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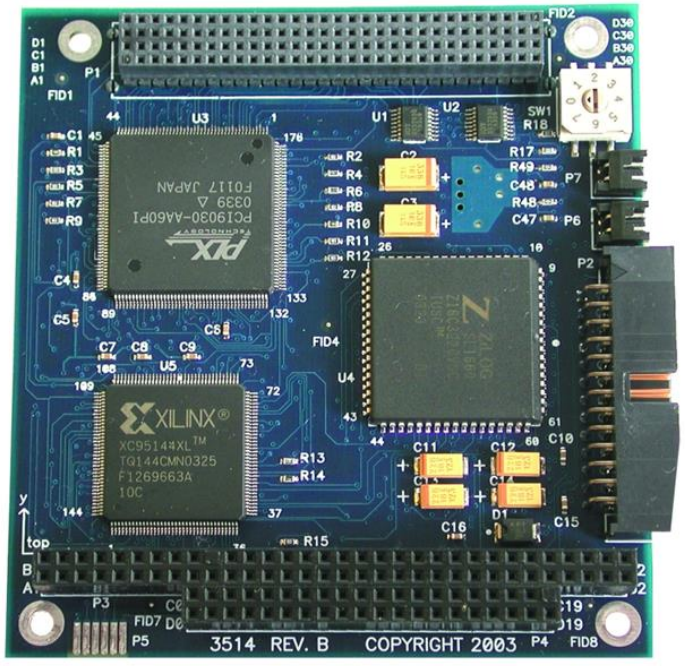
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ACB-104.ULTRA

User Manual | 3514



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Introduction

The ACB-104.ULTRA adapter provides the PC/104-Plus computer with a single channel high-speed multi-protocol serial interface suitable for the most popular communication protocols. This sync/async card provides an ideal solution for high-speed applications including LAN/WAN connectivity. Utilizing the Zilog Z16C32 (IUSC™) on chip DMA controller eliminates bus bandwidth constraints that are placed on typical interface adapters, allowing data rates to reach 10M bps in burst mode. By utilizing the Z16C32's 32 byte FIFO buffer coupled with 256K of on board memory, higher data rates are achieved.

Other Sealevel Sync Products

Model No.	Part No.	Description
PC/104		
ACB-104	(P/N 3512)	- Z85230 RS-232/422/485/530/530a/V.35
PCI		
Route 56.PCI	(P/N 5101)	- Z16C32 RS-232/422/485/530/530a/V.35
ACB-MP.PCI	(P/N 5102)	- Z85230 RS-232/422/485/530/530a/V.35
Low Profile PCI		
ACB-232.LPCI	(P/N 5103)	- Z85230 RS-232
ACB-Ultra.LPCI	(P/N 5104)	- Z16C32 RS-232/422/485/530/530a/V.35
PCMCIA		
PC-ACB-MP	(P/N 3612)	- Z85233 RS-232/422/485/530/530a/V.35
ISA		
ACB-III	(P/N 4010)	- Z85230 2-Port RS-232
ACB 56	(P/N 4021)	- Z85230 RS-232/V.35
ACB-II/EX	(P/N 4061)	- Z85230 RS-232/422/485/530
ACB 530	(P/N 4111)	- Z85230 2-Port RS-422/485/530
Route 56	(P/N 5011)	- Z16C32 RS-232/422/485/530/V.35

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Before You Get Started

What's Included

The ACB-104.ULTRA is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **ACB-104.ULTRA Adapter**
- **PC/104-Plus Mounting Hardware**

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.

Optional Items

Depending upon your application, you are likely to find one or more of the following items useful for interfacing the ACB-104.ULTRA to real-world signals. All items can be purchased from our website (www.sealevel.com) or by calling 864-843-4343.

- **CA-118** – Provides an 8" ribbon cable with an IDC26 connector to a DB-25 Male connector.
- **CA-178** – A 6' shielded cable with a DB-25F connector to an ITU-T ISO-2593 style connector (V.35) and converts the Sealevel DB-25 implementation to the ITU-T V.35 mechanical standard.
- **CA-104** – A 6' extension cable with one DB-25M connector and one DB-25Fconnector, pinned one-to-one, for use with RS-232 and RS-530.
- **CA-107** – A 10" shielded cabling adapter with a DB-25F (RS-530) to a DB-37M (RS-449 DTE). RS-530 is replacing RS-449 in Telecom applications, but there is still a very large installed base of equipment that still uses the RS-449 pin-out. Both standards use RS-422 to define the electrical specifications and are interchangeable via this adapter cable.
- **CA-159 –** A 6' shielded cable with a DB-25F (RS-530) to a DB-15M (X.21) and converts the standard DB-25 implementation of RS-530 or RS-422 to the ITU-T X.21 standard.

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Card Setup

Address Selection

As part of the PC/104-*Plus* specification, a means of selecting the appropriate signals to identify the position in which the adapter is installed in the stack must be provided. This is typically done via Dual 4:1 Mux/Demux chips and a rotary switch. They provide a 5 ohm switch that connects the input and output together. These switches provide a bi-directional path with no signal propagation delay other than the RC delay of the on resistance of the switch and the load capacitance. This is typically 250ps at 50pF Load. Other methods of configuring the modules are possible, but the rotary switch is the most convenient, cleanest and provides for the least possible error in configuration. The clocks are tuned on the Host Board such that the length of CLK3 trace is .0.662" less than CLK2, CLK2 trace is .0.662" less than CLK1, and CLK1 trace is .0.662" less than CLK0. Therefore, the first module on the stack must select CLK0 (the longest trace), the second CLK1, etc. This provides basically no clock skew between modules. The table below shows the appropriate switch setting and signals used for each module in the stack.

Switch Position	Module Slot	CLKID	Address	INT0*	INT1*	INT2*	INT3*
0 or 4	1	CLK0	AD20	INTA*	INTB*	INTC*	INTD*
1 or 5	2	CLK1	AD21	INTB*	INTC*	INTD*	INTA*
2 or 6	3	CLK2	AD22	INTC*	INTD”	INTA*	INTB*
3 or 7	4	CLK3	AD23	INTD*	INTA*	INTB*	INTC*

Software Installation

Windows 95/98/ME/NT/2000/XP Installation

1. Begin by locating, selecting, and installing the correct software from the Sealevel software driver database.

2. Select the Part Number (3514) for your adapter from the listing.

3. Select 'Windows 98/ME/2000/XP'. The setup file will automatically detect the operating environment and install the proper components. Next (depending on the OS version) select the 'Run this program from its current location' or 'Open' option. Follow the information presented on the screens that follow.

4. A screen may appear with the declaration: "The publisher cannot be determined due to the problems below: Authenticode signature not found." Please select 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.

5. 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.

Physical Installation

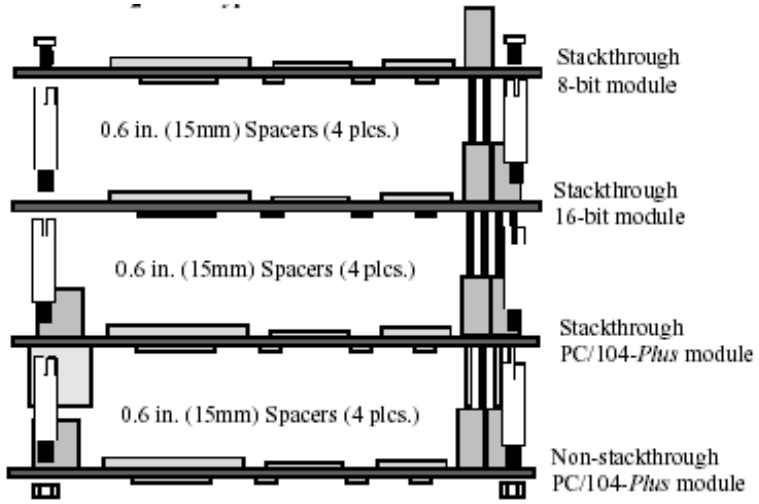
Extreme care should be taken when installing the adapter to avoid causing damage to the connectors. After the adapter is installed, connect your I/O cable to P1. Please note these connectors are keyed so that pin 1 of the cable matches pin 1 of the connector. The ACB-104.ULTRA is a universal bus add-in board and can be used on either 3V or 5V I/O signaling buses. Universal boards either use the VI/O signal to determine its signaling level or are 3V signaling boards that have 5V-tolerant I/O. Universal boards will work on either 3V or 5V I/O signaling buses. Manufacturers of PC/104-*Plus* modules must clearly label near or on the PCI connector the module's PCI signaling capabilities. The ACB-104.ULTRA is clearly labeled 'Universal'.

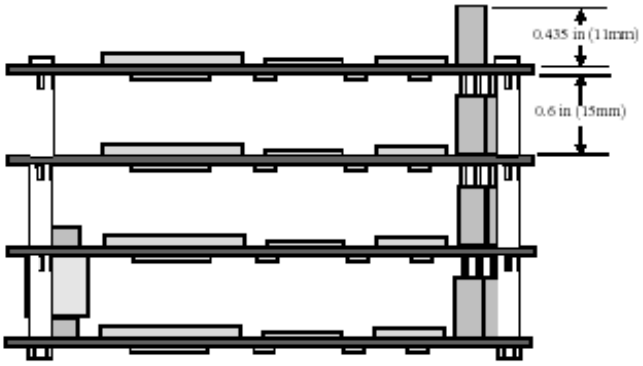


Do not install the Adapter in the machine until the software has been fully installed.

1. **Turn off power. Disconnect the power cord.**
2. Remove the case cover (if applicable).
3. Gently insert the adapter noting proper key orientation of the expansion connector on a PC/104 *Plus* expansion bus. The adapter is keyed per the current PC/104 and PC/104-*Plus* Specification. This will aid in preventing the adapter from being inserted incorrectly.
4. Mounting hardware (nylon stand-offs and screws) is provided to ensure a good mechanical connection. Retain any mounting hardware not used to allow for future expansion.
5. Replace the cover.
6. Connect the power cord and power up the machine.

Physical Installation, Continued





The ACB-104.ULTRA is now ready for use.

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Technical Description

The Sealevel Systems' ACB-104.ULTRA adapter was designed for seamless integration into any PC/104-*Plus* based system. The ACB-104.ULTRA adapter requires one IRQ, an 8 byte block of I/O address and a 16K block or 256K block of memory address and additionally, the IUSC requires a 256 byte block of memory.

Features

- Single channel high speed sync/async wide area network (WAN) interface
- RS-232, RS-422/449, EIA-530, V.35 and RS-485 serial interface capability with versatile cabling options
- Multi-protocol capable including PPP (point-to-point protocol), Frame Relay, X.25, high-speed Async, Bi-Sync, Mono-Sync, HDLC, SDLC, etc.
- Ideal for T1, Fractional T1, E1, and ISDN and other WAN applications
- On-board Z16C32 (IUSC™) with built in DMA controller and 32 byte FIFO buffer
- Up to 10 Mbps burst mode
- 256K of on-board RAM
- Link list DMA supported
- 32-bit data path
- OEM Security feature available as an option

IUSC™

The ACB-104.ULTRA is based on a single Zilog Z16C32 IUSC (**I**ntegrated **U**niversal **S**erial **C**ontroller). The IUSC has a built-in DMA controller that allows high-speed data transfers directly to and from the 256K block of on-board memory. The IUSC's built-in DMA controller supports 4 different modes of DMA transfer: Single Buffer, Pipelined, Array, and Link List. An on-board 20MHz oscillator clocks the IUSC.

RAM

The memory window is located by the BIOS PCI setup. The window size is one 256K linear block. High Memory options - 16 pages of 16K memory blocks totaling 256K or one linear block of 256K memory. In paged mode the registers are located in the I/O registers.

Status Signal LED Headers

The 3514 has a pair of 2mm two-pin right angle headers at board location P6 (Tx header) and P7 (Rx header) for connecting standard off-board LEDs (headers are Hirose item# DF3-2P-2DS). Pin 1 is +5V (anode) through a 330Ω resistor and can be recognized by a square solder pad on the side of the board opposite the header. Pin 2 is the LED control (cathode), which is driven by 5V CMOS logic (74HC123) and has a round solder pad on the reverse side of the board.

An LED connected to the header can be used to monitor the activity status of synchronous serial communications between the Z16C32 controller and the on-board memory buffer. Using SeaMAC V4, both LEDs will flash when the Z16C32 controller is reading from or writing to the memory buffer (operates similar to the activity LED on an Ethernet LAN card). This will confirm electrical continuity and that the Z16C32 controller is communicating correctly. The LEDs will not flash for sync characters or in cases where the Z16C32 controller is bypassed.

Programming For The LED Headers

Logic on the 3514 monitors local bus (DMA) ownership of the Z16C32 controller and how the on-board memory (256K byte buffer) is accessed. The LED logic treats the on-board buffer as 16 blocks of 16K bytes. The logic assumes that block zero will be used for control data and upper memory reserved for actual data. If the Z16C32 controller reads from memory block one through 15, the Tx LED (P6) will flash at a preset rate. If the Z16C32 controller writes to memory block one through 15, the Rx LED (P7) will flash at a preset rate. The LED headers are tied to the Z16C32 controller and will not flash if the controller is bypassed.

Storing the DMA control information in block zero of the on-board buffer, the LEDs will flash only when actual data is being read from or written to upper buffer memory. The LEDs ignore reads and writes to memory block zero and will not flash. Also, the LEDS will not flash on sync characters since they are not stored in memory. The control and status registers are defined below.

Control and Status Registers Defined

The control and status registers occupy 8 consecutive locations. The following tables provide a functional description of the bit positions.

Address	Mode	D7	D6	D5	D4	D3	D2	D1	D0
Base+0	RD	{0}	{0}	{0}	{1}+	P17	P16	P15	P14
Base+0	WR	ACCEN	MEM/IUC	X	X	P17	P16	P15	P14
Base+1	RD	{0}	{0}	{0}	{0}	{0}	{0}	{0}	{0}
Base+1	WR	X	X	X	X	X	X	X	X
Base+2	RD	LIN/PAGED	{0}	{1}	{0}	{0}	{0}	{0}	{0}
Base+2	WR	LIN/PAGED	X	X	X	X	X	X	X
Base+3	RD	{0}	{0}	INTPEND	RESTAT	{1}	{0}	{0}	{0}
Base+3	WR	SW Board Reset	X	X	X	X	X	X	X
Base+4	RD	{0}	IRQEN	{0}	{0}	{0}	{0}	{0}	{0}
Base+4	WR	X	IRQEN	X	X	X	X	X	X
Base+5	RD	LL	RL	{0}	{0}	M3	M2	M1	M0
Base+5	WR	LL	RL	X	X	M3	M2	M1	M0
Base+6	RD	SD7	SD6	SD5	SD4	SD3	SD2	SD1	SD0
Base+7	RD	SD15	SD14	SD13	SD12	SD11	SD10	SD9	SD8

X = do not care { }= always this value

Control and Status Name Definition

Field	Description
ACCEN	1 = Host access to RAM or IUSC enabled; 0 = Host access to RAM or IUSC disabled. (0 on power-up)
MEM/IUC	1 = Enable Host access to RAM; 0 = Enable Host access to IUSC. (0 on power-up)
P17-P14	These bits select which of sixteen 16K RAM pages is visible at the address selected by MA18-MA14.
IRQEN	1 = Interrupts enabled, 0 = Interrupts disabled. (0 on power-up)
INTPEND	IUSC interrupt status: 1 = No interrupt pending on IUSC; 0 = Interrupt pending on IUSC.
RESTAT	Reset status: 1 = On-board reset inactive; 0 = On-board reset active.
RL	Remote loopback
LL	Local loopback
M0-M3	I/O mode select to SP505 (all 0 on power-up) See Interface Selection table for valid interface options
SD0-SD15	Optional security feature. Unique value per customer or application. (default value = FFFF)
LIN/PAGE	1=256K linear block in high memory only, 0=16X16K pages in low or high memory, (0 on power-up)

Interface Selection

The ACB-104.ULTRA supports a variety of electrical interfaces. Reference the **Control and Status Registers Defined** 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.

Reset Circuit

Writing any value to base+3 will reset the Z16C32. Only one write is required. This starts a reset sequence, which lasts about 320 ns. During the reset sequence base+3 bit D4 will read 0. When the reset is complete, base+3 bit D4 will read 1.



The Z16C32 should not be accessed until the reset sequence is complete.

TSET Clock Select

Port5 of Z16C32 is used to select TSET clock source.

- 0 selects 16C32 TXC as source.
- 1 selects received TXC as source.

Z16C32 Register Access

Pin	Source
Port0	20 MHz clock
Port1	20 MHz clock
D/C (data/control)	Address SA6
S/D (serial/DMA)	Address SA7
DMA channel registers	Base + 0-127
Serial controller base +	128-255

I/O Signal Derivation

The ACB-104.ULTRA input/output signals are directly generated via the Zilog 16C32 IUSC. The following table defines these signals, their origin pin and signal name following the conventions set by the 16C32 user's manual. If using a Sealevel Systems, Inc. supplied driver, this is for informational use only.

Signal	Source
Transmit Data	16C32 TXD Pin
Request To Send	16C32 Port7 Pin
Data Terminal Ready	16C32 Port6 Pin
Transmit Signal Element Timing	16C32 TXC Pin
Receive Data	16C32 RXC Pin
Clear To Send	16C32 CTS Pin
Data Set Ready	16C32 RXREQ Pin
Data Carrier Detect	16C32 DCD Pin
Transmit Clock	16C32 TXCO Pin
Receive Clock	16C32 RXCO Pin
Ring Indicator	16C32 TXREQ Pin

26 Pin Header Signal Layouts

In all modes, Pin 1 has a 1K ohm resistor to GND and pin 13 has a 1K ohm resistor to +5V connection. This is useful for RS-485 biasing. If this presents a problem in your implementation, please contact Sealevel Systems' Technical Support for aid in removing.

For convenience, the signal layout is shown for the optional IDC26 to DB-25M 8" ribbon cable (Item# CA-118).

RS-232 Signals

Base+5, M3-M0=2, 0010

Signal	Name	Header Pin #	CA-118 Pin #	Mode
GND	Ground	13	7	
RD	Receive Data	5	3	Input
CTS	Clear To Send	9	5	Input
DSR	Data Set Ready	11	6	Input
DCD	Data Carrier Detect	15	8	Input
RI	Ring Indicator	18	22	Input
TXC	Transmit Clock	4	15	Input
RXC	Receive Clock	8	17	Input
TSET	Transmit Signal Element Timing	22	24	Output
DTR	Data Terminal Ready	14	20	Output
TD	Transmit Data	3	2	Output
RTS	Request To Send	7	4	Output

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V.35 Signals

Base+5, M3-M0=E, 1110

Signal	Name	Header Pin#	V.35	CA-118 Pin #	Mode
GND	Ground	13	B	7	
RDB RX+	Receive Positive	6	T	16	Input
RDA RX-	Receive Negative	5	R	3	Input
TXCB TXC+	Transmit Clock Positive	23	AA	12	Input
TXCA TXC-	Transmit Clock Negative	4	Y	15	Input
RXCB RXC+	Receive Clock Positive	17	X	9	Input
RXCA RXC-	Receive Clock Negative	8	V	17	Input
TDB TX+	Transmit Positive	2	S	14	Output
TDA TX-	Transmit Negative	3	P	2	Output
TSETB TSET+	Transmit Signal Element Timing +	21	W	11	Output
TSETA TSET-	Transmit Signal Element Timing -	22	U	24	Output
CTS	Clear To Send	9	D	5	Input *
DSR	Data Set Ready	11	E	6	Input *
DCD	Data Carrier Detect	15	F	8	Input *
RI	Ring Indicator	18	J	22	Input *
DTR	Data Terminal Ready	14	H	20	Output *
RTS	Request To Send	7	C	4	Output *

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

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RS-530 (RS-422)

Base+5, M3-M0=D, 1101

Signal	Name	Header Pin #	CA-118 Pin #	Mode
GND	Ground	13	7	
RDB RX+	Receive Positive	6	16	Input
RDA RX-	Receive Negative	5	3	Input
CTSB CTS+	Clear To Send Positive	25	13	Input
CTSA CTS-	Clear To Send Negative	9	5	Input
DCDB DCD+	Data Carrier Detect Positive	19	10	Input
DCDA DCD-	Data Carrier Detect Negative	15	8	Input
TXCB TXC+	Transmit Clock Positive	23	12	Input
TXCA TXC-	Transmit Clock Negative	4	15	Input
RXCB RXC+	Receive Clock Positive	17	9	Input
RXCA RXC-	Receive Clock Negative	8	17	Input
TDB TX+	Transmit Positive	2	14	Output
TDA TX-	Transmit Negative	3	2	Output
RTSB RTS+	Request To Send Positive	12	19	Output
RTSA RTS-	Request To Send Negative	7	4	Output
DTRB DTR+	Data Terminal Ready Positive	20	23	Output
DTRA DTR-	Data Terminal Ready Negative	14	20	Output
TSETB TSET+	Transmit Signal Element Timing Positive	21	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	22	24	Output
DSRB DSR+	Data Set Ready Positive	18	22	Input
DSRA DSR-	Data Set Ready Negative	11	6	Input

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RS-530A

Base+5, M3-M0=F, 1111

Signal	Name	Header Pin #	CA-118 Pin #	Mode
GND	Ground	13	7	
RDB RX+	Receive Positive	6	16	Input
RDA RX-	Receive Negative	5	3	Input
CTSB CTS+	Clear To Send Positive	25	13	Input
CTSA CTS-	Clear To Send Negative	9	5	Input
DCDB DCD+	Data Carrier Detect Positive	19	10	Input
DCDA DCD-	Data Carrier Detect Negative	15	8	Input
TXCB TXC+	Transmit Clock Positive	23	12	Input
TXCA TXC-	Transmit Clock Negative	4	15	Input
RXCB RXC+	Receive Clock Positive	17	9	Input
RXCA RXC-	Receive Clock Negative	8	17	Input
DSRA DSR-	Data Set Ready Negative	11	6	Input
TDB TX+	Transmit Positive	2	14	Output
TDA TX-	Transmit Negative	3	2	Output
RTSB RTS+	Request To Send Positive	12	19	Output
RTSA RTS-	Request To Send Negative	7	4	Output
TSETB TSET+	Transmit Signal Element Timing Positive	21	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	22	24	Output
DTRA DTR-	Data Terminal Ready Negative	14	20	Output

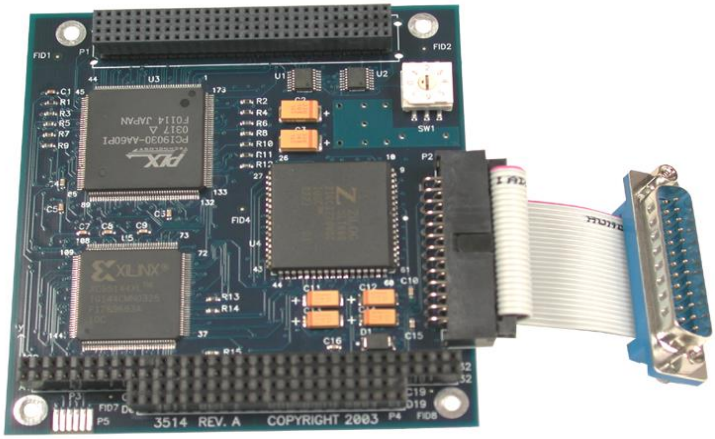
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RS-485 or RS-485T

Base+5, M3-M0=4, 0100 (With termination)

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

Signal	Name	Header Pin #	CA-118 Pin #	Mode
GND	Ground	13	7	
RDB RX+	Receive Positive	6	16	Input
RDA RX-	Receive Negative	5	3	Input
TXCB TXC+	Transmit Clock Positive	23	12	Input
TXCA TXC-	Transmit Clock Negative	4	15	Input
RXCB RXC+	Receive Clock Positive	17	9	Input
RXCA RXC-	Receive Clock Negative	8	17	Input
TDB TX+	Transmit Positive	2	14	Output
TDA TX-	Transmit Negative	3	2	Output
TSETB TSET+	Transmit Signal Element Timing Positive	21	11	Output
TSETA TSET-	Transmit Signal Element Timing Negative	22	24	Output



ACB-104.ULTRA shown with optional IDC26 to DB-25M 8" ribbon cable (Item# CA-118)

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Specifications

Environmental Specifications

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

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 bare copper or solder mask over tin nickel.

Power Consumption

Supply line	+5 VDC
Rating	450 mA

Appendix A – Troubleshooting

Following these simple steps can eliminate most common problems.

Install software first. After installing the software then proceed to adding the hardware. This places the required installation files in the correct locations.

Read this manual thoroughly before attempting to install the adapter in your system.

Use Device Manager under Windows to verify proper installation.

Use the SeaIO Control Panel applet or the Device Manager's property page for card identification and configuration.

If these steps do not solve your problem, please call Sealevel Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00AM-5PM Eastern Time Monday through Friday. For email support contact support@sealevel.com.

Appendix B – How To Get Assistance

Begin by reading through the Trouble Shooting Guide in Appendix A. If assistance is still needed please see below.

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.

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 https://www.sealevel.com/support/category/faqs/

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.

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.

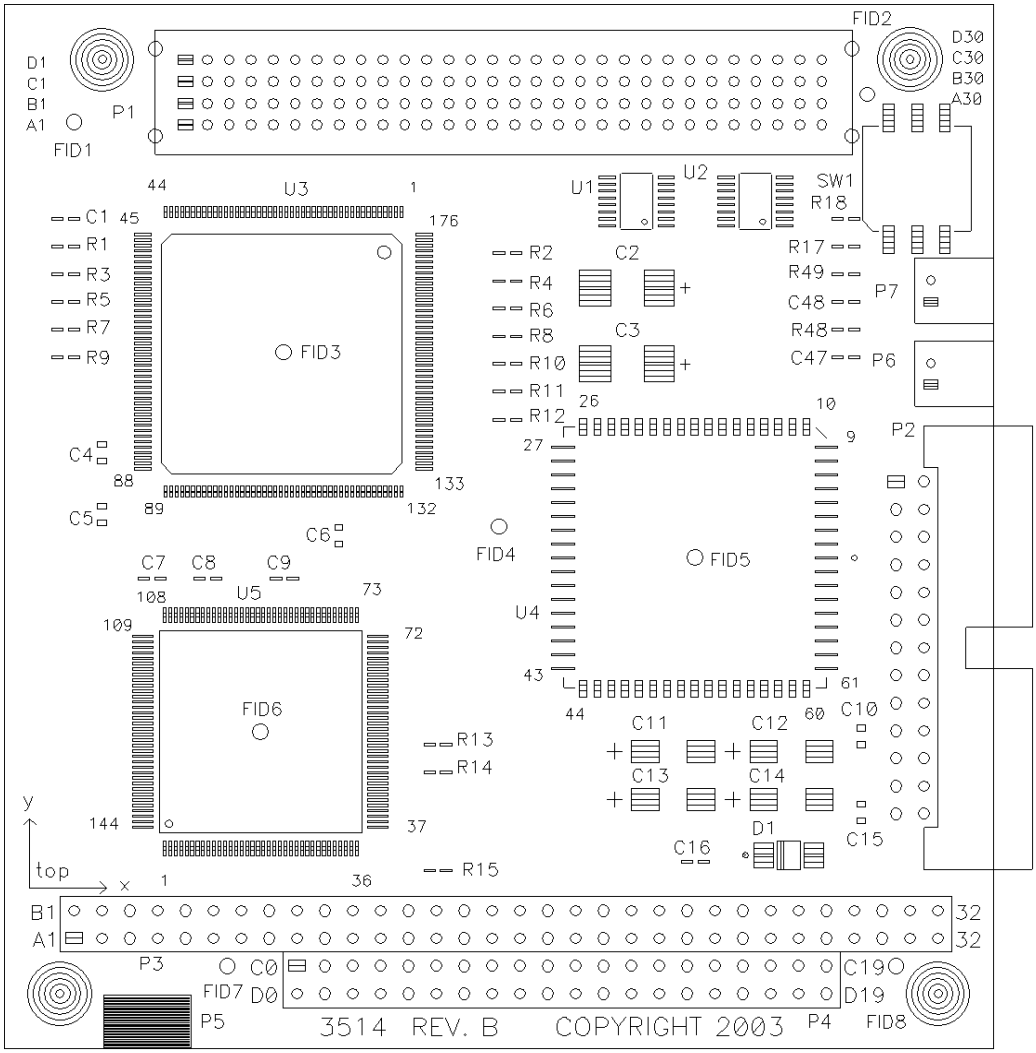
RS-530/530A

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 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 type 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 - 3514 PCB



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Appendix E – Compliance Notices

Federal Communications Commission (FCC) Statement



This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In such case the user will be required to correct the interference at 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".



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's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured I/O products. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at its Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing. Sealevel achieved ISO-9001:2015 certification in 2018.

Warranty Policy

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for the warranty period. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect, abuse, accidents, or acts of nature are not covered under this warranty.

Warranty service may be obtained by delivering the Product to Sealevel and providing proof of purchase. Customer agrees to ensure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Sealevel, and to use the original shipping container or equivalent. Warranty is valid only for original purchaser and is not transferable.

This warranty applies to Sealevel manufactured Product. Product purchased through Sealevel but manufactured by a third party will retain the original manufacturer's warranty.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found are subject to repair/retest charges. A purchase order or credit card number and authorization must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

How to obtain an RMA (Return Merchandise Authorization)

If you need to return a product for warranty or non-warranty repair, you must first obtain an RMA number. Please contact Sealevel Systems, Inc. Technical Support for assistance:

Available	Monday – Friday, 8:00AM to 5:00PM EST
Phone	864-843-4343
Email	support@sealevel.com

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