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ACB-MP+4.PCI Synchronous Serial Interface

USER MANUAL



ITEM# 5402

Sealevel Systems, Inc. Sealevel.com Phone 864.843.4343

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Before You Get Started

WHAT'S INCLUDED

The ACB-MP+4.PCI is shipped with the following items. If any of these items is missing or damaged please contact Sealevel for replacement.

- **ACB-MP+4.PCI Adapter** (Item# 5402)
- **100-Pin to (4) DB25M Breakout Cable**, 36" in Length (Item# CA339)
- **Sealevel Software CD with SeaMAC drivers**

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.

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Product Description

The ACB-MP+4.PCI (Item# 5402) is a four-port PCI bus RS-232, RS-422, RS-485,EIA-530, EIA-530A, V.35 synchronous serial interface. Designed using the popular Zilog Z85230 Enhanced Serial Communication Controller (ESCC), the board is an ideal solution for military, satellite, radar, banking, and other applications that require robust synchronous communications.

For maximum flexibility, each of the serial ports can be individually configured for RS-232, RS-422, RS-485,EIA-530, EIA-530A, V.35 communications. In RS-232 mode, all common modem control signals are implemented for compatibility with a wide range of peripherals. A digital phase lock loop (DPLL) is included on each port, and the board supports data rates up to 128K bps in burst mode. For easy implementation, a fan-out cable is included that terminates the onboard 100-pin connector to four DB-25M connectors.

The ACB-MP+4.PCI features Universal Bus (3.3V and 5V) compatibility with both new and legacy computer systems. Software support, critical for successful synchronous communication development, is provided through Sealevel's SeaMAC driver. HDLC/SDLC protocols are supported as well as certain configurations of Monosync, Bi-sync, and Raw modes.

The ACB-MP+4.PCI also utilizes the Exar SP-505 multi-protocol electrical interface chip that allows the ACB-MP+4.PCI to be compliant with EIA/TIA-530/530A, EIA/TIA-232E, EIA/TIA 485, and ITU V.35. Optional cables are available to connect RS-449, RS-530, RS-530A, V.35 and X.21 interfaces.

FEATURES

- Compliant with RoHS and WEEE directives
- Each port individually configurable for RS-232, RS-422, RS-485, RS-530, RS-530A, or V.35
- Z85230 Enhanced Serial Communications Controller (ESCC)
- Data rates to 128K bps (Burst mode)
- Included fan-out cable terminates 100-pin SCSI-style connector on board to four DB-25M connectors (Item# CA339)



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OPTIONAL ITEMS

Depending upon your application, you are likely to find one or more of the following items useful for interfacing the ACB-MP+4.PCI to real-world signals. All items can be purchased from our website (http://www.sealevel.com) or by calling 864 843-4343.

CABLES & CONVERTERS

DB25 Female to DB25 Male Extension Cable, 72 inch Length (Item# CA104)	
The CA104 is a standard DB25F to DB25M serial extension cable. Extend a DB25 cable or locate a piece of hardware where it is needed with this six foot (72 inch) cable. The connectors are pinned one-to-one so the cable is compatible with any device or cable with DB25 connectors. The cable is fully shielded against interference and the connectors are molded to provide strain relief. Dual metal thumbscrews secure the cable connections and prevent accidental disconnection. Recommended for applications with data rates less than 1M bps.	
DB25 Female (RS-530) to DB37 Male (RS-449 DTE) Cable, 10 inch Length (Item# CA107)	
DB25 Female (RS-530) to DB37 Male (RS-449 DTE) Cable, 10 inch Length. RS-530 was designed to replace the bulky DB37 RS-449 connector. The CA107 cable allows any Sealevel RS-530 adapter to be used in an RS-449 application.	
DB25 Female (RS-530) to DB15 Male (X.21) Cable, 72 inch Length (Item# CA159)	
DB25 Female (RS-530) to DB15 Male (X.21) Cable, 72 inch Length. Converts the Standard DB25 implementation of RS-530 or RS-422 to the ITU-T X.21 standard pinout.	
DB25 Female to DB25 Male (RS-530) Twisted Pair Serial Cable, 72 inch Length (Item# CA174)	
DB25 Female to DB25 Male Twisted Pair Serial Cable, 72 inch Length. Twisted Pairs provide increased data integrity in high-speed serial applications. Recommended for RS-530 applications with data rates greater than 1M bps.	
DB25 Female (V.35) to ITU-T ISO-2593 Style Connector (V.35) Cable, 72 inch Length (Item# CA178)	
DB25 Female (V.35) to ITU-T ISO-2593 Style Connector (V.35) Cable, 72 inch Length. The CA178 converts the Sealevel DB25 implementation of V.35 to the ITU-T V.35 mechanical standard.	

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OTHER PRODUCTS

Part #	Description
5102	Low Profile PCI RS-232, RS-422, RS-485, RS-530, RS-530A, V.35 Synchronous Serial Interface (uses Z85230)
5103	Low Profile PCI RS-232 Synchronous Serial Interface (uses Z85230)
5104	Low Profile PCI RS-232, RS-422, RS-485, RS-530, RS-530A, V.35 Synchronous Serial Interface (uses Z16C32)
3512	PC/104 RS-232, RS-422, RS-485, RS-530, RS-530A, V.35 Synchronous Serial Interface (uses Z85230)
3514	PC/104-Plus RS-232, RS-422, RS-485, RS-530, RS-530A, V.35 Synchronous Serial Interface (uses Z16C32)
3612	PCMCIA RS-232, RS-422, RS-485, RS-530, RS-530A, V.35 Synchronous Serial Interface Card (uses Z85233)

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Installation & Configuration

SOFTWARE INSTALLATION

MICROSOFT WINDOWS 2000/XP/VISTA/WINDOWS 7™ OPERATING SYSTEMS



Do not install the adapter until the software has been successfully installed.

1. Start Windows.
2. Insert the Sealevel Systems CD in your CD drive.
3. If 'Auto-Start' is enabled for this drive the software will automatically launch. Otherwise launch the 'autorun.exe' file located in the root directory of the CD.
4. Click the 'Install' button.
5. Type in or select the part number for the adapter from the listing.
6. The setup files will automatically detect the operating environment and install the proper components. Follow the information presented on the screens that follow.
7. A screen may appear with text similar to: "The publisher cannot be determined due to the problems below: Authenticode signature not found." Please click the 'Yes' button and proceed with the installation. This declaration simply means that the operating system is not aware of the driver being loaded. It will not cause any harm to your system.
8. During setup, the user may specify installation directories and other preferred configurations. This program also adds entries to the system registry that are necessary for specifying the operating parameters for each driver. An uninstall option is also included to remove all registry/INI file entries from the system.
9. The software is now installed and you can proceed with the hardware installation.

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PHYSICAL INSTALLATION

The adapter is universal bus compatible and can be installed in any 3.3V or 5V PCI expansion slot.



Do not install the adapter until the software has been successfully installed.

1. Turn off 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 PCI adapter into the slot. Make sure the adapter is seated properly.
5. Replace the screw (required for FCC Part 15 compliance).
6. Replace the cover.
7. Connect the power cord and power up the machine.
8. The ACB-MP+4.PCI is now ready to be installed when the system is booted.

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Technical Description

The ACB-MP+4.PCI utilizes the Zilog Z85230 Enhanced Serial Communications Controller (ESCC) and includes a dedicated Z85230 per port. This chip features programmable baud rate, data format and interrupt control. Refer to the ESCC User Manual, available from Zilog, for details on programming the 85230 ESCC chip in the event you are writing your own driver as opposed to using the SeaMAC driver.

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. It should be noted that the Z85230 chip is manufactured in different speed ranges and installation of a different oscillator may also require changing the Z85230.

CONTROL AND STATUS REGISTERS DEFINITION

The control and status registers occupy 12 consecutive I/O locations. The following tables provide a functional description of the bit positions. This table is provided for users that desire to write their own driver.

X = do not care.

Base	Mode	D7	D6	D5	D4	D3	D2	D1	D0
+4	RD	0	IRQST	0	0	0	0	0	DSRA
+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
+7	RD	X	X	X	X	IRQST4	IRQST3	IRQST2	IRQST1
+14	RD	SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0
+15	RD	SD15	SD14	SD13	SD12	SD11	SD10	SD9	SD8

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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

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INTERFACE SELECTION

The ACB-MP+4.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. This table is provided for users that desire to write their own driver. By default, at power-up, all signals are high impedance.

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 120Ω 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 loopback**
B	1	0	1	1	**differential loopback**
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**

100-PIN CONNECTOR PIN OUT

The ACB-MP+4.PCI has a 100-pin high-density connector and includes a cable (Item# CA339) that breaks out to four (4) DB25 male connectors. The pin outs for RS-232, RS-485, RS-530, RS-530A and V.35 interfaces on the DB25 connectors are listed on the following pages. For customers designing their own cable, the mating 100-pin connector is AMP Part# 5787169-9. The pin out for the 100-pin connector is listed below.

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		100-Pin Connector			
Signal Name	DB25	Port 1	Port 2	Port 3	Port 4
N/C		1	51	26	76
GND	7	2	52	27	77
TXD-	2	3	53	28	78
TXD+	14	4	54	29	79
RTS-	4	5	55	30	80
RTS+	19	6	56	31	81
DTR-	20	7	57	32	82
DTR+	23	8	58	33	83
TSET-	24	9	59	34	84
TSET+	11	10	60	35	85
RXD-	3	11	61	36	86
RXD+	16	12	62	37	87
CTS-	5	13	63	38	88
CTS+	13	14	64	39	89
DSR-	6	15	65	40	90
DSR+	22	16	66	41	91
DCD-	8	17	67	42	92
DCD+	10	18	68	43	93
TXC-	15	19	69	44	94
TXC+	12	20	70	45	95
RXC-	17	21	71	46	96
RXC+	9	22	72	47	97
LL-	18	23	73	48	98
RL-	21	24	74	49	99
NC		25	75	50	100
SHIELD	Shell	Shell	Shell	Shell	Shell

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DB-25M CONNECTOR PIN OUTS

RS-232 SIGNALS

Base+5, M3-M0=2, 0010

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

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

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

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RS-530 (RS-422)

Base+5, M3-M0=D, 1101

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

RS-530A

Base+5, M3-M0=F, 1111

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

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V.35 SIGNALS

Base+5, M3-M0=E, 1110

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

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

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Technical Specifications

ENVIRONMENTAL SPECIFICATIONS

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

POWER REQUIREMENTS

Supply line	+5 VDC
Rating	750 mA

DIMENSIONS

Length	6.53”	16.58cm
Width	4.20”	10.69cm

MANUFACTURING

All Sealevel Systems printed circuit boards are built to UL 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over “ELECTROLESS Ni / IMMERSION GOLD.

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Appendix A – Handling Instructions

ESD WARNINGS

ELECTROSTATIC DISCHARGES (ESD)

A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must therefore be observed. Always take the following precautions.

- Transport boards and cards in electrostatically secure containers or bags.
- Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
- Only touch electrostatically sensitive components when you are properly grounded.
- Store electrostatically sensitive components in protective packaging or on anti-static mats.

GROUNDING METHODS

The following measures help to avoid electrostatic damage to the device:

- Cover workstations with approved antistatic material. Always wear a wrist strap connected to workstation as well as properly grounded tools and equipment.
- Use antistatic mats, heel straps, or air ionizers for more protection.
- Always handle electrostatically sensitive components by their edge or by their casing.
- Avoid contact with pins, leads, or circuitry.
- Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools such as cutters, screwdrivers, and vacuum cleaners, which are conductive.

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Appendix B - Troubleshooting

Following these simple steps can eliminate most common problems.

1. Read this manual thoroughly before attempting to install the adapter in your system.
2. Install software first. This places the required installation files in the correct locations. After installing the software, proceed to the physical installation section of this manual.
3. 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.
4. 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.
5. Make sure the Sealevel Systems adapter is securely installed.
6. For Windows 2000/XP/Vista, and Windows 7, the diagnostic tool 'WinSSD' is installed the SeaMAC 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. The Loopback tab is primarily designed for asynchronous cards and should not be used in synchronous modes – use the BERT tab instead.
7. Always use Sealevel Systems diagnostic software when troubleshooting a problem. This will eliminate any software issues from the equation.

If these steps do not solve your problem, please call Sealevel Technical Support at +1864-843-4343. Our technical support is free and available Monday through Friday from 8:00 am – 5:00 pm EST. For email support, contact support@sealevel.com.

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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 partyline 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.

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RS-530 / 530A

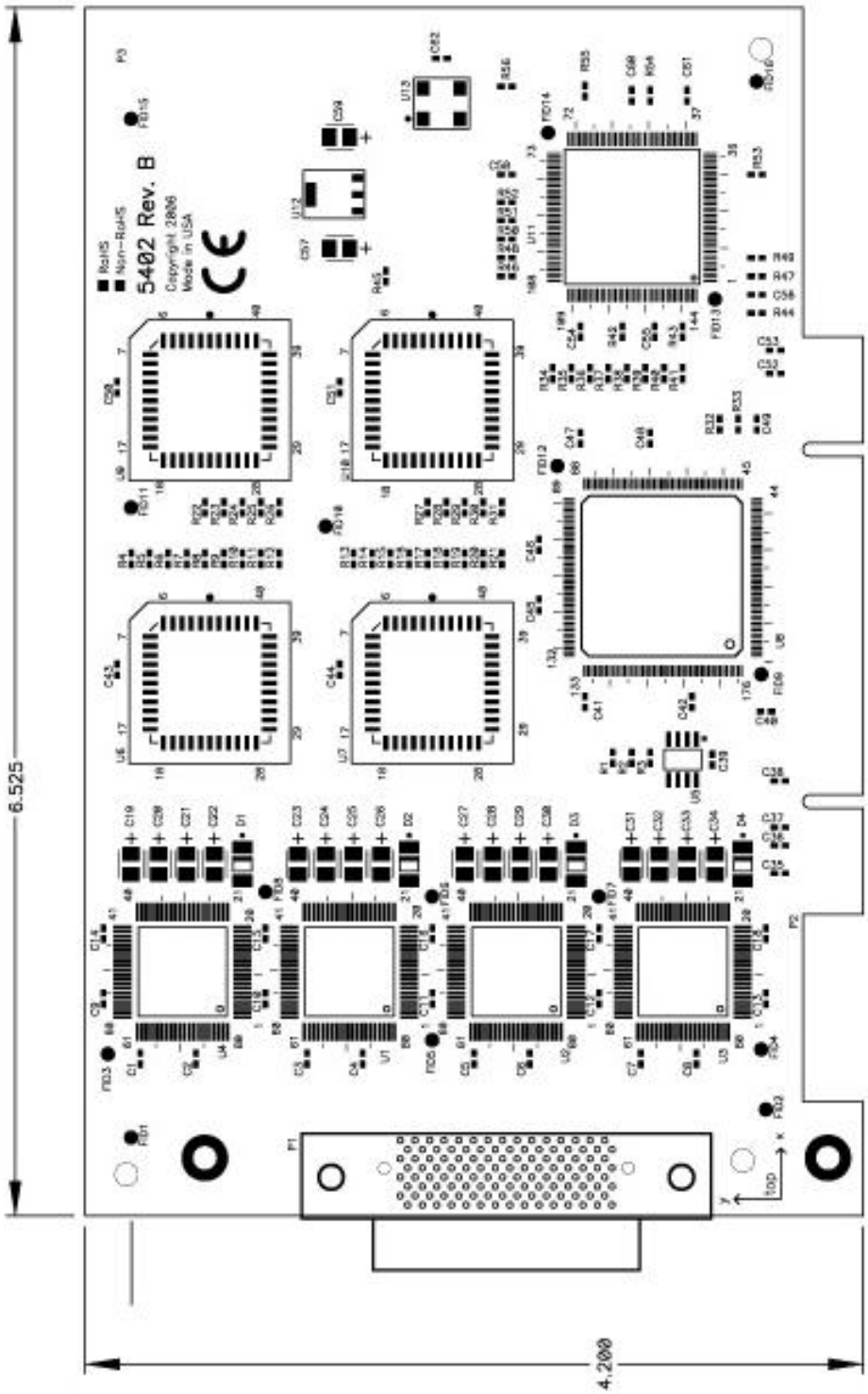
RS 530 (a.k.a. EIA 530) compatibility means that RS 422 signal levels are met, and the pin out for the DB 25 connector is specified. The EIA (Electronic Industry Association) created the RS 530 specification to detail the pin out, and define a full set of modem control signals that can be used for regulating flow control and line status. The major difference between RS-530 and RS-530A lies in some of the modem control interface signals. In RS-530 the signals all of the modem control signals are differential, in RS-530A some of these signals 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 referred 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.

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Appendix D- Mechanical Drawing



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Appendix E - How to Get Assistance

When calling for technical assistance, please have the device installed and ready to run diagnostics. If possible, have your user manual and current settings ready.

The Sealevel website is an excellent resource located at www.sealevel.com. The most current software updates and user manuals are available via our homepage by clicking on the 'Drivers' or 'Manuals' links located under 'Technical Support.' Manuals and software can also be downloaded from the product page for your device.

The FAQ section of our website answers many common questions. Refer to this helpful resource by visiting www.sealevel.com/faq.asp.

TECHNICAL SUPPORT

Monday – Friday
8:00 am to 5:00 pm EST
Phone: +1 (864) 843-4343
Email: 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.

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

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.

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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. Relio™ industrial computers are warranted for a period of two years and the R9 family is warranted for a five year period from date of purchase. 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-9001:2008 certification in 2011.

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

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