PC-SIO-232™
USER MANUAL

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Quick Start

Card Setup

The **PC-SIO-232** is a fully compliant PC-Card 'Plug and Play' adapter. All card resources (i.e. I/O address, IRQ selection) are auto-assigned by your currently installed Card and Socket Services.

Operating System Installation

Please install the proper software for your adapter before installing the hardware. Refer to the supplied software for the correct operating system installation procedure.

Changing settings from the Default in Windows 95/98

Now that the **PC-SIO-232** has been added to the system using the previous steps, the resources (i.e. I/O address and IRQ) can be changed using the following steps:

1. Select the Control Panel folder and select the System icon.

2. Select the Device Manager tab and click on the '+' symbol next to the Ports (COM & LPT) selection. Choose the port that corresponds to the **PC-SIO-232.**

3. Click the Properties button and then select the Resources tab.

4. Select the last Basic Configuration. This typically will allow you to customize both the IRQ and I/O settings.

5. If the message "This resource setting cannot be modified." is displayed, make sure you have selected a Base Configuration which allows this resource to be changed and that the 'Use Automatic Settings' checkbox is not selected.

6. When the 'OK' button is pressed Windows 95/98 will automatically update your settings. It will not be necessary to re-boot.

Introduction

Overview

Congratulations! You have now entered the world of mobile communications via the Sealevel Systems **PC-SIO-232** Serial Interface.

In the last few years, the portable and notebook market has grown by leaps and bounds. Most early laptops and notebooks handled I/O expansion through proprietary expansion slots. These slots provided limited expansion for specific peripherals such as modems and FAX peripherals. Mass storage peripherals were factory installed and could not be easily changed. Interconnectivity through local area networks offered limited performance through slow parallel port network interfaces.

During this time period two standards organizations, JEIDA and PCMCIA, were working on the standardization of memory IC cards. These cards were designed as strictly non-volatile silicon storage. JEIDA was the first to propose the 68-pin connector standard for memory cards. In 1989, PCMCIA adopted the JEIDA 68 pin standard and worked with JEIDA on further developments.

As the notebook market grew, the need for a standard I/O bus was seen. The PCMCIA groups saw an opportunity to meet this need with an expanded version of the 68-pin interface. Further development occurred and within one year, release 2.0 of the standard was completed. Release 2.0 was a major update to Release 1.0 and included full hardware support for I/O devices. Release 2.0 coincided with JEIDA's 4.1 release and is identical.

The **PC-SIO-232** continues the Sealevel Systems tradition of an easy to use, highly reliable, and technically advanced serial I/O solution.

What's Included

The **PC-SIO-232** is shipped with the following items. If any of these items are missing or damaged, contact the supplier.

- **PC-SIO-232** PCMCIA Serial Interface Adapter
- DB-25 cable assembly
- DB25 to DB9 Adapter
- Impact Resistant Carrying Case (Jewel Case)
- Sealevel Systems' Software

Card Setup

Card and Socket Services must be loaded on the system prior to installing the **PC-SIO-232** card. Card and Socket Services should be supplied by the PCMCIA slot provider (i.e. the computer manufacturer or the PC adapter manufacturer). These may be in the form of a third party add-on Card and Socket service (e.g. CardSoft's CardWizard) or with your current operating system (e.g. Windows 95/98/NT).

Socket Services are the lowest level of the PCMCIA Software hierarchy. Socket Services provide a standard interface to the higher-level drivers and isolate the socket controller's specific hardware details. Socket Services provide the **'**BIOS**'** interface to the socket controller hardware. Socket Services are typically hidden under Card Services and are rarely directly accessible by application software.

Card Services provide the interface to application software and drivers. Card Services are responsible for allocating card resources and ensuring that card resources do not interfere with other existing system resources. Card Services are typically implemented as a driver. Almost all PCMCIA type cards require some sort of software driver. In the case of the **PC-SIO-232**, the generic Card Services driver supplied with the computer system should provide adequate support for most applications. A DOS 'Enabler' is also provided for older systems in which the Generic Enabler isn't adequate. Please refer to Appendix C for information on the SEAPC enabler and the diagnostic tool SSEnable.

Connecting the **PC-SIO-232** to the computer requires no special technical skills. In fact it is usually done in as simple as two steps:

1. Follow the directions given for your operating system found on the supplied software.

2. Simply slide the card into a PCMCIA Type II compliant slot on the personal computer. The PCMCIA slot is keyed so that the **PC-SIO-232** cannot be installed backwards or upside down. The card should install with a minimal amount of pressure. Do not force the card into the slot. Forcing the card can result in damage to the **PC-SIO-232** or to the PCMCIA slot. After the card has been installed into the PCMCIA slot, the I/O cable should be connected to the card. The cable is also keyed to prevent it from being installed incorrectly.

Baud Rates and Divisors for the 'Div1' mode

Please note that this card is supplied with a clock that is four times faster than a standard com port. The data rate you choose in your application or setup will actually be four times faster. An example would be: you choose 9600 bps. The actual data rate of the card would be 38400bps. Use the chart below in determining your settings based on your data rate.

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	9600 bps
115.2 K bps	19.2K 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

Technical Description

The **PC-SIO-232** provides one RS-232 serial port utilizing the 16550 UART (Universal Asynchronous Receiver Transmitter).

The **PC-SIO-232** is addressable as any COM: port (e.g. COM1:, COM2:, etc.) The **PC-SIO-232** provides for selectable IRQs (3,4,5,7,9,10,11,12,15). I/O address and IRQ combinations are very flexible, and information on selecting these combinations is available in the Card Services Documentation and the supplied software. Please refer to the software supplied with the **PC-SIO-232** for any manual updates, corrections and software specific changes.

Each COM: Port requires a minimum of one block of eight I/O addresses. For example, COM1: is usually hex address 3F8. 3F8 is the base address, and the COM: ports extend through 3FF. In most applications, each COM: port will utilize one IRQ.

Connector Pin Assignments for RS-232 (DB-25 Male or DB-9 Male)

Signal	Name	DB-25	DB-9*	Mode
GND	Ground	7	5	
TD	Transmit Data	2	3	Output
RTS	Request To Send	4	7	Output
DTR	Data Terminal Ready	20	4	Output
RD	Receive Data	3	2	Input
CTS	Clear To Send	5	8	Input
DSR	Data Set Ready	6	6	Input
CD	Carrier Detect	8	1	Input
RI	Ring Indicator	22	9	Input

* Note: These assignments meet EIA/TIA/ANSI-574 DTE for DB-9 type connectors.

> *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	0º to 50º C (32º to 122º F)	-20º to 70º C (-4º to 158º F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Power Consumption

Supply Line	Product	Rating (mA)
+5 VDC	3603	25 mA

Mean Time Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Physical Dimensions

The **PC-SIO-232** conforms to the physical dimensions for all PCMCIA Type II cards as defined in the PCMCIA specification 2.0.

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 securely installed in a PC Card slot.

4. 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'.

5. 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.

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

Appendix B - 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 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.

4. Technical support is available Monday through 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 - SeaPC and SSEnable Software

SeaPC

SeaPC is a PCMCIA Version 2.0 compliant **DOS** client that will enable the selected PC Cards I/O address and IRQ when inserted. The **SeaPC** driver is located on the supplied software in the PCMCIA directory. Please refer to the README.DOC file for additional information.

Features

- Allows unique addressing and IRQ selection.

- Provides the highest level of compatibility with installed systems compliant with PCMCIA standard 2.0 or higher.

When should I use the enabler?

This PC Card Client Enabler is not needed in all situations. **SeaPC** should be used if one or more of the following conditions occur:

- The PCMCIA system software (Card and Socket Services) on the host computer will not configure the cards automatically.

- The PCMCIA system software on the host computer does not supply a configuration utility to allow the PC Card to be configured automatically.

- The configuration utility with the PCMCIA system software does not function properly.

SeaPC System Requirements

SeaPC was designed to operate on an IBM PC / AT or compatible computer. **SeaPC** requires approximately 3 kilobytes of free conventional memory. If **SeaPC** is loaded more than once, an additional 3 kilobytes plus buffer space is required for each resident copy. **SeaPC** may be used with memory managers and loaded into expanded memory. **SeaPC** requires MS-DOS or PC-DOS version 3.00 or higher and Card and Socket Services that are compliant with PCMCIA version 2.0 or higher.

Executing the Driver

SeaPC is a DOS Terminate and Stay Resident (TSR) program that can be executed from the DOS command prompt or from the AUTOEXEC.BAT file. For additional information on the AUTOEXEC.BAT file please refer to the DOS manual. When **SeaPC** is executed, a setup file must be specified on the command line.

Command Line Options

To display the available command line options, Type "**SeaPC** /?" at the DOS command prompt. The following should be displayed.

C:>**SeaPC** /?
Sealevel Systems, Inc. **SeaPC** PC Card I/O Enabler Version 1.00
Sealevel Systems Inc. (C) 1994. All rights reserved.

Syntax: **SeaPC** [/F:file] [/U] [/I] [/V] [/?]
        /F:[file] Where file is the configuration file
        /U   Unconditional installation
        /I   Display info on resident copies of **SeaPC** without installing the enabler
        /V   Show verbose installation information
        /?   Display command line options, inhibit driver from loading

Note: The /F: option is the only required command line parameter. If the setup file is not located in the default directory, the drive and path must be specified. The following section details the syntax of the setup file.

Setup File

An example setup file named **SeaPC**.INI is provided on the diskette. This file may be edited with the DOS EDIT utility. The following is the syntax for a PC Card configuration:

[card]
BaseIO = *Base I/O address*
IRQ = *Interrupt Request Signal*
Type = *Device Type*
Interface = *Electrical Interface Utilized*

Note: All items in *italics* need to be provided by the user. The following is a description of each entry in the setup file:

BaseIO	Base I/O address in Hexadecimal. Valid ranges are from 0 – 3FF Hex. Some ranges may be reserved by the PCMCIA system software or occupied by other peripherals in the host computer system.
IRQ	Interrupt Request Signal in Decimal. Valid ranges are from 2-15. Please note that some IRQs be reserved by the PCMCIA system software or occupied by other peripherals in the host computer system.
Type	Device Type. Valid option is UART for the 3603
Interface	Electrical Interface Utilized. Valid options are RS-232, RS-422, RS-485. (In the scope of the driver, RS-422 and RS-485 are viewed as the same value.)

A semicolon (;) at the beginning of a line denotes a comment and the remainder of that line is ignored. Note the above syntax is an example for one card. Multiple cards (up to eight) may be configured using the following syntax:

;First Card
[card]
BaseIO=238
IRQ=10
Type = UART
Interface=RS-232

To enable pulse mode interrupts, add the following line to the setup file:

IRQMode = Pulse

Remember this feature will only work on a platform that supports pulse mode interrupts, and if the Card and Socket services support pulse mode interrupts.

SSEnable

SSEnable is a PCMCIA DOS only utility that will allow the use of your PC Card without loading card and socket services. The utility is provided for applications that conflict with card and socket services. Please note that this utility does NOT use card and socket services and greatly reduces the features of the PCMCIA card.

One very important thing to remember about SSEnable is that it does not provide 'Hot Swapping' capability for the PCMCIA socket. Hot insertion or removal of the PC Card while using SSEnable could cause damage to the PCMCIA socket or the card.

The command line parameters for the program are listed by typing **SSEnable** at the DOS prompt. The following are example command line entries for the **SSEnable** program:

Enable base I/O address 238 hex,-IRQ 5, -memory range d000-dfff, (which has been excluded from any memory manager and is reserved for the PC Card attribute memory) and the PC Card is in socket 1

SSEnable /b:238 /i:5 /m:d000 /s:1

To remove the configuration on socket 1 type:

SSEnable /s:1 /r

Note: **SSEnable** will only work with Intel PCIC compatible socket controllers.

Appendix D - 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 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 at distances less than 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) 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 E - Compliance Notices

Federal Communications Commission 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

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 B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

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 B - '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'

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 EMC directives.

Warranty

Sealevel Systems, Inc. provides a lifetime warranty for this product. Should this product fail to be in good working order at any time during this period, Sealevel Systems will, at it's 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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