Reverse-Common Digital I/O Board with Opto-Isolation

PIO-32/32RL(PCI)H

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

This product is a PCI bus-compliant interface board for input/output of digital signals.

The product is a reverse-common typed and insulated digital input/output board and can input and output digital signals at 12 - 24VDC. This product uses opto-coupler isolated input (compatible with current source output) for input and opto-coupler isolated output (current source type) for output. This product can input/output up to 32 channels. You can use all of input signals as interrupt inputs. In addition, this product is equipped with digital filtering, and output transistor protection circuits (surge voltage 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 September, 2023.

Features

Opto-coupler isolated input (compatible with current source output) and opto-coupler isolated output (current source type)

This product has the 32ch of opto-coupler isolated input (compatible with current source output) and 32ch of opto-coupler isolated output (current source 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 bus (PC) is isolated from the input and output 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.

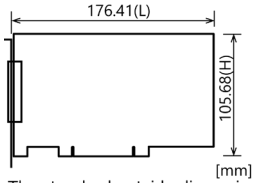
Zener diode for surge voltage protection and the circuit for overcurrent protection.

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.

Included Items

Product [PIO-32/32RL(PCI)H] ...1
Please read the following ... 1

Physical Dimensions



The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Specifications

Function specification

Item		Specifications
Input	Type	Opto-Isolated Input (Compatible with current source output) (Positive 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.
	Response time	200µsec within
Output	Type	Opto-Isolated Open Collector Output (Current source type) (Positive logic *1)
	Number of Channels	32ch (One common power supply per 16 channels)
	Output rated voltage	12 - 24VDC (±10%)
	Output rated current	100mA/channel (Max.)
	Maximum voltage drop at ON	1.5V or less
	Surge protector	Zener diode RD47FM(Renesas) or equivalent
	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	500Vrms
	External circuit power supply	12 - 24VDC (±10%)
	Power consumption	5VDC 200mA (Max.)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
	Dimension (mm)	176.41(L) x 105.68(H)
	Weight	215g

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

*2 This product requires power supply at +5 V from an expansion slot (it does not work on a machine with a +3.3-V power supply alone).

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

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/

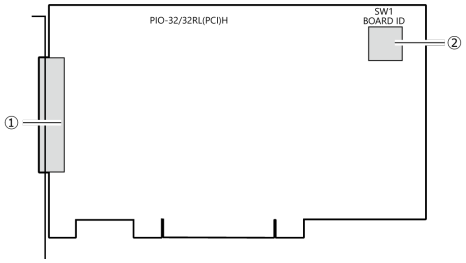
*2 For supported software, search the CONTEC website for this product and view the product page.
https://www.contec.com/

Optional Products

Product Name	Model type	Description
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 x 2)	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
Connector Conversion Board (96P→37P x 2)	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.

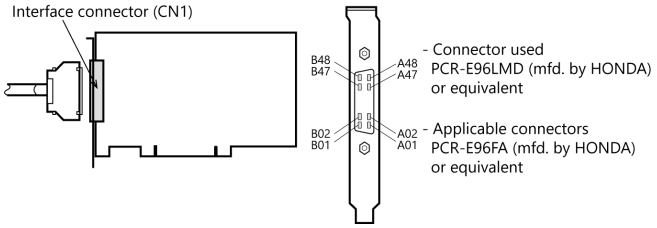
Component Name



No.	Name
1	Interface Connector
2	Board ID Setting Switch

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.



Layout on the Interface Connector(CN1)

Common plus pin for +6/+7 output ports	OP-6/7	B48	A48	N.C.	N.C.	
	OP-6/7	B47	A47	N.C.		
+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		
N.C.	N.C.	B30	A30	IN-2/3	Common minus pin for +2/+3 input ports	
	N.C.	B29	A29	IN-2/3		
	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.		
Common plus pin for +4/+5 output ports	OP-4/5	B20	A20	N.C.		
	OP-4/5	B19	A19	N.C.		
+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		
N.C.	N.C.	B02	A02	IN-0/1	Common minus pin for +0/+1 input ports	
	N.C.	B01	A01	IN-0/1		

[49] B48 [1] A48
B01 [96] A01 [48]

* I-00 - I-37 can be used as all of 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.
OP-4/5	When the external power supply is selected, its positive side is connected to these pins. These pins are common to 16 output signal pins. Both pins must be connected to the external power supply.
OP-6/7	When the external power supply is selected, its positive side is connected to these pins. These pins are common to 16 output signal pins. Both pins must be connected to the external power supply.
IN-0/1	When the external power supply is selected, its negative side is connected to these pins. 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. These pins are 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.

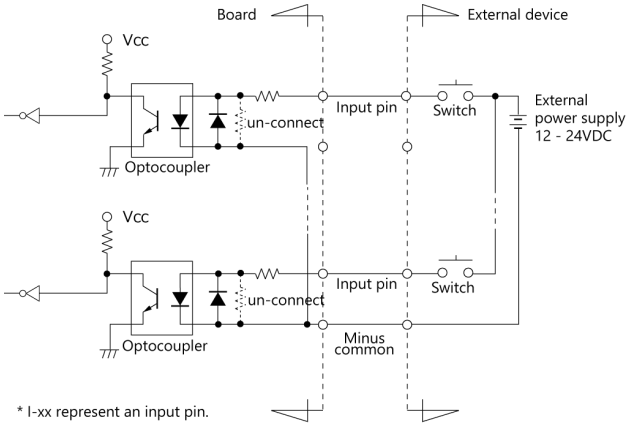
Connecting Input and Output Signals

Input Circuit

Connect the input signals to a device which can be current-driven, such as a switch or transistor output device.

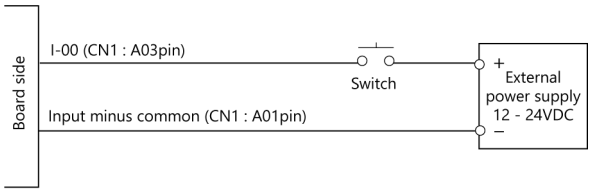
The connection requires an external power supply to feed currents.

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



The signal inputs are isolated by opto-couplers (Compatible with current source output). This product therefore requires the external power supply to drive the input section of this product. 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 I-00)



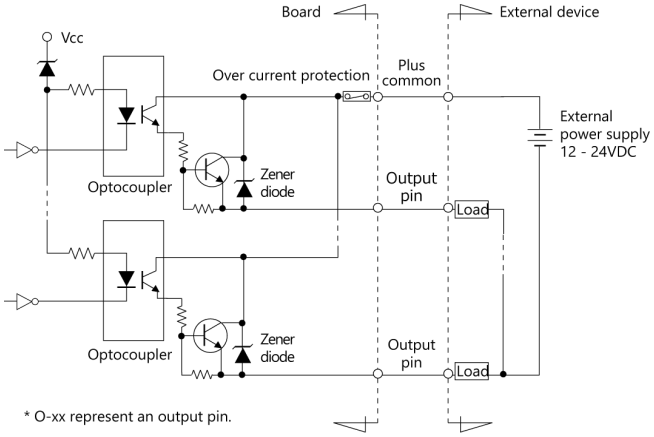
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Output Circuit

Connect the output signals to a current-driven controlled device such as a relay or LED.

The connection requires an external power supply to feed currents.

The product controls turning on/off the current-driven controlled device using a digital value.



The signal output section is an opto-coupler isolated (current source output type).

The board therefore requires an external power supply to drive the outputs.

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

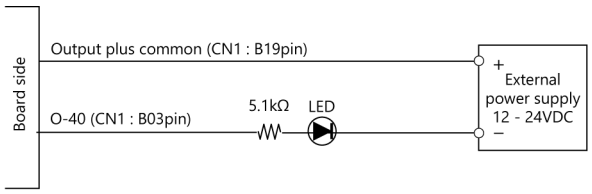
A zener diode is connected to the output transistor for protection from surge voltages.

A overcurrent protection components is provided for every 8 output transistors.

⚠ CAUTION

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

Connection to the LED (An Example to use Output O-40)



When outputting 1 to the corresponding bit, LED is ON.
When outputting 0 to the corresponding bit, by contrast, LED is off.

Circuit Block Diagram