

Seanet Pro

Software Manual

0706-SOM-00001, Issue: 06



© Tritech International Ltd

The copyright in this document is the property of Tritech International Ltd. The document is supplied by Tritech International Ltd on the understanding that it may not be copied, used, or disclosed to others except as authorised in writing by Tritech International Ltd.

Tritech International Ltd reserves the right to change, modify and update designs and specifications as part of their ongoing product development programme.

All product names are trademarks of their respective companies.

Table of Contents

Help & Support	4
Warning Symbols	5
1. Introduction	6
1.1. Features	6
1.2. Capabilities	6
2. Installing & Configuring Seanet Pro	8
2.1. Configuration Details	8
2.2. System Requirements	8
2.3. Software Installation	8
2.3.1. Seanet SCU Installation	8
2.3.2. PC or Laptop Installation	9
2.3.3. Uninstalling the software	11
3. Operating Seanet Pro	13
3.1. General Information and Operating Details	13
3.2. Seanet System Display	13
3.2.1. Main Screen	13
3.2.2. Toolbar Shortcut Buttons	14
3.2.3. Main Menu	16
3.2.4. Print Function	19
3.2.5. Environment Setup	20
3.2.6. Log Function	20
3.2.7. Colour Setup	21
3.2.8. GPS Display	22
3.2.9. Compass Display	24
3.2.10. Aux Device Display	24
3.2.11. Status Bar	25
3.2.12. Sidebar	26
3.2.13. Load/Save Settings	28
3.3. Configuring the Optional Video Input	28
3.3.1. Video Application Tools	29
3.3.2. Recording the Video	30
3.3.3. Video Capture Settings	31
3.3.4. Video Compression	31
3.3.5. Log Frame Rate	32
3.3.6. Video Frame Resolution	32
3.3.7. AVI File Sizes	32
3.4. Sonar Position Geo-referencing from 2 Marker Positions	32
4. Seanet Setup	37
4.1. Configuration Using Seanet Setup	37
4.2. Re-Programming Nodes	38
4.2.1. To Re-Program a Node	38
4.2.2. To Change a Node Number	39
4.3. Changing System Settings	41
4.3.1. General Setting Information	41
4.3.2. Configuring a COM Port for 3rd Party Devices	42
5. Troubleshooting	44
A. Input Stings Accepted by Seanet Pro	45
Glossary of Terminology	49

Help & Support

First please read this manual thoroughly (particularly the Troubleshooting section, if present). If a warranty is applicable, further details can be found in a Warranty Statement at the end of the manual.

Tritech International Ltd can be contacted as follows:

	Mail	<i>Tritech International Ltd</i> Peregrine Road Westhill Business Park Westhill, Aberdeenshire AB32 6JL, UK
	Telephone	++44(0)1224 744 111
	Fax	++44(0)1224 741 771
	Email	support@tritech.co.uk
	Website	www.tritech.co.uk

Prior to contacting *Tritech International Ltd* please ensure that the following is available:

1. The Serial Numbers of the product and any *Tritech International Ltd* equipment connected directly or indirectly to it.
2. Software or firmware revision numbers.
3. A clear fault description.
4. Details of any remedial action implemented.



Contamination

If the product has been used in a contaminated or hazardous environment you *must* de-contaminate the product and report any hazards *prior* to returning the unit for repair. *Under no circumstances should a product be returned that is contaminated with radioactive material.*

The name of the organisation which purchased the system is held on record at *Tritech International Ltd* and details of new software or hardware packages will be announced at regular intervals. This manual may not detail every aspect of operation and for the latest revision of the manual please refer to www.tritech.co.uk

Tritech International Ltd can only undertake to provide software support of systems loaded with the software in accordance with the instructions given in this manual. It is the customer's responsibility to ensure the compatibility of any other package they choose to use.

Warning Symbols

Throughout this manual the following symbols may be used where applicable to denote any particular hazards or areas which should be given special attention:



Note

This symbol highlights anything which would be of particular interest to the reader or provides extra information outside of the current topic.



Important

When this is shown there is potential to cause harm to the device due to static discharge. The components should not be handled without appropriate protection to prevent such a discharge occurring.



Caution

This highlights areas where extra care is needed to ensure that certain delicate components are not damaged.



Warning

DANGER OF INJURY TO SELF OR OTHERS

Where this symbol is present there is a serious risk of injury or loss of life. Care should be taken to follow the instructions correctly and also conduct a separate Risk Assessment prior to commencing work.

1. Introduction

Seanet Pro is the latest in a line of similar survey packages from *Tritech International Ltd* and follows on from previous WINSON and SONV3 surface display applications. Much of the functionality of these earlier packages has been built into Seanet Pro, along with increased functionality and an enhanced user interface.

It is possible to transfer sensors such as SeaKing and SeaPrince heads between the earlier SONV3 system and Seanet Pro. Transferring heads will usually first require a device re-program which is handled in the `Setup` application of each system. Ensure that when transferring heads they appear in the `Setup` node table with Status of `OK` (Seanet) or `Up to date` (SONV3).



Note

Newer devices such as the Sub Bottom Profiler, MicronNav, Gemini, SeaHub or Hammerhead will only operate under Seanet Pro. If in doubt, contact *Tritech International Ltd* for more details.

1.1. Features

- Fully integrated into the Windows Operating Systems (2000/XP/7/8).
- Intuitive look and feel.
- Fast and powerful program interface.
- Window resizing and multi-display capability.
- LAN interface options for network remote access.
- On-screen toolbars with quick access buttons for Logging, Printing, etc.
- On-screen "elastic-band" target measurements and markers.
- Video interfacing.
- Sonar scan enhancement tools and true acoustic zoom function.
- Improved serial device input and display.
- Integration and conversion of position data input.
- User configurable multi-device applications

1.2. Capabilities

Seanet Pro can simultaneously run and display several combinations of Imaging Sonar, Profiling Sonar, USBL Positioning, Bathymetric and Sidescan sensors.

By default the interface uses an ARCNET protocol to connect to the subsea devices allowing a standard data rate of 156kbps (max cable length 1200m) and is compatible with fibre-optic interfaces, other baud rates available for longer cable lengths, RS232 or RS485 serial communication.

Auxilliary devices can be connected via an RS232 serial port and the data-streams converted into visual output on the Seanet Pro display, examples include compasses, GPS devices and attitude sensors.

Seanet Pro has data logging and playback facilities which can be used to record and replay all data from subsea sensors such as SeaKing DFS Sonar, DFP Profiler, Sidescan and Bathy and also auxiliary device inputs, such as NMEA 1083.

Seanet Setup is used to display status of all connected nodes and to download new software and firmware upgrades into the subsea sensor heads onboard Flash RAM or FPGA module.

2. Installing & Configuring Seanet Pro

2.1. Configuration Details

The Seanet Pro software will be supplied on an Installation CD (PC systems) or ZIP Restore Disk (SCU systems). Also provided on these disks will be electronic copies of manuals and required drivers for AIF cards, SeaHub etc.

At regular intervals, updated versions of the Seanet Pro software will be announced by Trittech. Free upgrades will be offered to existing users; this is in keeping with our policy of maintaining the highest levels of customer support. Such updates will be made available for download from the Trittech web-site; www.tritech.co.uk

2.2. System Requirements

The Seanet Pro software should be installed on a system with the following minimum specification:

- Pentium III 800MHz or above (dual core CPU recommended for Gemini).
- Windows 2000, XP, 7 or 8.
- 256MB RAM for Windows 2000/XP, 1GB RAM for Windows 7.
- 1024 x 768 Resolution or above, High or True Colour.
- 50MB free hard disk space (plus additional for logging).
- CD Drive for PC installation.
- 1 spare PCI slot for AIF V4 Card, or spare USB 2.0 Port for SeaHub interface.
- Available Serial Port(s) for optional 3rd party device interfaces.



Note

Due to the discontinuation of Windows 98 and related support issues, current versions of Seanet Pro will no longer install on this platform.

2.3. Software Installation

The Seanet Pro software can either be installed on *Trittech International Ltd* Seanet SCUs installed with Windows XP Embedded or Windows 7 Embedded (depending on SCU version), or alternatively be installed to a PC based surface unit or laptop computer.

2.3.1. Seanet SCU Installation

The Seanet SCU will be pre-installed with the Windows Embedded operating system and Seanet Pro software. Seanet Pro can be re-installed from the disk partition, or a complete

system reset can be used to restore the device back to factory defaults. Refer to the SCU manual for more information on how to re-install the software (for SCUv4 devices this will involve using a Zip disk, SCUv5 uses an in-built flash drive).



Note

Consult the Seanet SCU product manual for more details and guidelines on installing, re-installing or repairing the software build including Windows operating system and Seanet Pro software.

2.3.2. PC or Laptop Installation

The PC or Laptop computer should be loaded with a standard version of Windows 2000, XP or 7. If for any reason it is necessary to reload the Seanet Pro software, this should be done using the installation CD supplied. Follow the setup dialog during installation.

The Seanet Pro software can be installed or reloaded as follows:

1. Insert the Seanet Pro Installation CD into the CD-ROM drive. If the CD auto-runs then a menu page will appear prompting to select the installation type. If `AutoRun` is disabled on the computer, then manually run the `Setup.exe` file to begin the installation.



Figure 2.1.

2. For AIF Card interfaces or SCU, select Seanet Pro using ARCNET.

For SeaHub or direct COM Port connections, Select Seanet Pro using RS232.



Figure 2.2.



Note

To install the Seanet Pro software, the computer must be logged on with Administrator rights.

- When the installation program starts, click **Next** to continue.



Figure 2.3.

- Read the license agreement and if you agree to the terms select the **YES** option, to allow you to click **Next**. Click **Next** to continue. Choose the installation destination directory. By default this will be `C:\Program Files\SeanetV2`. Click the browse button if you wish to change this location. Click **Next** to continue.

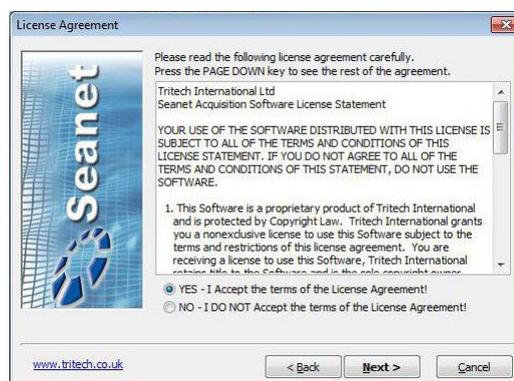


Figure 2.4.

- Choose the installation destination directory and click **Next** to continue.

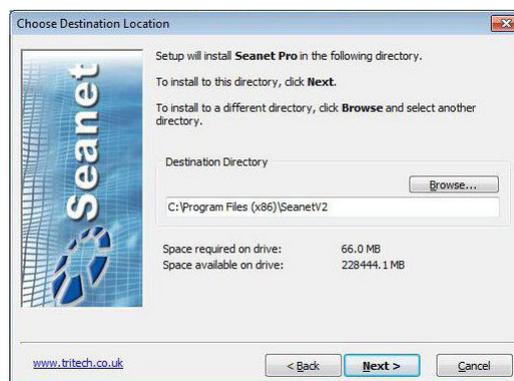


Figure 2.5.

6. Installation will proceed to copy program files and drivers onto your computer. Entries will be made in the Windows Registry. This process may take several minutes. Two desktop icons will be created during the installation
 - *Seanet Pro* is the main data acquisition and logging application.
 - *Seanet Setup* is used to verify device connection, re-configure devices and re-program them with updated software.



Figure 2.6.

7. Once files are copied, you will be prompted to restart the computer. Click **Finish** to reboot immediately. Rebooting may be deferred by selecting **No**, then clicking **Finish**.

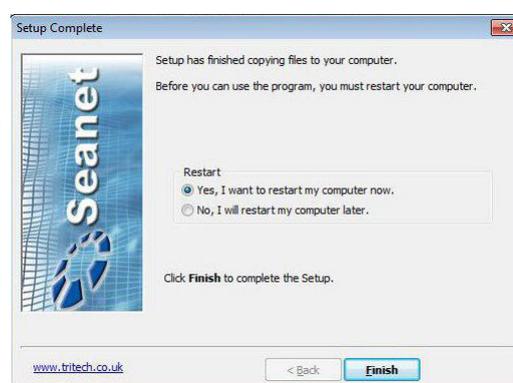


Figure 2.7.

8. The Screen resolution should be set to a recommended 1280x1024 at either 16-bit or 32-bit colours.

2.3.3. Uninstalling the software

To Remove the Seanet Pro software:

1. Open the Windows Control Panel, and select **Uninstall a program** from the **Programs** tab. (Note: use **Add or Remove Programs** in Windows XP).



Figure 2.8.

2. To remove the Seanet software, select **Seanet Pro** from the list, and click the **Uninstall** button.

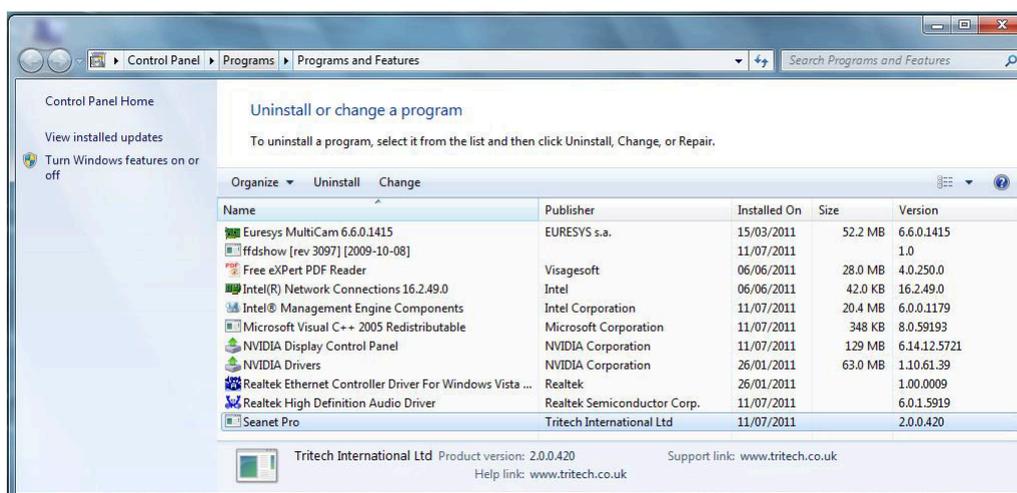


Figure 2.9.

3. When prompted click the **Yes** button to confirm un-installation. Un-installation will commence.
4. Click **Close** when complete to finish the task.

3. Operating Seanet Pro

3.1. General Information and Operating Details

Once a system has been installed in conjunction with the relevant sections of this manual, the subsea sensors and optional surface interfaces can be connected and powered. The sensors can be tested in air by powering up and observing that communications is established with the surface Seanet Pro software application.

When running the Seanet Pro application and with all subsea heads switched on, it may take a few seconds for the heads and other devices such as AIF card, SeaHub, RAT etc to become established and start communicating correctly. Until this time, the Status Bar will display a Timeout ('Timeout Node xx') message for each Node that it is trying to communicate with. These messages will disappear as each subsea element establishes communication.

If the RAT or subsea elements are not powered up, not present, or have a fault somewhere, then error messages (i.e. 'xxx N/A', 'xxx Bad') will be shown in the status bar boxes on the bottom of the display. If error messages appear, check that all the system parts are connected and that all leads/cables are correctly installed. When error messages continue to appear then there is a fault and the Troubleshooting section should be referred to.

The following sections of this manual will describe the general software controls in addition to installation and connection instructions. Further, separate manual sections will describe operation of each of the subsea Sensors and their connection details.

3.2. Seanet System Display

A general description of the screen layout and its controls will now be given. The screen menus and controls can all be accessed with Mouse pointer and keyboard. If the system Remote Access Terminal (RAT) is installed, then subsea device controls such as Gain and Range Scale can be adjusted using the RAT dials and Function buttons. The RAT Togglestick will provide additional control by providing the Mouse pointer interface.

There are a number of subsea devices that can be connected to the Seanet SCU including Imaging Sonar, Profiler, Bathy and Sidescan. Refer to the Operator's manual section that was supplied with each of these devices for specific details on their screen controls and functions. For the example below, an Imaging Sonar display will be used.

3.2.1. Main Screen

The Seanet Pro application can be run from the `Programs` group in the Windows `Start` menu or from the desktop by double clicking on the shortcut icon.

The Seanet Pro screen display shown below is a Gemini, SeaKing & Bathymetric application, although the view will vary depending on the applications chosen, each application will have a similar layout.

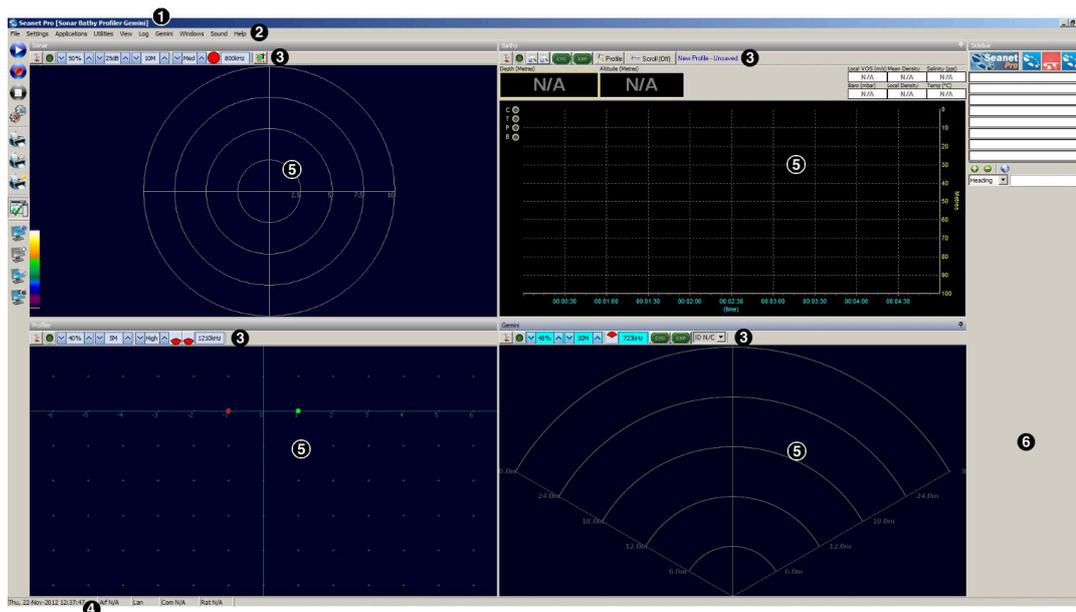


Figure 3.1.

The main areas of the display are:

- 1. Display Header** This part of the screen is used for system/software identification.
- 2. Menu Bar** This is where system set-up functions can be accessed. Printing, Application selection, Colour Scheme setup and Logging are some of the features that can be accessed in this screen area.
- 3. Settings Bar** This is where the Sensor can be controlled and configured. The Settings bar is on top of every display window for each device that is connected to the system. It includes a Tools Setup button, Led indicator (Pause/Go) and RAT dials and buttons
- 4. Status Bar** This part of the screen is used to display system status information, typically the AIF card interface status, Logging status/progress and Job specific information.
- 5. Sensor Display Area** This part of the screen is where the main Sensor data is displayed. Other pertinent data such as Range Scale, Cursor and status messages pertaining to the Sensor may also be displayed within this area - Refer to the manual section provided with each Sensor for further details of its display area.
- 6. Sidebar** This is where Serial input data and user text can be displayed. This bar can be placed on the Left or Right hand side with RHS the default setting. The operator can choose to have this bar visible or not and it can also be folded away.

3.2.2. Toolbar Shortcut Buttons

On the left hand edge of the main Seanet Pro display is a toolbar containing icons as detailed below:

1. `Play Log File` Opens a dialog window to enable the selection of a `.V4Log` file for playback.
2. `Record Log File` Starts recording a log file, a dialog box will present itself so a name can be chosen for the log file.
3. `Stop Logging/Playback` Halts the current playback or recording activities.
4. `Log File Setup` Opens the settings dialog to control how files are logged.
5. `Print` Opens the `Print` dialog to enable selection of an output printer, paper size, etc.
6. `Printer Setup` Enables printer settings to be changed.
7. `Quick Print` If `Quick Print` is enabled when `Print` is selected the dialog box will not appear and instead the printer will use whatever settings have been specified in `Printer Setup`.
8. `Sidebar` Displays or hides the right-hand sidebar.
9. `Start Screen Capture to AVI` Starts recording an AVI file onto disk - note that this does not include an associated log file.
10. `Stop Screen Capture` Stops the recording activity.
11. `Screen Capture Settings` For changing the settings for the AVI recording.
12. `Snapshot` Opens a dialog prompting for a name for either a Bitmap (`.bmp`) or TIFF (`.tiff`) image of the Seanet Pro display screen.



Figure 3.2.

Right-clicking on a space within the button bar brings up a menu to enable different types of buttons to be shown/hidden. This is a duplicate of the `Toolbar` option located in the `View` menu.

De-selecting `Large Icons` is useful if working on a low resolution display.

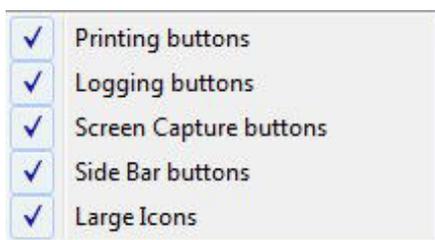


Figure 3.3.

3.2.3. Main Menu

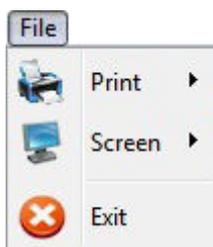


Figure 3.4.

1. `Print` Output screenshot to printer.
2. `Screen Capture` Screen to AVI or save screen to Bitmap/Tiff.
3. `Exit` Used to exit program.

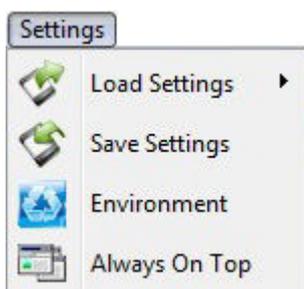


Figure 3.5.

1. `Load/Save Settings` Save and Load the current display and device settings (up to 8 can be saved).
2. `Environment` Used to enter environmental parameters such as system Velocity Of Sound.
3. `Always On Top` Main Screen is Always on Top of Windows desktop.



Figure 3.6.

This Menu Item will only be present in Seanet Pro and not from running Seanet Setup from the desktop icon. Application examples include `Single Sonar`, `Sonar Profiler` and `Sonar Bathy Profiler`. There is also an `Application Wizard` available at the top of the list which can be used to create user applications for required device combinations.



Figure 3.7.

1. GPS Pop-up Form to display GPS data received through a COM port.
2. Compass Pop-up Form to display Compass data received through a COM port.
3. Auxilliary Device Pop-up Form to display Aux Device data (i.e. Digiquartz Pressure Sensor or PA/NMEA Altimeter data) received through a COM port.
4. Com Setup Configure and Enable COM ports for various serial inputs/devices including GPS, Pipetracker, Barometer and Compass.
5. GPS Diagnostic Terminal window for viewing received serial data.
6. Compass Diagnostic Terminal window for viewing received serial data.
7. Auxilliary Device Diagnostic Terminal window for viewing received serial data.
8. Barometer Diagnostic Terminal window for viewing received serial data.

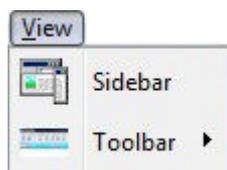


Figure 3.8.

1. Sidebar Enable/Disable the Sidebar. Note: In certain applications, i.e. 'Sonar Video', the Sidebar will be opened and docked to the blank $\frac{1}{4}$ window panel filler.
2. Toolbars There are several toolbars containing shortcut buttons which can be displayed in the Menu Bar area or docked to the sides of the Display Area. For details see the "Toolbar Shortcut Buttons" section.

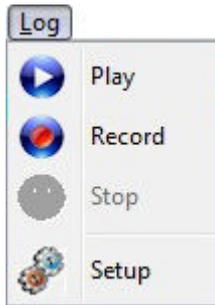


Figure 3.9.

1. **Play** Use to play back recorded log data (follow the on screen display).
2. **Record** Use to record Sonar data (follow the on screen display).
3. **Stop** Stop recording and/or Auto Logging.
4. **Setup** Select file options for recording log files (Follow the on screen display).



Figure 3.10.

Sonar (this will be renamed for other devices, e.g., Sidescan, Profiler, Bathy)

1. **Colours** Use to select a saved colour scheme.
2. **Colour Setup** Use to configure the existing colour scheme or create a new colour scheme.

Some examples of colour schemes that are available by default:

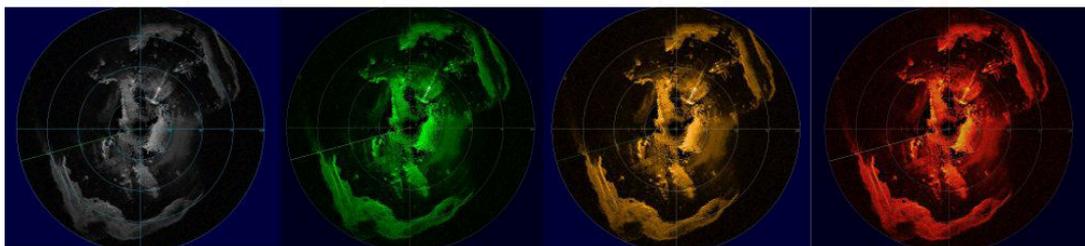


Figure 3.11.



Figure 3.12.

Windows (only functional in multi-Sensor Applications)

1. **Cycle F1** Cycle to the next Display Window (can also be done using the F1 key).
2. **Zoom F2** Enlarge the current Display Window to fill the window, click again to display all the Display Windows (can also be done with the F2 key).
3. **Sonar** Switch focus to Sonar Display window.
4. **Sidebar** Will be replaced with name of another Sensor in a Multi-Sensor Application.



Figure 3.13.

The **Sound** menu enables an acoustic representation of the visuals presented on the Main Screen of the Seanet Pro application. Clicking on **Setup** allows configuration of how this sound is represented.



Figure 3.14.

1. **About Seanet** Gives details of program and version number.
2. **Seanet Guide** Seanet Help file.
3. **System Information** Gives information of computer resources in use.

3.2.4. Print Function



Figure 3.15.

This is accessed by navigating to the **File** menu and selecting **Print**

1. **Quick Print On** When printing the **Print Setup** dialog box will not appear and default printer and its settings are chosen.
2. **Setup Printer** – Select and setup the Windows Printer.
3. **To Printer** – Print to Windows Printer. When **Quick Print On** is set to **Off**, a setup dialog will appear allowing the user to select printer and set options before printing.



Caution

Printing may take a few moments during which sonar updates are suspended. It is therefore not advisable to make printouts during actual underwater operations unless it is safe to do so.

3.2.5. Environment Setup

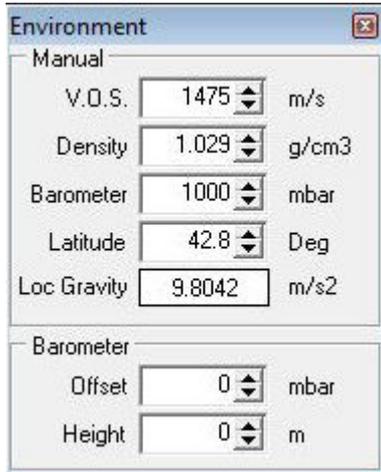


Figure 3.16.

This is accessed by navigating to `Environment` in the `Settings` menu. This is where all the environmental values should be applied for use in various device applications. Only the Velocity of Sound (V.O.S) will apply for a Sonar application – the remaining entries are for Bathymetric calculations.

1. `V.O.S.` System value applied to all acoustic devices to correct plotter ranges. Applies to Sonar and Profiler and can also be applied in MicronNav calculations.
2. `Density` Applied to SK701 Bathymetric (no CT probe) depth calculations.
3. `Latitude` Applied in the `Loc Gravity` calculation which is then applied in Bathymetric depth calculations.
4. `Barometer` Applied to Bathymetric depth calculations when a Barometer interface is not used. If Barometer interface is installed then `Offset` and `Height` values should be entered.

3.2.6. Log Function

This is accessed via the `Log` menu on the Menu bar:

With Logging de-activated, click on `Play` to replay a Log file or click `Record` to start recording a new Log file. When a new Log file is opened for recording, the file name will default to a Date and Time format.

During recording, the `Play` feature will be locked out and `Record` option will be ticked, highlighting a recording is active. During recording the status bar (on the bottom of the display) indicates the current log file size. Clicking on `Stop` or de-selecting `Record` will halt recording.

During log file playback, the file details will be displayed in the replay dialog. The `Pause` button temporarily halts the log file and `Continuous Loop` plays it continuously. There is

also a (clock) button to select play back at real time speed. The slider bar controls the replay speed.



Note

The name of the log file is displayed in the replay dialog caption bar.

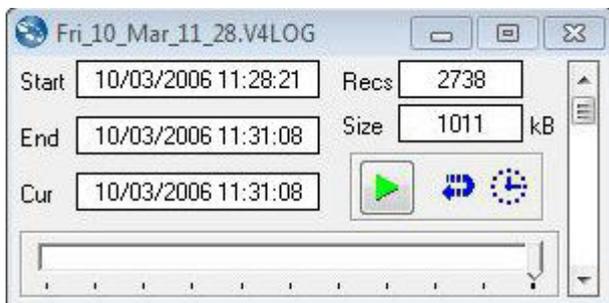


Figure 3.17.

Setup allows the directory where log files are to be stored to be changed and set a maximum file size selected. The time-stamping of saved records can be in either Local or UTC time.

There is an `Auto LogOn` option to allow auto logging as soon as the system starts. There is a check-box to activate this (On/Off) via the Rat 'F7' button.

The user can specify a `Base Name` or choose a `Date/Time` format to prefix the automatically generated file names.

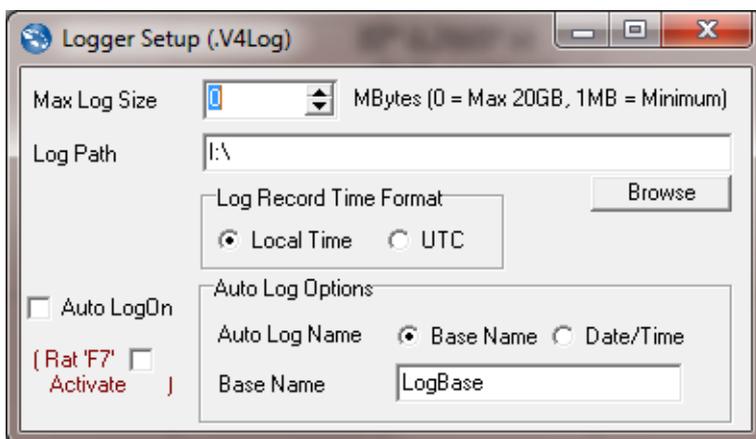


Figure 3.18.

3.2.7. Colour Setup

This is accessed via `Colour Setup` which is found in the `Sonar` menu.



Note

For other device applications such as `Profiler`, `Bathymetric` or `Sidescan`, the `Sonar` menu item will be replaced with `Profiler`, `Bathymetric`, `Sidescan` as appropriate.

Click on the `New` button to start a new colour scheme or change the colours of the current scheme (indicated in the drop-down list, `Colour6` in this case). There are 7 factory preset

colour schemes which cannot be altered. If you try to alter these schemes then a dialog will prompt you to save to a new scheme if and when you try to save or apply changes.

The various colour boxes can be clicked on to configure a new colour for that item. The 3 slider bars are used to set the new RGB colour levels for each item and the `Apply` button is used to confirm the changes. Clicking on `OK` accepts all changes and exits the dialog.

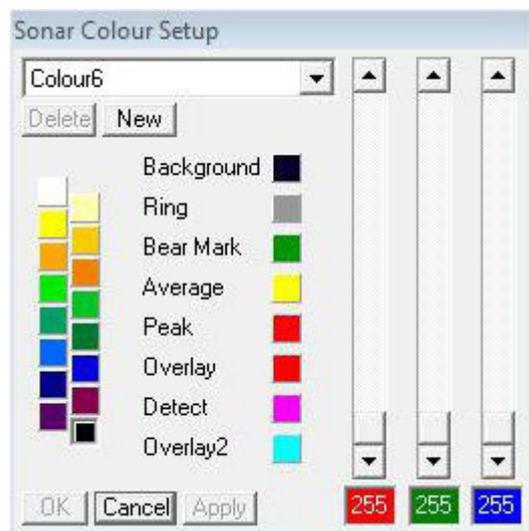


Figure 3.19.

3.2.8. GPS Display

This is accessed via the `GPS` in the `Utilities` menu.

When enabled, the GPS dialog will be displayed.

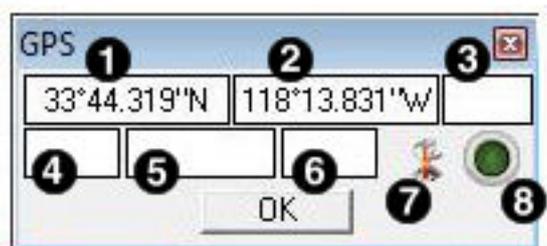


Figure 3.20.

1. Latitude or Easting
2. Longitude or Northing
3. Zone
4. Course Over Ground
5. Speed Over Ground
6. Heading
7. GPS Input is used to select and configure the GPS input messages.
8. Diagnostics flashes green when there is an incoming GPS packet.

The GPS input COM port is configured from Com Setup.

The GPS Setup panel is accessed by clicking on the GPS Input button and is where the NMEA 0183 message type can be selected.

All position data updates displayed in the GPS panel will be recorded when the logging function is used to record device data and GPS data.

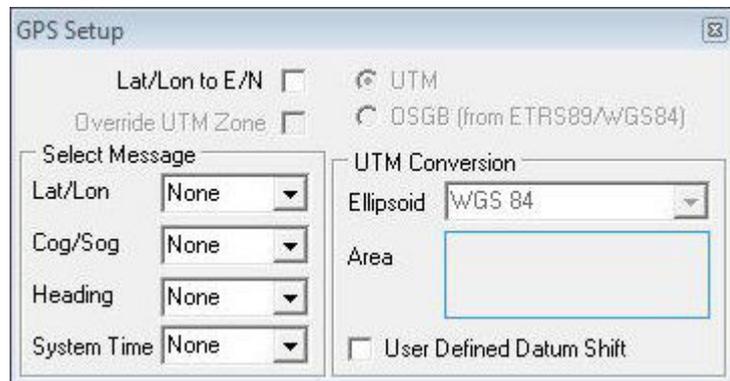


Figure 3.21.

The GPS Setup panel contains 4 drop-down menus for selecting NMEA 0183 message types for Latitude/Longitude, COG/SOG, Heading and System Time.

It is possible to set the system time via any of the listed NMEA messages and this will update the clock within the sensor device. This is used to time synchronise output data strings to a survey computer or if log data containing both device and GPS position data is to be post-processed.

The GPS Setup panel includes the option to convert and display the incoming Lat/Lon positions in Easting/Northing format using a UTM or OSGB conversion.

There is also facility to select the particular Ellipsoid to apply in the UTM conversion equation with option to apply a geodetic datum shift. By ticking the User Defined Datum Shift check-box, an Edit button will appear:



Figure 3.22.

Clicking on this button will display the User Defined Geodetic Shift panel where parameters can be entered for the required datum shift.

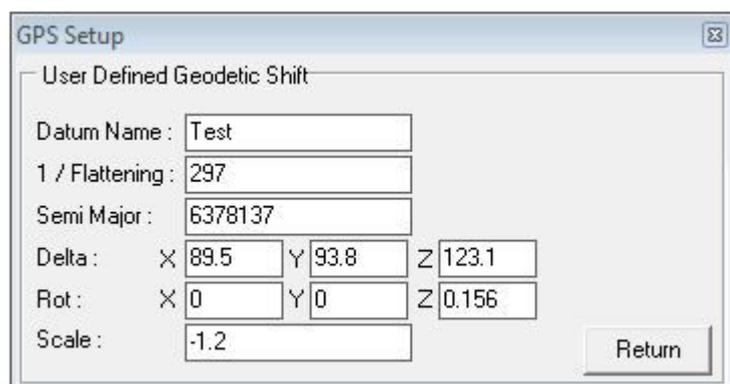


Figure 3.23.

Once parameters have been entered, press `Return` to go back to the previous setup panel.

A terminal window can also be opened to display the incoming GPS data strings. This is opened by clicking on `GPS Diagnostic` in the `Utilities` menu. The terminal window will appear as follows:

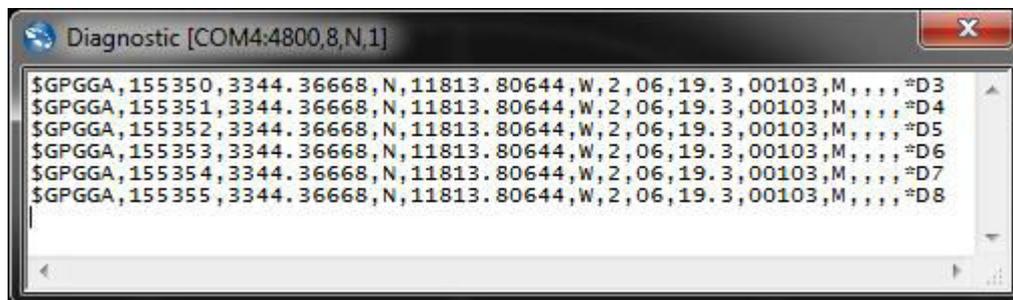


Figure 3.24.

3.2.9. Compass Display

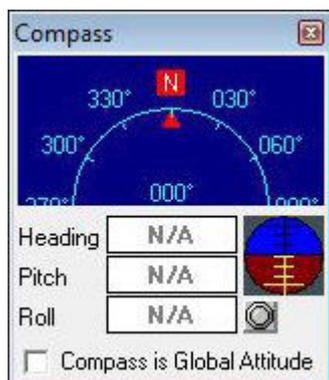


Figure 3.25.

This is accessed via the `Utilities` menu by clicking on `Compass`.

When enabled, a pop-up compass form will be displayed. This will display the compass data, received through a surface COM port, including Heading, Pitch and Roll (all in degrees).

All data updates displayed in the compass panel will be recorded when the logging function is used to record device data.

Also, on the pop-up compass form there is a diagnostic button which flashes green when there is an incoming GPS packet.

A Terminal window can also be opened to display the incoming Compass data strings. This is opened from `Compass Diagnostic` in the `Utilities` menu.

3.2.10. Aux Device Display

This is accessed via the `Utilities` menu by clicking on `Auxiliary Device`.

When enabled, a pop-up Text Box form will be displayed. This can be used to display ASCII character data from a serial device up to a maximum of 100 characters in length and terminated with a `<Carriage Return><Line Feed>` (ASCII code 13 followed by code 10).

The `Aux Device` form can process and display altitude data (in metres), received through a surface COM port, from a PA or NMEA Altimeter; Digiquartz pressure data will also be converted to display a depth in metres. The values entered into the `Environment` dialog (accessed through the `Settings` menu) for density, barometer and local gravity will also be applied to the calculation of depth.

- Use `As Remote Event` to send the Aux device data to the Sidescan Sonar or Sub-Bottom Profiler plotter as a 'Remote Event' for annotation.
- `View Raw Data` to view the raw data string from known devices such as a PA Altimeter or Digiquartz instead of the Seanet processed string.

All data updates displayed in the Aux Device text panel will be recorded when the logging function is used to record device data.

The Diagnostic Led flashes green when there is an incoming Aux packet. A Terminal window can also be opened to display the incoming data strings. This is opened from the `Utilities` menu by selecting `Auxiliary Device Diagnostic`.

3.2.11. Status Bar



Figure 3.26.

1. Date and time.
2. Status of interface card (AIF card).
3. ARCNET LAN Timeout counter
4. Status of Serial COM port inputs.
5. Status of Remote Access Terminal (RAT).
6. Sensor Status.

Various error codes are reported in the status bar at the bottom of the screen. These help the user determine any faults with equipment or cabling, as a guide to making any corrections or replacements

Status and error codes:

No Aif	The AIF card is not installed or not configured/enabled correctly. This status will also appear when using the SeaHub serial port interface instead of the AIF card interface.
Rat Ok	Remote Access Terminal (RAT) is connected and communicating okay.
Rat N/A	RAT is not connected or there is a connection problem.
No COM	Will display if only an AIF Card interface is in use or no COM Port has yet been opened (e.g. No "Aif" device yet enabled from <code>Com Setup</code> accessed through the <code>Utilities</code> menu).

Com OK	For SeaHub or COM Port interface; A COM port has been opened and is functioning correctly.
Com Bad	For SeaHub or COM Port interface; The COM port cannot be opened – it may already be in use by another application or may have a problem.
Com AIF Error TMO	For SeaHub or COM Port device interface; the device is not responding (check it is connected and powered).
Timeout x	There is no communication with head node x

3.2.12. Sidebar



Figure 3.27.

This can be enabled or disabled from the `View` menu and toggling the `Sidebar` option. Alternatively, the pin button on the top right of the sidebar can be toggled to permanently pin or fold it away. The sidebar can also be picked up by its caption bar and docked to either the left or right hand side of the display area.



Clicking on the pin button will fold away and hide the Sidebar. Moving the mouse over the `Sidebar` label will cause it to roll out. Click the pin again to permanently pin it back in place.

Figure 3.28.

The sidebar is the viewing area for `Client Icons` and `User Text Boxes`. These can be set via an `SK REMV4` command (`':SB'` Set Button Bar) received through the serial COM port.

Up to 8 types of pre-determined serial input string may be displayed and these include GPS and Compass data inputs.

`Client Icons`. In addition to the fixed Seanet Pro logo, there are 3 icons that can be configured by the client. Each icon is 32x32 pixels and can be loaded by a double-click which

will bring up a `Set Icon` dialog. Select `Icon Number` in a loaded `.EXE` or `.ICL` file as shown or select a `32x32 .ICO` file to display.



Figure 3.29.

`User Text Boxes`. Eight editable text boxes are available to display job or reminder information. Double-click on any text box to bring up an editor where text can be entered.

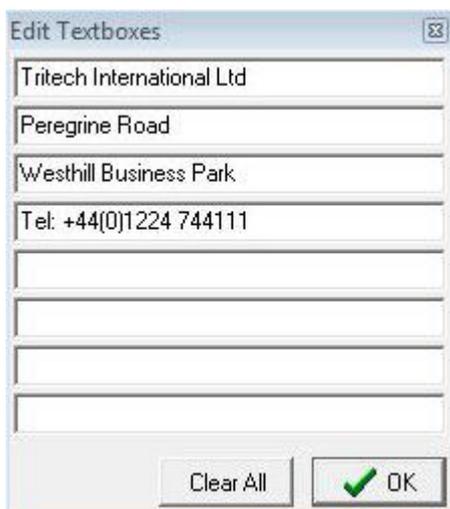


Figure 3.30.

Text can also be passed to these boxes using the `‘:SB’ SK REMV4` serial command.

`Serial Input Data` A maximum of 8 serial input display boxes can be selected (+ / -). The drop-down menu in each box will select the particular type of input to display. `Cog/Sog` from a GPS message and `Pitch/Roll` from an attitude sensor are shown, other inputs include `Heading` from a NMEA HDT/HDM string, `Depth` calculated from Digiquartz Pressure Sensor readings and `Altitude` from a PA or NMEA Altimeter.



Figure 3.31.

`GPS Data Input`. Click on this icon to open the GPS Setup dialog.

To configure a COM Port for serial input data, navigate to `Com Setup` in the `Utilities` menu.

3.2.13. Load/Save Settings

This is where the screen configuration can be saved and previously saved configurations can be loaded. This is accessed via the Settings menu on the Menu bar.

Place the mouse pointer over the `Load Settings` menu item, to bring up a sub-menu listing all the previously stored configuration settings.

There is a default setting that will always appear in the list and cannot be deleted. This is the setting to be used for reverting the system back to factory defaults.

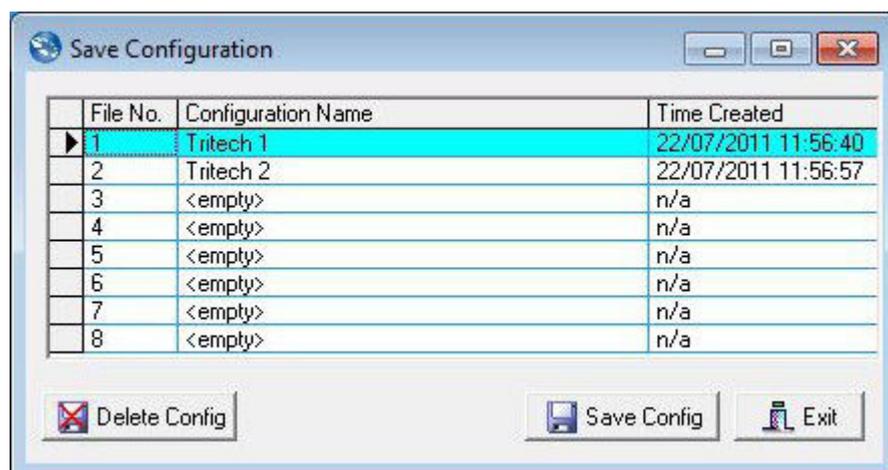


Figure 3.32.

In addition to the factory default up to 8 different configurations can be saved. To save the current application and form layout, click on the `Save Config` button. A prompt will be displayed to enter the configuration name, with a default name of "User x" initially given, where "x" is the configuration number.

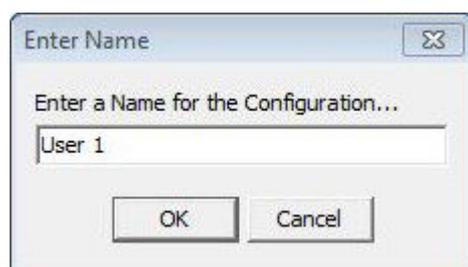


Figure 3.33.

Click on `OK` to store the current settings to file, where they can later be loaded using the `Load Settings`. Disused configurations can also be deleted from the `Save Configuration` form by highlighting the configuration to be deleted and then selecting `Delete Config`.

3.3. Configuring the Optional Video Input

The Seanet SCU or customer supplied PC can be installed with an optional video input capture card. This card will receive PAL/NTSC video from a composite source and display the video in a window adjacent to other devices such as Sonar. The `Application` menu allows selection of layouts which contain a video display screen.

3.3.1. Video Application Tools

To configure the video and capture settings, click on the tools icon on the left of the video settings bar to open the menu:

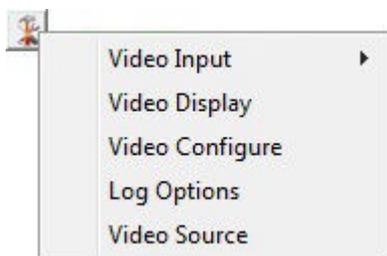


Figure 3.34.

`Video Input` lists the video inputs (or capture devices) that are installed into Windows. These may include internal capture cards, external USB devices and built-in webcams (if using a laptop computer).

If there is a capture device that has more than one driver installed then it may be necessary to try out the different drivers to find one that is correctly working. If there is a choice of drivers then it is recommended to opt for the driver labelled 'WDM' or 'Video' and not 'VFW'. A VFW driver (Video For Windows) is a driver that is used with older operating systems. Although it may work, the same performance will not be obtained compared with using more recent operating system drivers.

`Video Display` is called out from the device driver and will change according to capture device. This dialog will not always be available and will depend on the source capture device that is currently selected from the `Video Input` sub-menu.

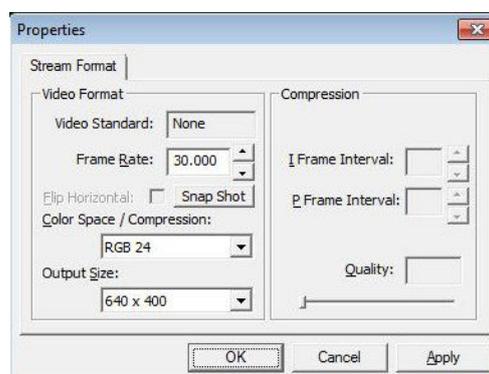


Figure 3.35.



Note

The `Output Size` can affect the display quality of the video preview. If the video display appears distorted try changing `Color Space/Compression` and `Output Size` to rectify (RGB24 and 640x480 are the recommended settings).

Video Configure is also called out from the device driver and will change according to capture device.

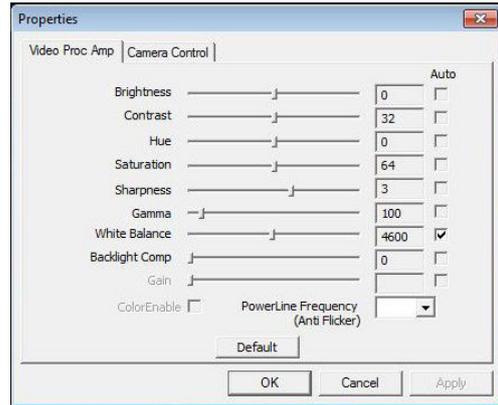


Figure 3.36.

Log Options The video footage is logged into an .AVI file format with same filename as the main Seanet Pro .V4Log log file. A frame index record is now logged into the log file which is used during playback to synchronise the video to any other sensor data that is being extracted from the log. if no other sensor data is present then video will be replayed on it's own.

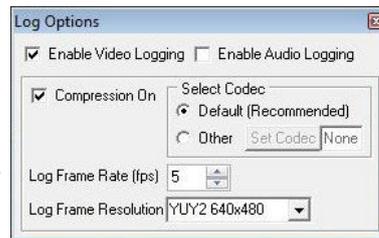


Figure 3.37.

- Tick the `Enable Video Logging` box to enable the video recording whenever a new log session is opened (by going to the `Log` menu and selecting `Record`).
- The `Log Frame Rate`, `Resolution` and `Compression` should then be configured, which will affect the video recording. A default video codec is installed which has been configured to capture good quality video at a relatively low data capacity. It is recommended that this codec be used although other codecs can be selected by selecting `Other` and clicking on `Set Codec`.
- Tick the `Enable Audio Logging` box to record audio from a connected Microphone or sound recording device. Such a device will first need to be configured and selected in Windows (e.g. Control Panel – Sounds and Audio Devices – ‘Audio’ tab page – ‘Sound Recording’/‘Sound Playback’). Audio will be sampled default at 8-bit, 11kHz, PCM format.

Video Source. A number of capture devices have multiple input sources. These sources can be for inputs from composite or S-VHS feeds and also from terrestrial TV stations (e.g. TV Tuner cards). It is important that the feed from the video camera (normally composite) is selected.

3.3.2. Recording the Video

The input video can be recorded alongside other device data such as Sonar and MicronNav. All device data is stored in the .V4Log log file. The video is recorded into a separate “.AVI file which is saved in the same root folder as the log file. The AVI file will be given the same filename as that of the log file.

For example, to start recording, click on `Log` menu and select `Record` then set the filename and path for the .V4Log file, and the video file will automatically be created, so if there is a file named:

D:\Logs\Thu_14_Apr_16_07.V4LOG

Then video will automatically be recorded to:

D:\Logs\Thu_14_Apr_16_07.AVI

When replaying the data (click `Log` menu and select `Play`), the `.V4LOG` log file is selected and opened. If there is an associated `.AVI` file (with same filename) found in the same folder as the `.V4Log` file then it will also be opened and replayed. The playback of both files will be simultaneous and in time synchronisation with each other.

3.3.3. Video Capture Settings

When capturing video to a log file, there are several settings available in the 'Log Options' to consider. These settings will affect the quality and size of the captured video data.

It is strongly suggested that video capture using Seanet Pro is tested, and capture files sizes and rates checked and verified, before going live. The PC specification should also be adequate and a suitable capture device used to give desired performance and video quality. Any modern computer should be capable of video capture although output performance can not always be associated with a the computer specification and a clean re-installation of Windows can often release resources and improve the overall performance. If purchasing a new computer for use with Seanet Pro ensure that the storage disk to be used is capable of fast transfer speeds. For internal hard-drives SATA or SCSI should be used and externally a minimum of USB2.0 is required.

There is also a limiting factor in some video capture devices, in particular with some USB models. The capture filter for the device can often share resources for both capture and preview functions. This means that the device hardware must share bandwidth between rendering video on the display and capturing video to file using the file writer. As a consequence of this sharing if the available bandwidth becomes over utilised then the preview function will begin to drop frames so that the capture element can maintain itself (the capture function is always given priority over the preview function). If during video capture it is seen that the video display is dropping frames (or perhaps not updating at all), but the AVI file is being written to, then it may be the capture device that is causing the fault.

3.3.4. Video Compression



Note

Selection of the correct codec will greatly reduce AVI file sizes.

Microsoft Windows is bundled with several video codecs. Some of these have limited functionality and limiting performance. In tests with Seanet Pro by *Tritech International Ltd* the best performance was obtained with the Cinepak® codec (developed for Microsoft by Radius).

For instance, using the Cinepak® codec can reduce video file sizes by up to 90% and more in some cases, which is very important when long video runs are to be recorded onto limited disk storage space. Using the correct codec can bring high quality video capture sizes down from 1GB min⁻¹ to under 10MB min⁻¹.

As an alternative Open Source codecs such as XVID are available. Similar to Cinepak®, XVID gives high quality and relatively loss-less video capture and remarkably small file sizes and can be downloaded from www.xvid.org. This codec could be useful if a portable solution is required, where an AVI file is to be distributed among AppleMac, Unix or Linux machines but it does require that the codec is installed on the computer prior to open and playback of the file.



Note

It is also possible to de-compress or even re-compress an AVI file post-job. A Microsoft utility named "GraphEdt.exe" is a tool that can be used to perform this task and is available from www.microsoft.com.

To enable video compression, tick the `Compression On` tick box in the `Log Options` page and then click on the `Set Codec` button to select from the list of codecs that are currently installed.

3.3.5. Log Frame Rate

This is the number of frames per second that is recorded to the AVI file. For capturing high speed moving object a frame rate of 25 frames per second is usually required. However, this can often be reduced to 15 or even 10 frames per second to give adequate motion coverage of moving targets underwater. The benefits of reducing the frame rate is to reduce the size of the AVI file. Also the more often the AVI is being written to then the more often the log file is written to which means that both files are being written to simultaneously. Disk transfer speeds and bus types in the computer therefore need to be capable of fast transfer speeds. SATA or SCSI solid state disks (SSD) are recommended above IDE hard drives. If using an external drive it needs to be at least USB 2.0 compliant and connected to a USB 2.0 port, and USB 3.0 or eSATA is recommended.

3.3.6. Video Frame Resolution

The list of available resolutions (horizontal x vertical of the video frame) will be fixed to each device type. Some capture devices will only handle specific resolutions and it is often best to use the highest resolution available to the device and then opt to apply compression and/or a reduced frame rate to keep AVI file sizes down. If the video is only going to be displayed and or screen printed in a ¼ window within Seanet Pro, then 320x240 may be sufficient.

3.3.7. AVI File Sizes

The video component uses DirectShow and will write AVI V2.0 files. These can be over 2.0GB in size. However, files over this size will not open in Seanet Pro and so it is strongly recommended that video capture rates are first tested before going live, and maximum recording time is then calculated to keep AVI file sizes within this limit. Seanet Pro will display a warning in the status bar when the AVI file size reaches 1.9GB and will then auto-close the file when it reaches the 2GB limit.

3.4. Sonar Position Geo-referencing from 2 Marker Positions



Note

This function requires an application with `Sonar` and `Nav` displays loaded (e.g., by selecting `Settings`→`Applications`→`Sonar Nav`). The chart of the `Nav` display is used to obtain the Marker position references to be used in this function. If a `Nav` chart is not used then the Marker positions must be manually entered in the `Sonar` display.

First from Seanet Pro, click on the Sonar Tools menu and open a pair of Markers (i.e., select Markers and choose A-B, C-D, E-F or G-H). The Marker pair A-B is opened in this example.

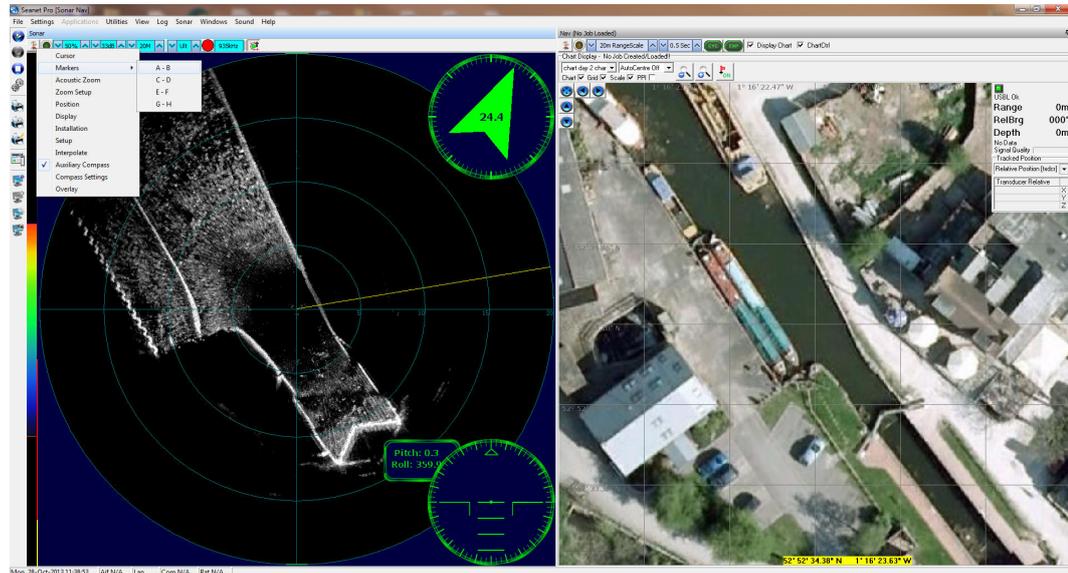


Figure 3.38.

Next, enable both markers as outlined in Figure 3.39, "" below. This will lay the markers at the center of the Sonar display as shown.

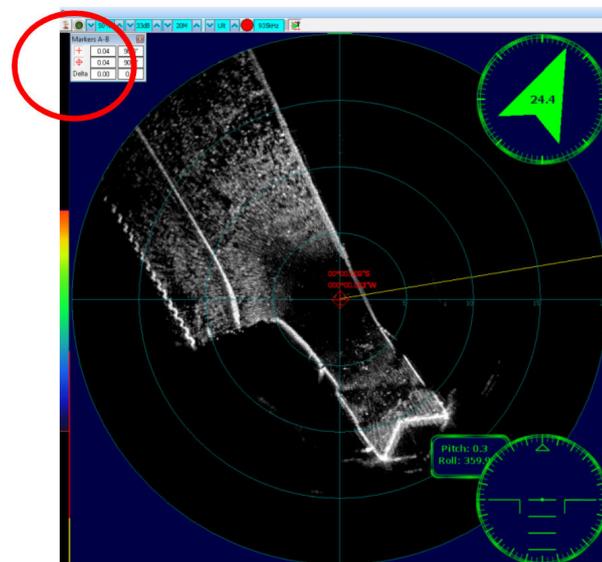


Figure 3.39.

Left click and drag both markers to the reference points that are to be used.

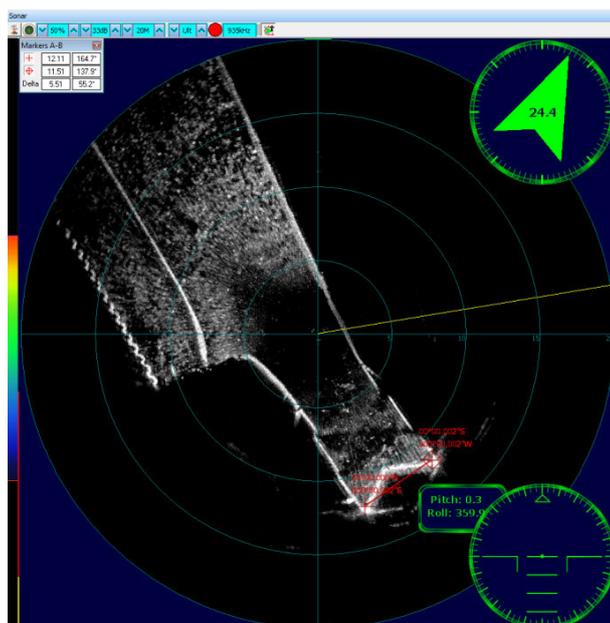


Figure 3.40.

Then, opening the Sonar Tools again select Installation.

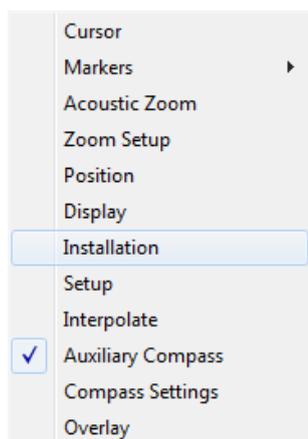


Figure 3.41.

This will open the Installation dialog. From this dialog select the option From Marker Positions as the Georeferencing option for the sonar and ensure the correct marker pair is selected (A and B in this case).

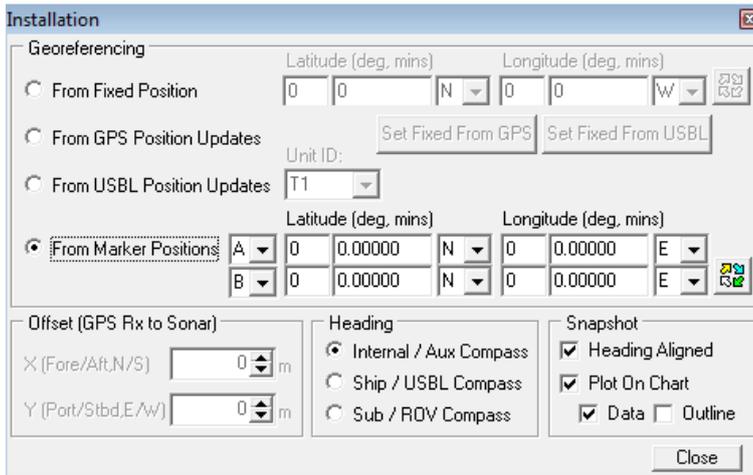


Figure 3.42.

At this stage the marker positions can be manually entered into the edit boxes (DegMins or DegMinSecs are the two format options available through clicking on the "cycle" button)

If a Nav chart is loaded then the Marker positions can be set from the chart. Simply right-click on the chart at the point of each Marker location and select Set As Marker x Position.

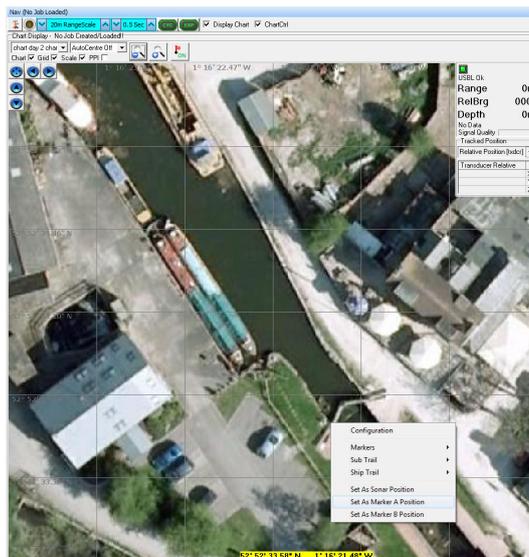


Figure 3.43.

This will update the Marker position entry in the Installation page as shown below.

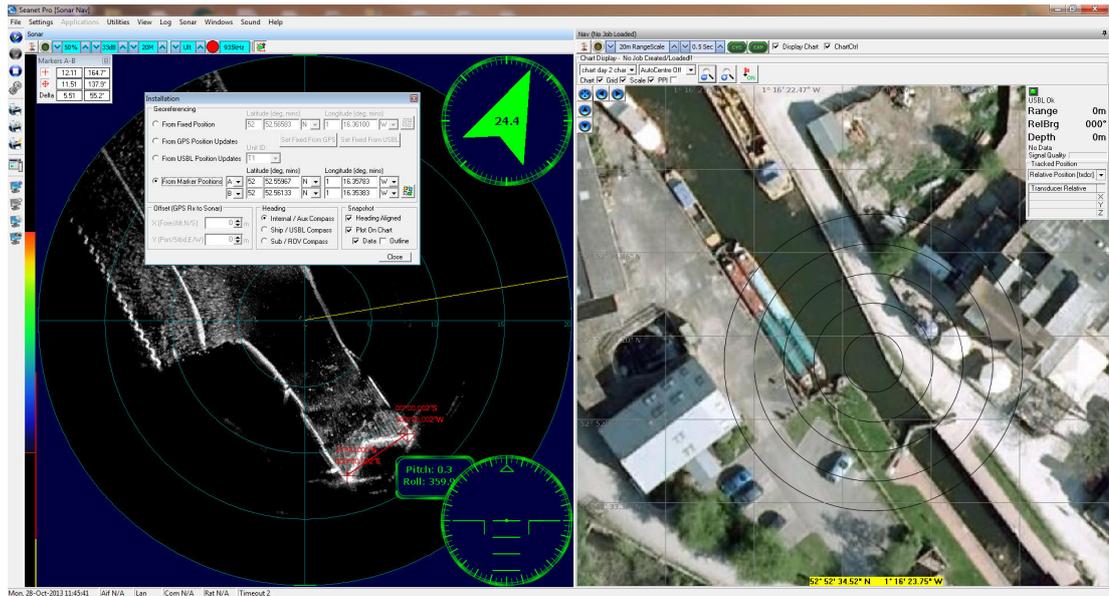


Figure 3.44.

The sonar is now geo-referenced. In the Nav chart the Sonar outline overlay will be displayed when this Nav feature is enabled.

4. Seanet Setup

4.1. Configuration Using Seanet Setup

The Seanet Setup application can be run to check the status of devices (e.g. AIF card and subsea sensors) currently connected and to perform other changes if directed. COM Port settings are also configured here for input of GPS and other such serial devices where available.

The application program can be run from shortcuts found in the same locations as the main Seanet Pro application.

When opening the Seanet Setup application, a panel will appear as below:

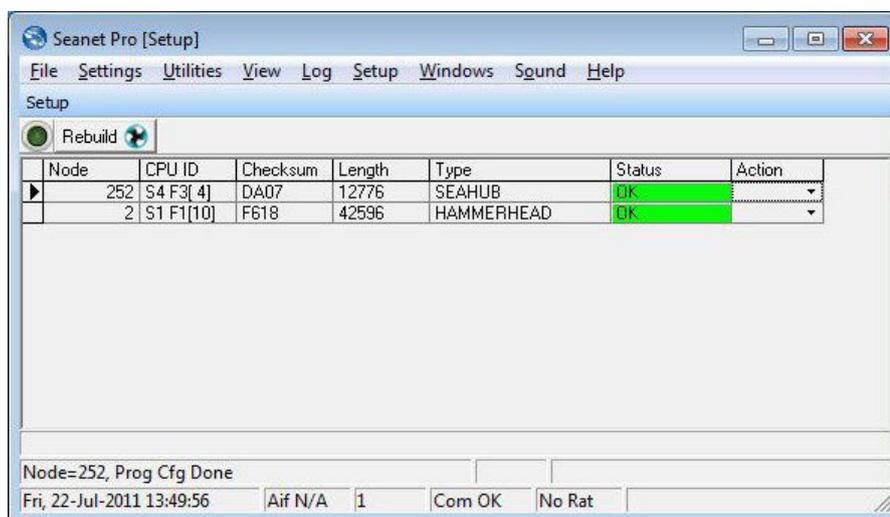


Figure 4.1.

Each head has a node address that allows it to be recognised on the ARCNET communications link. The system is expecting to find a node number of 255 for the AIF card (or 252 for a SeaHub) and then sensor node number(s) (node 2 is the imaging sonar head, nodes 20 & 21 are master and slave profilers, node 40 is bathy and node 10 is sidescan).

The menu bar is the same as for the main Seanet Pro program other than a *Setup* menu item is added that can be used to view the AIF Card, Gemini LAN and Bin File Settings.

Clicking on *Aif Card* will open the *Aif Setup* panel which should have the following default settings

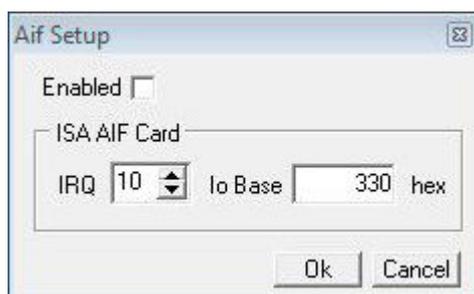


Figure 4.2.

If using the AIF card with a SCUv4 or PC the default settings of `Io Base = 330`, `Irq = 10` should always be shown and the `Enabled` tick-box should always be ticked.

If a SCUv5, SeaHub or other interface box is in use then the `Enabled` tick-box may be disabled.

4.2. Re-Programming Nodes

In some cases it may be necessary to update the software program installed within a Sensor or to change its node number. This may be the case particularly when subsea sensors are introduced from another system, hired in or taken from a spares pool.

After the node table is rebuilt in Seanet Setup, the `Status` column of each node should appear as status `OK`. This will confirm that whatever is programmed into that node is at the same software version as that contained in the Seanet Pro program that is loaded onto the computer. If the Status box appears with status `Update`, then it means that the node will need to be re-programmed to match the software version of the current version of Seanet Pro.



Caution

Only re-program nodes over short lengths of test cable (1m lengths are available from *Tritech International Ltd* if not already supplied with the sonar head at time of purchase). Longer cables increase the risk of the data becoming corrupted in transit and could result in the sonar head becoming unusable after the update.

4.2.1. To Re-Program a Node

1. Open the `Seanet Setup` program and wait for a few seconds for the nodes to build.
2. Click on the `Action` column for the node that has `Status` of `Update` and then select `Program`.

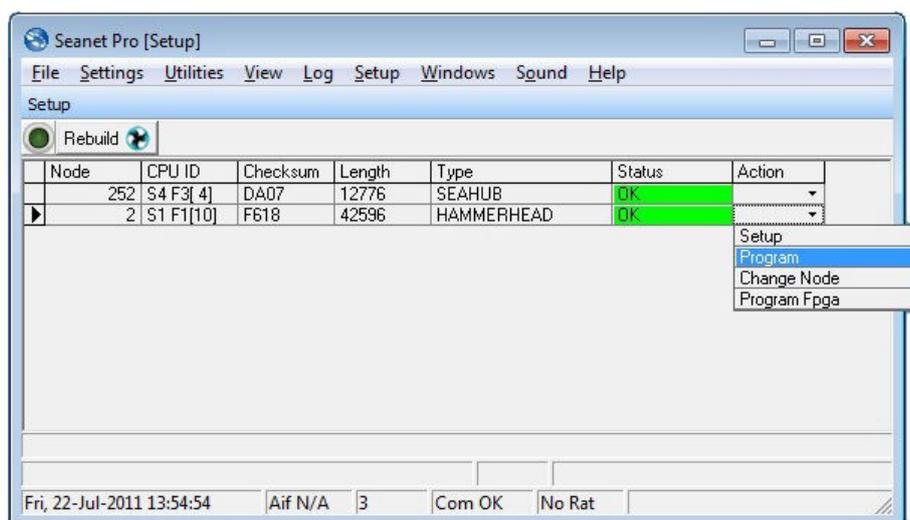


Figure 4.3.

3. Then click on `OK` to confirm the re-program operation

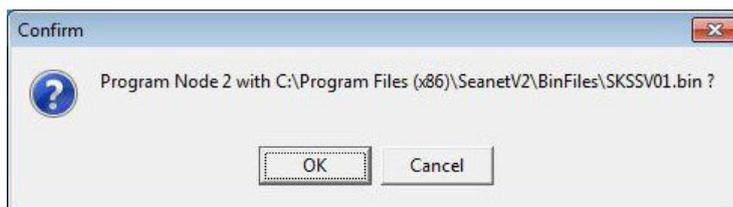


Figure 4.4.

4. The current software program will be downloaded into the node and this will be displayed on the download status bar indicator.

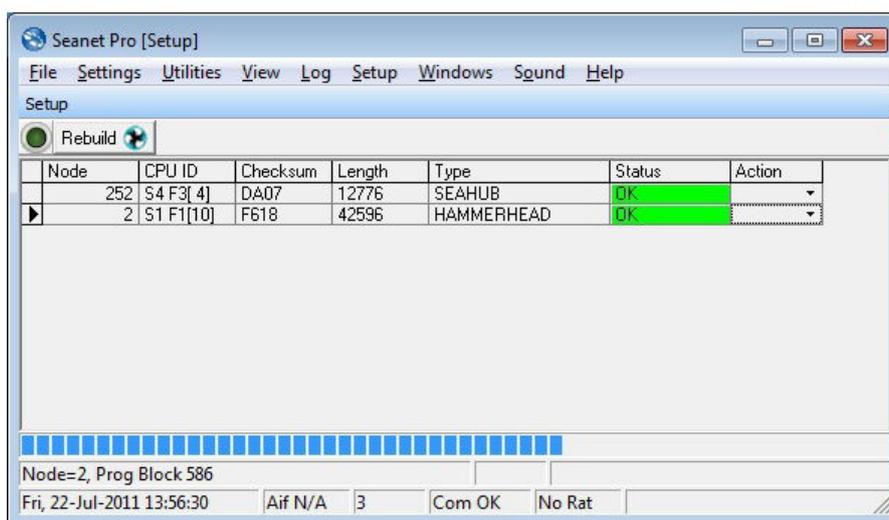


Figure 4.5.

5. Wait until the download has completed and until the table has been rebuilt. The node status should change from Update to OK to indicate that the download has been completed.

4.2.2. To Change a Node Number



Note

The different types of device are programmed with different ranges of node numbers and these devices will not operate if a node value is selected which is out of this range.

Node ranges:

- 2 – 5 SeaKing DF Sonar, SeaPrince, Micron, Hammerhead
- 10 – 11 SeaKing Sidescan (Towfish)
- 15 – 16 SeaKing Sub Bottom Profiler
- 20 – 29 SeaKing DF Profiler
- 40 – 43 SeaKing Bathy
- 60 Attitude Sensor

- 75 MicronNav Attitude Sensor
- 90 MicronNav Interface Box / Dunking Transducer
- 100 – 103 Gemini Sonar
- 104 – 109 Gemini Profiler
- 252 SCUv5 or SeaHub
- 254 Standalone AIF card, Multicomm Junction Box and SKIM-100
- 255 ARCNET Interface Card (ISA or PCI AIFV4 card in a PC)

Changing node numbers is useful for running a multiple Sonar application when 2 Sonars are connected that have the same node number. For example a dual sonar application using SeaKing Sonars requires that the nodes be 2 & 3, or using two SeaKing Profilers as master and slave pair requires nodes of 20 & 21.

In both of these cases, connect one of the Sonar or Profiler heads that is to have the node number re-programmed and then follow the procedures below to change its node number.



Caution

Only re-program nodes over short lengths of test cable (1m lengths are available from *Tritech International Ltd* if not already supplied with the sonar head at time of purchase). Longer cables increase the risk of the data becoming corrupted in transit and could result in the sonar head becoming unusable after the update.

1. Open Seanet Setup and wait for a few seconds for the nodes to build.
2. Click on the **Action** column for the node that requires its node number to be changed (node 2 in this case) and then select **Change Node**.

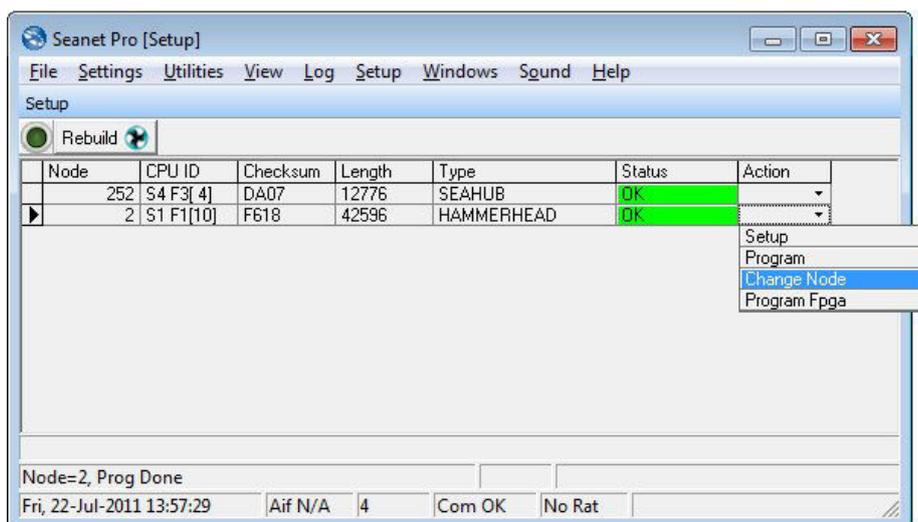


Figure 4.6.

3. Enter the new node number to be programmed into the device.

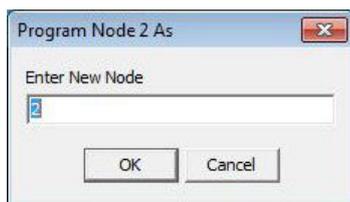


Figure 4.7.

4. Then click on **OK** to confirm the re-program operation.
5. The current software program will be downloaded into the node and this will be displayed on the download status bar indicator.
6. Wait until the download has completed and the table automatically rebuilds. Press the **Rebuild** button to rebuild the list and confirm that the node is showing correctly.

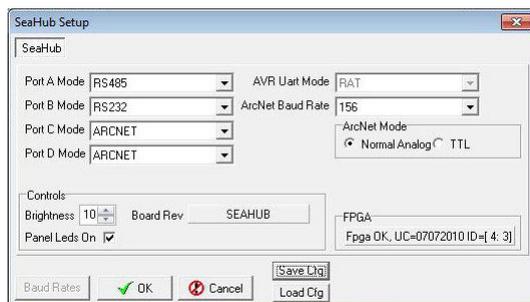
4.3. Changing System Settings

4.3.1. General Setting Information

Serial COM port settings or baud rates can be changed from several locations in the Seanet Setup program.

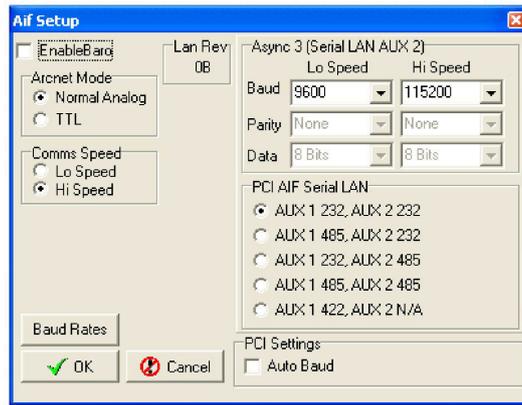
The AIF Interface settings can be viewed or changed by navigating to the node and selecting the **Action** column and then clicking on **Setup**.

The dialog opened will depend on which device is connected, below are examples for the settings accessed for a SeaHub and also an AIF card.



This is a SeaHub although SCUv5 settings are very similar. Note that **Baud Rates** is greyed out and cannot be accessed - this is changed from the **COM Setup** dialog as described later.

Figure 4.8.



This is the dialog box for a PCI AIF card equipped SCUv4 or for an PCI AIF card installed into a PC.

Figure 4.9.

The `Setup` menu has 3 items as previously described and can be used to change settings on the AIF card, a Gemini sonar, if one is connected, or the Bin Files settings.

The `Utilities` menu includes `COM Setup` for configuring serial I/O devices, such as GPS or pipetracker string inputs. This is also where the baud rates for SeaHub and other interface devices can be accessed and changed.

4.3.2. Configuring a COM Port for 3rd Party Devices

To display (and log) available serial device data, such as GPS data, along with the sensor data, a serial COM port must be enabled and configured for this purpose. In the following example, an NMEA 0183 type GPS message is to be received through COM1.

1. Open the Seanet Setup program by clicking on the Seanet Setup desktop shortcut.
2. Click on the `Utilities` menu and then select `Com Setup`.
3. The Channel Setup panel will be displayed with options to enable and configure COM Ports for available devices. For instance, to setup COM 1 for GPS input, first ensure that the Enabled check-box is ticked (as shown below). Set the Baud Rate and ensure that the Status displays 'Available' (else select another COM Port).

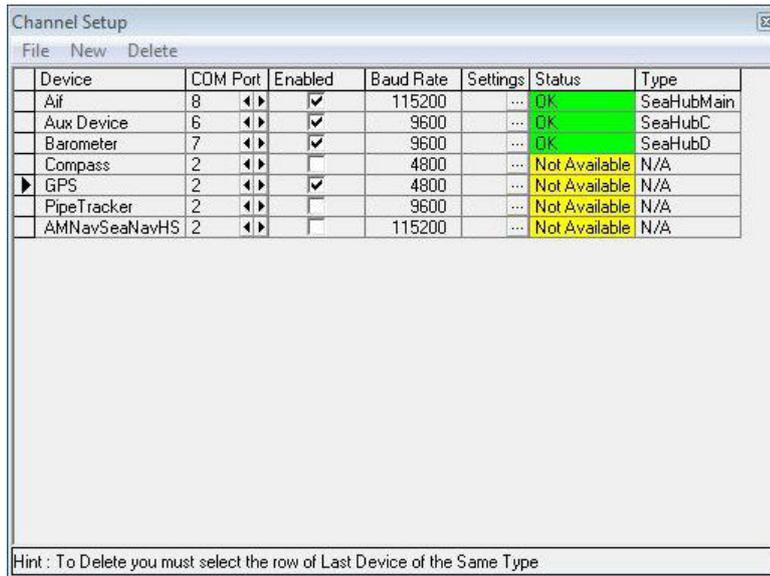


Figure 4.10.

- USB is the USB to serial converter
 - SeaHubxxx SeaHub port ('A'..'D', 'Main', 'Aux')
 - Generic Legacy COM Port and other
4. Then, click on the *Settings* ellipsis button (...) to open the Communication Settings panel to configure the port. The COM Port number and Baud rate can also be viewed or changed.

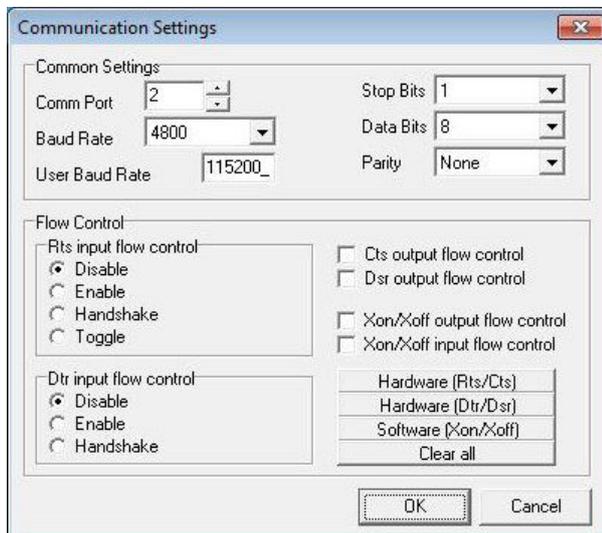


Figure 4.11.

Only Comm Port and Baud Rate should need to be changed.

5. Troubleshooting

Symptom	Likely cause	Solution
Failure to boot-up	Connectors are disconnected	Check that all connectors are secured. If an internal fault is suspected check the appropriate product manual for the device in use for further instructions.
Continuous Status "timeout"	This indicates that there is no communication with the device flagged	Check the power and communications links to the Subsea Sensor for continuity and for correct polarity, voltage and ensure that the power supply can provide sufficient current to power all devices. If necessary refer to the service section to check that the head internal fuses have not blown. If this occurs on first installation pay particular attention to cable terminations and check that you are not exceeding the recommended cable length (1200m using the standard Baud rate).



Caution

If a cable flood is suspected, then the conductors will need to be insulation tested; the subsea units must be disconnected from the surface interface.

Appendix A. Input Stings Accepted by Seanet Pro

Seanet Pro is capable of handling input from various different types of sensors using the following standard strings:

Altimeter

NMEA DBT

```
$--DBT,000.000,f,000.00,M,000.000,F*hh<CR><LF>
```

```
$--DBT,000.00,M<CR><LF>
```

PA Altimeter

```
000.00M<CR><LF>
```

```
00.000M<CR><LF>
```

```
000.000M<CR><LF>
```

Barometer

Paroscientific

```
*0001xxx.xxxx<CR><LF>
```

DB2

```
xxxx_MBAR<CR><LF>
```

Vaisala PTB220

```
xxxx.xx_HPA<LF>
```

Compass/MRU**TCM2**

```
$C123.4P12.3R12.3T12.3X123.4Y123.4Z123.4E000*FF<CR><LF>
```

NMEA HDG

```
$--HDG,x.x,x.x,a,x.x,a*hh<CR><LF>
```

NMEA HDT

```
$--HDT,x.x,T*hh<CR><LF>
```

NMEA HDM

```
$--HDM,x.x,M*hh<CR><LF>
```

NMEA TRO

```
$--TRO,x.xx,a,y.yy,b*kk<CR><LF>
```

NMEA TRH

```
$--TRH,x.xx,a,y.yy,b,z.zz,c*kk<CR><LF>
```

SXN

```
$PSXN,id,user,x1,x2,x3,x4,x5,x6*hh<CR><LF>
```

SMC

```
$PSMCS,±yy.yyy,±xx.xxx,±hh.hh<CR><LF>
```

```
$PSMCD,±yy.yy,±xx.xx,±zzz.z,±yv.yv,±xv.xv,±zv.zv*hh<CR><LF>
```

POSII

```
$POSII,D,xx.x,H,aa,R,bb,P,cc*hh<CR><LF>
```

CDL1

```
H123.4P+123.45R+123.45T00.0D00000.0B00.0FR<CR><LF>
```

MDL

```
H0123P-0123R-0123<CR><LF>
```

Digilog/OceanTools

```
H0123P-0123R-0123E<CR><LF>
```

CDL MicroTilt

```
P+12.34R+12.34<CR><LF>
```

TSS1

```
XXAAAASMHQHRRRRSMPPPP<CR><LF>
```

CDL TOGS

```
AHaaa.aa APbcc.cc ARdeee.ee Mf Eggggggg<CR><LF>
```

GPS**NMEA GLL**

```
$--GLL,5411.54,N,00305.90,W<CR><LF>
```

```
$--GLL,5411.54,N,00305.90,W,hhmmss.ss,A*hh<CR><LF>
```

NMEA RMC

```
$--RMC,135643,A,5411.540,N,00305.896,W,00.5,128,230295,05.9,W*hh<CR><LF>
```

NMEA GGA

```
$--GGA,hhmmss.ss,5411.540,N,00305.896,W,q,ss,d.d,a.a,m,g.s,m,  
d.t,drid*hh<CR><LF>
```

NMEA ZDA

```
$GPZDA,220320.0,26,06,1997,00,00*hh<CR><LF>
```

NMEA VTG

```
$GPVTG,15.9,T,15.9,M,3.8,N,3.8,K*hh<CR><LF>
```

PASHR

```
$PASHR,101403.00,31.31,T,-4.06,0.03,-0.00,0.507,0.507,0.814,1*hh<CR><LF>
```

Pipetracker**TSS340**

```
I+ aaaabbbbccccdddd<CR><LF>
```

TSS350

```
:SQsLLLL VVVV AAAAsCCCsSSs1111s2222s3333s4444s5555s6666 qq<CR><LF>
```

Innovatum

```
Dd Mmm YyyyHh:Mm:SsRh MS Str OhOdC HdisHerrVdisVerr Sktt Accur<CR><LF>
```

Pressure/Depth/CT**Digiquartz**

```
*0001xxx.xxxx<CR><LF>
```

```
*0001xxx.xxxxpsia<CR><LF>
```

SeaSun CTD

```
$PSSTA,00812,03253,33948,00002,,,,,,,,*62<CR><LF>
```

YSI CTD

```
$YSI,cc,xx,cc,xx.....*53<CR><LF>
```

Turns Counter

Red Lion

```
CTA0028.40@0*RESERVED*<CR><LF>
```

```
00CTA-250.5<CR><LF>
```

Hengstler

```
Lxxxxxxx<CS><CR><LF>
```

VT1

```
$PITCH±DD.D,ROLL±DDD.D,DIST±DDDD.DD<CR><LF>
```

Nav Beacon

NMEA GGA (*Lat/Lon only*)

NMEA GLL (*Lat/Lon only*)

NMEA RMC (*Lat/Lon only*)

\$PSIMSSB (*E/N, Depth*)

HPR 300P (*E/N, Depth*)

TP-2EC (*E/N, Depth, Slant Range, Bearing*)

Glossary of Terminology

AIF Card	ARCNET Interface Card - an ISA or PCI card which is installed into a PC or as part of the SCUv4. Note that SCUv5 and later use a custom ARCNET board which does not use a PCI card slot but provides exactly the same functionality.
ARCNET	Acronym for "Attached Resource Computer NETWORK" - it is a network protocol similar to ethernet but with the advantage of working over much longer ranges.
Micron Sonar	The smallest sonar that <i>Tritech International Ltd</i> produce.
MicronNav	An Ultra Short Baseline (USBL) system for location and tracking of ROV's, divers, etc. Consists of the MicronNav 100 surface control unit (similar to the SeaHub but with different functionality) a "dunking transducer" which is mounted on the vessel/dockside under the waterline and a responder which is mounted on the ROV, diver, etc.
RAT	Remote Access Terminal, a device which is detachable from the front of the Seanet SCU and can provide basic control over the Seanet Pro display.
RS232, RS422 or RS485	Standard serial communication protocols.
SeaHub	An alternative to using a Seanet SCU, this device connects to a laptop or PC via USB interface, essentially this takes the signal from the sonar (in RS232, RS485 or ARCNET) and converts it into a signal suitable for the USB port of the computer.
SeaKing	A specific sonar produced by <i>Tritech International Ltd</i> but also refers to the family of sonar equipment manufactured by <i>Tritech International Ltd</i> comprising of the SeaKing, SeaKing DST scanning and profiling sonars and the Hammerhead survey sonar.
Seanet Pro	The software supplied by <i>Tritech International Ltd</i> which is capable of running all the sonar devices.
Seanet SCU or Seanet	Surface Control Unit - a specially manufactured computer which is rack mountable and capable of processing the data from the sonar equipment running either embedded XP or Windows 7 and Seanet Pro software.
SeaPrince	A more compact sonar than the SeaKing which operates at a single fixed frequency.