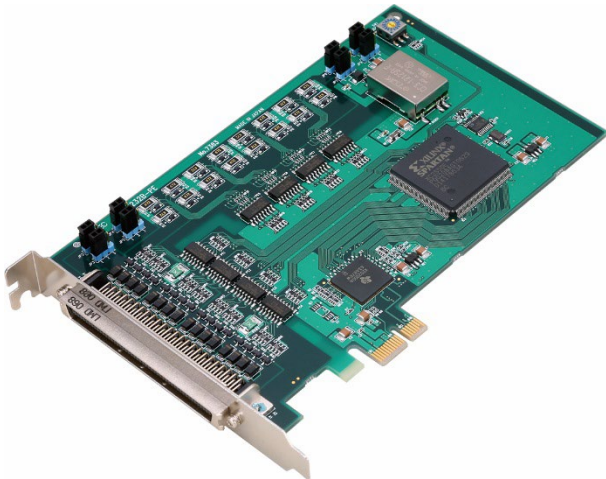


## Digital I/O Board with Opto-Isolation for PCI Express DIO-3232B-PE



\* 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)**  
This product has the 32ch of opto-coupler isolated input (supporting current sink output) and 32ch of opto-coupler isolated open-collector output (current sink type) 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 and output interfaces by opto-couplers, this product has excellent noise performance.

#### Power for opto-coupler operation (12VDC 240mA) supplied internally

As the power to run the opto-couplers is supplied internally, no external power supply is required. The use of jumpers allows you to decide whether you want to use the internal or external power supply for every 16 points.

#### 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.

#### Zener diode for surge voltage protection and the circuit for overcurrent 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 channel.

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

This product features 32 opto-coupler isolated inputs (supporting current sink output) and 32 opto-coupler isolated open-collector outputs (current sink type). You can use all of input signals as interrupt inputs. In addition, this product is equipped with a power supply for driving opto-couplers (12 VDC), the digital filter function to prevent wrong recognition of input signals is provided and output transistor protection circuit (surge voltage protection and overcurrent protection).

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.

### Functions and connectors are compatible with PCI compatible board PIO-32/32B(PCI)V

The functions same with PCI compatible board PIO-32/32B(PCI)V 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.

### Packing List

Product ...1

Please read the following ... 1

### 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/>

## Specification

### Function specification

Item		Specifications
Input	Type	Opto-Isolated Input (for current sinking output) (Negative logic *1)
	Number of Channels	32ch (all 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.
Output	Response time	200μsec within
	Type	Opto-Isolated Open Collector Output (current sinking type) (Negative logic *1)
	Number of Channels	32ch (One common power supply per 16 channels)
	Output rated voltage	35VDC (Max.)
	Output rated current	100mA/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(Renesas) or equivalent
	Response time	200μsec within
Common	Internal power	12VDC 240mA *2
	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	500Vrms
	External circuit power supply	12 - 24VDC(±10%)
	Power consumption	When using the internal power supply : 3.3VDC 500mA (Max), 12VDC 350mA (Max) When using the external power supply : 3.3VDC 500mA (Max)
	Bus specification	PCI Express Base Specification Rev. 1.0a x1
	Dimension (mm)	169.33(L) x 110.18(H)
	Weight	160g

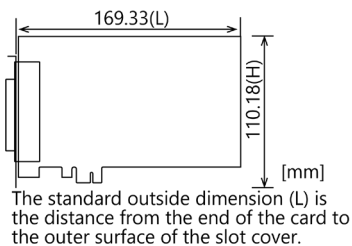
\*1 Data "0" and "1" correspond to the High and Low levels, respectively.

\*2 When using the internal power supply, the input section consumes up to 80mA and the SW section of output channel consumes up to 60mA, so the output current that can be supplied to the external device is 100mA.

### Installation Environment Requirements

Item	Specifications
Operating ambient temperature	0 - +50°C
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



## Optional Products

Product Name	Model type	Description
Shielded Cable with Two 96-Pin Half-Pitch Connectors	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
Shielded Cable with One 96-pin Half-Pitch Connector	PCA96PS-0.5P	0.5m
	PCA96PS-1.5P	1.5m
	PCA96PS-3P	3m
	PCA96PS-5P	5m
Flat Cable with One 96-pin Half-Pitch Connector	PCA96P-1.5	1.5m
	PCA96P-3	3m
Connection Conversion Shield Cable (96P→37P x2)	PCB96WS-1.5P	1.5m
	PCB96WS-3P	3m
	PCB96WS-5P	5m
Screw Terminal (M3 * 96)	EPD-96A	*1 *2
Terminal Unit for Relay Terminal Banks	EPD-96	*2
Screw Terminal (M3 * 37P)	EPD-37A	*1 *3
Screw Terminal (M3.5 * 37)	EPD-37	*3
Screw Terminal	DTP-64A	*2
General Purpose Terminal	DTP-3C	*3
Screw Terminal	DTP-4C	*3
Signal monitor Accessory for Digital I/O (64bits)	CM-64L	*2
Signal monitor Accessory for Digital I/O (32bits)	CM-32L	*3
Connector Conversion Board (96pin→37pinx2)	CCB-96	*4

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

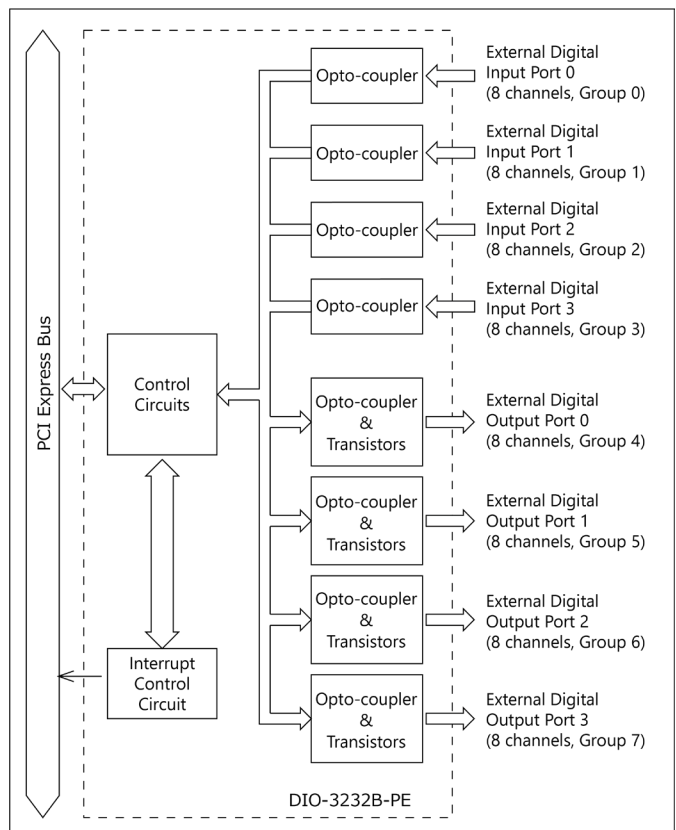
\*2 PCB96P or PCB96PS optional cable is required separately.

\*3 PCB96WS optional cable is required separately.

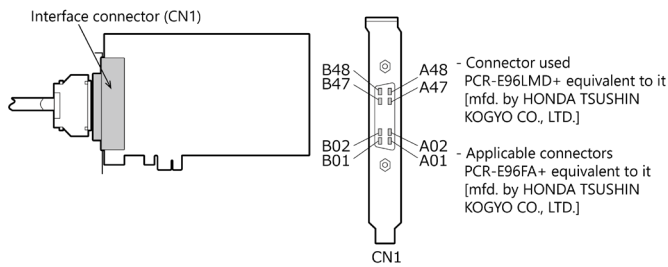
\*4 Option cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.

Visit the CONTEC website for the latest optional products.

## Block Diagram



## Connecting an Interface Connector



### Layout on the Interface Connector(CN1)

Common plus pin for +6/+7 output ports	OP-6/7	B48	A48	IP-2/3	Common plus pin for +2/+3 input ports
	OP-6/7	B47	A47	IP-2/3	
+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	
+6 port (Output)	O-70	B39	A39	I-30	+2 port (Input)
	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	
Common minus pin for +6/+7 output ports	O-61	B32	A32	I-21	Common minus pin for +2/+3 input ports
	O-60	B31	A31	I-20	
	ON-6/7	B30	A30	IN-2/3	
	ON-6/7	B29	A29	IN-2/3	
	N.C.	B28	A28	N.C.	
	N.C.	B27	A27	N.C.	
	N.C.	B26	A26	N.C.	
N.C.	N.C.	B25	A25	N.C.	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.	
	OP-4/5	B20	A20	IP-0/1	
	OP-4/5	B19	A19	IP-0/1	
+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	
+4 port (Output)	O-50	B11	A11	I-10	+0 port (Input)
	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	
Common minus pin for +4/+5 output ports	O-41	B04	A04	I-01	Common minus pin for +0/+1 input ports
	O-40	B03	A03	I-00	
	ON-4/5	B02	A02	IN-0/1	
	ON-4/5	B01	A01	IN-0/1	

\* 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.

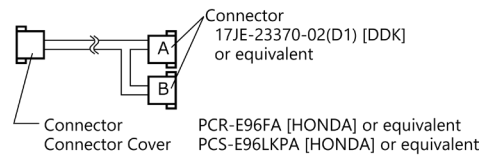
Signal name	Description
I-00 - I-37	32 input signal pins. Connect output signals from the external device to these pins.
O-40 - O-77	32 output signal pins. Connect these pins to the input signal pins of the external device.
IP-0/1	When the external power supply is selected, its positive side is connected to these pins. When the internal power supply is used, this pin output power at +12 V. These pins are common to 16 input signal pins.
IP-2/3	When the external power supply is selected, its positive side is connected to these pins. When the internal power supply is used, this pin output power at +12 V. These pins are common to 16 input signal pins.
OP-4/5	When the external power supply is selected, its positive side is connected to these pins. When the internal power supply is used, this pin output power at +12 V. These pins are common to 16 output signal pins.
OP-6/7	When the external power supply is selected, its positive side is connected to these pins. When the internal power supply is used, this pin output power at +12 V. These pins are common to 16 output signal pins.
IN-0/1	When the external power supply is selected, its negative side is connected to these pins. When the internal power supply is used, this pin serves as the ground. These pins are common to 16 input signal pins.
IN-2/3	When the external power supply is selected, its negative side is connected to these pins. When the internal power supply is used, this pin serves as the ground. These pins are common to 16 input signal pins.
ON-4/5	When the external power supply is selected, its negative side is connected to these pins. When the internal power supply is selected, this pin serves as the ground. These pins are common to 16 output signal pins. One pin permissible current of the connector is 1A. Please connect necessary number of pins for the corresponding total current of the output 16 channels. When 16 channels are used by the output full ratings (100mA per 1 channel), it is necessary to connect all.
ON-6/7	When the external power supply is selected, its negative side is connected to these pins. When the internal power supply is selected, this pin serves as the ground. These pins are common to 16 output signal pins. One pin permissible current of the connector is 1A. Please connect necessary number of pins for the corresponding total current of the output 16 channels. When 16 channels are used by the output full ratings (100mA per 1 channel), it is necessary to connect all.
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.

### Pin Assignments of Optional Connector PCB96WS

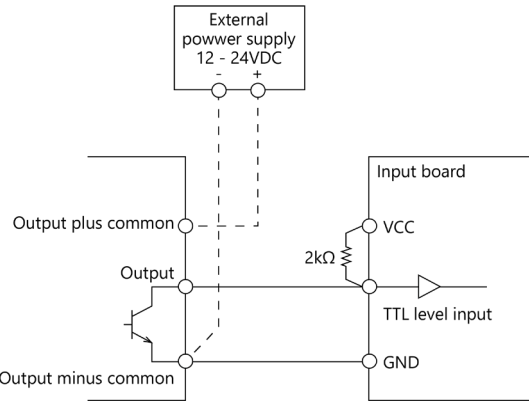
- Option cable PCB96WS-\*\*



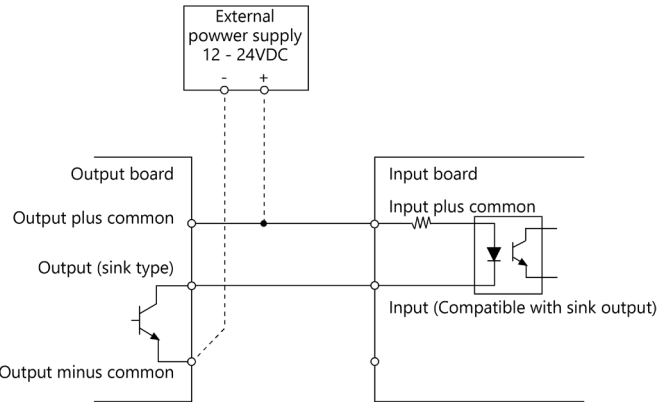
CNA										CNB									
	N.C.	19									N.C.	19							
Common plus pin for +0/+1 input ports	IP-0/1	18								Common plus pin for +4/+5 output ports	OP-4/5	18							
+1 port (Input)	I-17	17	19	37	36	I-37				+5 port (Output)	O-57	17	19	37	36	O-77			
	I-16	16			35	I-36					O-56	16			35	O-76			
	I-15	15			34	I-35					O-55	15			34	O-75			
	I-14	14			33	I-34					O-54	14			33	O-74			
	I-13	13			32	I-33					O-53	13			32	O-73			
	I-12	12			31	I-32					O-52	12			31	O-72			
	I-11	11			30	I-31					O-51	11			30	O-71			
	I-10	10			29	I-30					O-50	10			29	O-70			
	I-07	9			28	I-27					O-47	9			28	O-67			
	I-06	8			27	I-26					O-46	8			27	O-66			
+0 port (Input)	I-05	7			26	I-25				+4 port (Output)	O-45	7			26	O-65			
	I-04	6			25	I-24					O-44	6			25	O-64			
	I-03	5			24	I-23					O-43	5			24	O-63			
	I-02	4			23	I-22					O-42	4			23	O-62			
	I-01	3			22	I-21					O-41	3			22	O-61			
	I-00	2			21	I-20					O-40	2			21	O-60			
Common minus pin for +0/+1 input ports	IN-0/1	1			20	IN-2/3				Common minus pin for +4/+5 output ports	ON-4/5	1			20	ON-6/7			



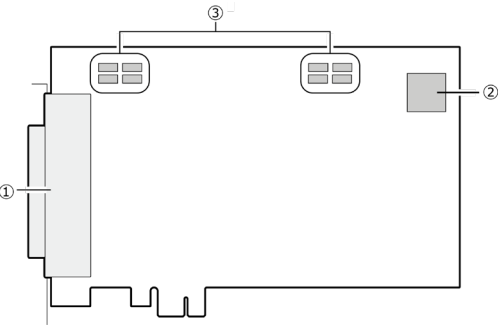
Example of Connection to TTL Level Input (Connection Example of Output and TTL level Input Signal)



**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.



Nomenclature of Product Components



No.	Name	No.	Name
1	Interface Connector	3	Supply power setting jumper
2	Board ID Setting Switch		