

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

SeaLINK+4

User Manual | 2403



SEALEVEL®

© Sealevel Systems, Inc.

SEALEVEL®

Contents

CONTENTS 2

REGULATORY 3

BEFORE YOU GET STARTED 4

PRODUCT DESCRIPTION 5

ELECTRICAL SPECIFICATIONS 10

TECHNICAL SPECIFICATIONS 12

HARDWARE CONFIGURATION 13

INSTALLATION 17

APPENDIX A – TROUBLESHOOTING 25

APPENDIX B – HANDLING INSTRUCTIONS 29

APPENDIX C – ELECTRICAL INTERFACE 30

APPENDIX D – ASYNCHRONOUS COMMUNICATIONS 31

APPENDIX E – COMPLIANCE NOTICES 32

APPENDIX F – HOW TO GET ASSISTANCE 34

WARRANTY 35

Regulatory

Federal Communications Commission (FCC) Statement



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Before You Get Started

What's Included

The 2403 is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **2403 – USB to RS-232/422/485 4-Port Serial Interface Adapter**
- **CA179 – USB Device Cable for Connecting to Upstream Host/Hub**

Advisory Conventions



Warning
The highest level of importance used to stress a condition where damage could result to the product, or the user could suffer serious injury.



Important
The middle level of importance used to highlight information that might not seem obvious or a situation that could cause the product to fail.



Note
The lowest level of importance used to provide background information, additional tips, or other non-critical facts that will not affect the use of the product.

Product Description

The SeaLINK® 2403 USB serial I/O adapter equips the PC with four RS-232, RS-422, or RS-485 asynchronous serial ports for USB connectivity to legacy or non-USB compliant devices. The advantage of this product over more traditional approaches is that it does not require opening the computer case, nor does it require resources such as I/O ports or IRQ's. It does require a system that supports USB both in terms of hardware and operating system.

Sealevel SeaCOM USB software drivers and utilities make installation and operation easy using Microsoft Windows and Linux operating systems. After installing the software, simply connect the 2403 serial interface adapter to your USB port. The device and serial ports are immediately recognized as standard COM ports by the host system enabling compatibility with legacy software. Now your non-USB peripherals can have the same connection simplicity and ease of use as USB aware peripherals.

Features

- Compliant with RoHS and WEEE directives
- Each port individually configurable for RS-232, RS-422, or RS-485
- High-speed UART with 128-byte Tx FIFO and 384-byte Rx FIFO
- Data rates from 300 bps to 921.6 Kbps
- Automatic RS-485 enable/disable
- Serial and USB activity LEDs
- Hot-swappable
- Powered by USB connection
- Sealevel SeaCOM software supports Microsoft Windows and Linux operating systems
- DB9M connectors
- Includes 6' USB device cable (Item# CA179)

.



© Sealevel Systems, Inc.

Optional Items

Depending upon your application, you are likely to find one or more of the following items useful. All items can be purchased from our website (www.sealevel.com) by calling our sales team at (864) 843-4343.

Cables

Terminal Block - DB9 Female to 5 Screw Terminals (RS-422/485) (Part# TB34)	
The TB34 terminal block adapter offers a simple solution for connecting RS-422 and RS-485 field wiring to a serial port. The terminal block is compatible with 2-wire and 4-wire RS-485 networks and matches the RS-422/485 pin-out on Sealevel serial devices with DB9 male connectors. A pair of thumbscrews secures the adapter to the serial port and prevents accidental disconnection. The TB34 is compact and allows multiple adapters to be used on multi-port serial devices, such as Sealevel USB serial adapters, Ethernet serial servers and other Sealevel serial devices with two or more ports.	
DB9F to DB25M (RS-485) Extension Cable (Part# CA177)	
The CA177 is a standard AT-style RS-232 modem cable with a DB9F connector on one end and a DB25M connector on the other. This cable is 72 inches in length.	
DB9F to DB9M Extension Cable (Part# CA127)	
The CA127 allows users to extend a DB9 cable up to six feet. The connectors are pinned one-to-one, so the cable is compatible with any device or cable that has DB9 connectors.	
DB9 Female to 9 Screw Terminal (Part# TB05)	
The TB05 terminal block breaks out a DB9 connector to 9 screw terminals to simplify field wiring of serial connections. It is ideal for RS-422 and RS-485 networks, yet it will work with any DB9 serial connection, including RS-232. The TB05 includes holes for board or panel mounting. The TB05 is designed to connect directly to Sealevel DB9 serial cards or any cable with a DB9M connector.	

Optional Items, Continued

Hubs

High Speed 4-Port USB 2.0 Hub with SeaLATCH USB Ports (Part# HUB4PH)

The hub is USB 2.0 compliant, providing a full 480M bps data rate to the host, and is backwards compatible with USB 1.1 and 1.0 devices. The HUB4PH includes a wall-mount AC adapter that supplies a full 500mA to each attached USB peripheral. The power supply outputs 5VDC @ 2.4A and has a locking DC connector to prevent accidental removal of the power cable.



High Speed 7-Port USB 2.0 Hub (Part# HUB7P)

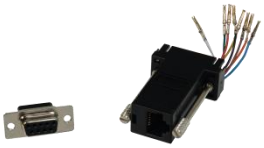
The HUB7P is USB 2.0 compliant, providing a full 480M bps data rate to the host, and is backwards compatible with USB 1.1 and 1.0 devices. The powered hub includes a wall-mount AC adapter that supplies a full 500mA to each attached USB peripheral. The power supply outputs 5VDC @ 4A and has a locking DC connector to prevent accidental removal of the power cable. The hub is housed in a rugged plastic enclosure and status LEDs indicate external power, connection to the host, and fault conditions.



Adapters and Converters

DB9F to RJ45 Modular Adapter (Item# RJ9S8)

The RJ9S8 is a DB9 female to RJ45 adapter. It can be configured without tools and is an excellent choice for using available infrastructure wiring.



DB9 Female to DB9 Male - Serial Surge Suppressor (Part# SS-DB9)

User configurable for use with male or female DB9 ports, the SS-DB9 protects all 9 lines, plus D shell chassis. Convenient DB9 input and output connects directly to the protected port, obtaining a ground outlet from the computer chassis. Surge suppression is handled with balanced arrays of high-speed avalanche diodes that divert excess energies created by electrostatic discharges, faulty wiring, or lightning away from network interface connections.



Product Family

Whether you require one serial port or 16, SeaLINK USB serial adapters will have you quickly communicating with RS-232, RS-422, and RS-485 peripherals. Unlike traditional UART-based devices, SeaLINK USB products use a state-machine architecture that reduces host processor overhead for faster, more reliable communications. Sealevel's SeaCOM software drivers and utilities make installation and operation easy using Microsoft Windows and Linux operating systems.

Part No.	Description
2105R	USB to 1-Port RS-232 DB9 Serial Interface Adapter
2106	USB to 1-Port RS-422 DB9 Serial Interface Adapter
2107	USB to 1-Port RS-485 DB9 Serial Interface Adapter
2113	USB to 1-Port RS-232, RS-422, RS-485 DB9 Serial Interface Adapter
2123	USB to 1-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter
2101	USB to 1-Port RS-232 DB25 Serial Interface Adapter
2102	USB to 1-Port RS 422, RS-485, RS-530 DB25 Serial Interface Adapter
2103	USB to 1-Port Isolated RS-232 DB25 Serial Interface Adapter
2104	USB to 1-Port RS 422, RS-485, RS-530 DB25 Serial Interface Adapter
2108	Embedded USB to 1-Port RS-232 DB9 Serial Interface Adapter with Low Profile PC Bracket
2128	Embedded USB to 1-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter with PC Bracket
2201	USB to 2-Port RS-232 DB9 Serial Interface Adapter
2202	USB to 2-Port RS-422, RS-485 DB9 Serial Interface Adapter
2203	USB to 2-Port RS-232, RS-422, RS-485 DB9 Serial Interface Adapter
2208	Embedded USB to 2-Port RS-232 DB9 Serial Interface Adapter with Standard Size PC Bracket
2213	USB to 2-Port Isolated RS-232, RS-422, RS-485 DB9 Serial Interface Adapter
2223	USB to 2-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter
2228	Embedded USB to 2-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter with PC Bracket
2401	USB to 4-Port RS-232 DB9 Serial Interface Adapter
2402	USB to 4-Port RS-422, RS-485 DB9 Serial Interface Adapter
2403	USB to 4-Port RS-232, RS-422, RS-485 DB9 Serial Interface Adapter

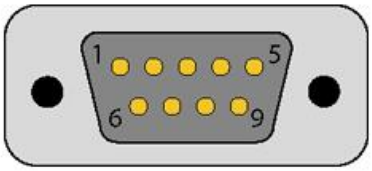
Product Family, Continued

Part No.	Description
2404	USB to 4-Port RS-232 RJ45 Serial Interface Adapter
2407	USB to 4-Port RS-232, RS-485 RJ45 VersaCom Serial Interface Adapter
2423	USB to 4-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter
2433	USB to 4-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter
641U	USB to RS-232 RJ45 Serial Interface Adapter
647U	USB to RS-232, RS-485 RJ45 VersaCom Serial Interface Adapter
2801	USB to 8-Port RS-232 DB9 Serial Interface Adapter
2802	USB to 8-Port RS-422, RS-485 DB9 Serial Interface Adapter
2803	USB to 8-Port RS-232, RS-422, RS-485 DB9 Serial Interface Adapter
2804	USB to 8-Port RS-232 RJ45 Serial Interface Adapter
2807	USB to 8-Port RS-232, RS-485, RJ45 VersaCom Serial Interface Adapter
2823	USB to 8-Port RS-232, RS-422, RS-485 (Software Configurable) DB9 Serial Interface Adapter
2833	USB to 8-Port RS-232, RS-422, RS-485 DB9 Serial Interface Adapter
681U	USB to RS-232 RJ45 Serial Interface Adapter
687U	USB to RS-232, RS-485 RJ45 VersaCom Serial Interface Adapter
2161	USB to 16-Port RS-232 RJ45 Serial Interface Adapter
2167	USB to 16-Port RS-232, RS-485 RJ45 VersaCom Serial Interface Adapter

Electrical Specifications

The 2403 utilizes four USB UARTs. These chips feature programmable baud rate, data format, 128-byte dual-port TX buffer, and 384-byte dual-port RX buffer. The RS-232/422/485 transceiver supports data rates from 300 baud up to 921.6 K baud for RS-422/485 and 460.8 K baud for RS-232. Refer to Appendix C for cable length limitations.

Connector Pin Out



RS-232 (DB9 Male)

Pin #	Signal	Name	Mode
1	DCD	Data Carrier Detect	Input
2	RD	Receive Data	Input
3	TD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Ground	
6	DSR	Data Set Ready	Input
7	RTS	Request To Send	Output
8	CTS	Clear To Send	Input
9	RI	Ring Indicator	Input

Please terminate any control signals that are not going to be used. The most common way to do this is connect RTS to CTS and RI. Also, connect DCD to DTR and DSR. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

© Sealevel Systems, Inc.

Electrical Specifications, Continued

RS-422 & RS-485 (DB9 Male)

Pin #	Signal	Name	Mode
1	RX +	Receive Data Positive	Input
2	RX –	Receive Data Negative	Input
3	TX –	Transmit Data Negative	Output
4	TX +	Transmit Data Positive	Output
5	GND	Ground	
6	RTS +	Request to Send Positive	Output
7	RTS –	Request to Send Negative	Output
8	CTS –	Clear to Send Negative	Input
9	CTS +	Clear to Send Positive	Input

Technical Specifications

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0° to 70° C (32° to 158° F)	-50° to 105° C (-58° to 221° F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Power Requirements

Supply line	+5 VDC
Rating	500 mA

Manufacturing

All Sealevel Systems, Inc. printed circuit boards are built to UL 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Mean Time Between Failure (MTBF)

Greater than 150,000 hours (calculated).

Hardware Configuration

Original Configuration

This 2403 ships from Sealevel Systems with the following configuration:

- RS-422 mode
- 120 ohm termination
- 1 K ohm pull up on RX+
- 1 K ohm pull down on RX-

In order to change this configuration, the enclosure must be opened by removing the four screws located on the bottom. When reassembling please note that the top and bottom halves of the enclosure are keyed to fit in only one direction.

Electrical Interface Selection

Each of the four serial ports on the 2403 can be individually configured as an RS-232, RS-422, or RS-485 interface. This is selectable via the DIP switches and DIP shunts located on the circuit board (PCB). Each of the switch positions is described on the following page.

© Sealevel Systems, Inc.

Hardware Configuration, Continued

Switch Descriptions

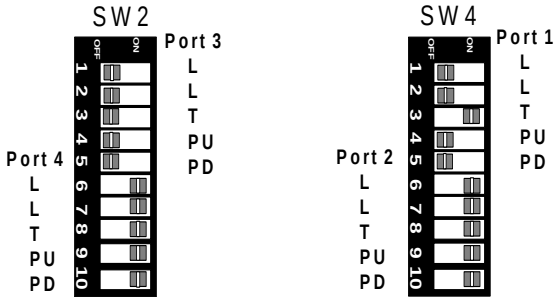


Figure 1: Switches SW2 and SW4

L RS-485 option, OFF for RS-422.
OFF: No effect
ON : Connects TX+ to RX+ for two-wire operation

L RS-485 option, OFF for RS-422.
OFF: No effect
ON : Connects TX- to RX- for two-wire operation

T RS-422 and RS-485 option.
OFF: No effect
ON : Adds a 120 ohm termination resistor between RX+ and RX-

PU RS-485 option, OFF for RS-422.
OFF: No effect
ON : Adds a 1 K ohm pull-up resistor to RX+

PD RS-485 option, OFF for RS-422.
OFF: No effect
ON : Adds a 1 K ohm pull-down resistor to RX-

© Sealevel Systems, Inc.

Switch Examples



Figure 2: RS-422/485 Interface Configuration

485 Mode Selection

OFF: RS-422 Mode

The transmitter lines TX+ and TX- are always driven

ON: RS-485 Mode

The transmitter lines TX+ and TX- are switched to high impedance when the device is not actively transmitting data

NE RS-485 option, OFF for RS-422

OFF: The receiver is always enabled. In a two-wire setup the receiver will echo back all transmitted data.

ON: The receiver is disabled when the transmitter is enabled. In a two-wire setup the receiver will not echo back transmitted data.

Switch positions 1 and 2 are for port 1 and switch positions 3 and 4 for port 2 on SW3. Switch positions 1 and 2 are for port 3 and switch positions 3 and 4 for port 4 on SW1.

© Sealevel Systems, Inc.

Switch Examples Continued

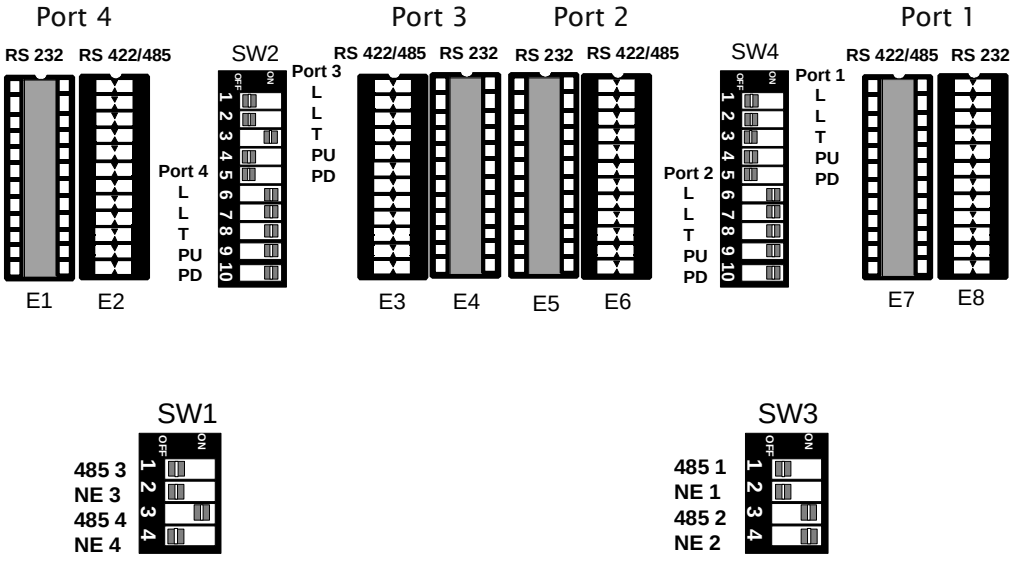


Figure 3: Electrical Interface Configuration

Port 1: RS-232
This is not a valid configuration for the 2402.
The switches will have no effect.

Port 2: RS-485 two wire communication with no echo.
The corresponding shunt is in the 422/485 position.
Switches 485 2, NE 2, and Port 2 L, L, T, PU, and PD are all in the ON position.

Port 3: RS-422 with 120 ohm termination.
The corresponding shunt is in the 422/485 position.
Switches 485 3, NE 3, and Port 3 L, L, PU, and PD are all in the OFF position,
T is in the ON position.

Port 4: RS-485 two wire communication with echo.
The corresponding shunt is in the 422/485 position.
Switches 485 4, and Port 4 L, L, T, PU, and PD are all in the ON position,
NE 4 is in the OFF position.

© Sealevel Systems, Inc.

Installation

Instructions For Software Installation Download

1. To obtain the most current software driver package from Sealevel's website, download from here:

   - SeaCOM for Windows
   - SeaCOM for Linux

2. Click on the SeaCOM link in the 'Downloads' section to download the current driver.

3. Once downloaded, double-click on the executable to launch the InstallShield wizard and initiate the driver installation.

4. SeaCOM software can also be downloaded from the 2403 product webpage: https://www.sealevel.com/product/2403

SeaCOM Software Installation



To install Sealevel Systems software, you must log in as an administrator or have administrator privileges in Windows.



For Windows XP and older versions of Windows, do not connect the device to a USB port until after the software has been successfully installed. In Windows Vista and newer versions of Windows, SeaCOM version 3.6.30 and later will install SeaCOM hardware that is already connected.

1. Locate the file on your computer (e.g., SS030703.exe), right-click on the filename, and click 'Run as Administrator' in the fly-out menu.

2. When the 'SeaCOM - InstallShield Wizard' window appears, click the 'Next' button to initiate the software installation.

3. When the 'License Agreement' window appears, accept the terms, and click 'Next' to continue. You can click the 'Print' button to print out a copy of the agreement for your records. If you do not accept the terms of the agreement, the installation will stop.

4. When the 'Ready to Install the Program' window appears, click the 'Install' button to install the software. The files will be automatically installed into the 'C:\Program Files (x86)' folder on your computer.

5. The setup file will automatically detect the operating environment and install the proper components. Once the installation is complete, close the SeaCOM installer window.

6. You have completed the software driver installation process.

7. Refer to the Physical Installation section to connect and install your adapter.

Upgrading To The Current SeaCOM Driver

1. Download the current driver using the Instructions from the 'Software Installation Download' section above. Please take note of the destination directory to which it will save.

2. Uninstall the currently loaded SeaCOM software found in the 'Apps and Features' (Windows 10 or newer) or 'Programs and Features' (Windows 8.1 and older) list.

3. Navigate to Device Manager and remove the 2403 by right clicking on the line items in 'Universal Serial Bus controllers' and choosing 'Uninstall'.

4. In the Device Manager under 'Action,' choose 'Scan for Hardware changes. This will prompt the installation of the adapter and associate it with the newly installed SeaCOM driver.

5. Proceed with the hardware installation of your SeaLINK USB serial adapter.

Installation, Continued

Hardware Installation

The 2403 can be connected to any Upstream Type A USB port at the PC host or an Upstream Hub. Since it is hot-pluggable, there is no need to power down your computer prior to installation. Once you have installed the software simply plug the USB connector into an available USB port. The drivers that were installed during setup will automatically be used to configure the adapter.

Verifying Installation

To confirm that the serial ports have been successfully installed, look in Device Manager under 'Ports (COM & LPT).' The COM assignments will be included with the associated COM numbers in parentheses.

To access Device Manager in Windows 10:

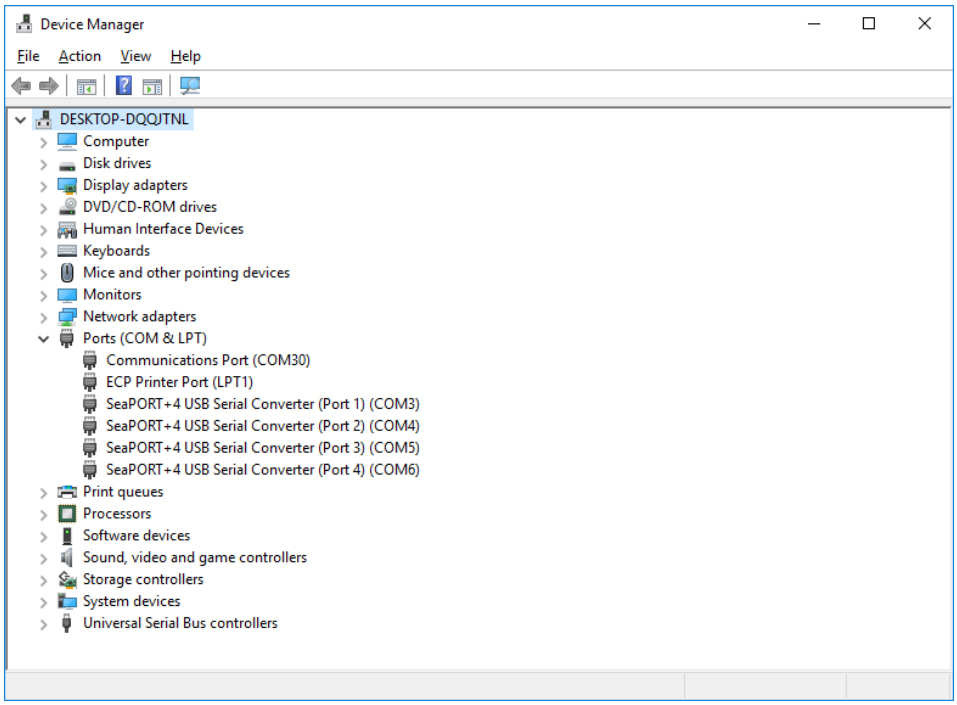
1. Right-click on the Start button (Windows logo).
2. In the fly-out menu, click 'Device Manager.'
3. Continue with step 4 below.

To access Device Manager in Windows 7:

1. Right-click on 'Computer' in the Start menu.
2. Click 'Manage' in the fly-out menu to launch the 'Computer Management' console window.
3. In the left pane under 'System Tools,' click 'Device Manager.'
4. In right pane near the bottom, expand the 'Ports (COM & LPT)' section by clicking the '>' symbol.
5. You should now see the COM assignments with the associated COM numbers in parentheses.



Your system will assign the next available COM numbers, which will vary by computer (COM 3-6 as shown in this example).



Uninstall & Upgrade Instructions

The SeaCOM software program adds entries to the system registry that are necessary for specifying the operating parameters for your device. To completely remove the hardware and associated software, follow the steps in the order that they appear.

To upgrade to the latest version of SeaCOM, follow the instructions to uninstall the hardware and software, followed by the upgrade instructions.

Start with the hardware connected to a USB port. Do not unplug it until instructed to do so.

Remove Hardware Using Device Manager

To access Device Manager in Windows 10:

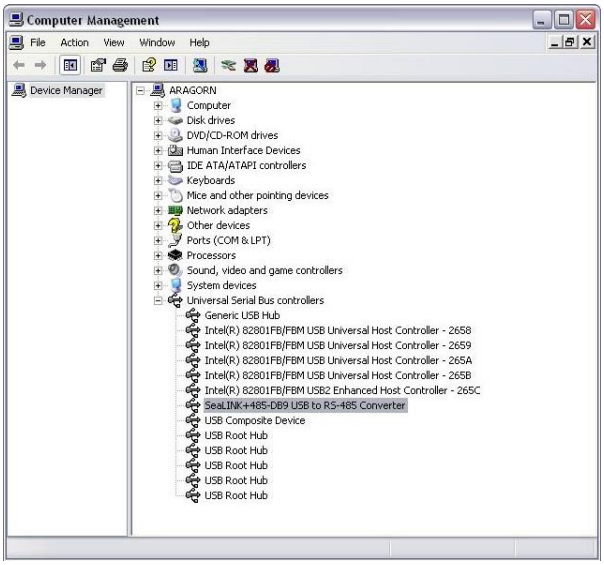
1. Right-click on the Start button.
2. In the fly-out menu, click 'Device Manager.'
3. In Device Manager, open the 'View' menu and select 'Show hidden devices.'
4. Continue with Step 4 below.

© Sealevel Systems, Inc. 2403 Manual | SL9102 6/2021

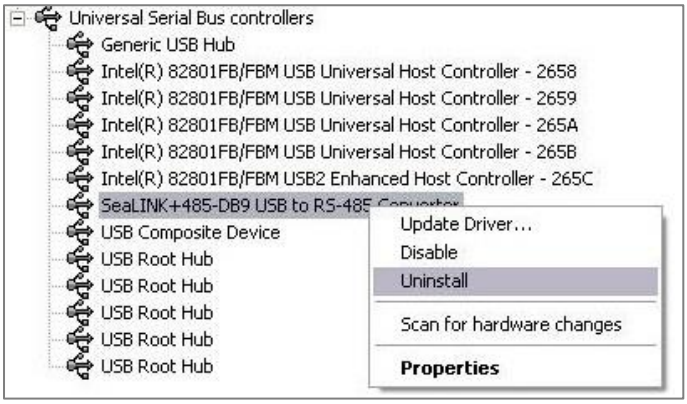
Installation, Continued

To access Device Manager in Windows 7:

1. Right-click on 'Computer' in the Start menu.
2. Click 'Manage' in the fly-out menu to launch the 'Computer Management' console window.
3. In the left pane under 'System Tools,' click 'Device Manager.'
4. In right pane near the bottom, expand the 'Universal Serial Bus controllers' section by clicking the '>' symbol.
5. Locate the SeaLINK device in the listing, highlighted below.



6. Right click on the entry for the SeaLINK device and click 'Uninstall' in the fly-out menu.



© Sealevel Systems, Inc. 2403 Manual | SL9102 6/2021

7. Confirm that you want to uninstall the SeaLINK device by clicking the 'OK' button. This will remove the hardware and all registry entries from your computer. Keep the device plugged in.



8. The window will refresh and the entry for the SeaLINK device will no longer appear. Repeat steps 5-8 as needed for each serial port.

9. Proceed with removing the software on the following pages.

Remove Software Using Apps & Features

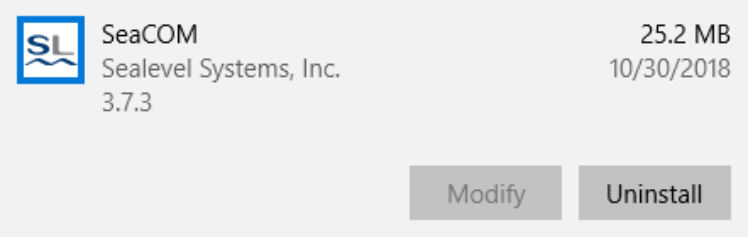
Make sure you have first removed the hardware using the instructions on the previous page before removing the software, otherwise remnants of the configuration settings will be left on your system. Keep the SeaLINK device plugged in until the software has been completely uninstalled.

In Windows 10:

1. Right-click the Start button.

2. In the fly-out menu, click 'Apps and Features.'

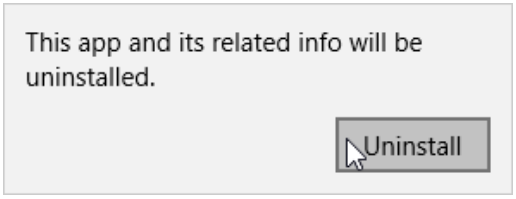
3. The Settings -> Apps & Features list will show all currently installed software. Once the list populates, locate, and select the entry for 'SeaCOM.'



© Sealevel Systems, Inc.

4. Click 'Uninstall.'

5. A confirmation dialog box may appear. Click 'Uninstall'



6. In the confirmation dialog box 'Do you want to allow this app to make changes to your device?' 'SeaCOM,' click 'Yes.'

7. The SeaCOM uninstallation program finishes.

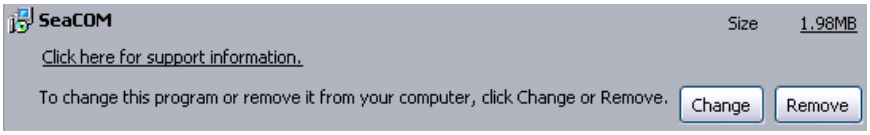
In Windows 7:

1. Access the Control Panel by clicking the 'Start' button, and then 'Control Panel.'

2. In the Control Panel window, double-click on 'Programs and Features.'

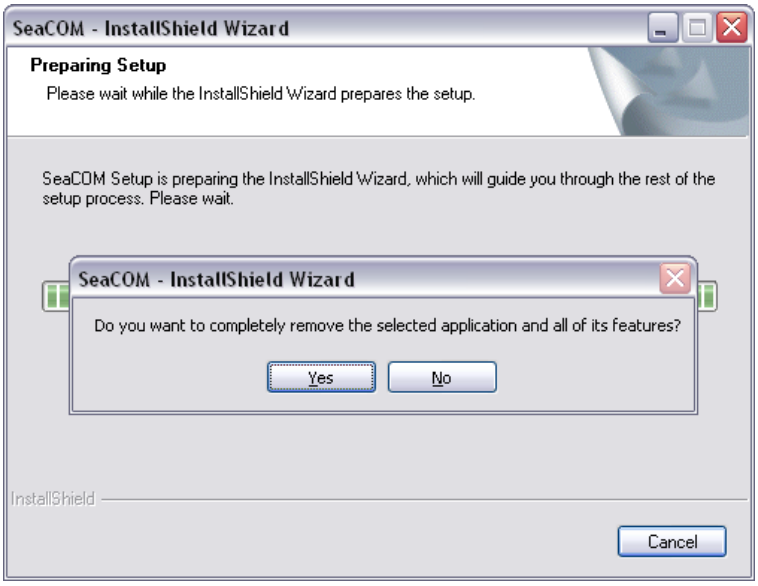
3. The Programs and Features window will list all currently installed software on your system. Once the 'Currently installed programs' list populates, locate and select the entry for 'SeaCOM.'

4. Click the 'Remove' button.



5. The 'SeaCOM – InstallShield Wizard' window will appear along with a dialog box asking you to confirm. Click the 'Yes' button to continue.

© Sealevel Systems, Inc.



6. When the removal process completes, click the 'Finish' button to close the window. A dialog box appears to confirm the removal success. Click the 'Ok' button on the dialog box.

7. If you are upgrading software, leave the SeaLINK device plugged in and follow the instructions in the 'UPGRADING TO THE CURRENT SEACOM DRIVER' section above.

© Sealevel Systems, Inc.

Appendix A – Troubleshooting

The adapter should provide years of trouble-free service. However, in the event that it appears to be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

Ensure that the Sealevel Systems SeaCOM software has been installed on the machine, so that the necessary files are in place to complete the installation. To confirm installation, click on the Windows 'Start' button and then select 'All Programs.' You should see the 'SeaCOM' program folder listed.

Check to make sure that USB support is enabled and functioning properly in the operating system. The presence of the 'Universal Serial Bus controllers' listing in Device Manager will confirm that USB support is enabled in Windows operating systems.

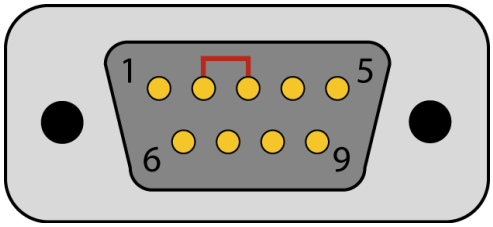
Locate the COM ports for your device in Device Manager (described under 'Verifying Installation' in the Installation and Configuration section of this manual).

Once you have confirmed that the serial adapter COM ports are listed in Device Manager, use the Sealevel WinSSD utility to verify communications. Detailed help is included in the WinSSD utility.

Please set the Electrical Interface for either RS-232 or RS-422.

If you have a loopback plug, put it on the adapter connector. If you do not have a loopback plug, you can use female jumper wires to make the connection to verify the functionality.

RS-232 requires pins 2 (Receive) & 3 (Transmit) to be jumpered as shown in this graphic:

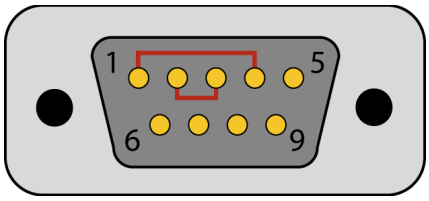


If you do not have a loopback plug or jumper wires handy, you can use a metal device such as a knife, screwdriver, key, or paperclip to short pins two and three.

© Sealevel Systems, Inc.

Troubleshooting, Continued

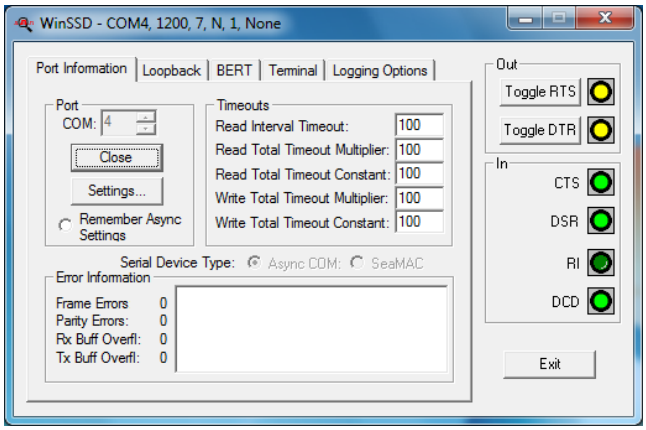
RS-422 requires pins 1 & 4 (Receive + and Transmit +) and also pins 2 & 3 (Receive - and Transmit -) to be jumpered as shown in this graphic:



To test communications, launch the WinSSD utility in the SeaCOM folder in the 'Start' menu.

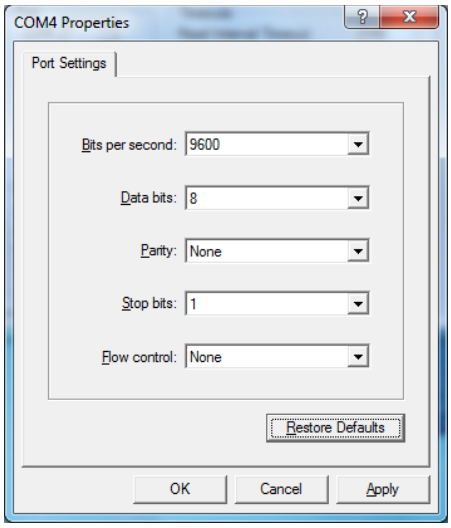
On the 'Port Information' tab, select the associated COM port and click the 'Open' button.

This will first open the COM port. From this tab the port can also be closed (See image below). Click the 'Settings' button to open the COM Port Properties dialog box. This will allow the Port Settings to be altered.



Change your parameters to 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control, as pictured below.

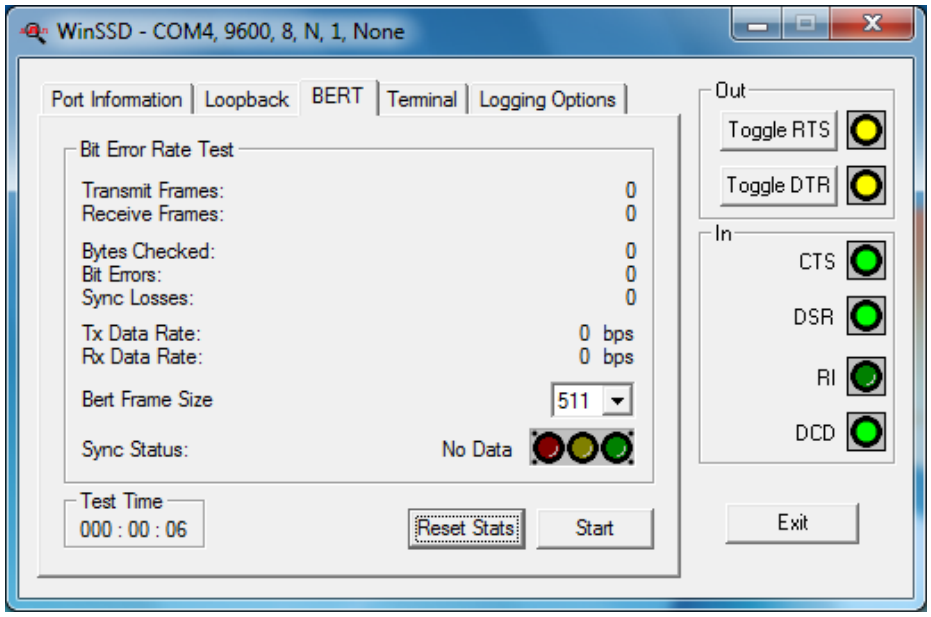
© Sealevel Systems, Inc. 2403 Manual | SL9102 6/2021



Click 'Apply' and 'OK.'

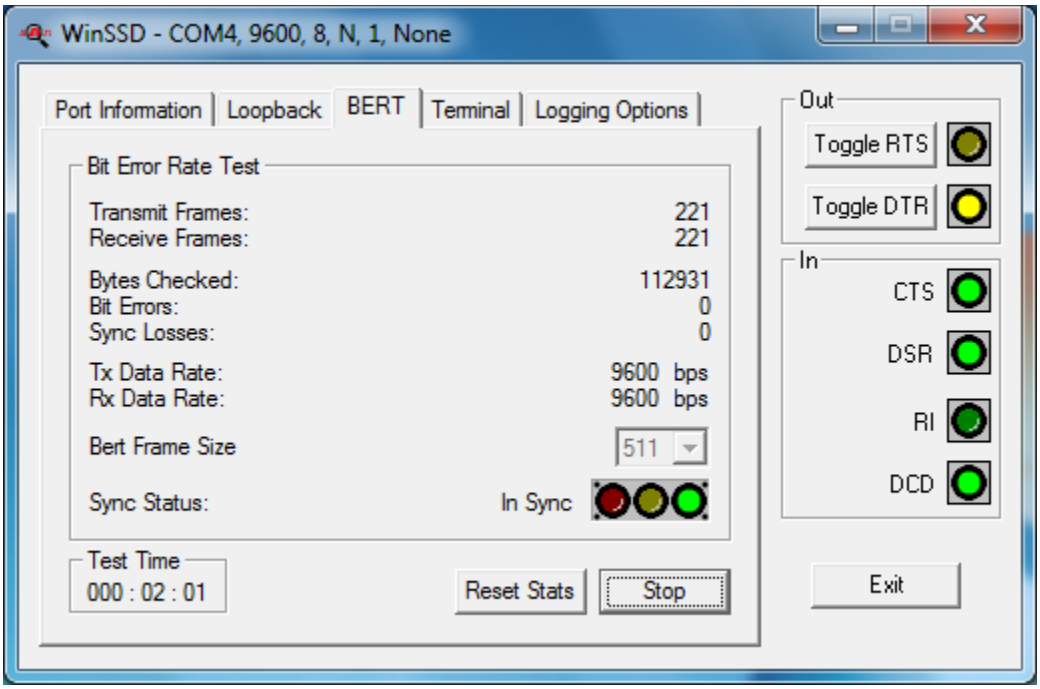
In the main WinSSD window, click on the 'BERT' tab (Bit Error Rate test).

Click on the 'Start' button.



If the COM port is properly working, the Sync Status green light will glow, and the Transmit Frames and Receive Frames will increase. The Tx and Rx Data Rates will show the calculated data rate.

© Sealevel Systems, Inc.



This verifies that the adapter is working properly. You can continue testing this port with different configurations or proceed with testing other ports, if necessary.

If these steps do not solve your problem, please call Sealevel Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00 AM to 5:00 PM Eastern Time Monday through Friday. For email support, contact support@sealevel.com.

© Sealevel Systems, Inc. 2403 Manual | SL9102 6/2021

Appendix B – Handling Instructions

ESD Warnings

Electrostatic Discharges (ESD)

A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must therefore be observed. Always take the following precautions:

1. Transport boards and cards in electrostatically secure containers or bags.
2. Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
3. Only touch electrostatically sensitive components when you are properly grounded.
4. Store electrostatically sensitive components in protective packaging or on anti-static mats.

Grounding Methods

The following measures help to avoid electrostatic damages to the device:

5. Cover workstations with approved antistatic material. Always wear a wrist strap connected to a properly grounded workplace.
6. Use antistatic mats, heel straps, and/or air ionizers for more protection.
7. Always handle electrostatically sensitive components by their edge or by their casing.
8. Avoid contact with pins, leads, or circuitry.
9. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
10. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
11. Use field service tools such as cutters, screwdrivers, and vacuum cleaners that are conductive.

Appendix C – Electrical Interface

RS-232

Quite possibly the most widely used communication standard is RS-232. This implementation has been defined and revised several times and is often referred to as RS-232 or EIA/TIA-232. The IBM PC computer defined the RS-232 port on a 9-pin D-sub connector, and subsequently, the EIA/TIA approved this implementation as the EIA/TIA-574 standard. This standard is defined as the 9-Position Non-Synchronous Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange. Both implementations are in widespread use and will be referred to as RS-232 in this document. RS-232 is capable of operating at data rates up to 20K bps at distances less than 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 is a single-ended or unbalanced interface, meaning that a single electrical signal is compared to a common signal (ground) to determine binary logic states. The RS-232 and the EIA/TIA-574 specification define two types of interface circuits: Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE).

RS-422

The RS-422 specification defines the electrical characteristics of balanced voltage digital interface circuits. RS-422 is a differential interface that defines voltage levels and driver/receiver electrical specifications. On a differential interface, logic levels are defined by the difference in voltage between a pair of outputs or inputs. In contrast, a single ended interface, for example RS-232, defines the logic levels as the difference in voltage between a single signal and a common ground connection. Differential interfaces are typically more immune to noise or voltage spikes that may occur on the communication lines. Differential interfaces also have greater drive capabilities that allow for longer cable lengths. RS-422 is rated up to 10 Megabits per second and can have cabling 4000 feet long. RS-422 also defines driver and receiver electrical characteristics that will allow 1 driver and up to 32 receivers on the line at once. RS-422 signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

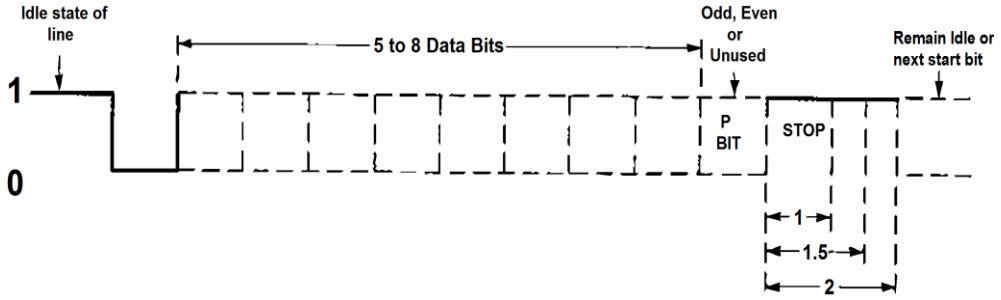
RS-485

RS-485 is backwardly compatible with RS-422; however, it is optimized for party line or multi-drop applications. The output of the RS-422/485 driver is capable of being Active (enabled) or Tri-State (disabled). This capability allows multiple ports to be connected in a multi-drop bus and selectively polled. RS-485 allows cable lengths up to 4000 feet and data rates up to 10 Megabits per second. The signal levels for RS-485 are the same as those defined by RS-422. RS-485 has electrical characteristics that allow for 32 drivers and 32 receivers to be connected to one line. This interface is ideal for multi-drop or network environments. RS-485 tri-state driver (not dual-state) will allow the electrical presence of the driver to be removed from the line. Only one driver may be active at a time and the other driver(s) must be tri-stated. RS-485 can be cabled in two ways, two wire and four wire mode. Two wire mode does not allow for full duplex communication and requires that data be transferred in only one direction at a time. For half-duplex operation, the two transmit pins should be connected to the two receive pins (Tx+ to Rx+ and Tx- to Rx-). Four wire mode allows full duplex data transfers. RS-485 does not define a connector pin-out or a set of modem control signals. RS-485 does not define a physical connector.

Appendix D – Asynchronous Communications

Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver that assembles the bits back into a character. Data rate, error checking, handshaking, and character framing (start/stop bits) are pre-defined and must correspond at both the transmitting and receiving ends.

Asynchronous communications are the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. A start bit, followed by a pre-defined number of data bits (5, 6, 7, or 8) defines character boundaries for asynchronous communications. The end of the character is defined by the transmission of a pre-defined number of stop bits (usually 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits.



This special bit is called the parity bit. Parity is a simple method of determining if a data bit has been lost or corrupted during transmission. There are several methods for implementing a parity check to guard against data corruption. Common methods are called (E)ven Parity or (O)dd Parity. Sometimes parity is not used to detect errors on the data stream. This is referred to as (N)o parity. Because each bit in asynchronous communications is sent consecutively, it is easy to generalize asynchronous communications by stating that each character is wrapped (framed) by pre-defined bits to mark the beginning and end of the serial transmission of the character. The data rate and communication parameters for asynchronous communications have to be the same at both the transmitting and receiving ends. The communication parameters are baud rate, parity, number of data bits per character, and stop bits (i.e., 9600, N, 8, 1).

© Sealevel Systems, Inc.

Appendix E – Compliance Notices

Federal Communications Commission (FCC) Statement



This equipment has been tested and found to comply with the limits for Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

EMC Directive Statement



Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) issued by the European Commission. To obey these directives, the following European standards must be met:

- **EN55022 Class A** - "Limits and methods of measurement of radio interference characteristics of information technology equipment"
- **EN55024** – "Information technology equipment Immunity characteristics Limits and methods of measurement".



Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high quality shielded cabling to maintain compliance with FCC/EMC directives.

Appendix E – Compliance Notices, Continued

Caution

Sealevel Systems, Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution of attachment of connecting cables and equipment other than those specified by Sealevel Systems. Such unauthorized modifications, substitutions, or attachments may void the user's authority to operate the equipment. The correction of interference caused by such unauthorized modifications, substitutions, or attachments will be the responsibility of the user.

Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high quality shielded cabling to maintain compliance with FCC directives.

Canadian Radio Interference Regulations

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet Appareil numérique de la classe A respecte toutes les exigences de Règlement sur le matériel du Canada.

Appendix F – How To Get Assistance

Please refer to Appendix A - Troubleshooting prior to calling Technical Support.

1. Read this manual thoroughly before attempting to install the adapter in your system.
2. When calling for technical assistance, please have your user manual and current adapter settings. If possible, please have the adapter installed in a computer ready to run diagnostics.
3. Sealevel Systems provides an FAQ section on its web site. Please refer to this to answer many common questions. This section can be found at http://www.sealevel.com/faq.asp.
4. Sealevel Systems maintains a Home page on the Internet. Our home page address is www.sealevel.com. The latest software updates, and newest manuals are available via our FTP site that can be accessed from our home page.
5. Technical support is available Monday thru Friday from 8:00 a.m. to 5:00 p.m. eastern time. Technical support can be reached at (864) 843-4343.

RETURN AUTHORIZATION MUST BE OBTAINED FROM SEALEVEL SYSTEMS BEFORE RETURNED MERCHANDISE WILL BE ACCEPTED. AUTHORIZATION CAN BE OBTAINED BY CALLING SEALEVEL SYSTEMS AND REQUESTING A RETURN MERCHANDISE AUTHORIZATION (RMA) NUMBER.

Warranty

Sealevel's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured I/O products. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at its Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing. Sealevel achieved ISO-9001:2015 certification in 2018.

Warranty Policy

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for the warranty period. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect, abuse, accidents, or acts of nature are not covered under this warranty.

Warranty service may be obtained by delivering the Product to Sealevel and providing proof of purchase. Customer agrees to ensure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Sealevel, and to use the original shipping container or equivalent. Warranty is valid only for original purchaser and is not transferable.

This warranty applies to Sealevel manufactured Product. Product purchased through Sealevel but manufactured by a third party will retain the original manufacturer's warranty.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found are subject to repair/retest charges. A purchase order or credit card number and authorization must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

How to obtain an RMA (Return Merchandise Authorization)

If you need to return a product for warranty or non-warranty repair, you must first obtain an RMA number. Please contact Sealevel Systems, Inc. Technical Support for assistance:

Available	Monday – Friday, 8:00AM to 5:00PM EST
Phone	864-843-4343
Email	support@sealevel.com

Trademarks

Sealevel Systems, Incorporated acknowledges that all trademarks referenced in this manual are the service mark, trademark, or registered trademark of the respective company.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP