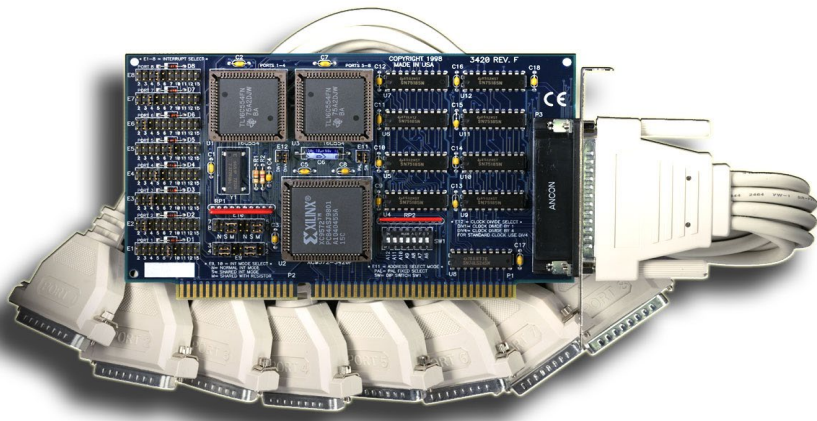


COMM+8™

User Manual | 3420



SEALEVEL®

Contents

CONTENTS.....2

INTRODUCTION3

BEFORE YOU GET STARTED4

CARD SETUP7

INSTALLATION11

TECHNICAL DESCRIPTION13

SPECIFICATIONS16

APPENDIX A – TROUBLESHOOTING.....17

APPENDIX B – HOW TO GET ASSISTANCE.....18

APPENDIX C – ELECTRICAL INTERFACE19

APPENDIX D – ASYNCHRONOUS COMMUNICATIONS20

APPENDIX E – SILK SCREEN21

APPENDIX F – COMPLIANCE NOTICES.....22

WARRANTY23

Introduction

Overview

The Sealevel Systems **COMM+8** provides the PC with eight RS-232 asynchronous ports. The **COMM+8** allows for connection to any device utilizing the RS-232 electrical interface, such as modems, data-entry terminals, and plotters.

Before You Get Started

What's Included

The **COMM+8** is shipped with the following items. If any of these items is missing or damaged, contact the supplier.

- **COMM+8** Serial I/O Adapter
- “Octopus” Cable providing 8 DB-25 or DB-9 connectors

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.

Factory Default Settings

The **COMM+8** factory default settings are as follows:

Port #	Base Address	IRQ	E12
Port 1	280	5	DIV4
Port 2	288	5	
Port 3	290	5	
Port 4	298	5	
Port 5	2A0	5	
Port 6	2A8	5	
Port 7	2B0	5	
Port 8	2B8	5	

To install the **COMM+8** using factory default settings, refer to the Installation section of this manual.

For your reference, record installed **COMM+8** settings below:

Port #	Base Address	IRQ	E12
Port 1			
Port 2			
Port 3			
Port 4			
Port 5			
Port 6			
Port 7			
Port 8			

The following table illustrates the port assignments for the Factory Default setting.

Port #	DB-25#	Address	Example
1	1	Base+0	280-287
2	2	Base+8	288-28F
3	3	Base+16	290-297
4	4	Base+24	298-29F
5	5	Base+32	2A0-2A7
6	6	Base+40	2A8-2AF
7	7	Base+48	2B0-2B7
8	8	Base+56	2B8-2BF

Card Setup

The **COMM+8** contains several jumper straps that must be set for proper operation.

Address Selection

The **COMM+8** occupies 64 I/O locations and can be addressed two different ways. If header E11 is set to the “Switch” position the **COMM+8** occupies 64 consecutive I/O locations, and the DIP-switch is used to set the base address for these locations. The starting address for these 64 I/O locations must be on a 64-byte boundary i.e.: Hex 200, 240, 280, or 2C0. Be careful when selecting the base address as some selections conflict with existing PC ports. The following table shows several examples that usually do not cause a conflict. Refer to [Appendix A](#) for common address contentions.

Address	Switch Position Setting:						
	1	2	3	4	5	6	7
100-13F	On	On	On	On	Off	On	On
180-1BF	On	On	On	On	Off	Off	On
240-27F	On	On	On	Off	On	On	Off
280-2BF	On	On	On	Off	On	Off	On
2C0-2FF	On	On	On	Off	On	Off	Off
300-3FF	On	On	On	Off	Off	On	On
500-53F	On	On	Off	On	Off	On	On
580-5BF	On	On	Off	On	Off	Off	On
1500-153F	Off	On	Off	On	Off	On	On
1580-15BF	Off	On	Off	On	Off	Off	On

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 280 (Factory Default) is selected as a base.

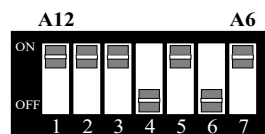


Figure 2 - DIP-switch Illustration



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

“PAL” Addressing

If header E11 is set to the “PAL” position, the board can be addressed at a customized location. Using the “PAL” option will allow you to obtain COM1: - COM4: addresses, XENIX COM: addresses, or any other standard or nonstandard address configuration. Using the “PAL” feature is a very cost-effective means of solving complex addressing problems. For more information on implementing the “PAL” option, please contact Sealevel Systems Technical Support.

IRQ Selection

Each port on the **COMM+8** has an interrupt jumper that may have to be set prior to use. The software you are using with the board will determine which interrupts, if any are to be used. The DOS serial port interface software does not use interrupts, while interrupt buffer programs do. DOS does not require the interrupt to be set, while most Multi - User Operating Systems will. Consult the particular manual for the software that you are using to determine the proper setting.

To set the interrupt for a particular port, first select the header for the port desired. Headers E1-E8 correspond to Ports 1-8. Next select an IRQ by placing one of the jumpers on the header location that corresponds to the IRQ number that you wish to use. Below is an example of a selected IRQ.

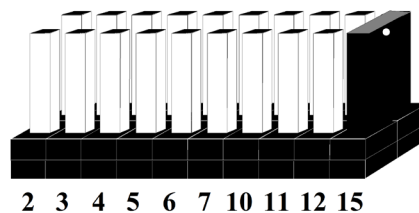


Figure 3 - Headers E1 to E8 (IRQ15 selected)

Interrupt Mode Options

The **COMM+8** will allow each port to have an independent interrupt level or share an interrupt with another port on the adapter. The **COMM+8** will even share interrupts with a compatible port that is located on another adapter. The **COMM+8** can operate in three interrupt modes. Header E9 determines the interrupt mode for Ports 1-4 and header E10 determines the interrupt mode for ports 5-8.

“**N**” indicates the (**N**)ormal, single interrupt per port mode. “**S**” Indicates the (**S**)hared interrupt mode, which allows more than one port to access a single IRQ. Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ setting and setting the appropriate selections at E1-E8. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper. “**M**” indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts.

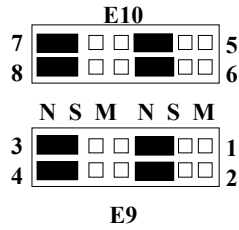


Figure 4 - Header E9 and E10, Normal IRQ Mode

Set jumpers to “S” for shared interrupt mode on all blocks sharing an IRQ except one. Set that port block for “M”. This provides the pull-down resistor circuit that makes IRQ sharing possible. If you are using more than one **COMM+8** or a compatible adapter in a bus, you should only have one port set to “M”. The following example shows all eight ports sharing a single IRQ.

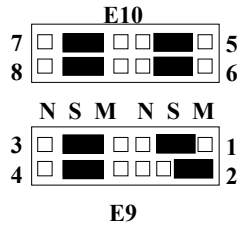


Figure 5 - Header E9 and E10, Shared IRQ Mode

Set all jumpers to “S” if you are using more than one **COMM+8** in a bus or you wish to completely remove the pull-down resistor for hardware compatibility. **Setting the COMM+8 in this configuration when it is not accompanied by a pull-down resistor will prevent the ports from triggering an interrupt.**

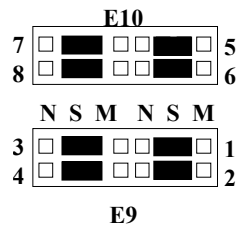


Figure 6 - Header E9 and E10, Sharing IRQs with another adapter

Clock Modes

The **COMM+8** employs a unique clocking option that allows the user to select from divide by 4 or divide by 1 clocking modes. This mode is selected at E12.

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).

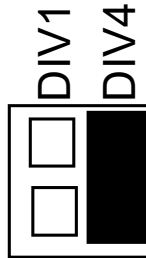


Figure 7 - Clocking Mode 'Divide By 4'

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

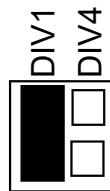


Figure 8 - Clocking Mode 'Divide By 1'

Baud Rates and Divisors for the 'Div1' mode

The following table shows some common data rates and the matching data rates you should choose 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

Installation

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 [Sealevel software driver database](#).
2. Select the Part Number (3420) for your device from the listing.
3. Click the 'Download Now' button for SeaCOM for Windows.

4. 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 3420 to your system. Refer to the Hardware Installation section for details.

Other Operating Systems

Refer to the appropriate section of the Serial Utilities Software.

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.

System Installation

The **COMM+8** can be installed in any 16-bit PC expansion slot. The **COMM+8** contains several jumper straps for each port that must be set for proper operation prior to installing the **COMM+8** into the computer.

1. Turn off PC power. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available slot and remove the blank metal slot cover.
4. Gently insert the **COMM+8** into the slot. Make sure that the adapter is seated properly.
5. Replace the screw.
6. Install the "Octopus" Cable
7. Replace the cover.
8. Connect the power cord.

Installation is complete.

Technical Description

The Sealevel **COMM+8** provides 8 additional serial ports for terminals, modems, printers, etc. The **COMM+8** utilizes the 16554 UART chip. This chip features programmable baud rate, data format, interrupt control and a 16-byte FIFO.

Features

- Eight RS-232 Ports with full modem control signals
- "PAL" addressing option allowing "Turn Key" configurations
- Selectable/Sharable Interrupts (IRQs 2/9-7,10,11,12, & 15)
- 8 DB-9 or DB-25 male connectors provided using the Sealevel Systems "Octopus Cable"

Interrupt Status Port

The **COMM+8** provides the user with an Interrupt Status Port (ISP) for greater throughput when servicing multiple ports on a single interrupt line. The ISP is a read only 8-bit register that sets a corresponding bit when an interrupt is pending. Port 1 interrupt line corresponds with Bit D0 of the status port, Port 2 with D1 etc.

The ISP can be addressed two different ways. If header E11 is in the "Switch" position the Status Register is located at Base+7 on each port (Example: Base = 280 Hex, Status Port = 287, 28F... etc.). This allows any one of eight locations to be read to obtain the value in the status register. All eight status ports on the **COMM+8** are identical, so any one of the eight can be read. If header E11 is in the "PAL" position, the status port can be addressed at any location. Please contact Sealevel Systems for information on PAL programming and custom configurations.

Example: This indicates that Channel 2 has an interrupt pending.

Bit Position:	7	6	5	4	3	2	1	0
Value Read:	0	0	0	0	0	0	1	0

DB-25 Connector Pin Assignments (DB-25 Male)

Signal	Name	Pin #	Mode
GND	Ground	7	
TD	Transmit Data	2	Output
RTS	Request To Send	4	Output
DTR	Data Terminal Ready	20	Output
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
DSR	Data Set Ready	6	Input
DCD	Data Carrier Detect	8	Input
RI	Ring Indicator	22	Input

Figure 9 - DB-25 Connector Pin Assignments

DB-9 (EIA-574 DTE) (DB-9 Male)

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

Figure 10 - DB-9 Connector Pin Assignments

DB-78 Connector Pin Assignments (DB-78 Female)

Port #	1	2	3	4	5	6	7	8
TD	36	12	27	3	75	51	66	42
RD	37	11	28	2	76	50	67	41
RTS	17	31	8	22	56	70	47	61
CTS	16	32	7	23	55	71	46	62
DTR	35	13	26	4	74	52	65	43
DSR	18	30	9	21	57	69	48	60
DCD	38	10	29	1	77	49	68	40
RI	15	33	6	24	54	72	45	63
GND	34	14	25	5	73	53	64	44

Figure 11 - DB-78 Connector Pin Assignments



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.

Specifications

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0° to 50° C (32° to 122° F)	-20° to 70° C (-4° to 158° F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Power Consumption

Supply line	+12 VDC	-12 VDC	+5 VDC
Rating	110 mA	130 mA	320 mA

Mean Time Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Physical Dimensions

Board length	7.0 inches (17.78 cm)
Board height including Goldfingers	4.2 inches (10.66 cm)
Board height excluding Goldfingers	3.9 inches (9.91 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. The IRQ is typically selected via an on-board header block. Refer to the section on Card Setup for help in choosing an I/O address and IRQ.
4. Make sure the Sealevel Systems adapter is securely installed in a motherboard slot.
5. 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 more information in regard to the utility software which will determine if your product is functioning properly.
6. Only users running Windows 7 or newer should utilize the diagnostic tool 'WinSSD' installed in the SeaCOM folder on the Start Menu during the setup process. First find the ports using the Device Manager, then use 'WinSSD' to verify that the ports are functional.
7. Always use the Sealevel Systems diagnostic software when troubleshooting a problem. This will help eliminate any software issues and identify any hardware conflicts.
8. The following are known I/O conflicts:
 - The 278 and 378 settings may conflict with your printer I/O adapter.
 - 3B0 cannot be used if a Monochrome adapter is installed.
 - 3F8-3FF is typically reserved for COM1:
 - 2F8-2FF is typically reserved for COM2:
 - 3E8-3EF is typically reserved for COM3:
 - 2E8-2EF is typically reserved for COM4:

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 20 Kbps / 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 often operates at 38.4 Kbps 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) denotes 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 – 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 is 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.

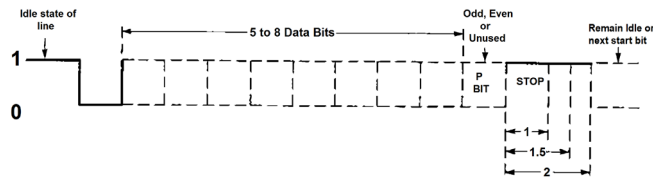
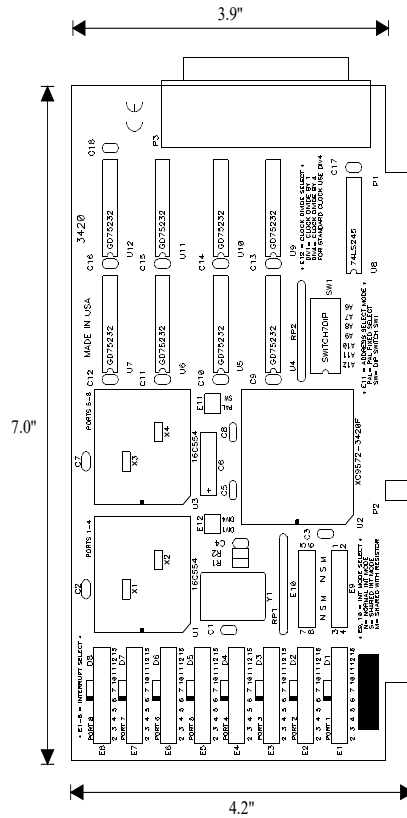


Figure12 - Asynchronous Communications Bit Diagram

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).

Appendix E – Silk Screen



Appendix F – Compliance Notices

Federal Communications Commission (FCC) Statement



This equipment has been tested and found to comply with the limits for Class A 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 commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in such case the user will be required to correct the interference at the user's expense.

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".



This is a Class A Product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures to prevent or correct the interference.



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.

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, 8:00 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.