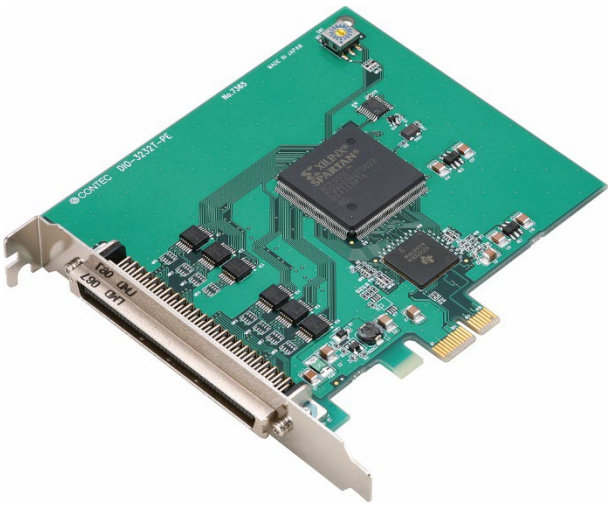
Digital I/O Board for PCI Express

DIO-3232T-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 I/O, input and output function on a PC.

The < DIO-3232T-PE > features 32 unisolated TTL level inputs and 32 unisolated open-collector outputs. You can use 32 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.

* The contents in this document are subject to change without notice.
* Visit the CONTEC website to check the latest details.
* The information in the data sheets is as of July, 2022.

Features

Unisolated TTL level input, unisolated open-collector output
The < DIO-3232T-PE > has the 32ch of unisolated TTL level input and 32ch of unisolated open-collector output whose response speed is 200nsec. The output rating is max. 30VDC, 40mA per ch.

You can use 32 input signals as interrupt request signals.
You can use 32 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.

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.

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.

Functions and connectors are compatible with PCI compatible board PIO-32/32T(PCI)HI

The < DIO-3232T-PE > : The functions same with PCI compatible board PIO-32/32T(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.

Packing List

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

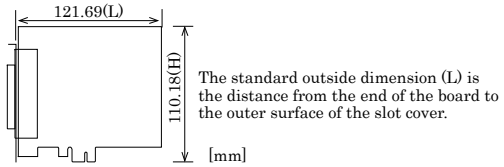
*1 The bundled disk contains the driver software and User's Guide.

Specification

Item			Specifications
Input			
	Input format		Unisolated TTL level input (Negative logic *1)
	Number of input signal channels		32ch (all available for interrupts) (1 common)
	Input resistance		10kΩ (1 TTL level load)
	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 200nsec
Output			
	Output format		Unisolated open-collector output (Negative logic *1)
	Number of output signal channels		32ch (1 common)
	Output rating	Output voltage	30VDC (Max.)
		Output current	40mA (par channel) (Max.)
	Response time		Within 200nsec (change by pull-up resistor value)
Common			
	External supply capable current (Max.)		5VDC 350mA
	Allowable distance of signal extension		Approx. 1.5m (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
	Power consumption (Max.)		3.3VDC 550mA
	Operating condition		0 - 50°C, 10 - 90%RH (No condensation)
	Bus specification		PCI Express Base Specification Rev. 1.0a x1
	Dimension (mm)		121.69(L) x 110.18(H)
	Connector		96-pin half pitch connector [F (female) type] PCR-E96LMD [HONDA TSUSHIN KOGYO CO., LTD.] or equivalent to it
	Weight		100g
	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



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 (Available for downloading (free of charge) from the CONTEC web site.)
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.
See CONTEC's Web site for details and download of DAQfast for LabVIEW.

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.
See CONTEC's Web site for details and download of VI-DAQ.

Cable & Connector (Option)

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

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

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

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

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

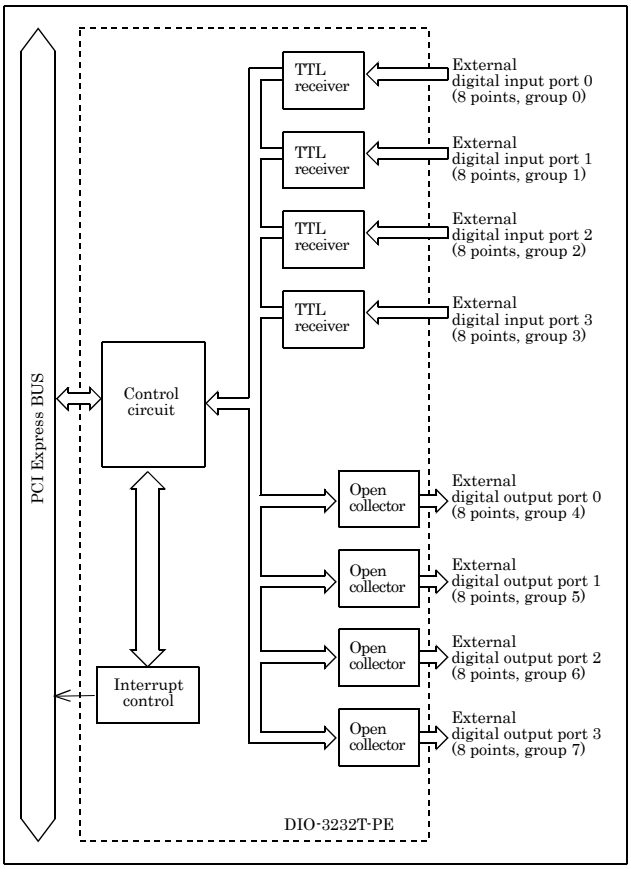
* Information about the option products, see the Contec's website.

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
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	DTP-3C *3
Screw Terminal	DTP-4C *3
Signal Monitor for Digital I/O	CM-32L *3
Connection Conversion Board (96-Pin → 37-Pin x 2)	CCB-96 *4

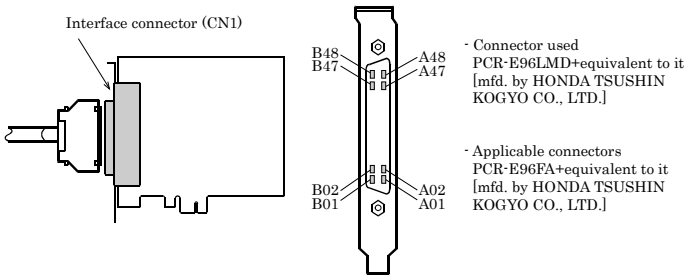
*1 A PCB96P or PCB96PS optional cable is required separately.
*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.
*3 A PCB96WS optional cable is required separately.
*4 Option cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.
* Check the CONTEC's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

Block Diagram



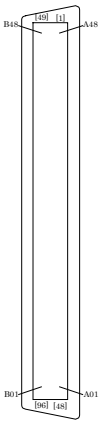
How to connect the connectors

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



Connector Pin Assignment

+5V	Vcc	B48		A48	Vcc	+5V
	Vcc	B47		A47	Vcc	
+7 port (Output)	O-77	B46		A46	I-37	+3 port (Input)
	O-76	B45		A45	I-36	
	O-75	B44		A44	I-35	
	O-74	B43		A43	I-34	
	O-73	B42		A42	I-33	
	O-72	B41		A41	I-32	
	O-71	B40		A40	I-31	
	O-70	B39		A39	I-30	
+6 port (Output)	O-67	B38		A38	I-27	+2 port (Input)
	O-66	B37		A37	I-26	
	O-65	B36		A36	I-25	
	O-64	B35		A35	I-24	
	O-63	B34		A34	I-23	
	O-62	B33		A33	I-22	
	O-61	B32		A32	I-21	
	O-60	B31		A31	I-20	
Signal common	GND	B30		A30	GND	Signal common
	GND	B29		A29	GND	
N.C.	N.C.	B28		A28	N.C.	N.C.
	N.C.	B27		A27	N.C.	
	N.C.	B26		A26	N.C.	
	N.C.	B25		A25	N.C.	
	N.C.	B24		A24	N.C.	
	N.C.	B23		A23	N.C.	
	N.C.	B22		A22	N.C.	
	N.C.	B21		A21	N.C.	
Signal common	Vcc	B20		A20	Vcc	+5V
	Vcc	B19		A19	Vcc	
+5 port (Output)	O-57	B18		A18	I-17	+1 port (Input)
	O-56	B17		A17	I-16	
	O-55	B16		A16	I-15	
	O-54	B15		A15	I-14	
	O-53	B14		A14	I-13	
	O-52	B13		A13	I-12	
	O-51	B12		A12	I-11	
	O-50	B11		A11	I-10	
+4 port (Output)	O-47	B10		A10	I-07	+0 port (Input)
	O-46	B09		A09	I-06	
	O-45	B08		A08	I-05	
	O-44	B07		A07	I-04	
	O-43	B06		A06	I-03	
	O-42	B05		A05	I-02	
	O-41	B04		A04	I-01	
	O-40	B03		A03	I-00	
Signal common	GND	B02		A02	GND	Signal common
	GND	B01		A01	GND	

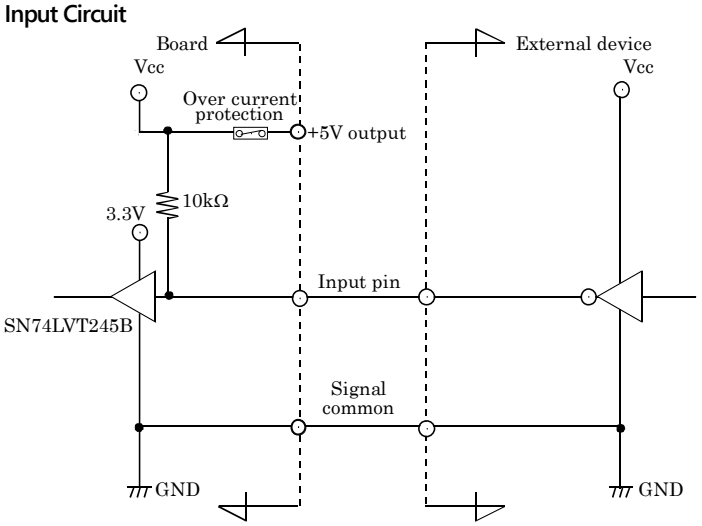


- [ ] shows the pin numbers specified by HONDA TSUSHIN KOGYO CO., LTD.

I-00 - I-37	32 input signal pins. Connect output signals from the external device to these pins.
O-40 - O-77	32 output signal pins. Connect these pins to the input signal pins of the external device.
Vcc	Output +5V. Max. electrical current is 350mA.
GND	This pin is connected to the slot's GND.
N.C.	This pin is left unconnected.

Connecting Input Signals

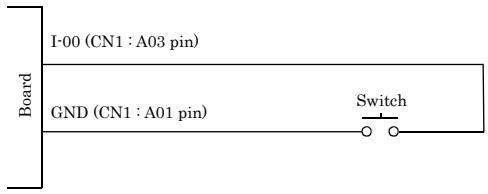
Input Circuit



* I-xx represents an input pin.
One polyswitch is connected for Vcc(+5V) terminal.

External digital signals given to signal inputs are TTL levels. The individual input signals are passed to the personal computer as negative logic signals. As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.

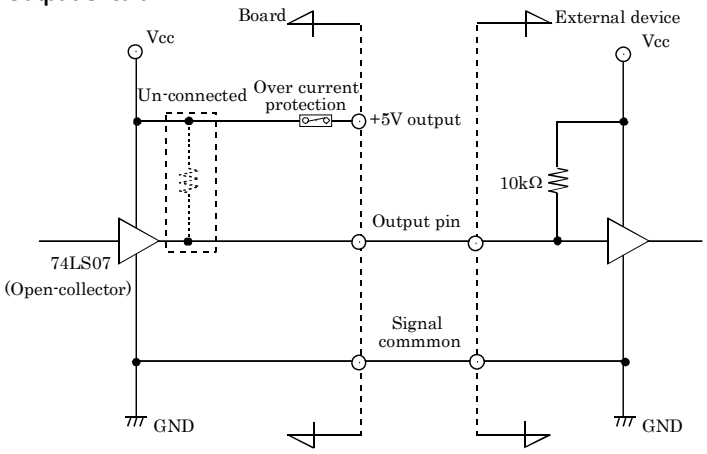
Connecting a Switch



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

Connecting Output Signals

Output Circuit

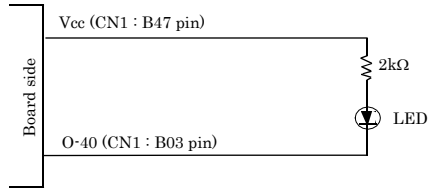


* O-xx represents an output pin.
One polyswitch is connected for Vcc(+5V) terminal.

Signal outputs are open-collector outputs; individual output signals are sent to the external device as negative logic signals. Note that each signal output must be pulled up at the external device as it is not pulled up internally.

⚠ 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.