LATCH-16

LATCH-16

PART #3097

USER MANUAL

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Contents

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Introduction

Latching relays retain their state until they are changed by the user. Power conditions do not affect the latching relays; therefore, the PC can be powered up or down without altering the state of the latch. Latching Relays have two coils as compared to normal relays , with one coil. The two coils are labeled "set" and "reset". When either "set" or "reset" coil is energized, the relay switches to that state and remains there until the opposite coil is pulsed. This allows "non-volatility" in the relay circuit. The Sealevel LATCH-16 provides two 8-bit latching relay output ports. This allows the user to set the LATCH-16 to a desired state, which is unaffected by power loss or interruption. The 16 relays remain in the desired state regardless of the power up / down condition of the PC. Software examples are included to help minimize development time.

Before You Get Started

What's Included

The LATCH-16 (3097) is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **LATCH-16 (3097) Adapter**

Advisory Conventions

W **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.

N **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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Installation

N   Be sure to set the Address and Jumper Options before installation.

The *LATCH-16* can be installed in any of the PC expansion slots, except J8 on the original IBM "XT" and Portable. Remove the PC case, remove the blank metal slot cover, and insert the board. Replace the screw, replace the case, and the installation is complete.

Card Setup

Address Selection

The *LATCH-16* relay output board occupies a total of four 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 PC ports. The following table shows several examples that usually do not cause a conflict.

N   The address line A9 is always "1".

Address	Binary			Switch Setting						
Hex	A9	A8	A0	1	2	3	4	5	6	7
300-303	1	1000000XX		Off	Cn	On	On	On	On	On
304-307	1	1000001XX		Off	Cn	On	On	On	On	Off
310-313	1	1000100XX		Off	On	On	On	Off	On	On
314-317	1	1000101XX		Off	On	On	On	Off	On	Off
320-323	1	1001000XX		Off	On	On	On	Off	On	On
3A0-3A3	1	1101000XX		Off	Off	On	Off	On	On	On

Figure 1 - Address Selection Table

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The following table shows the correlation between the dip switch setting and the address bits used to determine the base address. Assume 300 Hex to 303 Hex is the desired base address. 300 Hex=11 0000 0X in Binary.

Switch Position		Address Line	Binary	Switch Setting
N/A		A9	1	Always a 1
1		A8	1	OFF
2		A7	0	ON
3		A6	0	ON
4		A5	0	ON
5		A4	0	ON
6		A3	0	ON
7		A2	0	ON

Figure 2 - Addressing Example

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

Port Enable / Disable

The *LATCH-16* can be enabled or disabled with switch position 8 on the dipswitch. The port is enabled with the switch "On" or "Closed" and disabled when "Off" or "Open".

Technical Description

The *LATCH-16* provides two eight bit latched relay output ports. Latched Relays maintain their set or reset condition until set or reset again, regardless of power conditions. This allows the user to set the *LATCH-16* relays in a required state and power down the computer. When a change is required, the user can simply set or reset the relay(s) again.

The terms "set" and "reset" are used to define the state of the relay. Set means that the relay "S" coil has been energized, and the relay contacts are closed. Reset means that the relay "R" coil has been energized, and the contacts are open.

The Latch-16 is easily programmed as simple Port I/0. To set a relay, the corresponding bit in Base+0 (or Base+2) must be written as a "0". To reset a relay, the corresponding bit in Base+1 (or Base+3) must be written as a "0". Writing to any of these registers causes a 6 mS. (Millisecond) pulse generator to energize the relay coil. This particular hardware approach was chosen to keep the controlling software from having to use timing routines and perform tedious I/O operations.

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N While setting or resetting individual bits requires only one I/O write, writing a byte of data to the port requires writing both the set and reset register. This is because only the "0" bits in the byte cause a set or reset operation. Therefore, to write a byte (55 Hex) to Port A, first write a 55H to Base+0 and write the complement (AA Hex) to Base+1.

Output Functions:	Input Functions:
Base+0 Set relays on Port A (Relays K9-K16)	Read status of relays K9-K16.
Base+1 Reset relays on Port A (Relays K9-K16)	Read status of pulse generator (Port A).
Base+2 Set relays on Port B (Relays K1-K8)	Read status of relays K1-K8.
Base+3 Reset relays on Port B (Relays K1-K8)	Read status of pulse generator (Port B).

Again, writing to these registers causes a 6 millisecond (mS) pulse to be applied to the relay coil. You must avoid successive writes as this 6 mS pulse is necessary to energize the relay. By reading the registers at Base+1 and Base+3 you can determine if a write is in process and wait until it is finished before initiating another cycle. The status of the relays may be read back from Base+0 (K9-16) and Base+2 (K1-K8). Please note that when reading the status of the relays, a set bit (1) corresponds to an Open relay and a clear bit (0) corresponds to a Closed relay.

Read Operations

Base+0 An I/O read to Base+0 will return the status of the relays K9-K16. Reading a zero (0) indicates that the relay is closed. (**Port A see Figure 3 for actual Relay / Port-bit locations**)

Base+1 An I/O read to Base+1 will return a 0 in bit position D0 if a write to Base+0 is in progress (Set A). An I/O read to Base+1 will return a 0 in bit position D1 if a write to Base+1 is in progress (Reset A).

Base+2 An I/O read to Base+2 will return the status of the relays K1-K8 . Reading a zero (0) indicates that the relay is closed. (**Port B see Figure 3 for actual Relay / Port-bit locations**)

Base+3 An I/O read to Base+3 will return a 0 in bit position D0 if a write to Base+2 is in progress (Set B). An I/O read to Base+3 will return a 0 in bit position D1 if a write to Base+3 is in progress (Reset B).

Software Installation

Windows Installation

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

Only users running Windows 7 or newer should utilize these instructions for accessing and installing the appropriate driver via Sealevel's website. If you are utilizing an operating system prior to Windows 7, please contact Sealevel by calling 864.843.4343 or emailing support@sealevel.com to receive access to the legacy driver download and installation instructions.

1. Begin by locating, selecting, and installing the correct software – SeaIO Classic Digital I/O Drivers. Select '*Download Now*' for the SeaIO Classic for Windows. In the Downloads section: select "SeaIO Classic for Windows." The setup file will automatically detect the operating environment and install the proper components. Next (depending on your browser) select the 'Run this program from its current location' or 'Open' option. Follow the information presented on the screens that follow. 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 available to remove SeaIO files and registry/INI file entries from the system.

2. If installing in NT, skip to step 11. 'Windows NT Card Installation.'

3. Go to the "Add New Hardware Wizard" in the Control Panel.

4. When the Wizard asks if you want Windows to search for the new hardware, choose "No, I want to select the hardware from a list."

5. Scroll through the list of categorized hardware and select 'SeaIO Devices.' If this is the first SeaIO device you may need to select 'Other Devices' and 'Sealevel Systems, Inc.' instead of 'SeaIO Devices.'

6. Click "Next."

7. Select the card model and press "Next."

8. The Wizard will guide you through a few more informational prompts; continue to click "Next" until it is completed.

9. Your card's resource assignments may be adjusted through the Device Manager (if, for instance, you need to change the I/O port address Windows assigned when you installed the card).

10. Windows software installation is complete

11. Windows NT Card Installation: After accomplishing steps 1 – 6, bring up the Control Panel and double-click on the SeaIO Devices icon. To install a new card, click "Add Port." Repeat this procedure for as many SeaIO cards as you wish to install.

For additional software support, please call Sealevel Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00 AM - 5:00 PM Eastern Time, Monday through Friday. For email support contact: support@sealevel.com.

Port A		
D0	K13	2,20
D1	K14	3,21
D2	K15	4,22
D3	K16	5,23
D4	K9	6,24
D5	K10	7,25
D6	K11	8,26
D7	K12	9,27
Port B		
D0	K5	10,28
D1	K6	11,29
D2	K7	12,30
D3	K8	13,31
D4	K1	14,32
D5	K2	15,33
D6	K3	16,34
D7	K4	17,35
Power and Ground Locations		
	Ground	18,36,37
	+ 5 Volts	19
	+ 12 Volts	1

Figure 3 Bit, Relay and Connector Pin Positions

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Specifications

Environmental Specifications

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

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 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	210 mA

Appendix A – Troubleshooting

The adapter should provide years of trouble-free service. However, in the event that device appears to not be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

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

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

3. Use Device Manager under Windows to verify proper installation.

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

5. Always use the 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 Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00 A.M.to 5:00 P.M. Eastern Time Monday through Friday. For email support contact support@sealevel.com.

Appendix B – How To Get Assistance

Please refer to Troubleshooting Guide prior to calling Technical Support.

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

2. When calling for technical assistance, please have your user manual and current adapter settings. If possible, please have the adapter installed in a computer ready to run diagnostics.

3. Sealevel Systems 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.htm .

4. Sealevel Systems maintains a Home page on the Internet. Our home page address is https://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. 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.

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Appendix C – 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 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".

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.

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

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