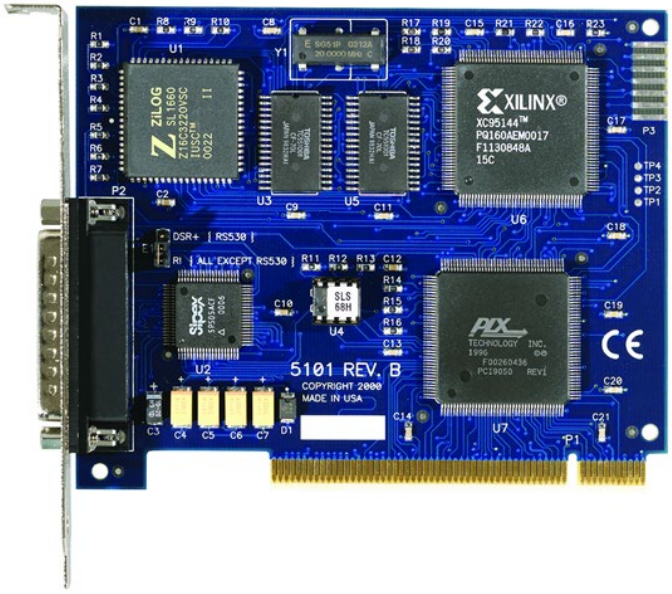
Route 56.PCI

User Manual | 5101



SEALEVEL®

SEALEVEL®

Contents

Introduction

The ROUTE 56.PCI adapter provides the PC 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.

Before You Get Started

What's Included

The Route 56.PCI is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **Route 56.PCI Adapter**

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.

Software Installation

Operation System Installation

Windows 98/ME/2000/XP/Vista™ Operating Systems

Do not connect the device to a USB port until the software is installed.

1. Click the SeaMAC link to select and install the SeaMAC software. The SeaMAC will install the Windows HDLC/SDLC driver. SeaMAC V6 provides a powerful WIN32 interface (CreateFile, ReadFile, WriteFile, etc) for Sealevel PCI Express and PCI synchronous serial products. SeaMAC V6 supports many popular protocols including HDLC/SDLC and various bisync, monosync, and raw (bit-shifter) modes.

2. The setup file will automatically detect the operating environment and install the proper components. Follow the information presented on the installation screens that follow.

3. **The SeaMAC Configuration utility that configures the driver will inform you that you must add a driver before proceeding. For the ROUTE 56.PCI this feature is not to be used.**

4. After installing the software in Windows NT/2000 power down the computer and install the card. Power the system back up and the driver will automatically be loaded.

5. The PCI BIOS will configure all resources for the card. You do not need to “add” a driver through the SeaMAC Configuration utility.

The system’s BIOS or Operating system assigns addresses and IRQ’s. There is one jumper to configure which selects whether pin 22 on the DB-25 is RI or DSR+.

Hardware Installation

The ROUTE 56.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 ROUTE 56.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 ROUTE 56.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.
- **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 Sealevel Systems' ROUTE 56.PCI adapter was designed for seamless integration into any PCI based system. The ROUTE 56.PCI adapter requires a PCI slot, one IRQ, an 8 byte block of I/O address and a 16K block or 256K block of memory address. The memory range of this adapter can be configured to reside in the lower 1 Megabyte memory only or anywhere in upper memory. Low memory must be configured as 16 X 16K blocks of page memory. High memory can be configured as a 256K linear block or 16K paged 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
- 16-bit data path
- OEM Security feature available as an option

IUSC™

The ROUTE 56.PCI is based on a single Zilog Z16C32 IUSC (**I**ntegrated **U**niversal **S**erial **C**ontroller). Application and driver software access the IUSC registers through the first 256 bytes of on-board RAM. Register access to the IUSC can be disabled via I/O registers allowing the first 256 bytes of RAM to be used for buffer storage. 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 BIOS PCI setup or the Set PCI function. The window size is a 16K paged or 256K linear block. In paged mode the registers are located in the I/O registers.

- Low Memory options: 16 pages of 16K memory blocks totaling 256K.
- High Memory options: 16 pages of 16K memory blocks totaling 256K or one linear block of 256K memory.

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.

X = do not care { }= always this value

Address	Mode	D7	D6	D5	D4	D3	D2	D1	D0
Base+0	RD	ACCEN	MEM/IUC	{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	Software 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

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+e; 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 ***ROUTE 56.PCI*** supports a variety of electrical interfaces. Reference 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

Reset Circuit

The 16C32 can be reset by writing any value to base+3. There is a capacitor that is discharged each time you write to base+3. It requires multiple writes to get a reset. When you read base+3 bit D4 and it is 0, that means you have written it enough times. After base+3 bit D4 goes to 0, then you must continue to read it until it goes back to 1.

TSET Clock Select

Port5 of 16C32 is used to select TSET clock source.

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

16C32 Register Access

Pin	Source
Port0	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 ROUTE 56.PCI 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

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
RI	Ring Indicator	22	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

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 *
RI	Ring Indicator	22	J	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.*

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

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.

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

DSR+ is available by placing a jumper over E1. This will disable the use of Ring Indicator on RS-232, V.35, and RS-530A.

In this mode the following signals will be available:

DSRB DSR+	Data Set Ready Positive	22	Input
DSRA DSR-	Data Set Ready Negative	6	Input

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
RIA	Ring Indicator Negative	22	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° C (32° to 122° F)	-20° to 70° C (-4° to 158° F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Mean Times Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Power Consumption

Supply line	+5 VDC
Rating	450 mA

Physical Dimensions

Board length	4.90 inches (12.446 cm)
Board height including Goldfingers	4.00 inches (10.160 cm)
Board height excluding Goldfingers	3.675 inches (9.335 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 your on-board serial ports, controller cards, sound cards etc. The I/O addresses used by these adapters, as well as the IRQ (if any) should be identified.

2. Configure your Sealevel Systems adapter so that there is no conflict with currently installed adapters. No two adapters can occupy the same I/O address.

3. Make sure the Sealevel Systems adapter is using a unique IRQ. While the Sealevel Systems adapter does allow the sharing of IRQs, many other adapters (i.e., SCSI adapters and on-board serial ports) do not. The IRQ is typically selected via an on-board header block. Refer to the section on Card Setup and the Control/Status port for help in choosing an I/O address and IRQ.

4. Make sure the Sealevel Systems adapter is securely installed in a PCI slot.

5. Use the supplied software and User Manual to verify that the Sealevel Systems adapter is configured correctly. The supplied software contains a diagnostic program “SSDR56” that will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use.

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

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 8:00 AM to 5:00 PM 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 http://www.sealevel.com/faq.asp

Sealevel Systems maintains a Home page on the Internet. Our home page address is support @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. For email support contact 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.

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.

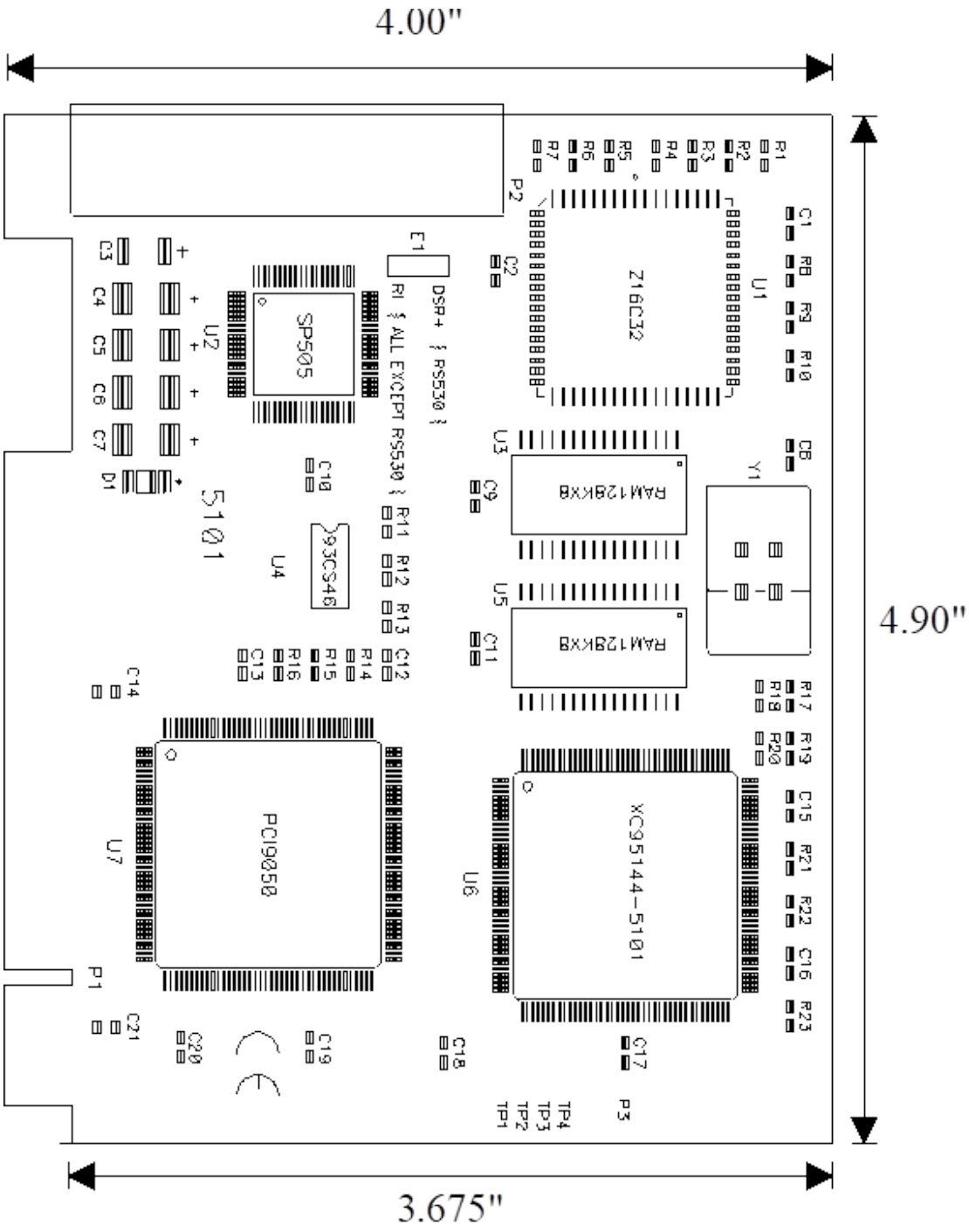
RS-530/530A

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 the signals are differential, in RS-530A the 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



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

Trademarks

Sealevel Systems, Incorporated acknowledges that all trademarks referenced in this manual are the service mark, trademark, or registered trademark of the respective company.