



LATCH-16™ PART # 3097 USER MANUAL

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Introduction

Latching relays retain their state until they are changed by the user. Power conditions do not effect 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.

SECTION 1.

Installation

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.

SECTION 2.

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.

Note that address line A9 is always a "1".

Address Hex	Binary			Switch Setting						
	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

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

NOTE: 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"

SECTION 3.

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.

Note: 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/O. 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.

Note: 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:

Base+0 Set relays on Port A (Relays K9-K16)
Base+1 Reset relays on Port A (Relays K9-K16)
Base+2 Set relays on Port B (Relays K1-K8)
Base+3 Reset relays on Port B (Relays K1-K8)

Input Functions:

Read status of relays K9-K16.
Read status of pulse generator (Port A).
Read status of 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

For Windows Users

Choose **Install Software** at the beginning of the CD and select the **Digital I/O** software drivers and install **SeaIO**.

Port Bit	Relay K#	DB-37 Pin #
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

SECTION 4.

Specifications

Environmental

Specification	Operating	Storage
Temperature range	0 - 50 Degrees C 32 - 122 Degrees F	-20 - 70 Degrees C -40 - 100 Degrees F
Humidity Range	0- 90% R.H. Non-Condensing	0- 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 U.L. 94V0 rating and are 100% Electrically tested. Boards are solder mask over bare copper or solder mask over tin nickel.

Power

Supply Line	+5
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SECTION 5.

Warranty

Sealevel Systems, Inc. provides a lifetime warranty for this product. Should this product fail to be in good working order at any time during this period, Sealevel Systems will, at its 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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