Isolated Digital I/O Board for PCI
(Internal power supply)
PIO-32/32B(PCI)V

This board is a PCI bus-compliant interface board for input/output of digital signals.
It can be inputted by switch and relay.   This product can input and output up to 32 channels.   And this board is the equivalent of PIO-32/32B(PCI)H.   For the detail, please refer to the page 5 Differences between PIO32/32B(PCI)H and this product.

Windows/Linux 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 October, 2022.

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

Features

Opto-coupler isolated input (compatible with current sink output) and opto-coupler isolated open-collector output (current sink type)
This product has the opto-coupler isolated input 32channels (compatible with 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 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.

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 supported.
Using the digital I/O driver 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.

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.

LabVIEW is supported by a plug-in of dedicated library.
Using the dedicated library makes it possible to make a LabVIEW application.

Hardware specifications

Item		Specification
Input		
Input format		Optocoupler isolated input (Compatible with current sink output)(Negative logic *1)
Number of input signal channels		32 channels (all available for interrupts) (One common power supply per 16 channels)
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		200μsec within
Output		
Output format		Optocoupler isolated open collector output (current sink type) (Negative logic*1)
Number of output signal channels		32 channels (One common power supply per 16 channels)
Output rating	Output voltage	35VDC (Max.)
	Output current	100mA (par 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
Response time		200μsec within
Common		
I/O address		Any 32-byte boundary
Interruption level		1 level use
Max. board count for connection		16 boards
Dielectric strength		500Vrms
External circuit power supply		12 - 24VDC(±10%)
Internal power		12VDC 250mA *2
Power consumption		5VDC 300mA(Max.) (Using the external power) 5VDC 1050mA(Max.)(Using the internal power)
Operating condition		0 - 50°C, 10 - 90%RH(No condensation)
Allowable distance of signal extension		Approx. 50m (depending on wiring environment)
PCI bus specification		32bit, 33MHz, Universal key shapes supported *3
Dimension (mm)		176.41(L) x 106.68(H) *4
Weight		215g
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.
*2   When the internal power supply is used, the input section consumes a maximum of 80 mA and the output channel switching section consumes a maximum of 60 mA.   In this case, therefore, the output current to be supplied from the board is 110 mA.
*3   This board requires +5V power supply from expansion slots (it does not operate in the environment of only +3.3V power supply).
*4   The size of board No.7283, No.7283A, and No.7283B is 176.41 (L) x 105.68 (H) mm.

Physical Dimensions

176.41(L)

106.68(H)

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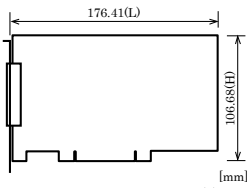
The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

You can use CONTEC support software according to your purpose and development environment. For more details on the supported OS, applicable languages, or to download the latest version of software, visit the CONTEC Web site.

Name	Contents	How to get
Windows Version Digital I/O Driver software API-DIO(WDM)	The API-DIO(WDM) is the Windows version driver 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.	Download from the CONTEC website
Linux Version Digital I/O Driver software 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.	Download from the CONTEC website
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.	Download from the CONTEC website

Option

Product Name	Model type	Description
96-Pin Shield Cable with a Half-Pitch Connector	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
96-Pin Shield Cable with 2Sided 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 x 96P)	EPD-96A	*1 *4
Screw Terminal (M3.5 x 96P)	EPD-96	*1
Digital I/O 64CH Series Terminal Panel (M3 x 96P)	DTP-64A	*1
Signal Monitor for Digital I/O (64Bits)	CM-64 L	*1
Screw Terminal (M3 x 37P)	EPD-37A	*2 *4
Screw Terminal (M3.5 x 37P)	EPD-37	*2
General Purpose Terminal (M3 x 37P)	DTP-3C	*2
Screw Terminal (M2.5 x 37P)	DTP-4C	*2
Signal Monitor for Digital I/O (32Bits)	CM-32L	*2
Connection Conversion Board (96-P → 37-P x 2)	CCB-96	*3

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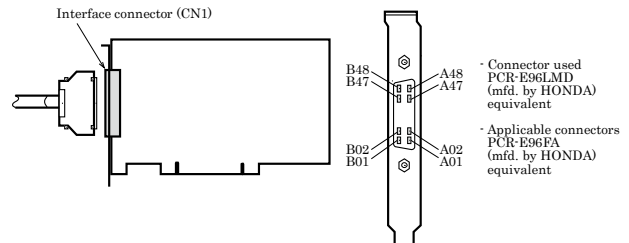
Included Items

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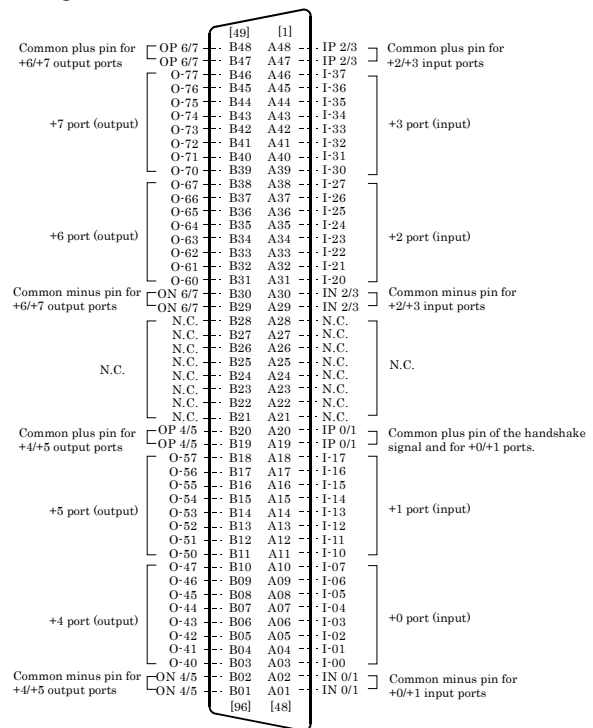Please read the following ... 1

How to connect the connectors

Connector shape
To connect an external device to this board, plug the cable from the device into the interface connector (CN1).

Interface connector (CN1)

B48 A48
B47 A47

B02 A02
B01 A01

· Connector used
  PCR-E96LMD
  (mfd. by HONDA)
  equivalent

· Applicable connectors
  PCR-E96FA
  (mfd. by HONDA)
  equivalent

Connector Pin Assignment
Pin Assignments of Interface Connector (CN1)

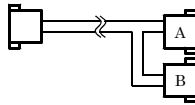|	[49]	[1]		
Common plus pin for +6/+7 output ports	OP 6/7 B48	A48 IP 2/3	Common plus pin for +2/+3 input ports	
	OP 6/7 B47	A47 IP 2/3		
	O-77 B46	A46 I-37		
	O-76 B45	A45 I-36		
	O-75 B44	A44 I-35		
+7 port (output)	O-74 B43	A43 I-34	+3 port (input)	
	O-73 B42	A42 I-33		
	O-72 B41	A41 I-32		
	O-71 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		
+6 port (output)	O-64 B35	A35 I-24	+2 port (input)	
	O-63 B34	A34 I-23		
	O-62 B33	A33 I-22		
	O-61 B32	A32 I-21		
	O-60 B31	A31 I-20		
Common minus pin for +6/+7 output ports	ON 6/7 B30	A30 IN 2/3	Common minus pin for +2/+3 input ports	
	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.		
Common plus pin for +4/+5 output ports	OP 4/5 B20	A20 IP 0/1	Common plus pin of the handshake signal and for +0/+1 ports.	
	OP 4/5 B19	A19 IP 0/1		
	O-57 B18	A18 I-17		
	O-56 B17	A17 I-16		
	O-55 B16	A16 I-15		
+5 port (output)	O-54 B15	A15 I-14	+1 port (input)	
	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		
+4 port (output)	O-44 B07	A07 I-04	+0 port (input)	
	O-43 B06	A06 I-03		
	O-42 B05	A05 I-02		
	O-41 B04	A04 I-01		
	O-40 B03	A03 I-00		
Common minus pin for +4/+5 output ports	ON 4/5 B02	A02 IN 0/1	Common minus pin for +0/+1 input ports	
	ON 4/5 B01	A01 IN 0/1		
	[96]	[48]		

- The number in squre 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.
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.
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 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 input signal pins.
N.C.	This pin is left unconnected.

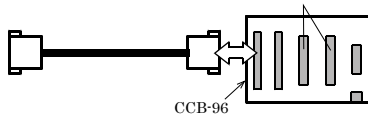## Pin Assignments of Optional Connector PCB96WS

- Optional cable PCB96WS

CNA

Common minus pin for +2/+3 input ports	IN 2/3	20		1	IN 0/1	Common minus pin for +0/+1 input ports
	I-20	21		2	I-00	
	I-21	22		3	I-01	
	I-22	23		4	I-02	
+2 port (input)	I-23	24		5	I-03	+0 port (input)
	I-24	25		6	I-04	
	I-25	26		7	I-05	
	I-26	27		8	I-06	
	I-27	28		9	I-07	
	I-30	29		10	I-10	
	I-31	30		11	I-11	
	I-32	31		12	I-12	
+3 port (input)	I-33	32		13	I-13	+1 port (input)
	I-34	33		14	I-14	
	I-35	34		15	I-15	
	I-36	35		16	I-16	
	I-37	36		17	I-17	
Common plus pin for +2/+3 input ports	IP 2/3	37		18	IP 0/1	Common plus pin for +0/+1 input ports
				19	N.C.	

CNB

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

CCB-96

CN3(CNA)

Common minus pin for +0/+1 input ports	IN 0/1	1		20	IN 2/3	Common minus pin for +2/+3 input ports
	I-00	2		21	I-20	
	I-01	3		22	I-21	
	I-02	4		23	I-22	
+0 port (input)	I-03	5		24	I-23	+2 port (input)
	I-04	6		25	I-24	
	I-05	7		26	I-25	
	I-06	8		27	I-26	
	I-07	9		28	I-27	
	I-10	10		29	I-30	
	I-11	11		30	I-31	
	I-12	12		31	I-32	
+1 port (input)	I-13	13		32	I-33	+3 port (input)
	I-14	14		33	I-34	
	I-15	15		34	I-35	
	I-16	16		35	I-36	
	I-17	17		36	I-37	
Common plus pin for +0/+1 input ports	IP 0/1	18		37	IP 2/3	Common plus pin for +2/+3 input ports
	N.C.	19				

CN4(CNB)

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

Connecting Input Signals

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

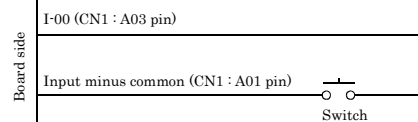### Input Circuit

* Input pin represents I-xx.
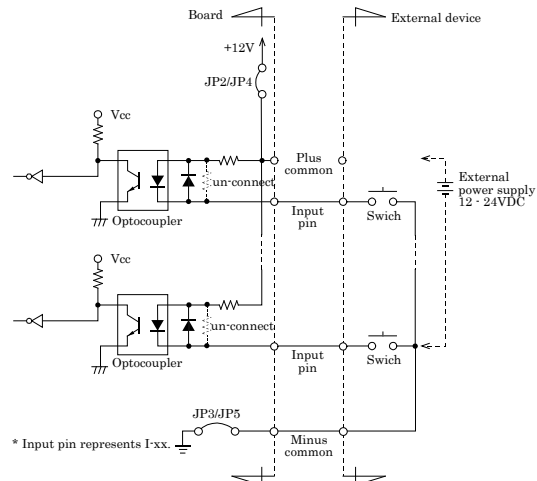
The input circuits of interface blocks of this board are illustrated in the image above.
The signal inputs are isolated by the Optocoupler (ready to accept current sinking output signals).   The board therefore requires an additional power supply isolated from the PC system to drive the photo-isolated circuits. The board offers you an on-board isolated 12VDC power supply in option.   In this case (using external supply), 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 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 board controls turning on/off the current-driven controlled device using a digital value.

Output Circuit
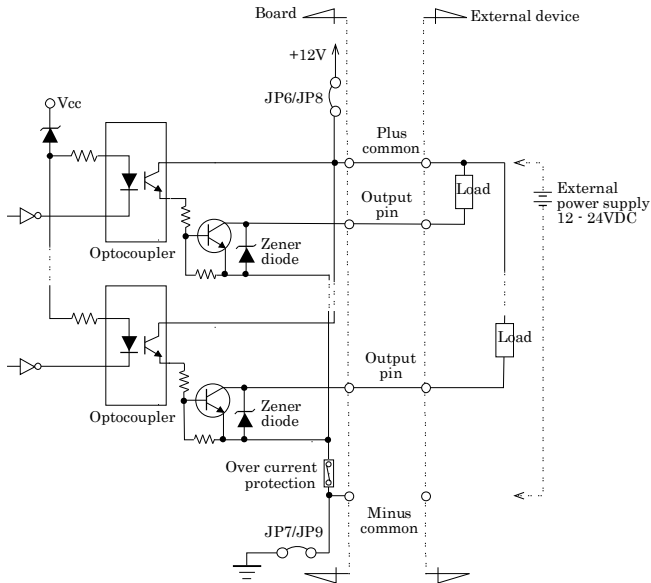
* Output pin represent output signals.

The output circuits of interface blocks of this product are illustrated in Figure. 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 overcurrent protector is provided for every 8 output transistors.
When the overcurrent protector works, the output section of this product is temporarily disabled. If this is the case, turn of the power to the PC and the external power supply and wait for a few minutes, then turn them on back.
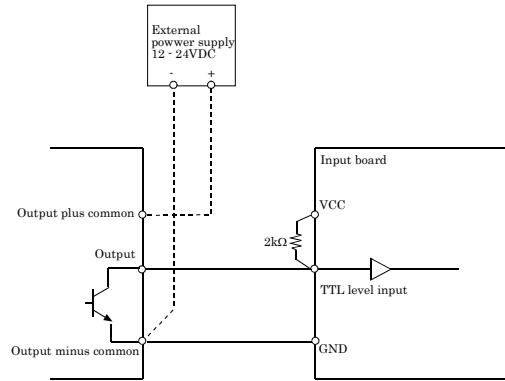
⚠ CAUTION
- When the PC is turned on, all output are reset to OFF.
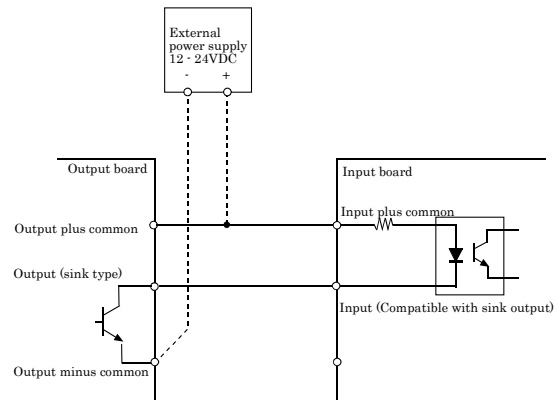
Connection to the LED
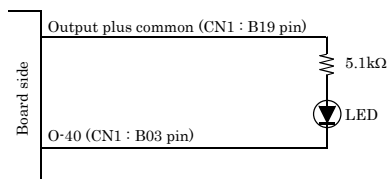
When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.

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.

Block Diagram