SeaHub

Product Manual

0594-SOM-00001, Issue: 02

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.

Head Variations

The SeaHub comes in the following configurations:

Desktop version	Rack mount version
	
• Desktop interface for Tritech products	• Rack mountable interface for Tritech products

1. Introduction

The Tritech SeaHub Surface Interface Module is designed to be a universal interface box providing a single module solution for interfacing the range of *Tritech International Ltd* sub-surface products (sonars, acoustic modems and other undersea sensors) into a PC computer or Laptop.

The SeaHub can be powered from a standard Mains power supply, or through the input DC socket at the rear of the unit and is available in either a 19" Rack mountable solution, or as a desktop unit.

The SeaHub can be connected to devices through a variety of communication protocols: ARCNET; RS232 (3 and 5 variants); RS422 (Full Duplex) and RS485 (Half Duplex). The front of the SeaHub provides a LED status panel which displays the communications protocol selected for each Port.

The SeaHub also provides a built in DC power supply that can power units. This is intended for testing purposes, but could be used where an alternative power source is not available. The two DIN connector ports have power automatically present, but there is also the three 4mm sockets at the rear of the unit.

Note

The DC power output level from the SeaHub is controlled by an internal variable resistor. See Chapter 4, *Operation* for more details.

Note

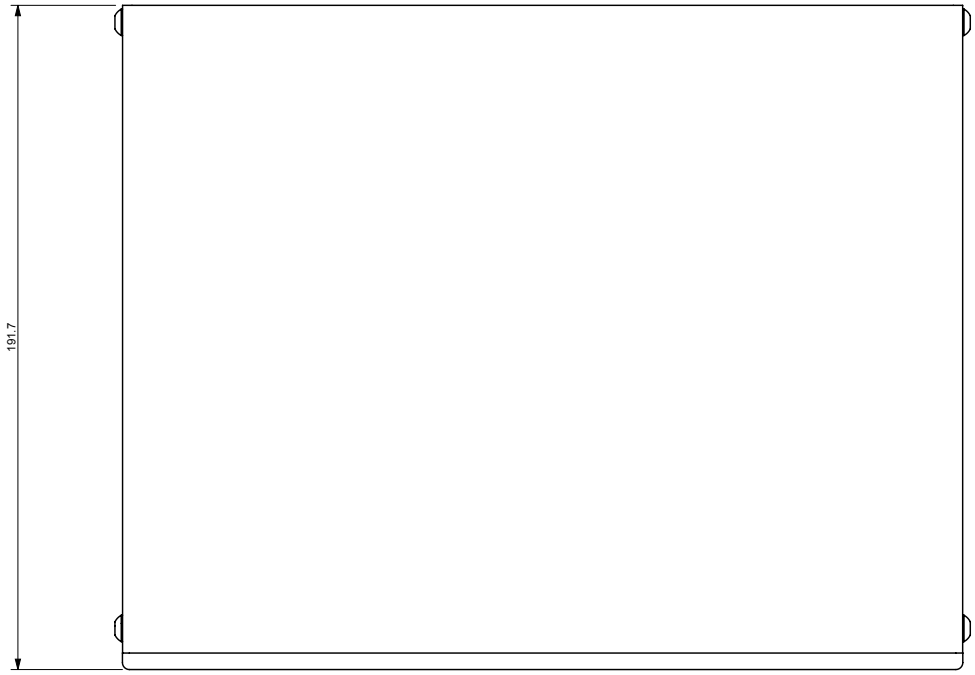
When powering the SeaHub from a DC power supply, the SeaHub will connect the DC output to this supply but with approximately a 2V voltage drop.

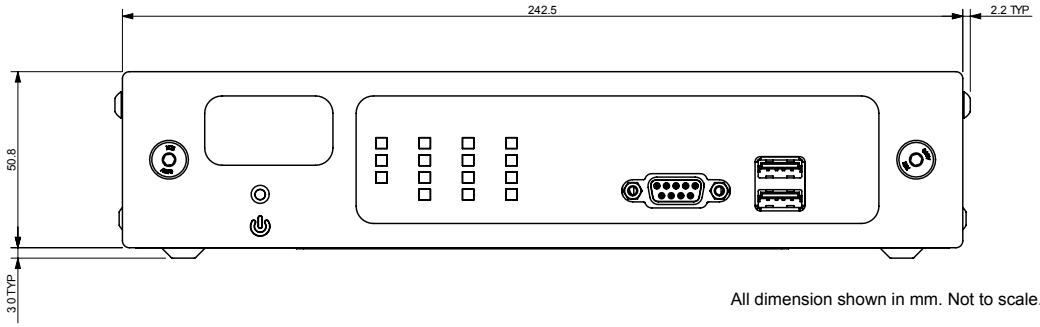
For sonar specific control, the front panel also contains provision for connection to a RAT. RATs with a PS2 “Togglestick” mouse-controller and RS485 serial communications are supported.

At the front of the SeaHub two USB Type-A sockets are also provided for user specific peripherals to be connected. Each socket is capable of delivering 500mA of current (to a self-powered hub), and is protected accordingly.

2. Specification

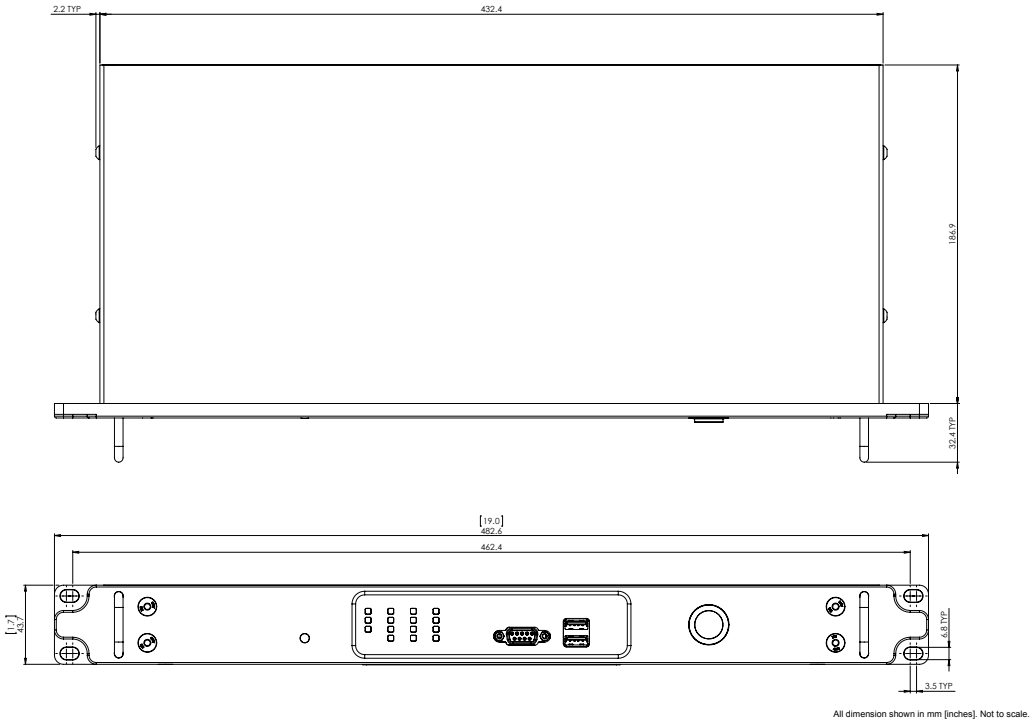
2.1. SeaHub Dimensions (Desktop version)





All dimension shown in mm. Not to scale.

2.2. SeaHub Dimensions (Rack mountable version)



All dimension shown in mm [inches]. Not to scale.

2.3. Physical

Desktop version	
Materials	Stainless Steel housing with Anodised Aluminium front facia
Weight	1.3kg
Dimensions	242.5 x 191.66 x 53.81mm (width x depth x height)
Temperature range	5 to 35°C (-20 to 50°C in storage)

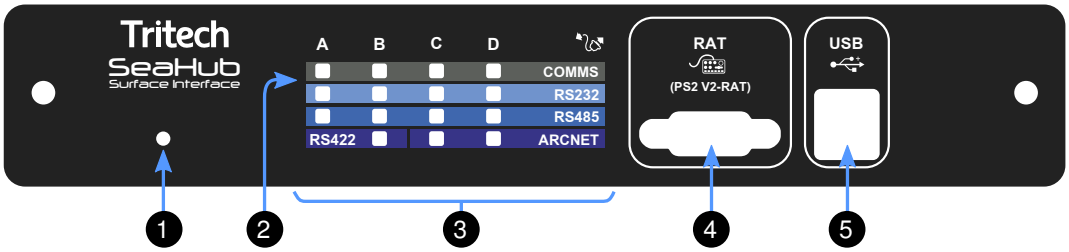
Rack mountable version	
Materials	Stainless Steel housing with Anodised Aluminium front facia
Weight	3.4kg
Dimensions	482.6 x 219.3 x 43.7mm (width x depth x height)
Temperature range	5 to 35°C (-20 to 50°C in storage)

2.4. Electrical and Communication

Power requirement	100 - 240V AC 50-60 Hz IEC-320 C14 socket (for C13 cord) 12 - 36V DC (5mm round, positive core)
Power output with AC input	28V DC (35W, 1.25A)
Power output with DC input	The same as input voltage (maximum 1.25A)
Power output options	Jumper options for fixed 5V or 12V DC
Rear ports	USB 2.0 (Type B) female for PC interface DA-15 ARCNET 3x banana plug DC out (Ground, +, -) 2x DE-9 male 2x DIN-45322 (6 pin) female IEC C14 male AC power 5mm round, positive centre, DC in
Front ports	2x USB 2.0 (Type A) female 1x DE-9 Remote Access Terminal
Port A functionality	RS232 with handshaking or RS485
Port B functionality	RS232, RS422, RS485
Port C functionality	RS232, RS485 or ARCNET (with power output)
Port D functionality	RS232, RS485 or ARCNET (with power output)

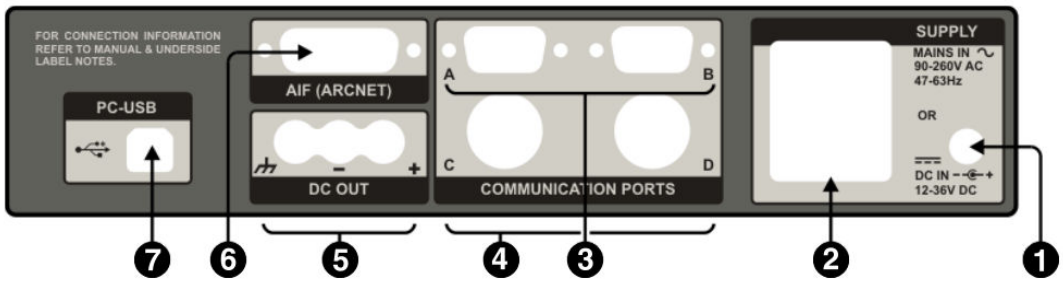
2.5. SeaHub (Desktop version) Panel Connectors

Front Panel



❶ Power and status LED
❷ Transmit (green) and receive (red) status LEDs
❸ Communications port mode LEDs (blue)
❹ RAT
❺ Two USB (type A) ports

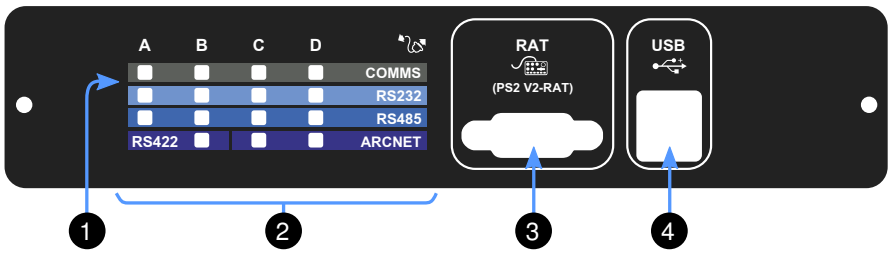
Rear Panel



1. DC power in
2. IEC AC power in
3. DE-9 ports A and B
4. DIN45322 ports C and D
5. DC power out
6. DA-15 AIF (ARCNET) connector
7. USB 2.0 (type B) for PC interface

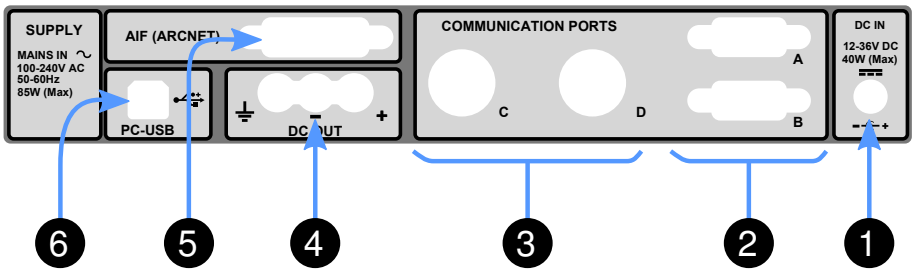
2.6. SeaHub (Rack mountable version) Panel Connectors

Front Panel



1. Transmit (green) and receive (red) status LEDs
2. Communications port mode LEDs (blue)
3. RAT
4. Two USB (type A) ports

Rear Panel



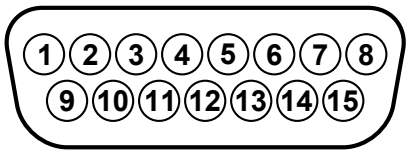
1. DC power in
2. DE-9 ports A and B
3. DIN45322 ports C and D
4. DC power out

❺ DA-15 AIF (ARCNET) connector
❻ USB 2.0 (type B) for PC interface

The IEC Mains connector and power switch is located to the left hand side of the rear panel connections.

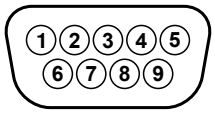
2.7. Pin-Out Diagrams

2.7.1. AIF (ARCNET) Port



Pin	Function	Pin	Function
1	n/c	9	+12v DC
2	COMMS GND	10	VCC
3	0V	11	LAN EN
4	LAN RX	12	RS232 RTS
5	RS232 CTS	13	RS232 RX
6	RS232 TX	14	LAN pulse 1
7	LAN pulse 2	15	LAN B
8	LAN A		

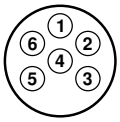
2.7.2. Ports A & B



‡ = connected for handshaking only.

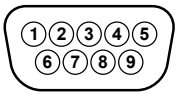
Pin	Port A and B		Port B
	RS232	RS485	RS422
1	‡	‡	‡
2	RX	TX/RX.A	TX.A
3	TX	TX/RX.B	TX.B
4	‡	‡	‡
5	Communications Ground		
6	‡	‡	‡
7	RTS	‡	RX.B
8	CTS	‡	RX.A
9	‡	‡	‡

2.7.3. Ports C & D



Pin	RS232	RS485	ARCNET
1	RX	TX/RX-A	LAN A
2	TX	TX/RX-B	LAN B
3	+ DC (max. 24V)		
4	0V		
5	Communications Ground		
6	Screen		

2.7.4. Front Panel RAT



‡ = connected for handshaking only.

Pin	Function	Pin	Function
1	0V	6	‡
2	+5v DC	7	PS/2 SCLK
3	RAT RS485 B	8	PS/2 SDATA
4	RAT RS485 A	9	+12v DC
5	‡		

3. Installation

3.1. Software Installation

Note

The hardware must not be connected to the PC prior to or during software installation.

If any Seanet software is already installed on the PC this must be removed correctly using Windows `Control Panel - Add or Remove Programs` (or `Programs and Features` in Windows 7) prior to starting the software installation.

Note

The latest version of Seanet Pro can be obtained from www.tritech.co.uk

Insert the `Seanet Pro` installation CD into the PC CD-ROM drive - if autorun is enabled a dialog will appear with installation options. If autorun is disabled then run the `Setup.exe` from the CD.

When the installation program starts, click `Next` to continue.

Read the license agreement and if you agree to its terms select the `YES` option and click `Next` to continue.

Confirm the installation destination directory (by default `C:\Program Files\SeanetV2` but if you wish to change this click the browse button and select an alternative directory), click `Next` to continue.

Installation will then copy files onto your computer and make entries in the Windows Registry, this process may take several minutes. If any anti-spyware software is running this may warn you that registry changes are being made, allow any changes to be made if prompted. Once

files are copied you will be prompted to restart the PC (if you wish to defer the restart select `No`), click `Finish` to continue.

If the installation has been successful two new icons will have been created on the desktop for Seanet Pro and Seanet Setup.

3.2. Surface Hardware Installation and Configuration

Caution

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

Note

Prior to connecting the SeaHub to the computer, Seanet Pro must be installed beforehand. See Section 3.1, “Software Installation” for more details.

- Connect the computer USB port on the rear panel of the SeaHub to a USB 2.0 port on the User computer with the supplied USB cable assembly.
- Connect power to the SeaHub and switch on. The indicator LEDs on the front of the unit will flash and the ports will auto-install on the computer - this will take a minute or so to complete and you may be prompted to re-boot the computer.
  - If the computer does not automatically load the drivers for the SeaHub some additional steps may be required. See Section 3.3, “Driver installation for SeaHub and NavHub” for more details.

Note

The Rack mount version of the SeaHub has a power switch located at the rear of the unit, next to the IEC connector. There is also a power switch at the front of the unit. Both of these must be activated when power is applied in order to switch the unit on.

There should be 6 COM Ports detected by the computer once all the drivers have been fully installed:

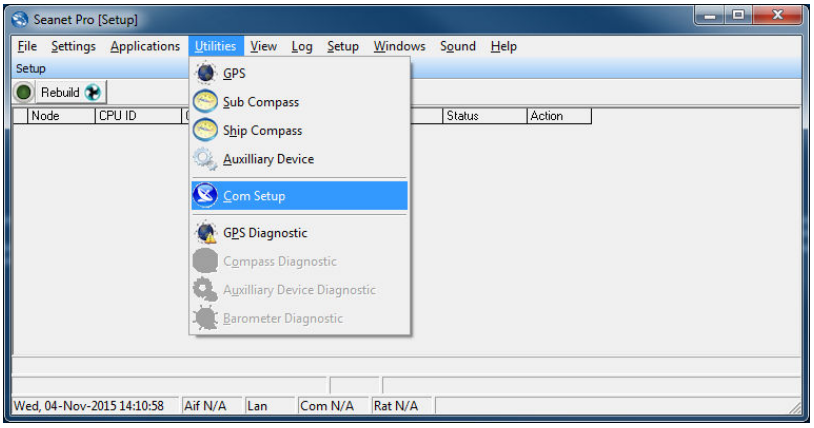
SeaHubMain	This is the main port used to communicate and control with the SeaHub and ARCNET interface.
SeaHubA	This is the port used to communicate via PORT A of the SeaHub
SeaHubB	This is the port used to communicate via PORT B of the SeaHub
SeaHubC	This is the port used to communicate via PORT C of the SeaHub
SeaHubD	This is the port used to communicate via PORT D of the SeaHub
SeaHubAUX	This is the port used for additional communication options. It is not user accessable.

The actual port numbers may vary from computer to computer.

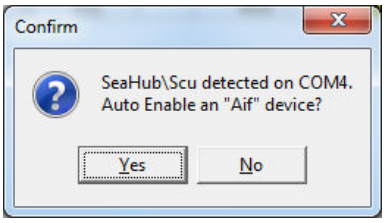
Basic Setup

The Seanet software must now be configured for the SeaHub – click the `Seanet Setup` icon on the desktop to run the Seanet setup program.

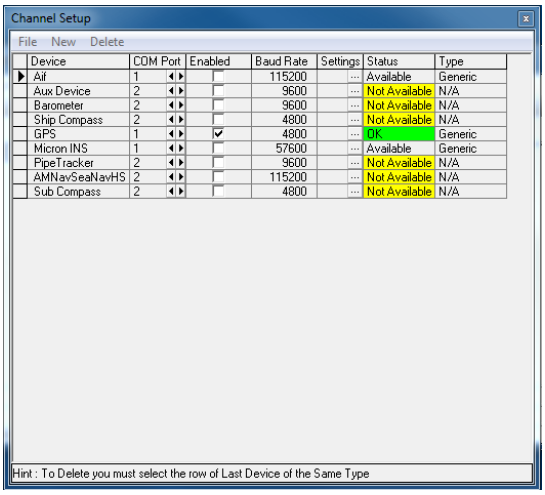
From the drop down menu at the top of the screen select `Utilities` then `Com Setup`.



The `Channel Setup` page will now be displayed on screen. If this is the first time the SeaHub has been used on the computer an additional dialog box will be shown to indicate that a SeaHub has been detected.



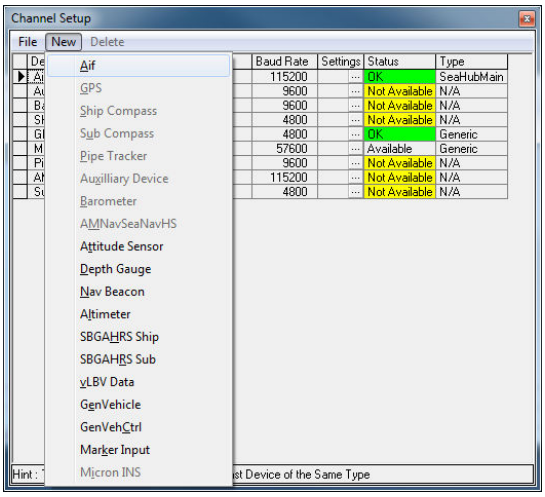
Click `Yes` on this pop up and the `Channel Setup` page will then automatically add and enable the main `COM Port` for the SeaHub.



Adding Additional Devices

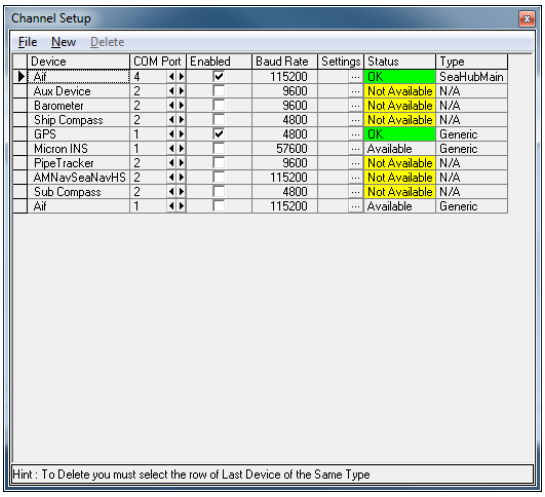
The `Channel Setup` page controls all the serial based information that is intended for use by Seanet Pro. The initial setup will only enable the `SeaHubMain` port, so the remaining ports will need to be manually configured.

From the drop down menu select `New`.

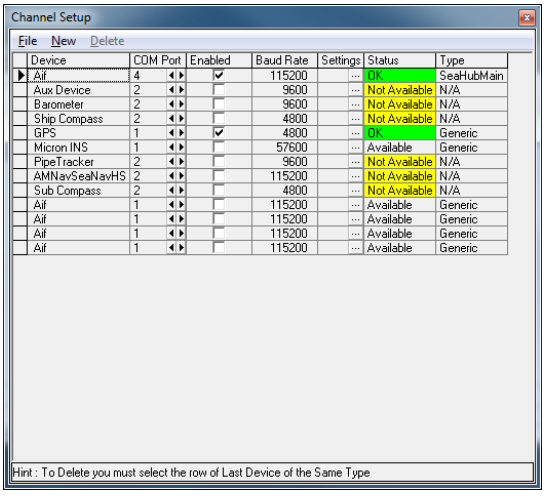


A list of all the potential devices that Seanet Pro can accept data from will be displayed.

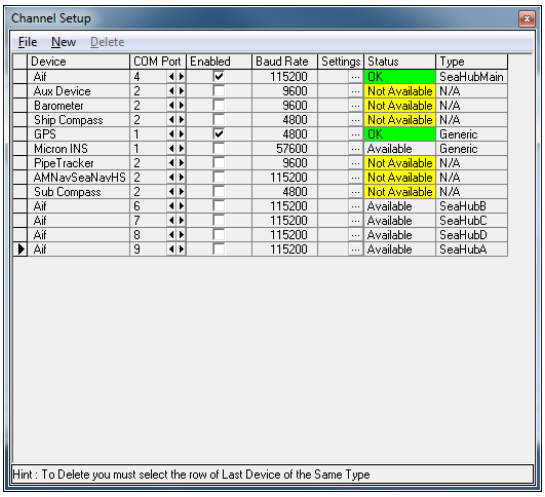
To add a new Port from the SeaHub, select the `AIF` option. The new `AIF` device will be added to the bottom of the list of available devices.



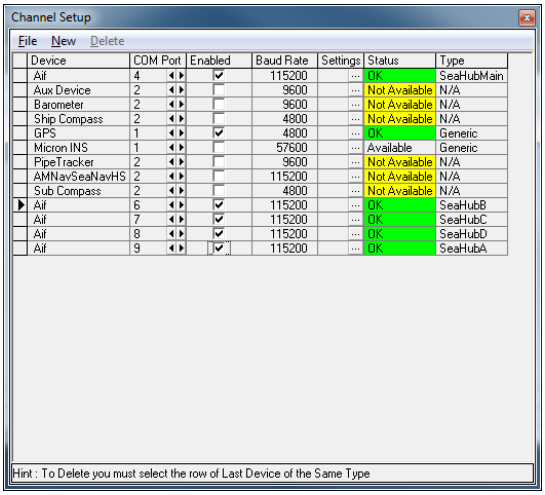
To allow for all four ports of the SeaHub, repeat this process a further three times.



Once the addition `AIF` devices have been added, use the left and right arrows within the `COM Port` to identify the various ports on the SeaHub.



Once all the ports have been identified, the `Enabled` box can be checked for each port that is required.



Note

Seanet Pro will expect a data stream from each enabled `AIF` device. If no data stream is detected a `ComAif Error TMO` error will be reported.

Once all the required ports have been setup and enabled, close the `Channel Setup` page using the close icon at the top right of the page.

3.3. Driver installation for SeaHub and NavHub

When connected to a computer for the first time, the computer will attempt to load the drivers for the attached device. For Windows based computers the process is largely similar regardless of the operating system being used.

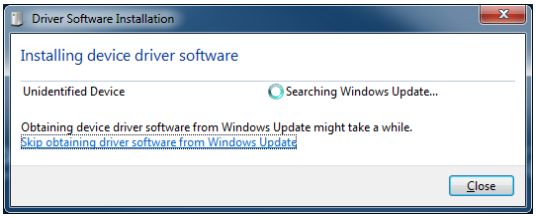
Note

The screenshots shown are example ones for a Windows 7 installation. Later editions of Windows OS may vary, but the same basic steps are still applicable. If required, contact *Tritech International Ltd* for more advice and support.

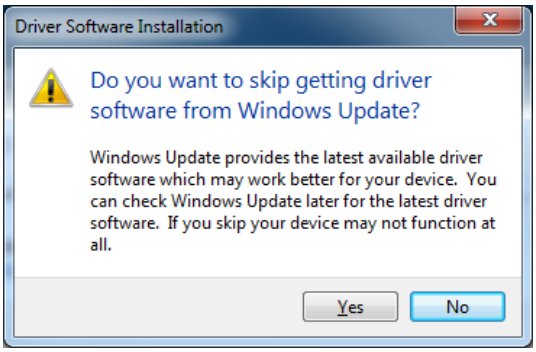
Driver installation

The system `Tasktray` will display an icon indicating that it is attempting to load the drivers.

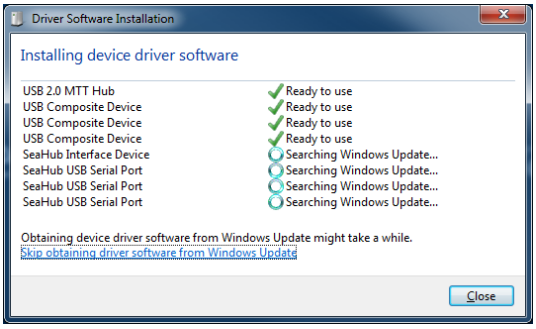
Click on the `Tasktray` icon and the `Driver Installation Window` will appear.



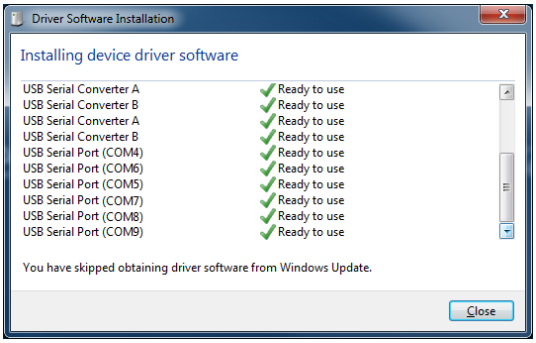
By default, Windows will try to load the latest drivers from the `Windows Update` service, but this is not required as all the appropriate drivers are installed along with Seanet Pro. Click on the `Skip obtaining drivers from Windows Update` link.



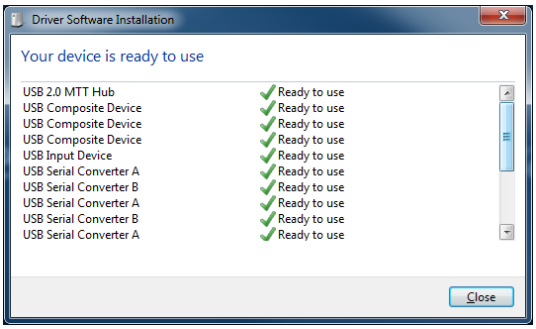
Click `Yes` to continue. Windows will now search for the appropriate drivers on the computer. After a short delay it should start to load the drivers and update the display.



During this process it is possible to see the `COM Ports` being allocated to the device. Use the scroll bar to locate the numbers being allocated.



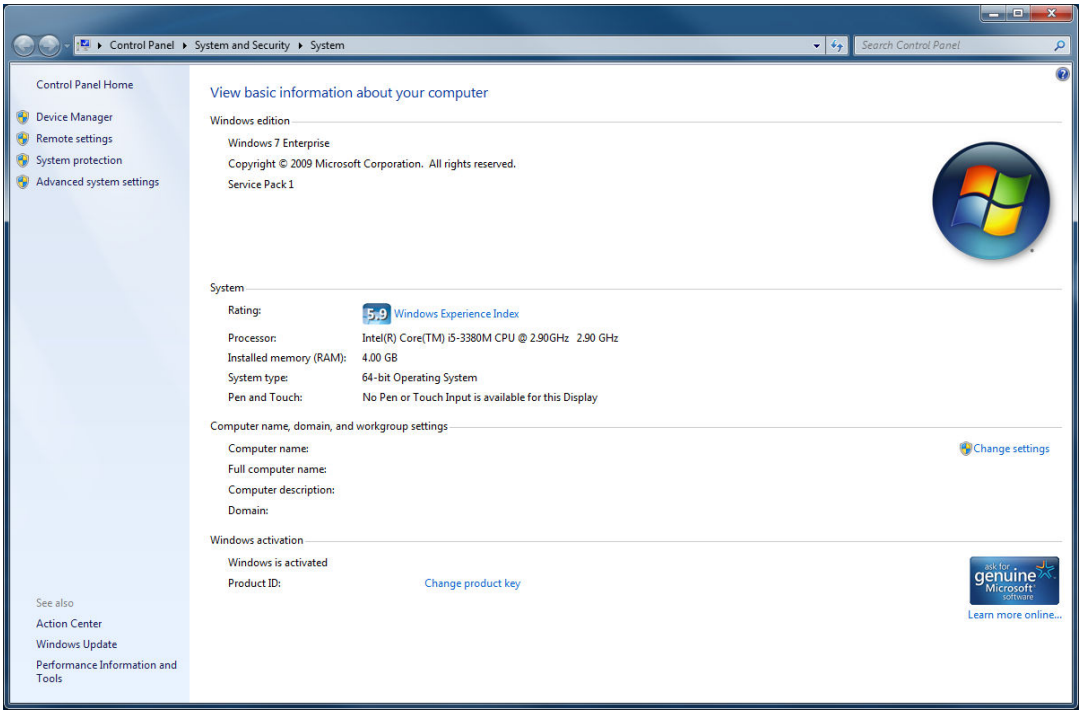
Once the process has been fully completed the device will be fully functional.



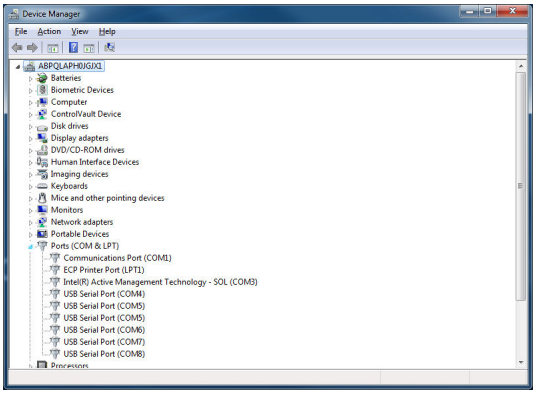
Checking the COM Ports

If the drivers are already installed, but the allocated `COM Ports` were not noted down at the point of installation it is possible to check which Ports are available by using the `Device Manager`. The simplest method for loading the `Device Manager` is as follows.

On the `My Computer` icon on the desktop (or within the `Start Menu`) right click and select `Properties`. This will display the System Information window.



Click on the `Device Manager` link that appears on the upper left hand side of the window. This will now display the `Device Manager`.



Scroll down to the `Ports (COM & LPT)` section and expand the listing. All the available `COM Ports` will now be displayed.

4. Operation

The SeaHub has been designed to act as an interface device between the surface control computer and connected subsea equipment. As such, during normal operation there is little to no onscreen notification of the SeaHub status.

The main means of checking the SeaHub status are:

- The front panel of LEDs
- The Seanet Pro `Setup` application

If an additional device is added, or the configuration of the system has to be changed then the SeaHub can be modified in the following ways.

Once the configuration of the SeaHub has been confirmed the appropriate `COM Ports` then need to be configured to the required baud rate - see Section 4.3, “Setting Up the COM Ports”.

4.1. SeaHub Front Panel

The front panel of the SeaHub can be used as a primary diagnostic tool as it displays the communications for each port, as well as the activity currently active on it.

The top row of LEDs indicate the communication activity that is currently taking place on each port. A `RED` flash indicates communication *from a device* has been detected. A `GREEN` flash indicates communication *from the SeaHub* has been detected. This can provide a visual aid in determining the status of equipment prior to any service work.

The next four rows of LEDs are used to indicate the communications protocol setup of each port. All four ports are capable of communicating on RS232 and RS485, but only certain ports are capable of communicating on ARCNET or RS422.

Protocol	Port A	Port B	Port C	Port D
RS232	Y	Y	Y	Y
RS485	Y	Y	Y	Y
RS422	N	Y	N	N
ARCNET	N	N	Y	Y

Note

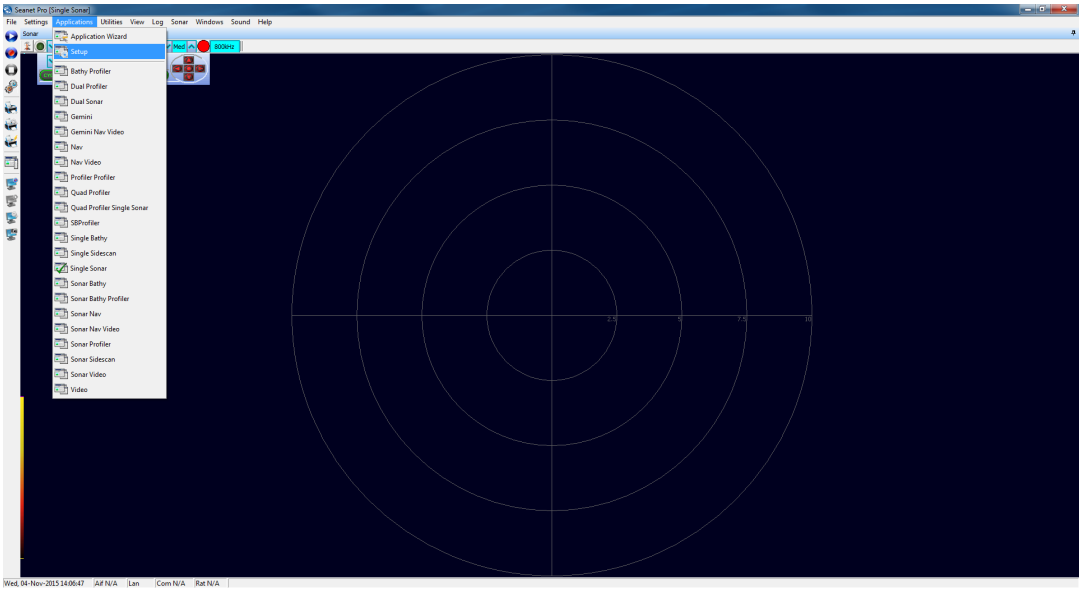
When Ports C and D are setup as ARCNET, the ports are electrically linked to the 15 way ARCNET port at the rear of the SeaHub.

When changes are made to the configuration of the SeaHub, all the LEDs will flash before the new configuration is displayed. During the reconfiguration process all communication to connected devices will be temporarily disrupted.

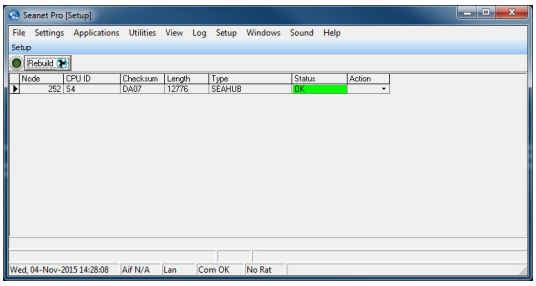
4.2. SeaHub Setup

In order to check, or modify, the SeaHub configuration the Seanet Pro Setup Application needs to be used.

With Seanet Pro running, go to the `Applications` drop down menu and select `Setup` application from the list.



Seanet Pro will now load the `Setup` application. Node 252 will appear within the `Node Table` and should have the `Status` of OK.



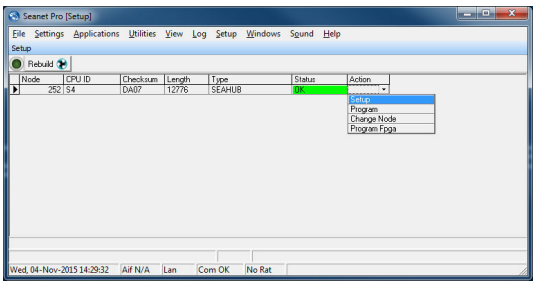
The `Node Table` contains several columns, each of which contains information that pertains to the current status of the items displayed.

Item	Description
Node	This is the node number that helps identify the type of device communicating with Seanet Pro. Node numbers need to be unique to the system attached to the computer. A SeaHub will always have the Node number of 252.
CPU ID	This contains the firmware revision information that the device is currently installed with.
Checksum	This contains information that Seanet Pro uses to confirm the validity of the devices setup information
Length	This contains information that Seanet Pro uses, along with the Checksum, to confirm the device setup information.
Type	This details the type of device being detected by Seanet Pro. A SeaHub will display the type of `SEAHUB`, whereas a Super SeaKing Sonar may show `SK6`.
Status	This shows the general status of the device. Ideally the device should report a status of OK. `UPDATE` usually means that the firmware is older, or newer, than that expected by Seanet Pro. `UNKNOWN` can mean that the device is not operating correctly, or that there is a problem with the communications to that device.
Action	This contains a button that, when pressed, reveals a drop down menu that allows the user to potentially do one of several actions: • `Setup` - This will open the device specific configuration page • `Program` - This will attempt to program the unit with the firmware revision expected by Seanet Pro • `Program FPGA` - This will attempt to re-program the FPGA firmware.

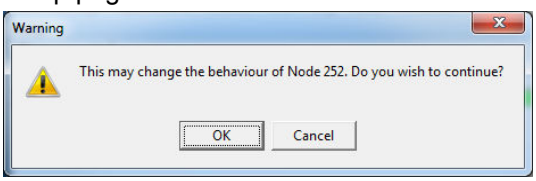
Caution

Re-programming the firmware or FPGA of a device can cause unexpected results. It is recommended that, before proceeding, *Tritech International Ltd* is contacted for support and advice.

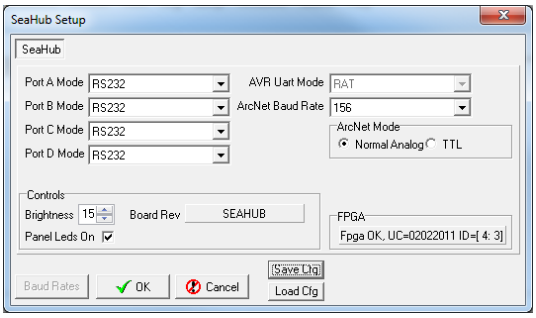
To configure the SeaHub, click on the button within the `Action` column and then select `Setup` from the drop down menu.



A pop up warning will appear asking confirmation to proceed. Click `OK` to proceed to the setup page.

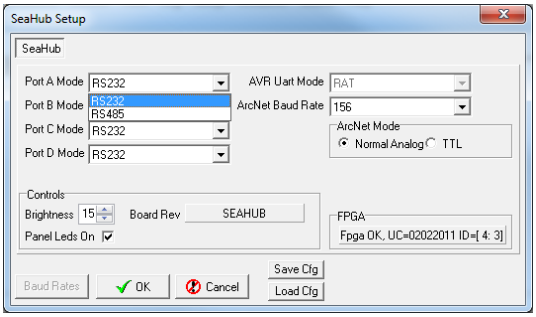


The SeaHub Setup window will now appear.



This Setup window enables the user to change the operation of each port of the SeaHub as well as modifying the baud rate for ARCNET communications

Port A through D Mode

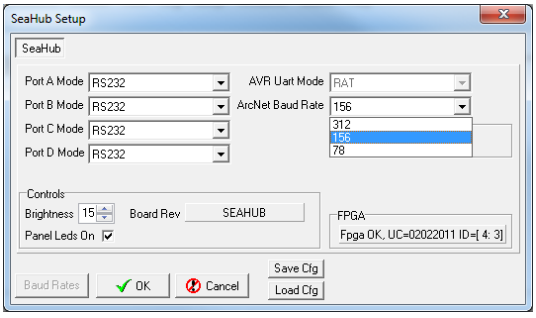


These drop down selection boxes change the communication protocol that the Port will operate on. For serial based communication protocols (RS232, RS485 and RS422) the Baud rates are controlled through the `Channel Setup` and not directly via the SeaHub.

AVR Uart Mode

This allows the SeaHub to accept a RAT on the front 9 way connector. It is not user changeable.

ARCNET Baud Rate



This drop down selection box changes the baud rate for ARCNET communications.

ARCNET Mode

This set of options changes the ARCNET communications supply voltage. For the majority of applications the `Normal Analog` option should be selected.

Brightness

This control sets the relative brightness of the front panel LEDs of the SeaHub. A setting of `15` is full brightness, with `0` being the lowest possible.

Panel LEDs On

This control, when unchecked, switch off the front panel LEDs regardless of the `Brightness` control. By default this control is checked.

Load Cfg and Save Cfg

These buttons allow the user to save the current configuration of the SeaHub or override the existing configuration by loading a pre-saved one.

Any changes to the configuration of the SeaHub will be applied once the `OK` button is clicked.

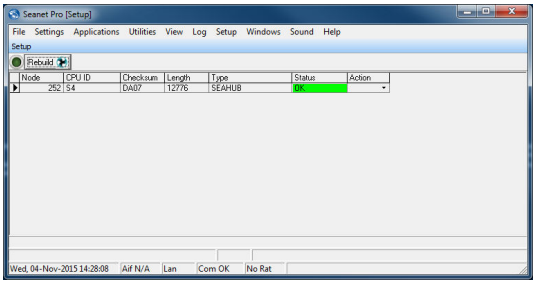
Note

If no changes have been made, it is recommended that the `Cancel` button be used instead.

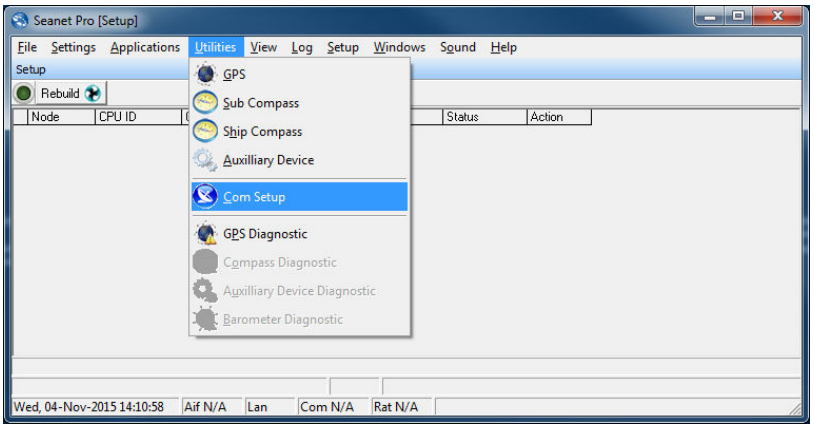
4.3. Setting Up the COM Ports

When connecting a device via serial based communications (RS232 / RS485 and RS422) to a SeaHub, the `COM Port` that corresponds to the SeaHub Port being used will need to be enabled and its baud rate checked.

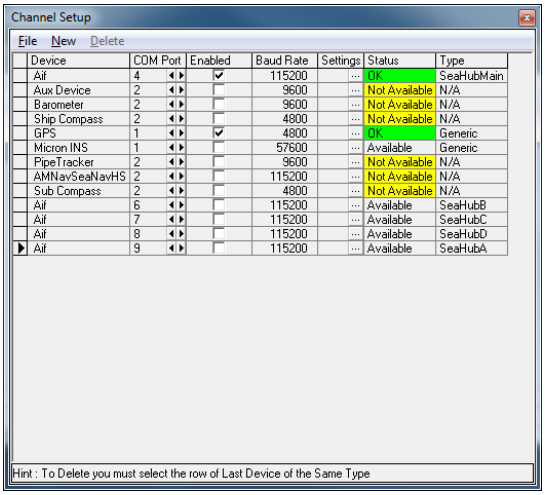
Run Seanet Pro and ensure that the `Setup` application is running. Node 252 should be displayed within the `Node Table`.



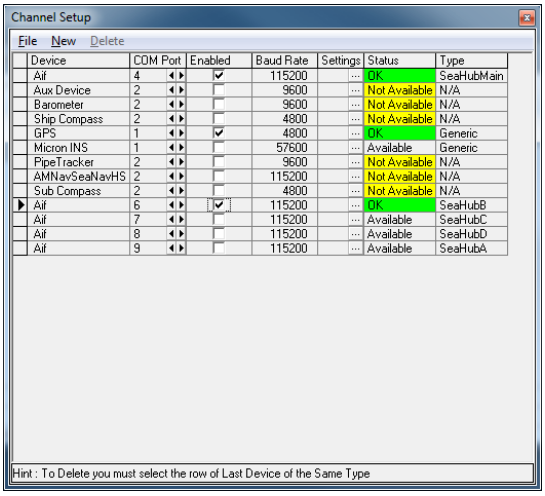
From the drop down menu at the top of the screen select `Utilities` then `Com Setup`.



The `Channel Setup`will now be loaded.

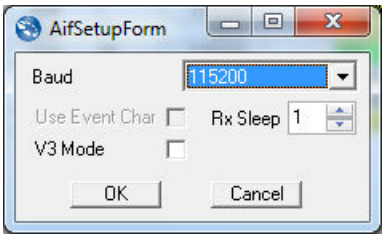


From the list of available `AIF` devices, identify the one that is linked to the SeaHub Port that you need to connect your device. Ensure that it, and the `SeaHubMain` port, are the only SeaHub Ports left enabled.

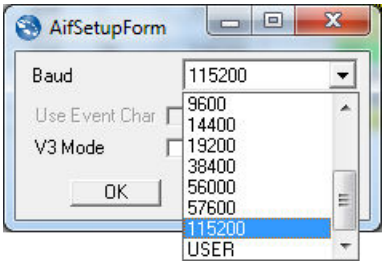


Disabling the other unused Ports will allow for their use by other programs.

Click on the `Settings` button for the SeaHub Port being used. This will display the `AifSetupForm`, which is used to control the Baud rate being used.



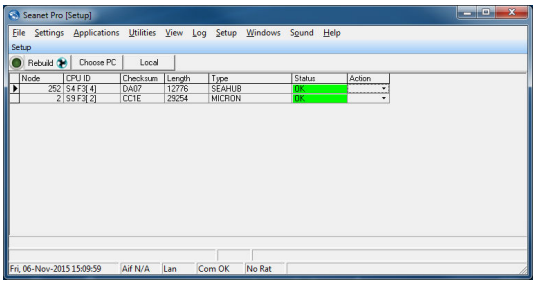
The default Baud rate for a SeaHub Port is 115200. This can be changed by using the drop down list.



The `V3 Mode` and `Rx Sleep` options are unused.

Click `OK` once the correct settings have been entered and then close the `Channel Setup` page by clicking on the close icon at the top right of the page.

The `Node Table` will now update and display the attached device.



5. Maintenance and Hardware Configuration

There are few user-serviceable parts inside the SeaHub that can be checked or replaced.

Firstly, it is recommended that the unit be used in a clean, well ventilated and dustfree environment. Also, operating in extreme temperature and humidity should be avoided if possible. The environmental temperature should be between 5 to 35°C.

When storing the SeaHub, ensure that the storage location has an environmental temperature between -20 to 50°C

Note

Maintenance of the SeaHub should only be carried out by competent, trained personnel.

5.1. Opening the SeaHub

Caution

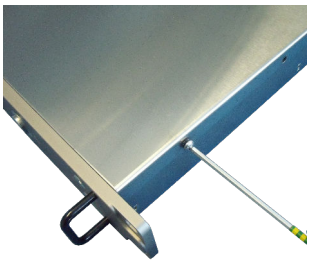
Before opening the SeaHub ensure that the unit is disconnected from any AC or DC power source, and all other devices are disconnected from it.

Important

Full ESD precautions should be undertaken when the SeaHub is opened in order to limit any potential damage to the internal PCBs.

The following steps are required in order to open a SeaHub for inspection or modification of the internal PCBs.

- Disconnect any AC or DC power supply to the unit
- Disconnect any connections to subsea units as well as any remaining USB connections or devices

	Desktop version	Rack mount version
• Using a 2.5mm Hexagonal (Allen) Key, unscrew the four screws on the side of the lid panel of the unit		
• Remove the lid of the housing, gently lifting it away from the enclosure		

- The internal PCB of the SeaHub is now visible.

Desktop version	Rack mount version
	

Once the lid of the SeaHub has been removed, there is no need for further disassembly.

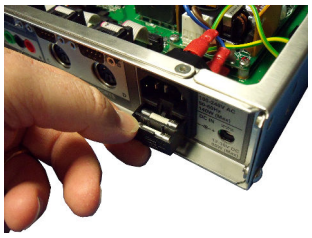
5.2. Checking and Replacing Fuses

The SeaHub has several fuses that are used to protect it from damage from transient power spikes from a variety of sources. See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

5.2.1. The AC Mains Fuse - Desktop version

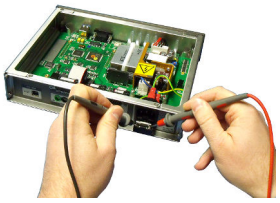
If the SeaHub does not appear to respond and the LEDs on the front panel do not illuminate when the unit is powered up, the following checks can be carried out to test the main AC fuse.

On the rear of the unit, slide outwards the “fuse drawer”, located just below the AC “Mains” inlet socket. This is usually possible with fingers, but a small flat-bladed screwdriver may help.



The “fuse drawer” is split into two compartments. The outermost compartment is for a spare fuse, while the inner one nearest to the housing contains the active fuse.

Use a continuity tester to determine if the main fuse has blown. While the drawer is pulled-out, this fuse is disconnected from the circuit, so the fuse may be tested without removing it from its compartment.



If the fuse has not blown, try checking the additional fuses detailed in Section 5.2.3, “The DC Output Fuse”

If the fuse has blown, use a small screwdriver to remove it from the “fuse drawer”, and replace with a similar “2A 250V 20x5mm Antisurge (T)” fuse.

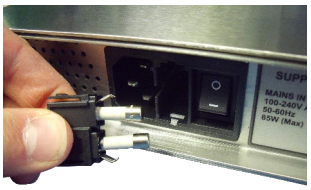
Close the drawer, and reconnect the AC supply. The front status indicators should flash when the unit power’s up.

5.2.2. The AC Mains Fuse - Rack mount version

As with the Desktop version, there is a fuse drawer at the rear of the unit. This is located to the right of the AC “Mains” inlet socket.

Open the fuse tray using a small, flat-bladed screwdriver. There are retention clips at the top and bottom of the tray and it is important not to force it too much in case they break.

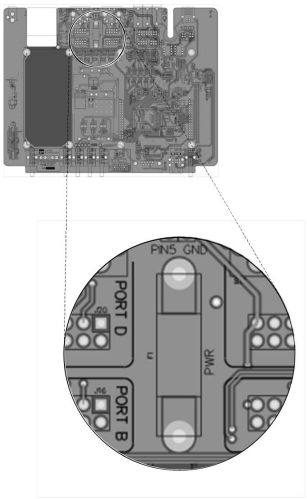
Both the top and bottom fuse are required for correct operation of the Rack mount SeaHub. As with the Desktop version, any replacement fuses should be "2A 250V 20x5mm Antisurge(T)".



5.2.3. The DC Output Fuse

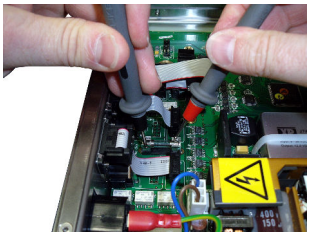
If there is no voltage output on the rear Power Sockets when the SeaHub is fully powered (via AC Mains) the following steps can be undertaken to test the appropriate Fuse.

Locate fuse holder “F1” on the PCB.

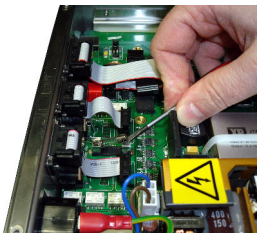


Use a continuity tester to determine if the fuse has blown.

If the fuse has not blown contact *Tritech International Ltd* for further assistance.



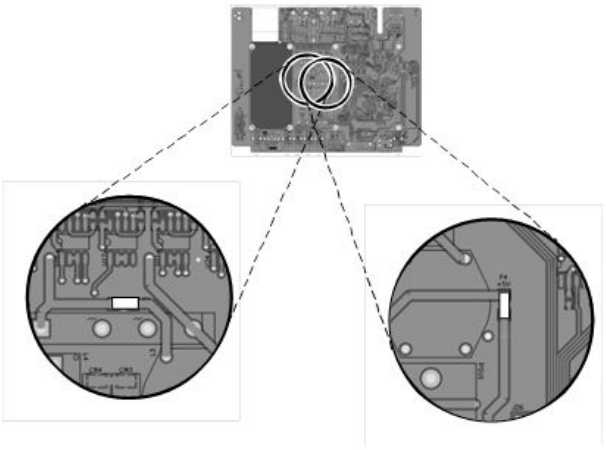
If the fuse has blown, use a screw-driver to carefully remove it from its holder (the body of the fuse is glass!), and replace with a “2A 250V 20x5mm Quick-Acting (F)” fuse



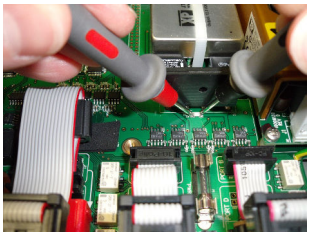
5.2.4. The DC Ext Output Fuses

If there is +12V or +5V voltage output on the rear Power Sockets or AIF ARCNET Connector when the SeaHub is fully powered (via AC Mains) the following steps can be undertaken to test the appropriate Fuse.

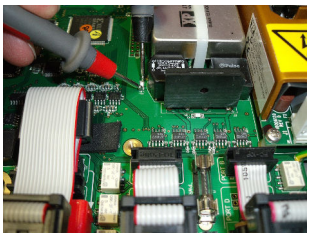
Locate fuses “F2” and “F4” on the PCB.



Use a continuity tester to determine if the fuse “F2” has blown – supplying the main PCB power from which both +12V and +5V is derived.



Use a continuity tester to determine if the fuse “F4” has blown – supplying the +5V supply.



Both these fuses are 2A surface mount “Quick Acting” fuses. If either has blown the most likely cause is excessive current drain from an externally connected device (5V for USB peripherals is protected by over-current limiting circuitry to prevent damage) – review you power setup, requirements and jumper settings. However, it is recommend to contact *Tritech International Ltd* for further assistance.

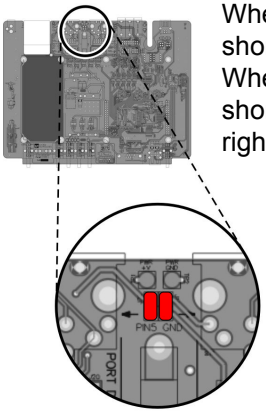
Once the desired setting has been selected the unit should be reassembled prior to being powered up and tested. See Section 5.8, “Closing the SeaHub”.

5.3. Making a Pingsync link for Dual Profilers

It may be required to connect a pair of ARCNET Profiler heads, operating in a Dual Profiler mode, to Ports C & D. For this, the DIN Sockets of Ports C & D must first be configured for ARCNET Comms Mode. The SeaHub has internal jumpers (J19 for Port C, J22 for Port D) which are used to configure the operational mode of Pin 5 on the DIN Sockets.

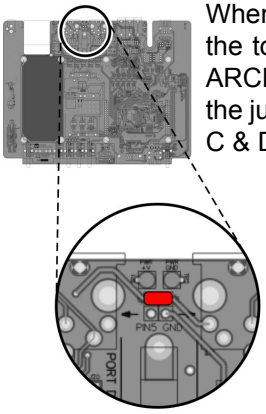
See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

The factory setting is for the Pin 5 of Ports C & D to be linked through to Comms Ground. In this configuration, when either Ports C or D are configured for RS-232 Comms Mode then the RS-232 Comms ground will be connected through on Pin 5.



When operating Port C in RS-232 Comms Mode, ensure that J19 is shorted, as indicated by the left jumper position in the diagram to the right. When operating Port D in RS-232 Comms Mode, ensure that J22 is shorted, as indicated by the right jumper position in the diagram to the right.

In the case of Ports C and D being configured for ARCNET Comms Mode, Pin 5 on these Ports will require to be isolated from Comms Ground whenever ARCNET Dual Profiler heads are connected. In a Dual Profiler system, the Pin 5 line is used to send synchronisation signals between the Master and Slave heads of the Dual Head Pair.



When operating Ports C and D in ARCNET Comms Mode, ensure that the top row pins of J19 and J22 are shorted together before connecting ARCNET Dual Head Profilers to Ports C & D. The diagram to the right shows the jumper position for this configuration which results in Pin 5 of DIN Ports C & D being linked together (and isolated from Comms Ground).

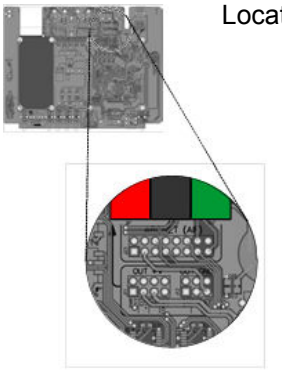
Once the jumpers have been set correctly the unit should be reassembled prior to being powered up and tested. See Section 5.8, “Closing the SeaHub”.

5.4. Changing the DC Voltage output

The DC supply voltage (and corresponding ground) output available from the 6 pin DIN connectors and 4mm Power Outlet “Banana” sockets on the rear of the SeaHub unit can be adjusted by using jumper blocks J11 and J12 on the PCB. See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

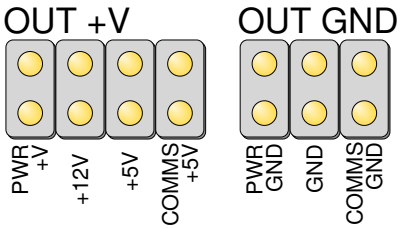
Caution

Before connecting any equipment to the DC output of the SeaHub it is vital that the input voltage tolerance of that equipment be checked. Attaching equipment to a voltage source higher, or lower, than the tolerances specified may damage both that equipment and the SeaHub.



Locate jumper blocks `J11` and `J12`, by the legend on the circuit board.

The PCB silk screen details the various connections possible using the headers.



See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

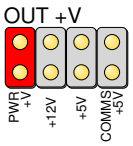
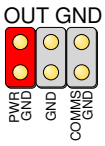
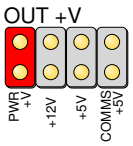
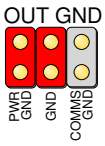
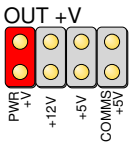
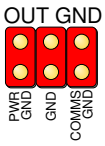
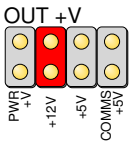
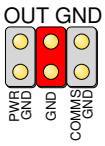
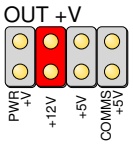
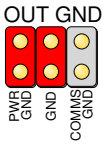
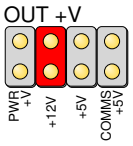
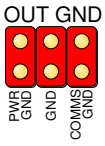
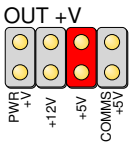
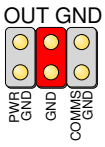
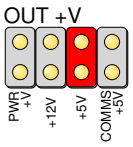
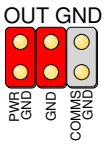
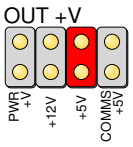
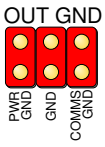
The following table details the variety of options available

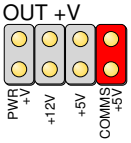
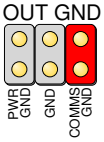
Caution

Header `J11` cannot have more than one vertical connection at any time. Fitting additional connections will result in damage to the SeaHub.

Caution

Headers should only have vertical connections. Horizontal connections between headers will result in damage to the SeaHub.

Output	Description	Jumper Settings		Power Limit
		J11	J12	
+28V[A]	Main Power Output, fully isolated from communication signals and all other signals.[B]			Not to exceed the greater of 50W or 2A
+28V[A]	Main Power Output, fully isolated from communication signals only.			Not to exceed the greater of 50W or 2A
+28V[A]	Main Power Output, with no isolation.			Not to exceed the greater of 50W or 2A
+12V	12V Output, isolated from communication signals and AC/DC power input.			Not to exceed 24W (2A)
+12V	12V Output, isolated from communication signals only			Not to exceed 24W (2A)
+12V	12V Output, with no isolation.			Not to exceed 24W (2A)
+5V	5V Output, isolated from communication signals and AC/DC power input.			Not to exceed 10W (2A)
+5V	5V Output, isolated from communication signals only.			Not to exceed 10W (2A)
+5V	5V Output, with no isolation.			Not to exceed 10W (2A)

Output	Description	Jumper Settings		Power Limit
		J11	J12	
COMMS +5V	Communication 5V supply, isolated from all signals apart from communication signals. Useful for low power consummation peripheral connection without introducing system noise. Other connection configurations of the COMMS +5V supply are not recommended – use the +5V supply instead	OUT +V 	OUT GND 	1W (200mA)

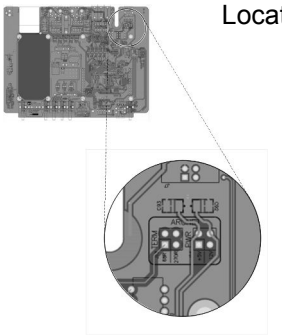
[A] Note: The output “+28V” (±5%) is the factory set DC output level that is available when running from an AC “Mains” source – it is possible to increase the 28V output voltage up to 36V (±5%) by internal PSU adjustment. Otherwise, the DC input voltage (minus approx 1.5V) will be used. The greater of the two will be present, if both power sources are connected together.
[B] Note: The term “Communication Signals” refers to serial signals such as RS232, RS485, RS422 and TTL ARCNET signals. Analogue ARCNET signals are always isolated by nature of the driver hardware used.

5.5. Changing the ARCNET Termination resistor

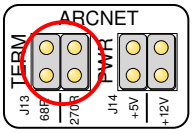
The ARCNET communication link normally requires termination resistors to be installed at each end of the umbilical cable. These resistors are fitted between each line of the twisted pair.

- For twisted pair cables that are below 100 metres in length, it is only necessary to install one termination resistor of value between 47Ω to 100Ω (68Ω nominally).
- For twisted pair cables that are greater than 100 metres in length, two termination resistors should be installed, one at either end of the cable. At the surface SeaHub module, a 270Ω resistor should be fitted. At the subsea end of the cable, a 39Ω resistor should be fitted – if there is more than one Sensor connected then this resistor should be fitted at the junction / splice point of the cable.

On the SeaHub PCB, jumper block `J13` allows either a 68Ω or 270Ω (default) termination resistor to be selected, depending on the system configuration. See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.



Locate jumper block `J13`, labelled as `ARCNET TERM` on the PCB.



Using a 2.5mm jumper, Select either the `68R` or `270R` option from the `J13` header

Once the desired termination has been selected the unit should be reassembled prior to being powered up and tested. See Section 5.8, “Closing the SeaHub”.

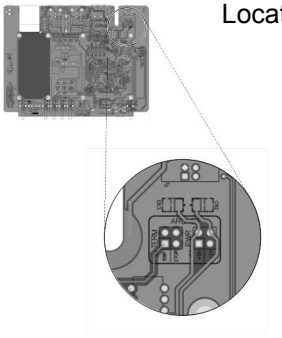
5.6. Changing the ARCNET Power Supply

The SeaHub has an internal jumper to select between +5V and +12V power options for the ARCNET line drive. See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

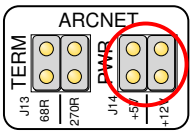
Note

The SeaHub will be supplied with the ARCNET Power Supply set to the factory default setting of +12V. This is the rail setting that is required to be used when communicating with Tritech ARCNET devices directly over twisted pair cabling.

However, if ARCNET communications is to be operated via a Fibre Optic Modem/Multiplexer then the ARCNET Power setting should ideally match whatever the ARCNET circuitry uses on the Fibre Optic interface board. Consult the F.O. manufacturer guidelines before making any changes, else set the ARCNET Power Supply to +12V



Locate jumper block `J14`, labelled as `ARCNET PWR` on the PCB.



Using a 2.5mm jumper, Select either the `+5V` or `+12V` option from the `J14` header

Once the desired setting has been selected the unit should be reassembled prior to being powered up and tested. See Section 5.8, “Closing the SeaHub”.

Caution

Do NOT fit both jumpers at the same time, or fit the jumpers in a horizontal orientation.

5.7. Hardware Reset

Important

The procedures outlined below involve opening the unit and appropriate precautions should be in place to protect against static discharge while carrying out this operation. See Section 5.1, “Opening the SeaHub” for details and precautions on opening the SeaHub.

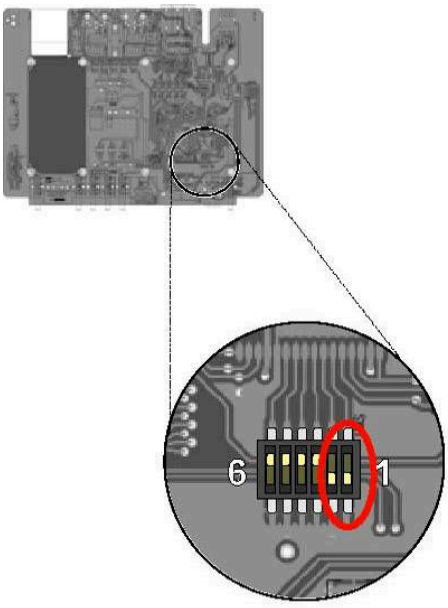
It is possible to lose communication with the surface SeaHub if the baud rate of the SeaHubMain port is taken too low (this is now only adjustable in Supervisor mode), the only way to recover from this is to perform a hardware reset on the unit to reinstate the default settings. This can only be done by opening the SeaHub.

Caution

Before attempting this procedure ensure that the unit is disconnected from the AC and DC power source, and all other devices are disconnected from it.

Open the SeaHub as described in Section 5.1, “Opening the SeaHub” in order to expose the main PCB within the unit.

The DIL switch located toward the front, right hand side of the PCB is used for activating the reset. SW2 will be set to the ON position and SW1 & SW3-SW6 will be set to the OFF position. To perform the reset operation change SW1 to the ON position, reassemble the unit and apply power to the unit for about 10 seconds.



To complete the reset operation disconnect the unit from the power supply, re-open the housing as above, set switch 1 back to the OFF position and reassemble the unit. Note: If this is not done the unit will not be able to store any new settings.

This sets the SeaHubMain baud rate back to 115200Bd and reinstates communications between SeahHub and user PC.

Note

Serial ports A – D default to RS232 so will need to be changed as required.

Once the reset has been completed the unit should be reassembled prior to being powered up and tested. See Section 5.8, “Closing the SeaHub”.

5.8. Closing the SeaHub

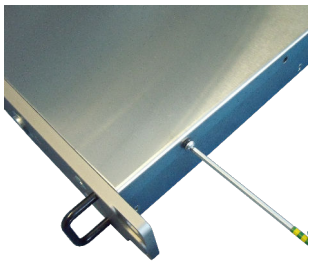
Caution

Once inspection, or modification, has been carried out on the SeaHub it is highly recommended that the unit be reassembled prior to power being applied to it again. This will significantly reduce any risk of damage to the internal PCBs as well as any risk of injury to the user.

Important

Full ESD precautions should be undertaken when the SeaHub is being reassembled in order to limit any potential damage to the internal PCBs.

The following steps are required in order to reassemble a SeaHub.

	Desktop version	Rack mount version
• Refit the lid of the housing, taking care when placing it back into the enclosure		
• Using a 2.5mm Hexagonal (Allen) Key, screw the four screws on the side of the panel of the unit and hand tighten		

- Reconnect any connections to subsea units as well as any remaining USB connections or devices
- Reconnect any AC or DC power supply to the unit

The SeaHub will now be ready for testing.

6. Troubleshooting

When the unit is powered up nothing happens

- If using the Rack mount version of the SeaHub, ensure that both the rear power switch (next to the IEC connector) and front power switch are activated
- Check that the front panel indicators have not been turned off under software control – if necessary reset the unit to its defaults, see Section 5.7, " Hardware Reset "
- If using a "mains" AC source, check and replace (if required) the fuse within the fuse drawer on the IEC power inlet connector at the rear of the unit, see Section 5.2.1, "The AC Mains Fuse - Desktop version" or Section 5.2.2, "The AC Mains Fuse - Rack mount version"
- If the above fails or a DC source is being used, check and replace (if required) the internal fuses – see Section 5.2.3, "The DC Output Fuse"
- Check that the power supply requirements for either the AC (Mains) or DC source have not been exceeded

The unit powers up, but no output power is available

- Check and replace (if required) the internal fuses – see Section 5.2, "Checking and Replacing Fuses"
- Check that the power supply requirements for either the AC (Mains) or DC source have not been exceeded

Sonars or other sensors I connect to the unit appear noisy

- The communication and power grounds may be inadvertently linked – see Section 2.7, "Pin-Out Diagrams"
- Disconnect any other sensors or peripherals from the system, and determine if they are injecting any electrical noise
- Check that either the AC or DC power supplies have sufficient noise filtering. Try running the system from a sufficient DC battery if possible

The ARCNET link (analogue) isn't functioning correctly

- Check that the correct connections are made to the connector, and signals aren't crossed over
- Check that the correct ARCNET power jumper is specified (either 5V or 12V) – see Section 5.6, "Changing the ARCNET Power Supply"
- Remove all but one of the ARCNET devices and for each device, check the node numbers reported in Seanet setup are all unique and not conflicting – change any conflicting nodes

- Check that the cable has the correct impedance and termination for its length

The ARCNET link (TTL) isn't functioning correctly

- Check that the correct connections are made to the connector, and signals aren't crossed over
- Check that the ground signal of the ARCNET link are connected to the COMMS ground - see Section 5.4, "Changing the DC Voltage output" and Section 2.7.1, "AIF (ARCNET) Port"

The USB link between the SeaHub and the PC doesn't work

- If using the USB cable supplied with the SeaHub, check that the LEDs are illuminated within the cable connector mouldings – this indicates that there is a voltage on the cable to the peripheral
- Check that the USB cable length doesn't exceed 5m
- Check that the SeaHub USB port is not plugged into any intermediate hubs between the unit and the PC
- Use the "Microsoft Windows" hardware Device Manager to check that all the USB drivers are correctly installed and setup on the PC

USB peripherals I plug into the front of the SeaHub unit, don't work

- Check that the SeaHub is powered up correctly
- Check that the SeaHub modules onboard peripherals and hub controller have correctly registered and detecting on the PC's operating system
- Check that all cables are correctly and firmly connected to their appropriate sockets
- Use the "Microsoft Windows" hardware Device Manager to check that all the USB drivers are correctly installed and setup on the PC
- Use the "Microsoft Windows" hardware Device Manager to check that the USB bandwidth available to connected peripherals versus their demands has not been exceeded
- Check that the connected USB peripheral is not exceeding the 500mA current limit on each USB port. Diagnostic LED's are available within the module to indicate this – contact *Tritech International Ltd* for further details

My serial port device doesn't work in RS232 mode

- Check RX and TX connections are correct on both ends – the SeaHub is wired as a DTE, the same as a PC. The sensor should use DCE wiring

- Check that ground connections are correct, and made to the COMMS GROUND
- Check that baud rates and serial setup on both the device and the PC are correct
- Check the cable length used does not exceed the stated RS232 specification for the baud rate being used. – 10m or less for 115.2KBaud
- Check that if handshaking is required, Port A is being used (as it is the only port that supports RTS and CTS signals)
- Check that there are no short circuit faults on the RS232 signals, and voltage levels are between ±5V and ±15V
- Check that no two conflicting devices have been connected, if using Port A, and the link connection to the AIF connector have been made
- Check the port is correctly configured as RS232 mode through the Seanet configuration interface
- If the device is drawing power from the SeaHub, check that the power supply requirements for either the AC (Mains) or DC source have not been exceeded

My serial port device doesn't work in RS485 mode

- Check A and B wiring connections are correct on both ends or any interconnect cabling, and not crossed
- Check that baud rates and serial setup on both the device and the PC are correct
- Check the cable length used does not exceed the stated RS485 specification for the baud rate being used
- Check that there are no short circuit faults on the RS485 signals, and voltage levels are 5V
- Check the port is correctly configured as RS485 mode through the Seanet Setup configuration interface
- Check that the correct termination has been fitted to the cable (approx 150Ω)
- Check that the half-duplex turnaround time is less than a half baud period on the RS485 device
- If the device is drawing power from the SeaHub, check that the power supply requirements for either the AC (Mains) or DC source have not been exceeded

My serial port device doesn't work in RS422 mode

- Check that Port B is being used, as this is the only port that supports RS422 mode
- Check RX and TX connections (with A and B pairs in each) are correct on both ends of any interconnect cabling
- Check that baud rates and serial setups on both the device and the PC are correct
- Check the cable length used does not exceed the stated RS422 specification for the baud rate being used

- Check that there are no short circuit faults on the RS422 signals, and voltage levels are 5V
- Check the port is correctly configured as RS422 mode through the Seanet Setup configuration interface
- Check that the correct termination has been fitted to the cable
- If the device is drawing power from the SeaHub, check that the power supply requirements for either the AC (Mains) or DC source have not been exceeded

The RAT does not work

- Check that the RAT being used is labelled as a “Version 2, PS-2” RAT. The SeaHub unit does not support previous versions (i.e. With Trackball instead of Togglestick pointer).
- Check that the connection of the RAT has not caused the power supply requirements for either the AC (Mains) or DC source to be exceeded

Appendix A. ARCNET Termination

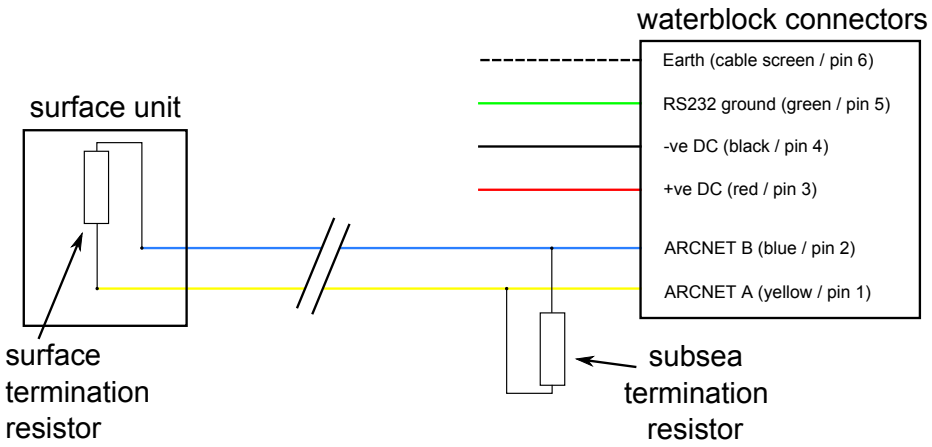
Depending on the cable length the ARCNET communication link requires a termination resistor to be installed at each end of the umbilical cable. Normally this is supplied fitted within the ARCNET cable DA-15 or within the SCU/SeaHub at the surface and is left for the user to fit at the sub-sea end in 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.

Glossary

AC	Alternating Current
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.
CD-ROM	Compact Disc - Read Only Memory
CTS	Clear To Send (data)
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.
DIN	Deutsches Institut für Normung e.V. (German Institute for Standardisation)
IEC	International Electro-technical Committee
LAN	Local Area Network
LED	Light Emitting Diode
PC	Personal Computer
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.
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).
RTS	Request To Send (data)
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.

