Digital Input Board with Opto-Isolation for PCI Express
DI-32L-PE

This product is a PCI Express bus-compliant interface board for input of digital signals.   This product can input digital signals at 12 - 24VDC.

DI-32L-PE features 32 opto-coupler isolated inputs (supporting current sink output).   You can use all of input signals as interrupt inputs.   In addition, the digital filter function to prevent wrong recognition of input signals is provided.

Windows/Linux device driver is supported with this product.

*The contents in this document are subject to change without notice.
*Visit the CONTEC website to check the latest details in the document.
*The information in the data sheets is as of February 2024.

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

Features

Opto-coupler isolated input (supporting current sink output)
DI-32L-PE has the 32ch of opto-coupler isolated input (supporting current sink output) whose response time is 200μsec.   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 PCI Express bus (PC) is isolated from the input interfaces by opto-couplers, this product has excellent noise performance.

All input signals can be used as interrupt request signals
You can use all 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 support device driver
Using the device driver API-TOOL 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.

Equipped with 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-16/16L(PCI)H series.
DI-32L-PE : The functions same with PCI compatible board PI-32L(PCI)H are provided.

Packing List

Product ...1
Please read the following ... 1

Specification

Function Specifications

Item		Specifications
Input	Type	Opto-Isolated Input (for current sinking output) (Negative logic *1)
	Number of Channels	32ch (all channels available for interrupts) (One common power supply per 16 channels)
	Input resistance	4.7kΩ
	Current required to turn ON	2.0mA or more
	Current required to turn OFF	0.16mA or less
	Interrupts	Combine 32 interrupt signals to one interrupt request signal as the INTA. Either rising edge or falling edge of input signal can generate interrupt.
	Response time	200μsec within
Common	Connecting distance	50m (Typ.)(depending on wiring environment)
	I/O address	Any 32-byte boundary
	Interruption level	1 level use
	Boards in one system	Maximum of 16 boards can be install in a same system.
	Isolated voltage	1000Vrms
	External circuit power supply	12 - 24VDC (±10%)
	Power consumption	3.3VDC 350mA(Max.)
	Bus specification	PCI Express Base Specification Rev. 1.0a x1
	Dimension (mm)	121.69(L) x 110.18(H)
	Weight	130g

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

Installation Environment Requirements

Item	Specifications
Operating ambient temperature	0 - +50℃
Operating ambient humidity	10 - 90%RH (No condensation)
Floating dust particles	Not to be excessive
Corrosive gases	None
Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

Physical Dimensions

121.69(L)

110.18(H)

[mm]
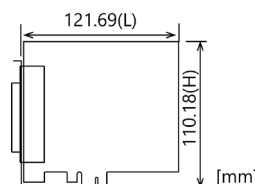
The standard outside dimension (L) is the distance from the end of the card to the outer surface of the slot cover.

Support Software

Name	Contents	How to get
Windows Version Digital I/O Driver software API-DIO(WDM)	The Windows device driver is provided as a form of Windows API functions. Various sample programs such as C# and Visual Basic .NET , Visual C++, Python etc. and diagnostic program useful for checking operation is provided.	Download from the CONTEC website *1
Linux Version Digital I/O Driver software API-DIO(LNX)	The Linux device driver is provided as a shared library. The software includes various sample programs such as gcc (C, C++) and Python programs, as well as a configuration tool to configure the device settings.	Download from the CONTEC website *1
Software Development Tool Kits (SDK) and Support Software	In addition to the device drivers, we offer many software programs for using CONTEC devices in an easier manner.	Download from the CONTEC website *2

*1 Download the files from the following URL

   https://www.contec.com/download/

*2 For supported software, search the CONTEC website for this product and view the product page.

   https://www.contec.com/

Optional Products

Product Name	Model type	Description
Shield 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 37-Pin D-type Connectors on 2Ends	PCB37P-1.5	1.5m
Shield Cable with One 37pin D-type Connector	PCA37PS-0.5P	0.5m
	PCA37PS-1.5P	1.5m
	PCA37PS-3P	3m
	PCA37PS-5P	5m
Flat Cable with a 37Pin D-type Connectors	PCA37P-1.5	1.5m
	PCA37P-3	3m
Screw Terminal (M3 * 37P)	EPD-37A	*1 *2
Screw Terminal (M3.5 * 37)	EPD-37	*2
General Purpose Terminal	DTP-3C	*2
Screw Terminal	DTP-4C	*2
Signal monitor Accessory for Digital I/O (32bits)	CM-32L	*2

*1   "Spring-up" type terminal is used to prevent terminal screws from falling off.

*2   PCB37P or PCB37PS optional cable is required separately.

Connecting an Interface Connector

To connect an external device to this product, plug the cable from the device into the interface connector (CN1) shown below.

Interface connector (CN1)

37 19
36 18
21 2
20 1

- Connector used
  37-pin D-SUB, female connector
  DCLC-J37SAF-20L9E (mfd. by JAE) or equivalent to it
  Lock Nut : UNC#4-40 (inch screw)
- Applicable connectors
  17JE-23370-02(D8C)-CG (mfd. by DDK),
  FDCD-37P(55) (mfd. by HIROSE),
  DC-37P-NR (mfd. by JAE),
  or equivalent

CN1
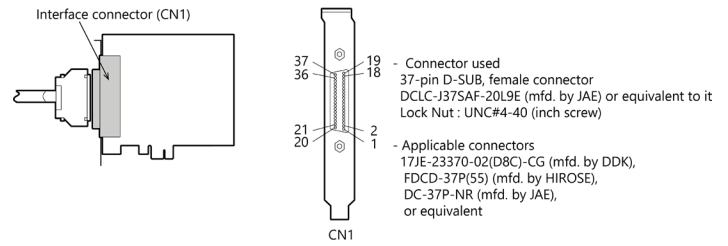
Layout on the Interface Connector(CN1)

				19	N.C.	
Common plus pin for +2/+3 input ports	IP-2/3	37		18	IP-0/1	Common plus pin for +0/+1 input ports
	I-37	36		17	I-17	
	I-36	35		16	I-16	
	I-35	34		15	I-15	
+3 port (Input)	I-34	33		14	I-14	+1 port (Input)
	I-33	32		13	I-13	
	I-32	31		12	I-12	
	I-31	30		11	I-11	
	I-30	29		10	I-10	
	I-27	28		9	I-07	
	I-26	27		8	I-06	
	I-25	26		7	I-05	
+2 port (Input)	I-24	25		6	I-04	+0 port (Input)
	I-23	24		5	I-03	
	I-22	23		4	I-02	
	I-21	22		3	I-01	
	I-20	21		2	I-00	
	N.C.	20		1	N.C.	

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

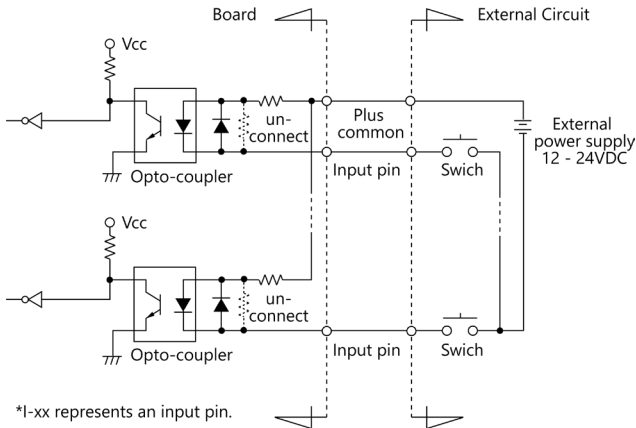| Signal name	Description
I-00 - I-37	32 input signal pins. Connect output signals from the external device to these pins.
IP-0/1	Connect the positive side of the external power supply. This pin is common to 16 input signal pins.
IP-2/3	Connect the positive side of the external power supply. This pin is common to 16 input signal pins.
N.C.	This pin is left unconnected.

⚠ **CAUTION**

To perform input/output using this product with the CONTEC device driver, specify logical ports and logical bits when calling each function.   For details, refer to the "Relationships between API-TOOL Logical Ports/Bits and Connector Signal Pins" of Reference Manual.

Connecting Input Signals

Input Circuit
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 product inputs the ON/OFF state of the current-driven device as a digital value.

Board | External Circuit
Vcc
un-connect
Opto-coupler
Plus common
Input pin
Swich
External power supply 12 - 24VDC

Vcc
un-connect
Opto-coupler
Input pin
Swich

*I-xx represents an input pin.

The signal inputs are isolated by opto-couplers (ready to accept current sinking output signals).   The product 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).
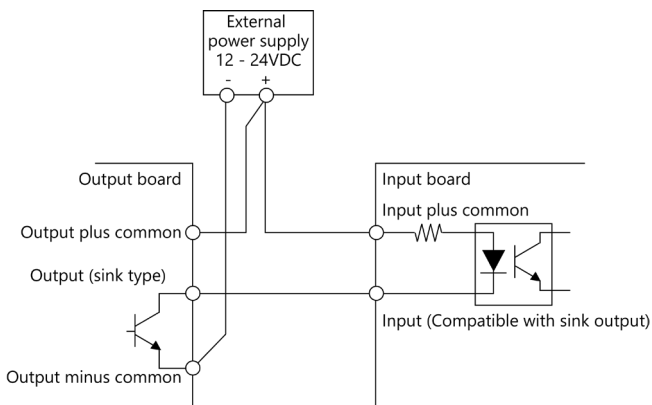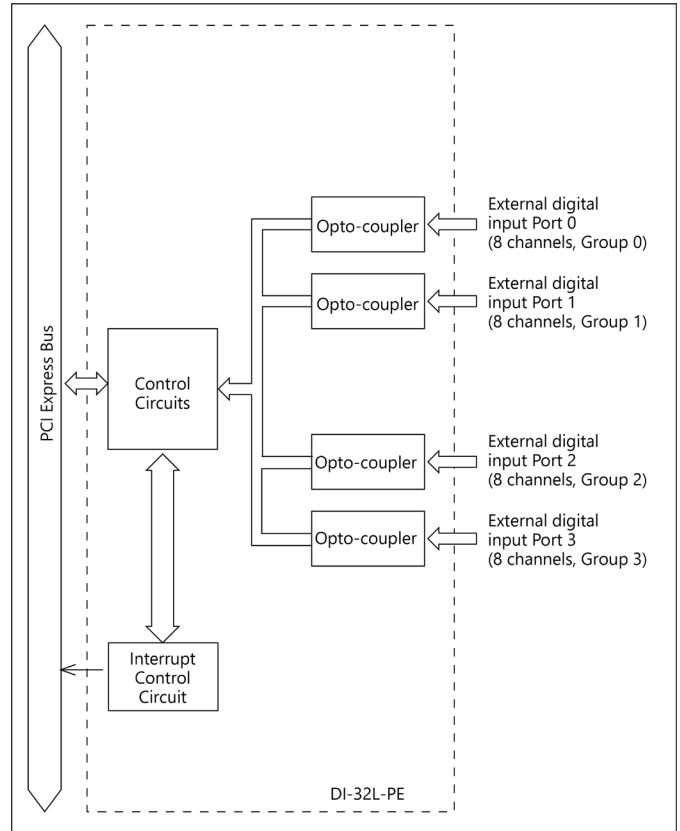
Connecting a Switch (An Example to use Input I00)

Input plas common (CN1: 18pin)
I-00 (CN1: 2pin)
Switch
External power supply 12 - 24VDC
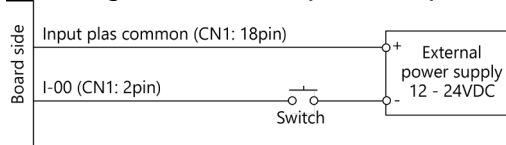
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Connecting the Sink Type Output and Sink Output Support Input
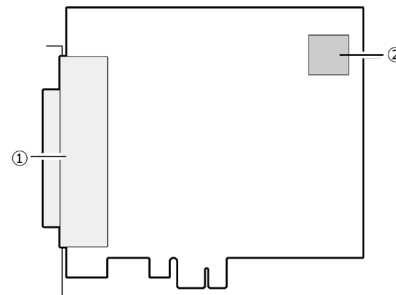The following example shows a connection between a sink type output (output board) and a sink output support input (input board). Refer to this connection example when you connect such boards to each other.

External power supply 12 - 24VDC

Output board
Output plus common
Output (sink type)
Output minus common

Input board
Input plus common
Input (Compatible with sink output)

Block Diagram

Opto-coupler — External digital input Port 0 (8 channels, Group 0)
Opto-coupler — External digital input Port 1 (8 channels, Group 1)
Opto-coupler — External digital input Port 2 (8 channels, Group 2)
Opto-coupler — External digital input Port 3 (8 channels, Group 3)
PCI Express Bus
Control Circuits
Interrupt Control Circuit
DI-32L-PE

Nomenclature of Product Components

No.	Name
1	Interface Connector
2	Board ID Setting Switch