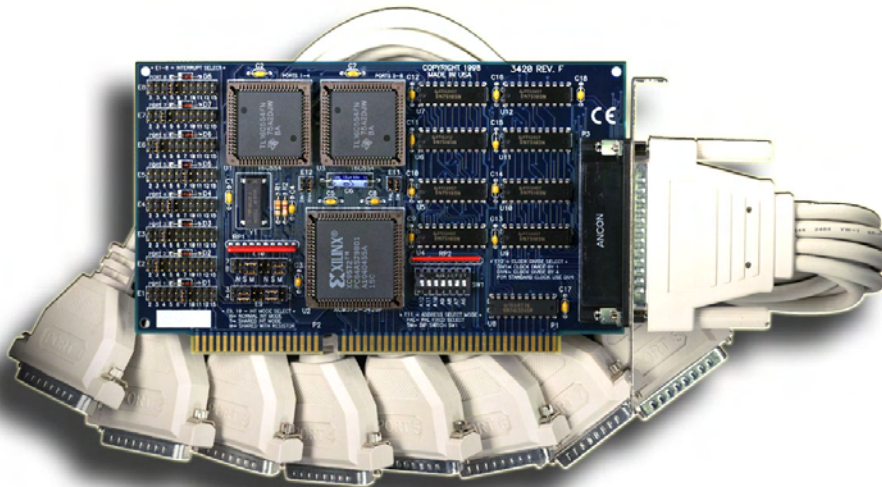




COMM+8™

USER MANUAL



Part #3420

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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.

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
- Sealevel Software

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.

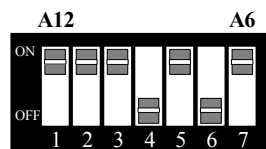


Figure 2 - DIP-switch Illustration

Note: 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.

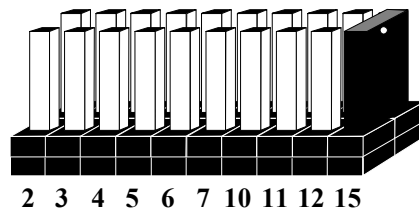


Figure 3 - Headers E1 to E8 (IRQ15 selected)

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.

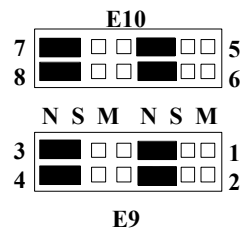


Figure 4 - Header E9 and E10, Normal IRQ Mode

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.

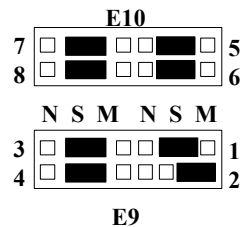


Figure 5 - Header E9 and E10, Shared IRQ Mode

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.**

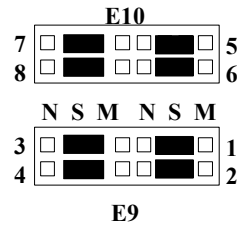


Figure 6 - Header E9 and E10, Sharing IRQs with another adapter

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).

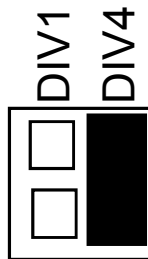


Figure 7 - Clocking Mode 'Divide By 4'

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

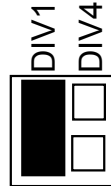


Figure 8 - Clocking Mode 'Divide By 1'

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

Operating System Installation

For Windows Users

Start by choosing **Install Software at the beginning of the CD**.
Choose **Asynchronous COM: Port Software, SeaCOM**.

Other Operating Systems

Refer to the appropriate section of the Serial Utilities Software.

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

Technical Note: 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

Serial Utility test software is supplied with the Sealevel Systems adapter and will be used in the troubleshooting procedures. By using this software and following these simple steps, most common problems can be eliminated 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. When running DOS, Windows 3.x or other operating systems refer to the Serial Utilities software for that operating system and the User Manual to verify that the Sealevel Systems adapter is configured correctly. The supplied software contains a diagnostic program 'SSD' that runs under DOS and will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use. Refer to the DIAG.txt file in the dos/diag directory for detailed instructions on using 'SSD'.
6. For Windows 95/98 and Windows NT, the diagnostic tool 'WinSSD' is installed in the Sealevel 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:

Always use the Sealevel Systems diagnostic software when troubleshooting a problem. This will eliminate any software issues and help identify any hardware conflicts.

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.htm>.
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 to 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.

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 wide spread 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. Character boundaries for asynchronous communications are defined by a starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8). 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.

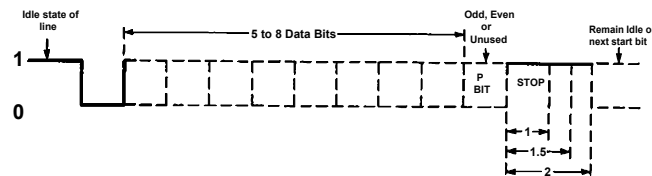
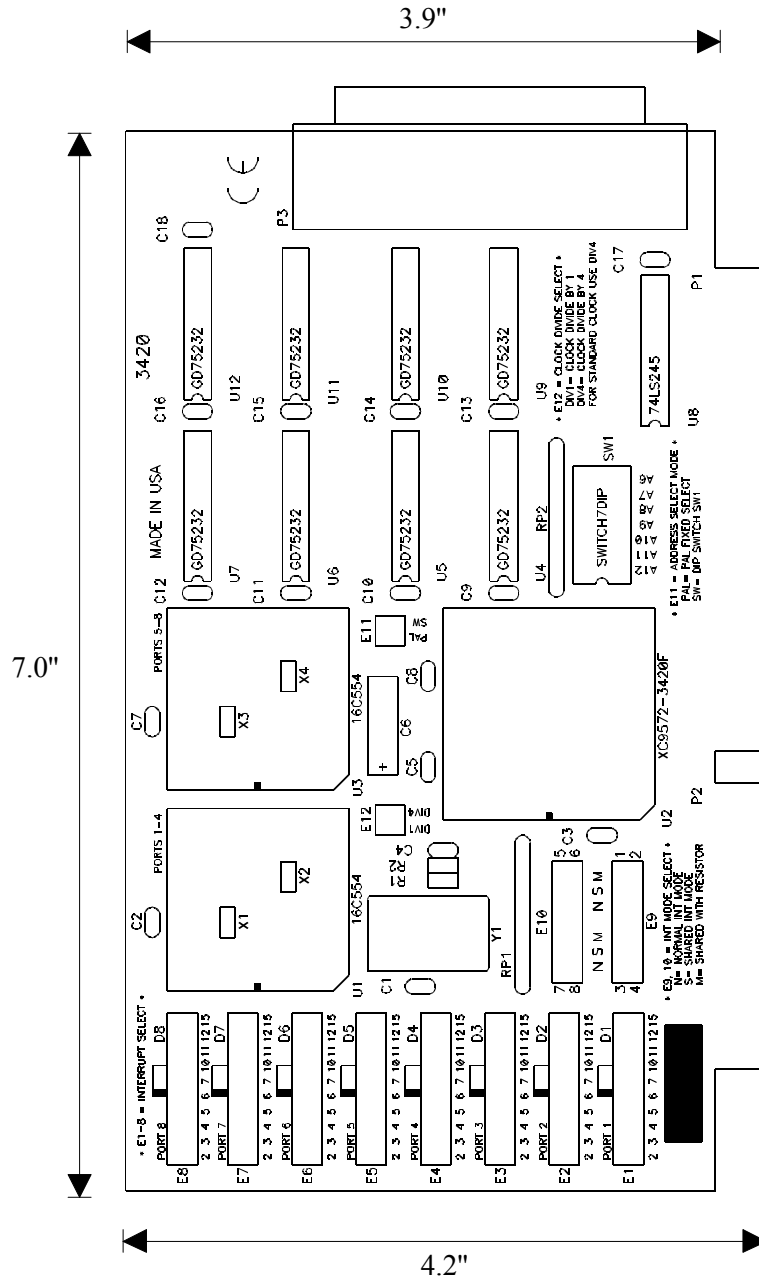


Figure 12 - Asynchronous Communications Bit Diagram

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 Statement

FCC - 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. 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 his own 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."
- **EN60950 (IEC950)** - "Safety of information technology equipment, including electrical business equipment"

Warning

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.

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 Systems, Inc. provides a limited lifetime warranty. Should this product fail to be in good working order at any time during this period, Sealevel Systems will, at its option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Sealevel Systems assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Sealevel Systems will not be liable for any claim made by any other related party.

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Technical Support is available from 8 a.m. to 5 p.m. Eastern time.
Monday - Friday

Trademarks

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COMM+8 is a trademark of Sealevel Systems, Incorporated.