ACB-104™
PART # 3510 & 3511
USER MANUAL

SECTIONS:

FIGURES:

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SECTION 1.

Installation

The **ACB-104** is installed by carefully inserting bus connector J1 so that it aligns pin 1 to pin 1 (pin 1 is labeled on the silk-screen as **B1**) of the expansion connector on a PC/104™ compatible card. Mounting hardware (nylon stand-offs and screws) is provided to insure a good mechanical connection. Extreme care should be taken when installing this board so as not to cause damage to the connectors. Before the board is installed, connect your I/O cable to P1. Please note that P1 is not keyed so care should be taken that pin 1 of the cable aligns with pin 1 of the connector (pin 1 is labeled on the silk-screen and the cable will have a colored stripe). Refer to Section 2 and 3 for information on setting the address and jumper options before connecting P1.

SECTION 2.

Address Selection

The **ACB-104** board occupies 8 consecutive I/O locations. A DIP-switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing ports. The following table shows several examples that usually do not cause a conflict. SW1 sets the I/O address for the **ACB-104** board.

Address	Binary	Switch Position Settings						
Hex	A9 A0	1	2	3	4	5	6	7
280-287	1010000XXX	Off	On	Off	On	On	On	On
2A0-2A7	1010100XXX	Off	On	Off	On	Off	On	On
2E8-2EF	1011101XXX	Off	On	Off	Off	Off	On	Off
2F8-2FF	1011111XXX	Off	On	Off	Off	Off	Off	Off
3E8-3EF	1111101XXX	Off	Off	Off	Off	Off	On	Off
300-307	1100000XXX	Off	Off	On	On	On	On	On
328-32F	1100101XXX	Off	Off	On	On	Off	On	Off
3F8-3FF	1111111XXX	Off	Off	Off	Off	Off	Off	Off

Typically COM1: = 3F8h; COM2: = 2F8h; COM3: = 3E8h; COM4: = 2E8h.

Figure 1
Address options

The following illustration shows the correlation between the dip-switch setting and the address bits used to determine the base address. In the example below, the address 300 Hex through 307 Hex is selected. 300 Hex =11 0000 0XXX in binary representation.

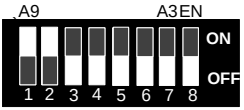

Figure 2
DIP-switch Illustration

Note: Setting the switch "On" or "Closed" corresponds to a "0" in the address, while leaving it "Off" or "Open" corresponds to a "1".

The **ACB-104** can be enabled or disabled with switch position 8 on the dip-switch. The port is enabled with the switch "On" or "Closed" and disabled when "Off" or "Open" (refer to Figure 2). If the port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper (refer to Figure 3).

SECTION 3.

Option Selection

The board contains several jumper straps for the port which must be set for proper operation.

IRQ Selection

E3 - Selects the interrupt request for the **ACB-104**. If no interrupt is desired, remove the jumper.

Figure 3.
Header E3 (IRQ Selection)

Position "R" is provided so that you can install a jumper that connects a 1K ohm pull-down resistor to the output of a high-impedance tri-state driver which carries the IRQ signal. Because the IRQ line is driven low only by the pull-down resistor, you can have two or more boards which share the same IRQ signal. Position "R" installed is the default setting and should be left on unless multiple cards are sharing a single IRQ. If multiple cards are sharing a single IRQ then only one pull-down resistor is needed in the circuit.

DMA Selection

E1 - Selects DMA mode of operation. The **ACB-104** can be operated in half duplex or full duplex DMA modes. Full Duplex Means that DMA can be used for simultaneous transmit and receive. Half duplex DMA means that you can either transmit, or receive with DMA but not simultaneously. The various options for E1 jumper settings are as follows:

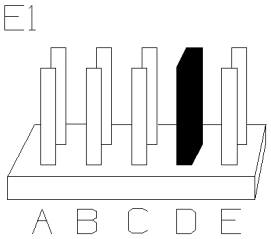

Figure 4
Header E1 (DMA Selection)

No DMA	E1 Position "A" & "B" not Covered
Half Duplex DMA Channel 1	E1 Position "A" Covered Only
Half Duplex DMA Channel 3	E1 Position "B" Covered Only
Full Duplex	E1 Position "A" & "B" Covered
DMA Permanently Enabled	E1 Position “D” Covered
DMA Enabled through Software	E1 Position “C” covered
RS-485 Mode	E1 Position “E” covered

Figure 5
DMA Jumper Table E1

The DMA Can be selectively enabled or disabled through software but, **E1** position **"C"** must be selected to enable this option The software enable feature uses Channel B RTS to enable or disable the DMA drivers on the **ACB-104**. Please refer to the SCC Users Manual and the supplied Developers Toolkit Diskette for examples of enabling DMA with software. To permanently enable DMA set the jumper to position "**D**"

Note: In full duplex mode, Transmit always uses DMA Channel 3, DTR/REQA and receive uses DMA Channel 1, W/REQA. Please refer to the toolkit diskette for further information.

ACB-104 485 Mode Only

RS-485 is backwardly compatible with RS-422, however optimized for partyline or multi-drop applications. The output of the RS-422/485 driver is capable of being *Active* (On) or *Tri-State* (Off). This capability allows multiple PC's (or other RS-422/485 devices) to be connected in a multi-drop bus and selectively polled. Half-duplex two-wire operation is also possible by connecting TX+ to RX+ and TX- to RX- (in the connector hood). The enable to the driver is connected to the SCC **R**equest **T**o **S**end (RTS) line. This is done by installing the "**E**" jumpers on E1. The unused signals can be left disconnected or floating, as they have pull-up/pull-down resistors to provide an **ON** (or true) condition if not connected.

Transmit Clock Selection

E2 - Selects the signal that is connected to the SCC TRXCA pin. This pin can be programmed as either an **Input** or an **Output**. Please refer to the 8530 Technical Reference for information on programming the TRXCA pin as either an input or an output.

I	If selection "**I**" is used the SCC TRXC Pin should be programmed as an input. This allows the TXC Pin(S) to input the Transmit Clock Signal.
0	If selection "**O**:" is selected then the SCC TRXC Pin should be programmed as an output. The Transmit Clock is then routed to the TSET Pins on the DB-25 as an output signal.

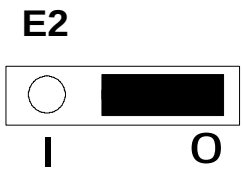

Figure 6
Transmit Clock Option

SECTION 4.

Technical Description

The Sealevel **ACB-104** Advanced Communications Board provides the PC/104 platform with one high speed Sync / Async port. The **ACB-104** can be used in a variety of sophisticated communications applications such as SDLC, HDLC, X.25, and high speed async.

Features Include:

- One Channel of Sync / Async communications using 8530 chip.
- DMA supports data rates greater than 1 million bps (bits per second).
- Selectable port address, IRQ level (2,3,4,5,7), and DMA Channel (1 or 3).
- Jumper options for Transmit Clock source.
- High speed Enhanced Serial Communications Controller (85C30,85230) compatible.
- Uses PC/104 compatible stack through connector for universal mounting.
- 5 Volt DC operation.
- DB-25P cable provided for ease in connecting.

The **ACB-104** utilizes the Zilog 8530 **S**erial **C**ommunications **C**ontroller (SCC). This chip features programmable baud rate, data format interrupt control, as well as DMA control. Refer to the 8530 Technical Manual, the Zilog Datacom I/C Handbook and the Toolkit Diskette for details on programming the SCC chip.

Direct Memory Access

Direct **M**emory **A**ccess (DMA) can be used to transfer data at very high rates. This requires additional programming and a very good understanding of the operation of the PC's DMA controller. The software examples provided on diskette demonstrate the setup and use of DMA. Refer to the *Sealevel Systems* software toolkit for applications examples (with source code) to help in your initial software development.

Internal Baud Rate Generator

The baud rate of the SCC is programmed under software control. The standard oscillator supplied with the board is 4.9152 Megahertz (MHZ). Other values may be substituted to achieve a different baud rate by replacing the oscillator (Y1) with a new part.

Communication Standards Technical Reference

The DB-25 male connectors meet the EIA-530 and the RS-232 specification for DTE devices. The following sections contain a brief summary of RS-422, EIA-530, RS-485 and RS-232.

RS-422

RS-422 allows very long distance (5000 feet at 9600 baud) communications with virtually error free differential drive characteristics. This is the same electrical standard used with RS-449. Unfortunately this standard did not have a mechanical standard. This allowed every manufacturer to use any pin arrangement and shell size that they saw fit.

EIA-530

EIA-530 compatibility means that RS-422 signal levels are met, and that the pin-out of the DB-25 connector is specified. The Electronic Industry Association (EIA) created the EIA-530 specification to detail the pin-out. EIA-530 is very similar to RS-449, which calls for RS-422 signals on a DB-37 connector. The EIA-530 is broken into two interfaces: DTE and DCE, much like RS-232. In addition to the asynchronous modem control signals on a standard PC serial port, EIA-530 specifies Synchronous Clock Signals, Modem Test and Loop-Back signals. The **ACB-104** (Part # 3510) has an EIA-530 DTE interface.

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. Half-duplex two-wire operation is also possible by connecting TX+ to RX+ and TX- to RX- in your cable hood. The enable to the driver is connected to the SCC Request To Send (RTS) line for RS-485 communications. This allows the RS-485 driver to be Tri-Stated when inactive on a multi-drop polled network. Your software must "know how" to enable the driver when it is answering a poll. To permanently enable the driver (normal RS-422 point to point mode) remove jumper **"E"** at E1.

Note: Failure to correctly set this jumper can cause transmitter contention problems, preventing operation by any nodes on the network.

EIA 530, RS-422 / 485 Connector Pin-Outs				
Name			**Pin#**	**Mode**
GND		Ground	7	
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
TSETB	TSET+	Transmit Signal Element Timing Positive.	11	Output
TSETA	TSET-	Transmit Signal Element Timing Negative	24	Output
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
RXCB	RXC+	Receive Clock Positive	9	Input
RXCA	RXC-	Receive Clock Negative	17	Input
TXCB	TXC+	Transmit Clock Positive	12	Input
TXCA	TXC-	Transmit Clock Negative	15	Input

RS-232

RS-232 has been the defacto standard for PC communications since the introduction of the IBM PC. This electrical / mechanical standard is met by the **ACB-104** (Part # 3511) for interfacing standard RS-232 modems, gateways, channel banks, CSUs, DSUs and a variety of other common communication equipment.

RS-232 Connector Pin-Outs			
Name		**Pin #**	**Mode**
GND	Ground	7	
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
RXC	Receive Clock	17	Input
TXC	Transmit Clock	15	Input
TSET	Transmit Signal Element Timing	24	Output
TD	Transmit Data	2	Output
RTS	Request To Send	4	Output

SECTION 5.

Specifications

Environmental

Specification	Operating	Storage
Temperature range	0 to 50 ° C 32 to 122 ° F	-20 to 70 ° C -40 to 100 ° F
Humidity Range	10 - 90% R.H.	10 - 90% R.H.

Performance

MTBF > 150,000 Hours
MTTR < .25 Hours
Turnaround For Repair - 5 Working Days

Manufacturing

- IPC 610-A Class-III standards adhered to with a 0.1 visual A.Q.L. and 100% Functional Testing.
- Boards are built to U.L. 94V0 rating and are 100% Electrically tested. Boards are solder mask over bare copper or solder mask over tin nickel.
- Board conforms to PC/104 size requirements.

Power

Supply Line	+5
Rating (mA)	270 mA

SECTION 6.

Warranty

Sealevel Systems, Inc. warrants this product to be in good working order for a period of one year from the date of purchase. 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.

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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Monday - Friday

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Please refer to your included diskette for any post production manual updates and application specific information.