

UM-8026-MC

User Manual for the Marine Computer

Issue A Rev 3

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Note



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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	07 Feb 2020	First Issue	All	All
A	2	23 Jun 2020	Removed reference to EN 61010: 2010	9.1	21
A	3	23 Mar 2021	Added procedure to remove USB security key from Navigation Computer.	App A	23
			Shelf mounted weight added	9.1	21

Section 1 – Introduction

1.1 Purpose of this Manual

This user manual is for personnel who operate and maintain the Type 8026 Marine Computer.

To ensure the safety of the installer and operator is maintained it is important that all warnings and cautions in *Section 2 –Safety* of this manual and in any related manuals are read and fully understood. A *Sonardyne Safety Manual* is supplied with this user manual

1.1 Scope of this Manual

This User Manual describes the safe configuration, operation and maintenance of the Type 8026 Marine Computer. 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

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 fully read and 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 subsea equipment.

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.

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.** Do not attempt to open the Marine Computer or power supply to gain access to internal components.

2.2.2 Cautions

 **Compass safe distance.** Connecting cables should not be mounted within one metre of a navigational compass.







 **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. In order to fall within acceptable limits for EN60945 and DNVGL-CG-0339 EMC standards (see Radiated and conducted emissions) it is mandatory to connect with the additional power supply filter part no: 517-0012.

 **Installation recommendation.** 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 equipment damage.** Make sure that the Marine Computer chassis is correctly installed and provided with adequate fixings and support to avoid damage from vibration.

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

-  Risk of damaging connectors. Do not move the Marine Computer with cables connected.
 -  Loss of data risk. You can cause damage to the hard disk or data corruption by switching off system power when the hard disk is reading or writing data. Do not switch off system power until after you have shut down the system correctly.
 -  Loss of data. Performing a system restore does not restore data or any additional files stored on the Marine Computer. Ensure all required data is backed up before performing a system restore.
 -  ESD risk. Make sure the Marine Computer has an earth lead connected to the chassis earth stud.
 -  ESD Risk. Electrostatic discharge can damage computer components. Use an anti-static wrist strap or an anti-static mat when handling electronic components.
 -  Operators should be aware that when used for regular navigation operations the metal casing of the marine PC can become warm.
-

Section 3 – Technical Description

3.1 Introduction

The Type 8026 Marine Computer is a versatile industrial specification, fanless embedded computer with a modern CPU architecture. It is designed for general marine purposes on the bridge, control rooms and other demanding environments. It is also used in conjunction with the Navigation Sensor Hub (NSH) and Ethernet Sensor Hub (ESH). It has been optimised to run Sonardyne's family of LBL and USBL navigational and positioning software applications.

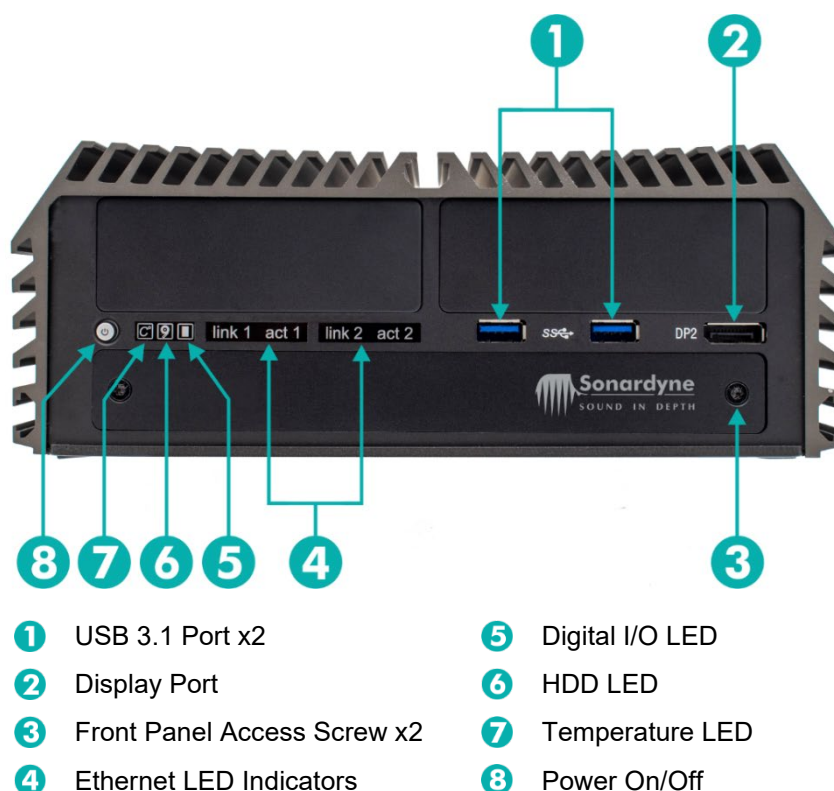
3.2 Description

The Marine Computer is designed to process the control and navigational data provided by Sonardyne's family of LBL and USBL navigational and positioning software applications. It can be desk mounted, vertically fixed or shelf mounted in a standard 19-inch rack (2U).

The Marine Computer incorporates a wide operating temperature solid state drive (SSD) together with Intel® 8th Gen modern architecture for improved performance and supports triple independent displays.

3.2.1 Front Features of the Standalone Marine Computer

Figure 3-1 Marine Computer Standalone Front View

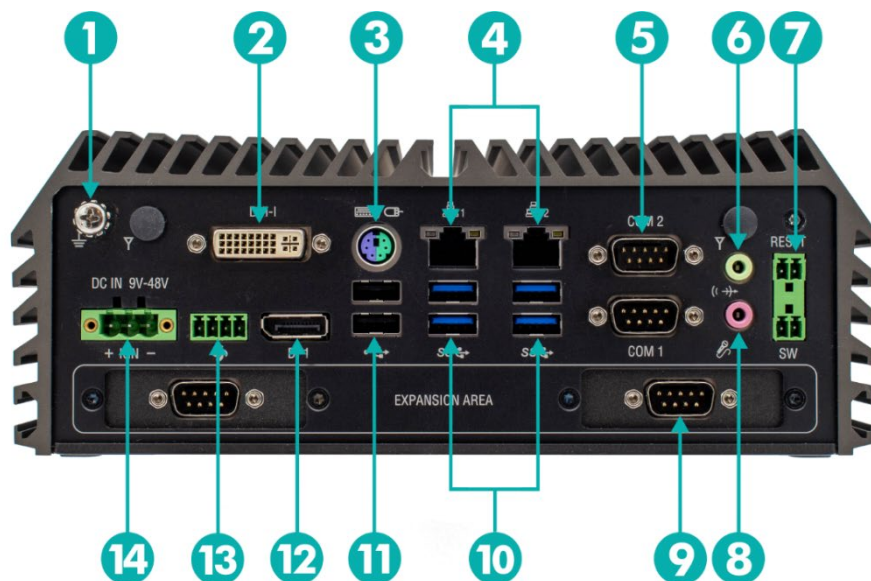


The front features of the Marine Computer when used freestanding/wall mounted include:

- USB 3.1 ports x2
- A removable front panel for fitting an additional SSD and replacing the CMOS battery.
- Display port.

3.2.2 Rear Features of the Marine Computer

Figure 3-2 Marine Computer Rear View




- | | |
|-------------------------------|----------------------|
| ① Earth Connection | ⑧ Microphone In |
| ② DVI-I Connector | ⑨ Serial Com Port x2 |
| ③ PS/2 Connector | ⑩ USB 3.0 Port x4 |
| ④ LAN Connector x2 | ⑪ USB 2.0 Port x2 |
| ⑤ Serial Com Port x2 | ⑫ Display Port |
| ⑥ Line In | ⑬ External Fan Power |
| ⑦ Remote Power Reset & On/Off | ⑭ DC In 9–48 V |

The rear features of the Marine Computer include:

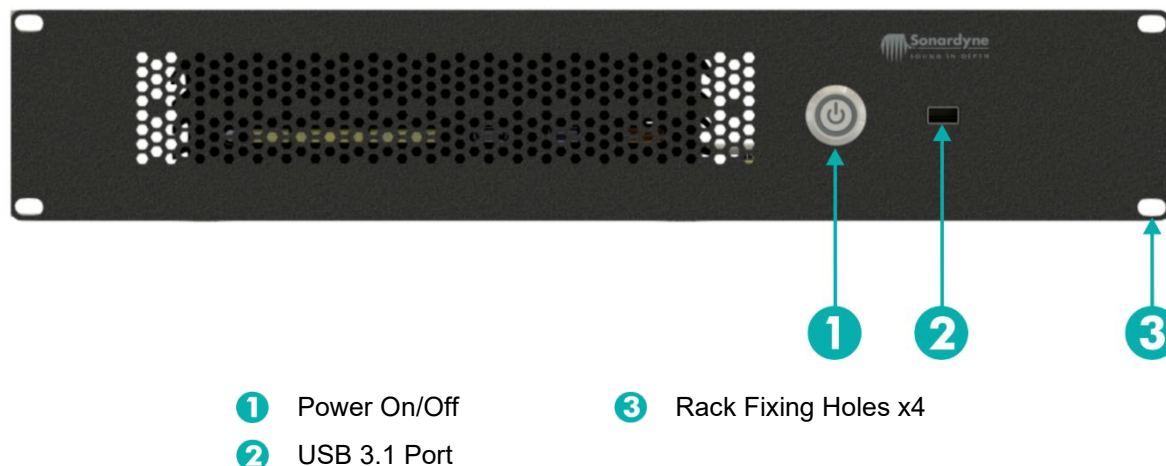
- DVI-I and display ports
- 4x USB 3.0, 2 x USB 2.0
- 4x RS232/422/485 serial ports (with auto flow control)
- 2x 1 Gbps Ethernet

Note

 Dual screen capabilities are available by using any combination of the DVI or Display ports. It is recommended that the additionally supplied DVI to VGA connector is used for connection to the video monitor. Use of the DVI or display ports can increase the EMC radiation levels conflicting marginally with the EN 60945 pass levels. These very stringent levels make it highly unlikely that any interference will be caused by other equipment, but should the DVI connection be used it is the responsibility of the system integrator to check there is no practical EMC interference to, or by, the Sonardyne Equipment caused by use of this interface.

3.2.3 Front Features of the Shelf Mounted Marine Computer

Figure 3-3 Marine Computer Shelf Mounted Front View



The front features of the Marine Computer when mounted in a shelf rack include:

- On/off switch
- USB 3.1 port

3.2.4 Marine Computer System Specification

See *Section 9 – Technical Specifications*.

Section 4 – Installation

4.1 Introduction








Before proceeding with installation of the Marine Computer, make sure *Section 2 – Safety* is read and fully understood.

The Marine Computer can be used either freestanding, wall mounted or shelf mounted in a standard 19" rack.

Note

 If the Marine Computer is replacing a previously installed Navigation Computer, the USB security key must first be removed from inside of the Navigation Computer; see *Appendix A*.

CAUTIONS

-  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.
 -  This equipment is intended to be used (and draw its power) within the Bridge and deck zone of the ship. In order to fall within acceptable limits for EN60945 and DNVGL-CG-0339 EMC standards (see Radiated and conducted emissions) it is mandatory to connect with the additional power supply filter part no: 517-0012.
 -  It is advisable to use a power outlet with a surge protector fitted. Preferably the Marine Computer should be supplied with power from an Uninterruptable Power Supply (UPS) to prevent vessel power interruptions affecting the computer operation.
 -  If the configuration of the rack prevents easy access to the rear of the Marine Computer, the rack ac power should be controlled by an isolation switch located in a position within easy reach of the operator. In the event of a fire or serious electrical malfunction within the rack, this will allow the operator to isolate the electrical supply quickly.
 -  It is recommended that hardware installations are located at least 10 metres from any VHF radio antennae operating in the 156–165 MHz band.
 -  Compass safe distance. Connecting cables should not be mounted within one metre of a navigational compass
 -  Operators should be aware that when used for regular navigation operations the metal casing of the marine PC when used in a can become warm.
-

4.2 Shelf Mounting the Marine Computer

The Marine Computer is designed to be installed in a 19" width rack between 242 and 619 mm depth, supported by two front and two rear mounting points.

Notes

 Front and rear/shelf support is essential to protect against shock and meet the vibration specifications detailed in *Section 9.1 "Marine Computer Specifications"*.

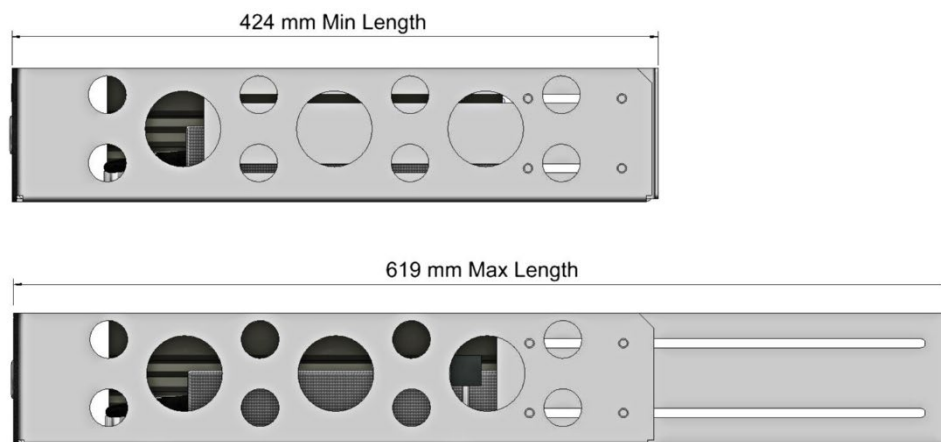
4.2.1 Shelf Mounting Installation

Before installation, inspect the rack to make sure the rear of Marine Computer will not be obstructed.



To secure the Marine Computer into the rack:

1. Remove any cables connected to the Marine Computer.
2. Carefully slide the Marine Computer fully into the rack.
3. Secure the front side panels to the front of the rack using four fixing bolts and washers.
4. Adjust the side sliding arms on each side to suit the depth of rack; align with the rear rack mountings and then tighten the four bolts on each side.



5. Secure the rear side panels to the rack using the four fixing bolts and washers.
6. Check that the shelf is mounted securely in the rack.
7. Connect the ac power lead to the 115/230 V ac IEC input connection on the rear of the Marine Computer.
8. Connect any peripheral cables to the rear of the Marine Computer.

4.3 Wall Mounting the Marine Computer

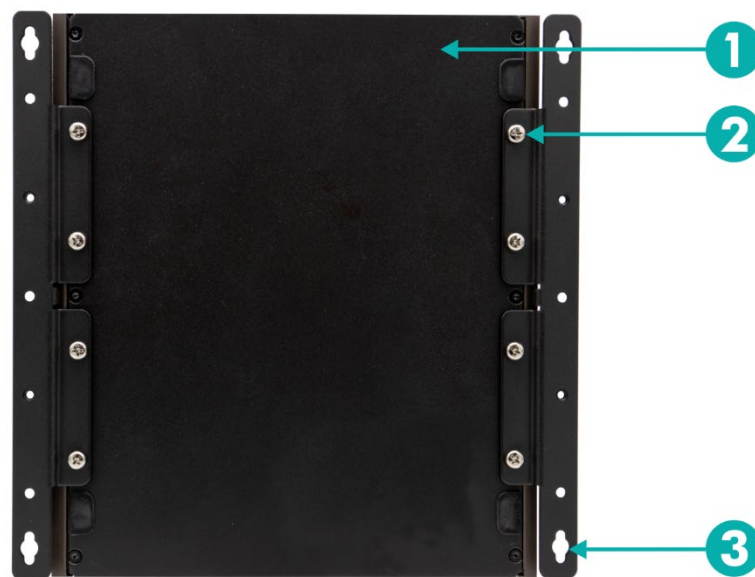
The Marine Computer can be wall mounted to a suitable fixing using the supplied brackets.

4.3.1 Wall Mounting Installation

1. Remove any cables connected to the Marine Computer.
2. The mounting brackets and screw set for mounting to the base of the Marine Computer are supplied.



3. Mount the two supplied brackets to the base **1** using the 8 screws and washers **2**.
4. Mount the Marine Computer using appropriate fixings (not supplied) through the four fixing holes **3** to a secure wall fixing.



5. Check the Marine Computer is mounted securely with no movement present.
6. Connect the ac power lead to the 115/230 V ac IEC input connection on the rear of the Marine Computer.
7. Connect any peripheral cables to the rear of the Marine Computer.

Section 5 – Operation

5.1 Introduction

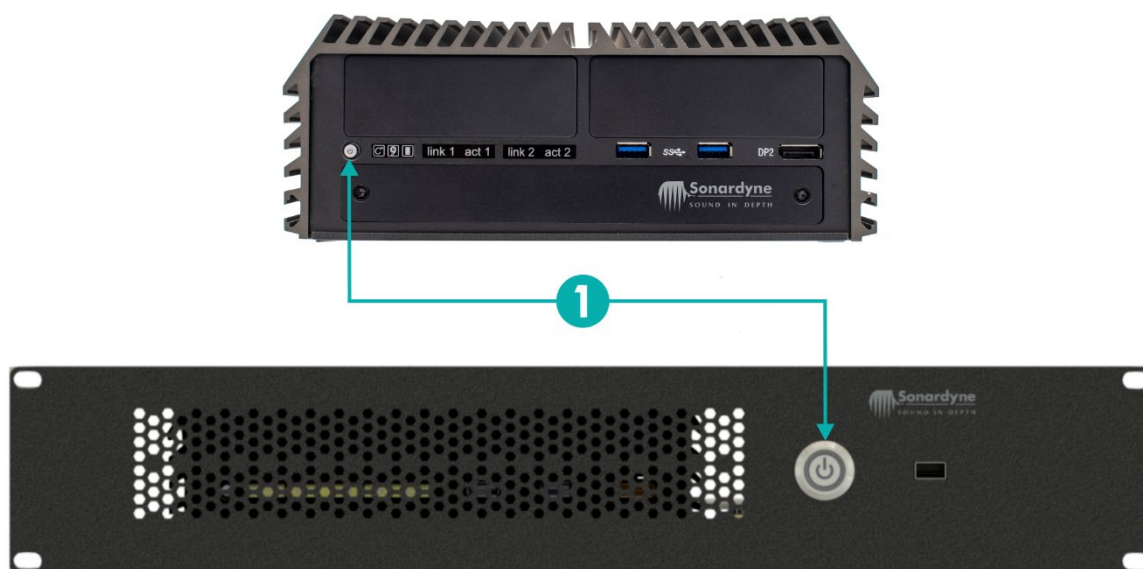
Before operating the equipment, make sure *Section 2 – Safety* is read and fully understood.

5.2 Operating the Marine Computer

5.2.1 Starting

Press the power button **1** to start the Marine Computer.

Figure 5-1 Marine Computer Power Button



8. The LED in the power button will illuminate to indicate it is powered.

5.2.2 Shutting Down

Always shut down the Marine PC using the normal Microsoft Windows® 10 shutdown. In the unlikely event that Windows has stopped responding, a power off can be forced; see (see *Section 5.2.3*).

5.2.3 Forcing Power Off

In the unlikely event that Windows stops responding, a hard power off can be performed.

CAUTION

! Forcing the power off can lead to corruption on the SSD causing possible permanent loss of personal files and data. In extreme circumstances it can lead to having to factory reset the computer and therefore this should only be used as a last recourse if Windows stops responding entirely.

1. Press and hold down the power button **1** (see *Figure 3-1*) for three seconds.
2. The power LED indicator will turn off when the computer has shut down.

3. If required, press the power button to start the computer again.

Note



It is likely that the computer will take longer to start while the operating system checks the SSD integrity.

Section 6 – Maintenance

Before any maintenance is performed, make sure *Section 2 – Safety* is read and fully understood.

6.1 Routine Maintenance

There are no routine maintenance activities necessary for the Marine Computer.

6.2 System Backup

It is the operator's responsibility to ensure that data and files on the Marine Computer are backed up on a regular basis to meet operational requirements.

Network connectivity, an additional drive bay and USB ports are provided for this purpose. Additional SSD drives can be ordered from Sonardyne.


6.3 System Restore

Performing a system restore restores the Marine Computer to the default factory configuration.

A USB flash drive containing the system restore files is supplied with the Marine Computer. If you have lost this device, contact Sonardyne Customer Support to obtain a replacement.

To restore the Marine Computer to factory configuration, proceed as follows:

CAUTION

 **Loss of data. Performing a system restore does not restore data or any additional files stored on the Marine Computer. Ensure all required data is backed up before performing a system restore.**

6.3.1 Initial Setup

1. Ensure the Marine Computer is powered OFF, and connected to a monitor, keyboard and mouse.
2. Insert the supplied system restore USB flash drive into a free USB port (front or back panel).
3. Familiarise yourself with the following steps before proceeding.

6.3.2 Setting the BIOS to boot from the USB flash drive

Note

 **The up/down/left/right arrow keys on the keyboard can be used to navigate the BIOS menus.**

1. Power on the Marine Computer and during start up, continuously press the **DELETE** key until **Entering Setup** is displayed.
2. On BIOS setup window, select the **Advanced** tab.
3. Select **CSM Configuration** and then press **Enter**.
4. Confirm the **CSM Support** status:
 - If **CSM Support** is set to **[Enabled]**, it must be disabled; see *Section 6.3.4 "Disabling CSM Support in the BIOS"*. Once disabled, return to *Step 1* above.
 - If **CSM Support** is set to **[Disabled]**, continue to *Step 5* below.
5. Press the **ESC** key to return to the **Advanced** tab.

6. Select the **Boot** tab, select **Boot Option #1** and then press **Enter**.
7. Select the boot disk option **UEFI: Generic USB Flash Disk 0.00, Partition 1** and then press **Enter**.
8. Confirm that **Boot Option #1** is now set to **[UEFI: Generic USB]**.
9. Select the **Save & Exit** tab, press **Enter** to **Save changes and Exit** and then press **Enter** to confirm.
10. The Marine Computer will restart and continue to boot from the system restore USB flash drive in preparation for installing Windows 10®.

6.3.3 Installing Windows 10

Installation

1. At the start of the Windows 10 installation, a command window will display the following instructions:
Disk 0 will be formatted and recovery image will be applied. Do you wish to proceed? (Y/N)
2. Type **Y** and press **Enter** to proceed with disk formatting (**Applying image** will display and the procedure will last approximately 12 minutes to complete).
3. When the message **Press any key to continue** displays, press **Enter**.
4. When the message **Disk 0 will be formatted and recovery image will be applied. Do you wish to proceed? (Y/N)** displays, select **N** and then press **Enter**.
5. Select **q** and press **Enter**.
6. Remove the system restore USB flash drive from the Marine Computer.
7. At the command prompt, type **exit** and then press **Enter**.
8. The Marine Computer will restart and boot from the internal hard drive. The Windows 10 installer will configure and after a short time will automatically restart again.

Windows 10 Initial Setup

The Marine Computer Windows 10 initial setup default factory configuration is shown below.

1. Region: **United Kingdom** and click **Yes**.
2. Keyboard: **United Kingdom** and click **Yes**.
3. **Second keyboard**: click **Skip**.
4. **Connect to network**: click **Skip for now**.
5. **Connect now to save time later**: click **No**.
6. Windows 10 will restart automatically.

After the restart:

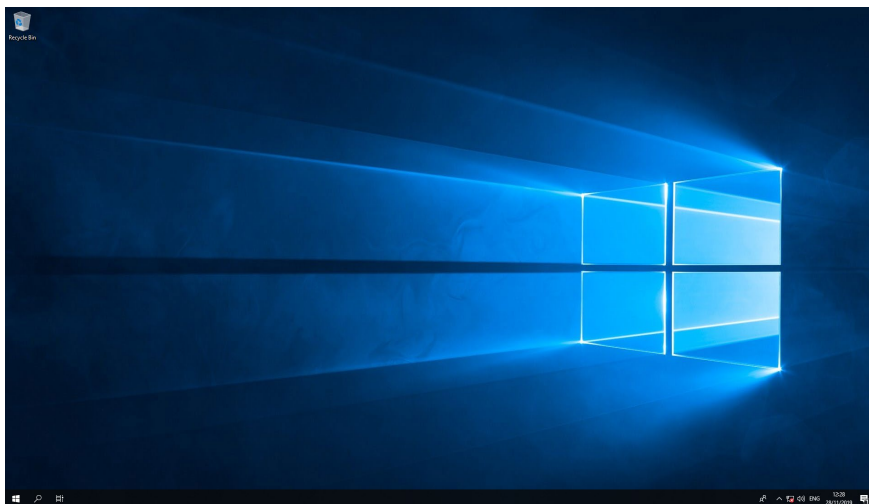
1. **Connect to network**: click **Skip for now**.
2. **Connect now to save time later**: click **No**.
3. **Windows 10 License Agreement**: click **Accept**.
4. Enter the username for this Marine Computer and click **Next**.
5. Enter your password and click **Next**.

6. Confirm the password: re-enter your password and click **Next**.
7. Create three security questions (click **Next** after entering each question).

Windows 10 Sonardyne Recommended Settings

The following Windows 10 setup procedures are not necessary for the Marine Computer working environment. Sonardyne recommends the following settings:

1. **Do more across devices with activity history**: click **NO**.
2. **Do more with your voice**: click: **Don't use online speech recognition** and then **ACCEPT**.
3. **Let Microsoft and apps use your location**: click **No** and then **ACCEPT**.
4. **Find my device**: click **No** and then **ACCEPT**.
5. **Send diagnostic data to Microsoft**: click **Basic** and then **ACCEPT**.
6. **Improve inking & typing**: click **No** and then **ACCEPT**.
7. **Get tailored experiences with diagnostic data**: click **No** and then **ACCEPT**.
8. **Let apps use advertising ID**: click **No** and then **ACCEPT**.
9. When you see the following screen the Marine Computer is restored and ready for your end user software to be installed.



6.3.4 Disabling CSM Support in the BIOS

The BIOS must have **CSM Support** set to **[Disabled]** for the system restore procedure to run.

To disable CSM Support in the BIOS:

1. Ensure the Marine Computer is powered OFF, and connected to a monitor, keyboard and mouse.
2. Ensure the system restore USB flash drive is NOT connected to the Marine Computer.
3. Power on the Marine Computer and during start up, continuously press the **DELETE** key until **Entering Setup** is displayed.
4. On BIOS setup window, select the **Save & Exit** tab.
5. Select **Restore Defaults** and then press **Enter**.
6. Press **Enter** to **Load Optimized Defaults**.
7. Select **Save Changes and Exit** and then then press **Enter**.

8. Press **Enter** again to confirm and then enter the BIOS as described in *Step 3* above.
9. On BIOS setup window, select the **Advanced** tab.
10. Select **CSM Configuration** and then press **Enter**.
11. Select **Video** and then press **Enter**.
12. Select **[UEFI]** and then press **Enter**.
13. Press the **ESC** key to return to the **Advanced** tab.
14. Select the **Save & Exit** tab, press **Enter** to **Save changes and Exit**.
15. Press **Enter** again to confirm and then enter the BIOS as described in *Step 3* above.
16. On BIOS setup window, select the **Advanced** tab.
17. Select **CSM Configuration** and then press **Enter**.
18. Confirm **CSM Support** is highlighted (white) and then press **Enter**.
19. Set **CSM Support** to **[DISABLED]** and then press **Enter**.
20. Press the **ESC** key to return to the **Advanced** tab.
21. Select the **Save & Exit** tab, press **Enter** to **Save changes and Exit**.
22. Press **Enter** again to confirm and then enter the BIOS as described in *Step 3* above.
23. When the BIOS window opens, turn off the power to the Marine Computer.
24. The BIOS **CSM Support** is now **[Disabled]**.

6.4 Replacing the BIOS Battery

Over the long life of the Marine Computer it may be necessary to replace the BIOS battery.

6.4.1 Tools Required

- T10 Torx screwdriver
- PH0 Phillips screwdriver
- Small flat bladed screwdriver
- Thin nosed pliers
- High temperature rated CR2032 battery

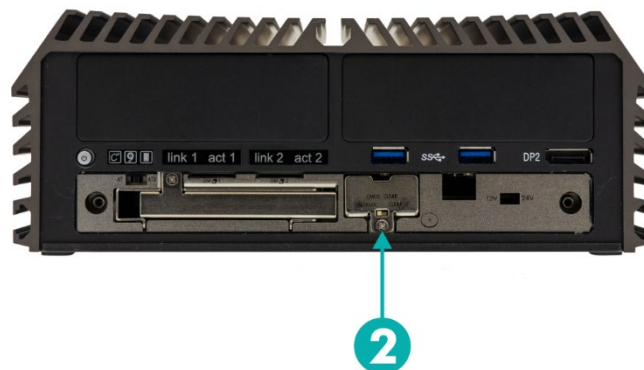
6.4.2 Replacement Instructions

To replace the BIOS battery:

1. Wear appropriate safety and antistatic PPE as defined in *Section 2 – Safety*.
2. Ensure the Marine Computer is turned off and unplugged from all other equipment, devices and power.
3. Using the T10 Torx screwdriver remove the two front maintenance panel retaining screws **1** and then remove the front panel.



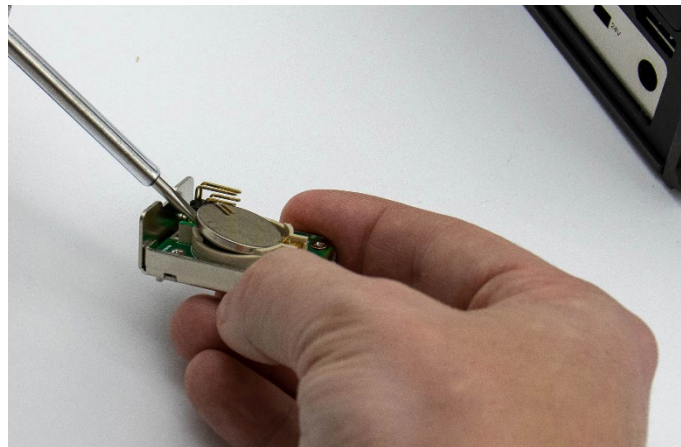
4. Remove the BIOS battery holder retaining screw **2**.



5. Carefully pull the BIOS battery holder from the front panel.



6. Using a suitable small bladed screwdriver, carefully lever out the BIOS battery and replace it with a battery of the same specification.



7. Insert the BIOS battery holder carefully into the front of the unit (do not be too forceful or the pins may bend) and then tighten the retaining screw.
8. Replace the maintenance panel and tighten the two retaining screws.
9. Start the Marine Computer and reset the date/time of the Marine Computer in the BIOS (if necessary); see *Section 6.3 "System Restore"* for a description of how to enter the BIOS.

6.5 Adding an SSD Hard Drive

An additional SSD hard drive can be added to increase the storage capacity of the Marine Computer. The SSD hard drive bay is located behind the maintenance panel.

CAUTION

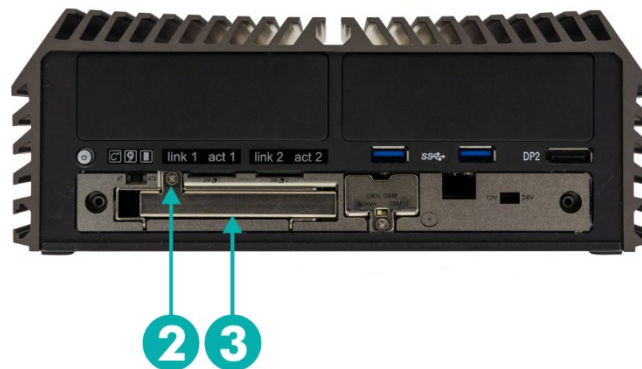
 The additional SSD hard drive must meet the same specifications as the installed SSD hard drive; contact Sonardyne Support for specification and configuration details.

To access the SSD hard drive bay:

1. Using a T10 Torx screwdriver remove the two front maintenance panel retaining screws **1** and then remove the front panel.



2. Remove the SSD cage retaining screw **2** and then open the cage locking arm **3**.



3. Carefully pull out the cage.
4. Install the replacement SSD hard drive into the cage and then secure using the SSD retaining screws (supplied with the SSD drive).
5. Carefully slide the SSD cage into the bay and lock in place with the cage locking arm.
6. Secure the SSD cage by tightening the retaining screw.
7. Start the Marine Computer and configure the new SSD drive in Windows 10; contact Sonardyne Support for more information.

Section 7 – Fault Diagnosis

7.1 Troubleshooting

Fault	Possible Cause	Action
No power/Marine Computer won't start	The ac supply is not within specification.	Check the ac power supply meets the Navigation Computer's specification; see <i>Section 9.1</i> .
	The ac power cable is not connected correctly.	Check the ac power supply cable is connected correctly.
Temperature warning displayed on front	Temperature of the environment and unit are above 70°C	Ensure that the temperature in the environment where the Marine Computer is being used is brought down below 70°C. If the PC is being used in an enclosed environment, ensure there is forced airflow across the fins (by using an external fan).
Other faults	Various	Contact Sonardyne Support

Section 8 – Spares

8.1 Introduction

When ordering spare parts, please provide the part number (CPN) and a description.

Enquiries about, or orders for spare parts should be directed to your local Sonardyne office or agent. For addresses and contact details, see the back page of this manual or visit our website at <https://www.sonardyne.com/get-in-touch/>.

8.2 Spare Parts

The following spare parts are available:

Part Number (CPN)	Description
265-5831	512 GB wide operating temperature SSD hard drive
650-0219	Connector Pack (typically used when installing to a bulkhead) (1 x dc power terminator, 1 x sw reset terminator, 1 x reset terminator, 1 x fan terminator)

Section 9 – Technical Specifications

9.1 Marine Computer Specifications

Feature		Specification
Processor		Intel® i7 8700T Hexacore 2.6 GHz
RAM		8 GB 2666 MHz DDR4 RAM (Non-ECC, Un-buffered)
Hard Disk		Single 512 GB wide operating temperature SSD
Drives		Additional 2.5" SATA drive bay
Ports		1x DVI, 2 x display port, 2x USB 3.1 Gen2, 4x USB 3.0, 2x USB 2.0, 4 x RS232/422/485 serial ports (with auto flow control), 1 x PS2 port, 1 x Line in, 1 x Mic in, 1 x Phone jack 3.5mm, External Fan port, external power port, external reset port
Network		2 x 1 Gbps Ethernet
Power In		Auto sensing ac voltage 115/230 V, 60/50 Hz Max power input 221 W Input current: 2 A @ 230 V
Audio		Realtek® ALC888 High definition audio
Video		Supports triple independent display
Environmental Specifications	Operating Temperature	-15 to 70°C (5 to 158°F)
	Storage Temperature	-15 to 70°C (5 to 158°F)
	Relative Humidity	95% @70°C (non-condensing)
	Vibration	5 Grms, 5-500Hz, 3 Axes according to IEC60068-2-64
	Shock	50 Grms, Half-sine 11ms Duration according to IEC60068-2-27
Intended Use		Indoor use (including bridge), altitude up to 2000 m, continuous operation
EMC		Immunity & Emission EN 60945 & DNVGL-CG-0339 compliant*
Dimensions – Unmounted (WxDxH)		227 x 261 x 88 mm (8.9 x 10.3 x 3.5")
Dimensions – Shelf Mounted (WxDxH)		482 x 423 x 88 mm (19.0 x 16.7 x 3.5")
Weight – Unmounted		4.3 kg
Weight – Shelf Mounted		10.5 kg

*Additional ac filter required (part no: 517-0012)

9.2 Storage

The Marine Computer should be stored and inspected as follows:

- Store in the original packaging provided.
- Carry out an annual visual check of equipment to ensure there are no signs of damage or water ingress.

Note



The internal BIOS battery shelf life is greater than five years.

Appendix A – Removing the Internal Security Key from a Navigation Computer

When replacing the Navigation Computer with a Marine Computer, the internal USB security key must first be removed from the Navigation Computer.

To remove the security key:

1. Turn off power to the Navigation Computer.
2. Remove the 13 M3x6 countersunk screws from the top lid.

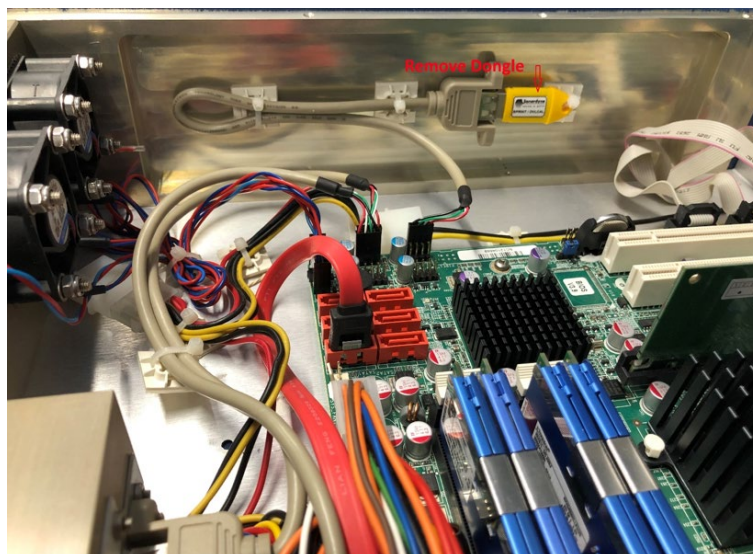


Note



Ensure ESD procedures are followed prior to opening the Navigation Computer top lid.

3. Remove the lid and then remove the security key from the USB connector on the side panel of the case.



Definitions

Term	Definition
BIOS	Basic Input/Output System. Built into the computer and is the first software run by a computer when powered on to initialize and test the system hardware components, and to load an operating system or other programs from a mass memory device.
DVI	Digital Video Interface
EMC	Electromagnetic Compatibility
EN60945:2002	Maritime navigation and radio communication equipment and systems. General requirements. Methods of testing and required test results.
ESD	Electrostatic Discharge
ESH	Ethernet Sensor Hub
HDD	Hard Disk Drive
I/O	Input/Output
IEC	International Electro-technical Commission
LAN	Local Area Network
LBL	Long BaseLine A system where two or more transponders are on the seabed. The positions of the transponders are established by a calibration process in a seabed frame. The distances from a transducer to each transponder are measured using a transceiver. The position of the transducer can be computed in the seabed frame. The name comes from the "baselines" joining each transponder
LED	Light Emitting Diode
NSH	Navigation Sensor Hub
PSU	Power Supply Unit
Sonardyne	Sonardyne International Limited and its affiliates.
SSD	Solid State Drive
UPS	Uninterrupted Power Supply
USB	Universal Serial Bis
USBL	Ultra-Short BaseLine A system similar to an SBL system except the system uses three or more elements in a single transducer array. The measurements it makes are the differences in "time-phase" of the signals from each element. The co-ordinate frame is fixed to the transducer array which must be oriented in the vessel frame to the equivalent to the SBL
V ac	Volts alternating current
V dc	Volts direct current
VGA	Video Graphics Array

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