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International
Limited**

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Seanet SCU v5

Product Manual

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Box Content

Standard Equipment



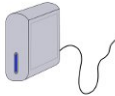
Product Manual



Software included in the internal flash rescue disk



SCU 3U Rack mount chassis



Power cable and VGA to DVI adapter

Help & Support

First please read this manual thoroughly (particularly the Troubleshooting section). For Warranty information please see the Warranty Statement at the end of the manual.

If your question or problem is still not answered then *Tritech International Ltd* can be contacted as follows:

	Mail	<i>Tritech International Ltd</i> Peregrine Road Westhill Business Park Westhill, Aberdeen 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* Technical Support service, please ensure that you have the following details to hand:

1. Serial Numbers of the Unit and any *Tritech International Ltd* equipment connected directly or indirectly to it.
2. Software/Firmware Revision Numbers.
3. Fault Description.
4. Any remedial action implemented.

Please also note the following:

- The name of the organisation which purchased this system is held on record at *Tritech International Ltd* and details of new software or hardware packages will be announced at regular intervals, however, due to the expansion of equipment capabilities and the fact that new sub-modules are continually being introduced, this manual may not detail every aspect of operation.
- Depending on the module, free upgrades may be offered in keeping with our policy of maintaining the highest levels of customer support.
- *Tritech International Ltd* can only undertake to provide software support of systems loaded with the Microsoft Windows™ Operating System and Seanet Pro software in accordance with the instructions given in this manual. It is the customer's responsibility to ensure the compatibility of any other package that they may choose to load.

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

The Seanet Surface Control Unit SCU (v5) incorporates the very latest in electronics and PC technology including readers for Memory Cards and a built-in Factory Restore mode. The latest v5 model of the SCU has again been designed with reliability and robustness in mind. The SCU is housed in a rugged 3U rack mount chassis and incorporates a front panel Remote Access Terminal (RAT) which enables all functions to be controlled by a combination of pointer and function button operations.

The Seanet SCU (v5) is designed to control and display the complete range of *Tritech International Ltd* sonars and subsidiary subsea sensors,

Features:

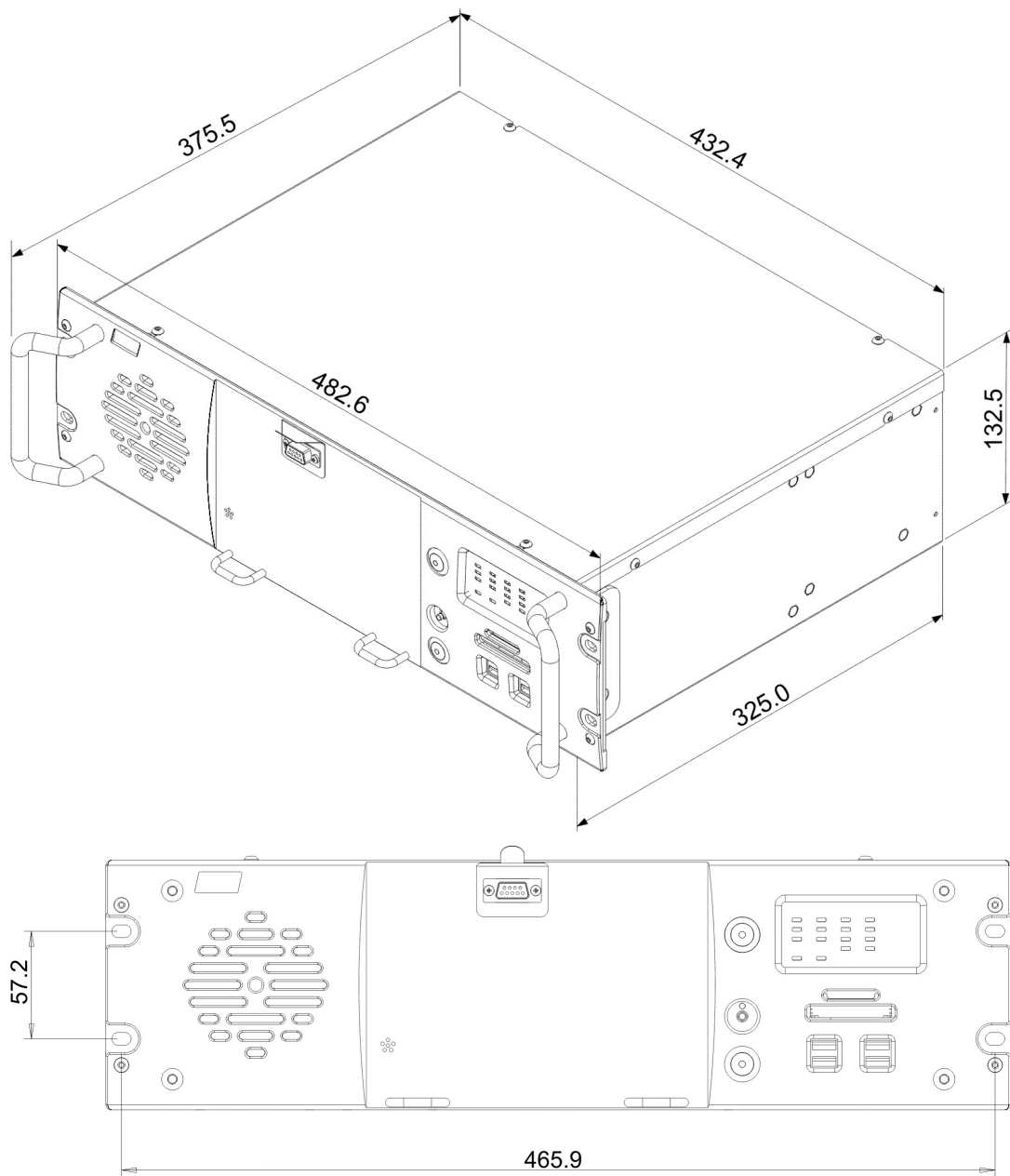
- The SCU can simultaneously run combinations of (amongst others) Imaging Sonar, Profiling Sonar, Bathymetric & Oceanographic package and Sidescan together.
- Uses a fast ARCNET communications to the subsea devices allowing a standard data rate of 156kBaud (max cable length 1200m) with options for fibre-optic interfaces and other Baud rates available for longer cable lengths.
- Simultaneous connection and operation of Gemini heads via Ethernet.
- Able to run on SVGA/SXGA monitors at up to 1280 x 1024 screen resolution and on latest QXGA capable monitors at up to 2048 x 1536 screen resolution.
- Built-in factory restore disk, for simple diskless restoration to original settings, also contains a minimum of 32GB SSD (10GB reserved for Operating System)
- Compact Flash, SD, Memory Stick slot in front panel.
- As well as sonar data, other data including NMEA 1083, Pipetracker, Turns Counter and Compass data may be recorded.
- A range of interface ports is provided including ARCNET 15-pin, USB2.0, 9-pin Serial, Ethernet RJ-45, PS/2, SVGA/SXGA & Video Out, Parallel Centronics and Audio.
- All data collected by the subsea devices can be made available on one or more serial ports - 5 x 9-pin legacy COM ports built in for this purpose and four of these ports (A – D) are general purpose and can provide RS-232, RS-485, RS-422 and ARCNET connections.
- Rack-mountable in racks of depth 330mm or greater.



Note

A range of factory fit options are available on request, such as video capture cards, please contact *Tritech International Ltd* for more information.

2. Specification



Processor	Intel™ Pentium Dual Core (or better)
Operating System	Microsoft Windows Embedded
Primary Control	PS/2 Remote Access Terminal (RAT)
Video Output	SVGA, XGA or SXGA
Video Output (optional)	Composite PAL/NTSC
ARCNET Link	1 x 156kbit/sec (1500m) or 78kbit/sec (2500m)
Storage Media	Minimum 32GB SSD (10GB reserved for OS)

Interface Ports	4 x 9-pin DE-9 ports (configurable RS-232, RS-485, RS-422, ARCNET) 1 x 15-pin DA-15 port for ARCNET or RS232 1 x 24VDC @ 36VA Output (for equipment test purposes) Front and rear USB 2.0 ports Multi-card reader
Input Voltage	Universal 100-240VAC 50/60Hz, Nominal 250W
Weight	~10kg
Material	Aluminium, Stainless Steel
Operating Temperature	0 to 40 °C
Storage Temperature	-20 to 50 °C
Options	Composite video input Internal HDD (instead of SSD) Additional gigabit ethernet ports (for Gemini sonars).

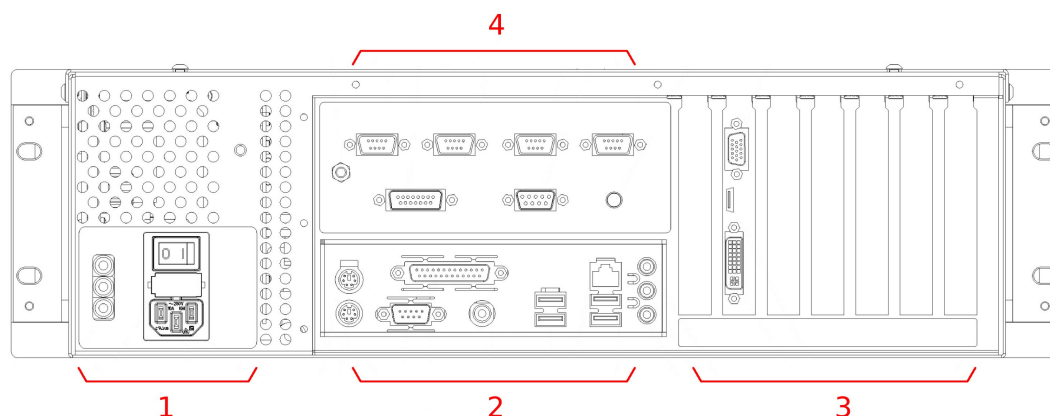
**Note**

Any connectors on the motherboard are not part of the SCU specification and may be used as part of the normal operation of the unit but their use is not covered by this manual.

SCUv5 Front Panel

1. The RAT can be de-coupled from the main unit completely or operated from an RS232 extension cable. The function of the RAT controls depend on which subsea sensors are fitted, and the user should refer to the appropriate section of each product manual for full details.
2. The AUX Power Switch toggles the DC Voltage Output on the rear of the SCU. This DC voltage is accessible on the DC OUT banana plugs on the rear.
3. The Memory Card reader is compatible with Compact Flash I/II, SD and Memory Stick formats. The Restore Disk on earlier Seanet SCU's is no longer used as there is an in-built factory restore option for system recovery.
4. The Port Activity LEDs indicate the state and configuration of the 4 x 9-pin COM ports (A - D) accessible on the rear.

Seanet SCU (v5) Rear Panel Layout



1. Power supply with DC Out ports
2. Motherboard connectors
3. Expansion slots (showing default installed graphics card) also for optional items such as video capture cards, additional ethernet cards, etc.
4. (from left to right) Earth mounting point, DE-9 (top row) and DA-15 (bottom row) ports for RS232, RS422, RS485, ARCNET and RAT, system restore button

For detailed pin-out diagrams and wiring options for the DE-9 and DA-15 connectors refer to Appendix A, *Data and Control Ports* and Appendix B, *SCUv5 Communications Setup*.

The motherboard connectors are subject to change in line with *Tritech International Ltd* policy of continual product improvement, however, this will not affect ordinary operation of the SCU. Generally the motherboard will have USB 2.0 ports, 1 or 2 PS/2 keyboard/mouse ports and RJ-45 ethernet.



Caution

If a DE-9 port is present on the motherboard it will only work with RS232 signals but is not fitted with over-current protection. To avoid potential damage to the motherboard it is recommended that this port is not used to connect sensor equipment.

Major differences between SCUv4 and SCUv5

Feature	SCU (v4)	SCU (v5)
RAM	256Mb	512Mb (minimum)
Data Storage	Zip Drive, optional HDD	SSD Drive, optional HDD (instead of SSD)
ARCNET Sonar Ports	1 x AIF card interface	2 x SCU5 Main Board Ports
Serial Sonar Ports	3 x RS232	4 x RS232/RS485 or 2 x RS422
USB Ports	2 front, 2 rear	4 front plus rear ports
ARCNET Ports	PCI AIF, Node 255	V5 Main Board, Node 252
Ethernet LAN Port	Optional	Normally 1, more can be added.
Port Activity LED Display	No	Yes
Aux Power Supply	24V 1A, non-switchable	24V 2.4A switchable, 33V 1.8A option, LED on warning
External Storage	Floppy Disk Drive, ZIP Drive	Compact Flash Card, SD Card, Memory Stick
System Recovery Device	ZIP Disk – stored internal to SCU. SCU Lid needs to be removed to access	Internal flash memory – switched system restore. No internal access required.



Caution

If a DE-9 port is present on the motherboard it will only work with RS232 signals but is not fitted with over-current protection. To avoid potential damage to the motherboard it is recommended that this port is not used to connect sensor equipment.

3. System Options

The SCU v5 can be factory supplied or field retro-fitted with a number of add-on options to provide expanded functionality and added user control. New options may be added at any time and may not be limited to the following available options.

Hard Disk Drive

The Primary Storage device may optionally be specified to be a Hard Disk Drive of at least 40GB capacity. This can be partitioned into a C: (System) and D: (User) drive in suitable proportion to reserve enough additional space on the D: drive for log file storage. This drive would be installed instead of the 32GB (minimum) SSD.

Video Input

A Video Input card may optionally be specified, to receive composite PAL/NTSC video, at up to 25 frames/sec.

MicronNav System Support

A connector port may be optionally specified for the MicronNav navigation system. This enables an Ultra-Short Baseline (USBL) transducer to be connected to the SCU, for display of sub-sea vehicle bearing and range information via Seanet software. A sub-sea vehicle used in such an application will require a Trittech Micron Modem transponder.

33V Auxiliary Power Supply

The 24V Auxiliary Power Supply may be optionally replaced by a 33V supply, for use where an instrument is to be supplied over a long cable length for example.

Additional ethernet ports

For controlling multiple Gemini sonar heads additional ethernet ports can be provided. It is possible to install cards with one, two or four extra ports per card.

4. Installation

The Seanet SCU (v5) should be carefully removed from its transit case and checked to see that the control unit is undamaged. The unit may be inverted to check for any parts that may have been loosened during transit. If so, remove the unit cover and investigate further. The unit should be firmly mounted in a clean dry installation such as a rack system.

If fitted in a confined space such as a rack, then an adequate supply of cool air should be available to keep the unit from overheating. The front and back of the unit must have a clear space for air venting, cooling and cable access. If the unit is mounted on a desk or bench, then it should be secured against movement when powered on. Again leave space for air circulation and cable access.

The SCU is supplied with the screen display and output and communications already configured. The user should not have to change the screen display layout or comm's set-up unless it is not suited to their use (contact *Tritech International Ltd* for more details).

4.1. Connections

The SCU mains inlet should be connected to a fused (rated 5A) 100-240V 50/60Hz power supply. The mains supply to the SCU must be clean, free of transient noise spikes and interference, as suitable for computers and electrical instruments. If the mains supply is of a dirty nature then a suitable filter or uninterruptible power supply (UPS) must be fitted. There is an On/Off isolator switch at the rear of the unit and momentary soft power switch at the front. The isolator switch must be ON before operating the front momentary soft power switch.

For the full connection details of the SCU (v5) please refer to Appendix B, *SCUv5 Communications Setup*.

Connect the DVI port to a suitable digital display, or use the DVI to VGA adapter if connecting a VGA computer screen. If the RAT is used remotely, use the extension lead supplied to connect it to either the front of the Seanet SCU, or on the rear port marked RAT. As an alternative to using the RAT a keyboard and mouse can be connected to the motherboard PS/2 ports. Finally connect any sensor equipment to the serial ports, ARCNET or ethernet port.



Caution

COM1 does not have any ESD / Transient protection and so should not be used for connection of serial Sensors and devices. Ports A – D are installed with protection.

Before powering up the Seanet SCU check that the subsea heads are correctly connected, check the data communication lines for shorts to other wires, and check the termination resistance is correct at both ends.

4.2. Communication Configuration

Fitted inside the SCU, located at the front panel, is the SCU V5 Main Board. This is a multi-purpose board that houses the bulk of the circuitry from the superseded AIF PCB. This includes the ARCNET interface, for communications with the subsea sensor heads, and the RAT interface. The Main Board is also populated with the Memory Card Reader, Port Status LED's and hardware for COM Ports A to D. The SCU V5 Main Board will appear in the Setup table as Node 252 which replaces the Node 255 for the superseded AIF Card.

Full details of all the connections are contained in Appendix B, *SCUv5 Communications Setup*. Normal communications with the subsea devices is via a customised version of the ARCNET network system and requires a good quality balanced twisted pair cable.

An optional RS-232 interface can be provided to allow telemetry connection through a fibre optic system capable of 115kBaud transmission. The RS-232 interface is available in the guise of an RS-232 to ARCNET converter PCB that is installed in a dry pod inside the ROV. Alternatively, an intelligent 4000m pressure rated Junction Box will provide the RS-232 interface to the network of SeaKing ARCNET devices.



Note

The SeaKing range of Subsea Sensors are designed to work from a smoothed DC power supply of 18v-36v DC (Absolute Maximum 36v DC).

If using a rectified transformer PSU, the output of the PSU must have a filter capacitor of not less than 470 μ F, for each head being powered. If an unregulated PSU is used, then make sure that the voltage value measured at the head is in the range 18-36v DC, both in power off and running conditions. If powering the head(s) down a long lead or umbilical, the maximum recommended loop resistance of the power line must not exceed 10ohm for one head, 5ohm for two heads, and 3ohm for three heads. If the supplied voltage is less than 18v dc the head may not operate correctly.



Caution

Never try to make *Tritech International Ltd* sonar heads work down a long cable by increasing the PSU output voltage above the recommended voltage.

For detail of the appropriate termination requirements for a *Tritech International Ltd* ARCNET network please refer to Appendix C, *ARCNET Termination*

Use with Ethernet Sonars

The motherboard ethernet port is capable of driving a single ethernet device, such as a Gemini imaging sonar or profiler, or it can be coupled to a network switch to enable multiple sonars to be operated. A specially designed Gemini Hub unit is available from *Tritech International Ltd* which enables multiple Gemini imagers and other sensors to be attached through the ethernet port.

Extra software may be required to operate the ethernet sonars, please contact *Tritech International Ltd* for more details.

Use with Serial Devices

The SCU is installed with four DE-9 ports on the rear panel for use with serial communications. These ports can be configured for different standards and for survey data output ports to a data logger or as ports where *Tritech International Ltd* or other 3rd party sensors/devices can be connected.

Ports A to D can be configured to operate to different communication standards:

Port	RS232	RS422	RS485	ARCNET
A	YES	NO	YES	NO
B	YES	YES	YES	NO
C	YES	NO	YES	YES
D	YES	NO	YES	YES



Caution

The internal motherboard DE-9 connector (if present) is not fitted with ESD protection and so should not be used to connect sonar or sensor equipment. Doing so might damage the motherboard of the SCU.

For a more complete listing of the ports and their capabilities (as well as pin-out diagrams) please refer to Appendix A, *Data and Control Ports*

5. Operation

Once a system has been installed in conjunction with the relevant sections of this manual and any relevant sensor manuals, it can be tested in air by powering up the system and observing that communications with the subsea device(s) is established.

When the SCU and subsea heads are switched on, the system display will appear on the monitor after a few seconds delay. Until the SCU, Remote Access Terminal (RAT), and Subsea elements are communicating correctly, the Status Bar will display a Timeout ('Timeout Node xx') message for each Node that it is trying to communicate with. These messages will be removed from the display as each subsea device is detected as operating correctly.

If the RAT or subsea elements are not powered up, not present, or have a fault somewhere, then error messages 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.

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.

Full details of the Seanet Pro and Seanet Setup operation can be found in the Seanet Pro Software Manual. There are also a number of devices that can be connected to the Seanet SCU including Imaging Sonar, Profiler, Bathymetric 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.



Note

The four DE-9 ports are labelled as `ScuA` to `ScuD` in `Seanet Setup`. These are assigned virtual port numbering in Windows. Two other ports will be shown, `ScuMain` and `ScuAux` - these are used for communication inside the SCU and not for external devices.

The port numbering will be re-set if a system restore is performed and due to the manner in which Windows manages resources the ports may be numbered differently each time the system is restored. If desired they can be manually re-assigned from the Windows Control Panel.

Setting COM Ports

1. From within the Control Panel select `System & Security`.
2. Select the `System` button.
3. Click on `Device Manager` in the left-hand pane.
4. Under `Ports (COM & LPT)` select the port to be changed and *right click* on it and select `Properties`.

5. Navigate to the Port Settings tab and then click the Advanced button and from here it is possible to change the port number to one that had not yet been assigned.

6. System Software Configuration

Your system will be delivered with Windows Embedded and Seanet System Software pre-installed.

A complete image of the Windows Embedded Operating System is provided on an internal flash memory device. This is independent from the Primary C:\ partition where the system software is installed to. This image can be re-installed at any time through a Boot Recovery process to restore the Primary C:\ partition to a factory default state.

The Boot Recovery process is initiated via a switch on the rear panel of the SCU. Files on the C:\ partition are re-installed during the recovery process, leaving user files on the D: drive unaffected.

There are 2 levels of restoration that can be carried out:

1. Re-installation of the Seanet Pro software only to factory default. It is recommended where possible that this is attempted before level 2 in order to recover the SCU.
2. Complete Re-installation of the Primary C:\ partition to factory supplied condition. Use of this level will erase all files currently stored on the C:\ drive and replace with a factory installation state. D:\ drive user files will be unaffected. The D:\ drive is also where a copy of the Seanet Pro software installer and Operator manuals can be located.

6.1. Seanet System Re-Installation

The SEANET SCU has the following Drive Letters:

Drive C:\ Primary, Flash Memory boot drive where system files and Seanet software are installed. This drive should NOT be used for storing any log files.

Drive D:\ This drive is where the Seanet software installer and operator manuals can be found. There is space to use this drive for user files and log files. The 'My Documents' folder has also been moved to this drive.

6.2. Repair of Seanet Pro

If the Seanet SCU (v5) is booting up normally and only the Seanet software is giving a problem then, as a first level recovery, the Seanet Pro software can be re-installed from the D:\ drive.

Before Re-Installing Seanet Pro, it is advisable to first remove the existing Seanet Pro installation. This can be performed through Control Panel – Programs

and Features. Select the Seanet Pro entry and then follow the on-screen instructions to remove the program.

For re-installation browse to the D:\SeaNet Installer folder and run SCU5Setup.exe and follow the installation prompts throughout. After installation is complete, click on the Finish button which will reboot the SCU ready to run Seanet Pro on Windows re-start.

6.3. Full Disk Re-Installation using Boot Recovery

If any part of the Windows operating system becomes corrupt and requires re-installing, the original factory configuration can be restored from a backup Image of the Primary disk that is retained on internal Flash Memory. Refer to the following steps for guidance:



Note

If this device is not listed then you will need to reboot once more following the above steps – it is important that the System Restore button is pressed immediately after power on as this engages the Flash Memory where the backup image is held.

1. With keyboard connected and SCU powered down, power on the SCU and immediately press and release the System Restore button located on the rear of the SCU.
2. When the BIOS Post Message is displayed after power up, press the <F8> or <F12> button on the keyboard (note: this button can vary depending on the motherboard fitted - if in doubt watch the screen during boot-up and select the appropriate button to get to the "boot" menu). This will start the SCU with the Boot Selection screen.
3. On this screen will be listed the boot device options which will vary depending on the SCU version between PRETEC 01GB USB DOF (early SCU 5 units), USB Disk module PMAP (later Windows XP SCU 5 units) or USB-HDD (for Windows 7 SCU 5 units). Select the correct device and press <Enter> on the keyboard.
4. The Microsoft Windows Startup Menu will soon appear.
 - For Windows XP units the user should select Option 1 Restore System Disk to Factory Defaults, press <Enter> on the keyboard and then press the <Y> key to confirm disk restore.
 - For Windows 7 units the option is labelled as "A" and Restore Hard Disk to Factory Defaults, so button <A> should be pressed and then the <Enter> key.
5. The system restore will start and when it is complete a notification to press the reset button on the front of SCU appears. At this point, press the *Reset* button to reboot the SCU.

6. (Windows XP only) On reboot, notification will be displayed that the Machine is Resealed, click the OK button at this point to reboot the SCU once more.
7. (Windows XP only) Once rebooted, Windows will restart and a 'Log On to Windows' box will appear. Click OK to proceed past this.
8. A prompt will then appear to Install Seanet Pro. Click on OK to proceed with this and follow the instructions given during the installation process.
9. Once Seanet Pro installation is complete, click Finish which will restart the SCU for a final time. The restore operation is now complete.

7. Maintenance

There are few user-serviceable parts inside the SEANET SCU (v5) that can be checked and/or replaced.

Firstly, it is recommended that the unit be used in a clean, well ventilated and dust-free environment. Also, operating in extreme temperature and humidity should be avoided if possible. The environmental temperature should be between 0 to +40 degrees C.

ESD / Transient Protection (COM Port A - D)



Note

The onboard motherboard COM1 is not fitted with any isolation or surge protection and so should only be used as a data logger output port and NOT used for Sensor interfacing.

The multi-purpose Ports A - D are installed with electrical surge protection. These elements are fitted on the SCU V5 Main Board which is located inside the SCU at the front. If the COM Ports A through D are subjected to very high electrostatic noise or transients, the protective elements on this PCB would blow / open-circuit and therefore protect the serial UART that is installed on the main board.

If in the unlikely event the protection does blow on the PCB then the user has a number of options open to themselves:

1. Replace the SCU V5 Main Board PCB with a spare if carried. Contact Tritech or a local agent who will supply this PCB.
2. Replace the blown protective elements / components on the PCB. This would obviously require some diagnosing and know-how on the part of the user.
3. Mark or label the failed Port as inoperative and continue to use the remaining available Ports until such time as the faulty Port can be repaired.

Front Air Inlet Filter

It is recommended that this filter be replaced annually although a replacement may be required sooner if operating the unit in a particularly dirty environment.



Note

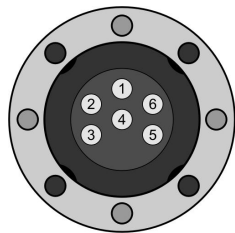
The Tritech Part number of the air filter is 5023.

Glossary of Terminology

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
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 or Hammerhead tripod.
RS232, RS422 or RS485	Standard serial communication protocols
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.
SCU	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.
Seanet Pro	The software supplied by <i>Tritech International Ltd</i> which is capable of running all the sonar devices
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.
SeaPrince	A more compact sonar than the SeaKing which operates at a single fixed frequency
Micron Sonar	The smallest sonar that <i>Tritech International Ltd</i> produce
MicronNav	A system for tracking and positioning objects underwater, such as divers, ROV's or survey sonars. Consists of an Ultra Short Baseline (USBL) transponder and up to 16 vehicle/diver mounted responder units.

Appendix A. Data and Control Ports

Waterblock Pin-out Diagram



Tritech Waterblock

Pin	MAIN port	AUX port	Cable colour
1	RS232 Tx ARCNET A RS485 A	RS232 Rx ARCNET A RS485 A	Yellow
2	RS232 Rx ARCNET B RS485 B	RS232 Tx ARCNET B RS485 B	Blue
3	+DC Power		Red
4	-DC Power		Black
5	RS232 Ground		Green
6	Earth/cable shield		cable screen

On the SCU a range of interface ports is provided, arranged as follows:

Location	Port Type	Number provided
Front Panel	USB 2.0	4
	RAT Interface	1
Rear Panel	Sonar/Sensor/Serial Interface	4
	RAT Interface	1
	ARCNET Link	2
	SVGA, XGA, SXGA	2
	TV/Video out (optional)	1

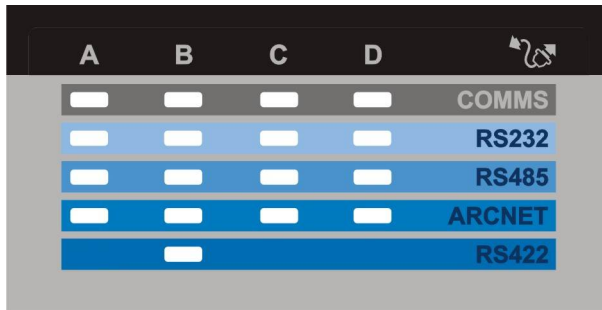
Notes:

1. 500mA current capacity per USB port
2. Sonar/Sensor Serial ports are software selectable up to 4 x RS-232, up to 4 x RS-485, 2 x ARCNET, 1 x RS-422.
3. The ARCNET Link provides a long distance communications link to other *Tritech International Ltd* instruments. It is software configurable (using Seanet) to operate up to 1500m cable (156kbps) or 2500m (78kbs).
4. The SVGA, XGA, SXGA port is a 15w High Density D, analogue; DVI (Digital Video Interface)
5. TV/Video out is Composite PAL/NTSC

6. Motherboard ports are subject to change and are not part of this specification.

Comms Status and Data Activity LEDs (Ports A – D)

The layout of the Communication Port COMMS status and data activity LED’s is shown below.



The COMMS row of LEDs are bi-colour, with Red - Receive; Green - Transmit

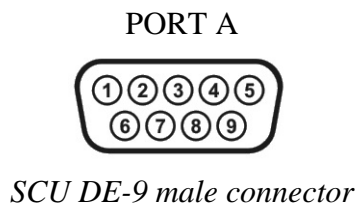
The remaining LEDs are Blue, indicating the communications protocol which has been software selected for a particular port.

If working in reduced lighting conditions, the overall brightness of the status indicators may be controlled through the “Seanet Setup” configuration interface for the SCU.

Port A Details

All signals are fully isolated and voltage transient protected with respect to the communications power supply. The modes are software selectable. When used in RS-232 mode, the pin out of this port is wired in the same way as a PC serial “COM” port (i.e. using DTE signal directions), and compatible with any standard RS-232 peripherals and cabling.

Supports data transfer rates of up to 921,600 baud.



Pin	RS232	RS485
1	‡	‡
2	RX	TX/RX.A
3	TX	TX/RX.B
4	‡	‡
5	GROUND	GROUND
6	‡	‡
7	RTS	‡
8	CTS	‡
9	‡	‡
‡ = connected for handshaking only.		

**Note**

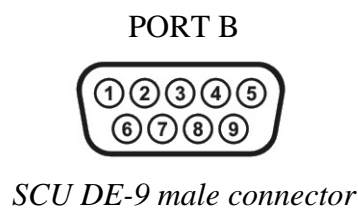
Port A will also work as a 3-wire RS232 connection without RTS and CTS. Pin 7 and 8 maintain signal levels of +/-12V for both 3-wire RS232 and RS485

Port B Details

All signals are fully isolated and voltage transient protected with respect to the communications power supply.

When used in RS-232 mode, the pin out of this port is wired in the same way as a PC serial “COM” port (i.e. using DTE signal directions), and compatible with any standard RS-232 peripherals and cabling.

Supports data transfer rates of up to 921,600 baud in RS-232/RS-485 mode.



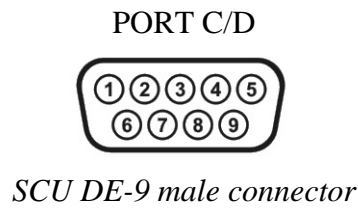
Pin	RS232	RS422	RS485
1	‡	‡	‡
2	RX	TX.A	TX/RX.A
3	TX	TX.B	TX/RX.B
4	‡	‡	‡
5	GROUND	GROUND	GROUND
6	‡	‡	‡
7	‡	RX.B	‡
8	‡	RX.A	‡
9	‡	‡	‡
‡ = connected for handshaking only.			

- 150ohm termination resistor is fitted across pins 2 and 3, when in RS-485/RS-422 mode, and pins 7 and 8 permanently.
- Pins 7 and 8 will have RS-422 signal levels (+/-5V) present on them when configured in RS-232 or RS-485 mode.
- RTS and CTS handshaking protocol is not available on this port. PC Serial ports should be configured to use no handshaking.

Port C & D Details

Signals are fully isolated and voltage transient protected with respect to the communications power supply.

Supports data transfer rates of up to 921,600 baud in RS-232/RS-485 mode.



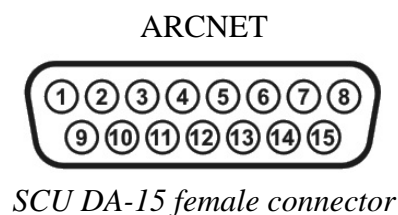
Pin	RS232	RS485	ARCNET
1	‡	‡	‡
2	RX	RX/TX.A	LAN A
3	TX	RX/TX.B	LAN B
4	‡	‡	‡
5	GROUND	GROUND	GROUND
6	‡	‡	‡
7	‡	‡	‡
8	‡	‡	‡
9	‡	‡	‡
‡ = connected for handshaking only.			

- 150ohm termination resistor is fitted across pins 1 and 2, when in RS-485 mode.
- RTS and CTS handshaking protocol not available on this port. PC Serial ports should be configured to use no handshaking.

ARCNET Port

DA-15 female connector, providing access to:

- Isolated +12V and +5V supplies.
- Isolated and protected TTL ARCNET connections (LAN PULSE1, LAN PULSE2, LAN EN and LAN RX).
- Isolated and protected differential ARCNET connections (LAN A, LAN B).
- Optional connections to “Port A” serial interface signals – consult factory for details.

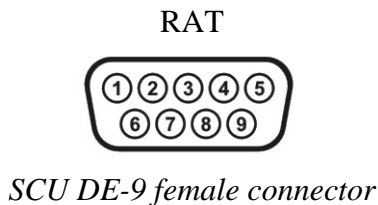


Pin	Connection	Pin	Connection
1	nc	9	+12v DC
2	COMMS Ground	10	VCC
3	Ground	11	LAN EN
4	LAN RX	12	RS232 RTX
5	RS232 CTS	13	RS232 RX
6	RS232 TX	14	LAN PULSE1
7	LAN PULSE2	15	LAN B
8	LAN A		
<i>nc = not connected</i>			

- Signals on pins 4, 5, 6, 7, 8, 11, 12, 13, 14 and 15 are with respect to the ground on pin 2.
- The +12V output on pin 9, and the +5V output on pin 10 is with respect to pin 3, External Ground.
- The RS-232 signals on pins 5, 6, 12, 2 and 13 are present simultaneously on this connector and the DE-9 connector PORT A.

RAT Interface

A single 9-Way D-Type Female connector for connection to a V2 RAT (with PS2 mouse and RS-485 data signals only)



Pin	Function
1	GROUND
2	+5v DC
3	RAT RS485 B
4	RAT RS485 A
5	‡
6	‡
7	PS/2 SCLK
8	PS/2 SDATA
9	+12v DC
‡ = connected for handshaking only.	

- RAT RS-485 and PS2 data signals are not isolated, and are with respect to the internal power supplies “+5V” and “GROUND”.
- An internal 150ohm termination resistor is fitted across the RS-485 input signals (pins 3 and 4).

Appendix B. SCUv5 Communications Setup

There is no AIF card inside the V5 Seanet SCU, in its place is the V5 Main Board. The Main Board provides 4 Serial Ports A,B,C,D which can be configured to RS232, RS485 or RS422. These are available on separate 9 pin D-type connectors

In addition to this the Main Board feeds a 15 pin D-type connector which has the same pinouts as the 15D connector fitted to the AIF card on earlier SCU models. Serial Port A is also available from 15D on the same pins as the earlier model SCU Serial LAN (AUX 0) connection.

The 4 Non-ARCNET serial ports can have several functions depending on user configuration.

- To allow single node communication to Subsea sensors such as Split AIF card, Multicomm or single head RS232 direct connection.
- REMV4 operations
- They can be used as a standard com port for interface to 3rd party devices such as GPS or compass.

The Main Board is detected as NODE 252 in the Seanet Setup program with TYPE set to SCU as below

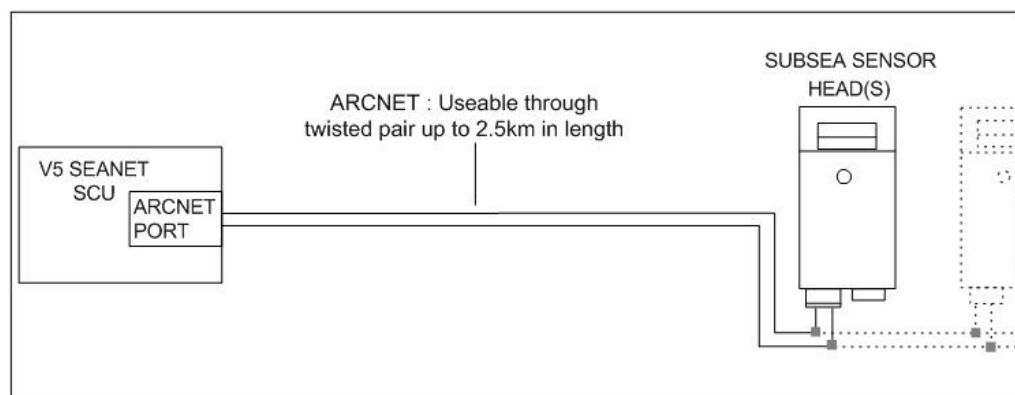


Note

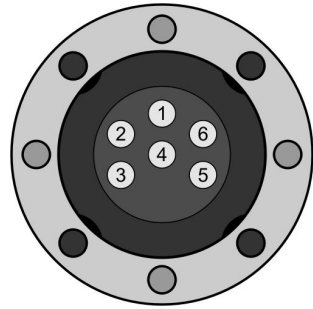
The flexibility of the V5 Seanet SCU means that not all connection possibilities are listed in this document, but an set of examples are shown.

SeaKing Sensor(S) in ARCNET through Twisted Pair

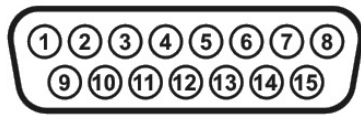
The traditional method of transmitting Trittech data from Subsea to Surface is via a twisted pair cable.



Connection to the V5 SCU should be made through the DA-15 connector, wired as below with any additionally networked heads connected in series off the first head.



Trittech 6-pin connector



SCU DA-15 female connector

Pin	Trittech Connector	DA-15 Connector
1	ARCNET A	nc
2	ARCNET B	nc
3	nc	nc
4	nc	nc
5	nc	nc
6	nc	nc
7	-	nc
8	-	ARCNET A
9	-	nc
10	-	nc
11	-	nc
12	-	nc
13	-	nc
14	-	nc
15	-	ARCNET B

nc = not connected

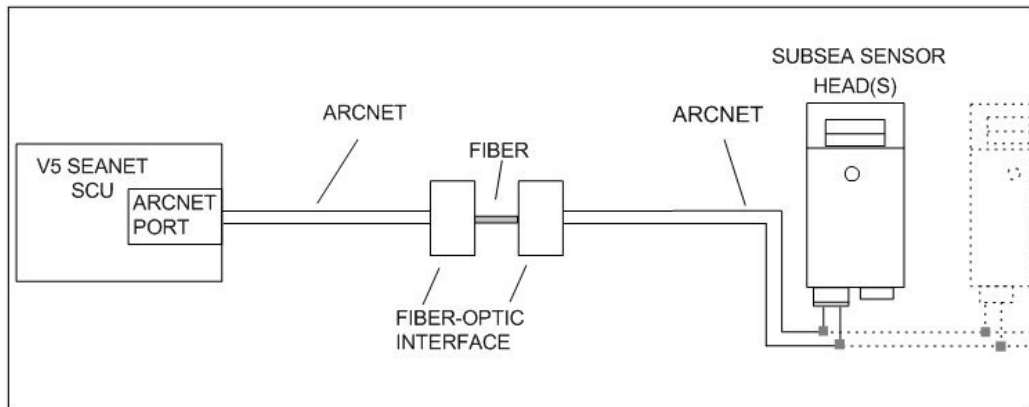


Note

Power will need to be supplied to the sonar head through pin 3 (24V DC supply for a SeaKing) and pin 4 (0V ground) of the Trittech connector - the ARCNET port will not be able to supply this power and a suitable external source should be used.

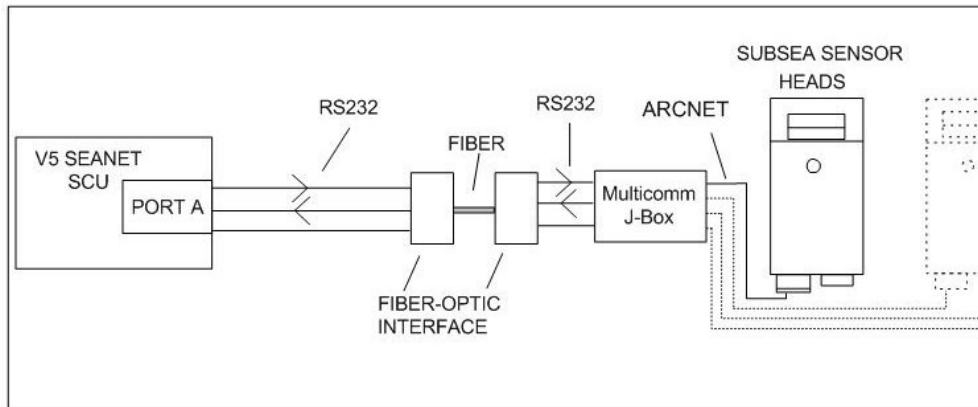
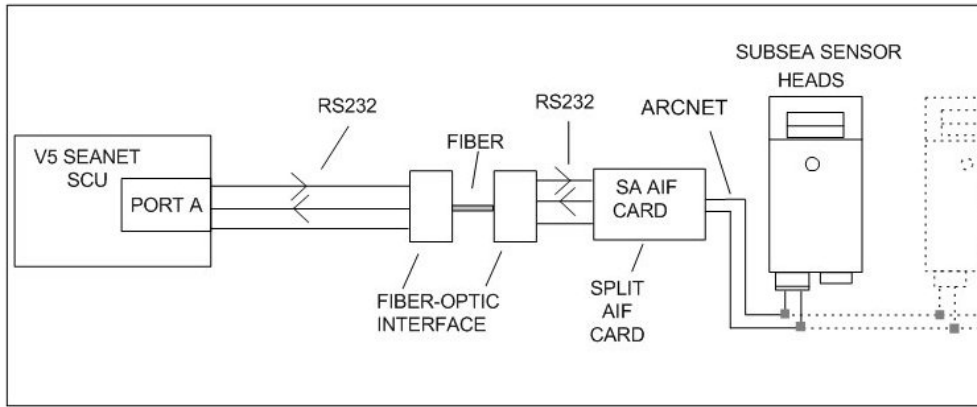
SeaKing Sensor(s) in ARCNET through Fiber Optic Interface

It is possible to connect a standard ARCNET system through Fiber, allowing multiple heads without the need for a stand alone AIF card or Junction Box

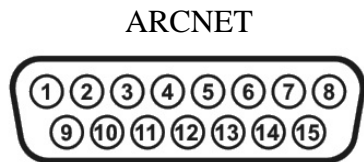


The connection to the SCU should be made through the ARCNET (DA-15) port and wired in the same manner as the *ARCNET Through Twisted Pair* shown above.

Junction Box or Split AIF with RS232



Connection to the SCU should be made through the DA-15 connector.



SCU DA-15 female connector

Pin	Connection	Pin	Connection
1	nc	9	nc
2	Ground	10	nc
3	nc	11	nc
4	nc	12	nc
5	nc	13	RS232 Rx
6	RS232 Tx	14	nc
7	nc	15	nc
8	nc		
<i>nc = not connected</i>			



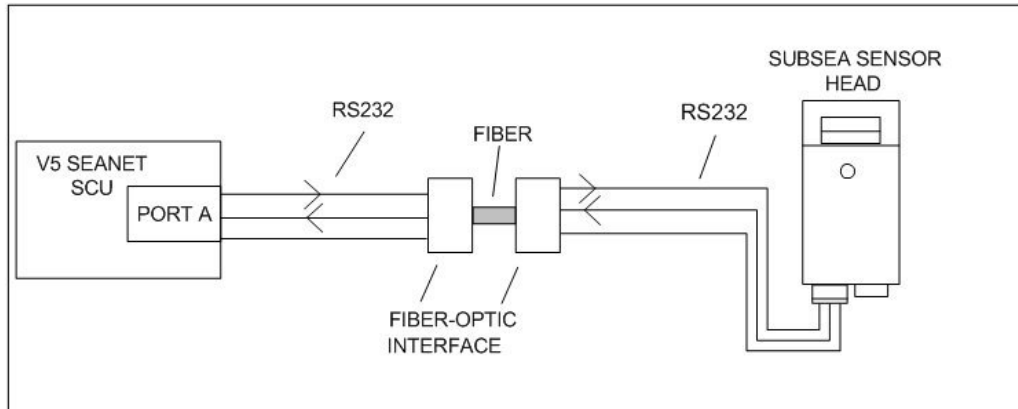
Note

In RS232 mode the DA-15 output is the same internal connection as the DE-9 RS232 port A and therefore a connection can be used to port A

instead. For a pin-out of of port A see Appendix A, *Data and Control Ports*.

Single SeaKing Sensor in RS232

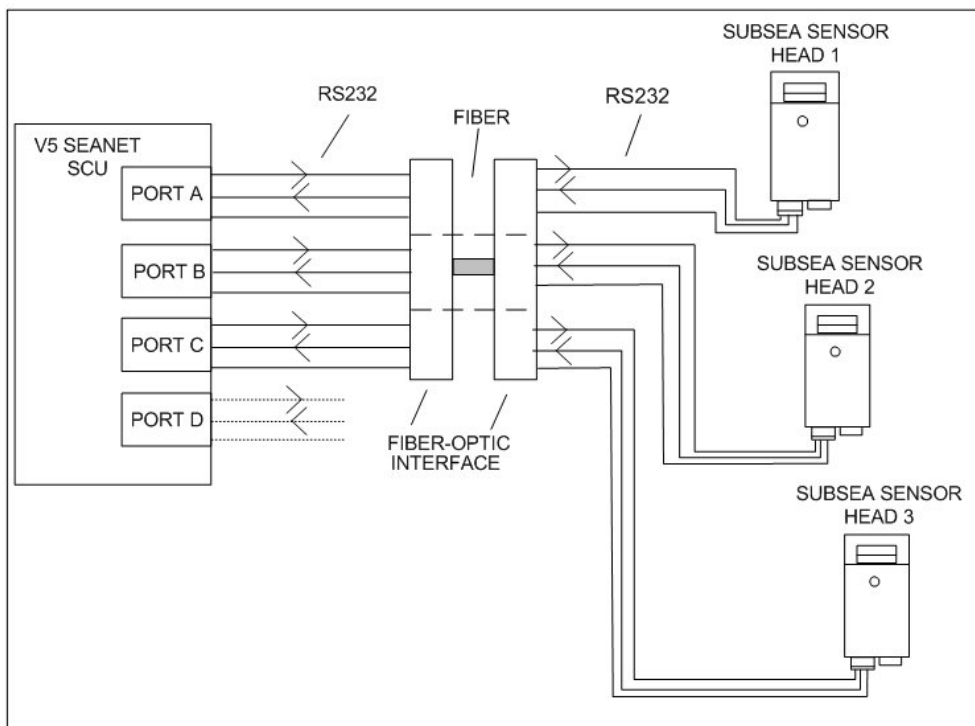
The V5 SCU can support direct connection of a single node to a dedicated RS232 port.



Connection should be made through the DA-15 connector, wired for RS232 communications as shown above. This configuration is single head so subsea networking is not possible.

Multiple Sensors Connected to the SCU

The connection of multiple serial sensors to a single V5 SCU is possible. Each sensor must feed into the SCU on its own port:

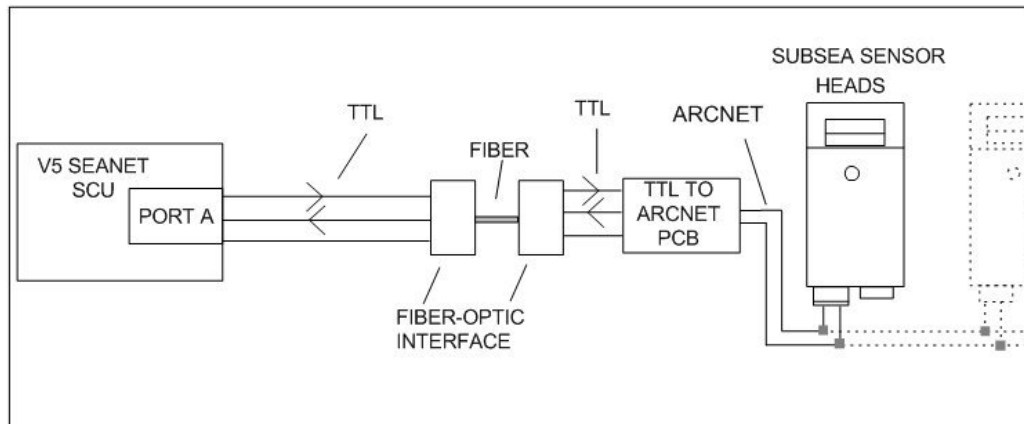


Connection should be made through the DE-9 connectors A through D, each wired for serial communications as shown in Appendix A, *Data and Control Ports* (the

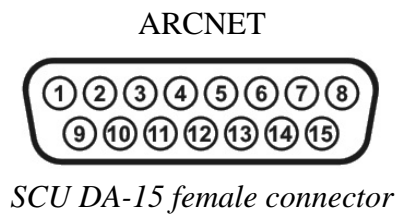
chosen serial standard, RS232, RS422 or RS485 will depend on the sensor in use - note that only port B can use RS422.

SeaKing Sensors Through TTL to ARCNET Modem

This is only applicable to systems operating with the *Tritech International Ltd* TTL to ARCNET interface PCB or alternative such as the Subsea 7 “Eagle Eye” PCB.



Connection to the SCU should be made through the DA-15 connector, wired as below. TTL signals are isolated on the V5 Seanet SCU.



Pin	Connection	Pin	Connection
1	nc	9	nc
2	Ground	10	nc
3	nc	11	nc
4	LAN.Rx	12	nc
5	nc	13	nc
6	nc	14	LAN.Tx
7	nc	15	nc
8	nc		
<i>nc = not connected</i>			

Appendix C. ARCNET Termination

The ARCNET communication link requires a termination resistor to be installed at each end of the umbilical cable. Normally this is supplied fitted within the ARCNET cable DA-15 connector at the surface and is left for the user to fit at the sub-sea end in a convenient junction box or by use of the yellow waterblock.



Caution

Fitting the resistor inside the unit is not recommended and may invalidate the warranty.

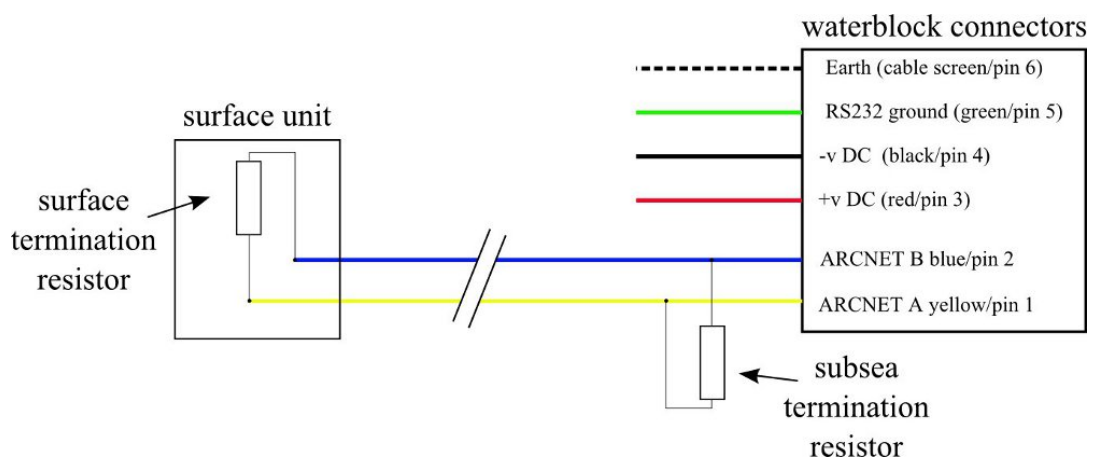
The purpose of these terminations is to attenuate any electrical interference or "reflections" which may occur due to an impedance mis-match and the overall aim is to improve signal quality and negate any effects which might otherwise be felt by other sources of impedance such as from the cable itself.

The diagram below shows best practice to use when installing termination resistors on an ARCNET network of *Tritech International Ltd* sonar products.



Note

A special yellow waterblock is available from *Tritech International Ltd* which contains an in-line impedance of 39ohm which will enable quick and easy installation of the subsea termination resistor.



Cable length	Termination	Baud rate setting
Less than 100m	Single 39ohm subsea resistor	Normal baud rate
100-1200m	270ohm at surface and 39ohm subsea	Normal baud rate
1200-2500m	270ohm at surface and 39ohm subsea	Half baud rate



Note

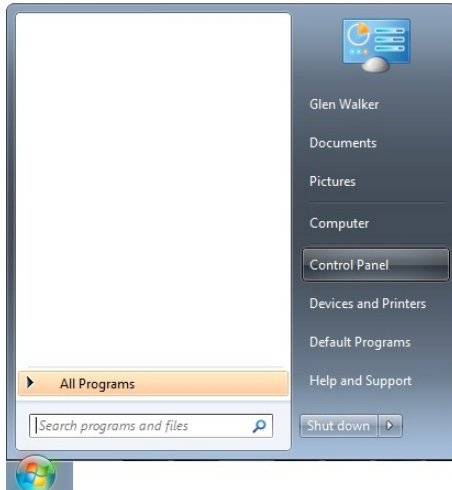
If there is more than one sensor connected then the sub-sea resistor should be fitted at the junction box or splice of the cable.

Appendix D. Setting the computer IP address in Windows 7

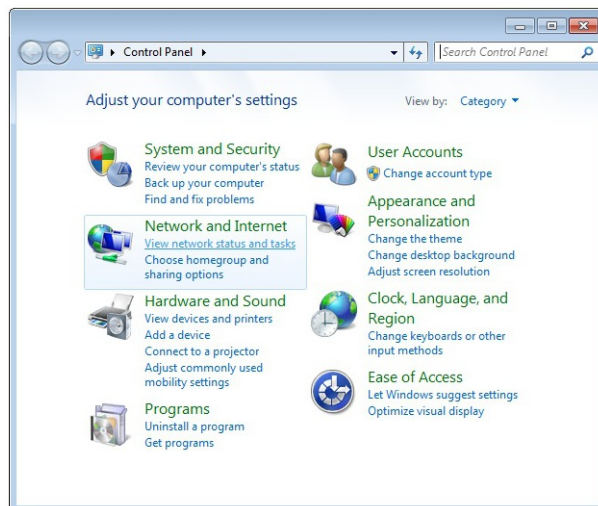
The following instructions apply to a computer running Windows 7, though the sequence for other operating systems will be similar.

Disconnect the computer from any existing network.

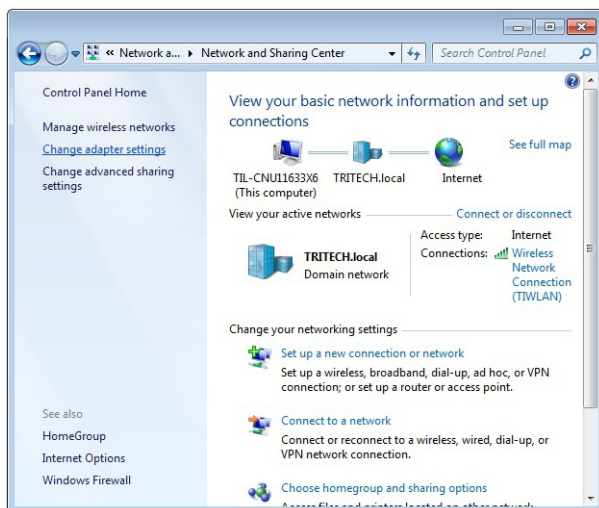
First click on the Start Menu and select Control Panel.



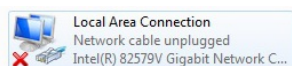
Under Network and Internet click on View network status and tasks.



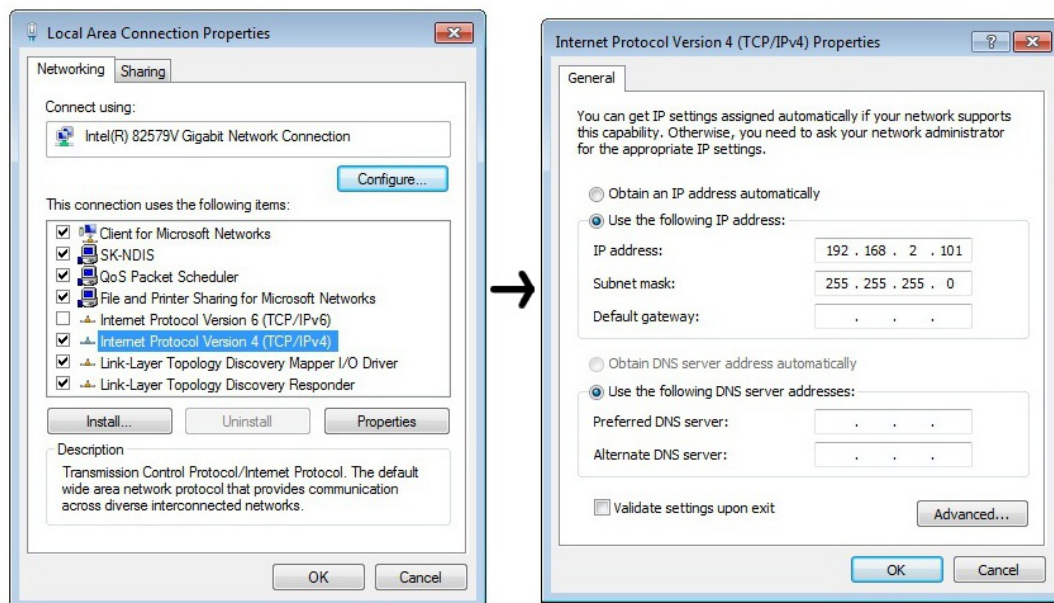
This will bring up the Network and Sharing Center which allows configuration of any networks on the computer. Click on Change adapter settings on the left-hand pane.



A list of attached network devices should now present itself. Find the one which the sonar is to be connected to and double-click on it.



The Local Area Connection Properties dialog should be displayed. Find the entry labelled Internet Protocol Version 4 (TCP/IPv4), select it and then click on the Properties button.



In the properties dialog which opens there will either be Obtain an IP address automatically or Use the following IP address selected. If an IP address is already present, make a note of it before changing any values since it will be needed if the computer is ever restored to the previous network. For connection to a Gemini sonar the IP address should be 192.168.2.101 and the subnet mask 255.255.255.0

Warranty Statement

Tritech International Ltd are herein after referred to as *TIL*

TIL warrants that at the time of shipment all products shall be free from defects in material and workmanship and suitable for the purpose specified in the product literature. The unit/system warranty commences immediately from the date of customer acceptance and runs for a period of 365 days. Customer acceptance will always be deemed to have occurred within 72 hours of delivery.

Conditions include, but are not limited to, the following:

1. The warranty is only deemed to be valid if the equipment was sold through TIL or one of its approved distributors.
2. The equipment must have been installed and commissioned in strict accordance with approved technical standards and specifications and for the purpose that the system was designed.
3. The warranty is not transferable, except or as applies to Purchaser first then to client.
4. TIL must be notified immediately (in writing) of any suspected defect and if advised by TIL, the equipment subject to the defect shall be returned by the customer to TIL, via a suitable mode of transportation and shall be freight paid.
5. The warranty does not apply to defects that have been caused by failure to follow the recommended installation or maintenance procedures. Or defects resulting from normal wear and tear, incorrect operation, fire, water ingress, lightning damage or fluctuations in vehicles supply voltages, or from any other circumstances that may arise after delivery that is out with the control of TIL.
6. The warranty does not cover the transportation of personnel and per diem allowances relating to any repair or replacement.
7. The warranty does not cover any direct, indirect, punitive, special consequential damages or any damages whatsoever arising out of or connected with misuse of this product.
8. Any equipment or parts returned under warranty provisions will be returned to the customer freight prepaid by TIL.
9. The warranty shall become invalid if the customer attempts to repair or modify the equipment without appropriate written authority being first received from TIL.
10. TIL retains the sole right to accept or reject any warranty claim.
11. Each product is carefully examined and checked before it is shipped. It should therefore be visually and operationally checked as soon as it is received. If it is damaged in any way, a claim should be filed with the courier and TIL notified of the damage.

Notes

1. The warranty does not apply in the event where a defect has been caused by isolation incompatibilities.
2. Any customer acceptance testing (if applicable) must be performed at either TIL premises or at one of their approved distributors unless mutually agreed in writing prior to dispatch.
3. TIL reserve the right to change specifications at any time without notice and without any obligation to incorporate new features in instruments previously sold.
4. If the instrument is not covered by warranty, or if it is determined that the fault is caused by misuse, repair will be billed to the customer, and an estimate submitted for customer approval before the commencement of repairs.

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