Digital I/O Board with High Voltage Isolation for PCI Express

DIO-1616RY-PE



This product is a PCI Express bus-compliant interface board used to provide a digital signal I/O function on a PC.
This product is compatible with the digital signal I/O with high voltage (input 12 - 48VDC, output 120VAC/DC) and features 16 opto-coupler isolated inputs (compatible with current sink output/current source output) and 16 semiconductor-relay outputs. You can use 16 input signals as interrupt inputs. In addition, the digital filter function to prevent wrong recognition of input signals is provided.
Windows/Linux driver is bundled with this product.
Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

* Specifications, color and design of the products are subject to change without notice.

Features

Opto-coupler isolated input (compatible with current sink output/current source output) and semiconductor-relay output

This product has the 16 of opto-coupler isolated input (compatible with current sink output/current source output) whose response speed is 200µsec and 16 of semiconductor-relay output whose response speed is 1.0msec. Supporting driver voltages of 12 - 48VDC for input and 120VAC/DC for output with high voltage

Opto-coupler and semiconductor-relay bus isolation

As the PCI Express bus (PC) is isolated from the input and output interfaces by opto-coupler and semiconductor-relay, this product has excellent noise performance.

You can use 16 input signals as interrupt request signals.

You can use 16 input signals as interrupt request signals and also disable or enable the interrupt in bit units and select the edge of the input signals, at which to generate an interrupt

Windows/Linux compatible driver libraries are attached.

Using the attached driver library API-PAC(W32) makes it possible to create applications of Windows/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

This product has a digital filter to prevent wrong recognition of input signals from carrying noise or a chattering.

This product has a digital filter to prevent wrong recognition of input signals from carrying noise or a chattering. All input terminals can be added a digital filter, and the setting can be performed by software.

Functions and connectors are compatible with PCI compatible board PIO-1616RY(PCI).

The functions same with PCI compatible board PIO-1616RY(PCI) are provided.
In addition, as there is compatibility in terms of connector shape and pin assignments, it is easy to migrate from the existing system.

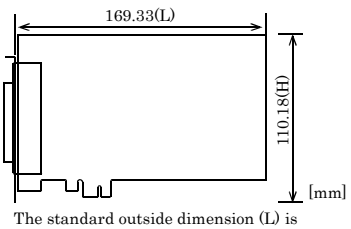
LabVIEW is supported by a plug-in of dedicated library VI-DAQ.

Using the dedicated library VI-DAQ makes it possible to make a LabVIEW application.

Specification

Item		Specification
Input		
Input format		Opto-isolated input (Both of current sink and source outputs supported)
Number of input signal points		16 points (all available for interrupts) (1 common pin)
Input resistance		3 kΩ (with 12 - 24 V selected) or 6 kΩ (with 24 - 48 V selected)
Input ON current		3.1mA or more
Input OFF current		1.0mA or less
External circuit power supply		12 - 24 VDC (±10%) or 24 - 48 VDC (±10%) (selected by jumper switch)
Interrupt		16 interrupt input signals are arranged into a single output of interrupt signal INTA. An interrupt occurs at the High-to-Low or Low-to-High edge (software-selected)
Response time		200µsec within
Output		
Output format		Semiconductor relay output
Number of output signal points		16 points (1 common)
Output rating	Output voltage	120VAC/DC(Max.)
	Output current	100mA (par channel) (Max.)
Device used		PS7221A-2A (NEC)
ON resistance		10.0Ω or less
OFF leakage current		1.0µA or less
Response time		1.0msec within
Common		
I/O address		Any 32-byte boundary
Interruption level		1 level use
Max. board count for connection		16 boards including the master board
Dielectric strength		1000Vrms
Power consumption		3.3VDC 550mA (Max.)
Operating condition		0 - 50°C, 10 - 90%RH (No condensation)
Allowable distance of signal extension		Approx. 50m (depending on wiring environment)
Bus specification		PCI Express Base Specification Rev. 1.0a x1
Dimension (mm)		169.33(L) x 110.18(H)
Weight		120g
Certification		RoHS,CE,VCCI

Board Dimensions



The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

Windows version of digital I/O driver API-DIO(WDM)/API-DIO(98/PC)

[Stored on the bundled Disk driver library API-PAC(W32)]

The API-DIO(98/PC) is the Windows version driver library software that provides products in the form of Win32 API functions (DLL). Various sample programs such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.
You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/). For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Linux version of digital I/O driver API-DIO(LNX)

[Stored on the bundled Disk driver library API-PAC(W32)]

The API-DIO(LNX) is the Linux version driver software which provides device drivers (modules) by shared library and kernel version. Various sample programs of gcc are provided.
You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/). For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Data acquisition VI library for LabVIEW VI-DAQ (Available for downloading (free of charge) from the CONTEC web site.)

This is a VI library to use in National Instruments LabVIEW. VI-DAQ is created with a function form similar to that of LabVIEW's Data Acquisition VI, allowing you to use various devices without complicated settings.
See http://www.contec.com/vidaq/ for details and download of VI-DAQ.

Cable & Connector

Cable (Option)

Flat cable with both-ends 37-pin D-SUB connector
: PCB37P-1.5 (1.5m)
: PCB37P-3 (3m)
: PCB37P-5 (5m)

Shielded cable with two 37-pin D-Type connectors
: PCB37PS-0.5P (0.5m)
: PCB37PS-1.5P (1.5m)
: PCB37PS-3P (3m)
: PCB37PS-5P (5m)

Flat cable with one-ends 37-Pin D-SUB connector
: PCA37P-1.5 (1.5m)
: PCA37P-3 (3m)
: PCA37P-5 (5m)

Shield cable with one-end 37-pin D-SUB connector
: PCA37PS-0.5P (0.5m)
: PCA37PS-1.5P (1.5m)
: PCA37PS-3P (3m)
: PCA37PS-5P (5m)

Connector (Option)

37pin D-SUB(male) connector Five-piece set
: CN5-D37M

Packing List

Board [DIO-1616RY-PE] …1
First step guide … 1
Disk *1 [API-PAC(W32)] …1
Serial number label…1
Product Registration Card & Warranty Certificate…1

*1 The Disk contains the driver software and User's Guide.

Accessories

Accessories (Option)

Screw Terminal (M3 x 37P)	: EPD-37A *1*2
Screw Terminal (M3.5 x 37P)	: EPD-37 *1
General Purpose Terminal	: DTP-3A *1
Screw Terminal	: DTP-4A *1
Signal Monitor for Digital I/O (32Bits)	: CM-32(PC)E *1

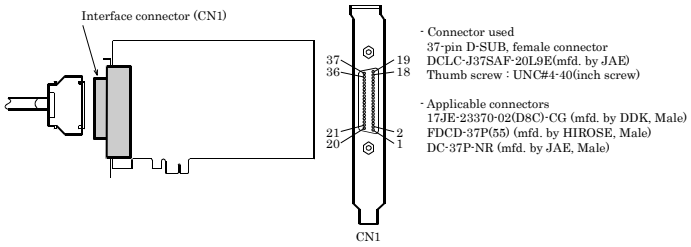
*1 A PCB37P or PCB37PS optional cable is required separately.
*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.

* Check the CONTEC's Web site for more information on these options.

How to connect the connectors

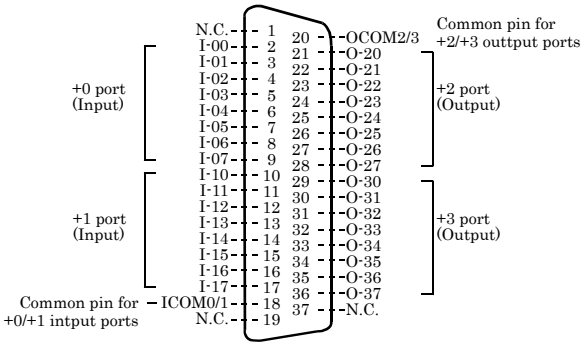
Connector shape

The on-board interface connector (CN1) is used when connecting this product and the external devices.



* Please refer to page 2 for more information on the supported cable and accessories.

Connector Pin Assignment



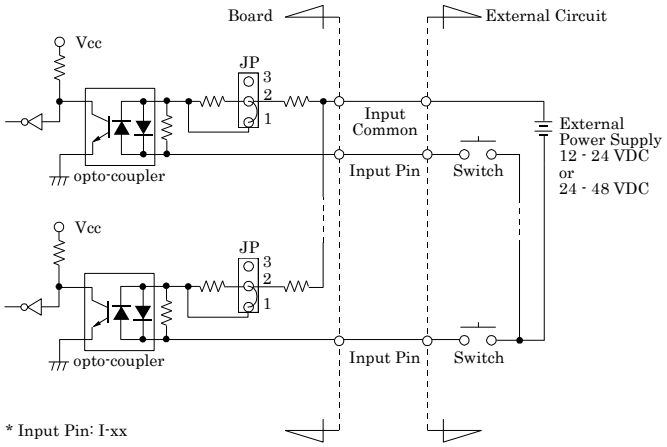
* I-00 - I-17 can be used as interrupt input.

I-00 - I-17	16 input signal pins. Connect output signals from the external device to these pins.
O20 - O37	16 output signal pins. Connect these pins to the input signal pins of the external device.
ICOM 0/1	Common pin for input signals. These pins are common to 16 input signal pins.
OCOM 2/3	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
N.C.	This pin is left unconnected.

Connecting Input Signals

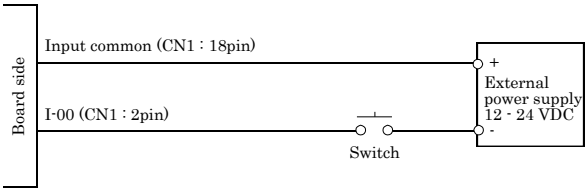
Connect the input signals to a device which can be current-driven, such as a switch or transistor output device.
The connection requires an external power supply to feed currents.
The board inputs the ON/OFF state of the current-driven device as a digital value.

Input Circuit



The input circuits of interface blocks of the board are illustrated in Figure 3.3. For each input channel, use the corresponding jumper to select a voltage range of 12 - 24 or 24 - 48 VDC depending on the voltage of the input signal.
The signal inputs are isolated by opto-couplers (Both of current sink and source outputs supported). The board therefore requires an external power supply to drive the inputs. The power capacity required for driving each input channel is about 8 mA when the signal voltage is 48 VDC (with the 24 - 48 VDC setting) or about 4 mA when the signal voltage is 12 VDC (with the 12 - 24 VDC setting).

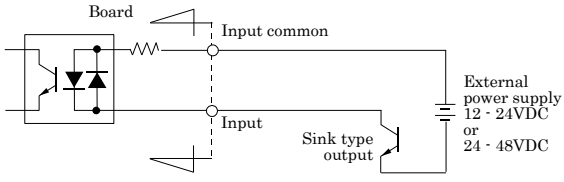
- Connecting a Switch



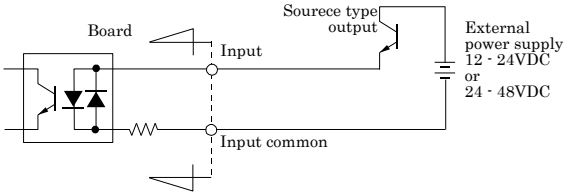
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Examples of Connecting the Board to an External Device

Connecting the input to the sink type output



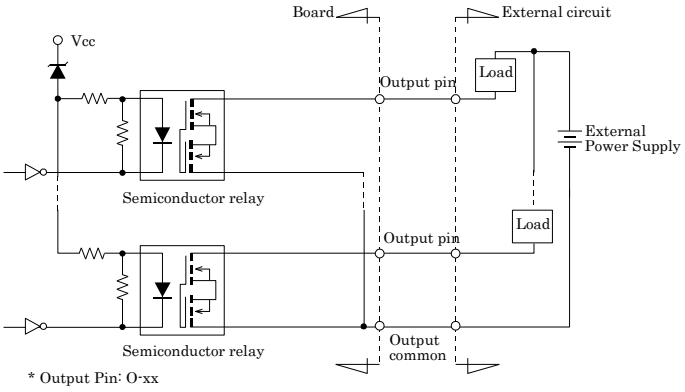
Connecting the input to the source type output



Connecting Output Signals

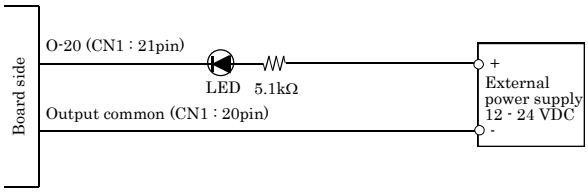
Connect the output signals to a current-driven controlled device such as a relay or LED.
The connection requires an external power supply to feed currents.
The board controls turning on/off the current-driven controlled device using a digital value.

Output Circuit



⚠ CAUTION
When the PC is turned on, all output are reset to OFF.

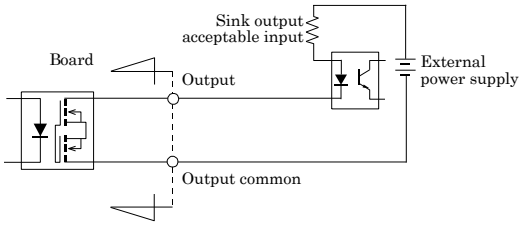
Connection to the LED



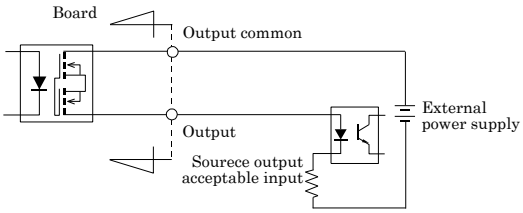
When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.

Examples of Connecting the Board to an External Device

Connecting the Output to the Sink Output Acceptable Input



Connecting the Output to the Source Output Acceptable Input



Block Diagram

