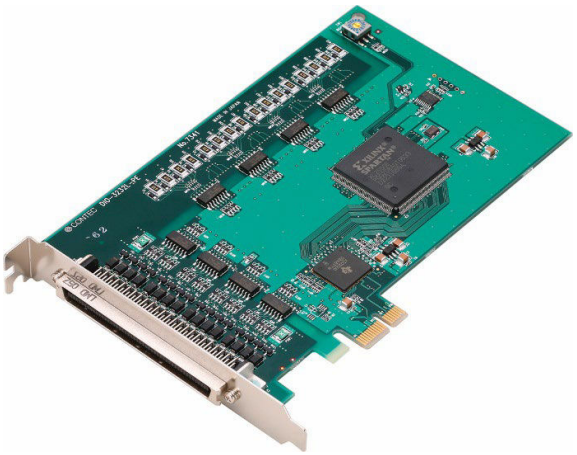
Digital I/O Board for PCI Express

DIO-3232L-PE



This product is a PCI Express bus-compliant interface board that extends the digital signal I/O functions of a PC.

DIO-3232L-PE is a 12 - 24VDC opto-coupler isolated type with opto-coupler isolated input 32ch and opto-coupler isolated open-collector output 32ch. You can use all of the input signals as interrupt inputs. Equipped with the digital filter function and output transistor protection circuit (surge voltage protection and overcurrent protection).

Windows/Linux driver is bundled with this product.

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

Features

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

Opto-coupler bus isolation
As the PCI Express bus (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 ch.

Functions and connectors are compatible with PCI compatible board PIO-32/32L(PCI)H series.
DIO-3232L-PE : The functions same with PCI compatible board PIO-32/32L(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.

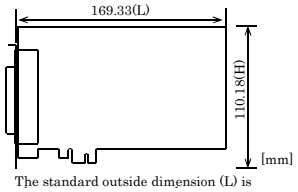
LabVIEW is supported by a plug-in of dedicated library.
Using the dedicated library makes it possible to make a LabVIEW application.

Specification

Item		Specification
Input		
Input format		Opto-coupler isolated input (Compatible with current sink output) (Negative logic *1)
Number of input signal channels		32ch (all available for interrupts) (1 common in 16ch)
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 rising edge (HIGH-to-LOW transition) or falling edge (LOW-to-HIGH transition).
Response time		Within 200µsec
Output		
Output format		Opto-coupler isolated open collector output (current sink type) (Negative logic *1)
Number of output signal channels		32ch (1 common in 16ch)
Output rating	Output voltage	35VDC (Max.)
	Output current	100mA (par channel) (Max.)
Residual voltage with output on		0.5V or less (Output current≤50mA), 1.0V or less (Output current≤100mA)
Surge protector		Zener diode RD47FM (NEC) or equivalent to it
Response time		Within 200µsec
Common		
Built-in power		None
Allowable distance of signal extension		Approx. 50m (depending on wiring environment)
I/O address		Any 32-byte boundary
Interruption level		1 level use
Max. board count for connection		16 boards including the master board
Isolated Power		1000Vrms
External circuit power supply		12 - 24VDC (±10%)
Power consumption		3.3VDC 400mA
Operating condition		0 - 50°C, 10 - 90%RH (No condensation)
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		215g
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)

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)

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	EPD-96A *1*2
Screw Terminal	EPD-96 *1
Digital I/O 64CH Series Terminal Panel (M3 x 96P)	DTP-64A *1
Signal Monitor for Digital I/O(64Bits)	CM-64L *1
Screw Terminal (M3 x 37P)	EPD-37A *2*3
Screw Terminal (M3.5 x 37P)	EPD-37 *3
General Purpose Terminal (M3 x 37P)	DTP-3C *3
Screw Terminal (M2.5 x 37P)	DTP-4C *3
Signal Monitor for Digital I/O	CM-32L *3
Connection Conversion Board (96-Pin → 37-Pin x 2)	CCB-96 *4

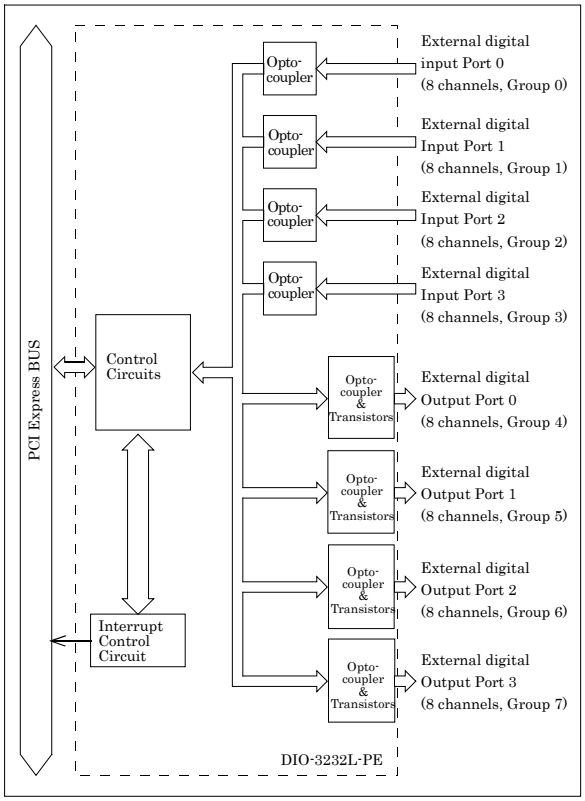
*1 A PCB96P or PCB96PS optional cable is required separately.
*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.
*3 A PCB96WS optional cable is required separately.
*4 Option cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.
* Check the CONTEC's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

Packing List

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

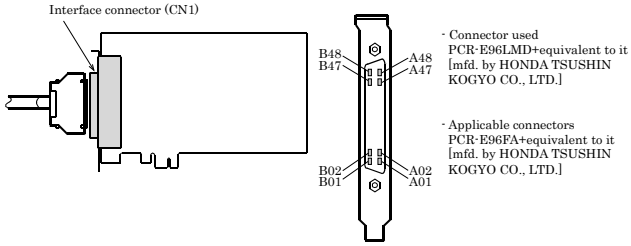
*1 The bundled disk contains the driver software and User's Guide.

Block Diagram

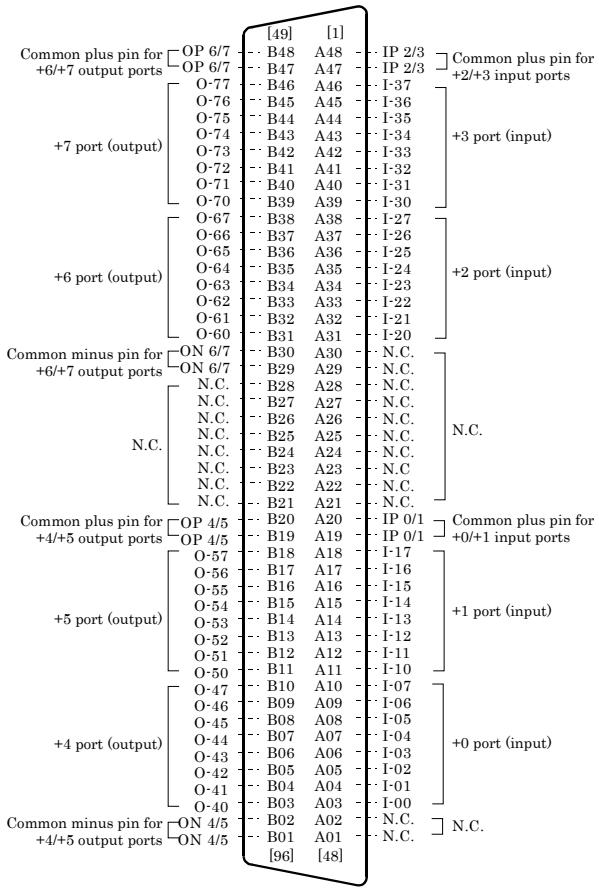


How to connect the connectors

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



Connector Pin Assignment
Pin Assignments of Interface Connector (CN1)



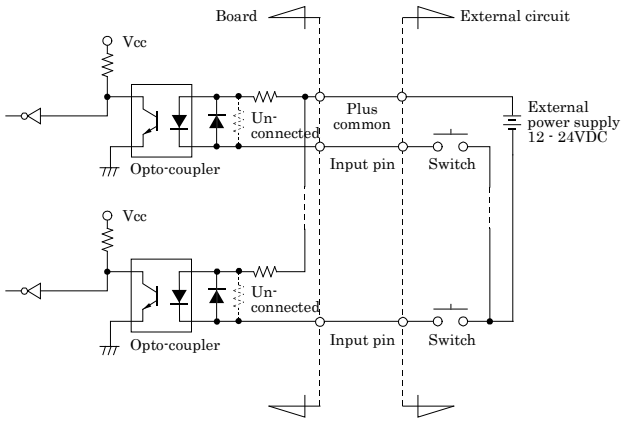
I-00 - I-37 can be used as interrupt signal.

* The numbers in square brackets [ ] are pin numbers designated by HONDA TSUSHIN KOGYO CO., LTD.

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.

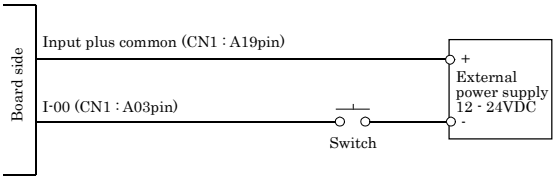
Input Circuit



* Input pin represent input signals.

The input circuits of interface blocks of this product is illustrated in the image above. The signal inputs are isolated by opto-couplers (ready to accept current sinking output signals). The board therefore requires an external power supply to drive the inputs. The power requirement for each input pin is about 5.1 mA at 24 VDC (about 2.6 mA at 12 VDC).

Connecting a Switch



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

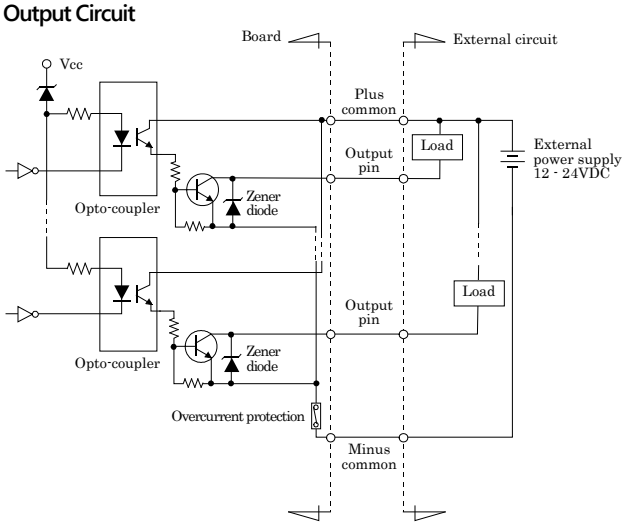
Connecting Output Signals

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



* O-xx represents the output pin.

The output circuits of interface blocks of this product is illustrated in the image above. The signal output section is an opto-coupler isolated, open-collector output (current sink type). Driving the output section requires an external power supply.

The rated output current per channel is 100 mA at maximum.

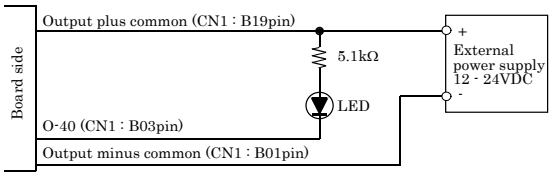
The output section can also be connected to a TTL level input as it uses a low-saturated transistor for output. The residual voltage (low-level voltage) between the collector and emitter with the output on is 0.5 V or less at an output current within 50 mA or at most 1.0 V at an output current within 100 mA.

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

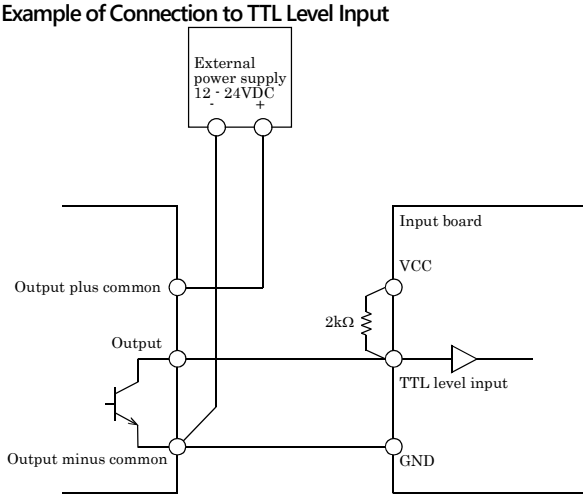
When the PC is turned on, all output are reset to OFF.

Connection to the LED



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.

Example of Connection to TTL Level Input



Connecting the Sink Type Output and Sink Output Support Input

The following example shows a connection between a sink type output (output board) and a sink output support input (input board). Refer to this connection example when you connect such boards to each other.