Current Source Digital I/O Board
with Opto-Isolation

PIO-32/32RL(PCI)H

This board is a PCI bus-compliant interface board for input/output of digital signals.
The board is a current source typed and isolated digital input/output board and can input and output digital signals at 12 - 24VDC.
This board can input and output up to 32 channels.
This product uses Optocoupler isolated input (ready to accept current sinking output signals) for input and Optocoupler isolated current sinking output for output.
Using the bundled driver library [API-PAC(W32)], you can create Windows application software for this board in your favorite programming language supporting Win32 API functions, such as Visual Basic or Visual C++.

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

Features

A different external power supply can be used for each common pin as it is shared by 16 channels.

The PCI bus (personal computer) and the I/O interface are isolated from each other by an Optocoupler, offering good noise immunity.

You can use 32 signal channels of the input signals as interrupt inputs.
You can also select the interrupt trigger edge of the input signal.

The board has a digital filter feature to prevent wrong recognition of input signals from carrying noise or a chattering.

Up to 35VDC, 100mA per signal, max. output.

Zener diode connected to output transistors for protection from surge voltage. Overcurrent protective device provided for every eight channels of output transistors.

Specification

Item		Specification
Input		
Input format		Opto-isolated input (corresponding to the current source output)(Positive 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 falling edge (HIGH-to-LOW transition) or rising edge (LOW-to-HIGH transition).
Response time		200μsec within
Output		
Output format		Opto-isolated (Compatible with current source output)(Positive 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 the equivalence for it
Response time		200μsec within
Common		
I/O address		8 bits x 32 ports
Interruption level		1 level use
Max. board count for connection		16 boards including the master board
Dielectric strength		500Vrms
External circuit power supply		12 - 24VDC(±10%)
Power consumption		5VDC 200mA(Max.)
Operating condition		0 - 50°C, 10 - 90%RH(No condensation)
Allowable distance of signal extension		Approx. 50m (depending on wiring environment)
Bus specification		PCI (32bit, 33MHz, Universal key shapes supported *2)
Dimension (mm)		176.41(L) x 105.68(H)
Weight		215g
Certification		RoHS,CE,VCCI

*1　Data "0" and "1" correspond to the Low and High levels, respectively.
*2　This board requires power supply at +5V from an expansion slot (it does not work on a machine with a +3.3V power supply alone).

Board Dimensions

176.41(L)

105.68(H)

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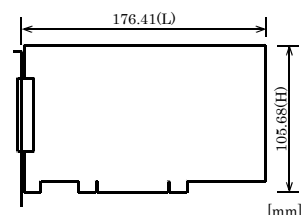
The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

Windows version of digital I/O driver API-DIO(WDM) / API-DIO(98/PC)[Stored on the bundled Disk 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 programms such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.
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 Disk 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.
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.

Packing List

Board [PIO-32/32RL(PCI)H] …1
First step guide … 1
Disk *1 [API-PAC(W32)] …1
Serial number label…1
Product Registration Card & Warranty Certificate…1

*1   The Disk contains the driver software and User's Guide.

Accessories

Accessories (Option)

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	: DTP-64(PC) *1
Screw Terminal (M3 x 37P)	: EPD-37A *2*4
Screw Terminal (M3.5 x 37P)	: EPD-37 *2
General Purpose Terminal	: DTP-3A *2
Screw Terminal	: DTP-4A *2

Connection Conversion Board (96-Pin →37-Pin x 2)
                                                : CCB-96 *3

*1   A PCB96P or PCB96PS optional cable is required separately.
*2   A 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.

Cable & Connector

Cable (Option)

|	
Shield Cable with 96-Pin Half-Pitch Connector at Both Ends (Mold Type)	: 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)
	: PCB96P-5 (5m)
Shield Cable with 96-Pin Half-Pitch Connector at One End (Mold Type)	
	: PCA96PS-0.5P (0.5m)
	: PCA96PS-1.5P (1.5m)
	: PCA96PS-3P (3m)
	: PCA96PS-5P (5m)
Flat Cable with 96-Pin Half-Pitch Connector at One End	: PCA96P-1.5 (1.5m)
	: PCA96P-3 (3m)
	: PCA96P-5 (5m)
Distribution Shield Cable with 96-Pin Half-Pitch Connector (96Pin→37Pin x 2)	: PCB96WS-1.5P (1.5m)
	: PCB96WS-3P (3m)
	: PCB96WS-5P (5m)
Distribution Flat Cable with 96-Pin Half-Pitch Connector (96Pin→37Pin x 2)	: PCB96W-1.5 (1.5m)
	: PCB96W-3 (3m)
	: PCB96W-5 (5m)

Connector (Option)

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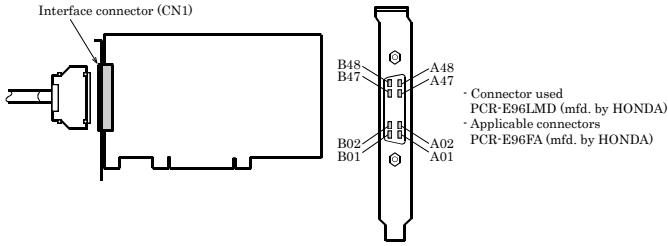Connector Set (5 Pieces)   : CN5-H96F

Block Diagram
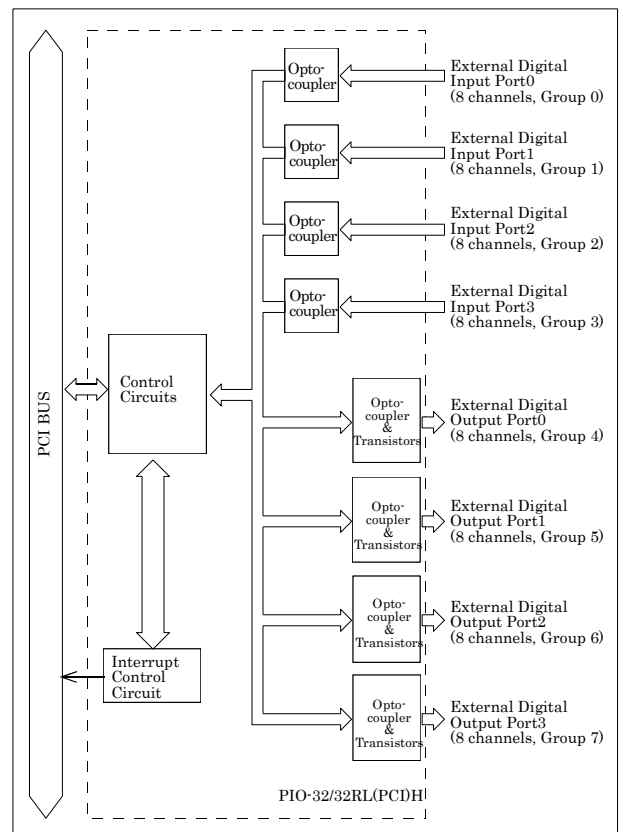
Using the On-board Connectors

Connecting a Device to a Connector

To connect an external device to this board, plug the cable from the device into the interface connector shown below.

Interface connector (CN1)

- Connector used
  PCR-E96LMD (mfd. by HONDA)
- Applicable connectors
  PCR-E96FA (mfd. by HONDA)

Connector Pin Assignment

Pin Assignments of Interface Connector

		[49]	[1]		
Common plus pin for +6/+7 output ports	OP 6/7	B48	A48	N.C.	N.C.
	OP 6/7	B47	A47	N.C.	
	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	
	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.	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.	
	N.C.	B20	A20	N.C.	
Common plus pin for +4/+5 output ports	OP 4/5	B19	A19	N.C.	
	OP 4/5	B18	A18	I-17	
	O-57	B17	A17	I-16	
	O-56	B16	A16	I-15	
	O-55	B15	A15	I-14	
+5 port (output)	O-54	B14	A14	I-13	+1 port (input)
	O-53	B13	A13	I-12	
	O-52	B12	A12	I-11	
	O-51	B11	A11	I-10	
	O-50	B10	A10	I-07	
	O-47	B09	A09	I-06	
	O-46	B08	A08	I-05	
	O-45	B07	A07	I-04	
+4 port (output)	O-44	B06	A06	I-03	+0 port (input)
	O-43	B05	A05	I-02	
	O-42	B04	A04	I-01	
	O-41	B03	A03	I-00	
	O-40	B02	A02	IN 0/1	Common minus pin for +0/+1 input ports
N.C.	N.C.	B01	A01	IN 0/1	
		[96]	[48]		

* 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.

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 - OP 6/7	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
IP 0/1 - IP 2/3	Connect the positive side of the external power supply. These pins are common to 16 input signal pins.
N.C.	This pin is left unconnected.

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.
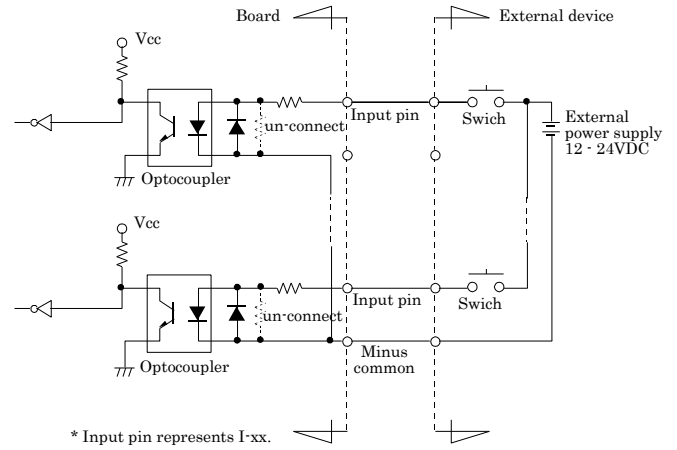
The input circuits of interface blocks of this board are illustrated in the image above.
The signal inputs are isolated by Optocoupler (corresponding to the current source output).   The board therefore requires an external power supply to drive the inputs.   The power requirement for each input pin is about 5.1mA at 24VDC (about 2.6mA at 12VDC).

Connecting a Switch

Board side

I-00 (CN1 : A03pin)

Switch

Input minus common (CN1 : A01pin)

+
External power supply
12 - 24VDC
-
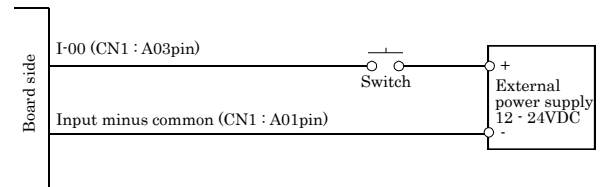
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Connecting Output Signals

Connect the output signals to a current-driven controlled device such as a relay or LED.
The 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 represents O-xx.
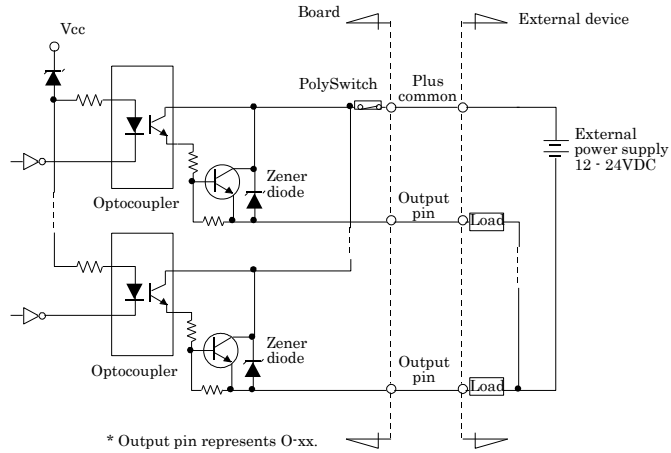
The output circuits of interface blocks of this board are illustrated in the image above. The signal output section is an Optocoupler isolated, current source output type. Driving the output section requires an external power supply.
The rated output current per channel is 100mA at maximum.
A zener diode is connected to the output transistor for protection from surge voltages. A PolySwitch-based overcurrent protector is provided for every eight output transistors. When the overcurrent protector works, the output section of the board 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 outputting 1 to the corresponding bit, LED is ON.
When outputting 0 to the corresponding bit, by contrast, LED is off.