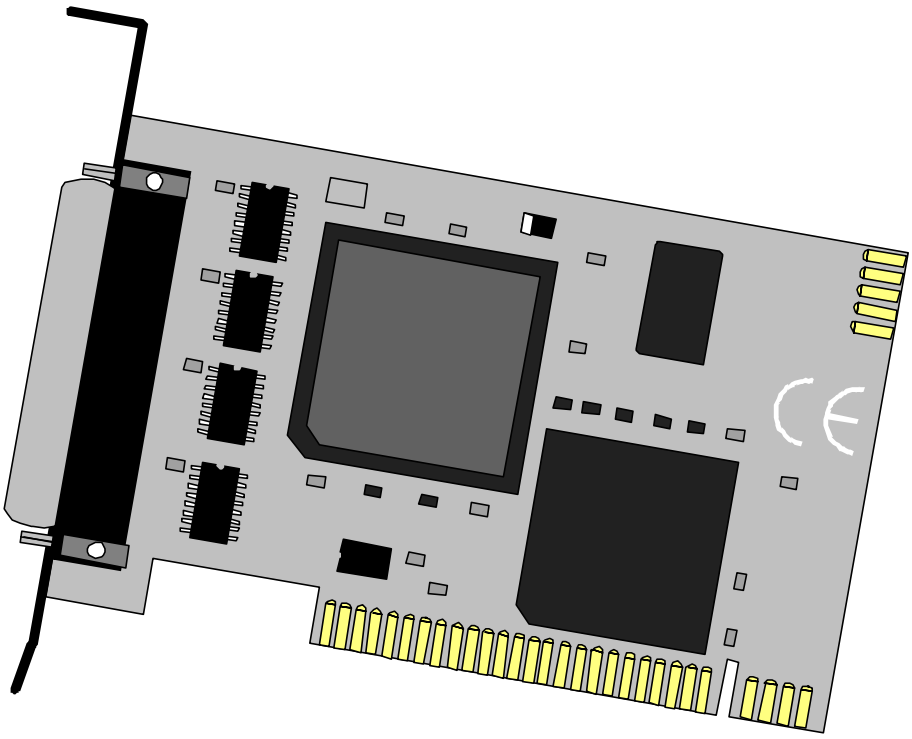
SEALEVEL
SYSTEMS INCORPORATED

ACB-MP. PCI™
USER MANUAL



Part # 5102

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Introduction

Overview

The ***ACB-MP.PCI*** adapter provides the PC with a single channel multi-protocol serial interface utilizing the Zilog Z85230 (ESCC™), which is suitable for the most popular communication protocols including HDLC/SDLC, X.25, Bi-Sync, Mono-Sync, and asynchronous.

The ***ACB-MP.PCI*** also utilizes the Sipex-505 multi-protocol electrical interface chip that allows the ***ACB-MP.PCI*** to be compliant with EIA/TIA-530/530A, EIA/TIA-232E, EIA/TIA-485, and ITU V.35.

What's Included

The ***ACB-MP.PCI*** is shipped with the following items. If any of these items are missing or damaged, contact the supplier.

- ***ACB-MP.PCI*** Adapter
- Sealevel Software
- Loopback Plug

Installation

Operation System Installation

For Windows users that are using Sealevel's SeaMAC software please note that there is a different install for this card than the normal SeaMAC software. When choosing to install the software from the CD scrool down to the SeaMAC drivers. You should see:* **Note:** If you are installing Part# 3612 or 5102, click here to install the Windows 2000 interrupt mode HDLC/SDLC driver. To install the Windows NT interrupt mode Async driver and for all other ACB products, click the "install SeaMAC" button below. Please be sure to follow these steps for a successful installation.

System Installation

The ***ACB-MP.PCI*** can be installed in any of the PCI expansion slots.

1. Turn off PC power. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available PCI slot and remove the blank metal slot cover.
4. Gently insert the ***ACB-MP.PCI*** into the slot. Make sure the adapter is seated properly.
5. Replace the screw.
6. Replace the cover.
7. Connect the power cord.

Installation is complete.

The ***ACB-MP.PCI*** has a number of cabling options available. These options include:

- **CA-103** - This cable provides a high quality shielded cable with the V.35 mechanical specification met on one end and a DB-25S (female) on the other end. V.35 has a mechanical specification that is impossible to place on a PC bracket and requires this adapter cable.
- **CA-104** - This cable provides a 6' extension for use with RS-232, and RS-530/530A.
- **CA-107** - RS-530 (DB-25P) to RS-449 (DB-37P) cabling adapter. RS-530 is replacing RS-449 in Telecom applications, but there is still a very large base of installed equipment that uses the RS-449 pin-out. Both standards use RS-422 to define the electrical specifications and are interchangeable via this adapter cable.

Technical Description

The ***ACB-MP.PCI*** utilizes the Zilog 85230 **E**nhanced **S**erial **C**ommunications **C**ontroller (ESCC). This chip features programmable baud rate, data format and interrupt control. Refer to the ESCC Users Manual for details on programming the 85230 ESCC chip.

Features

- One channel of synchronous or asynchronous communications using the Zilog Z85230 chip
- Programmable electrical interface selection EIA/TIA-232/530/530A/485 and ITU V.35
- Programmable options for Transmit clock as input or output
- Software programmable baud rate

Internal Baud Rate Generator

The baud rate of the ESCC is programmed under software control. The standard oscillator supplied with the board is 7.3728 MHz. However, other oscillator values can be substituted to achieve different baud rates.

Control and Status Registers Definition

The control and status registers occupy 16 consecutive I/O locations. The following tables provide a functional description of the bit positions. X = do not care

Base	Mode	D7	D6	D5	D4	D3	D2	D1	D0
+4	RD	0	IRQST	0	0	0	0	0	DSRA
+4	WR	X	X	X	0	X	X	X	X
+5	RD	485CLK	ECHOA	SYNCA_RTS	SYNCA_CTS	AM3	AM2	AM1	AM0
+5	WR	485CLK	ECHOA	SYNCA_RTS	SYNCA_CTS	AM3	AM2	AM1	AM0
+6	RD	0	0	0	0	RLA	LLA	TSETSLA	RXCOPTA
+6	WR	X	X	X	X	RLA	LLA	TSETSLA	RXCOPTA
+14	RD	SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0
+15	RD	SD15	SD14	SD13	SD12	SD11	SD10	SD9	SD8

Field	Description		
IRQST	SCC interrupt status:	**1 = No interrupt pending on ESCC**	0 = Interrupt pending on ESCC.
DSRA	DSRA:	**1 = DSRA not active**	0 = DSRA active
LLA	Local Loopback:	1 = LL set	**0 = LL not set**
RLA	Remote Loopback:	1 = RL set	**0 = RL not set**
TSETSLA	TSET clock source:	1= Received TXC as source	**0 = TRXCA as source**
RXCOPTA	RXCOPTA:	1= Selects SCC PCLK for RTXCA	**0 = Selects received RXC for RTXCA**
SYNCA_RTS	SYNCA _RTS:	1 = SYNCA connected to RTS	**0 = SYNCA is high**
SYNCA_CTS	SYNCA_CTS:	1 = SYNCA connected to CTS	**0 = SYNCA is high**
485CLK	TSET switches with TXD	1 = clk switches	**0 = no CLK switching**
ECHOA	ECHO enable:	1 = echo disabled	**0 = echo enabled**
AM0-AM3	I/O mode select.	See table for valid interface options	**0 = High Impedance**
SD0-SD15	Optional security feature. Unique value per customer or application.		**Default value = FFFF**

Note: Default values are listed in bold

Interface Selection

The ***ACB-MP.PCI*** supports a variety of electrical interfaces. Refer to the **Control and Status Register Definitions** found in the **Technical Description** section of this manual for this bit description. There is line termination on RXD, RXC, and TXC in the following modes: RS-530, RS-530A, RS-485T, and V.35.

HEX	M3	M2	M1	M0	Interface Mode
0	0	0	0	0	**All signals are high impedance**
1	0	0	0	1	* not supported *
2	0	0	1	0	**RS-232**
3	0	0	1	1	* not supported *
4	0	1	0	0	**RS-485T with 120 ohm termination**
5	0	1	0	1	**RS-485 without termination**
6,7,8,9	0	1	1	0	* not supported *
A	1	0	1	0	**single ended loop-back**
B	1	0	1	1	**differential loop-back**
C	1	1	0	0	* not supported *
D	1	1	0	1	**RS-530**
E	1	1	1	0	**V.35**
F	1	1	1	1	**RS-530A**

25 Pin Connector Signal Layouts (DB-25 Male)

RS-232 Signals

Base+5, M3-M0=2, 0010

Signal	Name	Pin #	Mode
GND	Ground	7	
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
DSR	Data Set Ready	6	Input
DCD	Data Carrier Detect	8	Input
TM	Test Mode	25	Input
TXC	Transmit Clock	15	Input
RXC	Receive Clock	17	Input
TSET	Transmit Signal Element Timing	24	Output
DTR	Data Terminal Ready	20	Output
TD	Transmit Data	2	Output
RTS	Request To Send	4	Output
LL	Local Loop-back	18	Output
RL	Remote Loop-back	21	Output

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.

V.35 Signals

Base+5, M3-M0=E, 1110

Signal	Name	DB-25	V.35	Mode
GND	Ground	7	B	
RDB RX+	Receive Positive	16	T	Input
RDA RX-	Receive Negative	3	R	Input
TXCB TXC+	Transmit Clock Positive	12	AA	Input
TXCA TXC-	Transmit Clock Negative	15	Y	Input
RXCB RXC+	Receive Clock Positive	9	X	Input
RXCA RXC-	Receive Clock Negative	17	V	Input
TDB TX+	Transmit Positive	14	S	Output
TDA TX-	Transmit Negative	2	P	Output
TSETB TSET+	Transmit Signal Element Timing +	11	W	Output
TSETA TSET-	Transmit Signal Element Timing -	24	U	Output
CTS	Clear To Send	5	D	Input *
DSR	Data Set Ready	6	E	Input *
DCD	Data Carrier Detect	8	F	Input *
DTR	Data Terminal Ready	20	H	Output *
RTS	Request To Send	4	C	Output *
LL	Local Loop-back	18		Output *
RL	Remote Loop-back	21		Output.*

- **Note:** All modem control signals are single ended (un-balanced) with RS-232 signal levels.

RS-530 (RS-422)

Base+5, M3-M0=D, 1101

Signal	Name	Pin #	Mode
GND	Ground	7	
RDB RX+	Receive Positive	16	Input
RDA RX-	Receive Negative	3	Input
CTSB CTS+	Clear To Send Positive	13	Input
CTSA CTS-	Clear To Send Negative	5	Input
DCDB DCD+	Data Carrier Detect Positive	10	Input
DCDA DCD-	Data Carrier Detect Negative	8	Input
TXCB TXC+	Transmit Clock Positive	12	Input
TXCA TXC-	Transmit Clock Negative	15	Input
RXCB RXC+	Receive Clock Positive	9	Input
RXCA RXC-	Receive Clock Negative	17	Input
TDB TX+	Transmit Positive	14	Output
TDA TX-	Transmit Negative	2	Output
RTSB RTS+	Request To Send Positive	19	Output
RTSA RTS-	Request To Send Negative	4	Output
DTRB DTR+	Data Terminal Ready Positive	23	Output
DTRA DTR-	Data Terminal Ready Negative	20	Output
TSETB TSET+	Transmit Signal Element Timing Positive	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	24	Output
DSRB DSR+	Data Set Ready Positive	22	Input
DSRA DSR-	Data Set Ready Negative	6	Input
LL	Local Loopback	18	Output
RL	Remote Loopback	21	Output

RS-530A

Base+5, M3-M0=F, 1111

Signal	Name	Pin #	Mode
GND	Ground	7	
RDB RX+	Receive Positive	16	Input
RDA RX-	Receive Negative	3	Input
CTSA CTS-	Clear To Send Negative	5	Input
DCDA DCD-	Data Carrier Detect Negative	8	Input
TXCB TXC+	Transmit Clock Positive	12	Input
TXCA TXC-	Transmit Clock Negative	15	Input
RXCB RXC+	Receive Clock Positive	9	Input
RXCA RXC-	Receive Clock Negative	17	Input
TDB TX+	Transmit Positive	14	Output
TDA TX-	Transmit Negative	2	Output
RTSA RTS-	Request To Send Negative	4	Output
DTRA DTR-	Data Terminal Ready Negative	20	Output
TSETB TSET+	Transmit Signal Element Timing Positive	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	24	Output
LL	Local Loop-back	18	Output
RL	Remote Loop-back	21	Output

RS-485 or RS-485T

Base+5, M3-M0=4, 0100 (With termination)
Base+5, M3-M0=5, 0101 (Without termination)

Signal	Name	Pin #	Mode
GND	Ground	7	
RDB RX+	Receive Positive	16	Input
RDA RX-	Receive Negative	3	Input
TXCB TXC+	Transmit Clock Positive	12	Input
TXCA TXC-	Transmit Clock Negative	15	Input
RXCB RXC+	Receive Clock Positive	9	Input
RXCA RXC-	Receive Clock Negative	17	Input
TDB TX+	Transmit Positive	14	Output
TDA TX-	Transmit Negative	2	Output
TSETB TSET+	Transmit Signal Element Timing Positive	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	24	Output
LL	Local Loop-back	18	Output
RL	Remote Loop-back	21	Output

Specifications

Environmental Specifications

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

Power Consumption

Supply line	+5 VDC
Rating	350 mA

Mean Time Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Physical Dimensions

Board length	4.75 inches	(12.065 cm.)
Board Height including Goldfingers	3.50 inches	(8.890 cm.)
Board Height excluding Goldfingers	3.175 inches	(8.065 cm.)

Appendix A - Troubleshooting

The Developers Toolkit Software is supplied with the Sealevel Systems adapter and will be used in the troubleshooting procedures. Using this software and following these simple steps 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 the 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. Make sure the Sealevel Systems adapter is securely installed in a PCI slot.

3. Use the supplied software and User Manual to verify that the Sealevel Systems adapter is configured correctly. The supplied software contains a diagnostic program "SSDMP" that will verify if the adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use.

4. Windows users can use the installed programs in the SeaMAC folder to verify operation.

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 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 or EIA/TIA-232. It is defined by the EIA as the *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. 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) denotes a binary 1 (mark). The RS-232 and the EIA/TIA-574 specification defines two type of interface circuits, Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). The Sealevel Systems adapter is a DTE interface.

RS-422

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

RS-485

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

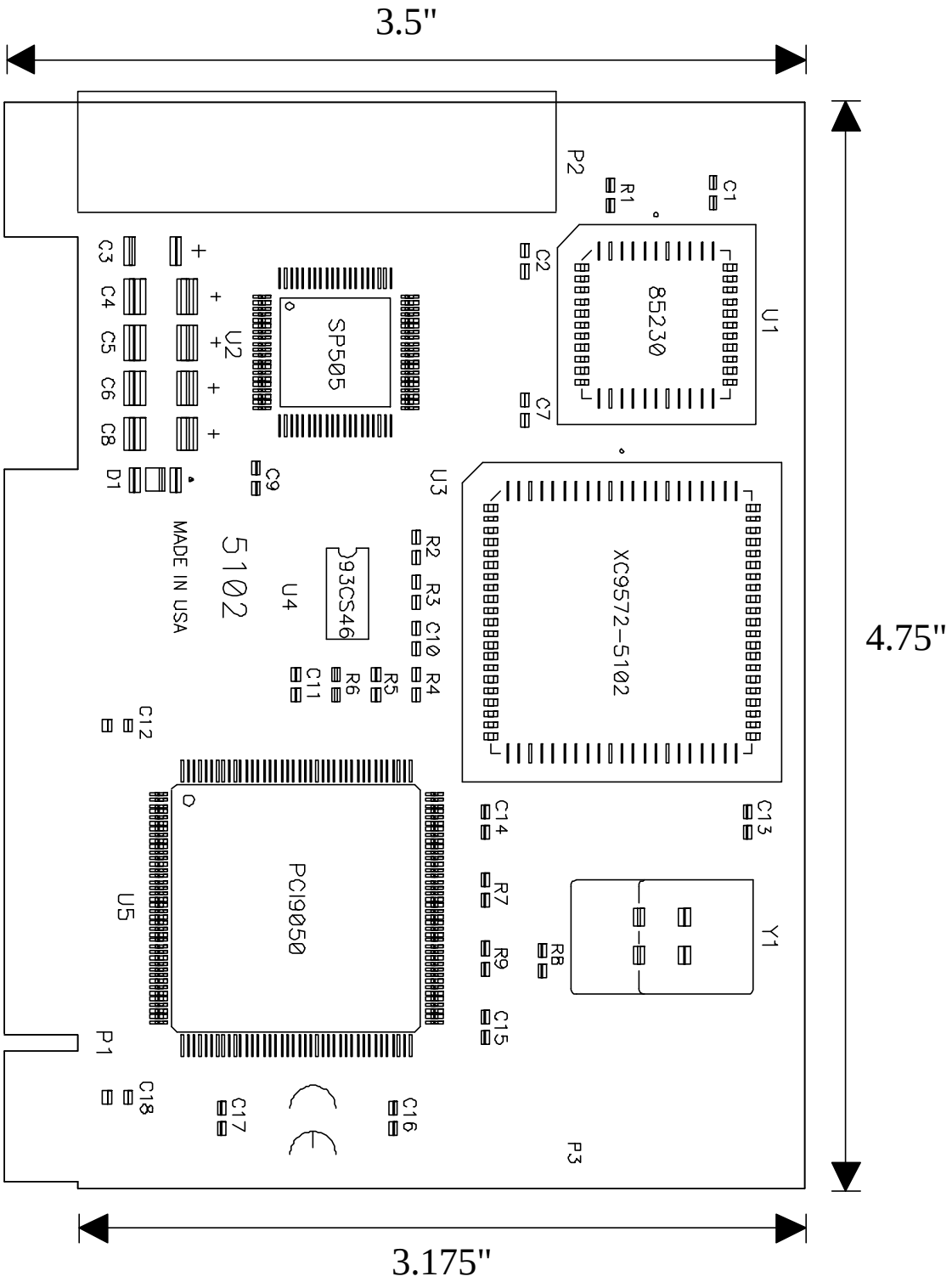
RS-530 / 530A

RS-530 (a.k.a. EIA-530) compatibility means that RS-422 signal levels are met, and the pin-out for the DB-25 connector is specified. The EIA (Electronic Industry Association) created the RS-530 specification to detail the pin-out, and define a full set of modem control signals that can be used for regulating flow control and line status. The major difference between RS-530 and RS-530A lies in the modem control interface signals. In RS-530 all signals are differential, in RS-530A signals DTR, DSR, DCD are single ended. The RS-530 specification defines two types of interface circuits, Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). The Sealevel Systems adapter is a DTE interface.

V.35

V.35 is a standard defined by ITU (formerly CCITT) that specifies an electrical, mechanical, and physical interface that is used extensively by high-speed digital carriers such as AT&T Dataphone Digital Service (DDS). ITU V.35 is an international standard that is often refereed to as *Data Transmission at 48 Kbps Using 60 - 108 KHz Group-Band Circuits*. ITU V.35 electrical characteristics are a combination of unbalanced voltage and balanced current mode signals. Data and clock signals are balanced current mode circuits. These circuits typically have voltage levels from 0.5 Volts to -0.5 Volts (1 Volt differential). The modem control signals are unbalanced signals and are compatible with RS-232. The physical connector is a 34-pin connector that supports 24 data, clock and control signals. The physical connector is defined in the ISO-2593 standard. ITU V.35 specification defines 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 - Silk-Screen



Appendix E - Compliance Notices

Federal Communications Commission Statement

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

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ACB-MP.PCI is a trademark of Sealevel Systems, Incorporated.