

Digital I/O Board  
for PCI Express

DIO-3232T-PE



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

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)H**

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 VI-DAQ.**

Using the dedicated library VI-DAQ makes it possible to make a LabVIEW application.

This product is a PCI Express bus-compliant interface board used to provide a digital signal I/O 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.

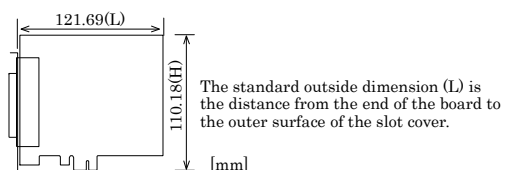
Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

Specification

Item	Specification
<b>Input</b>	
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
<b>Output</b>	
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 (Variable with pull-up resistance)
<b>Common</b>	
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

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

Board Dimensions



## 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

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)

Half Pitch 96P Female Connector Set (5 Pieces)  
: CN5-H96F

## Accessories

Screw Terminal Unit (M3 x 96P)	: EPD-96A *1*2
Screw Terminal Unit (M3.5 x 96P)	: EPD-96 *1
Terminal Unit for Cables (M2.5 x 96P)	: DTP-64(PC) *1
Signal Monitor / Output Accessory for Digital I/O (64P)	: CM-64(PC)E *1
Screw Terminal Unit (M3 x 37P)	: EPD-37A *2*3
Screw Terminal Unit (M3.5 x 37P)	: EPD-37 *3
General Purpose Terminal (M3 x 37P)	: DTP-3A *3
Screw Terminal (M2.6 x 37P)	: DTP-4A *3
Signal Monitor / Output Accessory for Digital I/O (32P)	: CM-32(PC)E *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

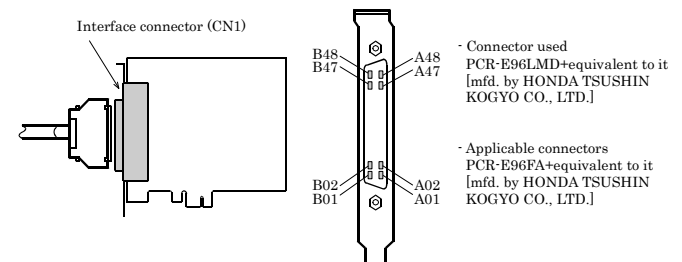
Board [DIO-3232T-PE] ... 1  
First step guide ... 1  
CD-ROM \*1 [API-PAC(W32)] ... 1

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

## How to connect the connectors

### Connector shape

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



\* Please refer to page 2 for more information on the supported cable and accessories.

### Pin Assignments of Interface Connector (CN1)

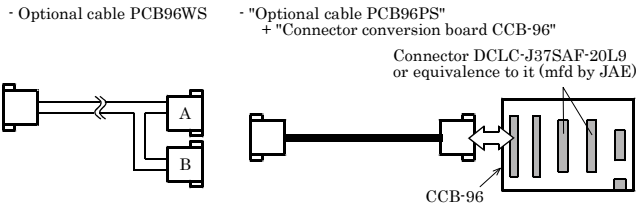
+5V	Vcc B48	A48	Vcc	+5V
	Vcc B47	A47	Vcc	
	O-77 B46	A46	I-37	
	O-76 B45	A45	I-36	
	O-75 B44	A44	I-35	
	O-74 B43	A43	I-34	
	O-73 B42	A42	I-33	
	O-72 B41	A41	I-32	
	O-71 B40	A40	I-31	
	O-70 B39	A39	I-30	
	O-67 B38	A38	I-27	
	O-66 B37	A37	I-26	
	O-65 B36	A36	I-25	
	O-64 B35	A35	I-24	
	O-63 B34	A34	I-23	
	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. B28	A28	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.	
	Vcc B20	A20	Vcc	
	Vcc B19	A19	Vcc	
	O-57 B18	A18	I-17	
	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	
	O-47 B10	A10	I-07	
	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	This pin outputs power at +5 V. Max. electrical current is 350mA.
GND	This pin is connected to the slot's GND.
N.C.	This pin is left unconnected.

### Pin Assignments of PCB96WS or CCB-96

The figure below shows the correspondence between the option cable pins and signals.



+5V	Vcc	37	19	N.C.	37
I-37	I-36	I-35	I-34	I-33	I-32
I-31	I-30	I-29	I-28	I-27	I-26
I-25	I-24	I-23	I-22	I-21	I-20
I-20	I-21				
Signal common	GND	20	1		

CNA of PCB96WS  
CN3(CNA) of CCB96

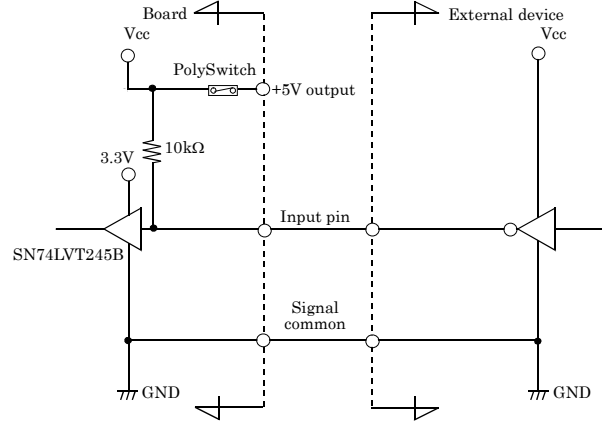
+5V	Vcc	37	19	N.C.	37
O-77	O-76	O-75	O-74	O-73	O-72
O-71	O-70	O-67	O-66	O-65	O-64
O-63	O-62	O-61	O-60		
Signal common	GND	20	1		

CNB of PCB96WS  
CN4(CNB) of CCB96

### Connecting Input Signals

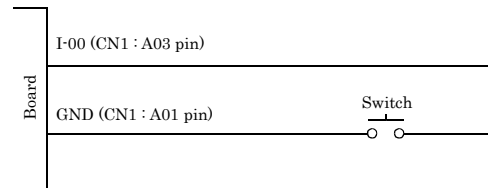
The input circuit of interface is illustrated in Figure 3.8. External digital signals given to signal inputs are TTL levels. The individual input signals are passed to the personal computer as negative logic signals. As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.

#### Input Circuit



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

#### Connecting a Switch

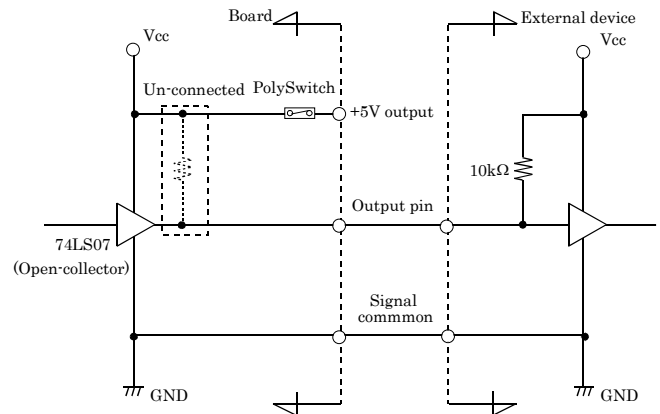


When the switch is ON, the corresponding bit contains 1.  
When the switch is OFF, by contrast, the bit contains 0.

### Connecting Output Signals

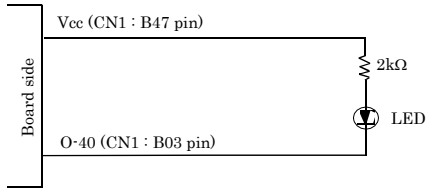
The output circuit of interface is illustrated in Figure 3.10. Signal outputs are open-collector outputs; individual output signals are sent to the external device as negative logic signals. Note that each signal output must be pulled up at the external device as it is not pulled up internally.

#### Output Circuit



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

### 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.

### A Protection Function of the +5V Outputs

A protection function, which prevents excessive current flow from the +5V outputs, is attached to this board. In case of accidental short of the +5V output and GND, for example, the function works, and the board operation may become impossible temporarily. In such a case, you should turn the PC off and wait for several minutes before you use the board again.

### Block Diagram

