

UM-8211

User Manual for Type 8211 Ethernet Serial Hub

Issue B1

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Note



Email and telephone support is available during normal UK office hours (08:00 to 17:00).

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Amendment History

The amendment history records all amendments and additions made to this manual.

Issue	Revision	Date	Comments	Section	Page
A	1	03/12/2015	Initial Issue	All	All
A	2	26/04/2017	Internal GNSS baud changed from 9600 to 115200. ESH Manager software procedure updated. Log files and ESH support moved to Section 6. Troubleshooting updated. Cable type CPN 820-0331 added. Monotime 1.0 copyright notice added.	5.5 6.3 6 7 9 App A	11 All 16–19 21 26 33
A	3	07/02/2018	ECN 13887: External PPS added. Log Files Section deleted. ESH Home and Support page images updated.	5.6 6.4 6.3.2	11 16–19 13–14
A	4	04/10/2019	Wi-Fi added. Network configuration updated. General update.	3 5.4 All	4–5 9–13 All
B	1	01/08/2022	Transceiver Power section added. Formatted with new branding style.	5.7 All	15 All

Section 1 – Introduction

1.1 Purpose

This user manual is intended for personnel installing, operating and maintaining the Type 8211 Ethernet Serial Hub (ESH).

1.1 Scope

This user manual describes the safe installation, operation and maintenance of the Type 8211 ESH. The information and procedures within this manual are based on Sonardyne's experience and knowledge.

1.2 Related Publications

The following publications can be referred to in conjunction with this manual.

Table 1-1 Related Publications

Publication	Title
<i>Sonardyne Safety Manual</i>	<i>Operational and Safety Precautions</i>

1.3 Conventions

The following conventions are used in this manual.

Table 1-2 Conventions used in this Manual

Format	Convention
Boldface Type	User Input, Menu Options, Keys, e.g. Click OK
Arrow (>)	Selection of an additional menu item e.g. File >Save
<i>Italic Type</i>	References to Figures, Tables, Sections and internal/external source

Section 2 – Safety

2.1 Introduction

Before any activity is carried out on the equipment, it is recommended that the included *Sonardyne Safety Manual* and all warnings and cautions in this manual are read and fully understood.

It is recommended that the operator complies with the Health and Safety Regulations applicable to the vessel and the region before operating this equipment.

Operators and service personnel must be familiar with the normal operating and safety procedures for the subsea equipment being operated.

Documentation must be consulted whenever a  or  warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which must be taken.

If any additional equipment is used, any warnings and cautions in the equipment user manual must be read and fully understood and the equipment must only be used as specified by the manufacturer.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

2.2 Safety Procedures

2.2.1 Warnings



Risk of fire. Make sure the power rating of any cables used is not exceeded.



Risk of electric shock. Keep metal objects away from connectors as this may result in short circuits, fire or electric shock.



Risk of electric shock. Do not attempt to remove any panels from the ESH to gain access to internal components or operate the ESH with any of the panels removed

2.2.2 Cautions



Compass safe distance. The ESH and connecting cables should not be mounted within 5 metres of a compass.



Risk of equipment damage. All instruments must be maintained according to their individual operating manuals. Failure to follow recommended procedures could result in instrument failure, and loss of system integrity.



Risk of equipment damage. Make sure that the ESH chassis is correctly installed in a rack or a console with adequate fixings and support to avoid damage from vibration.



Risk of equipment damage. Make sure the ESH chassis receives an adequate cool air supply to avoid damage caused by overheating.



Risk of equipment damage. There are no user-serviceable parts inside the ESH.

-  **Risk of short-circuit/ESD risk.** Make sure the ESH has an earth lead connected to the chassis earth at the rear when rack mounted.
-  **Risk of overheating.** Make sure the ESH is kept away from heat sources.
-  **EMC risk.** High quality cables should always be used for connection to external equipment. It is the responsibility of the system integrator to check there is no practical EMC interference to, or by, the Sonardyne equipment caused by connection to external equipment.
-  **Risk of damaging connectors.** Once installed, do not move the ESH with cables connected.
-  **Installation Recommendation.** It is recommended that hardware installations are located at least 10 metres from any VHF radio antennae operating in the 156-165 MHz band.
-  **Installation Recommendation.** This equipment is intended to be used (and draw its power) within the Bridge and deck zone of the ship. The BS IEC 60533 -1999 standard, *Electrical & Electronic Installations in Ships*, makes certain recommendation [see *emission limits Table 3*] to help aid protection in this specific zone. It requests that an inline RFI filter is to be installed in the power supply circuit between this zone and all other general power distribution zones. This filter is to be capable of achieving a decoupling of about 30 dB in the frequency range of 10 kHz to 30 MHz. This is the normal, anticipated practice and is stated here to secure EMC installation integrity and help complete the operators understanding of underlying requirements.
-  **Installation Recommendation.** To comply with FCC and Industry Canada RF exposure limits for general population / uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 29 mm from all persons and operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.
-  **Installation Recommendation.** It is advisable to use a power outlet with a surge protector fitted. Preferably the ESH should be supplied with power from an Uninterruptible Power Supply (UPS) to prevent vessel power interruptions affecting the operation.
-  **Equipment damage.** Only use fuses of the correct rating. The use of incorrect fuses could result in failure to protect the internal electronic components.
-  **Network connection failure.** Connection of the ESH to anything other than a closed private network or approved Sonardyne devices is at the risk of the operator. Sonardyne International Limited accepts no responsibility for network connections and configurations.

Section 3 – Technical Description

3.1 Introduction

The Ethernet Serial Hub (ESH) forms part of a 'one-box' solution designed to meet the complete on-board requirements of coastal USBL operations.

The ESH is the network interface between the in-water acoustic instrument, GNSS and the PC that runs the positioning software and provides power and communications for acoustic transceivers.

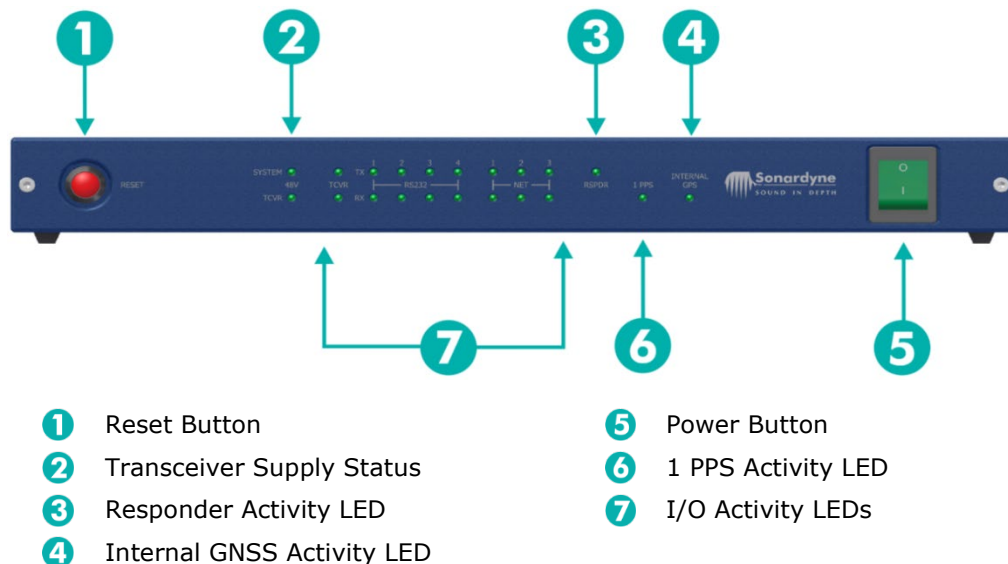
The ESH supports responder trigger and 1PPS synchronisation across systems.

The ESH has the following features:

- 3 port network switch
- 10/100 fast Ethernet uplink
- 4 RS232 serial ports
- 1 Transceiver port providing 48 V DC power
- 1 Responder trigger port
- Internal L1 GNSS receiver (requires an antenna)
- Wi-Fi¹

3.1.1 Front Features

Figure 3-1 Ethernet Serial Hub Front View



¹ This equipment contains a radio transmitter module FCC ID: TFB-1003

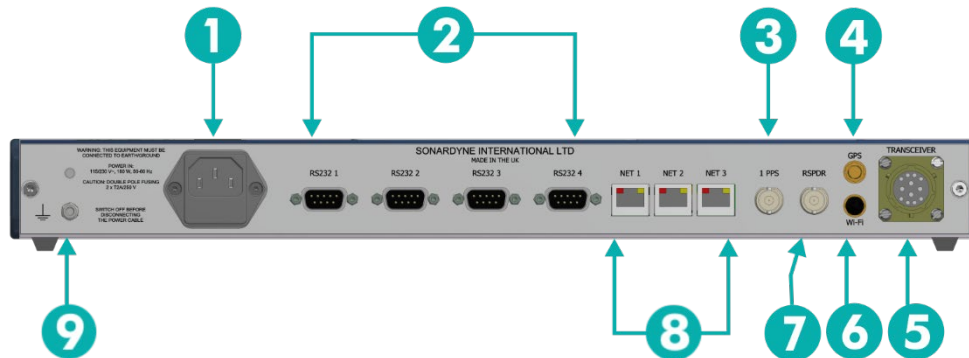
This equipment contains a radio transmitter module IC: 5969A-1003

The equipment user must only use the approved antenna(s) supplied with the equipment. [Sonardyne only supply approved antenna(s), listed by the module manufacturer, which have been certified with this module].

To comply with FCC and Industry Canada RF exposure limits for general population / uncontrolled exposure, the antenna must be installed to provide a separation distance of at least 29mm from all persons and operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

3.1.2 Rear Features

Figure 3-2 Ethernet Serial Hub Rear View



- | | |
|---|--|
| 1 IEC Socket 115/230 V AC and Fuse Holder | 6 1 x Reversed Polarity-SMA Jack (Wi-Fi) |
| 2 RS232 Serial Ports x 4 | 7 1 x BNC jack responder output 12 V, 100 mA |
| 3 1 BNC Jack 1PPS Input | 8 RJ45 Ethernet x 3 |
| 4 1 SMA jack GNSS Input (RF coaxial) | 9 Chassis Earth |
| 5 48 V Transceiver Connector (Amphenol) | |

Note

 **Internal Port ESH/5A is hard-wired to a simple internal GNSS that can be used for time synchronisation and basic positioning.**

Section 4 – Installation

4.1 Introduction

Before installing the ESH, make sure *Section 2 – Safety* is read and fully understood.

The ESH can either be installed in a rack or used on a desktop.

Note



The ESH and connecting cables should not be mounted within 5 metres of a compass.

4.2 Desktop Installation

With a desktop installation, it is recommended to site the ESH in a ventilated area. To reduce the risk of injury from sharp edges the supplied rack mounting front side panels are not fitted as standard.

1. Make sure the ac power supply is turned off.
2. Connect the power lead to the 115/230 V ac IEC socket on the rear of the ESH.
3. Connect any peripheral cables to the rear of the ESH.

4.3 Rack Mounting

The ESH is designed to be installed in a 19" width rack and must be supported by the two front side panels and either by a shelf or rear brackets (supplied as a kit for 480 mm depth racks, part number 650-0132).

Notes



Front and rear/shelf support is essential to protect against shock and meet the vibration specifications detailed in *Section 9 – Technical Specifications*.

To secure the ESH into the rack, the front side panels must first be installed.

4.3.1 Installing the Rack Mounting Front Side Panels

1. Remove the two M4 x 6 countersunk screws from each side of the front of the ESH.
2. Remove the two plastic blanking plates and keep them in a safe place.
3. Insert the side panels into the slots of each side, aligning the hole in the panel with the screw hole.
4. Refit the M4 socket screws and tighten.

Figure 4-1 Front Rack Mounting Side Panel Installation



- 1 Plastic Blanking Plate x 2
- 2 Front Side Panel x 2
- 3 ESH

4.3.2 Installing the ESH into the Rack

1. Make sure the ac power supply is turned off.
2. Connect the power lead to the 115/230 V ac IEC socket on the rear of the ESH.
3. Connect the chassis earth terminal to the rack earth.
4. Connect any peripheral cables to the rear of the ESH.
5. Carefully slide the ESH fully into the rack (remove the four adhesive feet if they cause an obstruction).
6. Secure the front side panels to the front of the rack using four M6 x 16 fixing bolts and washers.
7. Secure the ESH to the rack shelf, or if using a rear rack mounting support kit refer to *Section 4.3.3*.

4.3.3 Rear Fixing

After the ESH has been mounted in the rack and secured by the front fixing bolts the rear of the ESH can be secured to the rack using the rear rack mounting support kit. Fixing bolts and washers are supplied with the kit; see *Figure 4-2*.

Note

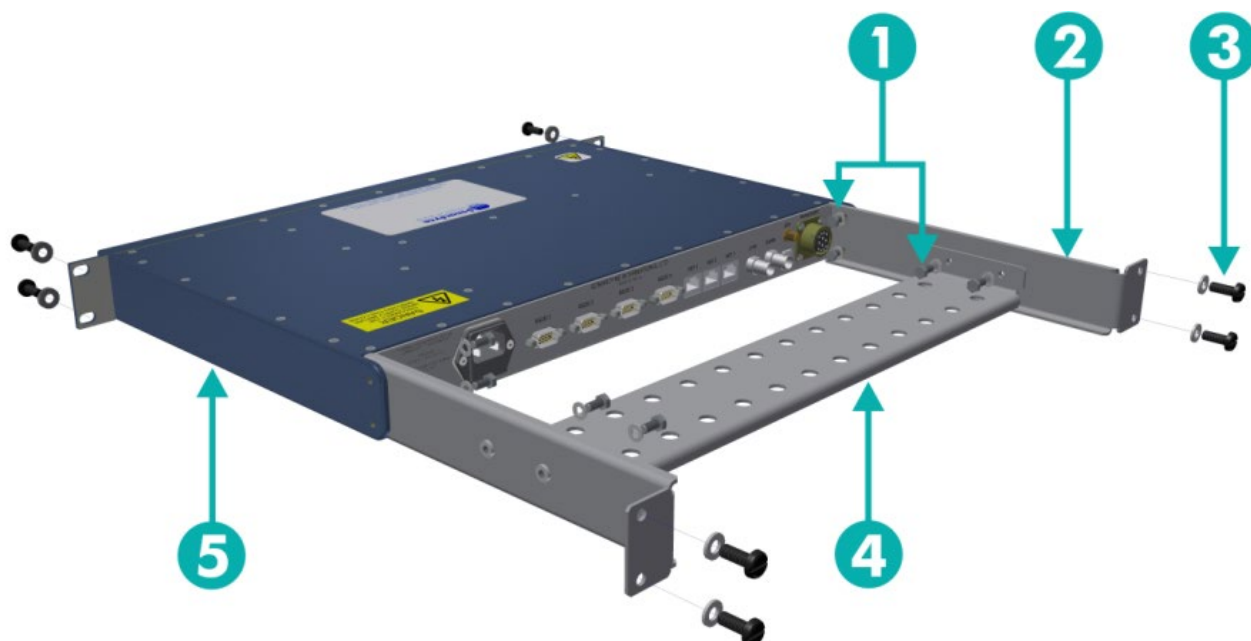


The Sonardyne rear mounting support kit is designed to be used in a 480 mm depth rack.

1. Secure the two rear side brackets to the rear of the ESH using M5 x 10 mm bolts and washers.
2. Secure the cable carrier support bracket to the rear side brackets using M5 x 10 mm bolts and washers taking care not to move or dislodge any attached cables.

- Secure the rear side brackets to the rear of the rack using M6 x 16 mm bolts and washers.

Figure 4-2 Rear Rack Mounting Support Kit



❶ M5 x 10 mm Fixing Bolt & Washer x 8

❷ Rear Bracket x 2

❸ M6 x 16 mm Fixing Bolt & Washer x 8

❹ Cable Carrier Support Bracket

❺ ESH

Section 5 – Operation

5.1 Introduction

Before proceeding with any operation of the ESH, make sure Section 2 – Safety is read and fully understood.

5.2 Connecting and Starting the ESH

Before starting the ESH ensure all peripherals are connected.

1. Ensure the power switch at the front of the ESH is set to position **0** (off).
2. Connect the power lead to the 115/230 V ac IEC input on the rear of the ESH.
3. Connect the other end of the power lead to the power outlet.
4. Turn on the system power by pressing the power switch at the front of the ESH to position **1**.

Note

After the ESH has been started it can be reset by pressing and holding down the red power/reset button on the front panel for approximately 4 seconds.

5. When the **SYSTEM** and **TCVR** green LEDs on the front panel illuminate this indicates the system is active and the 48 V supply is available for use.

Note

The TCVR status light illuminates when 48 V is available.

5.3 Turning Off the ESH

Press the power switch at the front of the ESH to position **0**.

5.4 Network Configuration

5.4.1 Connecting to the ESH

Note

Tera Term (open source software) can be used to configure the ESH network connection. Tera Term software is installed as part of the Mini-Ranger 2 installation.

To connect to the ESH:

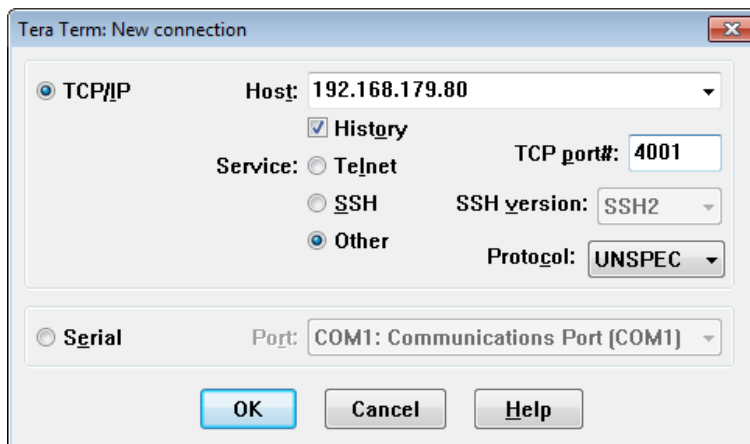
1. Click **Start > Tera Term**.

2. Enter the following and then click **OK**:

TCP/IP Host: 192.168.179.80

Service: Other

TCP port: 4001



5.4.2 Changing the ESH IP Address

When the ESH is started for the first time it defaults to a static IP address of **192.168.179.80**.

To change the IP address:

Note



Take care not to enter the incorrect Ethernet address. Entering the wrong address may cause other devices on the network to stop working or operate incorrectly.

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. To set the TCP/IP address enter the operator IP address as appropriate:

net ip 192.168.179.80

3. The ESH should respond with a confirmation e.g:

Setting ESH IP Address to: 192.168.179.80

Please restart this session

4. The ESH will now be configured with the new IP address.

5.4.3 DHCP

The ESH ships with a built in DHCP server. This can be used on small local networks to provide dynamic IPs to local PCs saving the need for static IP allocation. The DHCP server is disabled by default to ensure compatibility with older ESHs.

5.4.3.1 Enabling DHCP

To enable DHCP:

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. Enter the following:

net dhcp_server enable

3. The ESH should respond with a confirmation, for example:

Changing ESH DHCP Server Settings to: Enabled

Pool Size: 30

Pool Offset: 80

You may need to restart this session

OK

>

4. The ESH will now act as a DHCP server, releasing the IP address ranges from 192.168.179.81 to 192.168.179.110.

5.4.3.2 Disabling DHCP

To disable DHCP:

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. Enter the following:

net dhcp_server disable

3. The ESH will respond with a confirmation, for example:

Changing ESH DHCP Server Settings to: Disable

You may need to restart this session

OK

>

5.4.3.3 Modifying DHCP Pool Size and Offset

When DHCP is enabled it will set a DHCP pool size and offset relative to the ESH current IP Address. The default IP Address is 192.168.179.80 with a pool size and offset of 30 and 80 respectively. This will allow IPs between 192.168.179.81 and 192.168.179.120 to be allocated.

The pool size and offset can be changed as follows:

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. To change the pool size and pool offset, enter the following:

- a. Pool size:

net dhcp_server pool_size 60

- b. Pool offset:

net dhcp_server pool_offset 10

3. The ESH should respond with a confirmation, for example:

Changing ESH DHCP Server Settings to: Enabled

Pool Size: 60

Pool Offset: 10

You may need to restart this session

OK

>

4. The ESH will now act as a DHCP server, releasing the IP address ranges from 192.168.179.10 to 192.168.179.60

5.4.4 Wireless Access Point

The ESH can be configured to act as a Wireless Access Point (WAP). This allows the PC running Mini/Micro Ranger 2 software to connect to the ESH using a Wi-Fi adapter instead of Ethernet.

5.4.4.1 Enabling WAP

To enable WAP:

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. Enter the following:

net ap enable

3. The ESH should respond with a confirmation, for example:

Changing ESH AP Settings to:

AP Enabled

SSID: ESH-5100

Password: password

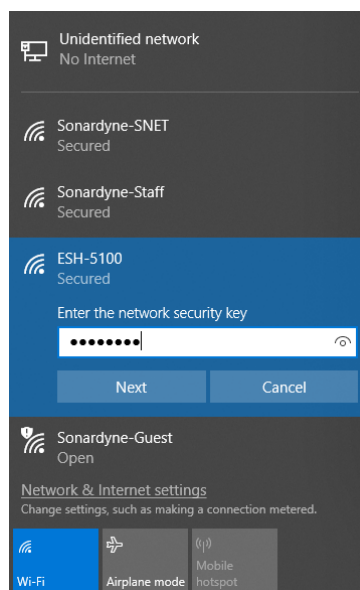
Channel: 6

Please restart this session

OK

>

4. The default SSID corresponds to the units UID (in the example below the UID is **ESH-5100**).
5. The default access point password is **password**.



Note



Connect to the WAP like you would with any other Wi-Fi network.

5.4.4.2 Disabling WAP

To disable WAP:

1. Connect to the ESH; see *Section 5.4.1 "Connecting to the ESH"*.
2. Enter the following:

```
net ap disable
```

3. The ESH should respond with a confirmation, for example:

Changing ESH AP Settings to:

AP Disabled

SSID: ESH-5100

Password: password

Channel: 6

Please restart this session

OK

>

5.4.4.3 Changing WAP Settings

Channel Number

The WAP channel number (1-11) can be configured using the following command:

```
net ap channel 9
```

Note



Channels 12–14 are not available as they can't be used in certain countries

Channel	F ₀ (MHz)	North America ^[B]	Japan ^[B]	Most of world ^{[B][C][D][E]} [1][2][3][4][5]
1	2412	Yes	Yes	Yes
2	2417	Yes	Yes	Yes
3	2422	Yes	Yes	Yes
4	2427	Yes	Yes	Yes
5	2432	Yes	Yes	Yes
6	2437	Yes	Yes	Yes
7	2442	Yes	Yes	Yes
8	2447	Yes	Yes	Yes
9	2452	Yes	Yes	Yes
10	2457	Yes	Yes	Yes
11	2462	Yes	Yes	Yes
12	2467	No ^B except CAN	Yes	Yes
13	2472	No ^B	Yes	Yes
14	2484	No	11b Only ^C	No

Password

The password can be configured using the following command:

```
net ap password password
```

Note



The password must be between 8 and 64 characters in length and can be any combination of upper or lower case letters and numbers.

5.5 Internal GNSS

The ESH comes fitted with an Internal Global Navigation Satellite System (GNSS), which can be used to provide basic positioning and timing information. The Internal GNSS is a simple L1 only multi constellation GNSS receiver that can be found on Port ESH/5A in Mini-Ranger 2 software. It supports the GPS, GLONASS, BeiDou and QZSS constellations as well as supporting satellite-based augmentation services provided by WAAS, EGNOS and MSAS.

Note

 **The Internal GNSS is configured with the following communication parameters and cannot be reconfigured: Port ESH/5A serial 115200,8,n,1**

By default, the internal GNSS outputs the following message stream, GGA, GLL, GSA, GSV, RMC, VTG at 1 Hz

5.5.1 GNSS Antenna

The ESH is designed to be connected to an external GNSS antenna via the SMA Jack labelled **GPS** on the rear of the ESH.

An active antenna is recommended and should meet the specification shown in *Table 5-1*.

The GNSS is used for vessel positioning and therefore the antenna mounting location is important for the system. It should be mounted high on a mast with a clear view of the sky in both the horizontal and vertical directions. If the antenna does not have a full view of the sky there may be times when signals will be blocked, resulting in degraded performance of the system.

Note

 **To reduce the risk of equipment interfering with the built in GNSS receiver, it is recommended to place the GNSS antenna as far away as possible from other devices that may radiate high emissions such as Radar, Immarsat-B Dome, VSAT and HF whip/wire transmitters.**

Table 5-1 GNSS Antenna Specification

Parameter	Specification
Supply Voltage	3.3 V
Minimum Gain	5 dB (at bulkhead)
Maximum Gain	20 dB (at bulkhead)
Maximum Noise Figure	1.5 dB

5.6 External PPS

An external PPS can be used in conjunction with a GPZDA time string to provide an external time sync. The ESH only supports a rising edge PPS triggered before the ZDA string on a serial input port.

5.7 Transceiver Power

The ESH can control power to the transceiver. The system also has a built-in watchdog to allow power to be automatically disabled after a specific period. This can be configured via the psustatus command.

CAUTION



Micro/Mini-Ranger 2 will automatically manage power to a Micro/Mini-Ranger 2 USBL. These commands must only be used if Ranger 2 software is not running.

To use the psustatus command, first connect to the ESH (see *Section 5.4.1 "Connecting to the ESH"*), the psustatus command can then be used as shown in the following table.

psustatus – command sent on its own will reply with the current TCVR power status.

Command	Response	Description
psustatus	psustatus tcvr: 48.0 V	TCVR on with current output voltage
	psustatus tcvr: off	TCVR is off
	psustatus tcvr: watchdog_count 48.0 V	TCVR with watchdog count – number of seconds till the watchdog powers the TCVR down

To turn a TCVR on: psustatus tcvr: on

To turn a TCVR off: psustatus tcvr: off

To turn the TCVR on for a specific period – the watchdog period is in seconds:

psustatus tcvr: watchdog_period

Example to turn the TCVR on for 60s: psustatus tcvr: 60

Section 6 – Maintenance

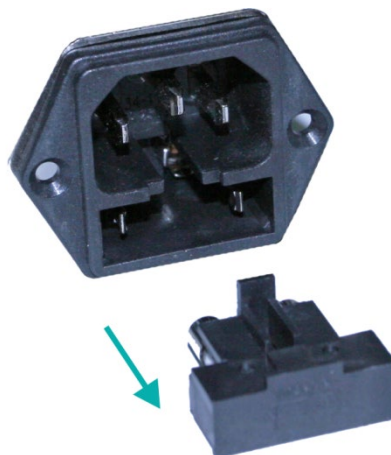
6.1 Introduction

Before proceeding with any maintenance of the ESH, make sure *Section 2 – Safety* is read and fully understood.

6.2 Replacing the Fuses

To protect the ESH from fluctuations or spikes in the ac power supply, two anti-surge 2 A fuses are installed (part number 327-1188). To replace these fuses, follow the instructions below.

1. Make sure the ESH and the ac power supply is switched off.
2. If the ESH has been rack mounted, remove the securing screws retaining the unit to the rack.
3. Pull the ESH forward sufficiently to gain access to the power lead to the rear IEC Socket and disconnect the power lead.
4. Disconnect any additional cables connected to the rear of the ESH.
5. Place the ESH on a clean dry desk.
6. Using a flat blade screwdriver to assist, lever the fuse holder out from its socket. The fuses are contained inside the holder, as shown below.



7. Replace with the same rated fuse; see *Section 8 – Spares*.
8. Refit the fuse holder back into the ESH.

6.3 Embedded ESH Manager Software Update

The following sections explain how to update the Embedded ESH Manager software from a web browser.

Sonardyne Support and the Sonardyne website will provide details when a software update becomes available.

6.3.1 Internet Browser Recommendations

The ESH has been tested on the Windows® 7 operating system using the following web browsers:

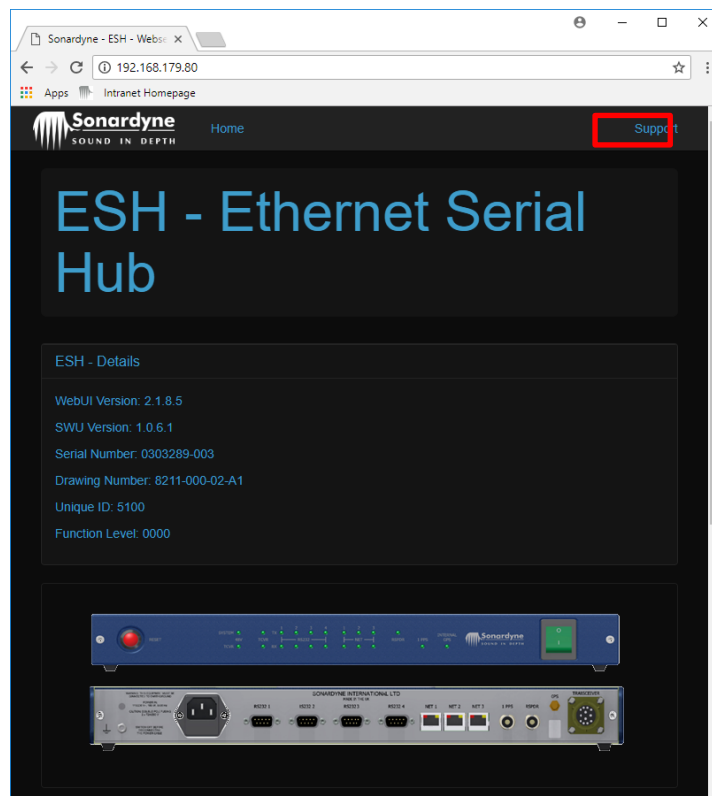
- Google Chrome Version 44.0.2403.157 m
- Internet Explorer (V10 or later)

Other HTML5 compatible browsers may be used but are not recommended. It is recommended to install and use the latest version of the internet browser for communicating with the ESH Manager.

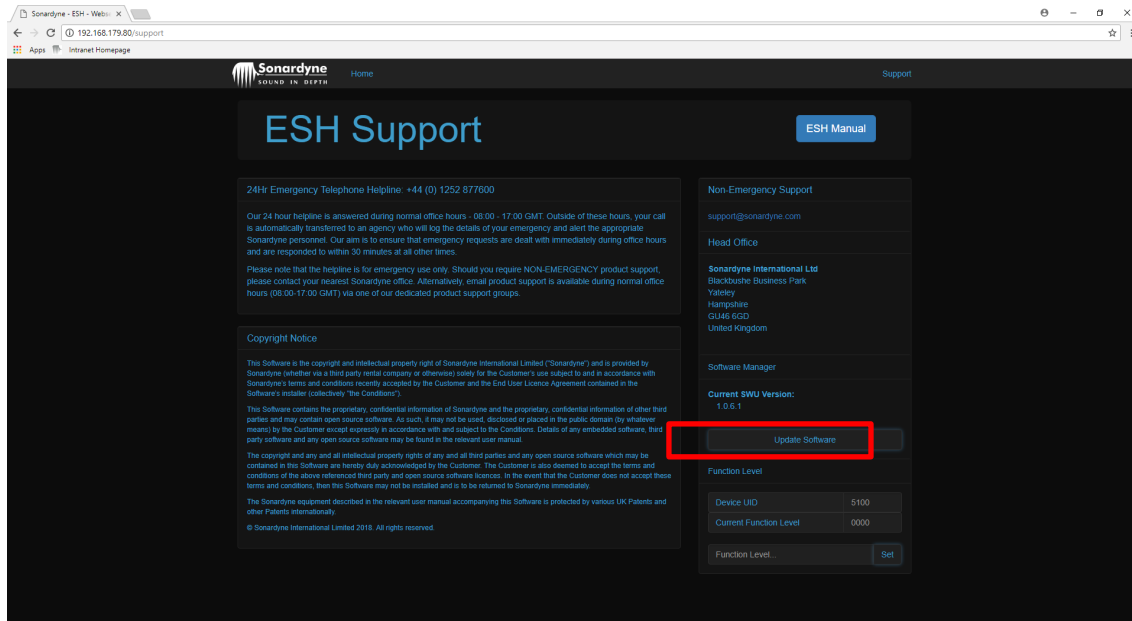
6.3.2 Updating the Software

To update the software:

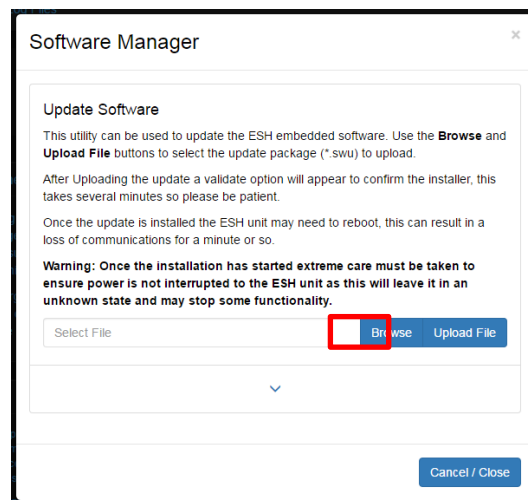
1. Save the updated software file (*.swu format) to a folder on the PC e.g. **Downloads**.
2. Connect an Ethernet cable from the ESH to the PC.
3. On the PC, open a web browser and enter the IP address **http://192.168.179.80** (or the IP address the ESH is changed to; see *Section 5.4.2 "Changing the ESH IP Address"*).
4. On the ESH Manager home page, click **Support**.



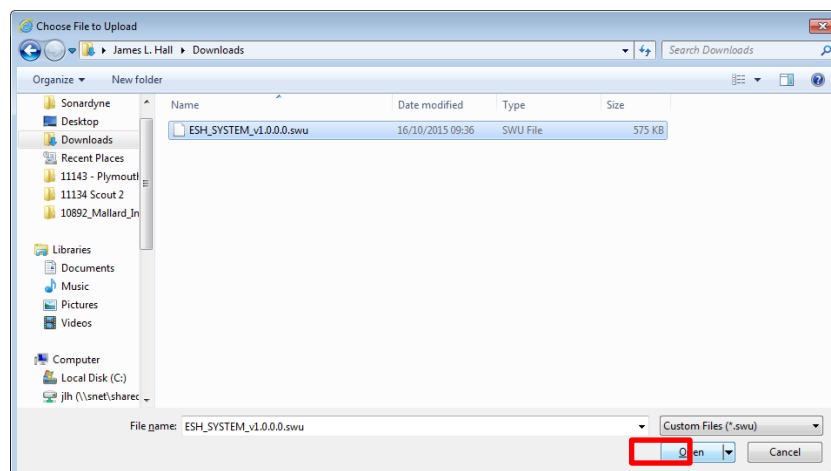
- On the ESH Manager Support page, click **Update Software**.



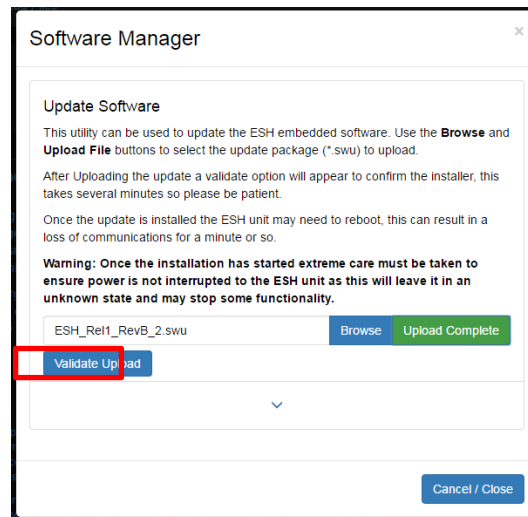
- On the **Software Update Manager** popup, click **Browse** and navigate to the new software file.



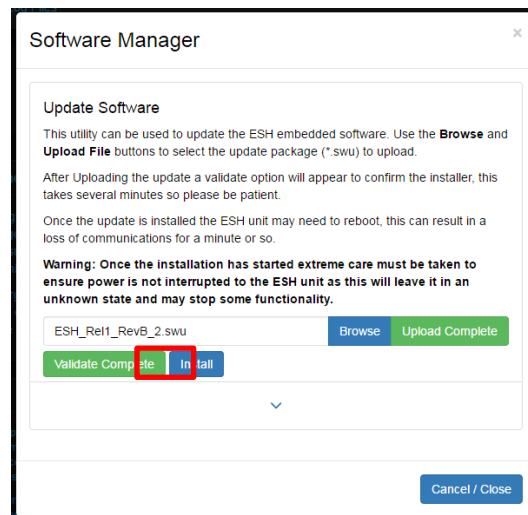
- Select the new software file and then click **Open**.



8. Click **Upload File** to copy the file to the ESH.
9. Once the file is uploaded click **validate upload** (this will request the ESH to confirm that the file uploaded isn't corrupted).



10. After validation, click **Install** to start the installation process.

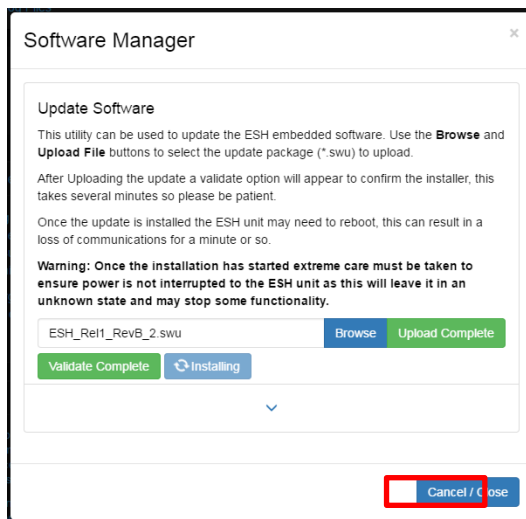


Note



Once the installation has started, extreme care must be taken to ensure power is not interrupted to the ESH or PC as this will leave the unit in an unknown state and may stop some functionality.

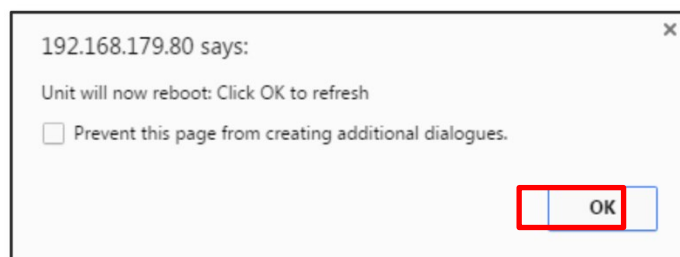
11. The installation can be cancelled at any point by clicking **Cancel/Close**.



Note

If an installation continues to fail, contact Sonardyne Support.

12. After the install is complete the ESH will reboot.
13. Click **OK** to refresh the page.

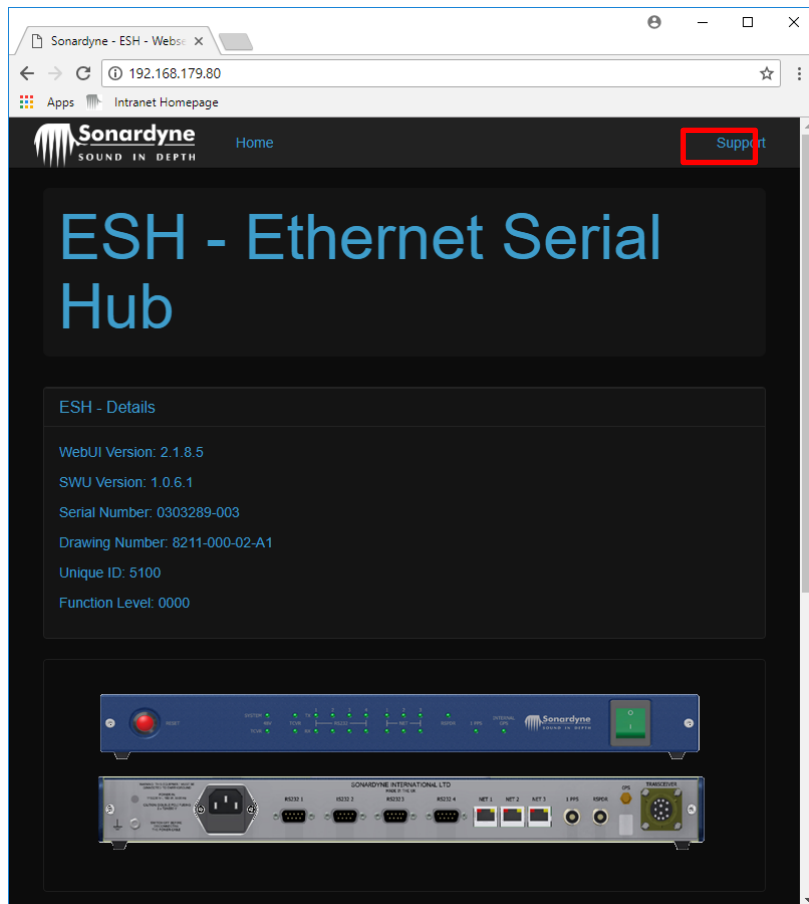


14. After the ESH has rebooted the new software version can be verified on the ESH Manager home page.

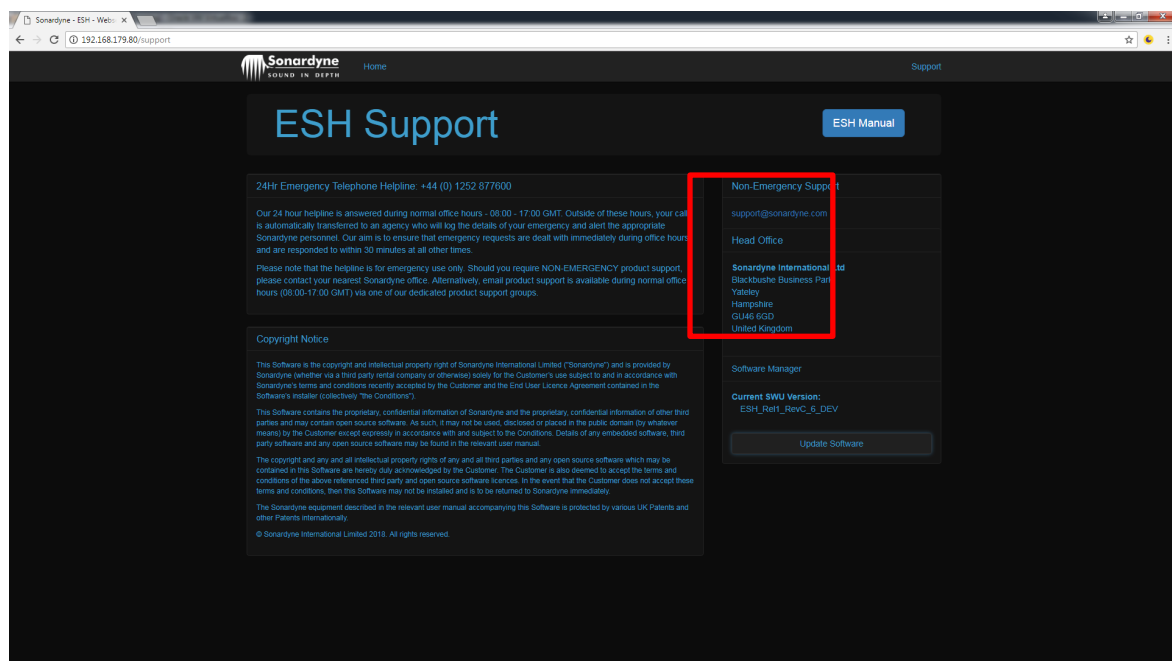
If any problems are encountered during the software update, see *Section 6.4 "ESH Support"*.

6.4 ESH Support

1. On the ESH Manager menu bar, click **Support**.



2. Sonardyne Support contact details are shown on the right pane.



3. Click the support@sonardyne.com email address to generate an email template containing the current ESH configuration that will help the support team diagnose any problems.
4. Type your support query at the top of the page and send the email.

ESH support SN:0303289-003

File Message Insert Options Format Text Review Help Tell me

Paste Basic Text Names Include Tags Dictate Voice

To... support@sonardyne.com

Cc...

Send Subject ESH support SN:0303289-003

Please add your support query here...

System Information - Please do not remove

- Serial Num: 0303289-003
- Drawing Num: 8211-000-02-A1
- WebUI Version: 2.1.8.5
- UID: 5100
- Func Level: 0000

- System Manager :

- External UARTS: 4
- Internal Devices: 1
- Port Manager Version: 1
- PIC Version: 1.00.02.00

- Hardware :

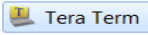
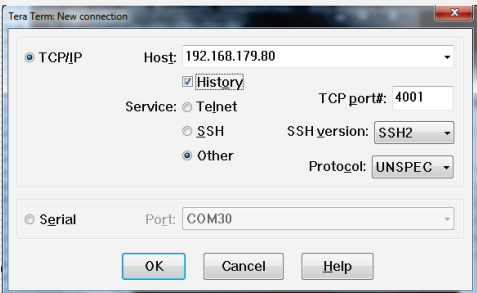
- Motherboard Serial Number: 0320146-002
- Motherboard Drawing Number: 8211-035-01-B1
- LED Panel Serial Number: 0302802-002
- LED Panel Drawing Number: 8211-036-00-A2
- SOM Serial Number: F8DC7A22A66A
- SOM Drawing Number: VSM-MX7-322B

Section 7 – Troubleshooting

7.1 Introduction

If any issues are encountered using the ESH, Sonardyne Customer Support contact details can be found on the ESH Manager Support page.

7.2 Communications

Fault	Action
Connection to the ESH has been lost. 	Press and hold the Reset button for five seconds to reboot the ESH (the ESH can take up to two minutes to reboot).  You may need to restart Mini-Ranger 2 to establish a connection.
Confirm communications.	Start Tera Term software to confirm communications: Start > Tera Term  Enter the Host: IP address and TCP port and then click OK.  Type port in the Tera Term command window and then press return to confirm communications.
If the connection problem still exists.	Power cycle the ESH (this will reset the internal switch). Finally, check that the firewall settings or anti-virus software are not blocking the connection.

Section 8 – Spares

8.1 Introduction

When ordering spare parts, you must provide:

- a) The part number
- b) The drawing number (if known)
- c) A description

Enquiries about, or orders for spare parts should be directed to your local Sonardyne office or agent. Sonardyne office addresses are shown on the back page.

8.2 Recommended Spares

Part Number	Description	Qty
327-1188	Fuse Anti-surge 20 mm 2 A, 250 V	2
650-0132	Rear Rack Mounting Support Kit	1

Section 9 – Technical Specifications

9.1 Specifications

Item		Specification
Storage		Internal 32 GB eMMC
Ports and Connectors		4 x RS232 ports (DB 9) 3 x RJ45 10/100 Ethernet sockets 1 x BNC jack 1PPS input 1 x BNC jack responder output 12 V, 100 mA 1 x SMA jack GNSS Input (RF coaxial) 1 x Reversed polarity-SMA jack (Wi-Fi) 1 x 48 V Transceiver connector (Amphenol) 1 x IEC socket 115/230 V ac, 1 A, 60/50 Hz
Power Supply		Auto sensing ac input voltage 115–230 V, 60/50 Hz Max current: 1 A Average operating current: 0.16 A @ 230 V (Without Transceiver)
Environmental Specifications	Operating Storage Relative Humidity Shock Vibration	-5 to 40°C (23 to 104°F) -20 to 55°C (-4 to 131°F) 20–80% (Non-Condensing) 10 g Acceleration 11 ms half sine (EN 60068-2-27:2009) Frequency 5 to 13.2 Hz – 1.0 mm peak displacement (DNV 2.4, class A) Frequency 13.2 to 100 Hz – 0.7 g acceleration (DNVGL-CG-0339 class A)
Safety		Complies with EN61010-1:2010
EMC		Complies with Immunity & Emission Requirements of EN60945
Dimensions (LxWxH)		1U Rack mounting 430 mm (16.9") x 295 mm (11.6") x 44.4 mm (1.75") without feet
Weight		3.3 kg (7.3 lbs)

9.2 Safety

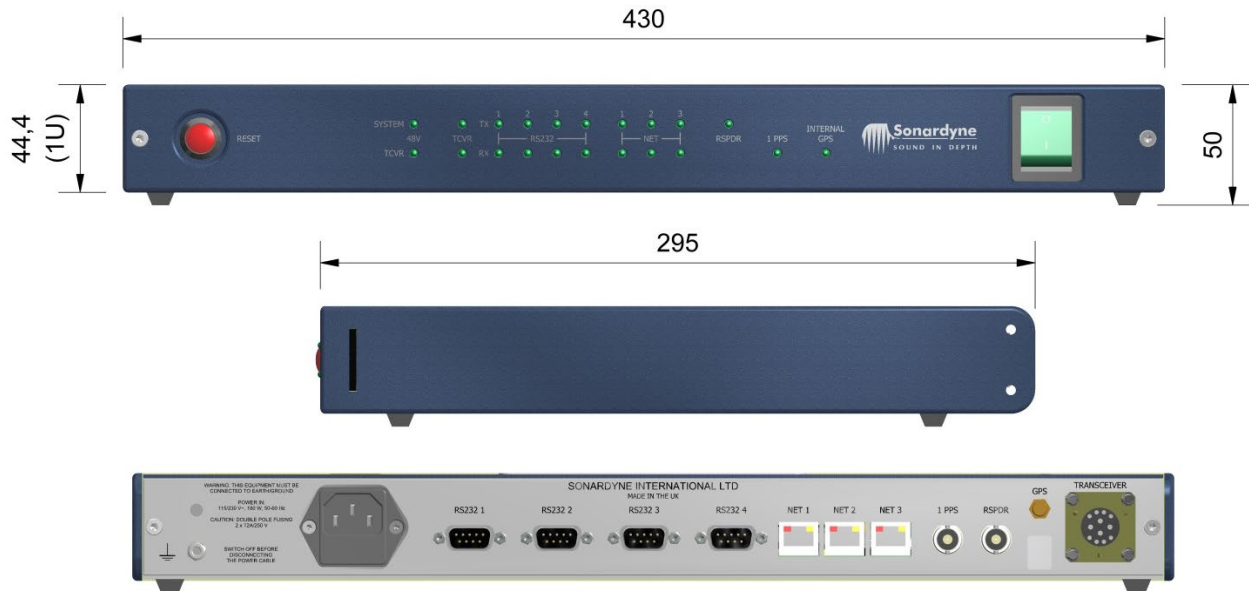
Complies with the requirements of EN61010-1:2010.

9.3 EMC

This hub is designed to comply with the Immunity & Emission requirements of EN60945:2002.

9.4 ESH Outline Drawing

Figure 9-1 ESH Dimensions



9.5 Transceiver Cable

Table 9-1 lists the transceiver interconnection cables available for use with the ESH. Cables are also available in different lengths.

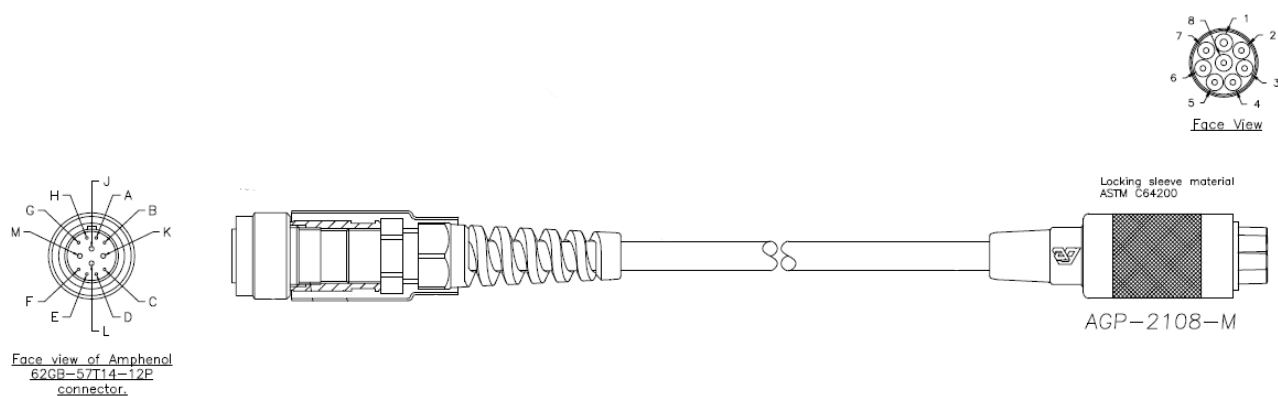
Table 9-1 Transceiver Cable Types

USBL Transceiver	CPN	Drawing No.	Description
Type 8221/8212	820-6793	8024-044	Amphenol to AGP Cable Assembly (30 m)
Type 8221/8212	820-0331*	8212-061	Amphenol to AGP Cable Assembly (30 m)

* Cable type 820-0331 supersedes cable type 820-6793

9.5.1 Cable Type CPN 820-6793

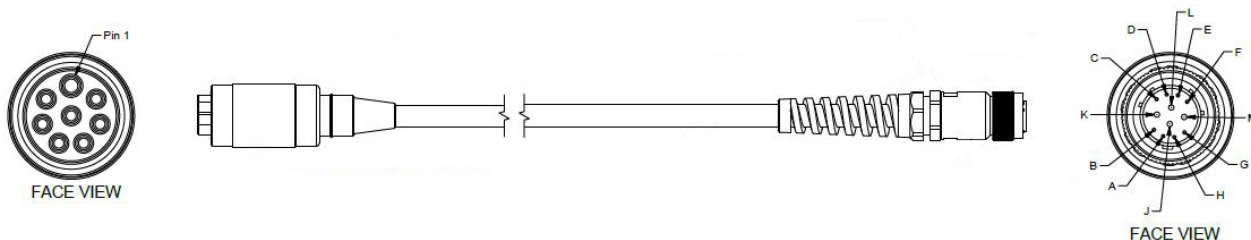
Figure 9-2 CPN 820-6793/DWG 8024-044 Transceiver Cable Assembly 30 m



Amphenol Pin Number	AGP Pin Number	Function
F	1	Screen
Earth Ring		
J	2	Power +
K	3	Ethernet Tx Data +
L	4	Ethernet Tx Data -
G	5	Trigger
M	6	Ground and Power Return
A	7	Ethernet Rx Data +
B	8	Ethernet Rx Data -
H	No Connection	N/A

9.5.2 Cable Type CPN 820-0331

Figure 9-3 CPN 820-0331/DWG 8212-061 Transceiver Cable Assembly 30 m



Amphenol Pin Number	AGP Pin Number	Function
F	1	Screen
Earth Ring		
J	2	Power +
K	3	Ethernet Tx Data +
L	4	Ethernet Tx Data -
G	5	Trigger
M	6	Ground and Power Return
A	7	Ethernet Rx Data +
B	8	Ethernet Rx Data -
H	No Connection	N/A

Appendix A – Open Source Software Licence Notices and Terms

The following open source software is supplied alongside the ESH; a list of open source software used in the ESH Firmware is displayed on the ESH support page; see *Section 6.4 "ESH Support"*.

A.1 Open Source Software

A.1.1 Tera Term

Copyright (c) T.Teranishi.
Copyright (c) TeraTerm Project.
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Definitions

Term	Definition
CPN	Component Part Number
DHCP	Dynamic Host Configuration Protocol
DWG	Drawing
GNSS	Global Navigation Satellite System
EMC	Electromagnetic Compatibility
ESH	Ethernet Serial Hub
ESH Manager	Embedded ESH Manager Software
GPS	Global Positioning System
IEC	International Electrotechnical Commission
IP	Internet Protocol
LED	Light Emitting Diode
ESH	Ethernet Serial Hub
PPS	Pulse Per Second
Sonardyne	Sonardyne International Limited and its affiliates
USBL	Ultra-Short Baseline
WAP	Wireless Access Point

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