Gemini 720im

Product Manual

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Tritech

Outstanding Performance in Underwater Technology

A Moog Inc. Company

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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 Gemini 720im fuses Tritech's Gemini Multibeam technology with Tritech's Micron technology to create the world's smallest Multibeam imaging sonar. Having a 90° horizontal field of view and 50m end range, with an update rate up to 20Hz and incredibly compact dimensions the Gemini 720im can be used in applications where size is critical. This makes the Gemini 720im ideally suited for micro ROV/AUV's in addition to applications where space is restricted or weight is critical, including diver helmet and pole mounted applications such as Search and Recovery (SAR) operations.

The Gemini 720im communicates with Tritech's next generation integrated software suite Genesis using Ethernet or Tritech's advanced Serial Multibeam Protocol (TSMP). The auxiliary port on the sonar allows for the daisy chaining of sensors including the Micron USBL Modem and Micron Echo Sounder. Advanced adaptive processing ensures that the most detailed image possible is generated regardless of range. This includes automatic switching between Compressed High Intensity Radar Pulse (CHIRP) and Continuous Wave (CW) modes of operation to maximize image definition.

Tritech's next generation integrated software suite Genesis is supplied with the Gemini 720im and is available from the Tritech website, supporting all Tritech's sensors. There is also a Windows® and Linux Software Development Kit (SDK) for the sonar to allow users to fully integrate the Gemini 720im into a customised system.

Throughout the manual, the following symbols may be used:


A computer mouse


Left click of the computer mouse


Right click of the computer mouse

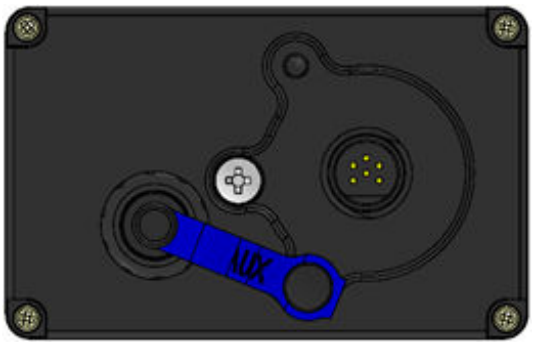

Scroll wheel of the computer mouse

These mouse actions assume the mouse has been set up for right hand orientation.

1.1. Sonar Variants

The following shows the 3 different connector types and communication protocols associated with them.

Tritech MICRON Connector



The 720im Tritech Micron

RS232/RS485 software configurable

350m Part number: **S11796**
750m Part number: **S12083**

Seacon HUMMER Connector

The 720im Seacon HUMMER

RS232/RS485 software configurable or Ethernet
Different cables are required for Serial and Ethernet communications see Chapter 2, *Getting Started*

350m Part number: **S11481**
750m Part number: **S12081**

Impulse Titan™ Connector

The 720im Impulse Titan™

RS232/RS485 software configurable or Ethernet
Different cables are required for Serial and Ethernet communications see Chapter 2, *Getting Started*

350m Part number: **S11792**
750m Part number: **S12082**

For pin out connector information, please see Appendix C, *Connector details*.

2. Getting Started

The following instructions are to help the user connect the system together for the first time and be able to successfully power on the unit. In order to prepare the system and test its functionality before mounting to a vehicle, the 720im requires either an Ethernet or Serial test kit (depending on user requirement). If seeking support from Tritech, reference may be made to bench testing the unit on a short test cable.

An example Gemini 720im test setup

Caution

It is recommended that the HUMMER connector faces are lightly lubricated prior to being mated. See the areas highlighted in red below.

Use non conductive silicon grease, G624 is recommended. **Do not overgrease.** Excessive lubrication is detrimental to the operation of the connector.

2.1. Serial System Test Kit

The serial system test kit has different part numbers. This reflects the different mating tails required for the connector fitted to the 720im purchased. Please reference the serial number of the 720im and connector variant when in conversation with Tritech. The following serial system tests kits are available:

- **S11796−KIT1**− Tritech Micron test kit
- **S11481−KIT1**− Seacon HUMMER serial test kit
- **S11792−KIT2**− Impulse Titan™ test kit

In general the serial system test kits consists of the following parts:

- A Gemini Power/Ethernet/Serial Break-out Assembly, enabling connection via a Serial to USB connection - for use in RS232/RS485 mode
  S11670 − Gemini Power/Ethernet/Serial Break-out Assembly

An example S11670 cable

- A power supply unit
  S11346 − Gemini imaging sonar power supply unit *(Country specific mains plug − specify at point of sale)*

An example S11346 power supply

- A 10m serial test cable *(Souriau to Impulse Titan™/ Seacon HUMMER/Tritech Micron depending on 720im purchased)*

An example Impulse Titan™ test cable *An example serial Seacon HUMMER test cable* *An example Micron test cable*

Note

A **blue** locking sleeve on the Seacon HUMMER connector denotes that it is wired for serial comms only.

2.1.1. Assembling the Serial System

Step 1: Connect the breakout assembly to the 10 metre serial test cable, making sure to properly align the Souriau connector and its keyway.

Female connector of the breakout assembly and male connector of the test cable.

A correctly mated Souriau communications cable

Step 2: Plug the connector end of the 10 metre serial cable into the 720im sonar, following the connection procedure for the appropriate connector.

A HUMMER Cable ready to be mated to the connector

A correctly mated HUMMER cable

Step 3: Connect the power supply unit to the breakout assembly, making sure to properly align the Souriau connector and its keyway.

Female connector of the power supply unit and male connector of the breakout assembly

A correctly mated power cable

Step 4: Plug the USB connector on the serial breakout assembly into your computer, once this is done an orange LED will be dimly lit, indicating the system is ready to establish communications.

A USB to serial converter indicating that it is establishing communications

Step 5: Once the system has established communication, the LED on the USB connector will be fully illuminated. The system is now ready to operate with the software, green LED's indicate the transmission and reception of data.
For more details of configuring the sonar parameters, please see the Genesis software manual - *0716-SOM-00001*.

A USB to serial converter indicating that has established communications

2.2. Ethernet System Test Kit

The Ethernet System Test Kit has different part numbers. This reflects the different mating tails required for the connector fitted to the 720im purchased. Please reference the serial number of the 720im and connector variant when in conversation with Tritech. The following serial system tests kits are available:

- **S11481−KIT2**− Seacon HUMMER Ethernet test kit
- **S11792−KIT2**− Impulse Titan™ test kit

In general the Ethernet System Test Kit consists of the following parts::

- A Gemini Power/Ethernet Break-out Assembly, enabling an Ethernet connection via an RJ45 plug.
  S11561 − Gemini Power/Ethernet Break-out Assembly

An example S11561 cable

- A power supply unit
  S11346 − Gemini imaging sonar power supply unit *(Country specific mains plug − specify at point of sale)*

An example S11346 power supply

- A 10m Ethernet test cable *(Souriau to Impulse Titan™ or Seacon HUMMER depending on 720im purchased)*

An example Impulse Titan™ test cable *An example Ethernet HUMMER test cable*

Note

A **black** locking sleeve on the Seacon HUMMER connector denotes that it is wired for ethernet comms only.

2.2.1. Assembling the Ethernet System

To assemble the Ethernet system the process is similar to the Serial system.

Step 1: Connect the Breakout assembly to the 10m Ethernet test cable, taking care to properly align the Souriau connector and its keyway.

Step 2: The connector on the Gemini and the Power Supply cable should be connected, similar to the instructions given for the Serial System setup (see Section 2.1.1, “ Assembling the Serial System ”).

Step 3: The Ethernet system requires the RJ45 connector plugged into your computer instead of the USB device. If using the system for the first time or after installing new software. See Appendix E, *Setting the computer IP address in Windows® XP* or Appendix F, *Setting the computer IP address in Windows® 7 or Windows® 10* for information on setting up your computers Ethernet network port.

3. Installation

3.1. Communication Protocols

This section details communication information that should be taken into consideration prior to installation.

3.1.1. Serial

In order to achieve the maximum performance from the serial link it is recommend that the Tritech USB adapter is used. The Tritech USB allows Genesis and the Gemini to automatically negotiate to the maximum permissible baud rate for the line. The higher the baud rate the greater the bandwidth resulting in an increase in the image update and quality.

The serial speeds available through the Tritech USB adapter are:

- 115200
- 230400
- 460800
- 921600

Tritech can supply Tritech USB adapters terminated to 9-Way D-Subminature connectors to simulate a standard serial port connector.

Note

When using the Tritech USB adapter, Genesis will automatically detect the USB hardware plugged into the PC and populate Genesis with the Gemini 720im information.

Autocomms

The Tritech USB adapter supports auto negotiation of baud rate and communications protocol. When it starts it always defaults to RS485. If RS232 is required then you will need to  the ID number of the Gemini and select RS232 from the dropdown within the General tab. This will only be an issue on links that do not allow RS485 communication, i.e. a fibre optic multiplexer

Serial Wiring

For wiring of the DE-9 connector please see Section C.5, “ USB to Serial ”

3.1.2. Ethernet

This is as simple as setting up the Ethernet adapter on the host PC to be in the same IP address range as the Gemini being attached. Using network comms allows multiple Geminis to be integrated using standard networking equipment.

Things to note :

- You need a minimum 100BASE−TX link. The Gemini Requires 100Mbps in order to function correctly. It will not work on lower 10BASE−T lines.
- It is not recommended that you connect the Gemini units through a network hub. It is recommended that Gemini sonar units are connected using a network switch.

Note

A network hub broadcast to all its ports and thus shares its bandwidth with each of the ports . If multiple devices are connected then the bandwidth allocation will be shared between devices, and so the bandwidth per device will drop. This will negatively affect the performance of the network.

A network switch keeps records of the MAC addresses of the devices connected so when a frame of data is received the data is sent to the appropriate port rather than broadcast. This means that each port on a network switch will have the maximum amount of bandwidth.

- Check your antivirus situation. Firewalls will see the data from the Gemini and may stop the broadcast message. Occasionally a firewall will allow the broadcast message but will stop the high data rate from imaging believing it to be a denial of service attack.

3.2. Hardware Installation

To correctly mount the 720im sonar the blue gemini logo should be at the top and the product label at the bottom.

The transmit and receive elements are arranged such that they are angled at 0° about the horizontal axis which should be taken into account when mounting the sonar.

Any metallic clamps should be electrically insulated from the sonar body by either rubber or plastic strips or mounting brackets of at least 3 mm thickness and extending at least 3 mm beyond the clamp boundary to reduce any galvanic corrosion effect. Non-metallic clamps are preferable; if metallic clamps are used (especially if they are different in composition to the material used by the sonar) they should be painted or lacquered with at least two or three coatings.

Caution

The outer case of the Gemini 720im is made of anodized aluminium. When deploying the sonar, direct contact with copper alloys such as brass or bronze should be avoided.

Note

Before connecting the 720im, it is recommended that the subsea cable connectors are dry. In the case of the Seacon HUMMER connectors, a small amount of grease should be applied to the face of the cable connector - this will help prevent damage to the rubber.

3.2.1. Installing the Gemini 720im using Tritech mounts

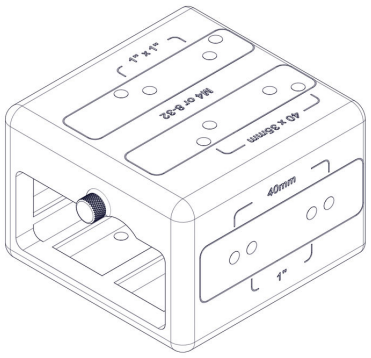
There are multiple ways to affix the 720im due to its small size and versatility. With this in mind, Tritech have produced the 720im Mounting Bracket Kit to enable the customer to adapt to their application, giving users the ability to angle the sonar at either 0° or 10° downward tilt. There is also the Clamp Mounting Bracket which can be used where a quick release system may be more appropriate.

Mounting using the Brackets

Gemini 720im Mounting Bracket Kit **S11708**

The kit comprises of the following components:

- 1 x Gemini 720im Mounting Bracket *(S11618 ASSY)*
- 4 x M4 x 12 screws *(S11772)*
- 4 x M4 Nyloc nuts *(S01159)*
- 4 x 8-32 x ½" screws *(S11771)*
- 4 x 8-32 x ½" Nyloc nuts *(S11775)*
- 1 x Metric Allen key *(S11774)*
- 1 x Imperial Allen key *(S11773)*



The Sonar Mounting Bracket allows the user to securely mount their 720im within a protective shell via a captive screw. The bracket utilises both imperial and metric fittings to enable the user to fit to their vehicle.

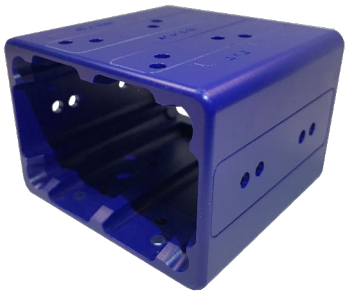
Gemini 720im 10° Bracket Adaptor Kit **S11709**

The kit comprises of the following components:

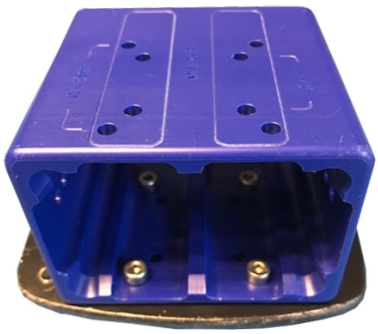
- 1 x Gemini 720im 10° Bracket Adaptor*(S11702 ASSY)*
- 4 x M4 x 12 screws*(S11772)*
- 4 x 8-32 x ½" screws*(S11771)*

This allows the user to easily mount their mounting bracket at a 10° downward tilt.

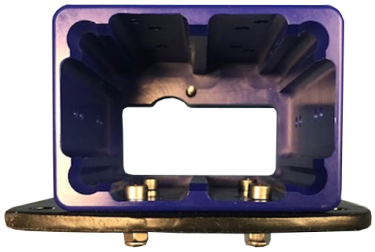
Fixing the Sonar Mounting Bracket to your vehicle at 0°



The Sonar Mounting Bracket has both Metric and Imperial mounting hole footprints to allow easy mounting of the adapter. The following instructions assume that holes have been drilled in a mounting plate for your vehicle. See Appendix D, *Mounting Bracket details* for the dimensions for imperial and Metric holes. The example in this manual is given using Metric fitments.



Step 1: Place the adapter onto the vehicle/ mounting plate as shown and place 4 of M4 x 10 screws into the required mounting holes



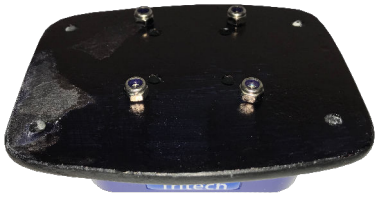
Step 2: Underneath this place 4 x M4 nyloc nuts to secure the mounting bracket in place, tighten up with a spanner and 3mm Allen key.

Fixing the Sonar Mounting Bracket to the 10° Adaptor

In the following examples the 720im is mounted via the 10° tilt adapter to a pre drilled mounting plate. See Appendix D, *Mounting Bracket details* for the footprint for the holes needed for mount.

The 10° Adapter has both Metric and Imperial mounting hole footprints to allow easy mounting of the adapter. The following instructions assume that holes have been drilled in a mounting plate for your vehicle. See Appendix D, *Mounting Bracket details* for the dimensions for imperial and Metric holes. The example in this manual is given using Metric fitments.

Step 1: Place the 10° adapter onto the vehicle or mounting plate with the Tritech logo facing the forward direction of the sonar, then place 4 of M4 x 10 screws into the required mounting holes. The 10° adapter needs to be fitted first as the bracket covers the fixing holes.



Step 2: Underneath this place 4 of M4 x 10 nyloc nuts to secure the mounting bracket in place, tighten up with a spanner and 3mm Allen key. Alternatively you could use captive nuts of inserts.

Step 3: You are now left with a fitted 10° adapter and the mounting bracket.

Step 4: Align the mounting holes that you want to use then fit the mounting bracket as shown onto the 10° adapter.

Mounting the 720im Sonar into the Bracket

Step 1: Insert the 720im as shown into the mounting bracket, making sure that the sonar is facing the correct way up.

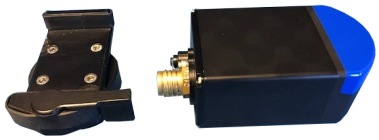
Step 2: Align the Sonar mounting hole with the captive screw and fasten by turning clockwise. The captive screw is shown located above the main connector.

The captive screw is shown above the connector unfastened.

A 720im securely mounted inside the Mounting Bracket.

Clamp Mounting Bracket

The clamp mounting bracket allows the user to quickly mount and dismount a Gemini 720im to their vehicle. The clamp mount bracket also allows you to fit the Gemini 720im at a 10° downward tilt.
To mount the 720im onto the clamp follow the instructions below.



Step 1: The photo shows the clamp bracket and the Gemini 720im needed for mounting the system to your vehicle.

Step 2: Place the Gemini 720im in the clamp bracket. In general you would want to position the clamp centrally on the 720im body. Lining up the end of the lever with the front of the Gemini, where the sides meet the front of the transducer is a good guide.

Step 3: Move the lever all the way to the left to lock off the mount. The Gemini 720im is now ready to connect its cable.

3.2.2. Installing the Gemini 720im onto a Pole Mount System

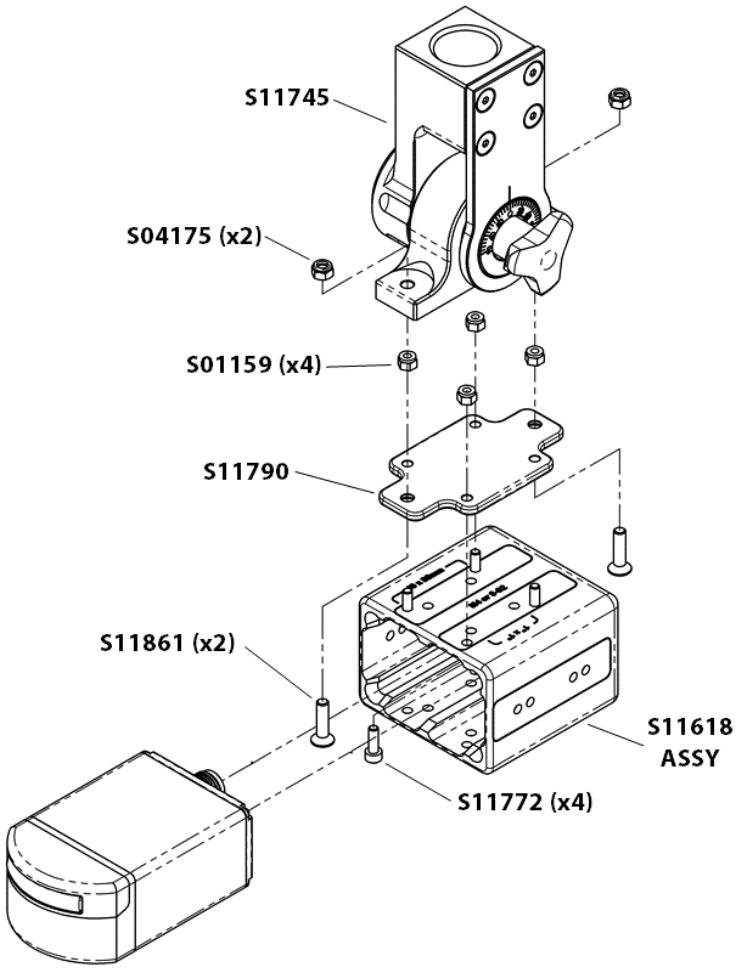
Tritech International Ltd have also created ancillary systems to allow users to Pole Mount a Gemini 720im. This methodology would be perfect for rapid deployment and imaging of an area where ROV access can be limited, or inappropriate.

Gemini 720im Deployment - Pole Mount Bracket	**S11938**

The standard S11938 kit comprises of the following components:

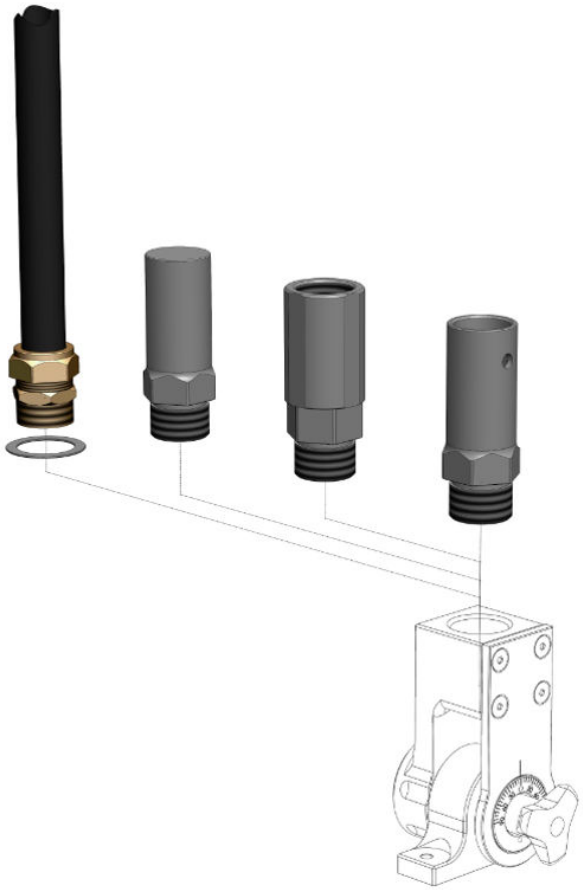
- 1 x Gemini DB - Pivot & Pole Mount Assembly*(S11745)*
- 1 x Gemini DB - 22mm Pole Assembly 0.5m (Alternatives available)*(S11836)*
- 1 x Gemini im Sonar Mount Assembly*(S11937)*

S11937 includes
4 x(S01159)
2 x(S04175)
1 x(S11618 ASSY)
4 x(S11772)
1 x(S11790)
2 x(S11861)



The 720im Pole Mount Kit allows the user to mount the sonar onto a pole for manual deployment. The kit allows the sonar to be angled between ±90°.
The Pole Mount Kit has been designed to be used in conjunction with the Sonar Mounting Bracket.

Alternative Pole Mount Adapters



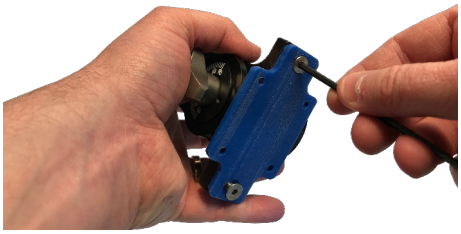
Items from left to right

Item No	Description	Qty
S11836	Gemini DB - Ø22mm Pole Assembly 0.5m	1
S11744	29mm ID x 40mm OD x 1mm Washer	1
S11743	Gemini DB - Pole Adapter Blank	1
S11904	Gemini DB - 1⅛"-18 UNEF Pole Adapter	1
S11741	Gemini DB - Reach & Rescue Pole Adapter	1

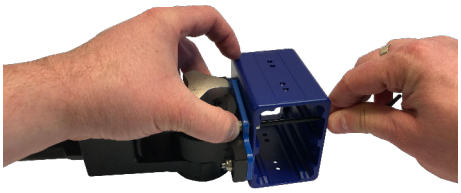
Common Interface thread: 1⅛"-14 BSW (Whitworth)
***S11836:** Utilises coupling on Ø22mm carbon pole as per USBL system*
***S11904:** Supplied for US customers*
***S11743:** A blank adapter for customer adaption*
***S11741:** Configured to accommodate "sprung" pin engagement common to a range of 'Reach & Rescue' telescopic pole systems*

S11836 & S11744 are supplied with all deployment pole mount brackets

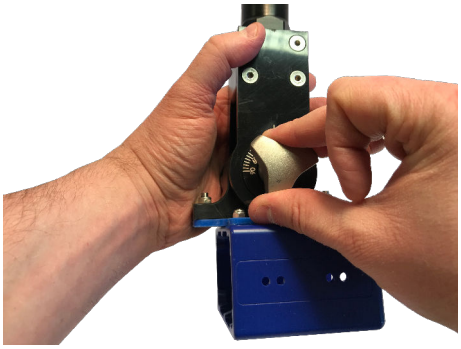
Fixing the Sonar Mounting Bracket to your Pole Mount Kit



Step 1: Secure the Gemini 720im Pole Mount Adaptor to the Gemini DB - Pivot & Pole Mount Assembly using the 2 x M5 x 20 screws and Nyloc nuts.



Step 2: Secure the Gemini 720im Pole Mount Adaptor to the Sonar Mounting Bracket, using the 4 x M4 x 12 screws and Nyloc nuts provided with the Sonar Mounting Bracket.



Step 3: To adjust the tilt of the Gemini 720im, unscrew the knob on the Gemini DB - Pivot & Pole Mount Assembly.

Step 4: Next, adjust the mechanism to the desired angle. The angle can be set in intervals of 6°. Once set, tighten the knob.

Step 5: The Pole Mount assembly is now complete and is ready for the Gemini 720im to be inserted into the Sonar Mounting Bracket.

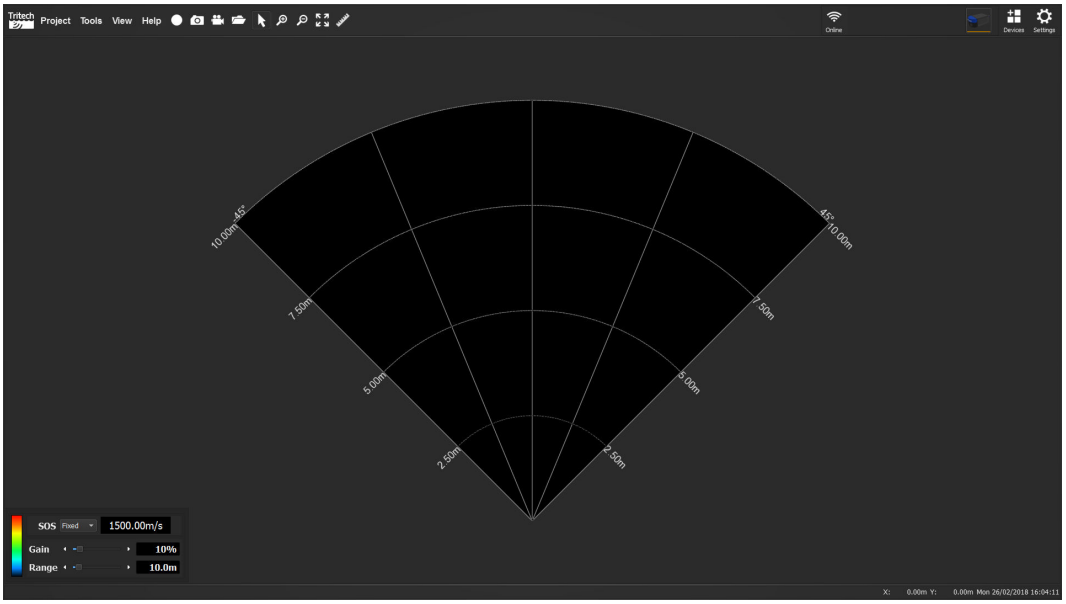
4. Operation

Once fully connected to the PC (see Chapter 2, *Getting Started*) run the Genesis software using the desktop icon: .

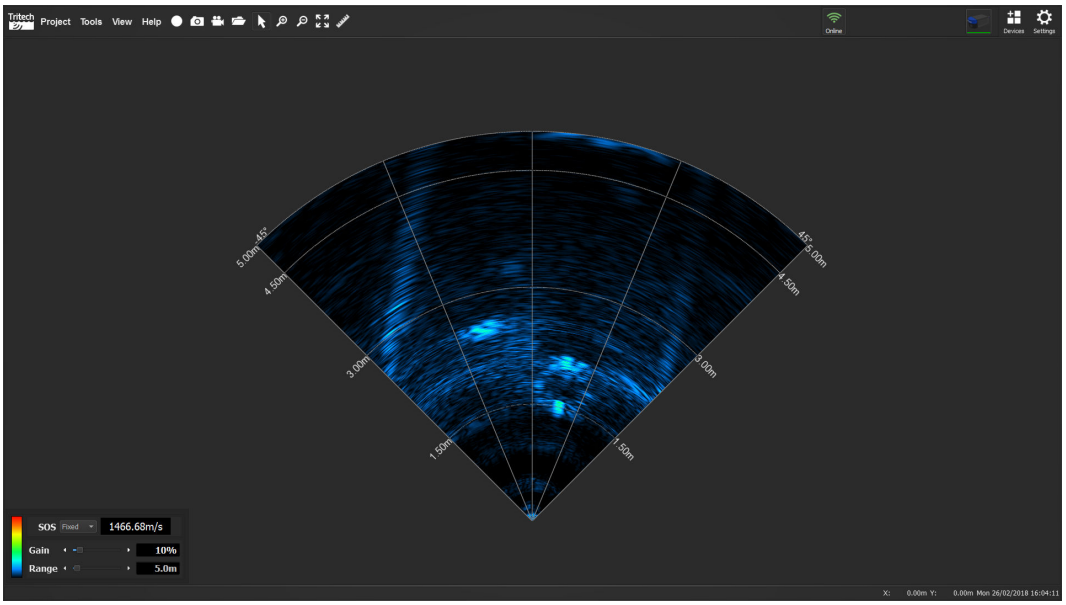
If connecting the Gemini 720im via an Ethernet connection, ensure that the computer IP has been set to the correct range to operate with the sonar. Please see Appendix E, *Setting the computer IP address in Windows® XP* or Appendix F, *Setting the computer IP address in Windows® 7 or Windows® 10* for details on this process.

4.1. First Power On

Genesis will automatically detect any Gemini 720im units connected to your computer and will update its **Device Bar** with all the available units.



To start seeing data from the Gemini, click on the **Online** button.



4.2. Basic Controls

4.2.1. Sonar Controls

When Genesis shows data from the Gemini 720im it will automatically display the Sonar Controls panel at the bottom left of the `View`.

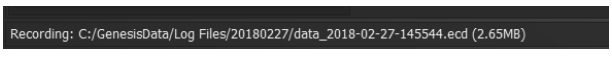
The Sonar Controls allow you to alter the operation of the Sonar in order to maximise its potential for your application.

Control	Function
Colours	The Colour palette control changes the colours used to display the imagery on screen. Depending on the strength of the acoustic return, the data will be displayed using one of the colours within the selected palette. Strong returns will tend to be at the upper end of the palette, while weak returns will be at the bottom end. If the data looks dark, with all the returns at the bottom end of the palette, try increasing the gain to brighten the image.
Gain	This control effectively increases the brightness of the image. By changing the gain the Sonar will amplify the incoming signal so that you can better see weak signals. This will also increase the effect of any noise in the system.
Range	This control changes how far the sonar can see. By increasing the range the sonar will visualise further and be able to see targets at greater distances. Increasing the range will affect the update rate of the sonar. Long ranges will mean slower update rates.

4.2.2. Logging data

To record data from the Gemini 720im, simply click on the **Record** button.

By default, Genesis will start recording into the default storage location. It will display the details of the log file at the bottom left hand side of the screen.



5. Maintenance

5.1. General guidance

Although the Gemini range is not field serviceable regular care and maintenance of the unit should be carried out. Ensuring that the electrical connectors are clean and free of corrosion will aid in preserving the working lifespan of the unit. Particular care should be taken for units that use an o-ring seal on the connectors and blanking caps to ensure that these o-rings are seated properly and in good condition. Regular visual inspection of the unit around the areas where salt build up can occur will help highlight any potential issues of corrosion and allow for corrective action to be undertaken before any integrity failure of the unit. The mechanical interface between the bulkhead connectors and housing elements should also be inspected.

Caution

It is recommended that Gemini units be returned to Tritech as part of a regular maintenance schedule. An annual return is highly recommended, but this can be lengthened, or shortened, by various factors:

- Frequency of use
- The operating environment (i.e. salinity, temperature)
- The presence of any galvanic action from dissimilar metals, or case voltages

5.2. After using the unit

After using the sonar head ensure it is washed down with fresh water and check the unit for any signs of obvious damage. Pay particular attention to the transducer head and free any organic matter which has become trapped. Once the unit is clean; dry thoroughly and place in storage container.

5.2.1. Sacrificial Anode Information

There is a zinc alloy sacrificial anode fitted to the rear of the Gemini 720im which is intended to prolong its active life when submerged for long periods of time.

The lifespan of the anode itself will vary greatly depending on the conditions it is exposed to, so it may need to be changed on a relatively regular basis. As a minimum, *Tritech International Ltd* recommend replacing the anode every year with the sonar in regular use.

Replacing the Anode

Step 1: Remove the spent or damaged sacrificial anode from your sonar with a cross head screwdriver.

Step 2: Open the replacement spare kit. Build the kit with the plastic washer nearest the sonar, anode and then the screw.

Step 3: Fit to the sonar and tighten up the screw.

Spare anode kits can be purchased from *Tritech International Ltd* using the part number: **S11882**

5.3. If storing the unit for extended periods

Make sure the unit is completely dry with no signs of moisture on any of the connectors. Fit all blanking plugs to the unit and pack into an appropriate storage container along with several pouches of silica gel.

6. Troubleshooting

The software reports that no sonars are detected

Ensure that the latest revision of Genesis software is running on your computer. Visit www.tritech.co.uk to download the latest version.
Check all cabling to the sonar and verify that it is powered correctly with appropriate voltage at the sonar.

For Ethernet systems: Check that the correct cable is in use, this needs to be a cable of at least Cat5e standard. If the sonar has successfully established a link then the problem will be with the network settings on the PC.

Note

Ethernet connection requires Cat5e cable for the entire cable run (max 80m) – lengths of untwisted cable must be kept to an absolute minimum. Some firewalls have been known to cause this issue. Contact the network administrator for advice if the sonar is connected to a network where disabling the firewall would present a security risk.

Genesis crashes as soon as the Gemini 720im is detected

Without a Gemini 720im connected, run Genesis then select `Help - About` and note the OpenGL driver version detected - it should be at least version 2.1. If this is not the case, update the graphics drivers present on the computer.

For Windows® OS: Ensure that the file system is not corrupted by launching a `cmd.exe` window with Administrative privileges then use the `sfc /scannow` command. This will analyse and correct any issues.

Sonar goes offline while operating out of water

The sonar head outputs heat to the body casing (using it as a heatsink) which is dissipated to the surrounding water during normal operation. In order to protect the internal electronics from damage due to overheating a thermal cut off will shut down the sonar if it gets too warm. It will be necessary to allow the unit to cool down before it will operate again. The unit should not be operated out of water for extended periods.

Sonar is present but will not ping

Ensure that you have OpenGL version 2.1 or greater installed.

For Ethernet systems: Check your network settings on the PC. Typing "route print" into the command line will show the PC routing table. The sonar and PC must be on the same subnet and the PC's routing table needs to be set up so that packets are routed correctly to the sonar. If the sonar is receiving ping requests then the IP address of the PC will appear in the

“Connected IP Address” field in the advanced settings page of the software. If the sonar is connected to the PC then the most likely cause is particularly bad packet loss on the network between sonar and PC.

Note

The sonar will only respond to ping requests from IP addresses on the same subnet as the sonar. Some firewalls have been known to cause this issue. To view the computers routing table type "route print" from the command line.

For Serial systems: When using the *Tritech International Ltd* USB adapter, ensure that the *Connected* LED is fully illuminated and that the Tx and Rx LEDs are flashing. If there is no LED activity, use the Device Manager in Windows® to ensure the USB drivers have been correctly installed.
If using a direct serial connection: ensure that the COM Port has been correctly assigned in the Genesis software and that the baud rate has been set to at least **115200**. Check that the wire cores have been correctly terminated.

Update rate is slow and there are sometimes large gaps between pings

Check that there is no other software, or service, that is intensively using the network connection. Run the PC or laptop with just the Gemini software and verify that the unit’s performance has been improved. There may be noise induced onto the Ethernet cables, be sure to route these as far away as practicable from noise sources. Some poor quality PC network cards have problems with the large data rate from the Gemini sonar and drop a significant amount of packets. If you have large packet loss, try updating network card drivers and a different brand of network card. Also check that the PC and graphics chipset meet the minimum spec.

Appendix A. 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 744 111
	Fax	++44(0)1224 741 771
	Email	support@tritech.co.uk
	Website	www.tritech.co.uk

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

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

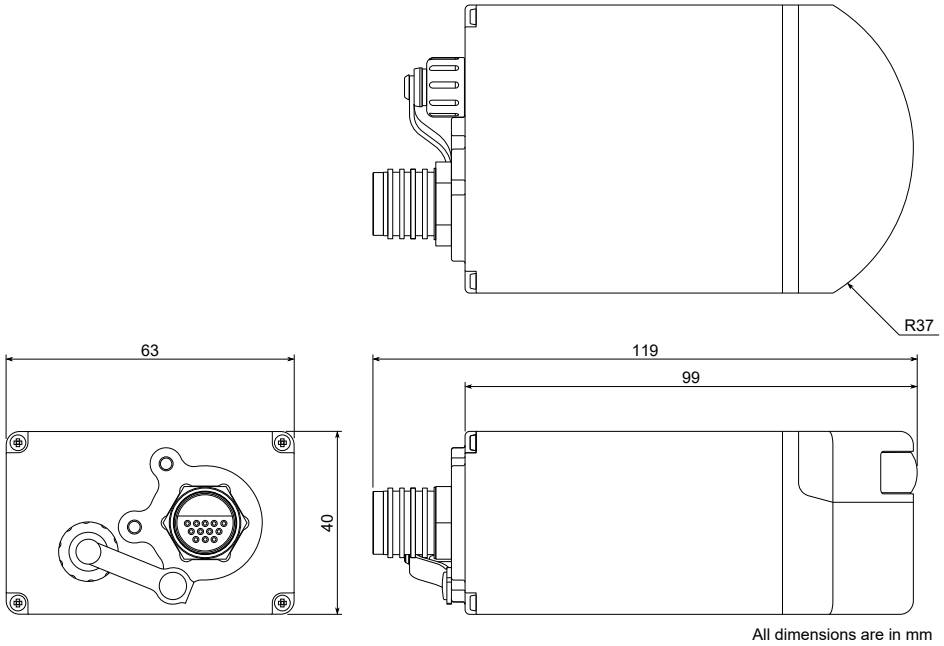
Contamination

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

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

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

Appendix B. Technical Specifications



All dimensions are in mm

Acoustic Specifications	
Operating frequency	720kHz
Angular resolution	2.34° acoustic, 0.7° effective
Range	0.2m to 50m
Number of beams	128
Horizontal beam width	90°
Vertical beam width	20° (±10° about horizontal axis)
Update rate (typical operation)	3 to 20Hz (range dependent)
Range resolution	8mm (range dependent)
Mode of operation	CW or CHIRP
Speed of sound	Adaptive beamforming based on user specified speed of sound

Interface	
Supply voltage	12 to 48V DC
Power requirement	4.5W - 17W (7.5W average)[1]
Main port protocol	Ethernet (100Base-T) and / or Serial (RS232 or RS485)
Auxiliary port protocol	Serial (RS232 or RS485)
Connector type	Main: Seacon HUMMER, Impulse Titan™ & Tritech Micron Aux: Tritech Micron

Physical Specification	
Depth rating	300m
Weight in air	0.435kg
Weight in water	0.244kg
Temperature rating	-10 to 35°C, (Storage -20 to 50°C)

[1] During transmit the sonar draws approximately 17W. The range setting has negligible effect on power consumption.

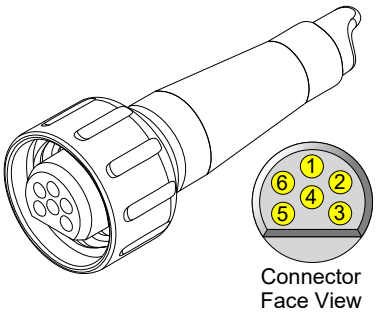
Appendix C. Connector details

Warning

Application of reverse supply voltage to the unit or supply voltage across any of the communication connections may lead to equipment damage not covered under the warranty conditions.

C.1. Tritech Micron

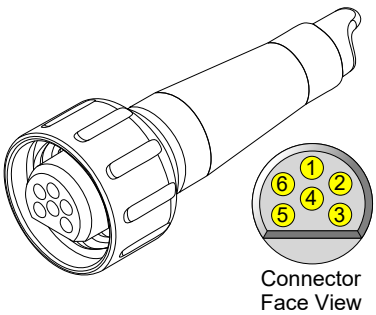
C.1.1. Main Port



Connector
Face View

Pin	Function	Cable Core Colour
1	RS485 A RS232 Tx	Yellow
2	RS485 B RS232 Rx	Blue
3	+ V	Red
4	0V DC	Black
5	RS232 GND	Green
6	Shield	Cable sheath
cable colours correct as of 24/09/18		

C.1.2. Aux Port



Connector
Face View

Pin	Function	Cable Core Colour
1	RS485 B RS232 Rx	Yellow
2	RS485 A RS232 Tx	Blue
3	+ V	Red
4	0V DC	Black
5	RS232 GND	Green
6	Shield	Cable sheath
cable colours correct as of 24/09/18		

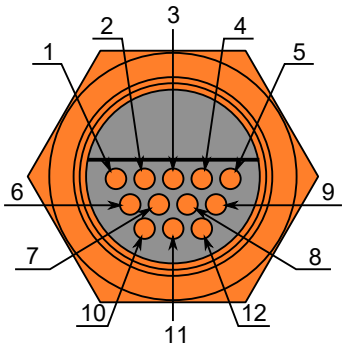
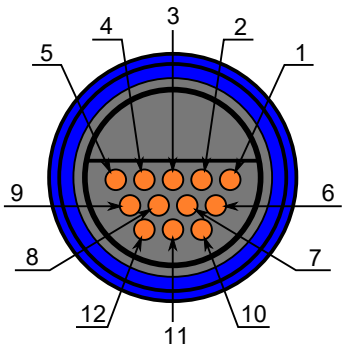
Caution

Cable core colours may change. The best practice when using the cable colours as reference is to double check against the connector pin out diagram supplied with them.
Failure to check cable wiring may result in damage to the unit

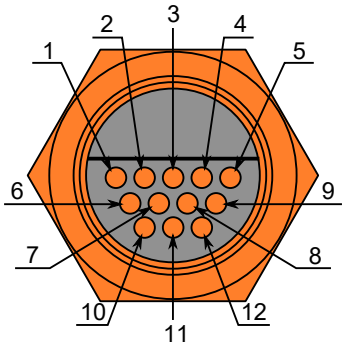
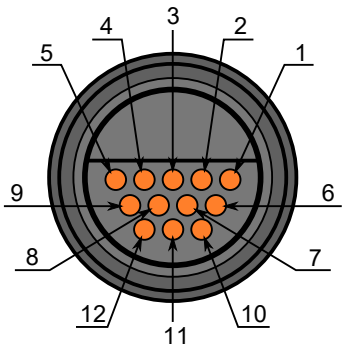
C.2. Seacon HUMMER

The cable views below show the wiring for the specific Ethernet and Serial HUMMER cables. The Gemini 720im with a Seacon HUMMER connector has both Ethernet and Serial communication as default.

Serial Communications

Bulkhead View	Pin		Function	Cable Face View
	1	Cable sheath	Screen	
	2	Red	+V DC	
	3	Red	+V DC	
	4	Black	GND	
	5	Black	GND	
	6	Blue (TP2)	Comms GND	
	7	White (TP1)	RS485 A RS232 Tx	
	8		N/C	
	9		N/C	
	10	Red (TP1)	RS485 B RS232 Rx	
	11		N/C	
	12		N/C	*Blue shell denotes Serial communications*
cable colours correct as of 24/09/18				

Ethernet Communications

Bulkhead View	Pin		Function	Cable Face View
	1	Cable sheath	Screen	
	2	Red	+V DC	
	3	Red	+V DC	
	4	Black	GND	
	5	Black	GND	
	6		N/C	
	7		N/C	
	8	Blue (TP2)	Ethernet Tx+	
	9	Red (TP1)	Ethernet Rx+	
	10		N/C	
	11	White (TP2)	Ethernet Tx-	
	12	White (TP1)	Ethernet Rx-	*Black shell denotes Ethernet communications*
cable colours correct as of 24/09/18				

Caution

Cable core colours may change. The best practice when using the cable colours as reference is to double check against the connector pin out diagram supplied with them.

Failure to check cable wiring may result in damage to the unit

Caution

It is recommended that the HUMMER connector faces are lightly lubricated prior to being mated. See the areas highlighted in red below.

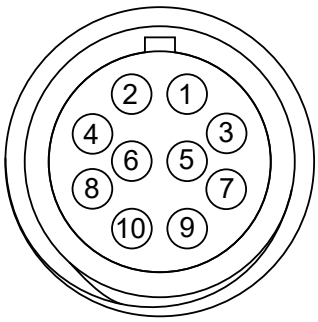
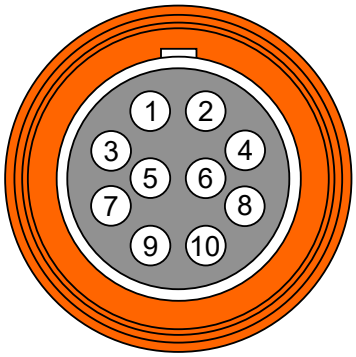
Use non conductive silicon grease, G624 is recommended. **Do not overgrease.** Excessive lubrication is detrimental to the operation of the connector.

C.3. Impulse Titan™

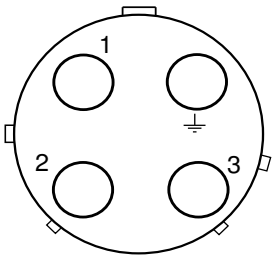
The cable view below shows a fully wired Impulse Titan™ cable.

This covers all the cable combinations.

The Serial and Ethernet variants of this cable will only be wired for Serial **OR** Ethernet.

Bulkhead Face View	Pin	Function	Cable Face View
	1	Screen	
	2	+V DC	
	3	RS232 GND	
	4	GND	
	5	RS485 A RS232 Tx	
	6	RS485 B RS232 Rx	
	7	Ethernet Tx+	
	8	Ethernet Rx+	
	9	Ethernet Tx-	
	10	Ethernet Rx-	

C.4. Souriau UTS6JC124S - S09126



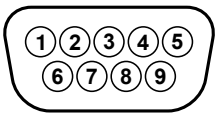
Pin	Function
1	0 VDC
2	+ VDC
3	N/C
earth	Screen

connector face view

C.5. USB to Serial

C.5.1. Gemini 720im Serial to USB Test Cable - S11942 1m

This is designed to replicate a PC serial port connection and as such is a DE-9M connector.

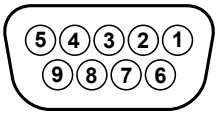


DE-9M face view

Pin	Tritech USB Function	Tritech USB Cable Core Colour
2	Rx/A	Red
3	Tx/B	Black
5	Signal GND	Brown

C.5.2. Gemini 720im Serial to USB VideoRay Pro4 Test Cable - S11859 1m

This is designed to plug into the AUX connection of a VideoRay Pro4.



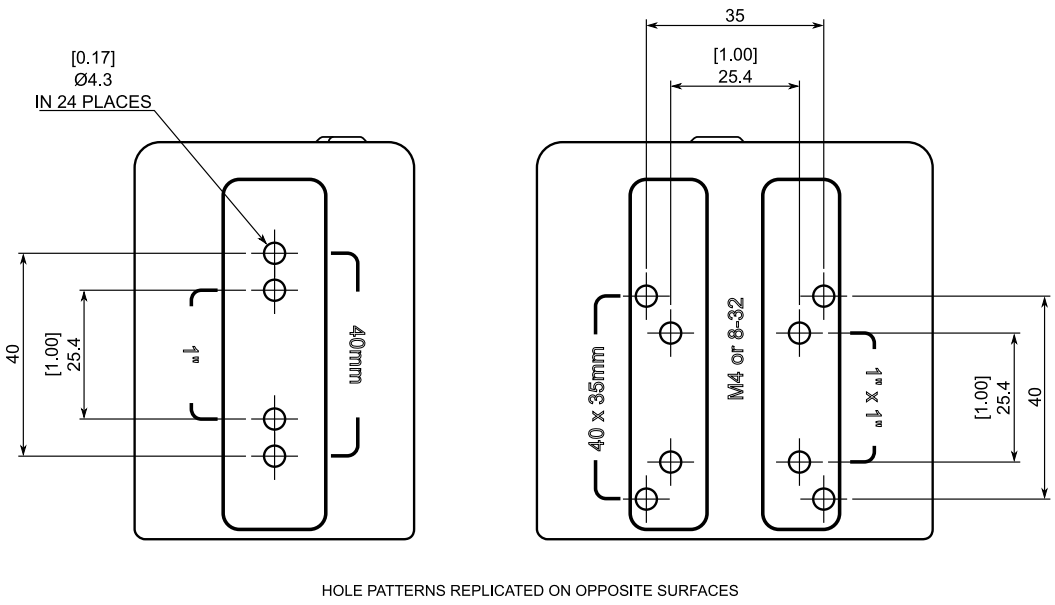
DE-9F face view

Pin	Tritech USB Function	Tritech USB Cable Core Colour
7	Rx/A	Red
8	Tx/B	Black
5	Signal GND	Brown

Appendix D. Mounting Bracket details

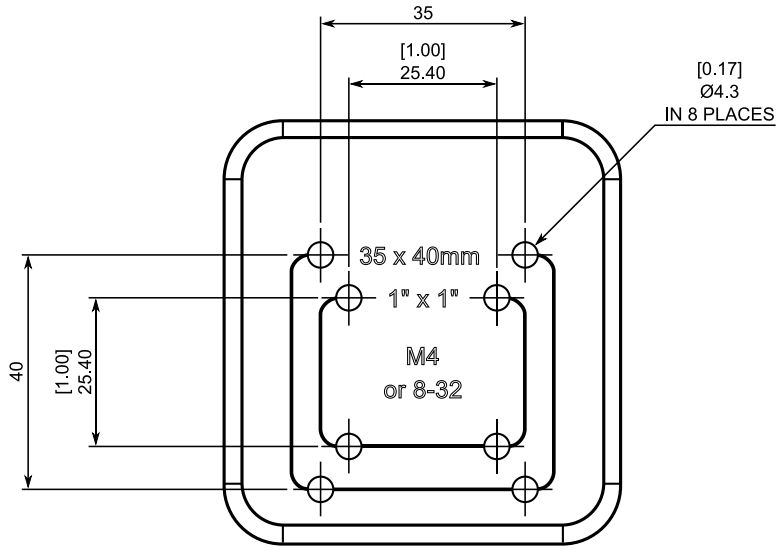
D.1. Sonar Mounting Bracket

Note
Drawings are not to scale.

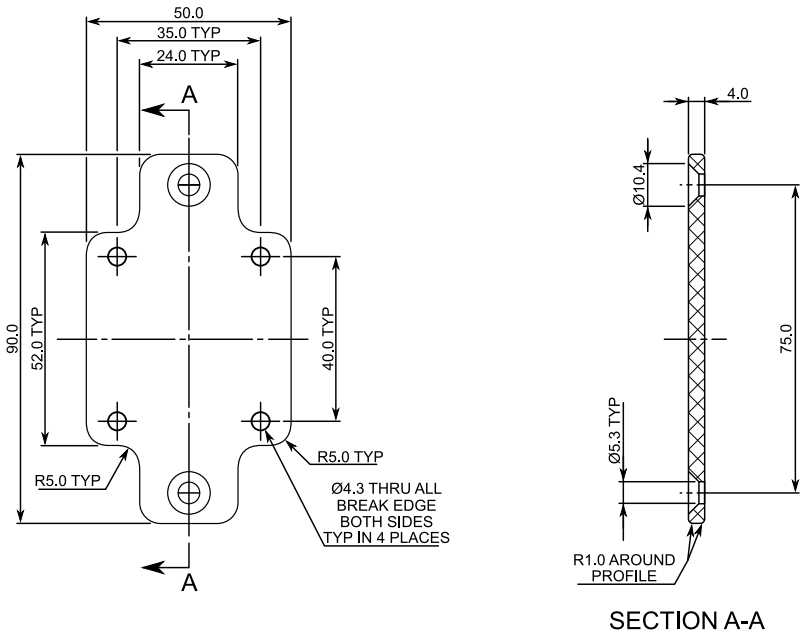


HOLE PATTERNS REPLICATED ON OPPOSITE SURFACES

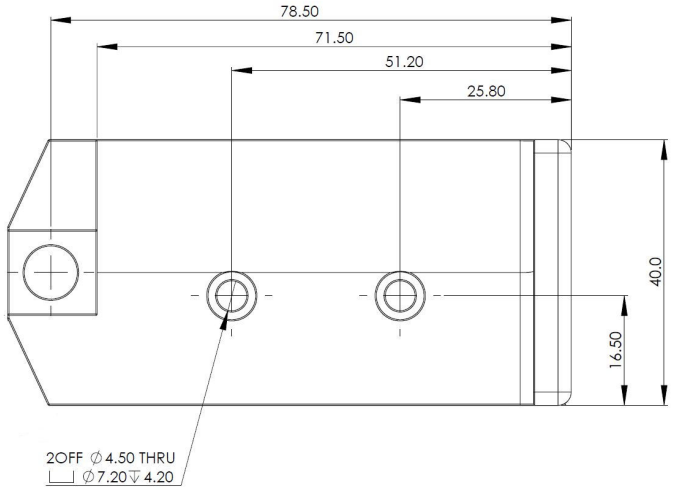
D.2. Mounting Bracket 10° Adaptor



D.3. Pole Mount Adaptor



D.4. Clamp Mount Adapter



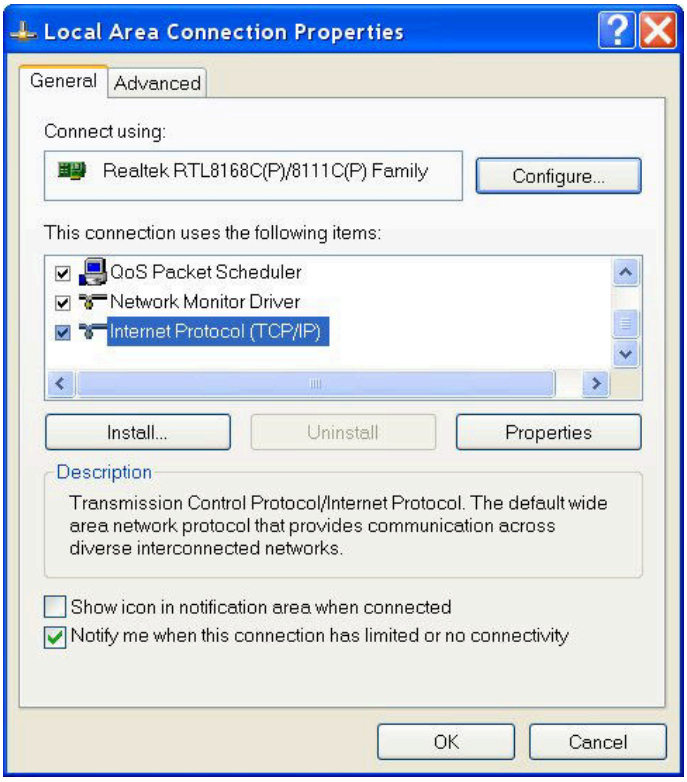
Appendix E. Setting the computer IP address in Windows® XP

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

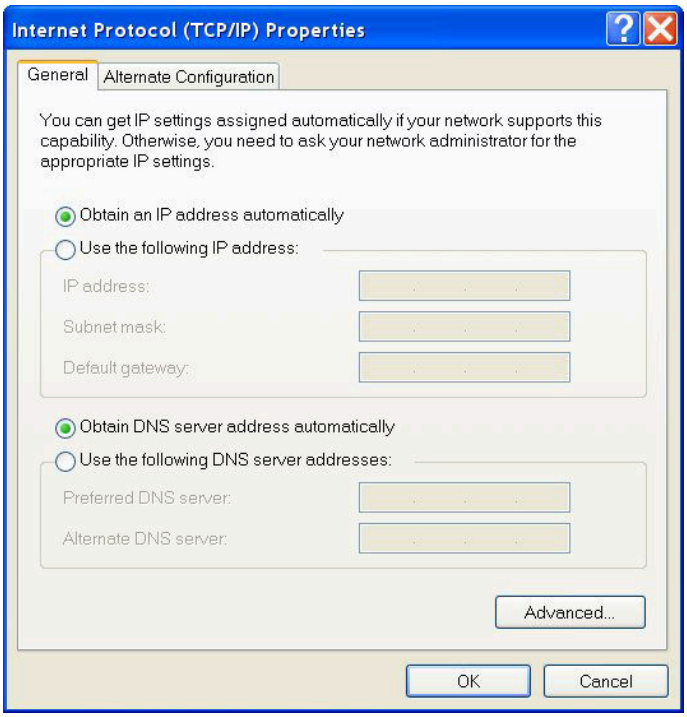
If the computer is connected to a network already, disconnect it from that network.

From the Start Menu select Control Panel. From the Control Panel Explorer window that opens, double click on Network Connections. From the list of available network connections that opens, double click on the Ethernet connection which will be used to connect to the Gemini head.

Click the Properties button on the dialog which opens. This will open a dialog which looks like this:

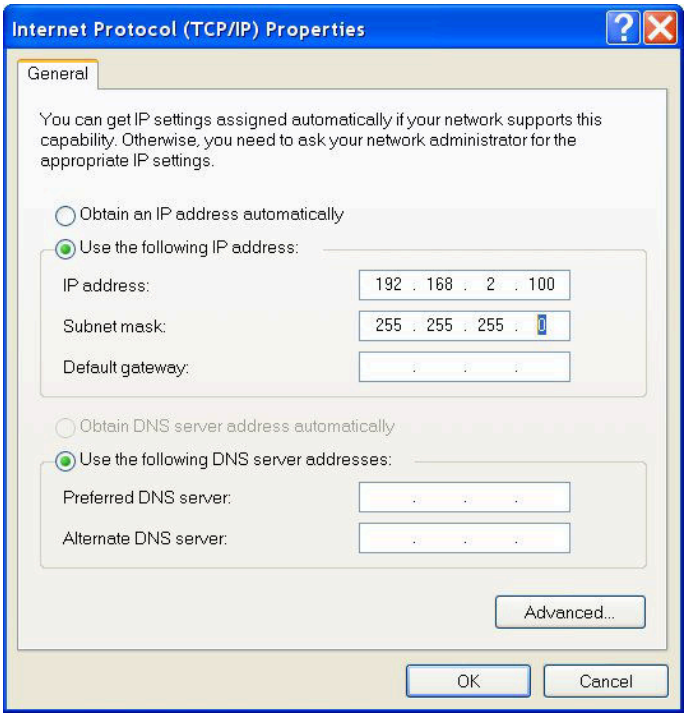


Scrolling the "This connection uses the following items" box will reveal an item titled "Internet Protocol (TCP/IP)". Click this item to select it, and then press the Properties button. The following dialog should open:



Make a note of the settings as currently used by the computer; these will be needed to restore the computer to any existing network. Refer to the appropriate section of this manual for the correct IP address to use.

The following screenshot shows the dialog after those changes have been made:

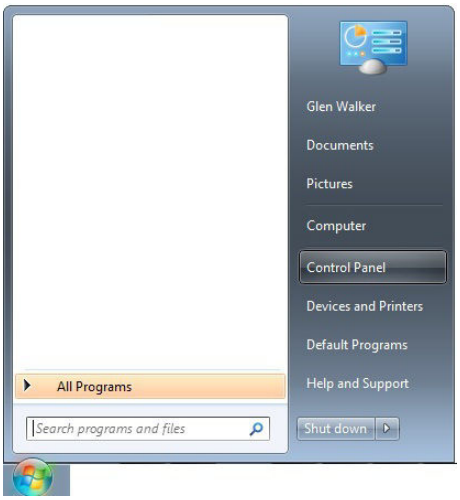


Appendix F. Setting the computer IP address in Windows® 7 or Windows® 10

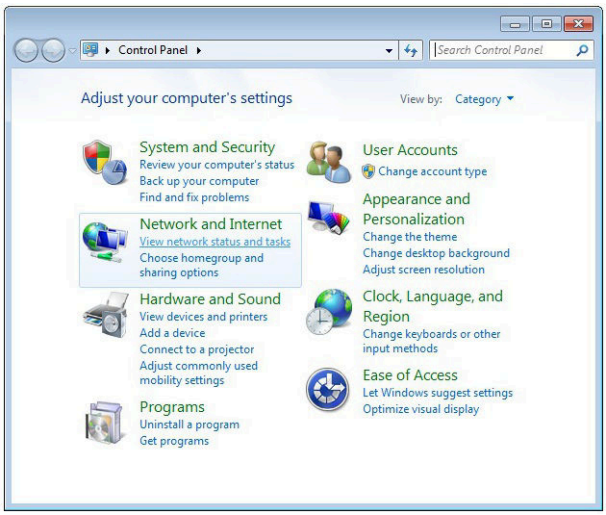
The following instructions apply to a computer running Windows® 7 or Windows® 10, though the sequence for other operating systems will be similar. All screenshots are from a Windows® 7 installation.

Disconnect the computer from any existing network.

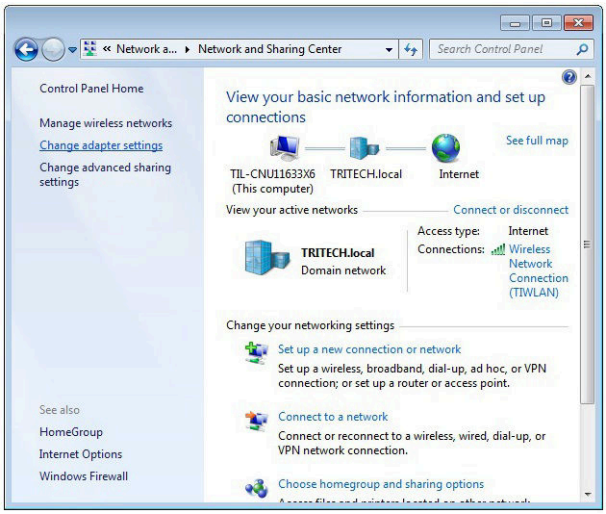
First click on the Start Menu and select `Control Panel`.



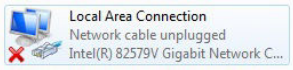
Under `Network and Internet` click on `View network status and tasks`.



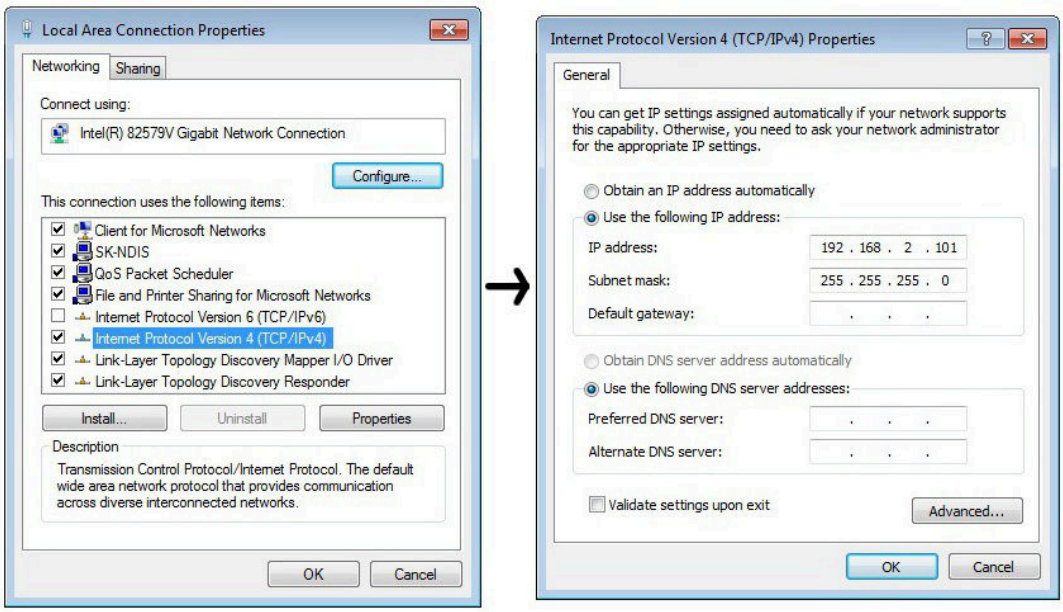
This will bring up the `Network and Sharing Center` which allows configuration of any networks on the computer. Click on `Change adapter settings` on the left-hand pane.



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

CHIRP	Compressed High Intensity Radar Pulse - a technology for improving image resolution initially used in radar systems but also adapted to sonar devices.
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.
Multibeam	A sonar which forms multiple "beams" of sound so it can update in real time and does not have to perform a full scan like a traditional sonar.
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).
TSMP	This is a data transmission protocol developed by Tritech to allow for the transmission of high volume data over a Serial (RS485 and RS232) link thus allowing a Multibeam to run over a simple copper twisted pair when using RS485. The Tritech USB to Serial converter has been developed to provide optimum telemetry performance although the sonar will operate with any high quality Serial interface.
USBL	Ultra Short Base Line (positioning system)

