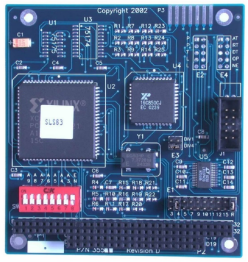

SEALEVEL SIO-104 2-Port Individually Configurable Serial Interface Card User Manual

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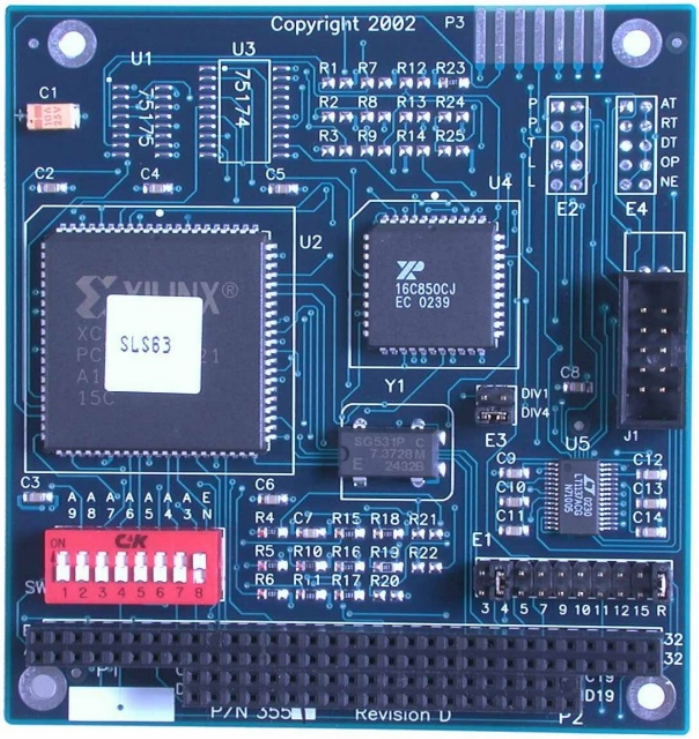
SEALEVEL

SIO-104 2-Port Individually Configurable Serial Interface Card



Product Information

The SIO-104 is the ultimate single port RS-232 serial connection for your PC/104 application. The SIO-104 utilizes the Exar 16C850, which provides 128-byte, transmit and receive FIFOs. These larger buffers allow error free operation even in high-speed applications.

Contents

1. Introduction
2. Before You Get Started
3. Optional Accessories
4. Card Setup
5. Address Selection
6. Port Enable / Disable
7. IRQ Selection
8. Clock Modes

Optional Accessories

Depending upon your application, you are likely to find one or more of the following items useful with the SIO-104. All items can be purchased from our website (www.sealevel.com) or by calling our sales team at 864-843-4343.

Item	Description
Accessory 1	Description of accessory 1.
Accessory 2	Description of accessory 2.
Accessory 3	Description of accessory 3.

Card Setup

The SIO-104 contains several jumper straps for each port, which must be set for proper operation.

Address Selection:
The SIO-104 occupies eight consecutive I/O locations. A DIP-switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing ports. The following table shows several examples that typically do not cause a conflict. SW1 sets the I/O address for the SIO-104.

Address	Hex	Binary	Switch Position
280-287	2A0-2A7	1010000XXX	Off On Off On On On On Off On Off On Off On On Off On Off Off Off On Off Off On Off Off Off Off Off Off Off Off Off Off On Off Off Off On On On On On Off Off On On Off On Off Off Off Off Off Off Off Off
2E8-2EF	1011101XXX	On On Off On On On On Off	
2F8-2FF	1011111XXX	Off Off On Off Off Off Off On	
3E8-3EF	1111101XXX	Off On Off Off On On On On	
300-307	1100000XXX	On Off Off Off Off Off On On	
328-32F	1100101XXX	Off Off On On Off On Off On	
3F8-3FF	1111111XXX	Off Off Off Off On On On On	

The following illustration shows the correlation between the DIP-switch setting and the address bits used to determine the base address. In the example below, address 300 is selected as a base.
Address 300 in binary is XX11 0000 0XXX where X = a non-selectable address bit.

Port Enable / Disable
The port on the SIO-104 can be enabled or disabled with switch position 8 on the DIP-switch. The port is enabled with the switch On or Closed and disabled when Off or Open (refer to DIP-Switch Illustration). If the port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper at header J2.

IRQ Selection
The IRQ can be set at jumper J2 for IRQ 2/9, 3-5, 7, 10, 11, 12, or 15. In the following example, the IRQ is set as IRQ4.

Product Usage Instructions:

1. Connect the SIO-104 to your PC/104 application.
2. Ensure that all necessary accessories are connected, if applicable.
3. Set the address for the SIO-104 by adjusting the corresponding DIP-switch on SW1. Refer to the Address Selection table for address options and switch positions.
4. Enable or disable the port on the SIO-104 by adjusting switch position 8 on the DIP-switch. Refer to the Port Enable / Disable section for switch positions.
5. If the port is disabled, remove the IRQ jumper at header J2 to disable the interrupt request for that port.
6. If desired, set the IRQ at jumper J2 for the desired IRQ option. Refer to the IRQ Selection section for jumper positions.
7. Configure any other settings or parameters as needed for your specific application.
8. Power on your PC/104 application and ensure that the SIO-104 is functioning correctly.

Introduction

The SIO-104 is the ultimate single port RS-232 serial connection for your PC/104 application. The SIO-104 utilizes the Exar 16C850, which provides 128-byte, transmit and receive FIFOs. These larger buffers allow error free operation even in high-speed applications.

Before You Get Started

What's Included

The SIO-I04 is shipped with the following items. If any of these items are missing or damaged, contact the supplier.

- (1) SIO-104 Serial Interface Adapter
- (1) Nylon Mounting Hardware Kit (PC304-NK)

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.

Optional Accessories

Depending upon your application, you are likely to find one or more of the following items useful with the SIO-104. All items can be purchased from our website (www.sealevel.com) or by calling our sales team at 864-843-4343.

- CA152 – Terminates the SIO-104 10 pin header to a DB9M connector. This termination provides the Sealevel

Systems' DB9 standard for RS-422/485.

Card Setup

The SIO-104 contains several jumper straps for each port, which must be set for proper operation.

Address Selection

- The SIO-104 occupies eight consecutive I/O locations. A DIP-switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing ports. The following table shows several examples that typically do not cause a conflict. SW1 sets the I/O address for the SIO-104.

Address	Binary	Switch Position Setting						
Hex	A9 A0	1	2	3	4	5	6	7
280-287	1010000XXX	Off	On	Off	On	On	On	On
2A0-2A7	1010100XXX	Off	On	Off	On	Off	On	On
2E8-2EF	1011101XXX	Off	On	Off	Off	Off	On	Off
2F8-2FF	1011111XXX	Off	On	Off	Off	Off	Off	Off
3E8-3EF	1111101XXX	Off	Off	Off	Off	Off	On	Off
300-307	1100000XXX	Off	Off	On	On	On	On	On
328-32F	1100101XXX	Off	Off	On	On	Off	On	Off
3F8-3FF	1111111XXX	Off	Off	Off	Off	Off	Off	Off

Figure 1 - Address Selection Table

- The following illustration shows the correlation between the DIP-switch setting and the address bits used to determine the base address. In the example below, address 300 is selected as a base. Address 300 in binary is XX11 0000 0XXX where X = a non-selectable address bit.

Figure 2 - DIP-Switch Illustration

Setting the switch "On" or "Closed" corresponds to a "0" in the address, while leaving it "Off" or "Open" corresponds to a "1".

Port Enable / Disable

The port on the SIO-104 can be enabled or disabled with switch position 8 on the DIP-switch. The port is enabled with the switch “On” or “Closed” and disabled when “Off” or “Open” (refer to Figure 2). If the port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper at header J2.

IRQ Selection

The SIO-104 has an interrupt selection jumper, which should be set prior to use, if an interrupt is required by your application software. Consult the user manual for the application software being used to determine the proper setting. Position “R” is provided so that a jumper can be installed that connects a 1K-Ohm pull-down resistor to the output of a high-impedance tri-state driver which carries the IRQ signal. Because the IRQ line is driven low only by the pull-down resistor, it is possible for two or more boards to share the same IRQ signal. Position “R” installed is the default setting and should be left as is unless multiple cards are sharing a single IRQ. If multiple adapters are sharing a single IRQ, then only one adapter should have the pull-down resistor (position “R” selected) in the circuit.

The IRQ can be set at jumper J2 for IRQ 2/9, 3-5, 7, 10, 11, 12, or 15. In the following example, the IRQ is set as IRQ4.

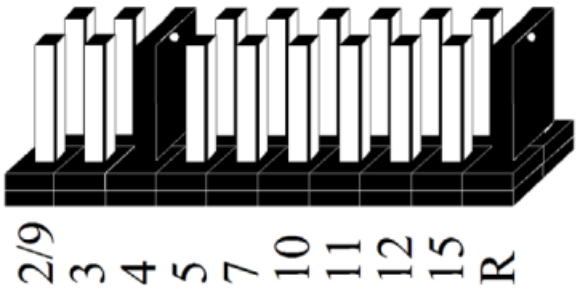


Figure 3 - Header J2, IRQ Selection (Factory Default)

Clock Modes

- The ULTRA 530.PCI employs a unique clocking option that allows the end user to select from divide by 4 and divide by 1 clocking modes. These modes are selected at Header E8.
- To select the Baud rates commonly associated with COM: ports (i.e. 2400, 4800, 9600, 19.2, … 115.2K Bps) place the jumper in the divide by 4 mode (silk-screen DIV4).

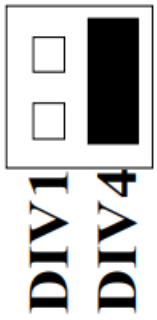


Figure 4 - Clocking Mode 'Divide by 4'

- To select the maximum data rate (460.8K bps) place the jumper in the divide by 1 (silk-screen DIV1) position.

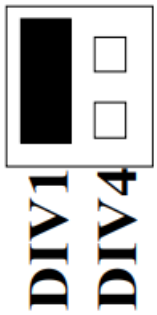


Figure 5 - Clocking Mode 'Divide By 1'

Baud Rates and Divisors for the ‘Div1’ mode

- The following table shows some common data rates and the rates you should choose to match them if using the adapter in the ‘Div1’ mode.

For this Data Rate	Choose this Data Rate
1200 bps	300 bps
2400 bps	600 bps
4800 bps	1200 bps
9600 bps	2400 bps
19.2K bps	4800 bps
57.6 K bps	14.4K bps
115.2 K bps	28.8K bps
230.4K bps	57.6 K bps
460.8K bps	115.2 K bps

- If your communications package allows the use of Baud rate divisors, choose the appropriate divisor from the following table:

For this Data Rate	Choose this Divisor
1200 bps	384
2400 bps	192
4800 bps	96
9600 bps	48
19.2K bps	24
38.4K bps	12
57.6K bps	8
115.2K bps	4
230.4K bps	2
460.8K bps	1

Software Installation

Windows Installation

- Do not install the Adapter in the machine until the software has been fully installed.
- Only users running Windows 7 or newer should utilize these instructions for accessing and installing the appropriate driver via Sealevel's website. If you are utilizing an operating system prior to Windows 7, please contact Sealevel by calling 864.843.4343 or emailing **support@sealevel.com** to receive access to the proper driver download and installation instructions.
    1. Begin by locating, selecting, and installing the correct software from the website -SeaCOM software.
    2. Select the "SeaCOM for Windows" download link.
    3. The setup file will automatically detect the operating environment and install the proper components.
- To confirm that the SeaCOM driver has been successfully installed, click on the 'Start' button, and then select 'All Programs'. You should see the 'SeaCOM' program folder listed.
- You are now ready to proceed with connecting the 3551 to your system. Refer to the Hardware Installation section for details.

Linux Installation

- You MUST have "root" privileges to install the software and drivers.
- The syntax is case sensitive.
- SeaCOM for Linux can be downloaded here: **https://www.sealevel.com/support/software-seacom-linux/**. It includes the README and the Serial-HOWTO help files (located at seacom/dox/howto). This series of files both explains typical Linux serial implementations and informs the user about Linux syntax and preferred practices.
- User can use a program such as 7-Zip to extract the tar.gz file.

- In addition, the software selectable interface settings can be accessed by referencing seacom/utilities/3551mode.
- For additional software support, including QNX, please call Sealevel Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00 AM – 5:00 PM Eastern Time, Monday through Friday. For email support contact: **support@sealevel.com**.

Physical Installation

Extreme care should be taken when installing the SIO-104 to avoid causing damage to the connectors. After the adapter is installed, connect your I/O cable to J1. Please note these headers are keyed so that pin 1 of the cable matches pin 1 of the connector. Refer to Card Setup for information on setting the address and jumper options before inserting the SIO-104 onto the stack.
Do not install the Adapter in the machine until the software has been fully installed.

1. Turn off PC power. Disconnect the power cord.
2. Remove the case cover (if applicable).
3. Gently insert the SIO-104 into the connector noting proper key orientation of the expansion connector on a PC/104 compatible card. The SIO-104 adapter is keyed per the current PC/104 Specification. This will aid in preventing the adapter from being inserted incorrectly.
4. Mounting hardware (nylon stand-offs and screws) is provided to ensure a good mechanical connection. Retain any mounting hardware not used to allow for future expansion.
5. The cables provided are keyed and can be installed before or after the adapter is inserted in the stack.
6. Replace the cover.
7. Connect the power cord and power up the machine.

Technical Description

The SIO-104 provides a standard RS-232C interface that is fully compatible with all popular modem software, network operating systems software, and mouse drivers. The SIO-104 utilizes the Exar 16C850, which provides 128-byte, transmit and receive FIFOs. These larger buffers allow error free operation even in high-speed applications.

Features

- Selectable interrupts (IRQs) 3, 4, 5, 7, 9, 10, 11, 12, 15
- Multiple adapters can share the same IRQ
- Uses PC/104 compatible stack through connector for universal mounting
- 5-volt DC operation

RS-232

Signal	Name	Header J1	DB9 (CA152) Pin #	Mode
GND	Ground	9	5	
TD	Transmit Data	5	3	Output
RTS	Request To Send	4	7	Output
DTR	Data Terminal Ready	7	4	Output
RD	Receive Data	3	2	Input
CTS	Clear To Send	6	8	Input
DSR	Data Set Ready	2	6	Input
CD	Carrier Detect	1	1	Input
RI	Ring Indicator	8	9	Input

These assignments meet EIA/TIA/ANSI-574 DTE for DB-9 type connectors.
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, DTR to DCD and DSR. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

Specifications

Environmental Specifications

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

Manufacturing
All Sealevel Systems 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.

Power Requirements

Supply line	+5 VDC
Rating (mA)	125 mA

Physical Dimensions
The SIO-104 is PC/104 “Compliant” meaning that it conforms to all non-optional aspects of the PC/104 Specification, including both the mechanical and the electrical specifications.

Board length	3.775 inches (9.588 cm)
Board Width	3.550 inches (9.017 cm)

Appendix A – Troubleshooting

The adapter should provide years of trouble-free service. However, in the event that device appears to not be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

1. Identify all I/O adapters currently installed in your system. This includes your on-board serial ports, controller cards, sound cards etc. The I/O addresses used by these adapters, as well as the IRQ (if any) should be identified.
2. Configure your Sealevel Systems adapter so that there is no conflict with currently installed adapters. No two adapters can occupy the same I/O address.
3. Make sure the Sealevel Systems adapter is using a unique IRQ. While the Sealevel Systems adapter does allow the sharing of IRQs, many other adapters (i.e., SCSI adapters & on-board serial ports) do not.
4. For Windows operating systems, the diagnostic tool 'WinSSD' is installed in the SeaCOM folder on the Start Menu during the setup process. First find the ports using the Device Manager, the use 'WinSSD' to verify that the ports are functional.
5. Remember that a loopback test is not possible with the 'NE' jumper in place.
6. Always use the Sealevel Systems diagnostic software when troubleshooting a problem. This will help eliminate any software issues and identify any hardware conflicts.
   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 A.M.- 5:00 P.M., Eastern Time Monday through Friday. For email support contact **support@sealevel.com**.

Appendix B – How To Get Assistance

Please refer to Troubleshooting Guide prior to calling Technical Support.

1. Begin by reading through the Trouble Shooting Guide in Appendix A. If assistance is still needed, please see below.
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 web page on the Internet. Our home page address is www.sealevel.com. The latest software updates, and newest manuals are available via our web site.
5. Technical support is available Monday to Friday from 8:00 A.M. to 5:00 P.M. Eastern Time. Technical support can be reached at (864) 843-4343. For email support contact **support@sealevel.com**.\
   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.

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-C/D/E or EIA/TIA-232-C/D/E. It is defined as "Interface between Data Terminal Equipment and Data Circuit- Terminating Equipment Employing Serial Binary Data Interchange". The mechanical implementation of RS-232 is on a 25-pin D sub connector. The IBM PC

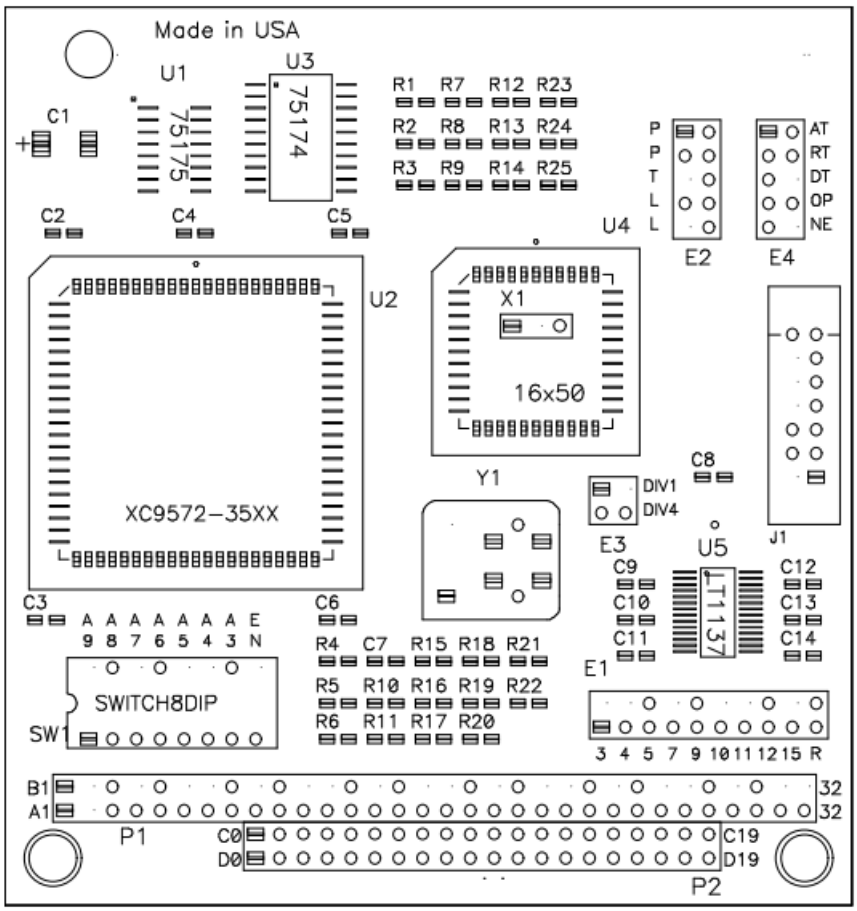
computer defined the RS-232 port on a 9 pin D sub connector and subsequently the EIA/TIA approved this implementation as the EIA/TIA-574 standard. This standard has defined as the “9-Position Non-Synchronous Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial 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 / 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 often operates at 38.4K bps over very short distances. The voltage levels defined by RS-232 range from -12 to +12 volts. 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. A voltage of +12 volts (usually +3 to +10 volts) represents a binary 0 (space) and -12 volts (-3 to -10 volts) denote a binary 1 (mark). 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). The Sealevel Systems Adapter is a DTE interface.

Appendix D – PC/104

What is PC/104?

- The PC has become extremely popular in both general purpose (desktop) and dedicated (embedded) applications. Unfortunately, the PC has been hampered by the large size required to maintain PC compatibility. PC/104 addresses this by optimizing the PC bus in a form factor designed for embedded applications.
- Briefly, the key differences between PC/104 and the standard “AT” or ISA bus computer are as follows:
    - Reducing the form factor, to 3.550 by 3.775 inches
    - Eliminating the need for backplanes or card cages, through its self-stacking bus
    - Minimizing component count and power consumption (typically 1-2 Watts per module) by reducing required bus drive on most signals to 4 mA.
- Sealevel Systems has been a member of the PC/104 Consortium since its inception.
- Questions about the PC/104 Consortium can be sent to:
    - PC/104 Consortium
    - P. O. Box 4303
    - Mountain View, CA 94040
    - (415) 903-8304 Ph. (415) 967-0995 Fax
    - PC104 Consortium – PC/104 ConsortiumPC/104 Consortium

Appendix E – Silk Screen



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 in 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, 8:00 AM to 5:00 PM 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.

Documents / Resources

	SEALEVEL SIO-104 2-Port Individually Configurable Serial Interface Card [pdf] User Manual SIO-104 2-Port Individually Configurable Serial Interface Card, SIO-104, 2-Port Individually Configurable Serial Interface Card, Configurable Serial Interface Card, Serial Interface Card, Interface Card, Card

References

- Sealevel - I/O & Computing Products, Engineering and Manufacturing
- Sealevel - I/O & Computing Products, Engineering and Manufacturing
- FAQs - Sealevel
- Sealevel - I/O & Computing Products, Engineering and Manufacturing
- Software: SeaCOM - Linux - Sealevel
- Software: SeaCOM - Windows - Sealevel