

Diver Mounted Display (Tethered)

Product Manual

0747-SOM-00002 Rev 03



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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 or changes that will affect the operation and performance of the equipment.

**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.

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:



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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 a 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.

Introduction

General Overview

The DMD system has been designed to provide divers with the ability to navigate and carry out inspections in zero visibility conditions.

Utilising the Gemini range of multibeam imaging sonars allows the user to select the most suitable sonar for the type of operation required. Employing a high degree of resolution and field of view the diver can opt for either the Gemini 720ik, Gemini 1200ik or the Micron Gemini multibeam imaging sonars, all provide excellent range, resolution and field of view. These high specification multibeam imaging sonars provide a diver with a high degree of confidence while working in zero visibility conditions and allow searches to be undertaken far more efficiently than using conventional search pattern techniques. The DMD systems have been designed to be used with the Inodive accessory rail system, allowing for the DMD system to be used with an extensive range of dive masks and helmets. All of the Gemini sonars, when supplied with a DMD system, are built-up with an Inodive interface to allow for seamless installation onto the dive mask/helmet.

Power and control of the DMD system can either be through a tethered connection to the surface, where the topside operator controls what the diver sees, or the diver can work autonomously with no need for a surface connection by utilising a diver battery pack and DMD hand controller.

The tethered system (DMD-T) is intended primarily for surface air dive systems where the supplied tether connects the diver to the surface and control of the sonar is undertaken by the support team. The same DMD-T system can be used by scuba divers, where it's acceptable to be attached to the surface by the tether.

The untethered system (DMD-U) allows the diver to operate totally independent of a surface connection, with the diver himself taking control of the sonar operation. This is of particular benefit where a diver wishes to operate in a covert fashion or where there may be hazards that the tether could get snagged on.

By using the DMD system, a diver has the ability to view the sonar image on the diver mounted monacle, allowing the diver to quickly and efficiently locate targets of interest. The DMD-U system allows the diver to adjust settings using a custom hand controller and record data of interest on the subsea computer, while the DMD-T system allows the support diver on the surface to make any necessary adjustments to the sonar settings and highlight any targets of interest for the diver to investigate.

The Inodive rail system simplifies the fitting and removal of the DMD system. This allows the sonar to be removed from the mask/helmet and attached to a Gemini sonar pistol grip where this may at times offer some advantage, such as difficult to reach areas or where a different sonar viewing angle may be beneficial.

The innovative design allows for the Monacle to be accurately positioned on the divers helmet/mask and yet it can also easily be lifted out of the divers view and later replaced back into the same position by the diver when it's required.

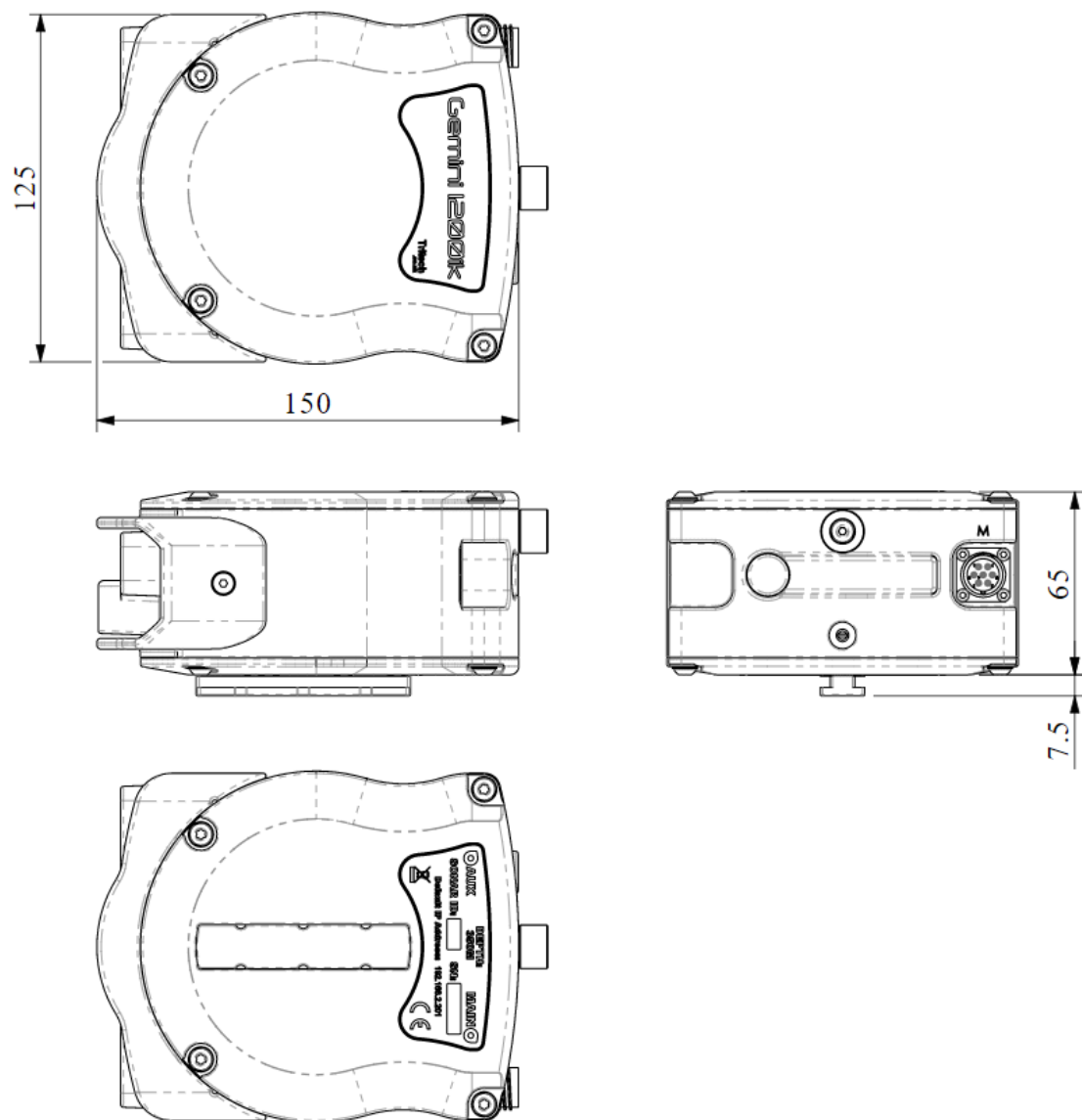
Technical Specifications

The system is designed to be used with our Gemini range of multibeam sonars, primarily the (Micron Gemini, 1200ik and 720ik multibeam sonars) fitted with an Inodive mounting plate.



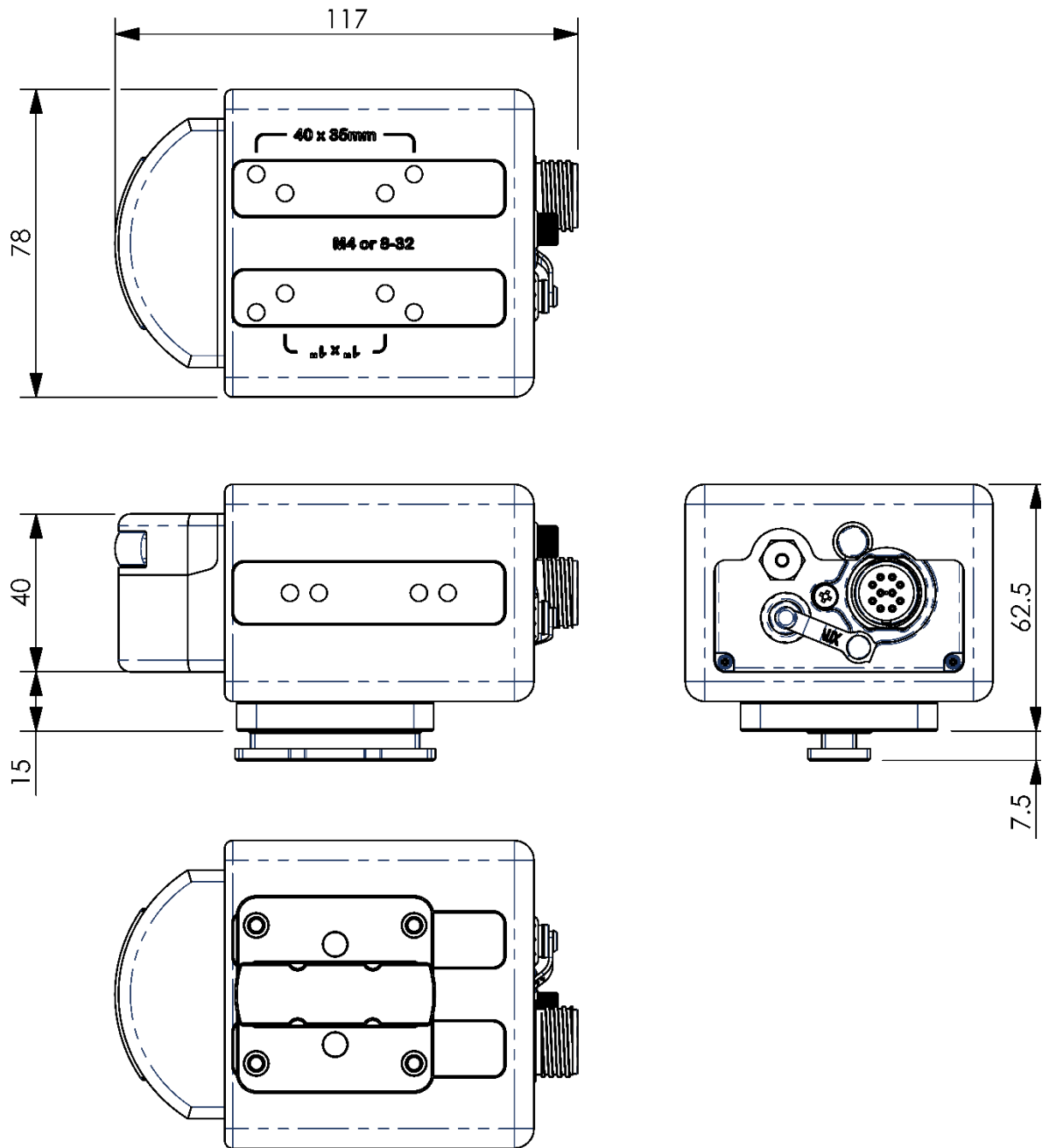
Drawings are not to scale. Dimensions in millimetres (mm) unless otherwise stated.

Gemini 1200ik & 720ik Sonar Dimensions for Slide Attachments



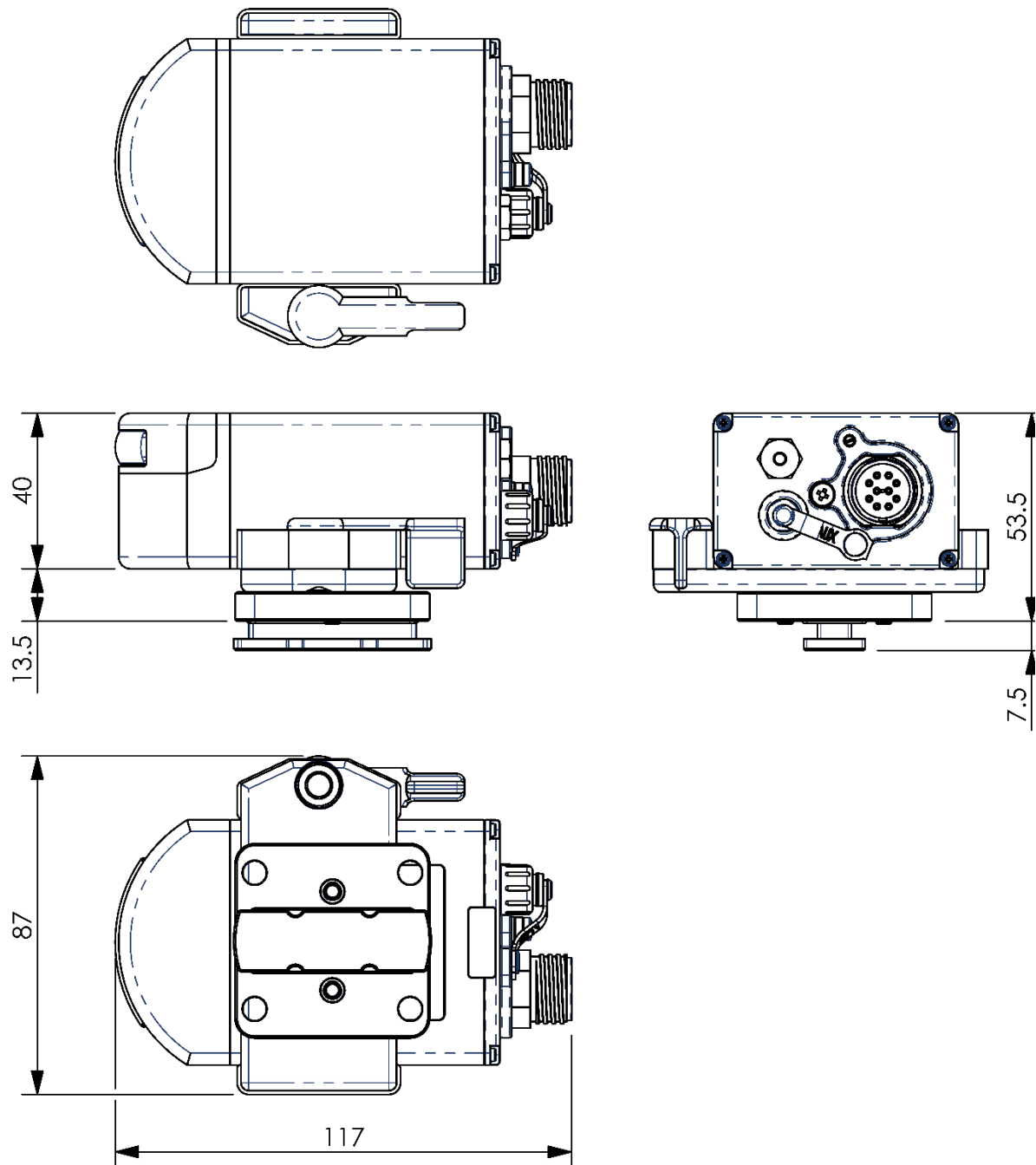
Please refer to the Gemini 1200ik & 720ik manuals available on our website tritech.co.uk for full sonar specifications.

Micron Gemini Sonar Dimensions with Fixed Mounting Bracket



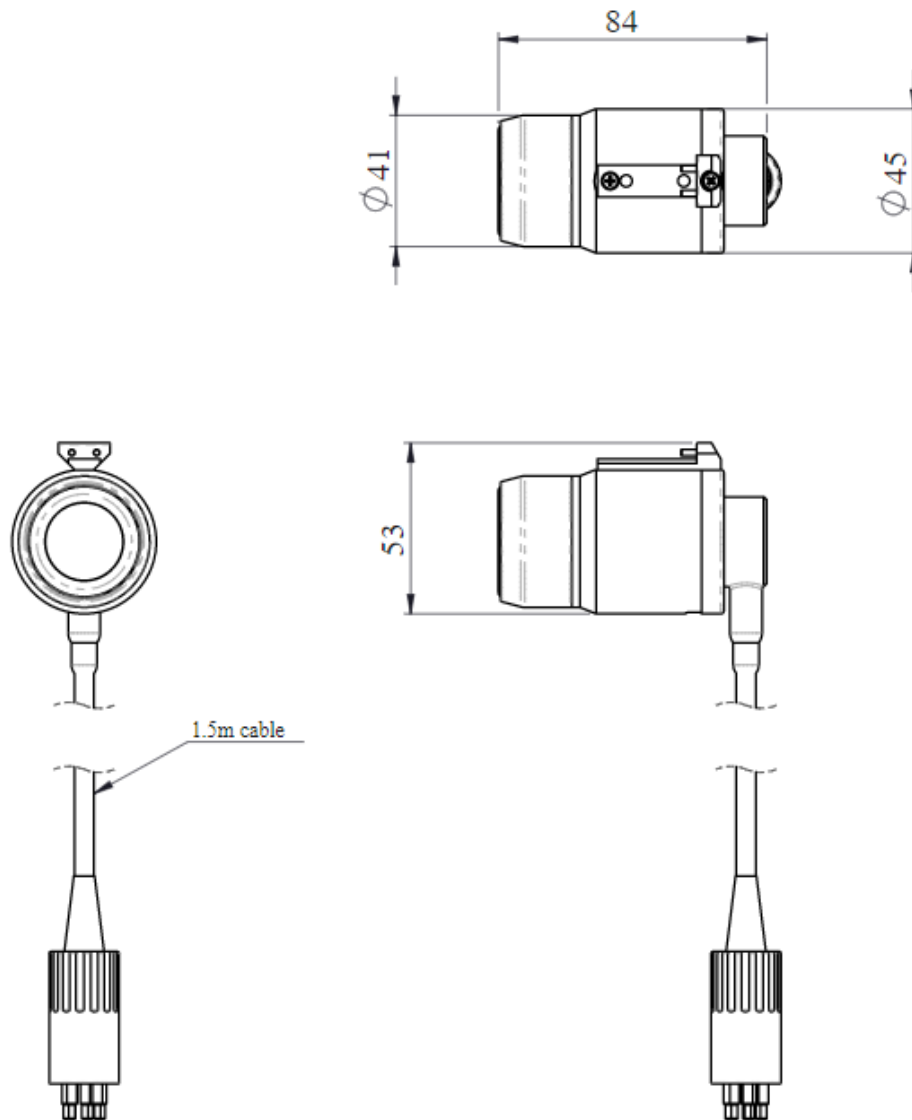
Please refer to the Micron Gemini manual available on our website www.tritech.co.uk for full sonar specifications.

Micron Gemini Sonar Dimensions with Clamp Mounting Bracket



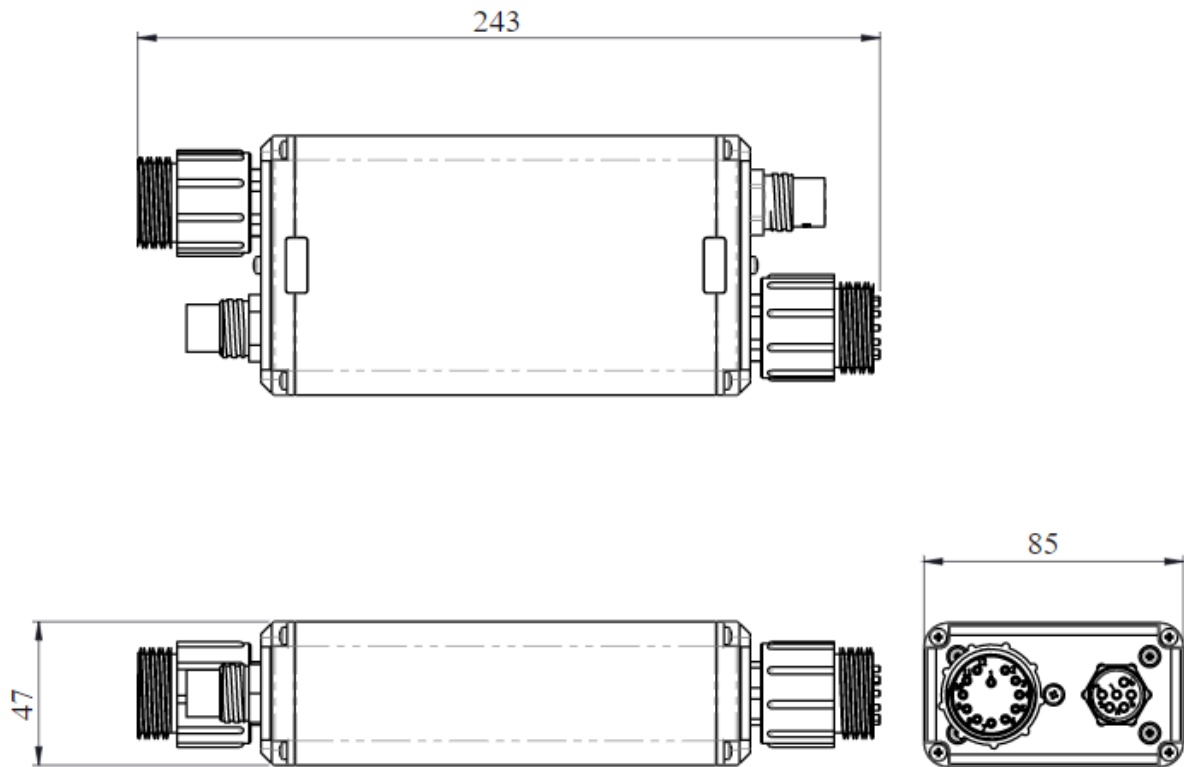
Please refer to the Micron Gemini manual available on our website www.tritech.co.uk for full sonar specifications.

Diver Monocle Specifications



DMD Monocle	
Power requirement	0.5 W at +5 Vdc (from Subsea Computer)
Depth rating	100 m
Display input	RGB, HSYNC, VSYNC
Display resolution	SVGA (800 x 600)
Connector	SubConn Micro Circular series
Weight in water	0.09 kg

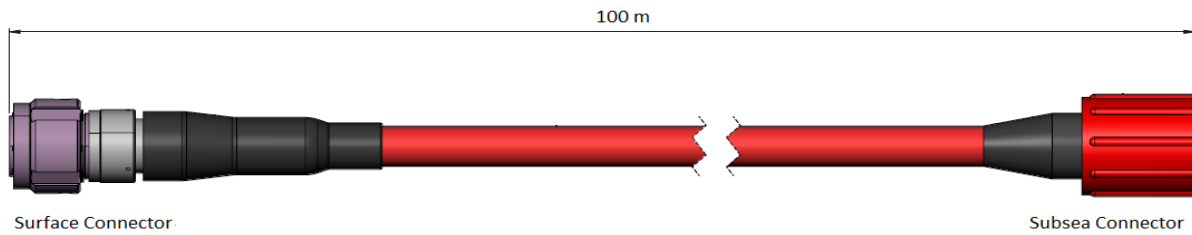
Subsea Computer (SSC) Specifications



Subsea Computer	
Power Requirement *	10 W at 20 to 42 Vdc (from Surface Control Unit)
Depth Rating	100 m
Connectors	SubConn Micro Circular series
Weight in Water	0.54 kg

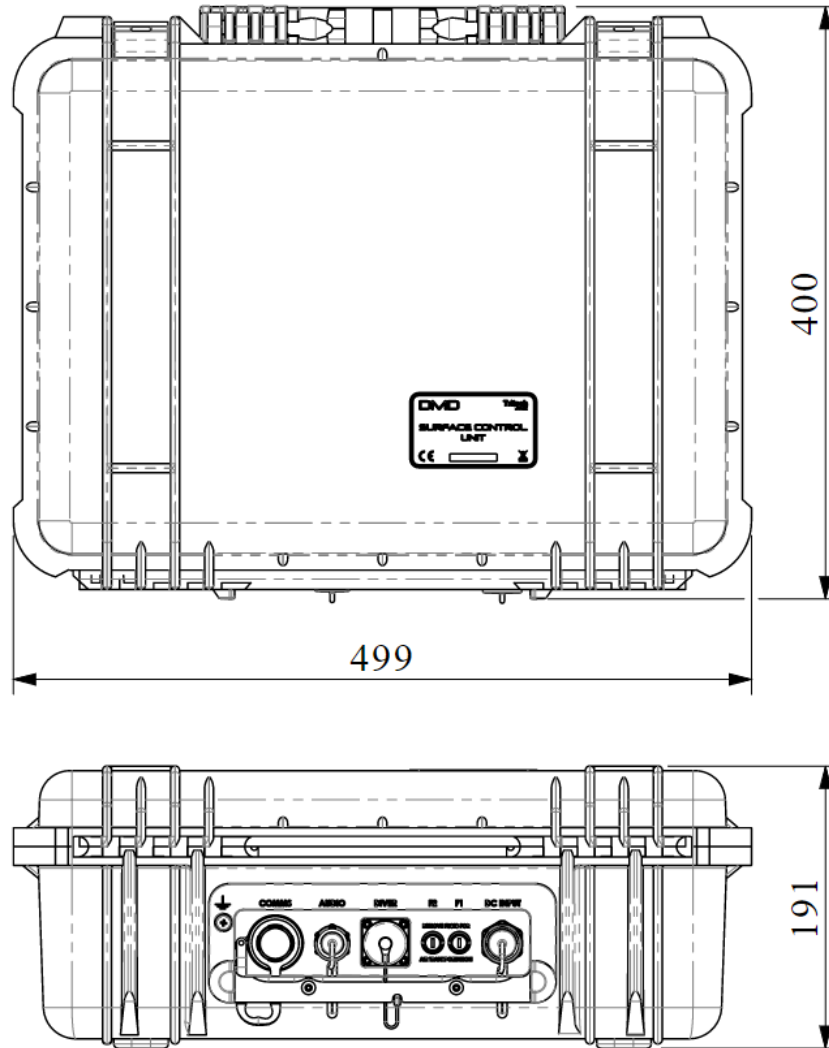
*Does not allow for attached sonar or accessories

Tether Specifications



DMD Tether	
Cable Length	100 m
Nominal Outer Diameter	13.5 mm
Nominal Radial Thickness of Outer PU Sheath	1.3 mm
Weight of Cable in Air	216 kg/km
Weight of Cable in Seawater	69 kg/km
Weight of Cable in Freshwater	73 kg/km (0.073 kg/m)
Ambient Operating Temperature Range	-20 to 80 °C
Minimum Recommended Static Bend radius	122 mm
Minimum Recommended Dynamic Bend radius	176 mm
Maximum Hydrostatic Working Pressure	2500 psi
Connectors	SubConn Micro Circular

DMD Surface Control Unit (SCU) Specifications



	SCU	Laptop (Toughbook 55)
Power	Internal Battery or AC Power Supply	
Duration of Operation	Approx 3 to 4 hrs	Up to 19 hours
Protection	Weatherproof	IP53
Battery Chemistry	Li-Ion	
Weight in Air	8 kg (plus laptop)	2 kg
Output of AC Power Supply	48 Vdc 3.13 A	15.6 Vdc 7.05 A
Input Power	30 - 55 Vdc 3.3 A	N/A
Output Power	42.5 Vdc 2.5 A	N/A
Internal Battery	5500 mAh (198 Wh)	6500 mAh (70 Wh)

Hardware Installation & Configuration

The full DMD system is contained within 4 separate rugged deployment transit cases. These are:

- DMD Surface Control Unit
- DMD Instrument Deployment Case
- DMD Diver to Surface Deployment Case
- DMD Sonar Deployment Case

DMD Surface Control Unit (SCU)

The DMD SCU case is a self-contained rugged transit case featuring integrated connection points on its rear which provide all the surface connections required which power run and deploy the system onto a diver.

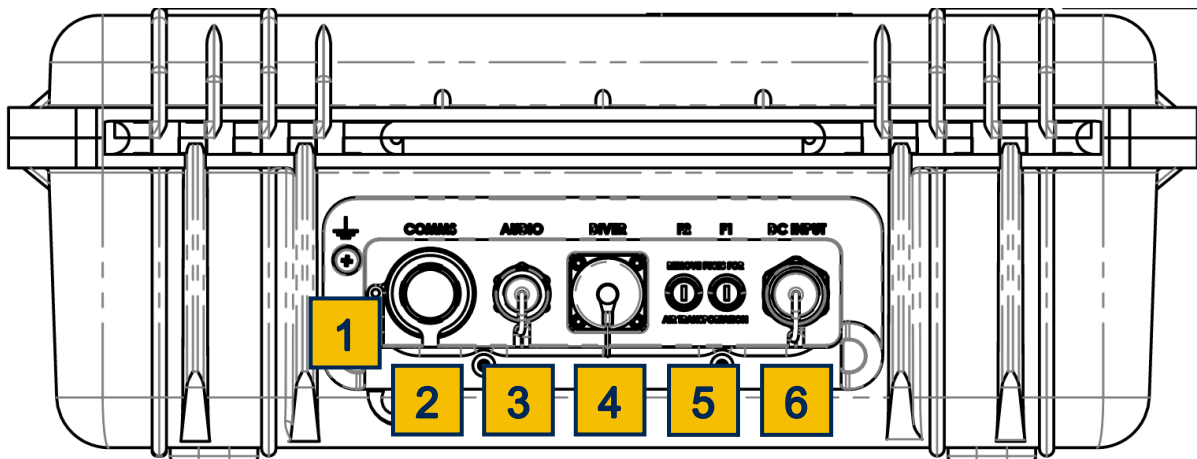
Contained within the DMD SCU are two Li-Ion battery packs linked into an intelligent charging circuit. These batteries provide power to the connected subsea equipment.



To comply with IATA shipping regulations the Toughbook laptop must be packaged separate to the DMD SCU when the unit is presented for international air transportation. The Toughbook laptop should be shipped within the DMD Instrument Deployment Case.

The 'Air Transportation Fuses' at F1 & F2 on the rear of the SCU must be removed (and stored separately) to isolate the Li-Ion batteries.

Connection panel at the rear of the SCU



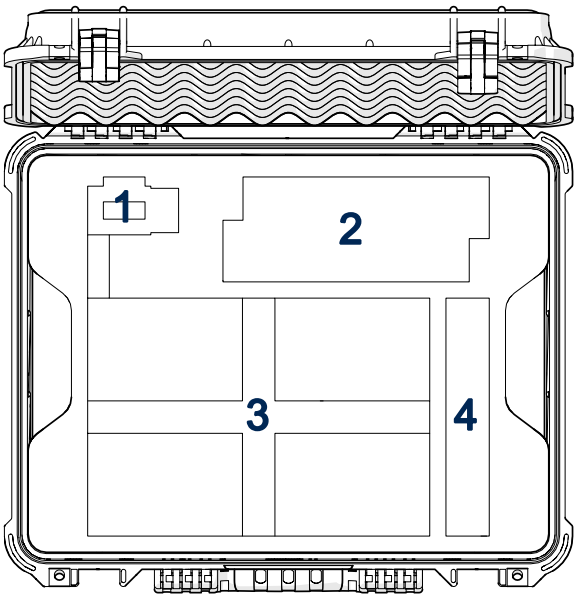
- 1 – Earth Connection Tab.
- 2 – Comms from SCU to the Laptop.
- 3 – Audio Comms Pass thru. (please refer to 'Appendix B' for further information)
- 4 – Main Tether Connection.
- 5 – Transportation Fuses.
- 6 – DC Power Input.

DMD Instrument Deployment Case

The DMD Instrument Deployment case is a rugged transit case featuring bespoke cut-outs for safely storing and transporting all the items and accessories (other than the sonar head) required to install and deploy the system on site.



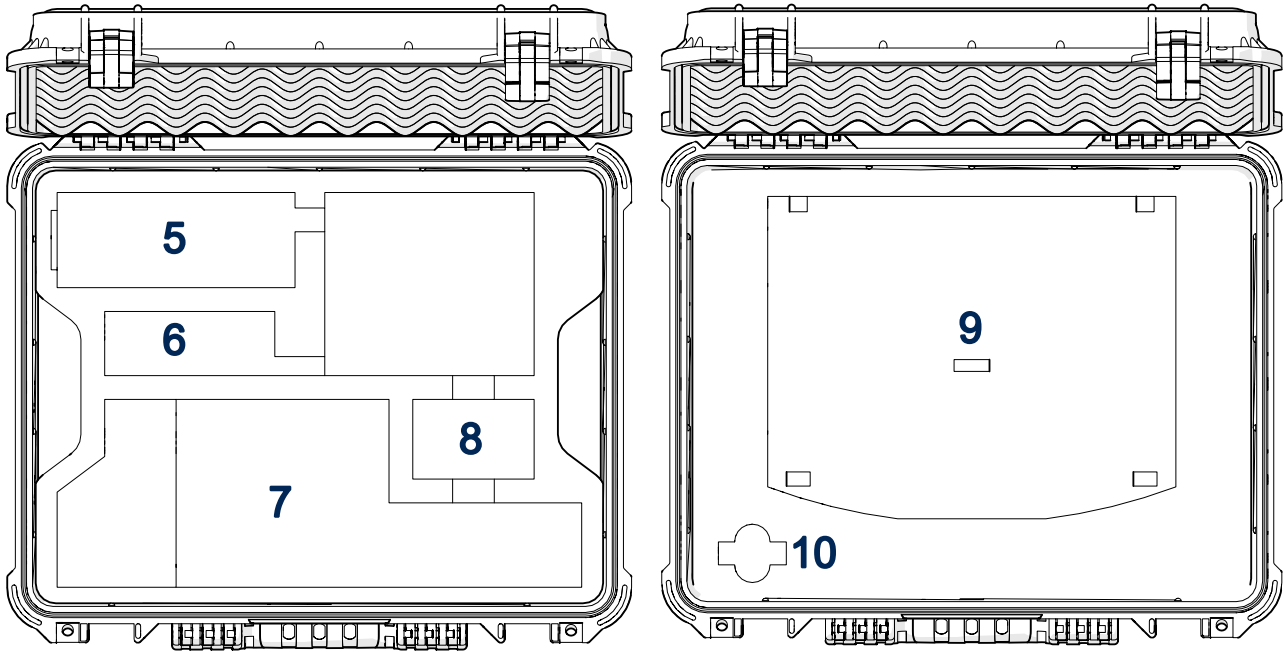
The case consists of two removable trays, and a fixed bottom tray as illustrated below.



Tier 1 – Top Level	
1	S12148 DMD Monocle
2	S12384 Subsea Computer SSC (with S12716 black, Molle strapping pouch)
3	S12412 1.5M DMD sonar cable S12422 1.5M Subconn MCOM6M with Diver Comms Cable (Female blanking plug (MCDC6F) fitted) Monocle and sonar mounting accessories. S12535 Monocle Locking Pivot Assembly S12521 Double ended rigid snap hook S12578 Trittech cable ties
4	S09992 USB cable



Monocle and sonar fitting accessories are available for various dive masks. Please ensure you specify the manufacturer and type of mask at time of order.



Tier 2 – Middle Level	
5	S12445 SCU Power Supply unit
6	Toughbook Power Supply unit
7	S00025 Mains lead for SCU Mains Lead for Toughbook S12420 2M DMD SCU Diver Comms Audio Cable S12504 Subconn MCDC12F S12505 Subconn MCDC10M S09174 Subconn MCDC6M S12506 Subconn MCDC8M S12507 Subconn MCDC10F S10071 Subconn MCDC8F S11541 Subconn MCDC6F S08059 MCDLS-F Locking sleeve S12585 Content Management Cable S12588 Management cable DC supply
8	S12523 Accessories Kit (DMD SCU Air Transportation fuses, monocle face o-ring, grease and hex keys)

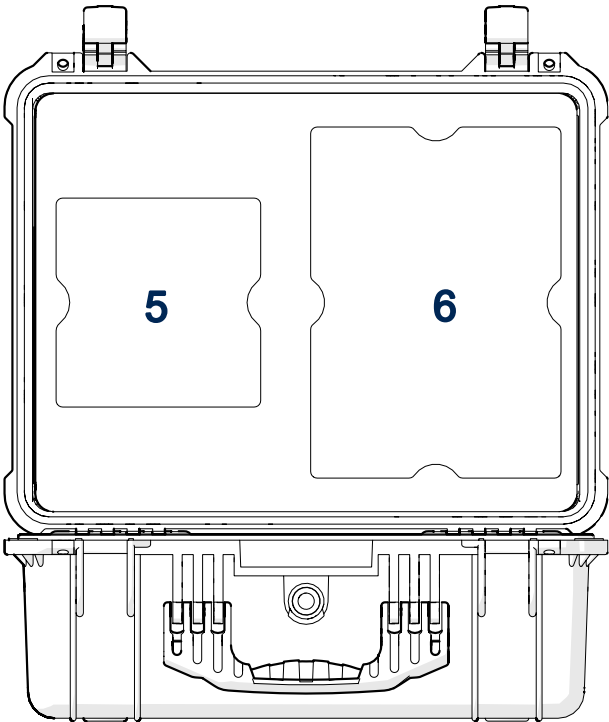
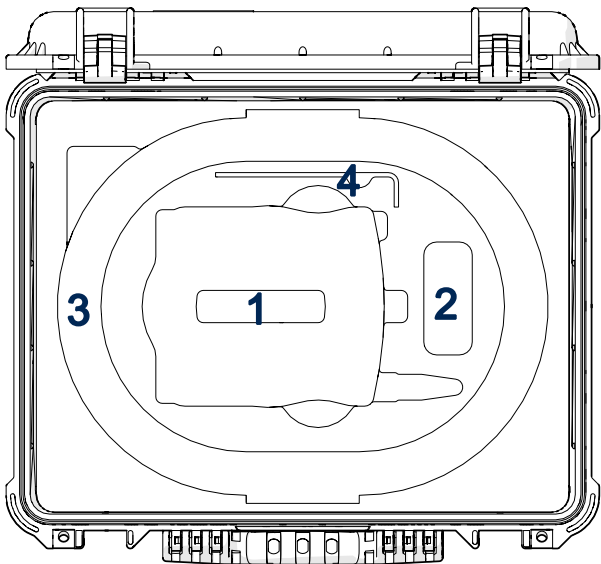
Tier 3 – Bottom Level (fixed)	
9	S12441 Panasonic Toughbook Laptop
10	S12597 USB Pen Drive

Specifications	
Dimensions	53 x 43 x 22 cm
Weight	12 kg (inc. laptop)

DMD Sonar Deployment Case

The DMD Sonar Deployment case is a rugged transit case featuring bespoke cut-outs for safely storing and transporting the Gemini multibeam sonar heads.

The case might differ depending on which system has been purchased.



Item	Description
1	Gemini sonar
2	Spare Pocket Space
3	Cable Stowage Space
4	2mm Hex Key
5 & 6	Document Space

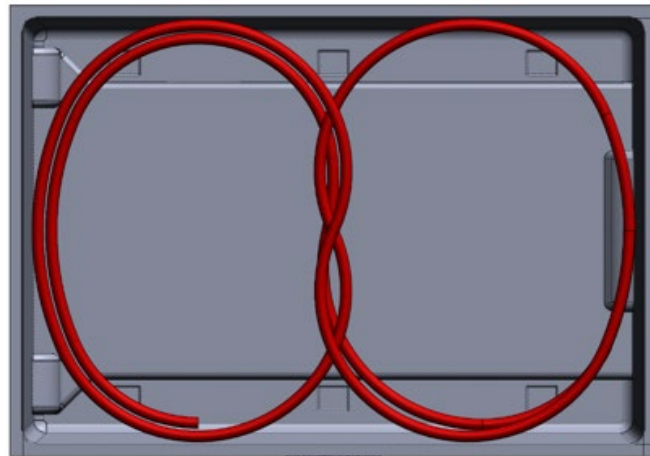
Specifications	Sonar Only Case (pictured)	System Compact Case
Dimensions	37 x 29 x 17 cm	50 x 40 x 24 cm
Weight	4 kg	7.5 kg

DMD Diver to Surface Umbilical Deployment Case

The DMD Diver to Surface Deployment case is a large rugged transit case used to store and transport the main diver to surface umbilical.



The umbilical can be coiled within the case in a 'figure of 8' configuration, which makes deploying straight from the case simpler. This is shown in the illustration below.



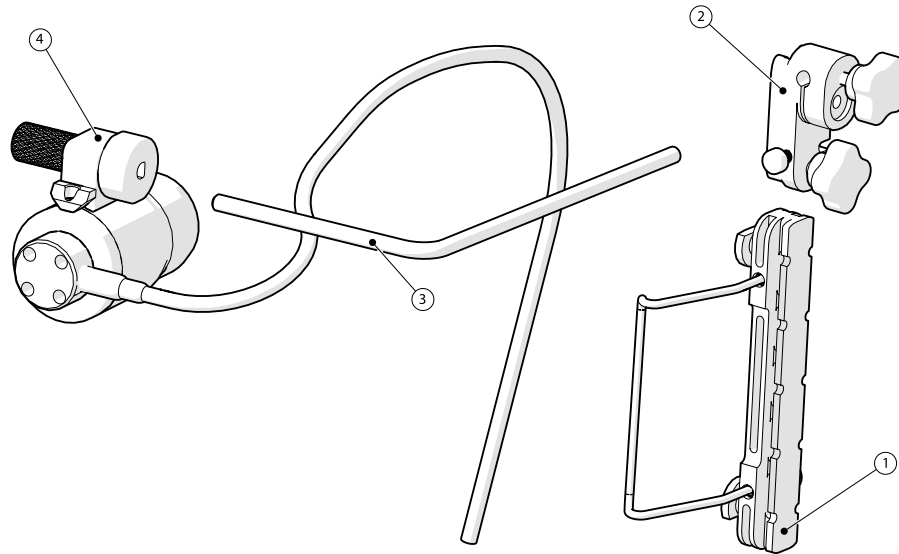
Kellems Grips are located at each end of the cable to provide strain relief at surface & subsea connection points. **Make sure that, at the very minimum, the subsea end is attached to a secure point on the diver.**



Specifications	
Dimensions	95 x 70 x 35 cm
Weight	35 kg (including tether)

Assembly of Accessories onto Mask

Fitting of the Monocle Using OTS Accessories

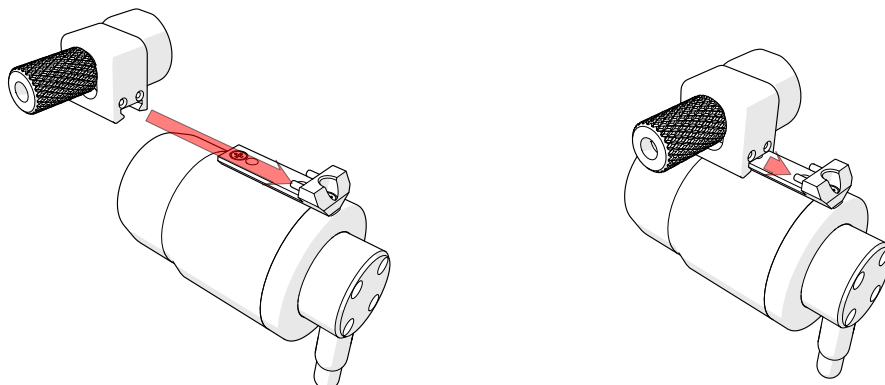


The diagram above shows the parts required to assemble and mount the Monocle onto the OTS Guardian diver mask.

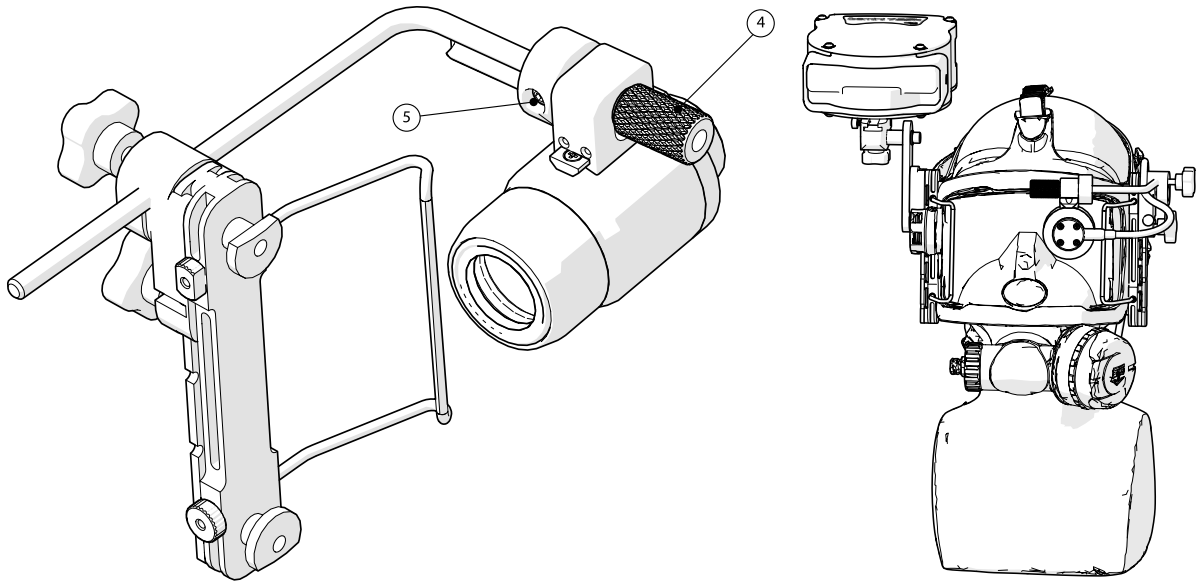
Item	Qty	Part No.	Description
1	1	S12055	OTS Guardian Accessory Rail
2	1	S12363	Clamping Slide with 1/4" Hole
3	1	S12275	DMD Monocle 1/4" Mounting Rod
4	1	S12467	DMD Monocle and Locking Assembly

To assemble and mount the monocular to the side of the mask:

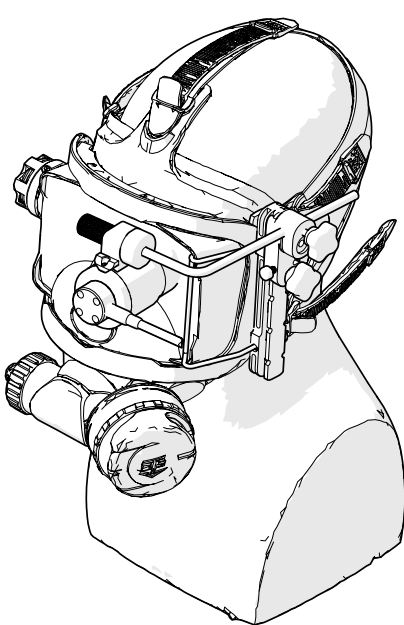
- Take the Clamping Slide [2] and slide onto the Accessory Rail [1].
- Slide the long section of the 1/4" bar [3] through the hole in the clamping slide [2], and when the monocular is up against the diver mask turn the knob clockwise to lock the bar in place.
- Loosen / unscrew the knurled section of the monocular mount assembly [4] and loosen / unscrew the 2.5mm hex screw [5] (shown in the next page). The monocular can now be slid onto the angled rod and the whole assembly mounted on the diver's mask.
- The monocular slides onto the locking assembly as shown below:



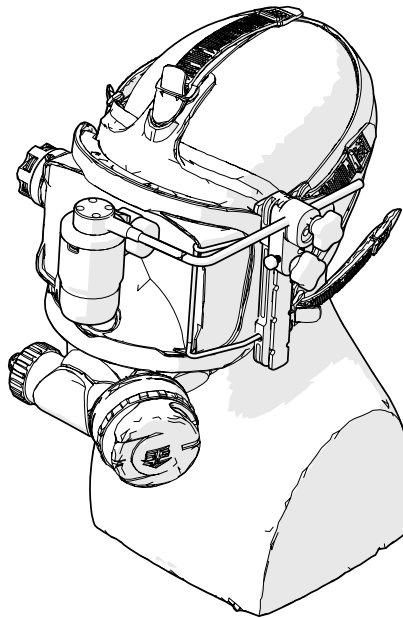
- When positioned for comfort and best view for the diver, re-tighten the knurled section [4] and the 2.5mm hex screw [5] to lock it in place.



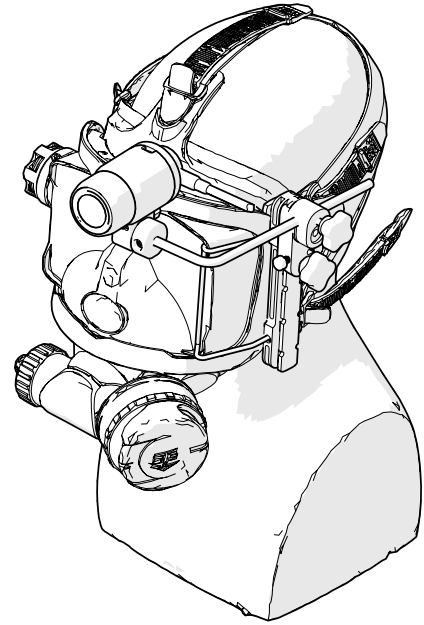
The monacle assembly is designed to allow it to be flipped up and out of the view of the diver if required. Simply hold the front & rear of the monacle between the thumb and index finger and rotate the assembly around the mounting bar. The monacle will click into final position either against the mask or at 180-degree rotation flipped up and out of the way.



Monacle in position



Monacle 50% of the way up

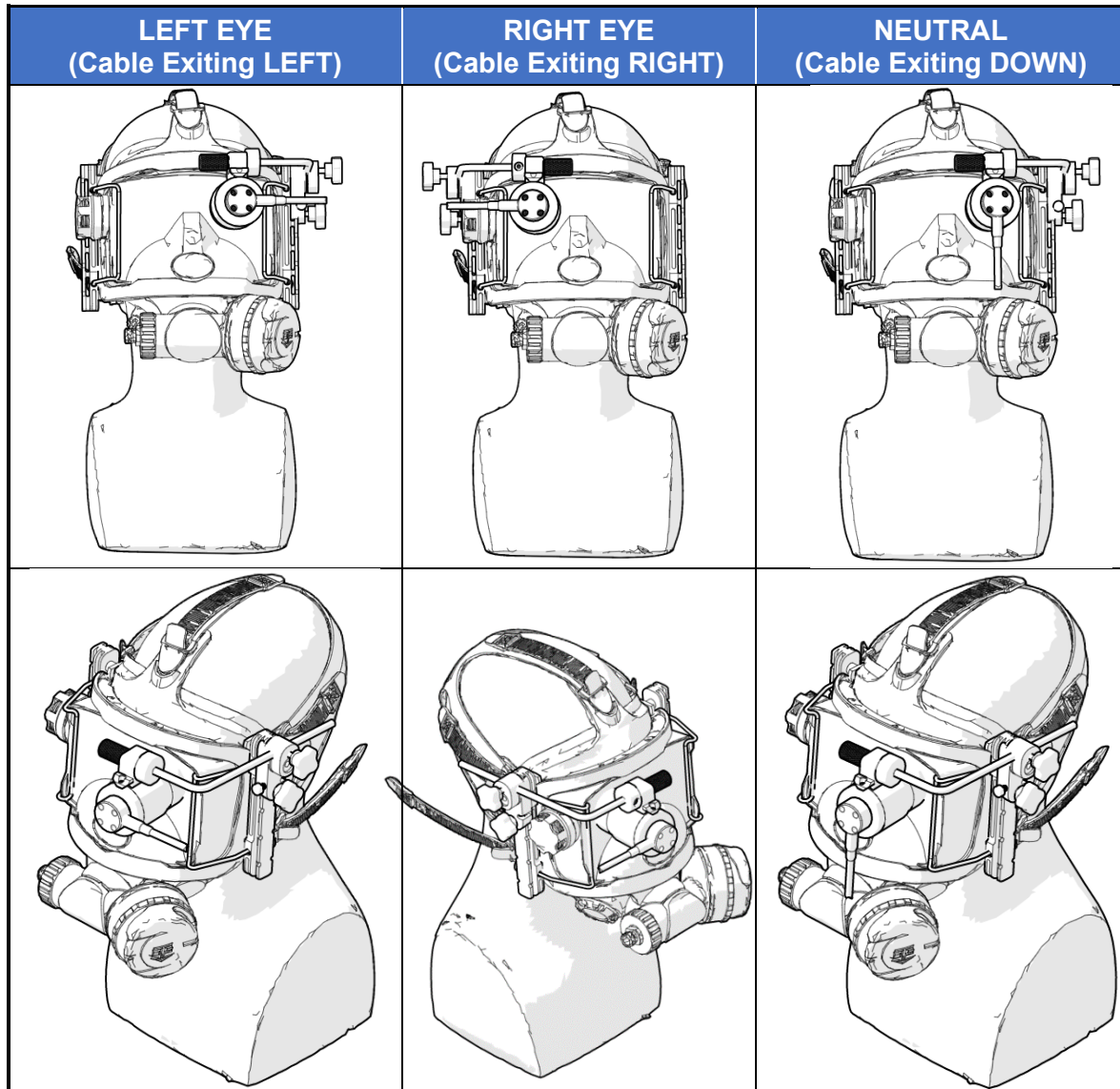


Monacle out of the way

Monocle Orientation

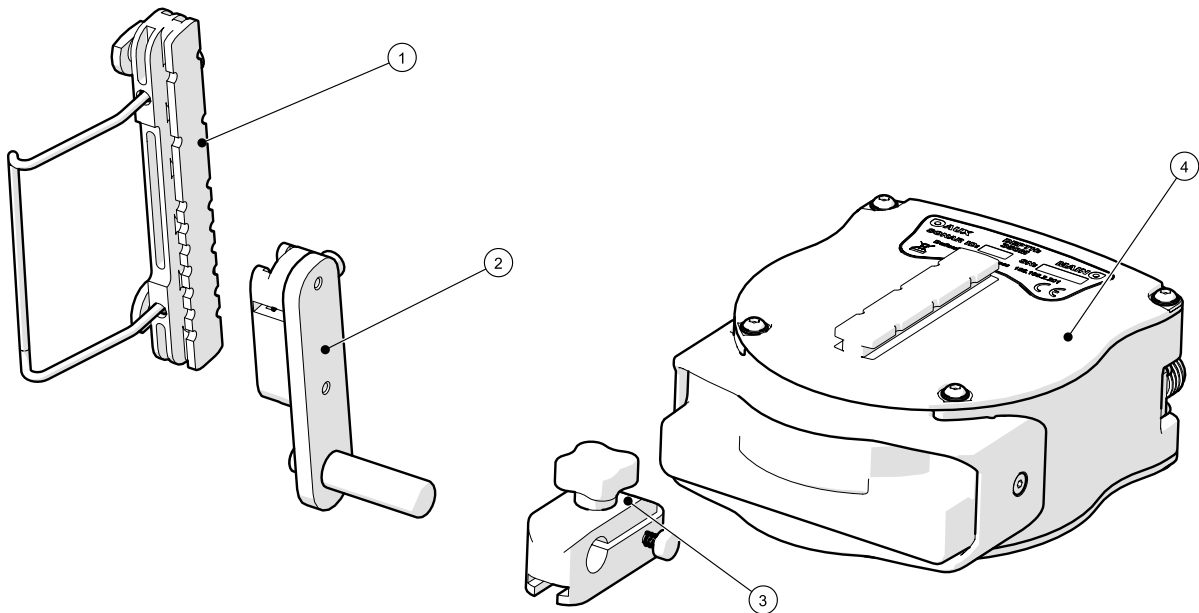
The monocle can be configured in any one of 3 separate configurations:

- For fitment and use over the divers LEFT eye only.
- For fitment and use over the divers RIGHT eye only.
- NEUTRAL, can be used over either eye (in this configuration cable routing may not be ideal).



The monocle orientation is specified at the point of purchase and it is fixed. No attempt should be made to alter this in the field. Any attempt to do so may result in damage to the monocle. Should you require a different monocle orientation than originally specified, please contact Trittech International for advice.

Fitting of Gemini “ik” Sonar Using the OTS Accessories



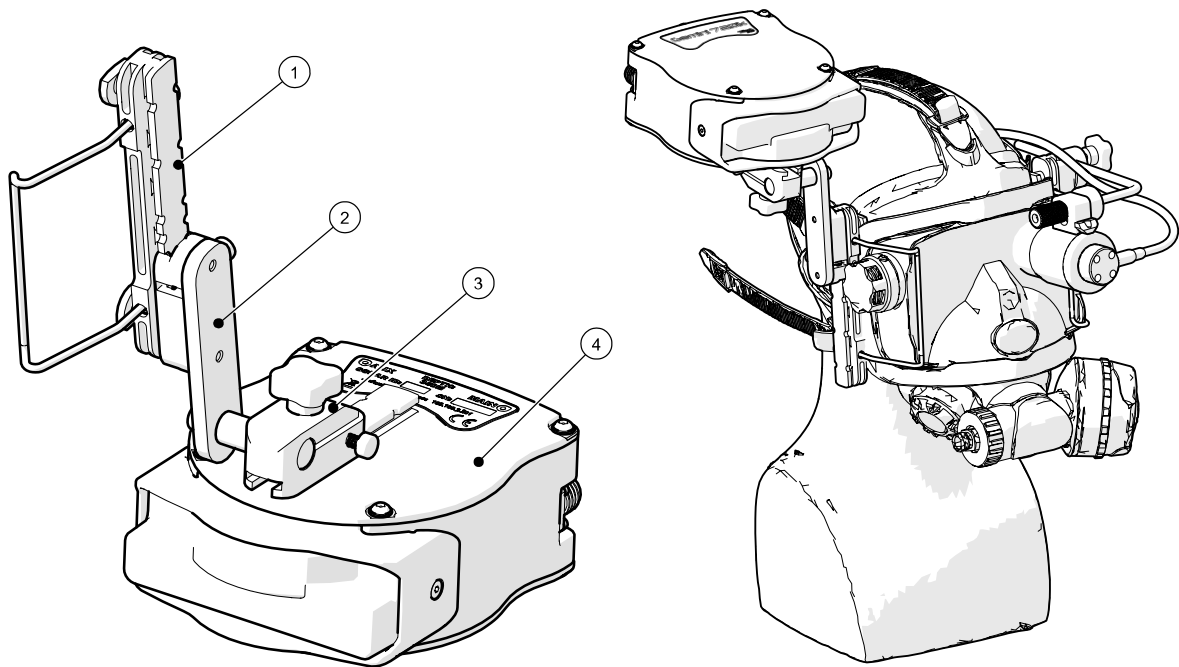
The diagram above shows the parts required to construct and mount the sonar onto the OTS Guardian diver mask. The parts are shown upside down for clarity.

Item	Qty	Part No.	Description
1	1	S12055	OTS Guardian Accessory Rail
2	1	S12051	Spigot Assembly, 90 deg
3	1	S12049	Clamping Slide with 1/2" hole
4	1	-	Gemini ik Sonar with Inodive Mounting

To assemble and mount the sonar to the side of the mask:

- Slide the Clamping Slide with 1/2" hole [3] onto the slide connection on the underside of the Gemini ik sonar [4].
- Slide the 90 Degree Spigot Assembly [2] onto the Accessory Rail [1].
- Slide the Sonar [4] and clamping slide [3] onto the mounting spigot [2].
- Use the knob on the Clamping Slide [3] to fix the sonar firmly in place when correctly adjusted for position.

The illustrations below show the mounting fully assembled and attached to the side of the mask.

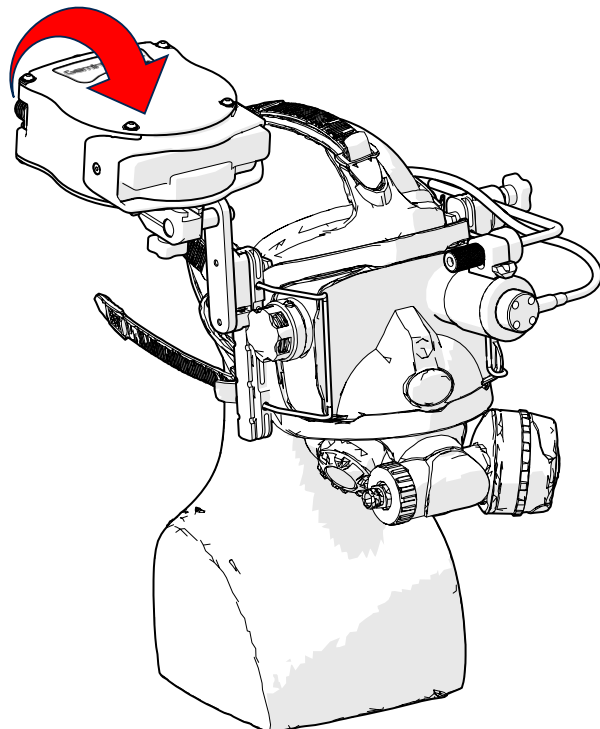


(Assembly shown upside down for clarity)

During use the diver may find it helpful to reach up and adjust the orientation of the sonar slightly.

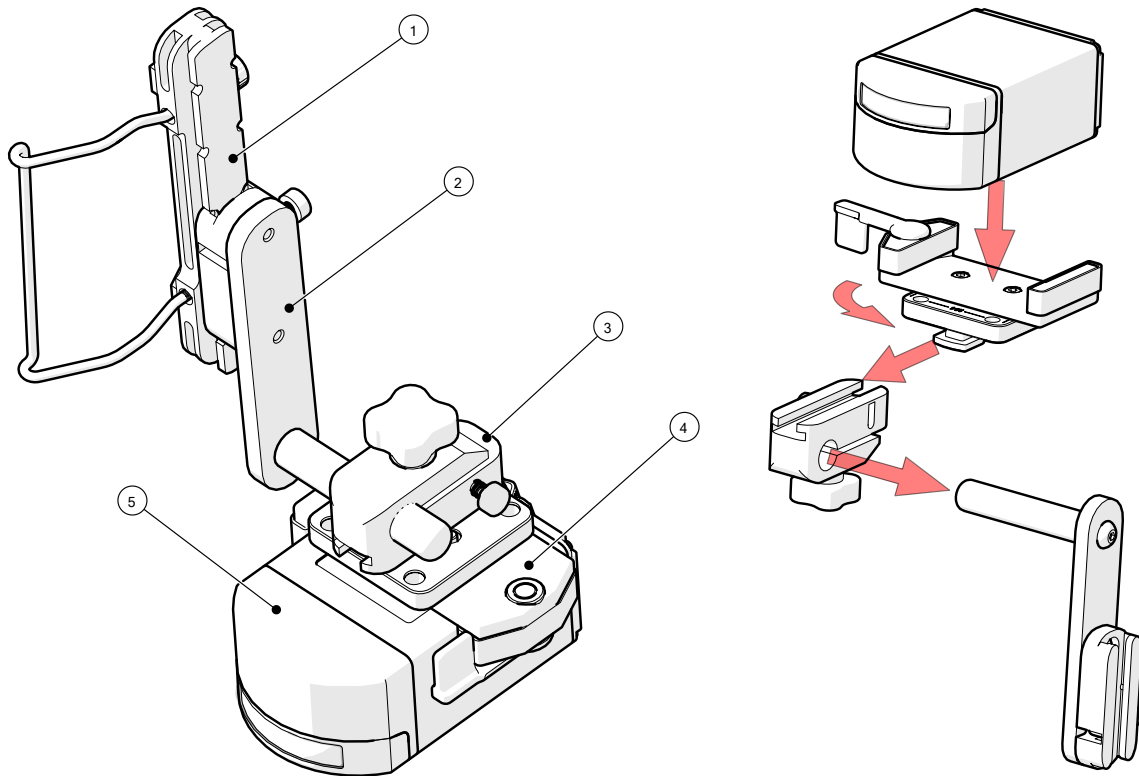
To do this, use gentle pressure to rotate it forward or backward on the mounting spigot. This will assist with the best operating angle for the sonar dependant on the positioning of the diver in the water. i.e., standing, crawling, swimming, etc.

The diver may need to slacken the knob on the clamping slide [3] to allow the sonar to rotate easily.



Fitting of Micron Gemini Sonar Using the Interspiro Accessories

The diagrams below list the parts required to construct and mount the Micron Gemini sonar onto the Interspiro Divator (AGA) diver mask. The parts are shown upside down for clarity.

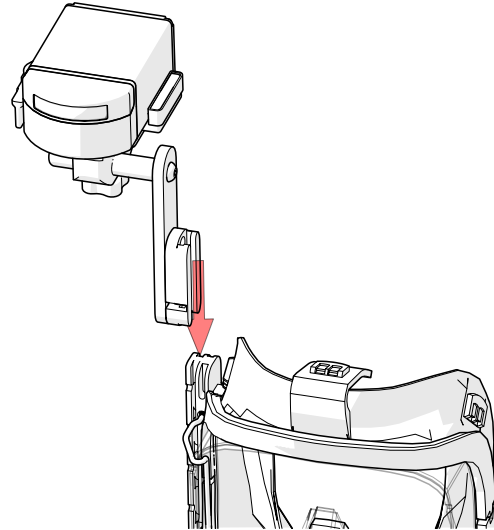


Item	Qty	Part No.	Description
1	1	S12056	Interspiro Divator (AGA) Accessory Rail
2	1	S12051	Spigot Assembly, 90 deg
3	1	S12049	Clamping Slide with 1/2" hole
4	1	S12788	Clamp Mounting Bracket with Inodive Adaptor Rail
5	1	-	Micron Gemini Sonar

To assemble and mount the sonar to the side of the mask:

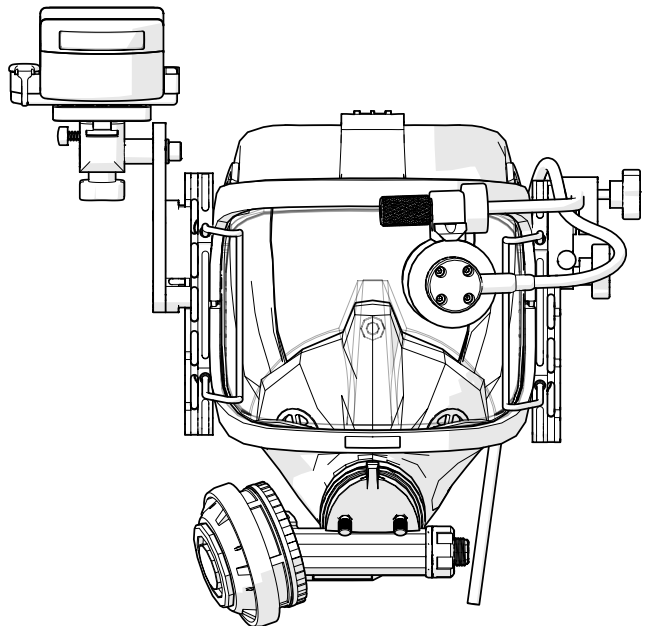
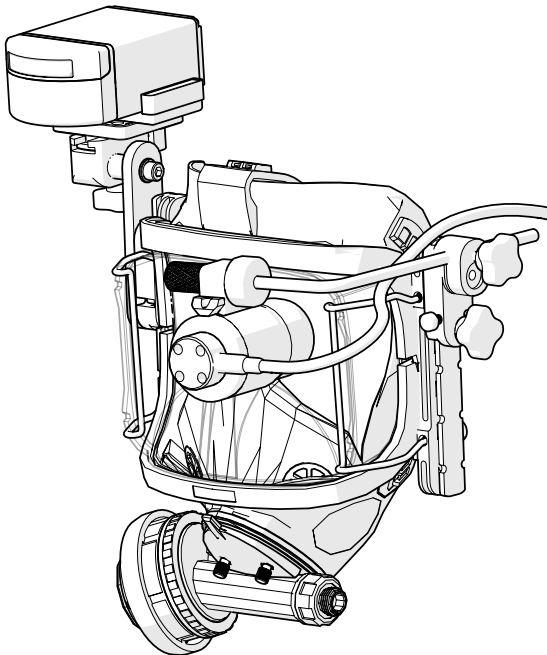
- Slide the Clamping Slide with 1/2" hole [3] onto the slide connection of the Clamp Mounting Bracket [4].
- Insert the 90 Degree Spigot Assembly [2] onto the Clamping Slide with 1/2" hole [3].
- Place the Sonar [5] in the Clamp Mounting Bracket [4]. Move the lever all the way to the back to lock off the mount. You should position the clamp centrally on the Micron Gemini body. Lining up the end of the lever with the front of the Micron Gemini, where the sides meet the front of the transducer, is a good guide.

- Slide the Sonar [5], Clamp Mounting Bracket [4], Clamping slide [3] and 90 Degree Spigot [2] onto the Accessory Rail [1].



- Use the knob on the Clamping Slide [3] to fix the sonar firmly in place when correctly adjusted for position.

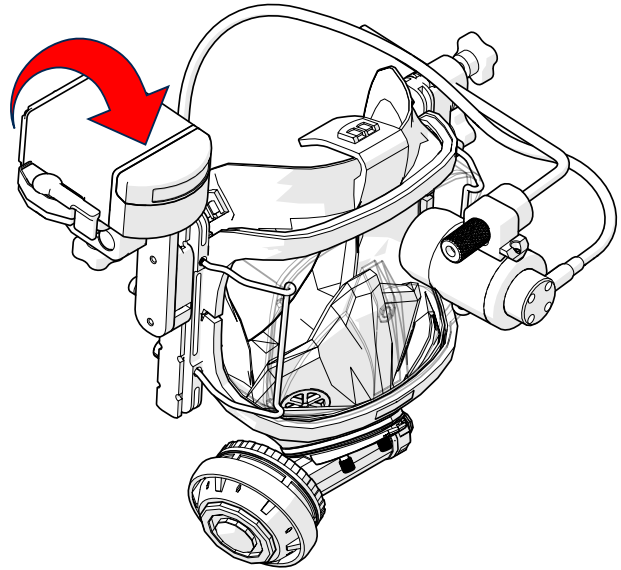
The illustrations below show the mounting fully assembled and attached to the side of the mask.



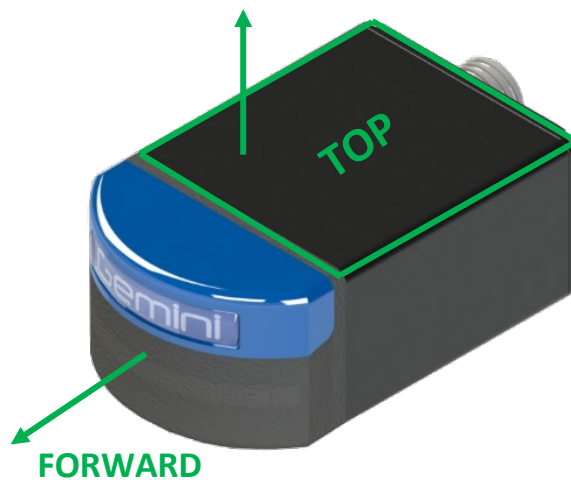
During use the diver may find it helpful to reach up and adjust the orientation of the sonar slightly.

To do this, use gentle pressure to rotate it forward or backward on the mounting spigot. This will assist with the best operating angle for the sonar dependant on the positioning of the diver in the water.
i.e., standing, crawling, swimming, etc.

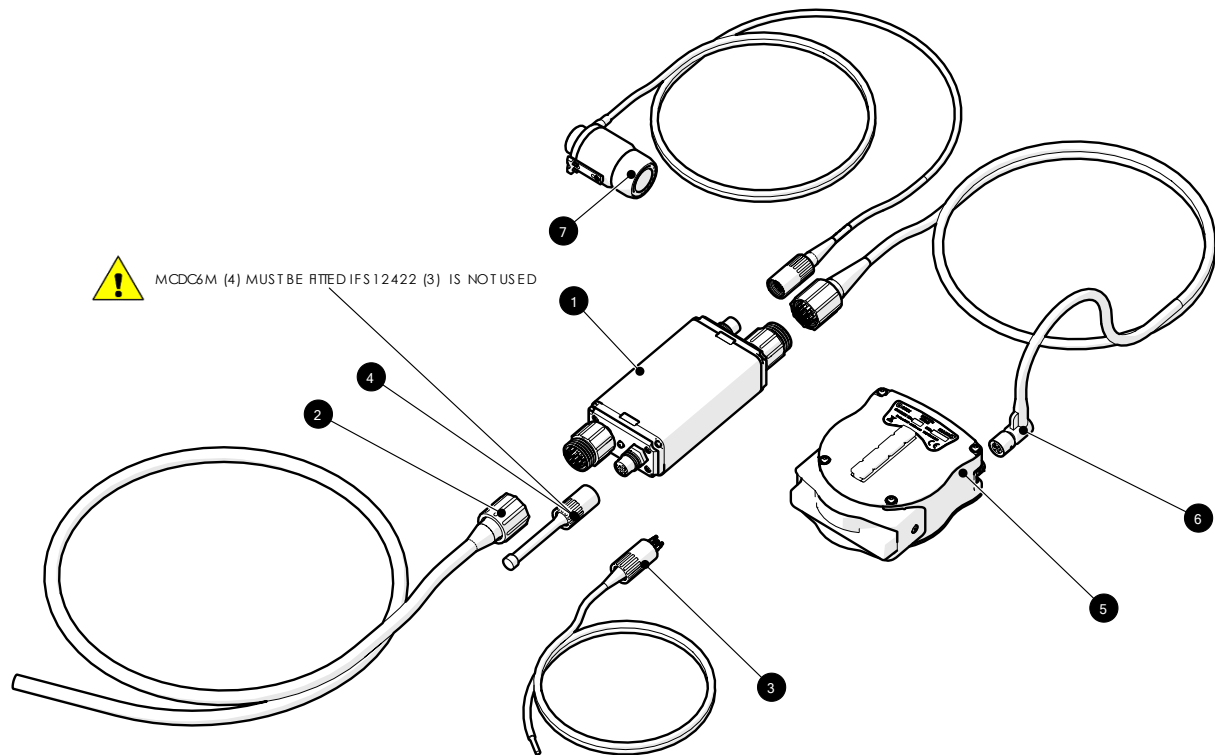
The diver may need to slacken the knob on the clamping slide [3] to allow the sonar to rotate easily.



IMPORTANT - Make sure the sonar is mounted to the mask with its [TOP] facing upwards. This will ensure the sonar image is not “inverted” when moving it left or right.



Diver System Connections



The diagram above shows the cable connections required at the SSC before the system is powered on and deployed.



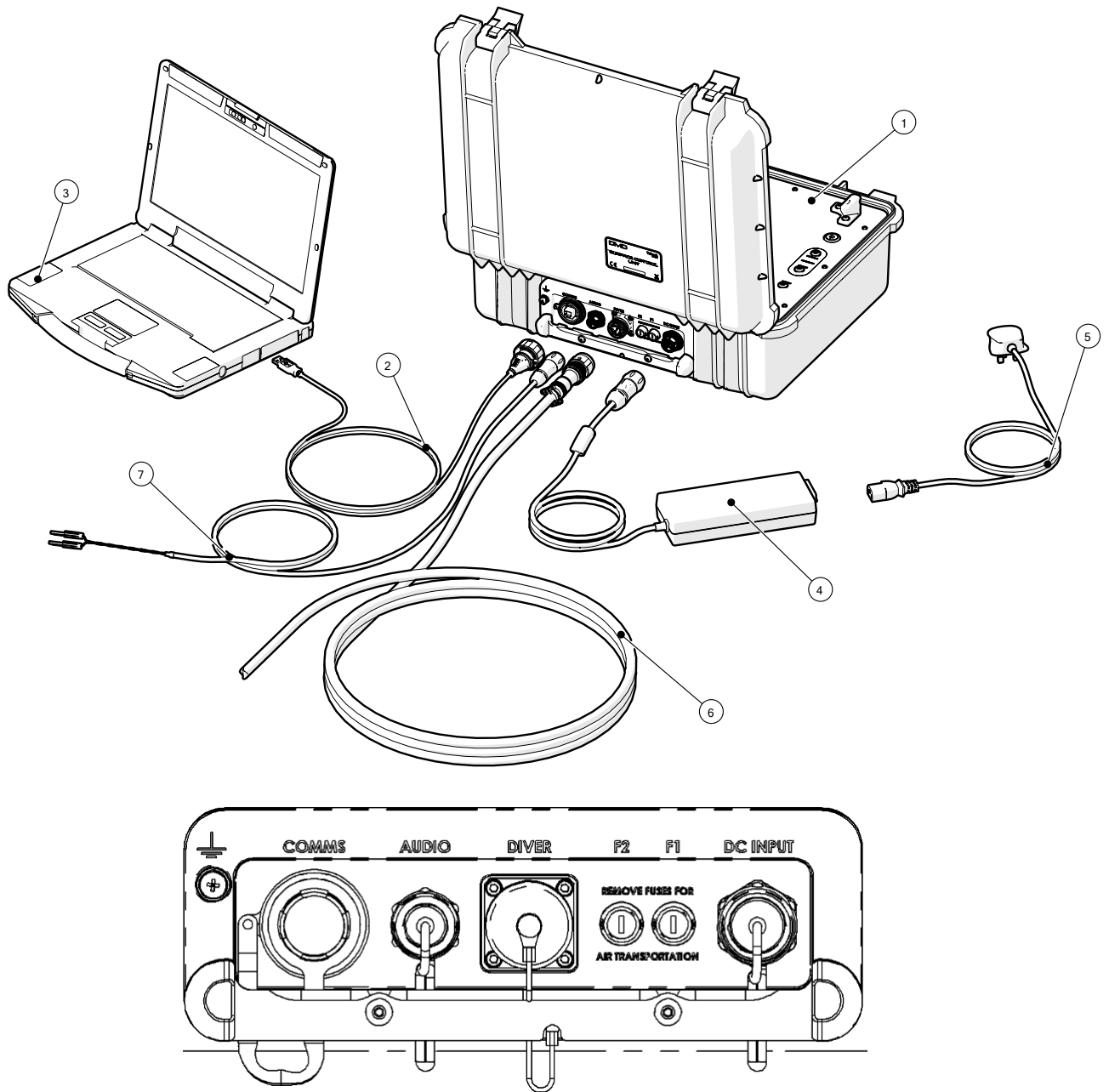
Particular care should be taken to ensure that the blanking plug [4] is fitted if not utilising the diver comms pass-thru option on the SSC. **Submerging the unit and powering ON without the blank fitted will result in damage to the SSC not covered under warranty.**



If you plan on utilising the diver comms pass-thru option, please refer to 'Appendix B' for further information and an example of how it should be wired.

Item No	Qty	Part Number	Description
1	1	S12384	DMD Subsea Computer
2	1	S12300	DMD Diver To Surface Cable
3	1	S12422	Subconn MCOM6M Diver Comms Cable
4	1	S09174 & S08059	Subconn MCD6M Dummy Plug & MCDLS-F Locking Sleeve
5	1	-	Gemini Sonar with Inodive Mounting
6	1	S12412	Impulse MKS(W)-307-CCP To Subconn MCOM10M Cable Assy
7	1	S12148	DMD Monocle Assembly

Surface System Connections



The diagram above shows the cable connections required at the DMD Surface Computer before the system can be powered on and deployed.

Item No.	Qty	Part Number	Description
1	1	S12341	DMD Surface Control Unit
2	1	S09992	PX0840-B-2M00 IP68 USB Cable
3	1	S12441	Panasonic Toughbook FZ-55
4	1	S12445	DMD SCU AC Power Supply Unit
5	1	-	IEC320 C13 Mains Power Lead
6	1	S12300	DMD Diver Cable
7	1	S12420	DMD SCU Diver Comms Audio Cable

DMD System Operation

SCU Charging Instructions

The internal batteries will automatically charge with the application of input power. The battery charging will occur regardless of the SCU power button being in the ON or OFF position. A full charge cycle will take approximately 5 hours.

Charging Status LED (Amber)

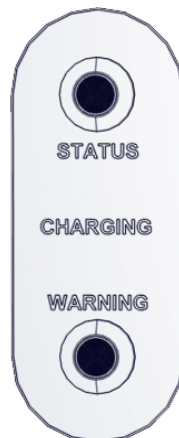
This will be illuminated during the charge cycle of the internal batteries. The LED will be OFF when the batteries are fully charged.

Charging Warning LED (Red)

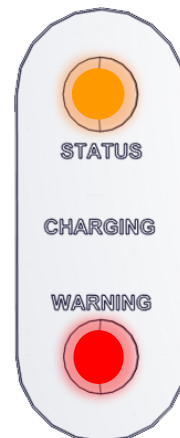
This will be illuminated if the charge cycle is paused due to the temperature of the batteries being outside their charging temperature range of 0°C to 45°C or if a battery fault is detected.



CHARGING



CHARGED



ERROR

SCU Communications

To establish communication between the SCU and laptop, use the USB (A-type) to USB (B-type) cable and connect one end to a USB port in the laptop and the other end to the SCU COMMS port on the back panel.

Comms Status LED (Flashing Green)

This indicates communication activity between the SCU and the DMD Subsea Computer. It may take up to a minute before the SSC boots up and establishes comms with the SCU.



COMMS

COMMS ACTIVITY

Switch ON & Start-Up Sequence

When all connections have successfully been made to both the surface & subsea equipment as per the manual sections '*Diver System Connections*' & '*Surface System Connections*' the equipment can then be powered ON.



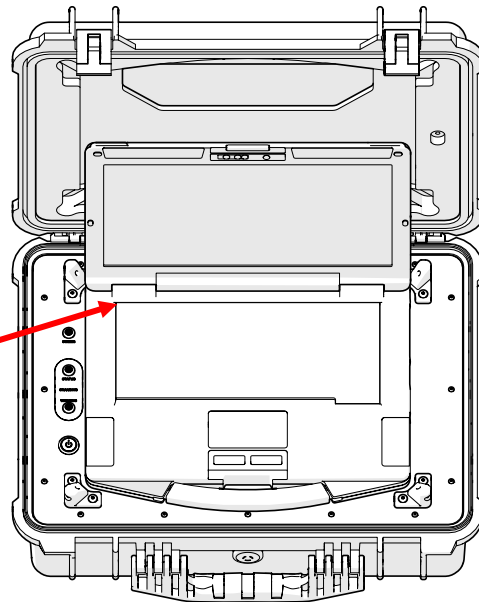
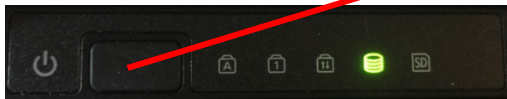
IMPORTANT – If the DMD SCU transportation fuses were previously removed for shipping purposes then these must be re-fitted. If not fitted the SCU will be unable to supply power via the Diver Cable to the SSC.

Powering should be initiated in the following sequence:

Starting the Computer and Software

Power on the 'TOUGHBOOK' Laptop.

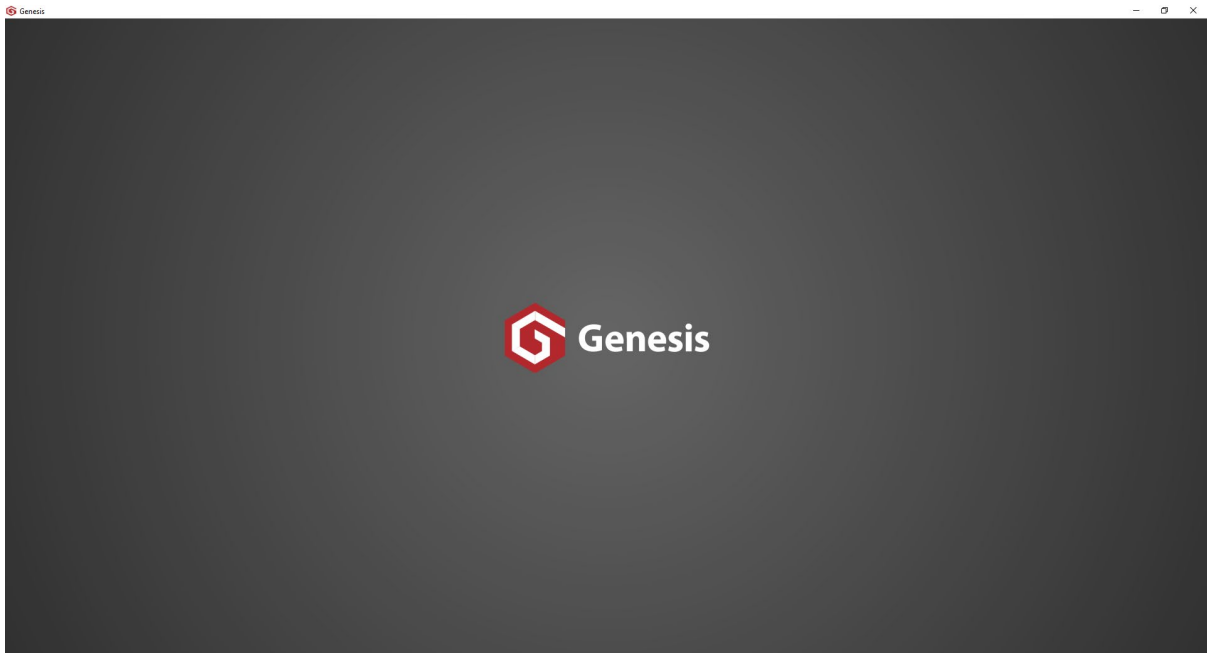
The laptop can be powered via its own internal Lithium battery or connected to a mains supply using its dedicated charging adapter PSU.



Once the laptop has 'booted' to the desktop, double click the Genesis (DMD) shortcut to launch the system software.



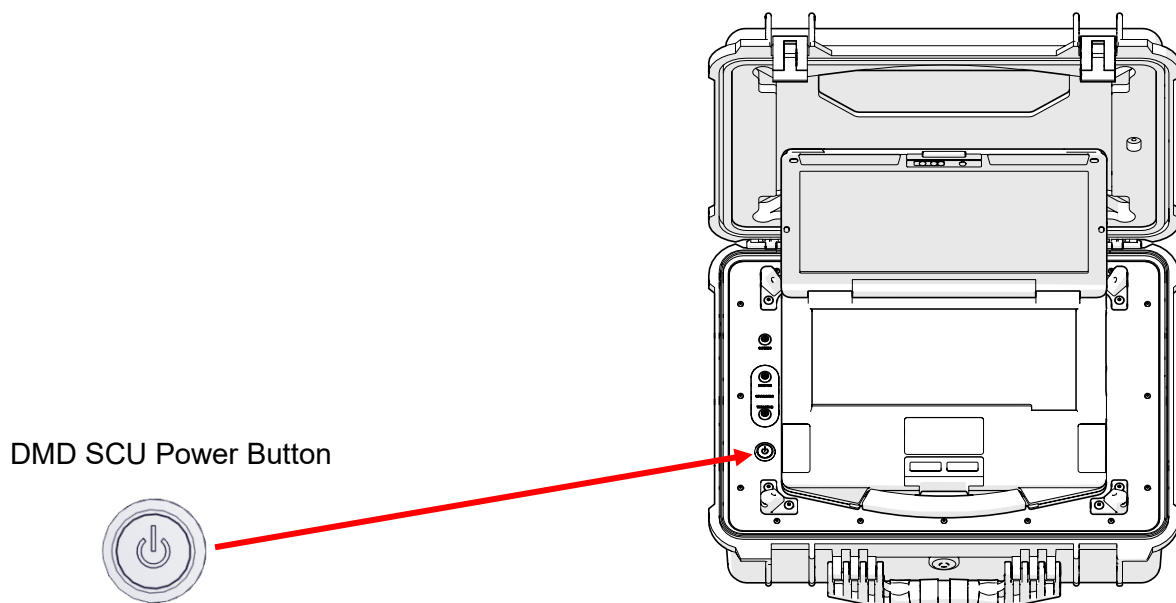
The Genesis version splash screen will appear briefly followed by a plain grey screen as seen below.



The software is now initiated and waiting for a connection with the SSC.

Starting the DMD SCU and SSC

Power on the DMD SCU by pressing the power button as shown below. This will power up the SSC (Subsea Computer), the connected sonar head and the DMD monacle.

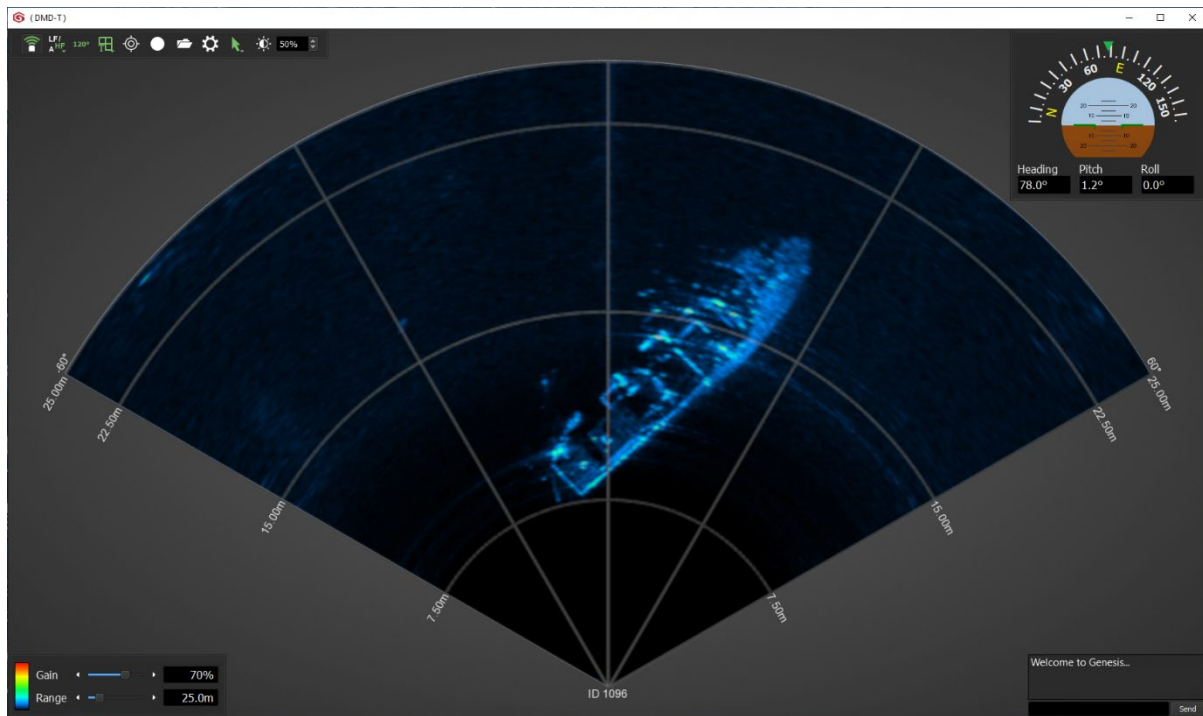


Once the SSC has booted up, it will establish communication with the DMD SCU. The comms light on the DMD SCU will flash GREEN and the Genesis sonar display screen will become active.

Software Display & Operation

On the Tethered DMD system the Genesis sonar display screen will appear slightly differently when viewed on the Divers display monocle or the Surface Operators laptop. This is because all inputs which alter the control and display of the sonar image must be made by the surface control operator, the diver has no direct control and simply views the sonar image.

Surface Operators View on DMD SCU Laptop



In the top left of the sonar view there is a toolbar displayed with sonar specific controls along with DMD specific functions, these functions are described below.



Sonar Online/Offline

This button indicates and will toggle the sonar online or offline. The icons shown indicate the device as offline or online, respectively.



Operating Frequency Settings

(Only available with the Gemini 1200ik)

The frequency control button and drop down menu can be used to select the operating frequency. The icons shown indicate the frequency control selection as Automatic, High Frequency or Low Frequency sonar operation, respectively.



120° or 65° Scanning Aperture

(Only available with the Gemini 1200ik)

On a sonar with pre-set apertures (width of view) this button will quickly switch between aperture settings.



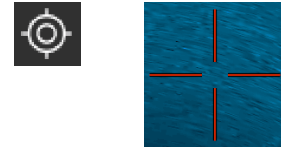
Grid and Label Display Options

This button and drop-down menu will control the grid and labels display options for the current sonar view.



Go to Target Indicator

Once enabled, the user can place a crosshair indicator over the sonar window by clicking in the desired location. This will then be visible by the diver and act as a “go to” indicator.



Data Recording

The record button starts and stops the recording of a data log file within Genesis and is red while recording.



Open Log File

The open log file button allows you to load and replay a previously saved data log file.



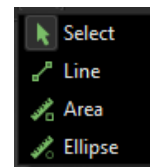
Settings

The settings button will open a window where you can change the display units to metric or imperial, reset the sonar and control the sonar speed of sound settings. A diagnostics tab is also present which provides important information about the system and sonar.



Measurement Tool

The measurement tool allows a variety of different measurements to be made on the device display.



Monocle Brightness

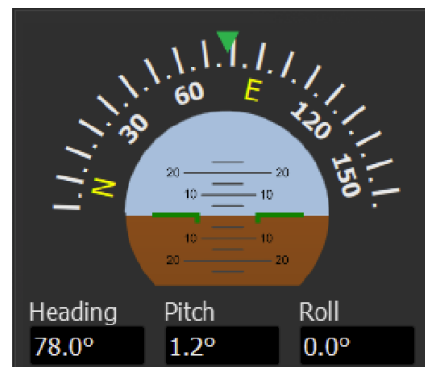
This button controls the diver's monocle brightness. For more information, please refer to the *Monocle Brightness* section found in this manual.

AHRS Display

Compass device presenting heading, pitch, and roll of the sonar via the artificial horizon display type.

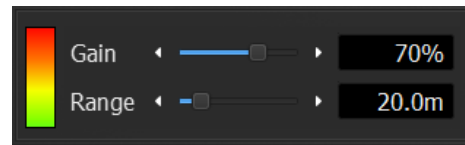
In the top right of the sonar view there is a compass display.

This is only visible when used with a Gemini sonar with an internal AHRS.



Gain, Range and Colour Palette Menu

At the bottom left of the sonar view there are a set of secondary controls for the display colour palette, gain and range.



Gain will control the amount of gain used on the display of the sonar image. This can be adjusted using the slider or typed into the display box.

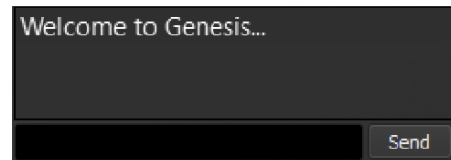
Range will allow control of the sonar operating range between the minimum and maximum values.

Selecting the current Colour Palette with the mouse will display a range of different colour palettes to choose from. Strong returns will display in colours at the upper end of the palette and weaker returns at the lower end.

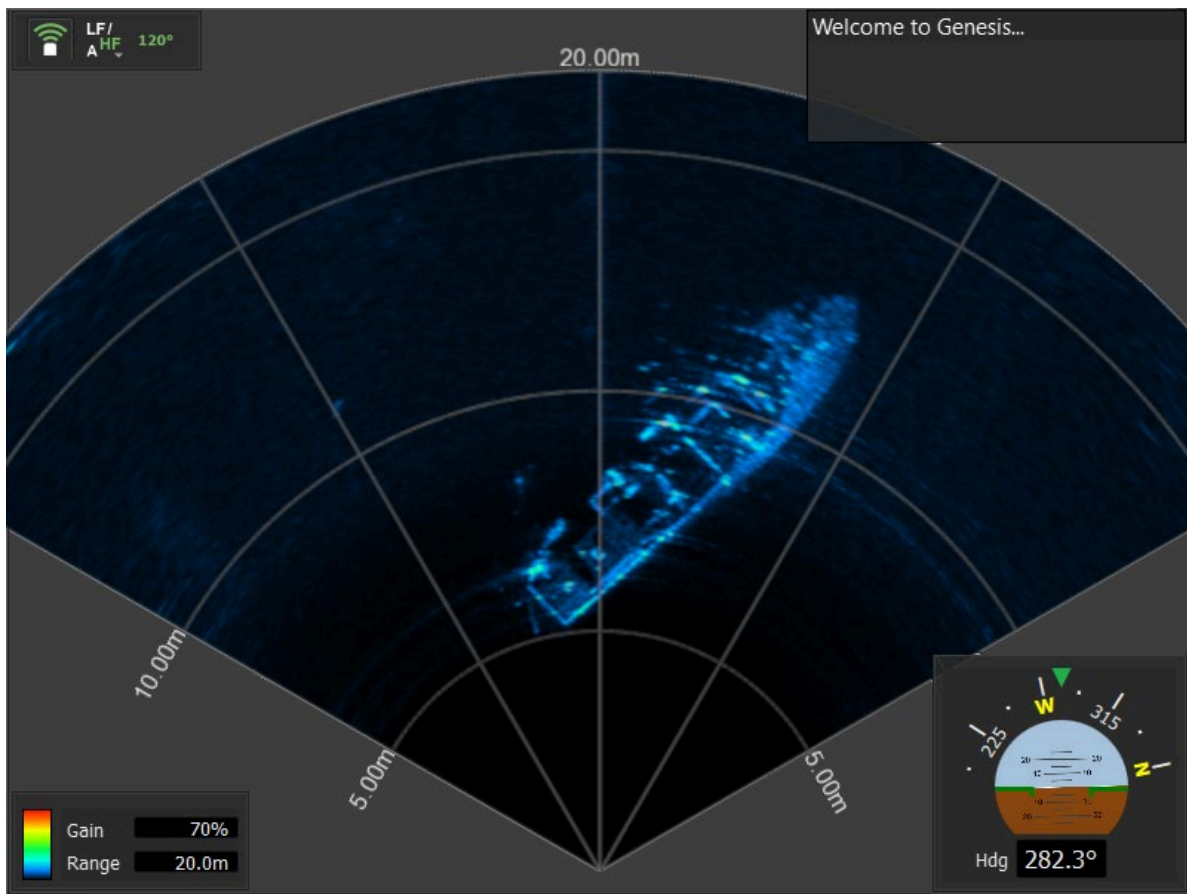


Message Box

At the bottom right of the sonar view there is a message box. This feature can be used to send messages from the surface to the diver. It will also show sonar head alerts and a small history of the messages sent during a session.



Divers View on the DMD Monocle



In the top left of the sonar view there is a toolbar displayed with sonar specific controls, these functions are described below.



Sonar Online/Offline

The icons shown indicate the device as offline or online, respectively.



Operating Frequency Settings

(Only available with the Gemini 1200ik)

The icons shown indicate the frequency control selection as Automatic, High Frequency or Low Frequency sonar operation, respectively.



120° or 65° pre-set scanning aperture

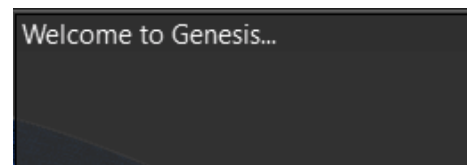
(Only available with the Gemini 1200ik)

On a sonar with pre-set apertures (width of view) this icon will indicate the currently selected aperture.



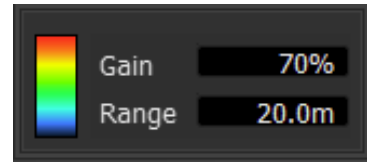
Message Box

In the top right of the sonar view there is a message box.



Gain, Range and Colour Palette Menu

At the bottom left of the sonar view there is a display for the sonar view colour palette, gain and range.



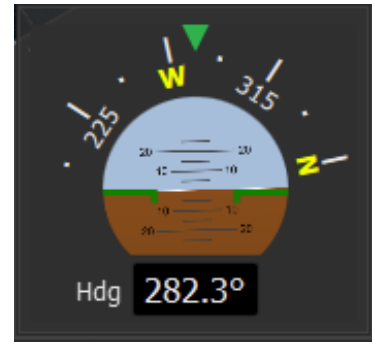
Displays the currently selected gain, range and colour palette settings.

AHRS Display

Compass device presenting heading, pitch, and roll of the sonar via the artificial horizon display type.

At the bottom right of the sonar view there is a compass display.

This is only visible when used with a Gemini sonar with an internal AHRS.



Monocle Brightness

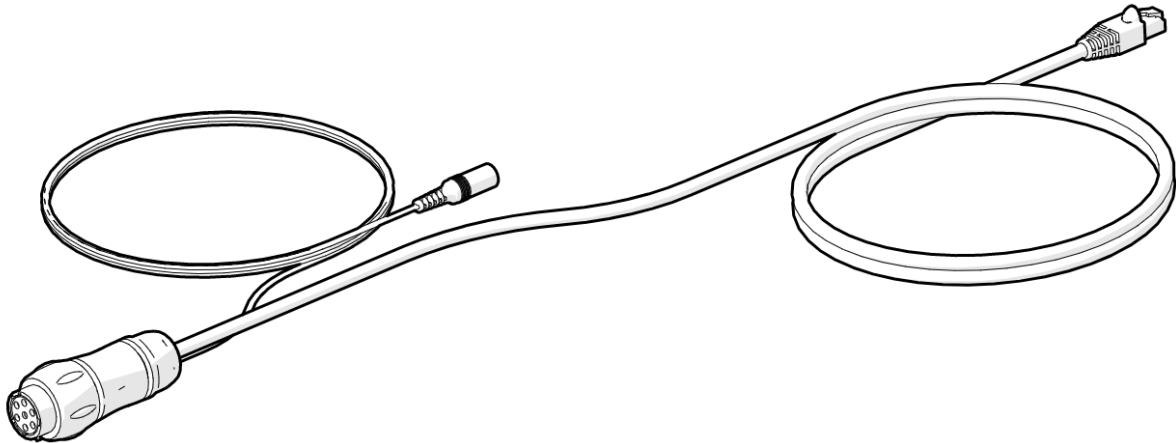
The brightness of the monocle can be adjusted to suit the ambient conditions of the dive location. For example, if the dive zone is very dark with very little ambient light then it may be advantageous to reduce the monocle brightness to avoid glare affecting the diver's peripheral vision.

The adjustment of monocle brightness is made via the software GUI from the surface control computer.



The standard default setting is 50% and this can be adjusted up or down via the arrow buttons or by selecting the number and typing a new value.

Updating the Genesis Software on the SSC



The Tethered system is supplied with a content management cable assembly. When plugged into the sonar port on the SSC this cable enables an Ethernet connection to be setup between the SSC and the user's PC or laptop.

By installing and using the 'Content Management Tool', a separate software utility, the user can then install any future updates of the Genesis sonar control GUI loaded onto the SSC.

Before using the cable, you must install the Content Management Tool application onto your Windows® PC. This program is available from the USB pen drive supplied with your DMD system.



DMD SSC
Content
Management

After installation, a purple DMD SSC Management icon will be placed onto your desktop.



DMD
SubSea
Computer



The IP address of the DMD SSC is set to 192.168.2.60 and the default address of the Gemini sonar is 192.168.2.201.

To communicate with the SSC over the Content Management Cable you must have your Ethernet network adapter **manually** set to a corresponding IP address. An example and recommendation is shown below.

IP Address: 192.168.2.50

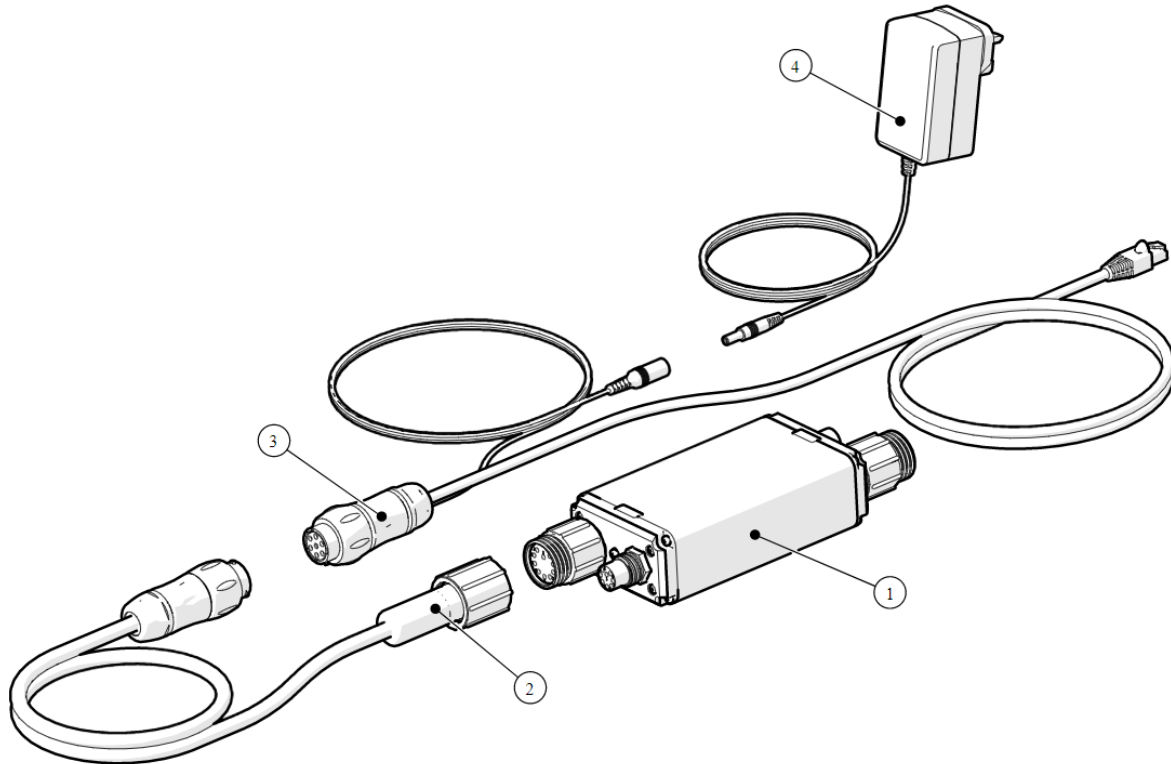
Subnet Mask: 255.255.255.0

Do not set the PC network address to the same as the DMD SSC or Gemini sonar.



The computer that comes with the DMD-T system already has the network adapter configured correctly. However, should it not be working as expected, please follow the instructions found in '*Appendix A*' to reconfigure correctly.

The illustration below shows the different items needed to connect the SSC to the PC and how they are connected. The SubConn to Souriau adapter cable [2] allows connection between the Content Management Cable [3] and DMD Subsea Computer [1]. The system is powered by the supplied AC to 24 Vdc power supply [4] and the RJ45 plug on the Content Management Cable [3] into the Ethernet Network Adapter of your PC.



Item	Qty	Part No.	Description
1	1	S12384	DMD Subsea Computer
2	1	S12585	Subconn MCOM10M to Souriau UTS1JC147P
3	1		Souriau UTS6JC147S to 2.1mm DC Fem & RJ45
4	1	S12588	Universal AC to 24 Vdc Power Supply (2.1mm)

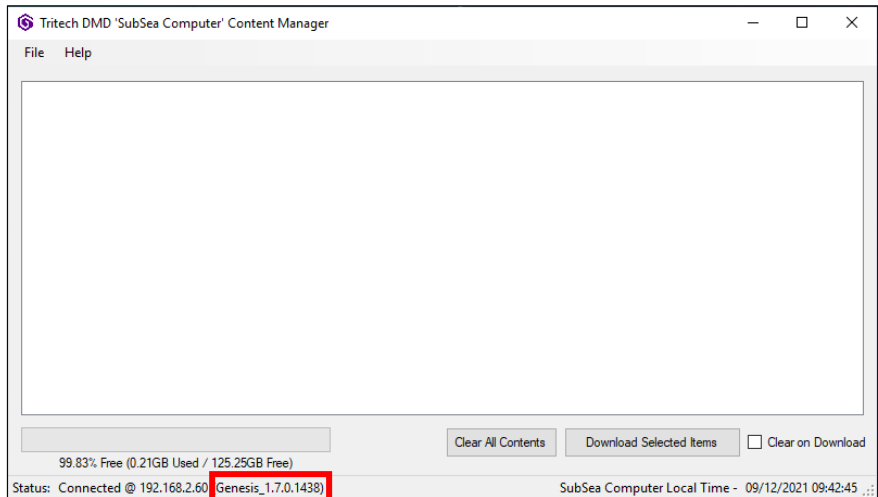


For a short video on how to update the Genesis software on the SSC, please refer to the following link:

[YouTube - How to Update your DMD's Software](#)

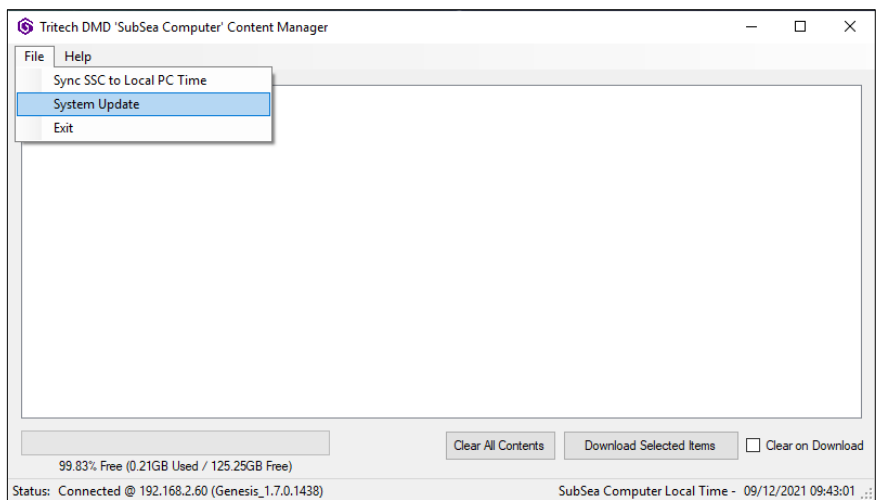
Connect the content management cable to the SSC and launch the software to connect with the SSC.

The current version of Genesis software installed on the SSC will be displayed in the status message highlighted by the RED box.



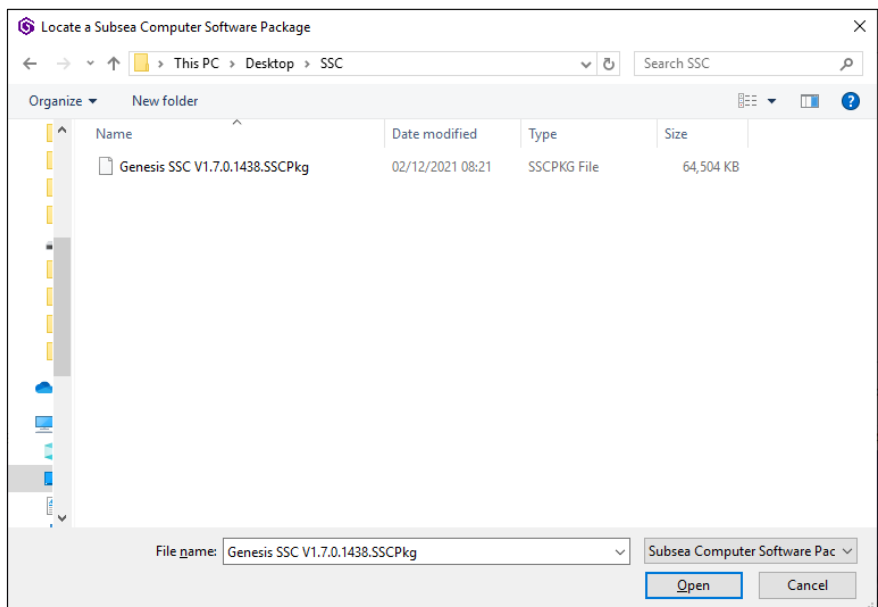
Click on **File** and then on **System Update**.

This will open a file explorer window which will ask to locate a 'Subsea Computer Software Package'.

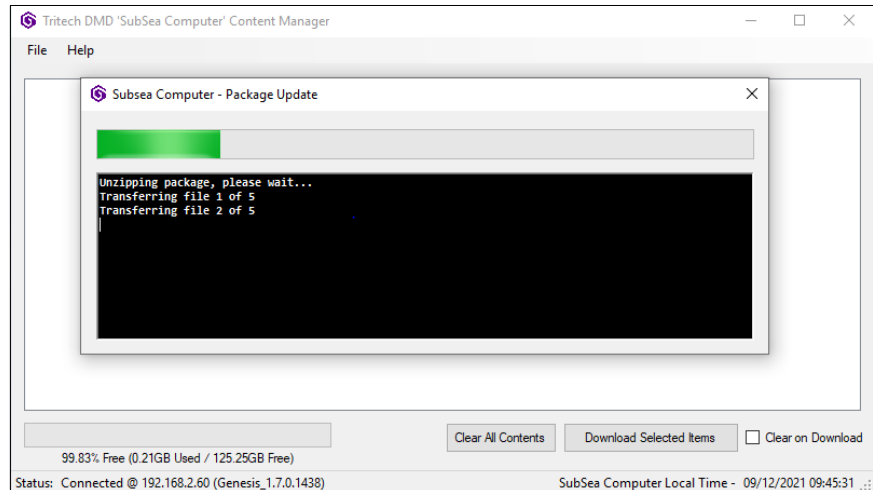


The file will have the filename extension **.SSCPkg** and will include the Genesis version it contains. In this example the Genesis version is V1.7.0.1438 and the full filename is Genesis SSC V1.7.0.1438.SSCPkg

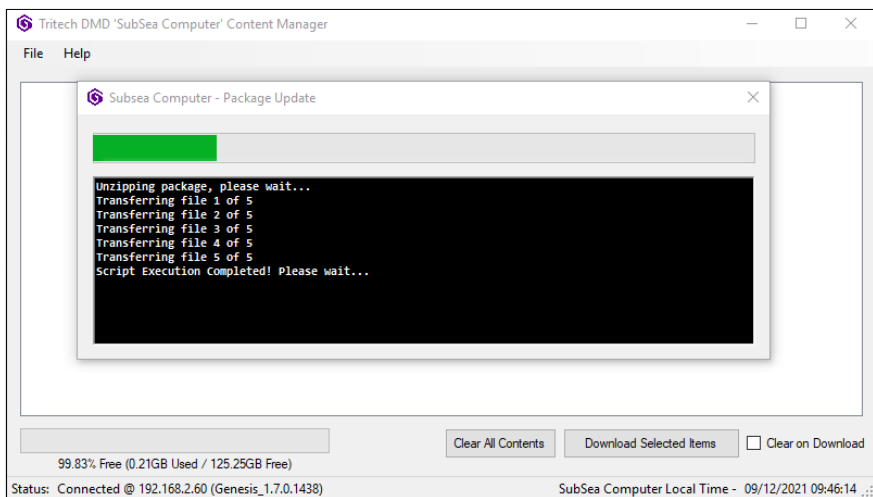
Point the file explorer window to the location of the **.SSCPkg** file then click on **Open** to begin the file installation



The installer will start unzipping and transferring the files to the SSC

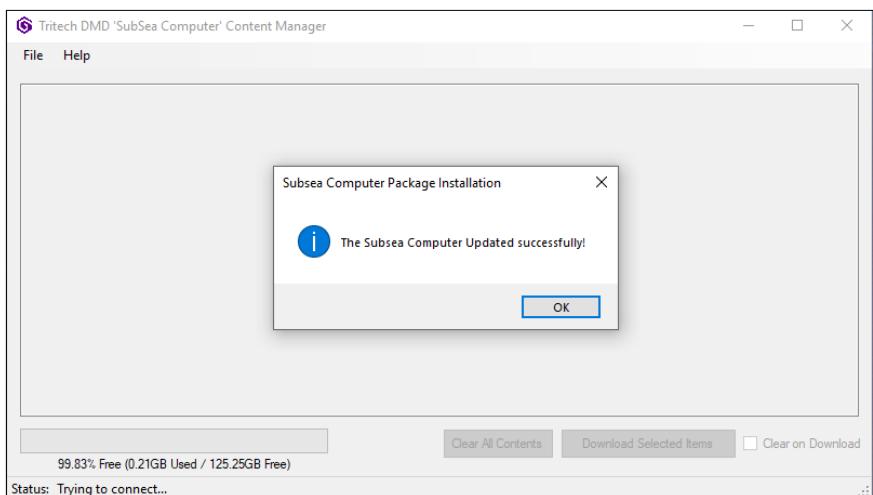


When this process has concluded the message **'Script Execution Completed! Please wait...'** will be displayed



After a wait of around 15 seconds the message **'The Subsea Computer Updated successfully!'** will be displayed.

The SSC will now have been updated with a new Genesis software version.



The Genesis software version must be the same as loaded on BOTH the surface control PC and the Subsea Computer (SSC).

Troubleshooting

Nothing happens when the SCU is powered up.

- Make sure the air transportation fuses are intact and correctly fitted to the SCU. If not fitted, the SCU will be unable to supply power via the Diver Cable to the SSC.
- If not using the AC power adapter, make sure the SCU battery is fully charged before attempting to use it again.

The USB link between the DMD SCU and the Laptop doesn't work.

- Close the Genesis application and re-open it after a short while.
- If not using the cable supplied with the DMD SCU, check that the USB cable length doesn't exceed 5m.
- Check that the cable to the DMD SCU USB port is plugged correctly and screwed in all the way.
- Use the Microsoft Windows® hardware [Device Manager] to check that all the USB drivers are correctly installed and setup on the PC under [Ports (COM & LPT)].

The software reports that no sonars are detected.

- Ensure that the latest revision of DMD Genesis software is running on your computer. Contact support@tritech.co.uk to obtain the latest version of DMD Genesis.
- Ensure the Genesis software version is the same on the SSC and laptop.
- Check that all connections to the SCU are properly made up and that it is powered correctly with the appropriate voltage.
- If the sonar has successfully established a link, then the problem will likely be with the network settings on the PC. Please refer to 'Appendix A' to configure it again.

Sonar goes offline while operating on deck

- 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 cutoff 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.

The sonar AHRS display is not responding and looks frozen.

- Click on the settings button and then click on the [Reset Sonar] button.
- Close the Genesis application and re-open it after a short while.

General System Operation

Sonar Operational Notes

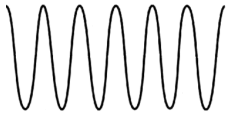
When using a dual frequency 1200ik multibeam sonar there are some operational factors which must be considered in order to make best use of the dual channel capability of the sonar.

Dual Frequency Options



720 kHz Low Frequency Operation

The sonar has a 120° horizontal field of view at +/- 10° about the horizontal axis (20° in total). In this mode of operation the sonar can image targets up to its maximum range however the definition of targets will be lower than when used in its higher frequency mode.



1200 kHz High Frequency Operation

The sonar has a 120° horizontal field of view at +/- 6° about the horizontal axis (12° in total) which is a slightly reduced vertical beam-width when compared with the lower frequency channel. This mode will produce higher definition images compared with the lower frequency mode. In high frequency (1200kHz) mode, the user has the option of switching to using just a 65° sector which will double the update rate when compared to utilising the full 120° sector scan.

High frequency (HF) 1200 kHz will work best up to 40m range scale providing the user with higher resolution images than if operating on the lower (LF) 720 kHz channel. Due to acoustic principals the effectiveness of 1200 kHz operation drops off significantly at range. When operating in auto frequency mode the sonar will automatically switch to LF operation above 40m range.

For more details on Genesis operation see the quick start guides on our website here: <https://www.tritech.co.uk/support/software/genesis#resources>

DMD Diving Tips

- To obtain good images the diver will need to move their head very slowly and steadily. It's a good idea to start by scanning a large area slowly and then move to potential targets. Always moving slowly and maintaining an appropriate sonar angle to achieve the best image possible.
- If you have no comms with the diver, that's not a problem! You can use the built-in messaging system to communicate with the diver. Remember to make simple and easy questions with a YES or NO answer. Once the question has been submitted the diver can "respond" by moving their head twice up and down to indicate a YES answer. To indicate a NO answer, the diver can move their head twice from left to right. This will be visible in the sonar display and also via the compass display.
- With the DMD system attached to the diver, it's very important that all loose cables are appropriately managed with the provided cable ties. This will reduce the chance of a snag while still allowing the diver space to move freely.

System Storage Specifications & Recommendations

The equipment should, whenever possible, be stored in its original transportation cases until ready for operation. During storage, each box must not be used for any purpose for which it was not intended (work platform, table, steps etc.).

After unpacking and during storage all equipment must be kept in a dry, non-condensing atmosphere, free from corrosive agents and isolated from sources of vibration.

After use and prior to storage the underwater items should be thoroughly washed down using fresh water and allowed to dry naturally prior to storage. Although the anodised aluminium components are very resistant to corrosion, using fresh water is a simple way of minimising the chance of corrosion. If required items may be cleaned using a non-abrasive cloth and mild non-abrasive detergent. Do not clean with solvents!



For a short video on how to properly maintain and clean your DMD system, please refer to the following link:

[YouTube - How to Clean Your Diver Mounted Display](#)

If the unit is to be stored for long periods between operations, it is advisable to remove the transportation fuses from the DMD SCU before stowage to isolate the lithium batteries.

There are no user-serviceable parts in the sonar head, Subsea Computer or monacle and no components requiring routine maintenance. Do not undertake maintenance of the units, outside the scope of that defined within this manual, unless instructed to do so by Trittech International Ltd technical support. Wherever possible, avoid any prolonged exposure to extreme climatic and weathering conditions to reduce any aging effects on surfaces, cables and connectors.

If a unit needs to be packed for storage or shipment you must, whenever possible, use its original packing material and/or case.

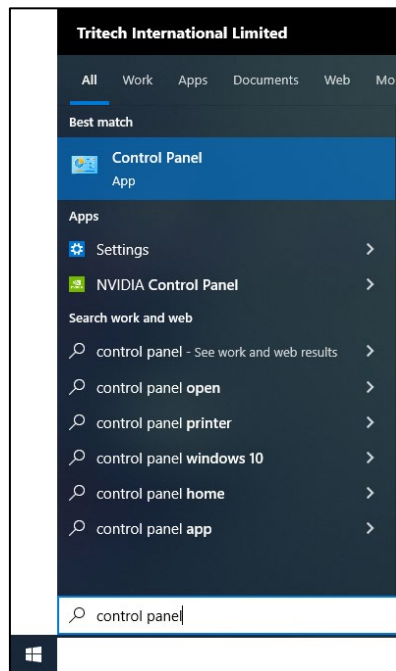
Temperature limits -10°C to 35°C (operating), -20°C to 50°C (storage).

Appendix A – Setting the computer IP address in Windows®

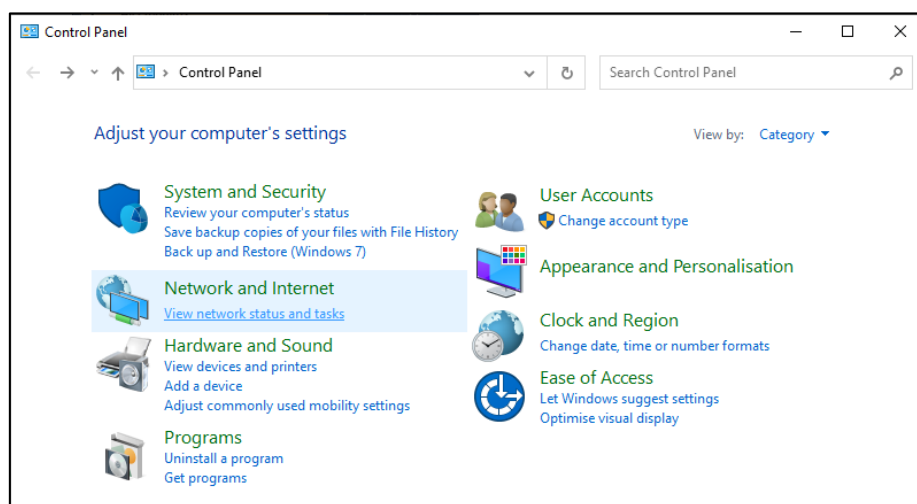
The following instructions apply to a computer running Windows® 7, Windows® 10 or Windows® 11, though the sequence for other operating systems will be similar. All screenshots are from a Windows® 10 installation.

Disconnect the computer from any existing network.

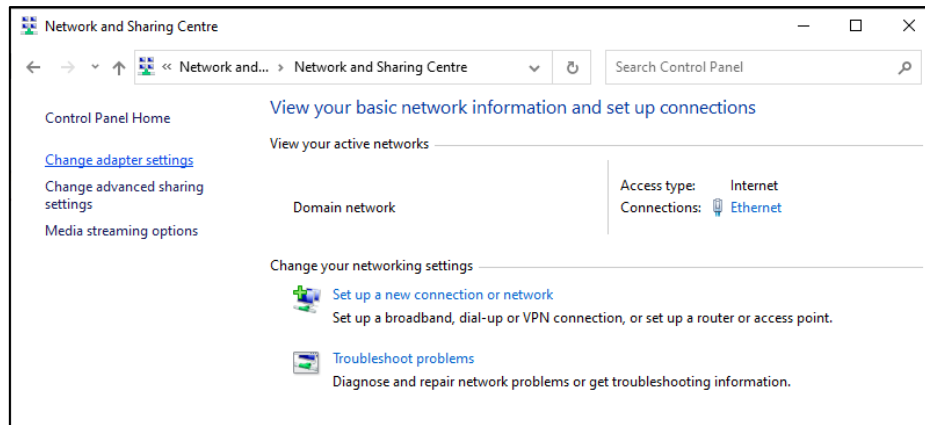
First click on the [Start Menu], type “*Control Panel*” and select [Control Panel].



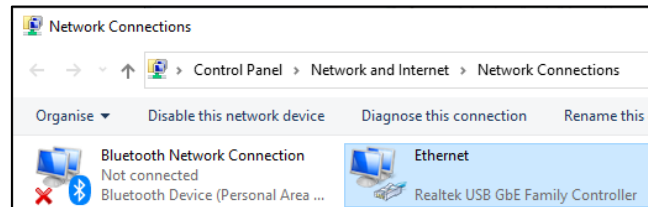
Under [Network and Internet], click on [View network status and tasks].



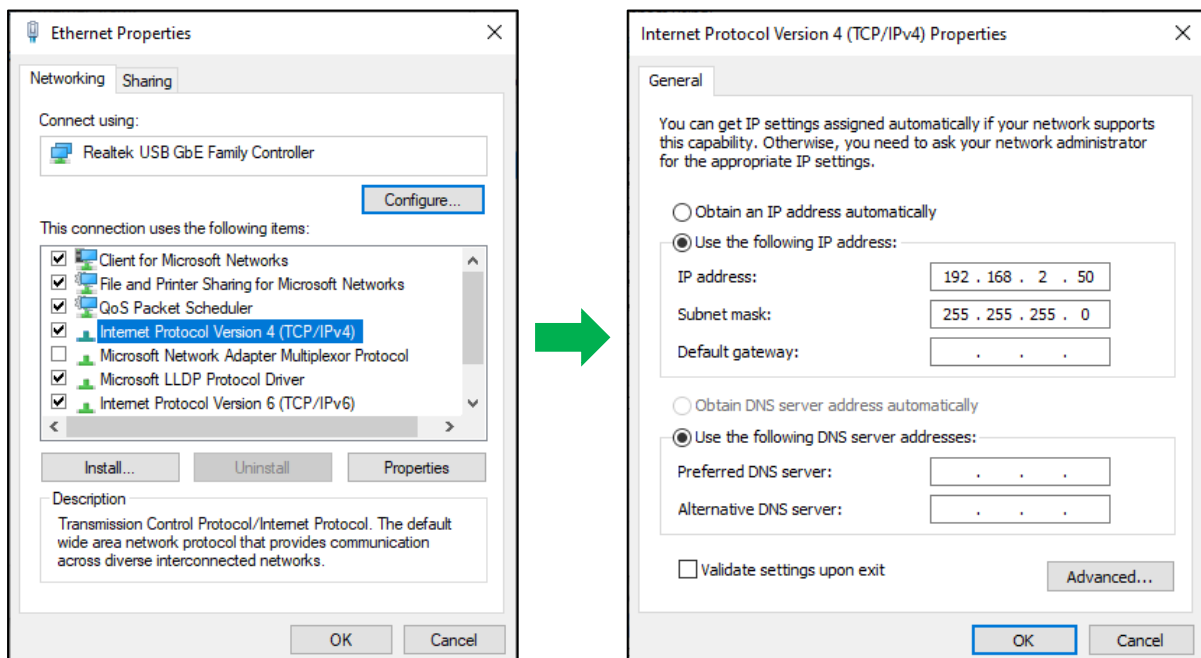
This will bring up the [Network and Sharing Centre] which allows configuration of any networks on the computer. Click on [Change adapter settings] on the left-hand pane.



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. (In this example it is called “*Ethernet*”) Then click on [Properties] on the window that opens.



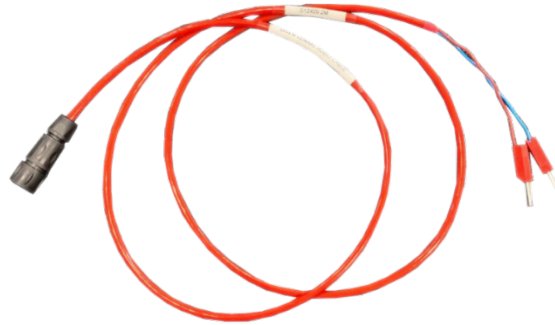
The [Ethernet] Properties dialog should be displayed. Find the entry labelled [Internet Protocol Version 4 (TCP/IPv4)], select it and then click on the [Properties] button.



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 the appropriate section of this manual for the correct IP address to use.

Appendix B – Diver Comms Pass-Thru Cable

The DMD Tethered System has the ability to pass thru diver audio via the DMD umbilical. This is achieved via a spare copper twisted pair in the umbilical. This can then be taken off the SCU using cable S12420, shown below, for input into your preferred Diver Intercom Hardware.



S12420 - 2M DMD SCU Diver Comms Audio Cable

For this example, we have used the OTS MK-III Diver Intercom system. This is an example only and it's not endorsed or recommend by Tritech. Below is an illustration showing how cable S12420 is wired to the intercom box, highlighted in the blue circle.



As there is only one twisted pair available within the DMD umbilical, the diver comms cable (S12422), shown below, must be terminated to the OTS HI-USE connector for a two-wire comms link, as opposed to four-wire. This means the earpieces are "HOT" all the time and the push button that activates the MIC will feedback through the piezo earpieces. This is normal behaviour when using the two-wire comms mode.



S12422 - 1.5M Subconn Diver Comms Cable

Please refer to the drawing on the next page for an example of how this is wired to the OTS HI-USE connector.

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION	DRAWING NUMBER
1	1	N/A	OTS-4P HI-USE CONNECTOR POTTING SLEEVE	N/A
2	1	N/A	OTS-4P HI-USE CONNECTOR	N/A
3	1	12422 'X.X'M	SUBCONN MCOM6M DIVER COMMS CABLE TAIL	0114-MSA-00136
4	4	N/A	HEAT SHRINK SLEEVING / BOOT	N/A

NOTES:

THIS SHEET COVERS THE FIELD-ATTACHABLE VARIANT USING 12422 'X.X'M CABLE TAIL

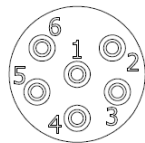
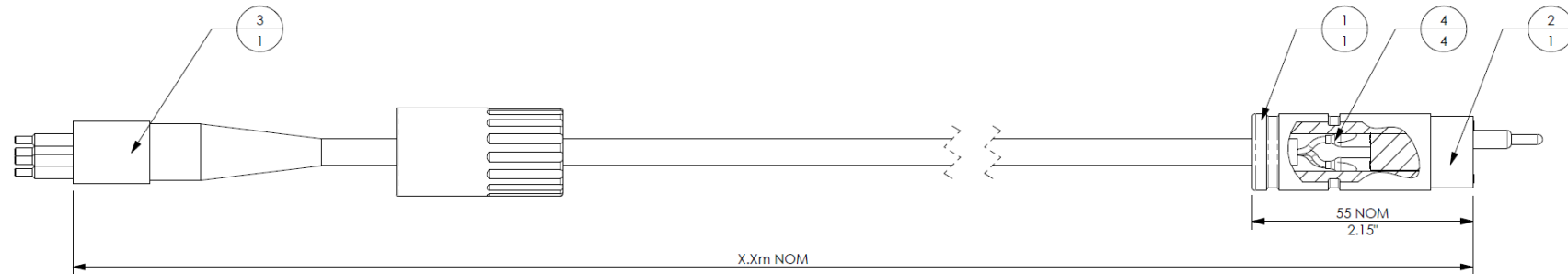
SEE 0114-MSA-00136 FOR ADDITIONAL INFORMATION RELEVANT FOR CABLE LAYUP

FOR FURTHER REFERENCE, SEE OCEAN TECHNOLOGY SYSTEMS (OTS) WEBSITE FOR DETAILS & PIN-OUT DOCUMENTATION FOR OTS-4P HI-USE CONNECTOR

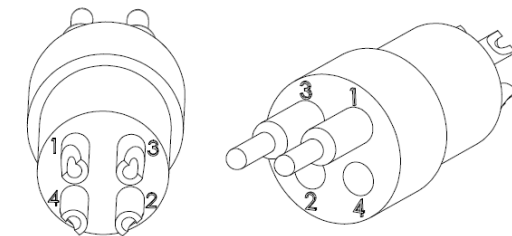
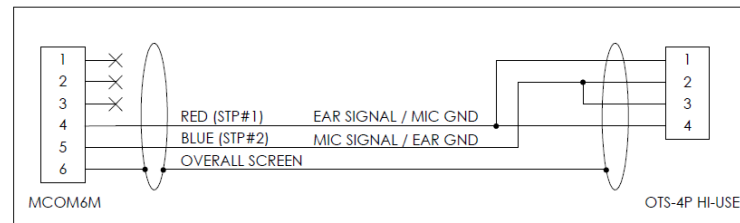
CONNECTION TO THE OTS-4P HI-USE CONNECTOR IS PER 2-WIRE COMMS LINK (SEE SCHEMATIC BELOW):

- STRIP BACK JACKET BETWEEN 0.75" (19mm) AND 1" (25mm), STRIP EACH CONDUCTOR ~ 3/16" (5mm)
- CUT THE SCREEN DRAIN WIRE FLUSH TO THE JACKET
- ABRASE JACKET UP BY BETWEEN 1/2" (13mm) AND 3/5" (15mm) TO ENSURE GOOD BOND
- ENSURE MCOM6M LOCKING & OTS-4P POTTING SLEEVES ARE FITTED OVER CABLE BEFORE TERMINATION
- FORM AND TERMINATE A LINK ACROSS 'RED' (STP#1) TO CONTACTS 1 & 4 AND TERMINATE 'BLUE' (STP#2) TO CONTACTS 2 & 3
- IDEALLY USE HEAT SHRINK SLEEVING / BOOTS TO INSULATE EACH CONTACT & LINK CONNECTION
- FIT POTTING SLEEVE OVER THE BACK OF THE CONNECTOR
- POSITION VERTICALLY ALLOWING THE CABLE TO CENTRALISE AND FIX IN PLACE READY FOR BACK POTTING
- MIX AND FILL USING A SUITABLE 2-PART POLYURETHANE ELASTOMER OR SIMILAR

TEST CONTINUITY CONDUCTOR TO CONDUCTOR BEFORE THE BACK POTTING STAGE



MCOM6M FACE VIEW
SCALE 2:1



OTS-4P HI-USE 'FIELD-ATTACHABLE'
CONNECTOR 3/4 VIEWS
SCALE 2:1

NOTE: CONTACT IDENTIS SHOWN FOR TECHNICAL
COMMUNICATION ONLY & DEFINED FOR 'UMBILICAL
SIDE' & NOT 'DIVER COMMS HARNESS SIDE'

TOLERANCES (EXCEPT AS NOTED) FRACTIONS .X ±0.1mm .XX ±0.05mm .XXX ±0.02mm ANGULAR CONCENTRIC ±0.5° 0.05mm						DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED DO NOT SCALE IF IN DOUBT ASK A3		DWG BY AE 02/10/2023 RVD. BY TR 06/10/2023 AUTH. BY AE 06/10/2023 REF. No TU PART No		Tritech International Limited Quibor Hill, Next Nest Lane, Ulverston, Cumbria, LA12 7LS Tel: +44 (0)1229 586672  Tritech TITLE 0114 SUBSEA CABLE ASSEMBLIES SUBCONN MCOM6M TO OTS-4P DIVER COMMS CABLE: FIELD-ATTACHABLE COPYRIGHT AND DESIGN RIGHTS RESERVED	
ISSUE	DATE	DCN. No	ISSUED BY	RVD. BY	AUTH. BY	MACH FINISH OR NOTED CLEAN BURRS & BREAK CORNERS  1/6 MATERIAL N/A		ORIGINAL SCALE 1:1	DWG.No 0114-MSA-00166-01	SHEET No 2 OF 2	
DRAWING CHANGES											