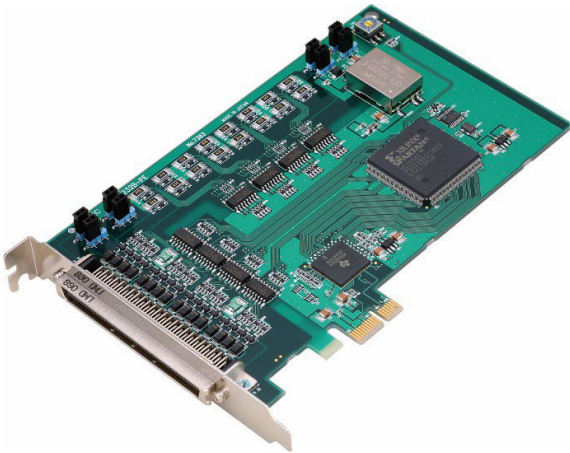


Digital I/O Board with Opto-Isolation for PCI Express DIO-3232B-PE



* 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 opto-coupler isolated input 32ch (supporting current sink output) whose high speed response speed is 5μsec and opto-coupler isolated open-collector output 32ch (current sink type). Common terminal provided per 16ch, capable of supporting a different external power supply. Supporting driver voltages of 12 - 24 VDC for I/O

Opto-coupler isolated input (supporting current sink output) and opto-coupler isolated open-collector output (current sink type)

This product has the opto-coupler isolated input 32channels (supporting current sink output) whose response speed is 200μsec and opto-coupler isolated open-collector output 32channels (current sink type). 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 supply (12VDC 240mA) for driving opto-coupler

Power supply (12VDC 240mA) for driving opto-coupler is equipped. Whether or not to use the internal power supply can be specified by jumpers in blocks of 16channels.

You can use all of the input signals as interrupt request signals.

You can use all of the 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 Windows/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.

This product is a PCI Express board used to provide a digital signal I/O function on a PC. This product features 32 inputs and 32 open-collector outputs, and has 12 - 24VDC opto-coupler type isolation with an internal 12VDC power supply that does not require external power. You can use all of the input signals as interrupt inputs. Equipped with the digital filter function and output transistor protection circuit (surge voltage protection and overcurrent protection). Windows/Linux driver is bundled with this product.

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

The output circuit, has a built-in Zener diode and the overcurrent protection circuit of the surge voltage 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.

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.

LabVIEW is supported by a plug-in of dedicated library.

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

Specification

Function specification <1/2>

Item	Specifications
Input	
Input format	Opto-coupler isolated input (Compatible with current sink output) (Negative logic*1)
Number of input signal channels	32channels (all available for interrupts) (1 common in 16channels)
Input resistance	4.7kΩ
Input ON current	2.0mA or more
Input OFF current	0.16mA or less
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 200μsec
Output	
Output format	Opto-coupler isolated open collector output (current sink type) (Negative logic*1)
Number of output signal channels	32channels (1 common per 16channels)
Output rating	Output voltage
	35VDC (Max.)
	Output current
	100mA (per 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(NEC) or equivalent to it
Response time	Within 200μsec

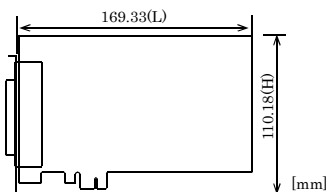
*1 Data "0" and "1" correspond to the High and Low levels, respectively.

Function specification <2/2>

Item	Specifications
Common	
Built-in power	12VDC 240mA*2
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	500Vrms
External circuit power supply	12 - 24VDC (±10%)
Power consumption (Max)	When using the internal power supply: 3.3VDC 500mA, 12VDC 350mA When using the external power supply: 3.3VDC 500mA
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	96 pin half pitch connector (M (male) type) PCR-E96LMD+ [HONDA TSUSHIN KOGYO CO., LTD.] equivalent to it
Weight	160g
Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*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.

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 & 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

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.

Data acquisition library for LabVIEW VI-DAQ

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.

Cable & Connector (Option)

Shield Cable with 96-Pin Half-Pitch Connectors at Both Ends

: 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)

Shield Cable with 96-Pin Half-Pitch Connectors at One End

: PCA96PS-0.5P (0.5m)
: PCA96PS-1.5P (1.5m)
: PCA96PS-3P (3m)
: PCA96PS-5P (5m)

Flat Cable with 96-Pin Half-Pitch Connectors at One End

: PCA96P-1.5 (1.5m)
: PCA96P-3 (3m)

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

: PCB96WS-1.5P (1.5m)
: PCB96WS-3P (3m)
: PCB96WS-5P (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-3A *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 PCB96P or PCB96PS optional cable is required separately.

*2 PCB96WS optional cable is required separately.

*3 ption cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.

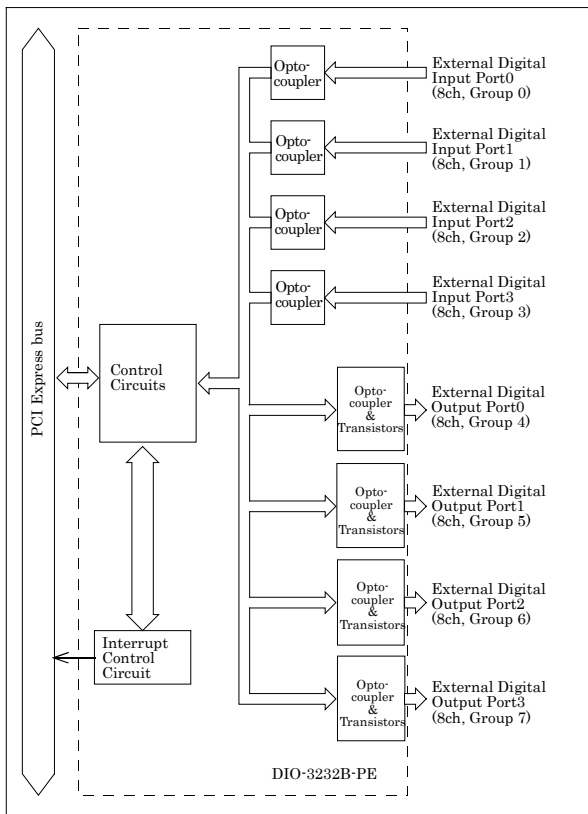
* Check the CONTEC's Web site for more information on these options.

Packing List

Board [DIO-3232B-PE]...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.

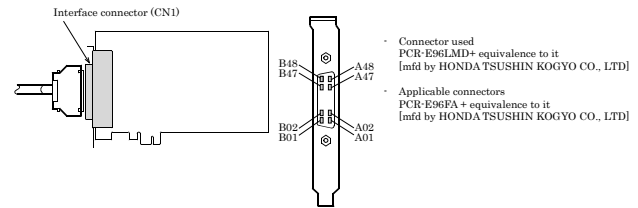
Block Diagram



How to connect the connectors

Connector shape

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



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

Connector Pin Assignment

Pin Assignments of Interface Connector (CN1)

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

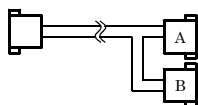
* I-00 - I-17 can be used as interrupt signal.



* The numbers in square brackets [] are pin numbers designated 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.
IP 0/1 - 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, these pins output power at +12 V. These pins are common to 16 input signal pins.
OP 4/5 - 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, these pins output power at +12 V. These pins are common to 16 output signal pins.
IN 0/1 - IN 2/3	When the external power supply is selected, its negative side is connected to this pin. When the internal power supply is selected, this pin serves as the ground. These pins are common to 16 input signal pins.
ON 4/5 - ON 6/7	When the external power supply is selected, its negative side is connected to this pin. When the internal power supply is selected, this pin serves as the ground. These pins are common to 16 output signal pins.
N.C.	This pin is left unconnected.

Pin Assignments of Optional Connector PCB96WS

- Optional cable PCB96WS

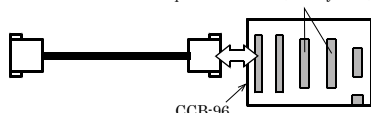


CNA										CNB										
Common minus pin for +2/+3 input ports	IN23	20				1	IN01	Common minus pin for +0/+1 input ports		Common minus pin for +0/+1 output ports	ON 67	20				1	ON 45	Common minus pin for +4/+5 output ports		
+2 port (input)	I20	21					2	I00	+0 port (input)		O60	21					2	O40	+4 port (output)	
	I21	22					3	I01			O61	22					3	O41		
	I22	23					4	I02			O62	23					4	O42		
	I23	24					5	I03			O63	24					5	O43		
	I24	25					6	I04			O64	25					6	O44		
	I25	26					7	I05			O65	26					7	O45		
	I26	27					8	I06			O66	27					8	O46		
	I27	28					9	I07			O67	28					9	O47		
	I30	29					10	I10			O70	29					10	O50		
	I31	30					11	I11		+1 port (input)		O71		30				11		O51
I32	31				12	I12		O72	31					12	O52					
I33	32				13	I13		O73	32					13	O53					
I34	33				14	I14		O74	33					14	O54					
I35	34				15	I15		O75	34					15	O55					
I36	35				16	I16		O76	35					16	O56					
I37	36				17	I17		O77	36					17	O57					
Common plus pin for +2/+3 input ports	IP23	37				18	IP01	Common plus pin for +0/+1 input ports			Common plus pin for +0/+1 output ports	OP 67	37				18	OP45	Common plus pin for +4/+5 output ports	
						19	N.C.										19	N.C.		

Pin Assignments of Optional Connector CCB-96

- "Optional cable PCB96PS"
- + "Connector conversion board CCB-96"

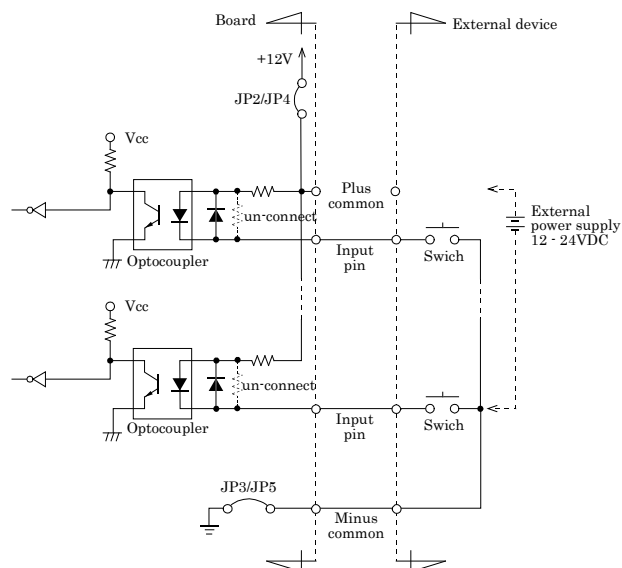
Connector DCLC-J37SAF-20L9
or equivalence to it (mfd by JAE)

[illegible]

Connecting Input Signals

Connect the input signals to a device which can be current-driven, such as a switch or transistor output device. The board inputs the ON/OFF state of the current-driven device as a digital value.

Input Circuit



* Input pin represents I-xx.

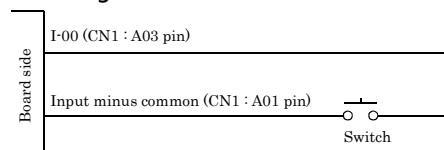
The input circuits of interface blocks of this product are illustrated above. Connect the input signals to a device which can be current-driven, such as a switch or transistor output device.

This product inputs the ON/OFF state of the current-driven device as a digital value. The signal inputs are isolated by opto-couplers (ready to accept current sinking output signals). This product therefore requires the on-board internal power supply or the external power supply to drive the input section of this product. In this case, 5.1mA current is requested each channel on 24VDC (2.6mA on 12VDC).

⚠ CAUTION

Please refer to Selecting Power Supply, and choose the proper supply by jumps.

Connecting a Switch

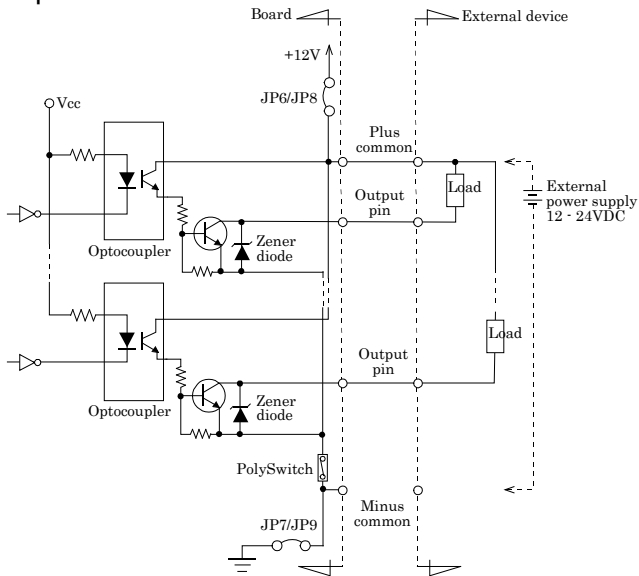


When the switch is ON, the corresponding bit contains 1
When the switch is OFF, by contrast, the bit contains 0.

Connecting Output Signals

Connect the output signals to a current-driven controlled device such as a relay or LED. The board controls turning ON/OFF the current-driven controlled device using a digital value.

Output Circuit



* Output pin represents O-xx.

The output circuits of interface blocks of this product are illustrated above. The signal output section is an opto-coupler isolated, open-collector output (current sink type). This product therefore requires the on-board internal power supply or the external power supply to drive the output section of this product.

The rated output current per channel is 100 mA at maximum.

The output section can also be connected to a TTL level input as it uses a low-saturated transistor for output. The residual voltage (low-level voltage) between the collector and emitter with the output on is 0.5 V or less at an output current within 50 mA or at most 1.0 V at an output current within 100 mA.

A zener diode is connected to the output transistor for protection from surge voltages.

A PolySwitch-based over-current protector is provided for every 8 output transistors.

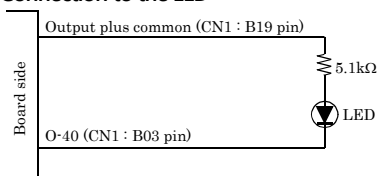
When the over-current protector works, the output section of this product is temporarily disabled. If this is the case, turn off the power to the PC and the external power supply and wait for a few minutes, then turn them on back.

⚠ CAUTION

When the PC is turned on, all outputs are reset to OFF.

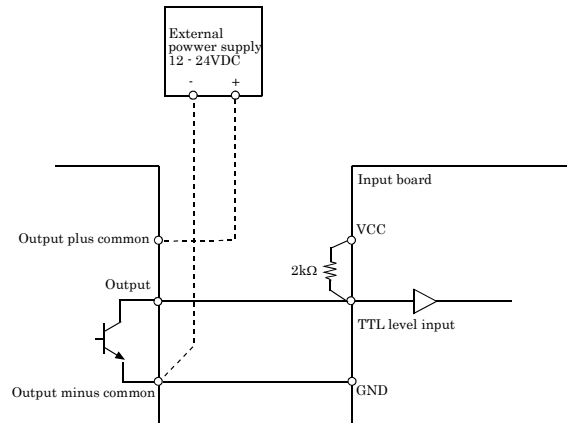
Please refer to "Selecting Power Supply" and then connect to the jumper in accordance with the power supply to be used.

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.

Example of Connection to TTL Level Input



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.

