Digital Input Board with Opto-Isolation
for PCI Express

DI-128L-PE

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

This product is a PCI Express bus-compliant interface board used to provide a digital signal input function on a PC.
This product can input digital signals at 12 - 24VDC.

This product features 128 Optocoupler isolated inputs.   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.

Features

Optocoupler isolated inputs (compatible with current sink output)
This product has the 128 channels of Optocoupler isolated input (compatible with current sink output) whose response speed is 200μsec.   Common terminal provided per 16 channels, capable of supporting a different external power supply.   Supporting driver voltages of 12 - 24 VDC for I/O.

Optocoupler bus isolation
As the PC is isolated from the input and output interfaces by Optocoupler, 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 Window/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 PI-128L(PCI)H.
The functions same with PCI compatible board PI-128L(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 VI-DAQ.
Using the dedicated library VI-DAQ makes it possible to make a LabVIEW application.

Specification

Item		Specification
Input		
	Input format	Optocoupler isolated input (Compatible with current sink output)(Negative logic *1)
	Number of input signal channels	128 channels (16 channels available for interrupts) (1 common per 16 channels unit)
	Input resistance	4.7kΩ
	Input ON current	2.0mA or more
	Input OFF current	0.16mA or less
	Interrupt	16 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) (set by software).
	Response time	Within 200μsec
Common		
	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	250Vrms
	External circuit power supply	12 - 24VDC(±10%)
	Power consumption (Max.)	3.3VDC 600mA
	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	100 pin 0.8mm pitch connector [F (female) type] x 2 HDRA-E100W1LFDT1EC-SL+[HONDA TSUSHIN KOGYO CO., LTD.] or equivalent to it
	Weight	215g

*1   Data "0" corresponds at the High level and data "1" correspond at the Low level.

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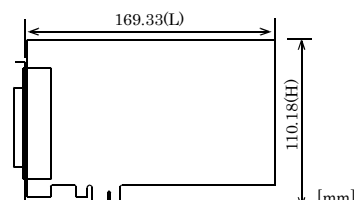
The standard outside dimension (L) is
the distance from the end of the board to
the outer surface of the slot cover.

Support Software

Windows version of digital I/O driver API-DIO(WDM) / API-DIO(98/PC)
[Stored on the bundled CD-ROM driver library API-PAC(W32)]

The API-DIO(WDM) / 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.

< Operating environment >
OS   Windows Vista, XP, Server 2003, 2000
Adaptation language   Visual Basic, Visual C++, Visual C#,
                                Delphi, C++ Builder

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 CD-ROM 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.

< Operating environment >
OS   RedHatLinux, TurboLinux
                                (For details on supported distributions,
                                refer to Help available after installation.)
Adaptation language   gcc

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)

Shielded Cable With Two 100pin Connector
                                    : PCB100PS-0.5 (0.5m)
                                    : PCB100PS-1.5 (1.5m)
                                    : PCB100PS-3 (3m)
                                    : PCB100PS-5 (5m)

Connection Conversion Shield Cable (100P→96P)
                                    : PCB100/96PS-1.5 (1.5m)
                                    : PCB100/96PS-3 (3m)
                                    : PCB100/96PS-5 (5m)

Flat Cable with One 100-Pin Connector
                                    : PCA100P-1.5 (1.5m)
                                    : PCA100P-3 (3m)
                                    : PCA100P-5 (5m)

Connection Conversion Shield Cable (100P→37P D-SUB x 2)
                                    : PCB100WS-1.5 (1.5m)
                                    : PCB100WS-3 (3m)
                                    : PCB100WS-5 (5m)

*1   If using both the CNA and CNB connectors, two cable sets are required.

Accessories

Accessories (Option)

Screw Terminal Unit (M3 x 100P)   : EPD-100A *1*4*6
Screw Terminal Unit (M3 x 96P)   : EPD-96A *2*4*6
Screw Terminal Unit (M3.5 x 96P)   : EPD-96 *2*4
Terminal Unit for Cables (M2.5 x 96P)   : DTP-64(PC) *2*4
Connector Conversion Board
(96-Pin→37-Pin x 2)   : CCB-96 *2*4
Signal Monitor / Output Accessory
for Digital I/O (64P)   : CM-64(PC)E *2*4
Screw Terminal Unit (M3 x 37P)   : EPD-37A *3*5*6
Screw Terminal Unit (M3.5 x 37P)   : EPD-37 *3*5
General Purpose Terminal (M3 x 37P)   : DTP-3A *3*5
Screw Terminal (M2.6 x 37P)   : DTP-4A *3*5

*1   PCB100PS optional cable is required separately.
*2   PCB100/96PS optional cable is required separately.
*3   PCB100WS optional cable is required separately.
*4   If using both the CNA and CNB connectors, two each of the terminal block and cable sets are required.
*5   If using both the CNA and CNB connectors, two cable sets are required.
      You will also require sufficient terminal blocks for the number of I/O points you are using.
*6   "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.
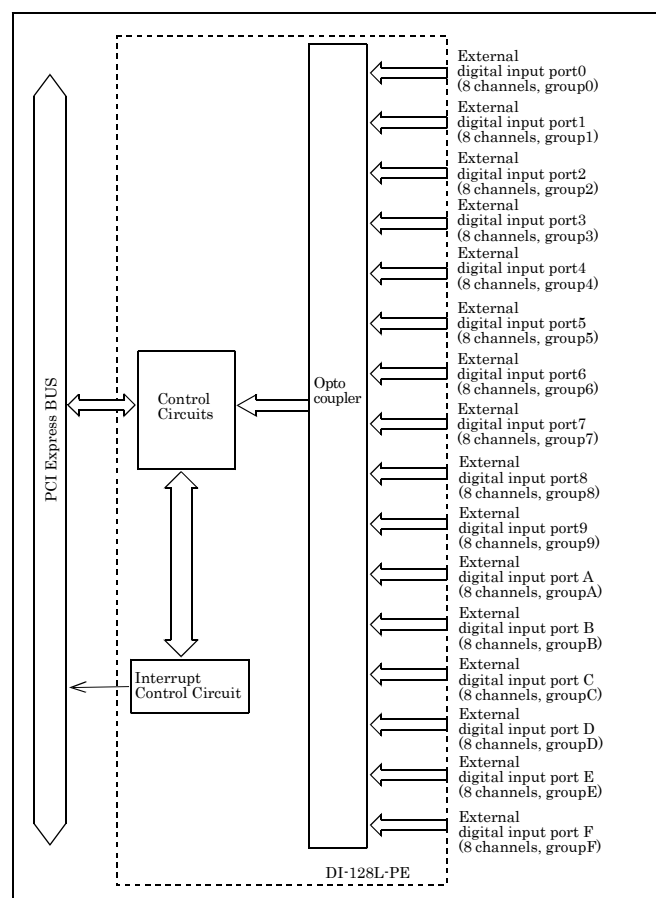
Packing List

Board [DI-128L-PE] …1
First step guide … 1
CD-ROM *1 [API-PAC(W32)] …1

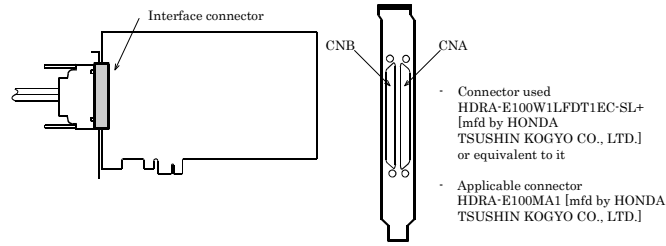*1   The CD-ROM contains the driver software and User's Guide.

Block Diagram

DI-128L-PE

External digital input port0 (8 channels, group0)
External digital input port1 (8 channels, group1)
External digital input port2 (8 channels, group2)
External digital input port3 (8 channels, group3)
External digital input port4 (8 channels, group4)
External digital input port5 (8 channels, group5)
External digital input port6 (8 channels, group6)
External digital input port7 (8 channels, group7)
External digital input port8 (8 channels, group8)
External digital input port9 (8 channels, group9)
External digital input port A (8 channels, groupA)
External digital input port B (8 channels, groupB)
External digital input port C (8 channels, groupC)
External digital input port D (8 channels, groupD)
External digital input port E (8 channels, groupE)
External digital input port F (8 channels, groupF)

PCI Express BUS
Control Circuits
Opto coupler
Interrupt Control Circuit

How to connect the connectors

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

- Connector used
  HDRA-E100W1LFDT1EC-SL+
  [mfd by HONDA TSUSHIN KOGYO CO., LTD.]
  or equivalent to it
- Applicable connector
  HDRA-E100MA1 [mfd by HONDA TSUSHIN KOGYO CO., LTD.]

* Please refer to page 2 for more information on the supported cable and accessories.
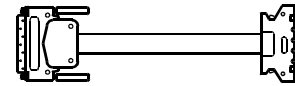
Connector Pin Assignment
Pin Assignments Interface Connector (CNA, CNB)

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

I-00 - I-F7	128 channels input signal. Connect output signals from the external device to these pins.
P-0/1 - P-E/F	Connect the positive side of the external power supply. These pins are common to 16 channels input signal.
N.C.	This pin is left unconnected.

Pin assignments for connecting to the PCB100/96PS or PCB100WS

PCB100/96PS

*[ ] shows pin numbers specified by HONDA TSUSHIN KOGYO CO., LTD.

PCB100WS

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
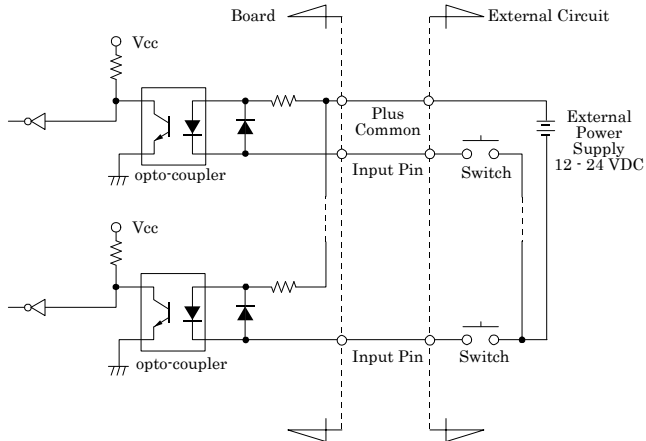
* I-xx shows input pins.

This product input circuit of interface is illustrated in the image above.

The signal inputs are isolated by Optocoupler (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 5.1mA at 24VDC (about 2.6mA at 12VDC).

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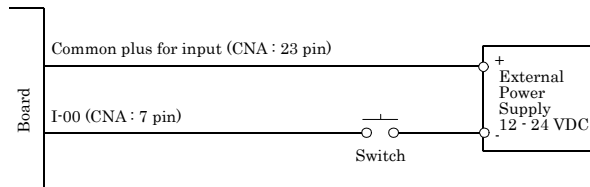
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

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.