrieve the data with a program similar to L3 Client, but that program will read from a file instead of an IP address. A competent engineer will try to repair partially damaged files to help the authorities investigate the incident.

-        Retrieve the capsule
-        Close it as soon as possible in an air tide container to avoid further deterioration
-        Transport the container with extreme care: a damaged capsule is not as durable as a new one.
-        Contact COMAS or the capsule manufacturer for further instructions, describing in details capsule condition.

5.8.4 Copying data from the main unit

All data that are written to the capsule are written to the main unit, too. The data are stored to the directory C:\SVDR and are normally not from the last 12 hours, but some days long. To copy data you need to put the SVDR out of service, as described in the firs part of this manual, and then copy data to an appropriate medium, for example a flash memory. All filenames contain date and time in sort able form: YYYYMMDDHHMMSSHH, meaning year, month, day, hour, minute, seconds and hundreds of seconds. Thus it is easy to find the files of interest and copy them to the external medium.