



SEALEVEL 8012e Reed Relay Output Isolated User Manual

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SEALEVEL®

DIO-16.LPCle
User Manual | 8012e



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Before You Get Started

What's Included

The DIO-16.LPCle is shipped with the following items. If any of these items is missing or damaged, please contact Sealevel for replacement.

- DIO-16.LPCle Low Profile PCI Express 8 Reed Relay Output / 8 Isolated Input (3-30V)
- Item# 8012e ships with Low Profile PCI bracket
- Item# 8012eS ships with a Standard PCI bracket

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.



High Voltage Warning – USE EXTREME CAUTION!

High voltages will be present on the Seal/O family of products when high voltage is connected. Never handle the printed circuit board when high voltage signals are connected to the board.

Optional Items

Depending upon your application, you are likely to find one or more of the following items useful for interfacing the DIO-16.LPCle to real-world signals. All items can be purchased from our website (www.sealevel.com) or by calling (864) 843-4343.

Cables

DB44 Male to DB44 Female, 72" Extension Cable (Item# CA185)

The CA185 is a standard DB44M to DB44F extension cable. Extend a DB44 cable or locate a piece of hardware where it is needed with this six foot (72") cable. The connectors are pinned one-to-one, so the cable is compatible with any device or cable with DB44 connectors. The cable is fully shielded against interference and the connectors are molded to provide strain relief. Dual metal thumbscrews secure the cable connections and prevent accidental disconnection.



DB44 Male to DB37 Male, 72" Cable (Item# CA206)

DB44 Male to DB37 Male Cable, 72 in Length – for 8012. The CA206 is useful for interfacing the DB44 connector on the 8012e to the DB37 connector on the TB02 terminal block.



Terminal Block – DB37 Male and DB37 Female to 27 Screw Terminals (Item# TB02) (Cable & Terminal Block Kit)

The TB02 terminal block can be used to break out serial and digital DB37 connectors to screw terminals for easy field wiring. The terminal block was designed with both DB37 male and female connectors, therefore; it can be used with any DB37 board regardless of the board's port gender.



Terminal Block Kit – DB37 Male and DB37 Female to 27 Screw Terminals (Item# TB02-KT)

The TB02-KT terminal block can be used to break out serial and digital DB37 connectors to screw terminals for easy field wiring. The terminal block was designed with both DB37 male and female connectors, therefore; it can be used with any DB37 board regardless of the board's port gender. The TB02-KT ships with a RoHS compliant TB02 terminal block, a 6" piece of slotted Snap Track, and two DIN-rail mounting clips.



Terminal Block Kit – TB02 + CA206 Cable (Item# KT111)

Terminal Block KT111 simplifies field wiring requirements by creating a direct connection between a TB02 terminal block and the 8012 board. The KT111 includes the TB02 terminal block, CA206 cable, ST101 Snap Track and STDIN mounting clips.



Reference Book

The Digital I/O Handbook – A Practical Guide to Industrial Input and Output Applications (Item# REF101)

Renowned technical author Jon Titus and president and CEO of Sealevel Systems, Tom O'Hanlan, clearly explain real-world digital input/output implementation from both a hardware and software perspective. Whether you are a practicing engineer or a student, The Digital I/O Handbook will provide helpful insight you will use again and again.



Introduction

The DIO-16.LPC1e provides 8 optically isolated inputs and 8 reed relay SPST (single pole-single throw) outputs. The inputs protect the PC and other sensitive equipment from spikes and ground loop current that can be generated in industrial environments, while the outputs provide high quality, long life, low current (10 Watt maximum), dry contact switch closures. Reed relays are well suited for low current applications.

The relays are normally open and will close when energized.

The board meets the requirements a low profile PCI Express add-in card as defined by the PCI-SIG in the PCI Express Card Electromechanical Specification Revision 1.1.

The DIO-16.LPCle is designed to be used with Windows Operating Systems. The Seal/O API (Application Programming Interface) included in Sealevel's software provides a variety of useful high-level function calls implemented as a Windows dynamic link library (.DLL). In addition to the API, Seal/O includes a device driver, sample code, and utilities to simplify software development.

Features

- PCI Express x1 compliant
- Eight optically isolated inputs
- Eight Reed relay outputs (SPST)
- Low Profile compliant
- Power (+5V and +12V) and ground provided on connector

Other Sealevel PCI Digital I/O Products

Product	Item#	Description
PIO-32.PCI	8010	32 TTL Inputs/Outputs
PIO-48.PCI	8005	48 TTL Inputs/Outputs
PIO-96.PCI	8009	96 TTL Inputs/Outputs
REL-16.PCI	8003	16 Reed Relay Outputs
DIO-32.PCI	8004	16 Reed Relay Outputs/16 Opto-isolated Inputs
DIO-32.PCI	8004H	16 Reed Relay Outputs/16 Opto-isolated Inputs (10-30V)
ISO-16.PCI	8006	16 Opto-isolated Inputs
ISO-16.PCI	8006H	16 Opto-isolated Inputs (10-30V)
REL-32.PCI	8007	32 Reed Relay Outputs
PLC-16.PCI	8011	8 Form C Relay Outputs/8 Opto-isolated Inputs
DIO-16.PCI	8012	8 Reed Relay Outputs/8 Opto-isolated Inputs (3-13V)
DIO-16.PCI	8012H	8 Reed Relay Outputs/8 Opto-isolated Inputs (10-30V)
DIO-32.PCIE	8004e	16 Reed Relay Outputs/16 Opto-isolated Inputs
DIO-32.PCIE	8004He	16 Reed Relay Outputs/16 Opto-isolated Inputs (10-30V)

Software Installation

Windows Installation



Do not connect the hardware 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 proper driver download and installation instructions.

1. Begin by locating, selecting, and installing the correct software from the Sealevel software driver database.
2. Type in or select the part number (#8012e) for the adapter from the listing.
3. Select “Download Now” for Seal/O for Windows.
4. The setup files will automatically detect the operating environment and install the proper components. Follow the information presented on the screens that follow.
5. A screen may appear with text similar to: “The publisher cannot be determined due to the problems below: Authenticode signature not found.” Please click 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.
6. 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.
7. The software is now installed, and you can proceed with the hardware installation.



To install Sealevel software, you must log in as an administrator or have administrator privileges in Windows. All Sealevel Systems software drivers have been fully tested by Sealevel. Clicking “OK” button to continue.

Physical Installation



Do not install the PCI express board until the software has been successfully installed.



The Sealevel DIO-16-LPCle can be installed in any PCIe expansion slot (x1/x4/x16).

PCI Express x1



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



To prevent damage from improper handling, please reference Appendix B – ESD Handling Instructions.

1. Turn off PC power. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available PCIe slot and remove the blank metal slot cover.
4. Gently insert the PCIe adapter into the slot. Make sure that the adapter is seated properly.

5. Replace the screw you removed for the blank and use it to secure the adapter bracket into the slot. This is required to ensure FCC Part 15 compliance.
6. Replace the cover.
7. Connect the power cord.

Programming the DIO-16.LPCle

Sealevel's Seal/O software is provided to assist in the development of reliable applications for the Sealevel Systems family of digital I/O adapters. Included on the Seal/O CD are driver functions for use in accessing the I/O as well as helpful samples and utilities.

Programming for Windows

The Seal/O API (Application Programmer Interface) provides a variety of useful high-level function calls implemented in a Windows dynamic link library (DLL). The API is defined in the help file (Start/Programs/SealO/SealO Help) under "Application Programmers Interface". This help file also includes detailed information dealing with installation / removal of the software and information about latency, logic states, and device configuration.

For C language programmers we recommend using the API to access the DIO-16.LPCle. If you are programming in Visual Basic, using the ActiveX control included with Seal/O is advised.

Samples and Utilities

A variety of sample programs and utilities (both executable and source code) are included with Seal/O. Further documentation on these samples can be found by selecting "Start/Programs/SealO/Sample Application Description". Information about where the files are physically stored on your disk is also included in this same file.

Register Layout

Reference the following sections for more information about the meaning and use of the registers available.

Address	Mode	Mode	D7	D6	D5	D4	D3	D2	D1	D0
BasetO	Input Port A	RD	PAD7	PAD6	PADS	PAD4	PADS	PAD2	PAD1	PADO
Baset2	Output Port C	RD/W R	PCD7	PCD6	PCD5	PCD4	PCD3	PCD2	PCD1	PCDO

Reading the Inputs

The inputs are active Low. If no voltage is applied across one of the differential inputs, it returns a one on that bit. If an AC or DC voltage is applied, it returns a zero on that bit.

Reading the Outputs

The relay ports return the ones complement of the value that is currently being used to drive the relays.

When using the API the actual value is returned not the complement of the value.

Writing the Outputs

The output ports are the only ports that can be written. The relays on a standard DIO-16.LPCle are normally open. To close a relay a one must be written to the appropriate bit.

Interrupts

Interrupts are not currently supported; however they may be added. Contact Sealevel with your requirements.

Input Ports

Port A is an 8 bit input port connected to optically isolated input sensors. Each sensor can be used to interface a voltage input and then sense whether the voltage is on or off. Each sensor is isolated (with respect to a common ground) from every other sensor and is also isolated with respect to the host PC ground. This means that signals such as low-level AC line voltage, motor servo voltage, and control relay signals can be 'sensed', or read by the PC, without the risk of damage due to ground loops or ground faults. Each sensor input pair has a current limiting resistor that is used to limit the input current to the optoisolator. The opto-isolator has two 'back-to-back' diodes internally. This allows AC or DC signals to be sensed, regardless of polarity. When the applied voltage is high enough to cause the LED in the opto-isolator to turn-on, the output of the opto-isolator goes low (0 volts) and the signal is read as a low logic level (binary 0)

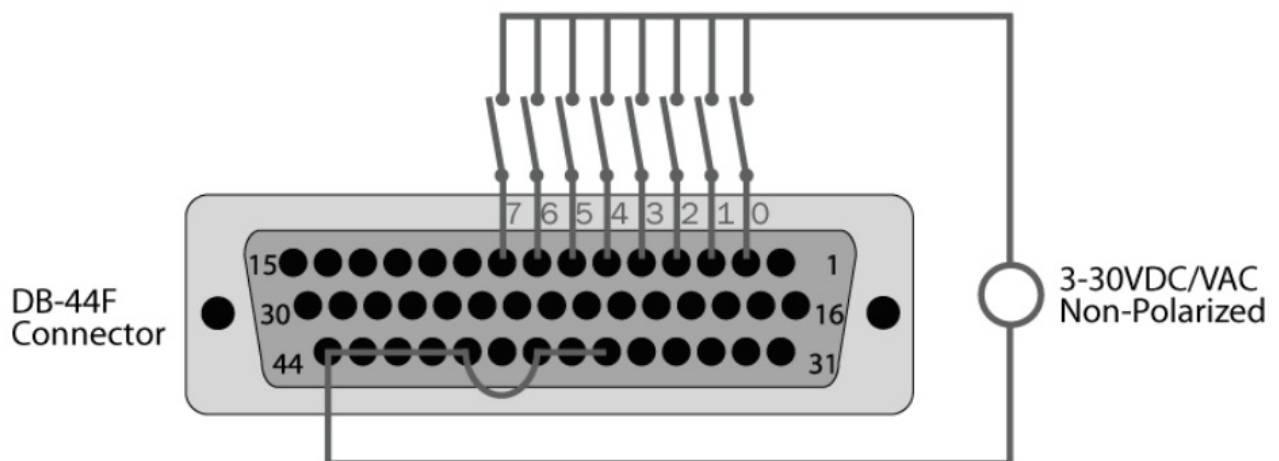
by the PC. When the input signal is too low to turn on the opto-isolator, the output goes high, and the port bit is read by the PC as a high logic level (binary 1). The input impedance of each isolated input is approximately 1500 ohms (factory default). The opto-isolator requires approximately 2 mA to turn on. The maximum input current is 20 mA.

⚠ The input circuits are not intended for monitoring 120-volt AC circuits. In addition to being too high a voltage for the circuits, it is dangerous to have that high a voltage on the card.

Input Port Pin Assignments (DB-44 Female)

Port A Bit	Port A Pins
0	2,40
1	3,41
2	4,36
3	5,37
4	6,38
5	7,42
6	8,43
7	9,44

DB-44 Input Application Example Wired on Connector



The above diagram is representative of how dry contact inputs (or current / voltage sources) can be monitored by the optically isolated inputs. When switch 1 above is closed, it will allow current to flow from the power source, into pin 3 of the DB-44, through the optocoupler, out pin 41, and back to the power source. If the current flow is between 2 and 20 mA, this input will be read as logic "0". All the input associated with all open switches will be read as logic "1".

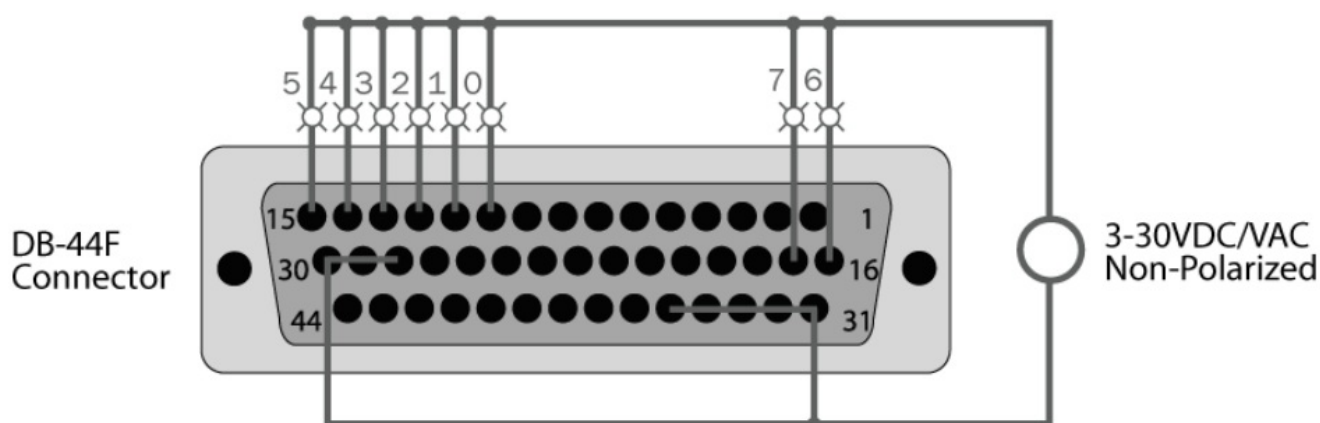
In the diagram above, pins 36-38, and 40-44 are joined, providing a common return path for the optocouplers. In this case, the interconnections are being made on the connector itself. In the DB-37 diagram below the return path is supplied external to the connector. Also for electrical isolation, each input / output pair can be powered from an individual power source with no common present.

Output Ports (Reed Relay)

Reed relays provide very high quality, long life, low current, dry contact switch closures. Reed relays are not suited for high current applications, and can be destroyed by inductive load switching, where a spark occurs across the contacts internally. The relays are normally open, and close when energized. Output Ports (Reed Relay) Pin Assignments (DB-44 Female)

Port C Bit	Relay	Port C Pins
0	K3	10,28
1	K2	11,29
2	K1	12,30
3	K5	13,31
4	K4	14,32
5	K6	15,33
6	K7	16,34
7	K8	17,35

DB-44 Output Application Example Wired on Connector



The above diagram is representative of how lights (or other devices) can be controlled by the relay outputs. When relay 2 on the card is closed, it will allow current to flow from the power source, into pin 12 of the DB44, through the relay, out pin 30, and back to the power source thereby turning the light labeled “2” on. In the diagram above, pins 28-30 and 31-35 of the connector are joined, providing a common return path for the circuit. In this case the interconnections are being made on the connector itself. In the DB-37 diagram below the return path is supplied external to the connector. For electrical isolation, each relay can be wired to an independent isolated circuit.

Power and Ground Pin Assignments (DB-44 Female)

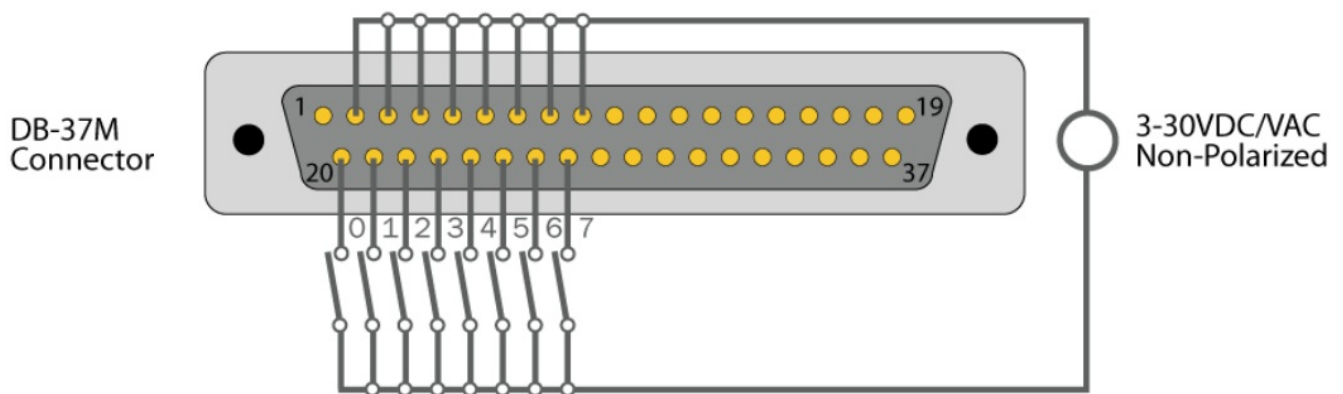
Signal	Pin(s)
Ground	22,23,24
+ 5 Volts	39
+ 12 Volts	1

DB-37 Male Pin Assignment

Via optional DB-44 Male to DB-37 Male 6' cable, Part Number CA206

Bit	Port A Pins	Port C Pins
0	2,20	10,28
1	3,21	11,29
2	4,22	12,30
3	5,23	13,31
4	6,24	14,32
5	7,25	15,33
6	8,26	16,34
7	9,27	17,35
GND	18,36,37	
+12V	1	
+5V	19	

DB-37 Input Application Example Wired from Connector



The diagram is representative of how dry contact inputs (or current / voltage sources) can be monitored by the optically isolated inputs. When switch 1 above is closed, it will allow current to flow from the power source, into pin 3 of the DB-37, through the optocoupler, out pin 21, and back to the power source. If the current flow is between 2 and 20 milliamps, this input will be read as logic “0”. All the input associated with all open switches will be read as logic “1”.

The above diagram shows that the common path to the optocouplers is provided external to the connector.

The common path can be provided at the connector as shown in the DB-44 diagram above. Also for electrical isolation, each input / output pair can be powered from an individual power source with no common present.

Technical Specifications

Opto-Insulated Input Ports

Turn On Current	2 mA
Input Independence	1500 ohms
Resistor Power Max	1 W
Isolator Diode Drop Max	1.4 VDC
Absolute Maximum Input Range	3-35 VDC/VAC
Recommended Input Range	3-30 VDC/VAC
Isolation	300 VAC RMS

Reed Relay Output Ports

Contact Max Power	10W
Switching Voltage Max DC /Peak AC Resistive	60V
Switching Current Max DC /Peak AC Resistive	0.5A
Relay Max Operative Time, including bounce**	1 ms
Relay Max Release Time**	0.2 ms
Isolation	300 VAC RMS

* Reference Coto Technology Whitepaper “Testing Reed Switches and Relays for Reliability” for more information: http://www.cotorelay.com/Coto_WP_Reliability_Ver_003.pdf

** Minimum hardware timing requirements

Output power

+5VDC Output Current Max	500 mA
+12VDC Output Current Max	200 mA

Power Requirements

PCIe +3.3V Power Rail*	PCIe +12V Power Rail*
Max: 1.6A (8.1W)	Max: 100mA (0.5W)
Typ: 0.73A (3.6W)	Typ: 50mA (0.3W)

*Does not include Output Power pins (+5V/+12V)

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0°C – 70°C	-35°C – 100°C
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

PCB Dimensions

Length	Height (Including Gold fingers)
5.5" (14.0 cm)	2.68" (7.0 cm)

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.

Appendix A – Troubleshooting

Following these simple troubleshooting steps can eliminate most common problems.



To install Sealevel Systems Software and hardware in Windows, you must log in as an administrator or have administrator privileges.

Software

Installation

First, install the software driver and then install the I/O adapter. If the I/O adapter was installed first, complete the 'uninstall/reinstall' steps.

Next, verify that your Sealevel Software is properly installed. This places the required installation files in the correct locations. In Windows it will be located here: Start – All Programs – SealO

Uninstall/Reinstall

1. Install the most current Sealevel Software.



To obtain the most current software package from Sealevel's website, download from [here](#).

- Sealevel Software Drivers

2. Navigate to the Device Manager (right click on 'My Computer' and choose 'Manage', then 'Device Manager').
3. Look for the Seal/O Device category and expand it to expose the Sealevel adapter.
4. Right click on the listed adapter and choose 'Uninstall'.
5. Click on 'Actions' and choose 'Scan for hardware changes'.

Hardware

1. With the system powered down, verify the I/O adapter is seated properly into the slot.

PCI Express Card Edge

PCI Express Card Edge



2. If a slot seems unresponsive, power the system down and install the I/O adapter on a different slot on the motherboard.
3. Install the Sealevel Software and I/O adapter in another computer.

BIOS

1. PCIe adapters are automatically assigned addressing and IRQs by the system BIOS based on availability. Ensure that available IRQs are set to PCI/PNP (this represents 'Plug and Play').
2. If hardware installation issues persist, remove other bus level devices from your system to verify if this corrects the problem.

Device Manager Verification

Once your Sealevel Software is installed, verify the I/O adapter is properly enumerated. Navigate to the Device Manager for verification and configuration.

To access the Device Manager, right click on 'My Computer' and choose 'Manage'. When the Computer Management menu appears, choose 'Device Manager'.

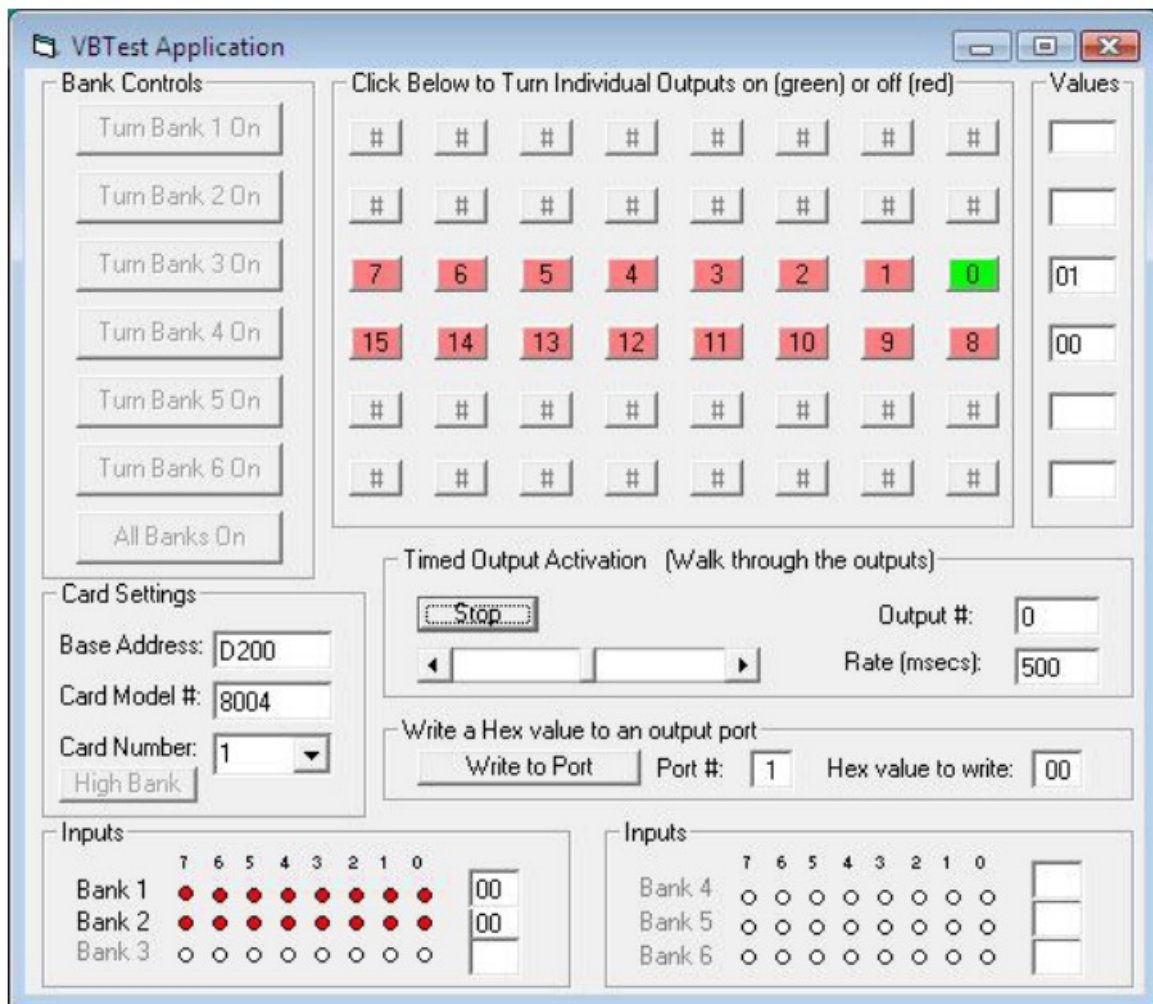
Troubleshooting/Verification Utilities for SealO Classic Products

These three utilities were designed to verify the functionality of your Sealevel digital I/O adapters.

To access these utilities navigate to: Start – All Programs – SealO.

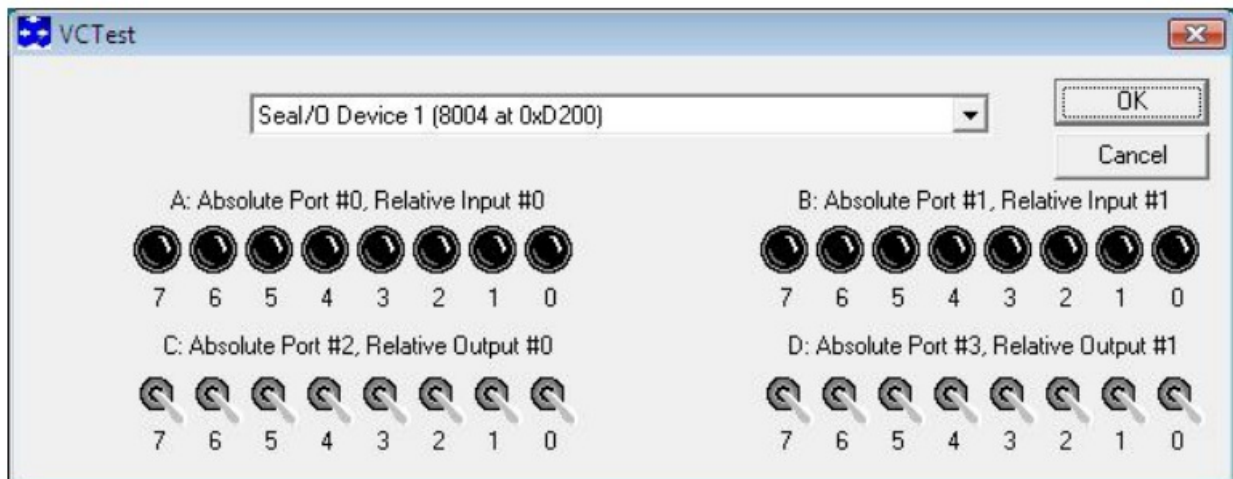
VB Test

This utility allows the setting and clearing of individual relays and groups of relays. It also offers timed activation of relays and monitoring of input signals.



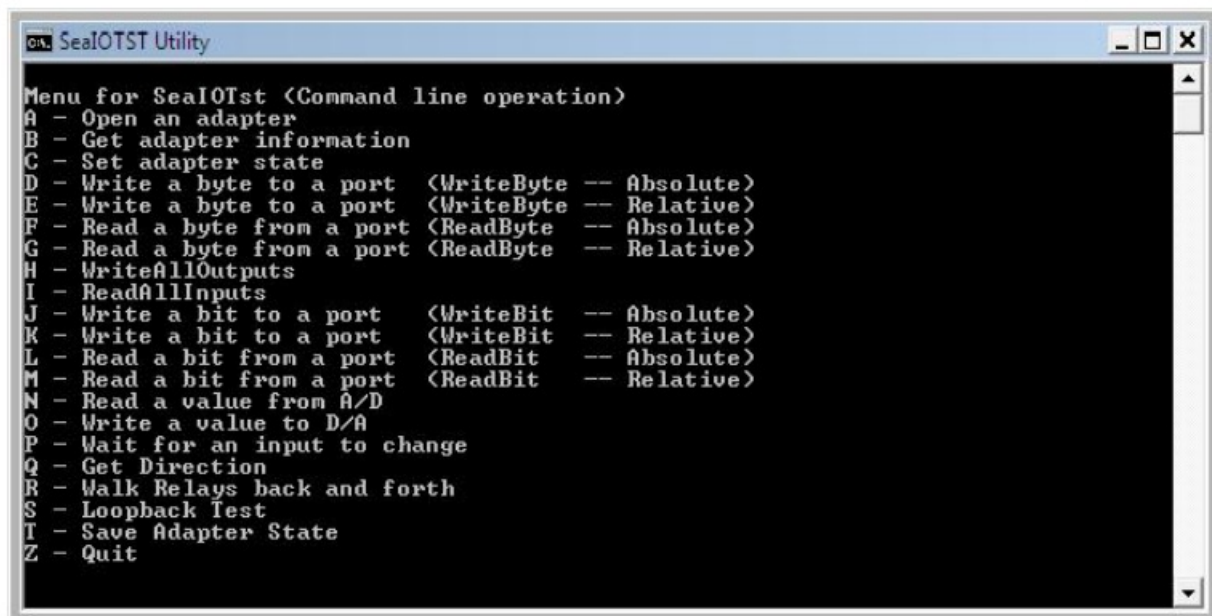
VCTEST

This utility allows the setting and clearing of individual relays. It also offers monitoring of input signals.



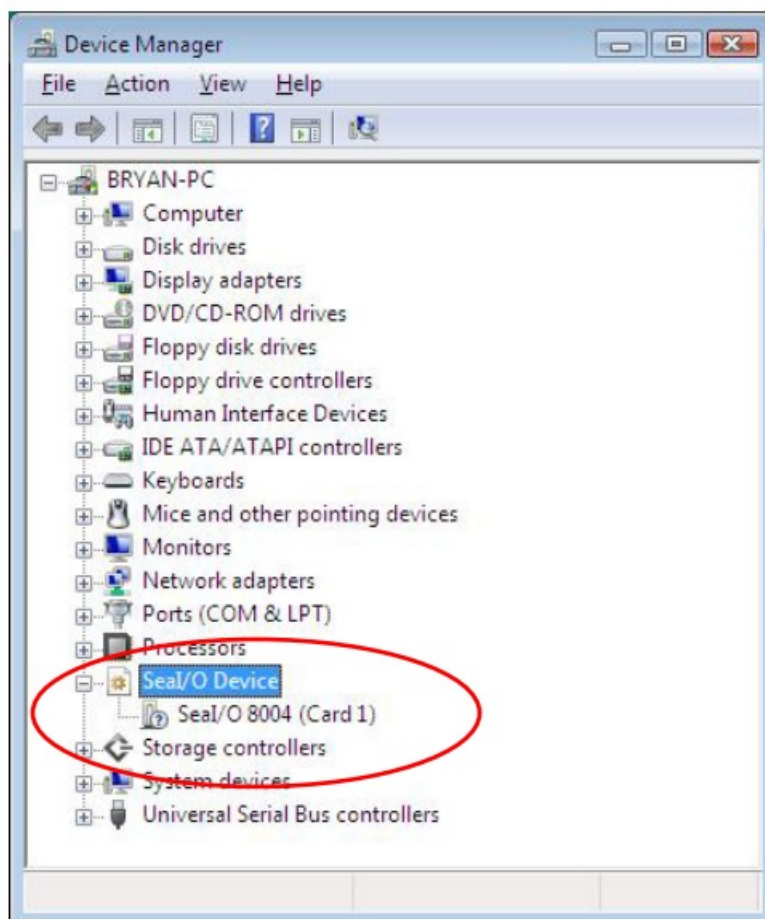
SealOTST

This utility is a Win32 console application designed for testing all calls to the driver. This utility is very useful for verifying proper SealO driver configuration and hardware adapter settings. A main menu offers choices for reading and writing ports and setting and clearing relays. This utility also demonstrates the use of the Notify Input Change API call.

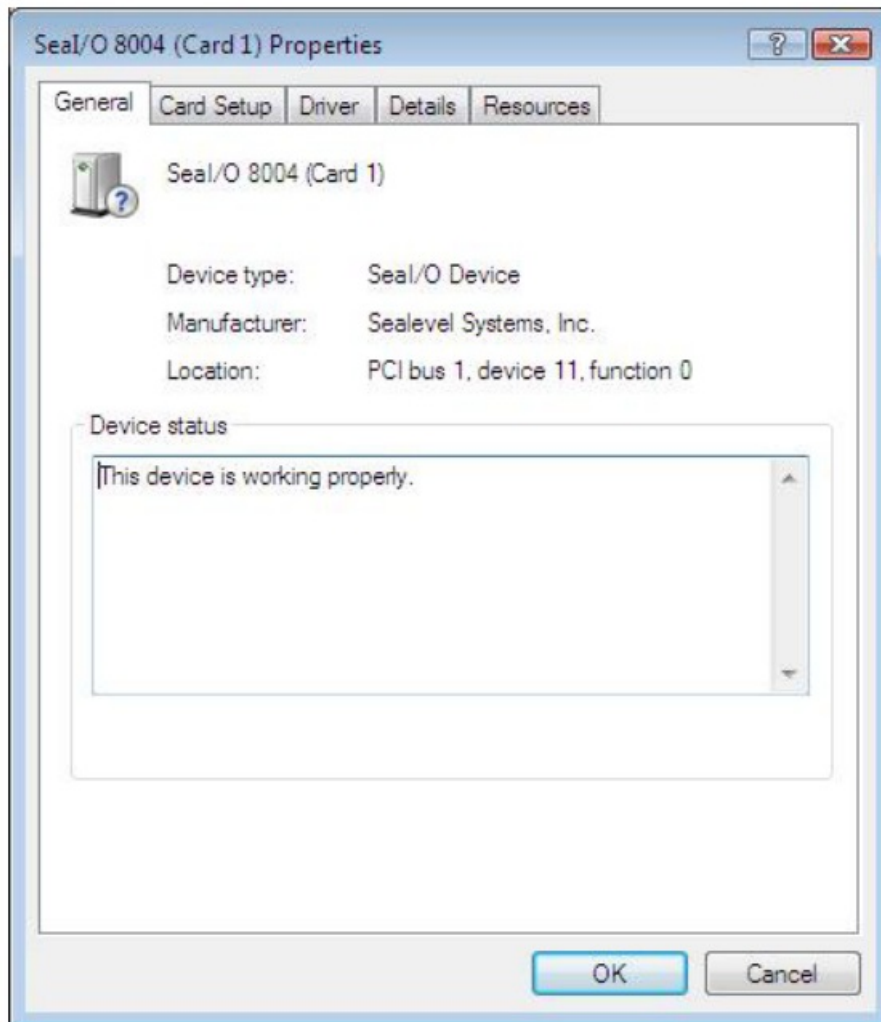


Seal/O Classic Hardware

This is an example of a properly enumerated Seal/O digital I/O adapter in Windows Device Manager.



Right click on the adapter line item under the Seal/O Device category and choose 'Properties'. This will show the Properties dialog box, as seen below.



This verifies that the Seal/O digital I/O adapter (8004) is correctly enumerated.

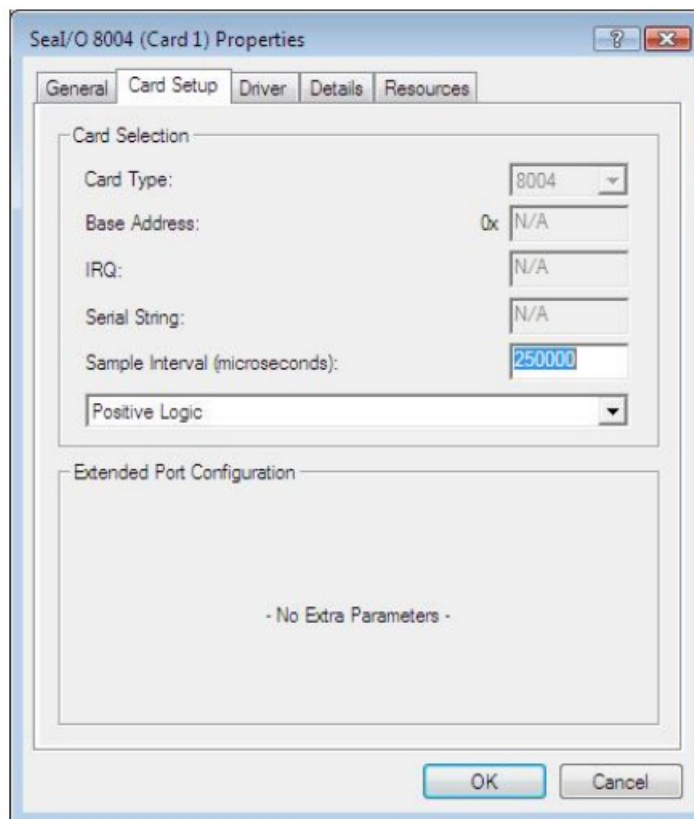


To properly configure your digital I/O adapter, please click on the 'Card Setup' tab and refer to the Configuration section of this manual.

SealO Device Driver Configuration

Configure your Seal/O adapter device driver settings by navigating to the Device Manger and opening the Properties dialog box for the installed Seal/O adapter device.

Choose the Card Setup tab. The example below shows a Seal/O 8004 adapter.



Card Selection Configuration

Sample Interval

This parameter sets the time interval for the timer used by the device driver to check the adapter for input state changes. To use, your application must invoke the `SealO_NotifyInputChange` overlapped API device driver call. The default value on installation is 250,000 microseconds (250 milliseconds).



Setting the sampling rate below 10,000 microseconds is not recommended as this can heavily tax the host processor. When the Sample Interval parameter is non-zero, the driver periodically looks at the inputs to see when one changes. When an input changes, the driver will complete the previously issued overlapped call. The driver utilizes a recurring timer to notify it to look at the inputs. The period of time (in microseconds) that occurs between passes of the driver looking at the inputs is specified in the Sample Interval box.

Additional information on Sample Interval can be located in the SealO Software Information Help file found here: Start – All Programs – SealO – SealO Help – Device Configuration.

Logic States



The combo box allows selection of the type of logic that the driver will use: Positive or Negative. The default selection is Positive logic.

The original SealO API treated devices as if they had active low inputs. This behavior has been revised. The current SealO API returns inputs as active high.

Legacy SealO calls are: `SealO_ReadReg` and `SealO_WriteReg` functions.

Their counterparts are: `SealO_ReadByte`, `SealO_WriteByte`, `SealO_ReadBit`, `SealO_WriteBit`, `SealO_WriteAllOutputs` and `SealO_ReadAllInputs`.

These functions should be used exclusively by new applications.

Positive Logic

PIO cards

Inputs: If the input threshold voltage has not been met the API returns a 0.

If the input threshold voltage has been met the API returns a 1.

Outputs: If a 0 is written to the port the output is 0v.

If a 1 is written to the port the output is 3-5v.

DIO cards

Inputs: If the input threshold voltage has not been met the API returns a 0.

If the input threshold voltage has been met the API returns a 1.

Outputs: If a 0 is written to the port the relay is de-energized.

If a 1 is written to the port the relay is energized.

Negative Logic

PIO cards

Inputs: If the threshold voltage has not been met the API returns a 1.

If the input threshold voltage has been met the API returns a 0.

Outputs: If a 0 is written to the port the output is 3-5v.

If a 1 is written to the port the output is 0v.

DIO cards

Inputs:

If the input threshold voltage has not been met the API returns a 1.

If the input threshold voltage has been met the API returns a 0.

Outputs: If a 0 is written to the port the relay is energized.

If a 1 is written to the port the relay is de-energized.

Additional information for Positive and Negative logic choices can be located in the SealIO Software Information Help file found here: Start – All Programs – SealIO – SealIO Help – Logic States.

Appendix B – Handling Instructions

ESD Warnings

Electrostatic Discharges (ESD)

A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must therefore be observed. Always take the following precautions:

1. Transport boards and cards in electrostatically secure containers or bags.
2. Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
3. Only touch electrostatically sensitive components when you are properly grounded.
4. Store electrostatically sensitive components in protective packaging or on anti-static mats.

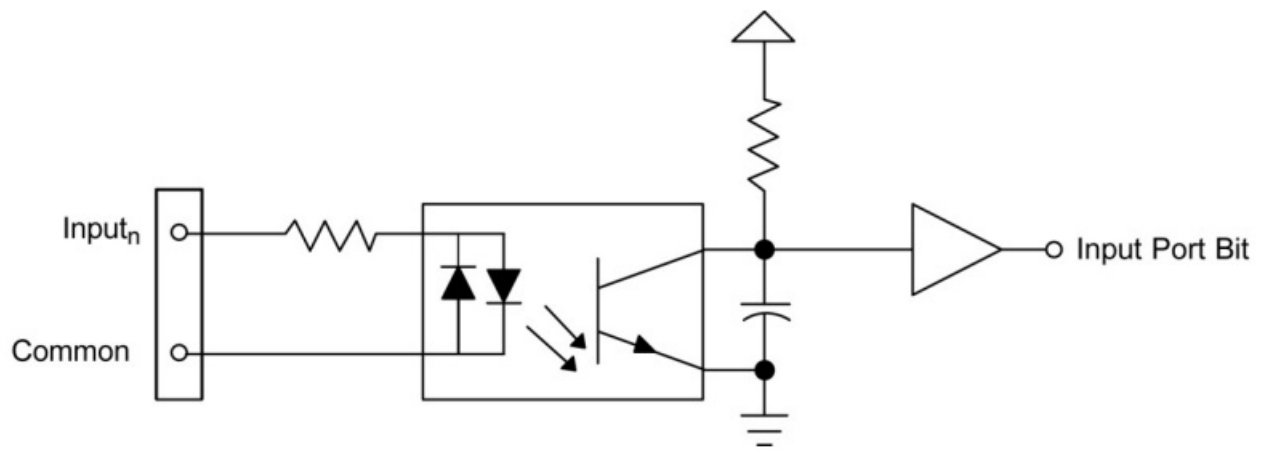
Grounding Methods

The following measures help to avoid electrostatic damages to the device:

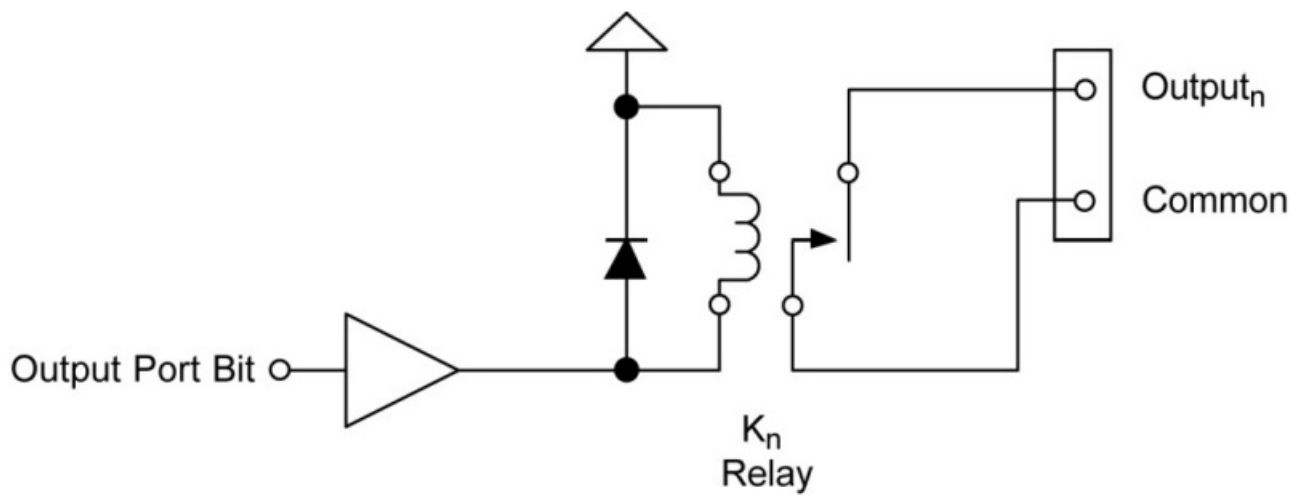
5. Cover workstations with approved antistatic material. Always wear a wrist strap connected to a properly grounded workplace.
6. Use antistatic mats, heel straps, and/or air ionizers for more protection.
7. Always handle electrostatically sensitive components by their edge or by their casing.
8. Avoid contact with pins, leads, or circuitry.
9. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
10. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
11. Use field service tools such as cutters, screwdrivers, and vacuum cleaners that are conductive.

Appendix C – Example Circuits

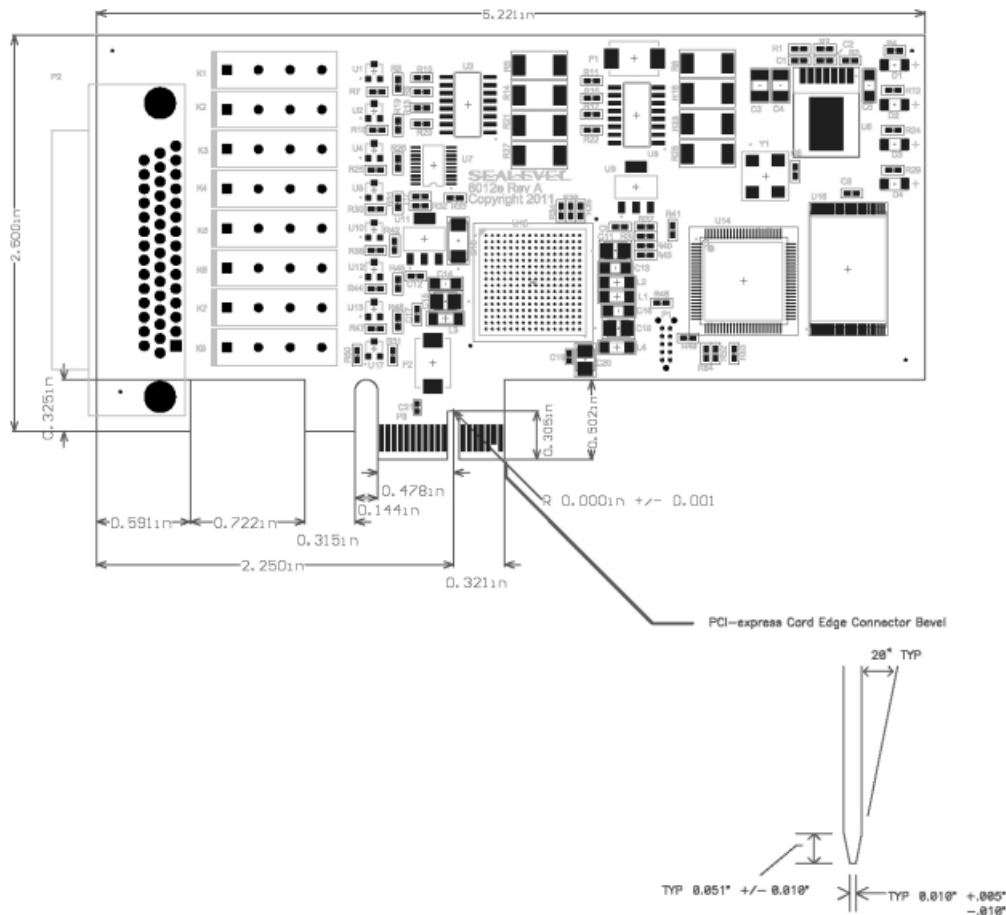
Input Circuit



Output Circuit



Appendix D – 8012e PCB Drawing



Appendix E – 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 www.sealevel.com.
The latest software updates, and newest manuals are available via our FTP site that can be accessed from our home page.
5. 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 F – 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”.

United Kingdom Conformity Assessed Statement



Products with UKCA marking are in conformity with the essential requirements of the UK Electromagnetic Compatibility Regulations 2016:

- Equipment must be designed and manufactured to ensure that the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment cannot operate as intended.
- The equipment has a level of immunity to the electromagnetic disturbance to be expected in its intended use which allows it to operate without unacceptable degradation of its intended use.



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

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

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Documents / Resources

	<p>SEALEVEL 8012e Reed Relay Output Isolated [pdf] User Manual</p> <p>8012e Reed Relay Output Isolated, 8012e, Reed Relay Output Isolated, Relay Output Isolated, Output Isolated, Isolated</p>
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References

- [Sealevel - I/O & Computing Products, Engineering and Manufacturing](#)
- [Sealevel - I/O & Computing Products, Engineering and Manufacturing](#)
- [FAQs - Sealevel](#)
- [Sealevel - I/O & Computing Products, Engineering and Manufacturing](#)
- [Software Driver Search - Sealevel](#)
- [User Manual](#)