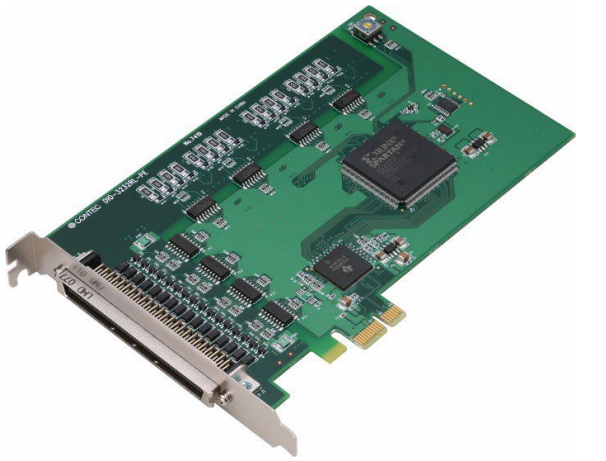
Negative-Common Opto-Isolated Digital I/O
for PCI Express 32 ch type

DIO-3232RL-PE



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

This product is a negative-common typed PCI Express bus-compliant interface board used to provide a digital signal I/O function on a PC. This product can input and output digital signals at 12 - 24VDC.

DIO-3232RL-PE features 32 opto-coupler isolated inputs (compatible with current source output signals) and 32 opto-coupler isolated outputs (current source type). You can use 32 input signals as interrupt inputs. Equipped with the digital filter function to prevent wrong recognition of input signals is provided and output transistor protection circuit (surge voltage protection and overcurrent protection).

Windows/Linux driver is bundled with this product.

Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

Features

Opto-coupler isolated input (compatible with current source output signals) and opto-coupler isolated output (current source type)
DIO-3232RL-PE has the opto-coupler isolated input 32channels (compatible with current source output signals) whose response speed is 200µsec and opto-coupler isolated output 16channels (current source type). Common terminal provided per 16channels, capable of supporting a different external power supply. Supporting driver voltages of 12 - 24 VDC for I/O

Opto-coupler bus isolation
As the PC is isolated from the input and output interfaces by opto-couplers, this product has excellent noise performance.

You can use all of the input signals as interrupt request signals.
You can use all of the 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.

The output circuit, has a built-in Zener diode and the overcurrent protection circuit of the surge voltage protection.
Zener diodes are connected to the output circuits to protect against surge voltages. In addition, the output circuit, it attaches the overcurrent protection circuit at the output 8-channel unit. The output rating is max. 35VDC, 100mA per channel.

Functions and connectors are compatible with PCI compatible board PIO-32/32RL(PCI)H.
DIO-3232RL-PE : The functions same with PCI compatible board PIO-32/32RL(PCI)H 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.
Using the dedicated library makes it possible to make a LabVIEW application.

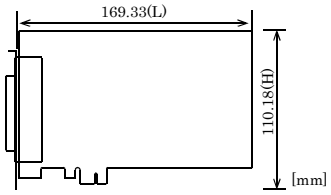
Specification

Function specification

Item		Specifications
Input		
Input format		Opto-isolated input (Compatible with current source output)(Positive logic *1)
Number of input signal channels		32 channels (all available for interrupts)(One common power supply per 16 channels)
Input resistance		4.7kΩ
Input ON current		2.0mA or more
Input OFF current		0.16mA or less
Interrupt		32 interrupt input signals are arranged into a single output of interrupt signal INTA. An interrupt is generated at the falling edge (HIGH-to-LOW transition) or rising edge (LOW-to-HIGH transition).
Response time		Within 200µsec
Output		
Output format		Opto-isolated output (Current source type)(Positive logic *1)
Number of output signal channels		32 channels (One common power supply per 16 channels)
Output rating	Output voltage	12 - 24VDC (±10%)
	Output current	100mA (par channel) (Max.)
Maximum voltage drop at ON		1.5V or less
Surge protector		Zener diode RD47FM(NEC) or the equivalence for it
Response time		Within 200µsec
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
External circuit power supply		12 - 24VDC (±10%)
Power consumption		3.3VDC 400mA (Max.)
Operating condition		0 - 50°C, 10 - 90%RH (No condensation)
Allowable distance of signal extension		Approx. 50 m (depending on wiring environment)
Bus specification		PCI Express Base Specification Rev. 1.0a x1
Dimension (mm)		169.33(L) x 110.18(H)
Connector		96 pin half pitch connector [M (male) type] PCR-E96LMD+[HONDA TSUSHIN KOGYO CO., LTD.] equivalent to it
Weight		130g
Standard		VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*1 Data "0" and "1" correspond to the High and Low levels, respectively.

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 & Service

Windows version of digital I/O driver API-DIO(WDM)
The API-DIO(WDM) 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 *1useful for checking operation is provided.
For more details on the supported OS, applicable language and how to download the updated version, please visit the CONTEC's Web site.

Linux version of digital I/O driver API-DIO(LNX)
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.
For more details on the supported OS, applicable language and how to download the updated version, please visit the CONTEC's Web site.

LabVIEW-support data acquisition library DAQfast for LabVIEW
This is a data collection library to use in the LabVIEW by National Instruments. With Polymorphic VI, our design enables a LabVIEW user to operate seamlessly. Our aim is that the customers to perform easily, promptly what they wish to do.

Data acquisition 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.

Cable & Connector (Option)

Shield Cable with 96-Pin Half-Pitch Connectors at Both Ends
: PCB96PS-0.5P (0.5m)
: PCB96PS-1.5P (1.5m)
: PCB96PS-3P (3m)
: PCB96PS-5P (5m)

Flat Cable with 96-Pin Half-Pitch Connectors at Both Ends
: PCB96P-1.5 (1.5m)
: PCB96P-3 (3m)
: PCB96P-5 (5m)

Shield Cable with 96-Pin Half-Pitch Connectors at One End
: PCA96PS-0.5P (0.5m)
: PCA96PS-1.5P (1.5m)
: PCA96PS-3P (3m)
: PCA96PS-5P (5m)

Flat Cable with 96-Pin Half-Pitch Connectors at One End
: PCA96P-1.5 (1.5m)
: PCA96P-3 (3m)
: PCA96P-5 (5m)

Distribution shield cable with 96-Pin Half-Pitch Connectors (96P→37P x 2)
: PCB96WS-1.5P (1.5m)
: PCB96WS-3P (3m)
: PCB96WS-5P (5m)

* Information about the option products, see the Contec's website.

Accessories (Option)

Screw Terminal (M3 x 96)	EPD-96A *1*2
Screw Terminal (M3.5 x 96)	EPD-96 *1
Digital I/O 64CH Series Terminal Panel	DTP-64A *1
Screw Terminal (M3 x 37P)	EPD-37A *2*3
Screw Terminal (M3.5 x 37P)	EPD-37 *3
General Purpose Terminal	DTP-3C *3
Screw Terminal	DTP-4C *3
Connection Conversion Board (96-Pin → 37-Pin x 2)	CCB-96 *4

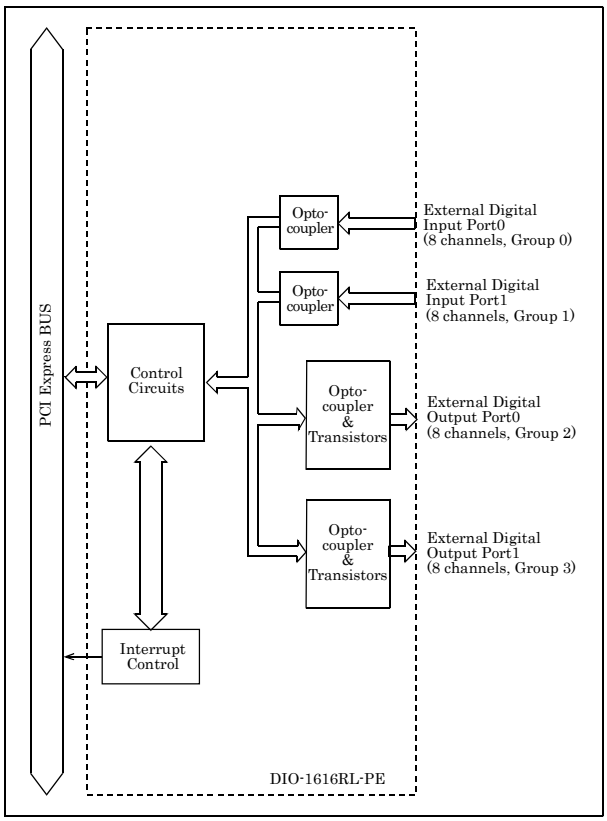
*1 A PCB96P or PCB96PS optional cable is required separately.
*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.
*3 A PCB96WS optional cable is required separately.
*4 Option cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.
* Check the CONTEC's Web site for more information on these options.

Packing List

Board [DIO-3232RL-PE]...1
First step guide ... 1
Disk *1 [API-PAC(W32)] ...1
Warranty Certificate ...1
Serial Number Lable...1

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

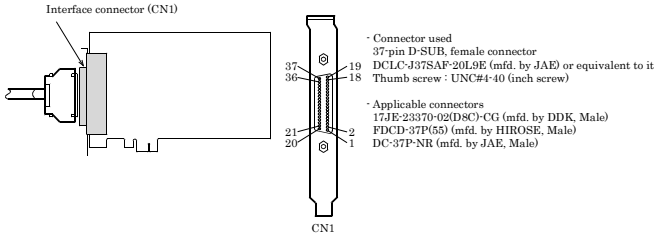
Block Diagram



Using the On-board Connectors

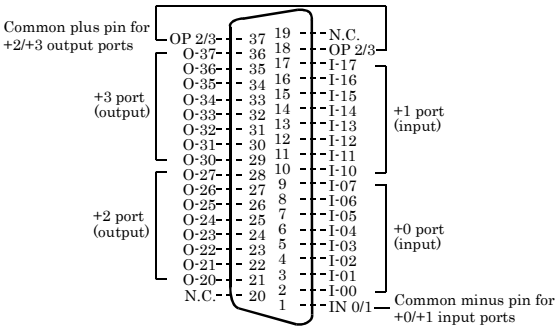
Connecting a Device to a Connector

To connect an external device to this board, plug the cable from the device into the interface connector shown below.



- Connector Pin Assignment

< Pin Assignments of Interface Connector (CN1) >

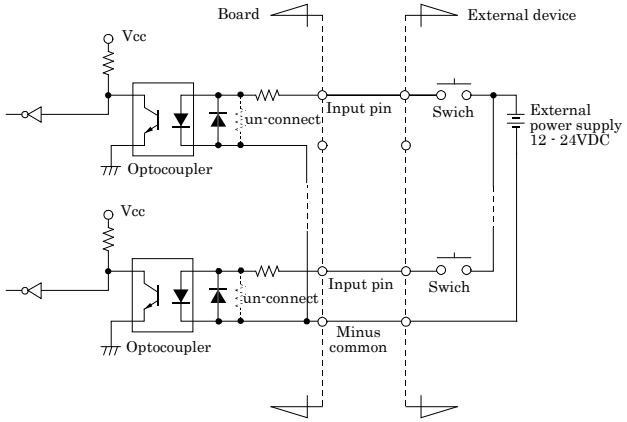


I-00 - I-17	16 input signal pins. Connect output signals from the external device to these pins.
O20 - O37	16 output signal pins. Connect these pins to the input signal pins of the external device.
IN 0/1	Connect the negative side of the external power supply. These pins are common to 16 input signal pins.
OP 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

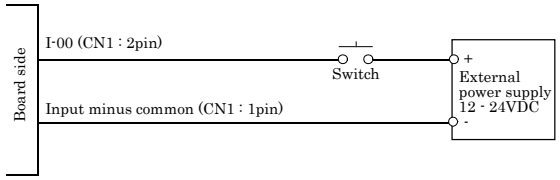


* Input pin represents I-xx.

The input circuits of interface blocks of the DIO-1616RL-PE are illustrated above.

The signal inputs are isolated by opto-couplers (corresponding to the current source output). The board therefore requires an external power supply to drive the inputs. The power requirement for each input pin is about 5.1mA at 24VDC (about 2.6mA at 12VDC).

Connecting a Switch

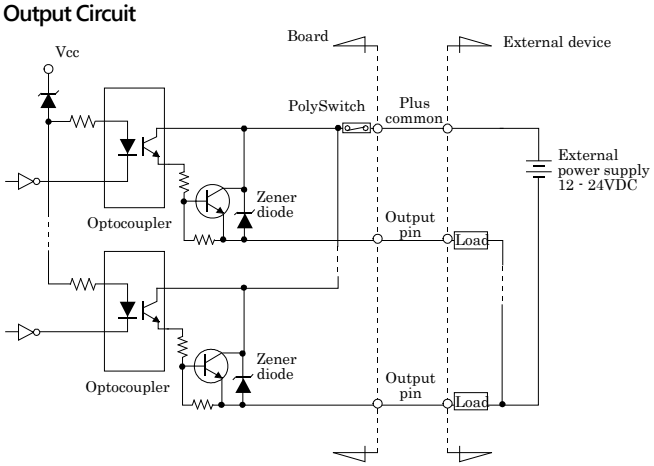


When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

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



* Output pin represents O-xx.

The output circuits of interface blocks of the DIO-1616RL-PE are illustrated above. The signal output section is an opto-coupler isolated output (current source type). Driving the output section requires an external power supply.
The rated output current per channel is 100mA at maximum.
A zener diode is connected to the output transistor for protection from surge voltages. A PolySwitch-based overcurrent protector is provided for every eight output transistors. When the overcurrent protector works, the output section of the board is temporarily disabled. If this is the case, turn of the power to the PC and the external power supply and wait for a few minutes, then turn them on back.

⚠ CAUTION

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

Connection to the LED