Seanet SCU v5

Product Manual

0581-SOM-00002, Issue: 05

Tritech

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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 the Warranty Statement, 0080-STF-00139, available upon request.

Tritech International Ltd can be contacted as follows:

	Mail	*Tritech International Ltd* Peregrine Road Westhill Business Park Westhill, Aberdeenshire AB32 6JL, UK
	Telephone	+44 (0)1224 744111
	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

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 156kbps (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

- 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 and SD slot in front panel

- As well as data from Tritech devices, other data including NMEA 1083, Pipetracker, Turns Counter and Compass data may be recorded

- A range of interface ports is provided including DA-15 ARCNET, USB, DE-9 serial and Ethernet RJ45

- Data export capability via the 5 x DE-9 connectors using RS232, RS485 or RS422

- 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

2.1. Dimensions

375.5

432.4

482.6

132.5

325.0

All dimensions are in mm. Not to scale.

57.2

465.9
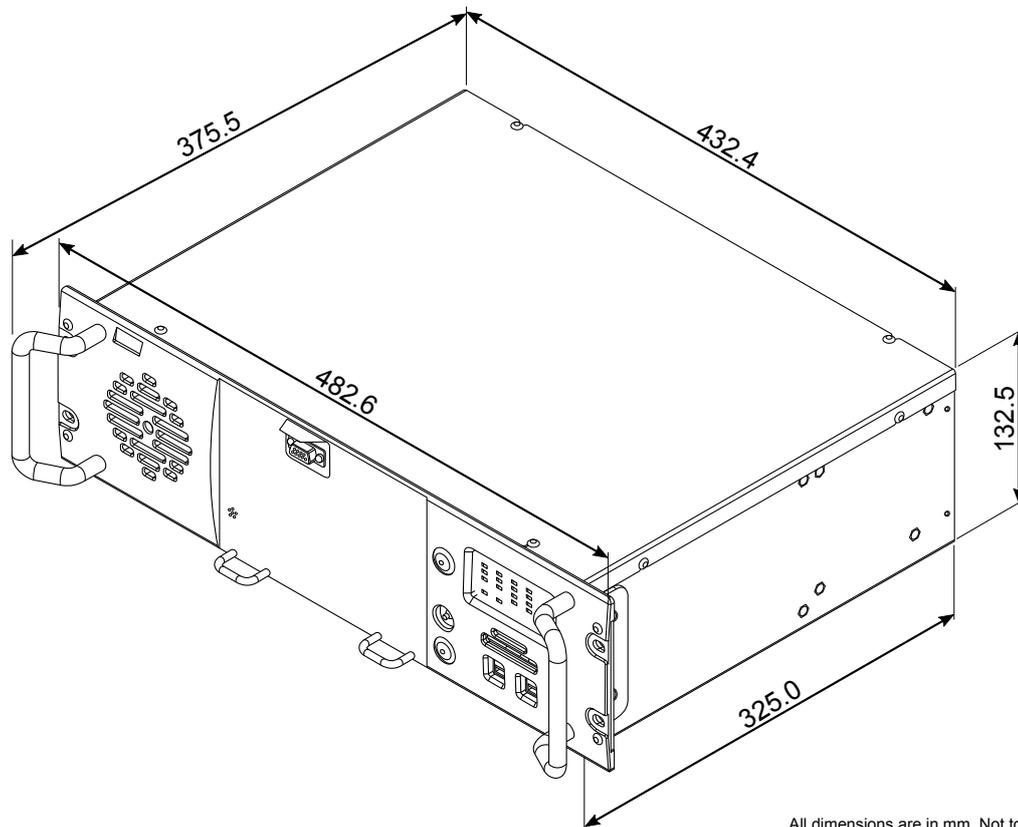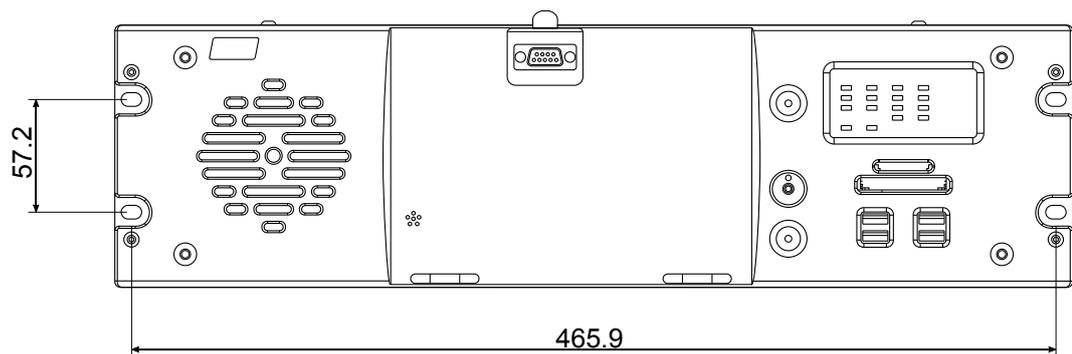
All dimensions are in mm. Not to scale.

2.2. Computer and Electrical

Item	Details
Processor	Intel™ Dual Core (or better)
Operating System	Microsoft Windows® Embedded
Primary Control	PS/2 Remote Access Terminal (RAT)
Video Output	SVGA, XGA, SXGA, and Display Port HDMI and DVI available via Display Port adaptors
ARCNET Link	1 x 156kbit·s⁻¹ (1200m) or 78kbit·s⁻¹ (2500m)
Storage Media	64GB SSD
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 at 36VA Output (for equipment test purposes) Front and rear USB ports (3.0 or better) Multi-card reader (CF Type 1 & SD card) Ethernet
Input Voltage	Universal 100-240VAC 50/60Hz

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.

2.3. Physical

Item	Details
Weight	~10kg
Material	Aluminium, Stainless Steel
Operating Temperature	5 to 35°C
Storage Temperature	-20 to 50°C

2.4. SCUv5 Front Panel
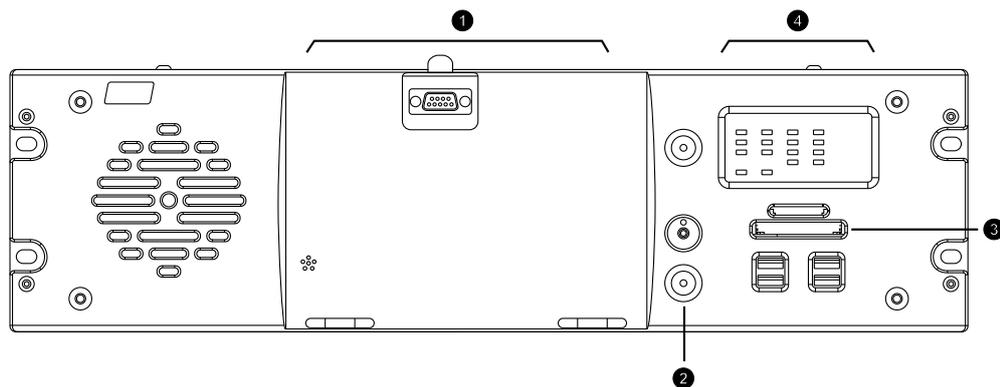
1. The RAT can be de-coupled from the main unit completely or operated from an RS232 extension cable. The function of the RAT controls depend on which subsea sensors are fitted, and the user should refer to the appropriate section of each product manual for full details.

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 and SD cards. The restore disk on earlier Seanet SCUs 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 DE-9 COM ports (A - D) accessible on the rear

2.5. Seanet SCU (v5) Rear Panel Layout
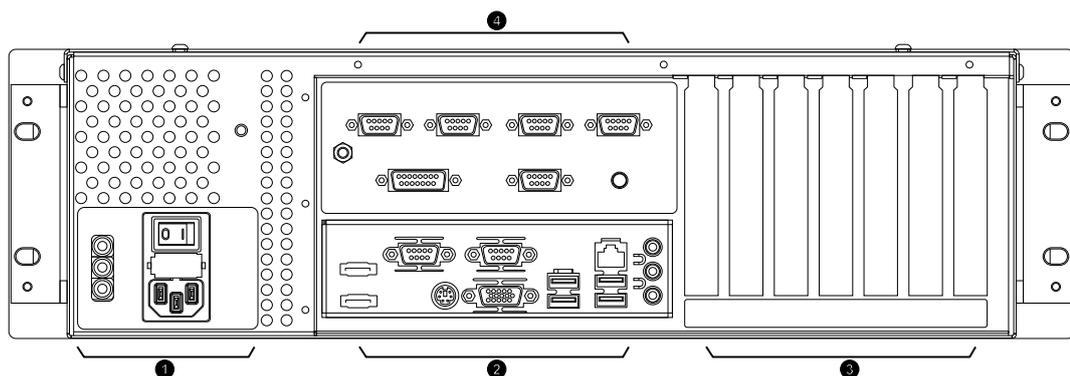
1. Power supply with DC Out ports

2. Motherboard connectors

3. Expansion slots for PCI based cards (including PCI-E)

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

Note

The exact rear panel layout of the SCUv5 is subject to change and may not be identical to the layout shown above.

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*.

Note

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 ports (conforming to at least the USB2.0 standard), 1 or 2 PS/2 keyboard/mouse ports and RJ45 Ethernet.

Caution

If a DE-9 port is present on the motherboard it may 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. Contact *Tritech International Ltd* with details of your SCU if more information or assistance is required.

2.6. 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 may 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. Contact *Tritech International Ltd* with details of your SCU if more information or assistance is required.

3. 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).

3.1. Connections

Caution

The power should be turned off before making a connection between the sonar head and surface controller (SCU or SeaHub).

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 SCUv5 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.

3.2. Communication Configuration

Fitted inside the SCU, located at the front panel, is the SCUv5 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 LEDs and hardware for COM Ports A to D. The SCUv5 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 RS232 interface can be provided to allow telemetry connection through a fibre optic system capable of 115kbit·s⁻¹ transmission. The RS232 interface is available in the guise of an RS232 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 RS232 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 20-72V DC (Absolute Maximum 72V DC) when fitted with a COMV6 PCB. For more details, please contact *Tritech International Ltd*.

Caution

SeaKing units fitted with a COMV5 MOD A PCB, or earlier, have an operating voltage range of either 18-28 VDC or 18-36 VDC. Please contact *Tritech International Ltd* for more information and advice.

If using a rectified transformer PSU, the output of the PSU must have a filter capacitor of not less than 470µF, 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 20-72v 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 10Ω for one head, 5Ω for two heads, and 3Ω for three heads. If the supplied voltage is less than 20V 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 profilers 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*

4. 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.

Caution

The power should be turned off before making a connection between the sonar head and surface controller (SCU or SeaHub).

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 individual device manual for specific details of 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

5. System Software Configuration

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

A complete image of the Microsoft 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 manuals can be located.

5.1. Seanet System Re-Installation

The Seanet SCU has the following drive letters:

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

Drive D:\   This drive is where the Seanet Pro 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.

5.2. Repair of Seanet Pro

If the Seanet SCUv5 is booting up normally and only the Seanet Pro 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 Microsoft Windows® re-start.

5.3. Full Disk Re-Installation using Boot Recovery

If any part of the Microsoft 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:

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>`, `<F11>` or `<F12>` button on the keyboard (note: this button can very 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:

   - `PRETEC 01GB USB DOF` (early SCUv5 units)

   - `USB Disk module PMAP` (later Microsoft Windows® XP SCUv5 units)

   - `USB-HDD` (for Microsoft Windows® 7 SCUv5 units)
   Select the correct device and press `<Enter>` on the keyboard.

4. The Microsoft Windows® Startup Menu will soon appear.

   - For Microsoft 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 Microsoft 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 retore 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. (Microsoft 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. (Microsoft Windows® XP only) Once rebooted, Microsoft 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.

> ### 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.

6. 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 5 to 35°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 SCUv5 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 `S05023`.

Appendix A. Data and Control Ports

Waterblock Pin-out Diagram
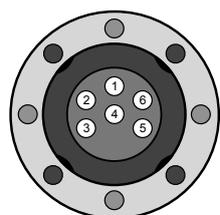
Tritech Waterblock

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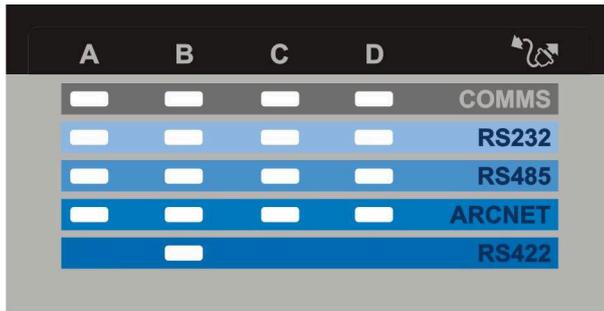
The COMMS row of LEDs are bi-colour, with Red - Receive; Green - Transmit

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 115200 baud.
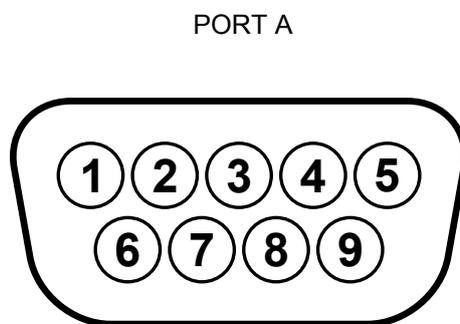
PORT A

SCU DE-9 male connector

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 115200 baud in RS-232/RS-485 mode.

PORT B
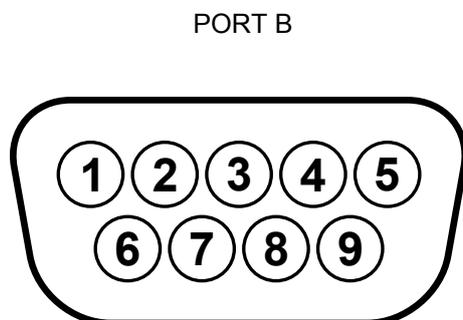
SCU DE-9 male connector

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 115200 baud in RS-232/RS-485 mode.

PORT C/D
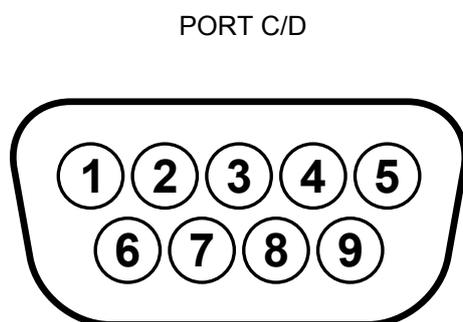
SCU DE-9 male connector

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.

ARCNET

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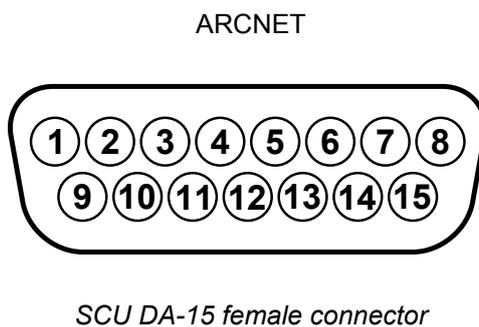
Pin	Connection	Pin	Connection
1	nc	9	+12v DC
2	COMMS Ground	10	VCC
3	Ground	11	LAN EN
4	LAN RX	12	RS232 RTX
5	RS232 CTS	13	RS232 RX
6	RS232 TX	14	LAN PULSE1
7	LAN PULSE2	15	LAN B
8	LAN A		
nc = not connected			

- 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)

RAT

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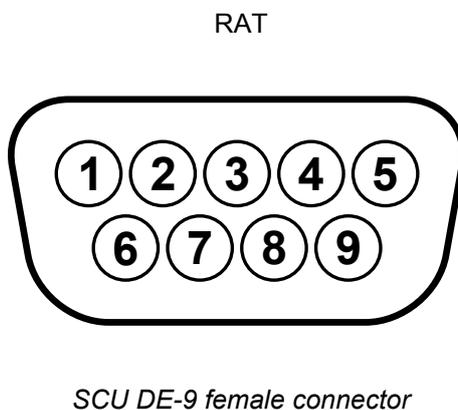
Pin	Function
1	GROUND
2	+5v DC
3	RAT RS485 B
4	RAT RS485 A
5	‡
6	‡
7	PS/2 SCLK
8	PS/2 SDATA
9	+12v DC
‡ = connected for handshaking only.	

- 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. Ports C & D can be configured to operate with an ARCNET LAN network. In these cases, the Port is internally linked to the 15 pin D-type - acting as an extension to it.

The 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 Tritech data from Subsea to Surface is via a twisted pair cable.
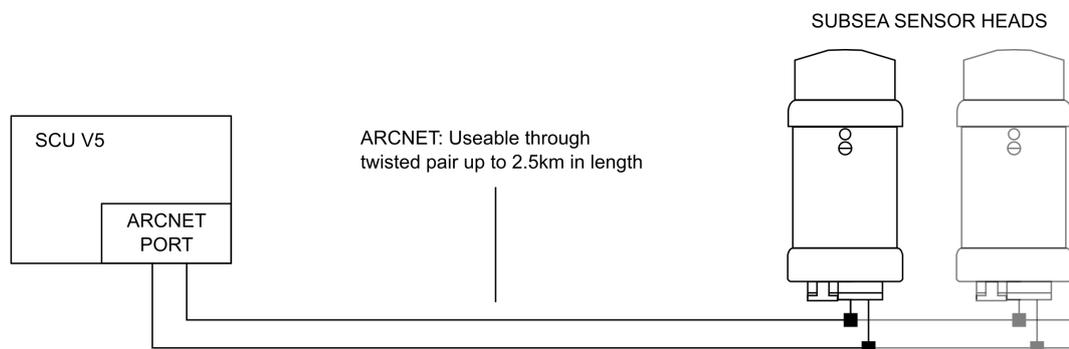
Connection to the V5 SCU should be made through the DA-15 connector, wired as below with any additionally networked heads connected in series off the first head.
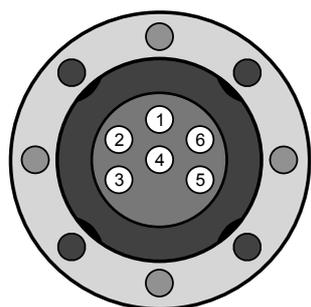
Tritech 6-pin connector
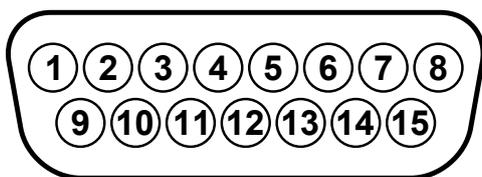
SCU DA-15 female connector

Pin	Tritech Connector	DA-15 Connector
1	ARCNET A	nc
2	ARCNET B	nc
3	(see note)	nc
4	(see note)	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 (for example 24V DC supply for a SeaKing) and pin 4 (0V ground) of the Tritech 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
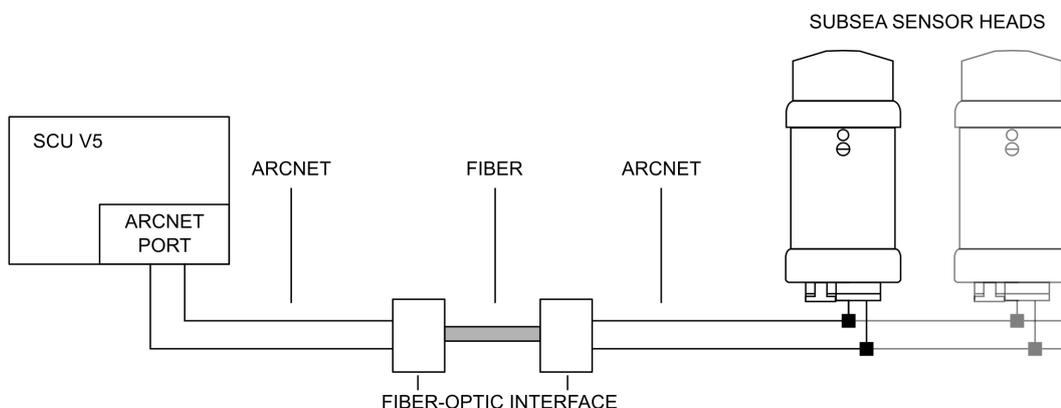
The connection to the SCU should be made through the ARCNET (DA-15) port and wired in the same manner as the *ARCNET Through Twisted Pair* shown above.

Junction Box or Split AIF with RS232

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

ARCNET
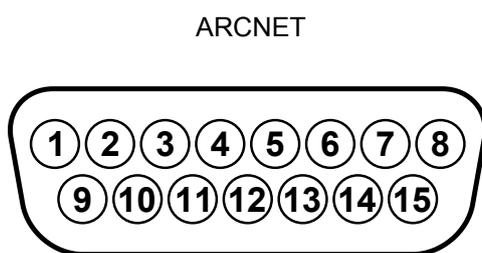
SCU DA-15 female connector

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		
nc = not connected			

Note

In DA-15 can operate in RS232 mode (this type of operation is fixed during manufacture of the unit and cannot subsequently be changed). In RS232 mode the output has 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.
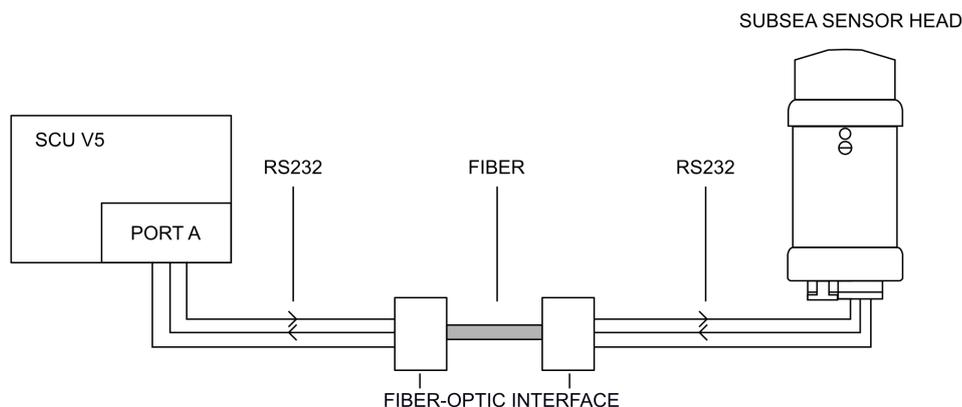
Connection can be made through the DA-15 connector (if it is wired for RS232 communications) or through one of the standard DE-9 ports, such as PORT A shown above. This configuration is single head so subsea networking is not possible.

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:
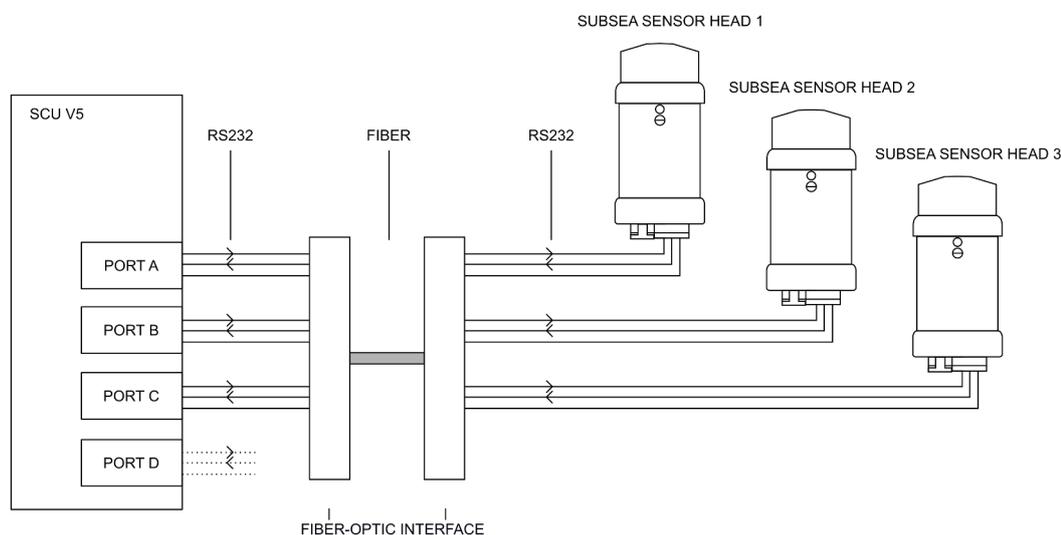
Connection should be made through the DE-9 connectors A through D, each wired for serial communications as shown in Appendix A, *Data and Control Ports* (the chosen serial standard, RS232, RS422 or RS485 will depend on the sensor in use - note that only port B can use RS422.

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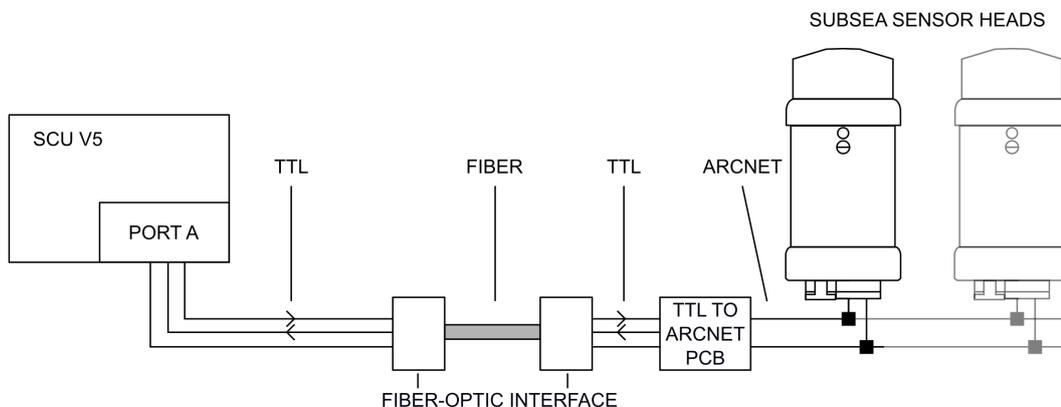
Connection to the SCU should be made through the DA-15 connector, wired as below. TTL signals are isolated on the V5 Seanet SCU.

ARCNET
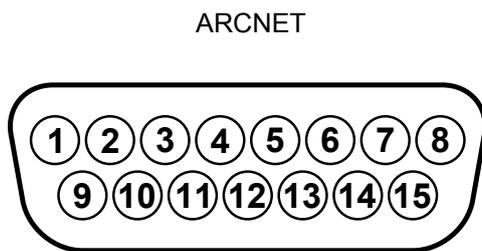
SCU DA-15 female connector

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		
nc = not connected			

Appendix C. ARCNET Termination

Depending on the cable length 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 or within the SCU/SeaHub 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 a special waterblock.

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 39Ω which will enable quick and easy installation of the subsea termination resistor.
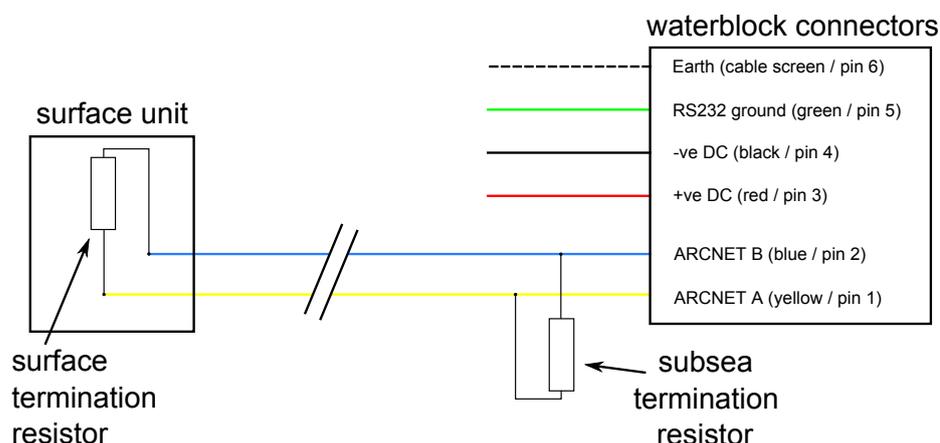
Cable length	Termination	Baud rate setting
Less than 100m	Single 39Ω subsea resistor	Normal baud rate
100-1200m	270Ω at surface and 39Ω subsea	Normal baud rate
1200-2500m	270Ω at surface and 39Ω subsea	Half baud rate

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 or Windows® 10

The following instructions apply to a computer running Windows® 7 or Windows® 10, though the sequence for other operating systems will be similar. All screenshots are from a Windows® 7 installation.

Disconnect the computer from any existing network.

First click on the Start Menu and select `Control Panel`.
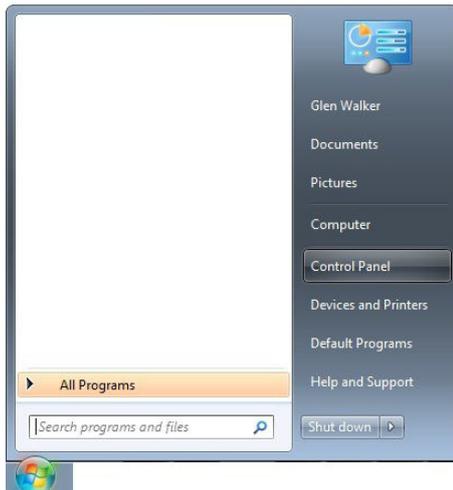
Under `Network and Internet` click on `View network status and tasks.`

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 Gemini head 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.
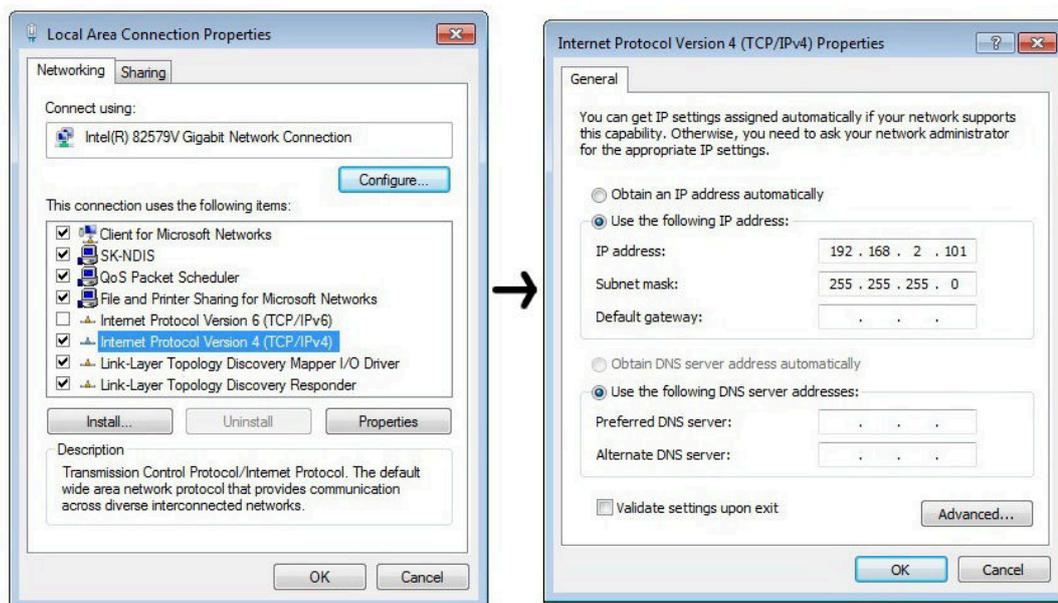
In the properties dialog which opens there will either be `Obtain an IP address automatically` or `Use the following IP address` selected. If an IP address is already present, make a note of it before changing any values since it will be needed if the computer is ever restored to the previous network. Refer to appropriate section of this manual for the correct IP addresses to use.

Glossary

AIF	Originally "Acoustic Interface" but also used to refer to "ARCNET Interface" in which case it can refer to either the interface port on a SeaHub or SCU or to the expansion card available for installation into a computer.
ARCNET	Attached Resource Computer NETwork - a network protocol similar to Ethernet but with the advantage of working over much longer ranges.
BIOS	Basic Input Output System - the code that loads when a computer is initially turned on.
DA-15	A 15 pin D shaped connector used mainly for the ARCNET connection on the SCU and SeaHub.
DC	Direct Current
DE-9	A 9 pin D shaped connector commonly used for serial communications on computers.
DVI	Digital Visual Interface, a standard connector for connecting from a computer to a monitor.
Ethernet	A family of computer networking technologies for local area networks (LANs).
Gemini	Unless specified this can refer to any of the multibeam sonars in the Gemini range by *Tritech International Ltd*, from the market leading 720is to the world's smallest multibeam - the 720im.
Gemini Hub	A rack mountable device capable of driving 2 Gemini sonars and multiple serial sensors and outputting the data to a PC network.
LED	Light Emitting Diode
NMEA	National Marine Electronics Association - a USA based standards association responsible for overseeing electrical and data communications standards between marine devices (due to become the IMEA or International Marine Electronics Association in 2012).
PCB	Printed Circuit Board
PSU	Power Supply Unit
RAT	Remote Access Terminal - the detachable front part of the Tritech Surface Control Unit (SCU) computer. Provides an alternative to using a keyboard and mouse.
RJ45	Registered Jack wiring scheme commonly used to refer to the 8 position 8 contact (8P8C) connector wired for Ethernet communications.
RS232	Traditional name for a series of standards for serial binary data control signals.
RS485	A standard for defining the electrical characteristics of drivers and receivers for use in a balanced digital multipoint system (also known as EIA-485).
RX	Receive (data)

SCU	Surface Control Unit - a specially manufactured computer which is rack mountable and capable of processing the data from the sonar equipment running either Windows® XP Embedded or Windows® 7 and Seanet Pro or Gemini software.
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.
Seanet Pro	The software supplied by *Tritech International Ltd* which is capable of running all the sonar devices.
TX	Transmit (data)
USB	Universal Serial Bus.