Digital I/O Board with Opto-Isolation for PCI

PIO-32/32L(PCI)H

Digital Input Board with Opto-Isolation for PCI

PI-64L(PCI)H

Digital Output Board with Opto-Isolation for PCI

PO-64L(PCI)H

with Driver Library [API-PAC(W32)]

This board is a PCI-compliant interface board for input/output of digital signals.
The board can input and output digital signals at 12 - 24 VDC.
<PIO-32/32L(PCI)H> can input and output up to 32 channels.
<PI-64L(PCI)H> can input up to 64 channels.
<PO-64L(PCI)H> can output up to 64 channels.
Using the bundled API function library package [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/C++.

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 opto-coupler, 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.
  <PIO-32/32L(PCI)H>, <PI-64L(PCI)H>
- The board has a digital filter feature to prevent noise or chatter from causing erroneous inputs.
  <PIO-32/32L(PCI)H>, <PI-64L(PCI)H>
- Up to 35VDC, 100mA per signal, max. output.
  <PIO-32/32L(PCI)H>, <PO-64L(PCI)H>
- Zener diode connected to output transistors for protection from surge voltage. Overcurrent protective device provided for every eight channels of output transistors.
  <PIO-32/32L(PCI)H>, <PO-64L(PCI)H>

Specifications

■ PIO-32/32L(PCI)H

Item			Specification
Input			
	Input format		Opto-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		Opto-isolated input (Compatible with current sink output)(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 including the master board
	Dielectric strength		500Vrms
	External circuit power supply		12 - 24VDC(±10%)
	Power consumption		5VDC 250mA (Max.)
	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 *2
	Dimension (mm)		176.41(L) x 105.68(H)
	Weight		215g

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

*2 This board 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).

■ PI-64L(PCI)H

Item		Specification
Input		
	Input format	Opto-isolated input (Compatible with current sink output)(Negative logic *1)
	Number of input signal channels	64 channels (32 channels 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
Common		
	I/O address	Any 32-byte boundary
	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 250mA (Max.)
	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 *2
	Dimension (mm)	176.41(L) x 105.68(H)
	Weight	215g

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

*2 This board 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).

■ PO-64L(PCI)H

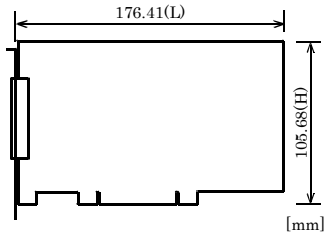
Item			Specification
Output			
	Output format		Opto-isolated input (Compatible with current sink output)(Negative logic *1)
	Number of output signal channels		64 channels(One common power supply per 16 channels)
	Output rating	Output voltage	35VDC (Max.)
		Output current	100mA (par channel) (Max.)
	Residual 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		Not used
	Max. board count for connection		16 boards including the master board
	Dielectric strength		500Vrms
	External circuit power supply		12 - 24VDC (±10%)
	Power consumption		5VDC 250mA (Max.)
	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 *2
	Dimension (mm)		176.41(L) x 105.68(H)
	Weight		215g

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

*2 This board 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).

■ Board Dimensions

[PIO-32/32L(PCI)H, PI-64L(PCI)H, PO-64L(PCI)H]



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 should use CONTEC support software according to your purpose and development environment.

■ Driver Software Package API-PAC(W32) (Bundled)

API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL). It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C/C++.
It can also be used by the installed diagnosis program to check hardware operations.
CONTEC provides download services to supply the updated drivers and differential files.
For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.
< Operating environment >

OS	Windows XP, 2000, NT, Me, 98, etc..
Adaptation language	Visual C/C++, Visual Basic, Delphi, Builder, etc..

■ Linux version of digital I/O driver API-DIO(LNX) (Supplied: Stored on the API-PAC(W32) CD-ROM)

This driver is used to control CONTEC digital I/O boards (cards) from within Linux.
You can control CONTEC I/O boards easily using the shared library used by gcc and Kylix, the device driver (module) for each kernel version, and the board (card) configuration program (config).
CONTEC provides download services to supply the updated drivers and differential files.
For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.
< Operating environment >

OS	RedHatLinux, TurboLinux, etc.. (For details on supported distributions, refer to Help available after installation.)
Adaptation language	gcc, Kylix, etc..

■ Data acquisition VI library for LabVIEW VI-DAQ (Free download)

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.

Cable & Connector

Cable & Connector (Option)

96-Pin Shield Cable with a Half-Pitch Connector
: PCB96PS-0.5P(0.5m)
: PCB96PS-1.5P(1.5m)
: 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)
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)
: PCA96P-5 (5m)
Connection Conversion Shield Cable(96P 37P x 2)
: PCB96WS-1.5P (1.5m)
: PCB96WS-3P (3m)
: PCB96WS-5P (5m)
Connection Conversion Flat Cable(96P 37P D-SUB x 2)
: PCB96W-1.5 (1.5m)
: PCB96W-3 (3m)
: PCB96W-5 (5m)
Half Pitch 96P Female Connector Set(5 Pieces)
: CN5-H96F

Accessories

Accessories (Option)

Screw Terminal : EPD-96 *1
Digital I/O 64CH Series Terminal Panel : DTP-64(PC) *1
Signal Monitor for Digital I/O(64Bits) : CM-64(PC)E *1
Screw Terminal : EPD-37A *2
Screw Terminal : EPD-37 *2
Signal Monitor for Digital I/O : CM-32(PC)E *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 PCB96W or PCB96WS optional cable is required separately.
*3 Option 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.

Product Configuration List

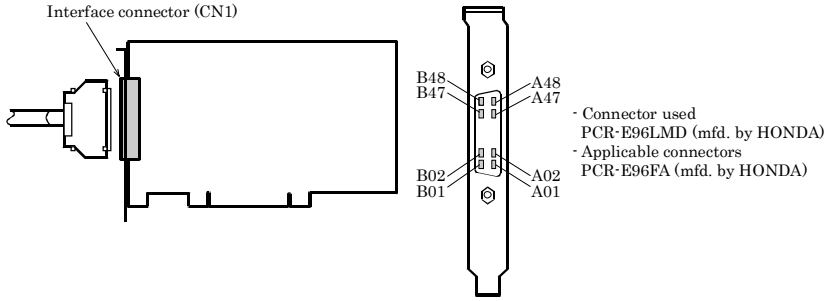
- Board (One of the following)
  [PIO-32/32L(PCI)H, PI-64L(PCI)H, or PO-64L(PCI)H] ... 1
- First step guide ... 1
- CD-ROM *1 [API-PAC(W32)] ... 1

*1 The CD-ROM contains the driver software and User's Guide (this guide)

Using the On-board Connectors

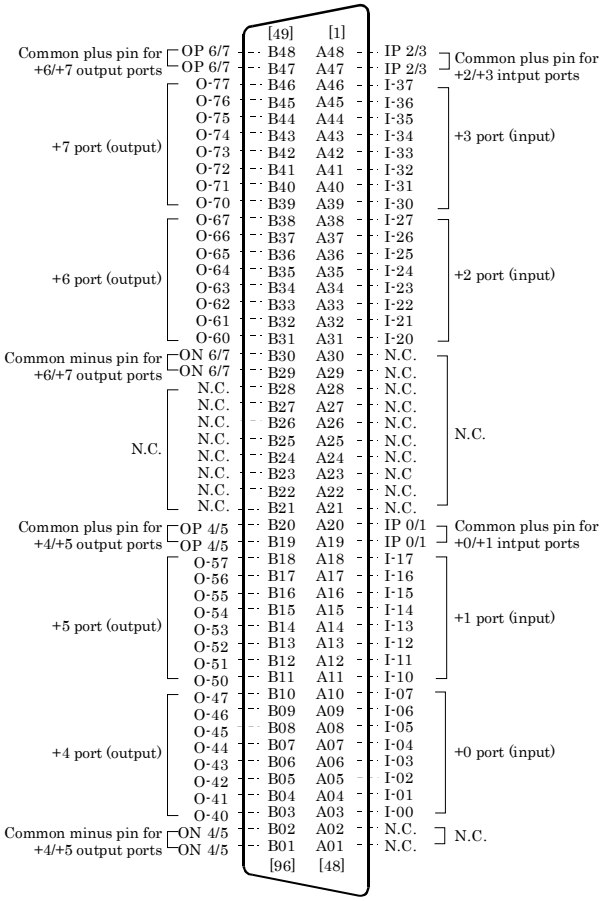
◆ Connecting a Device to a Connector

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



◆ Connector Pin Assignment

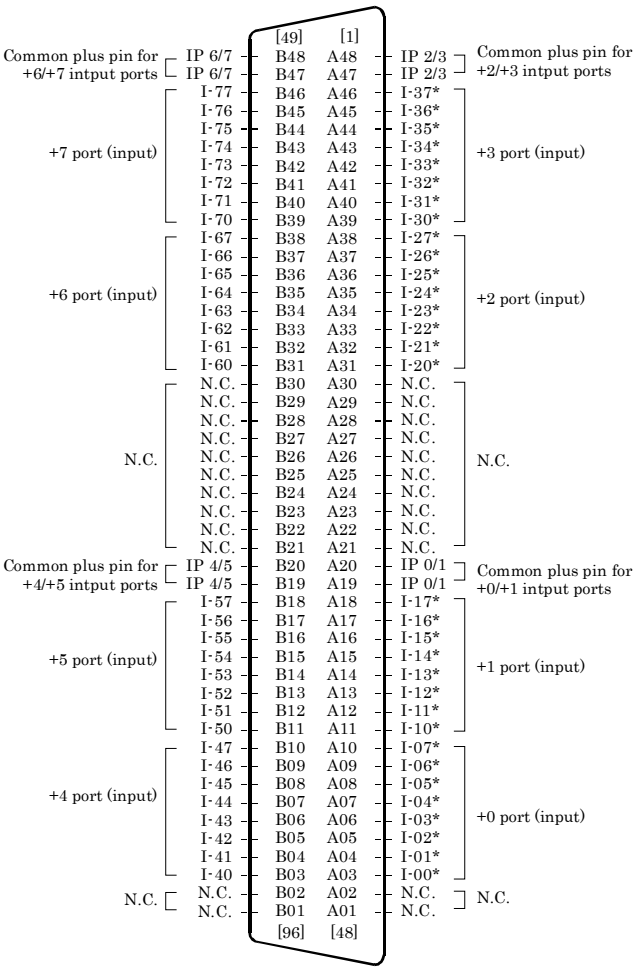
■ Pin Assignments of Interface Connector <PIO-32/32L(PCI)H>



* 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.
IP 0/1 - IP 2/3	Connect the positive side of the external power supply. These pins are common to 16 input signal pins.
OP 4/5 - OP 6/7	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
ON 4/5 - ON 6/7	Connect the negative side of the external power supply. These pins are common to 16 output signal pins.
N.C.	This pin is left unconnected.

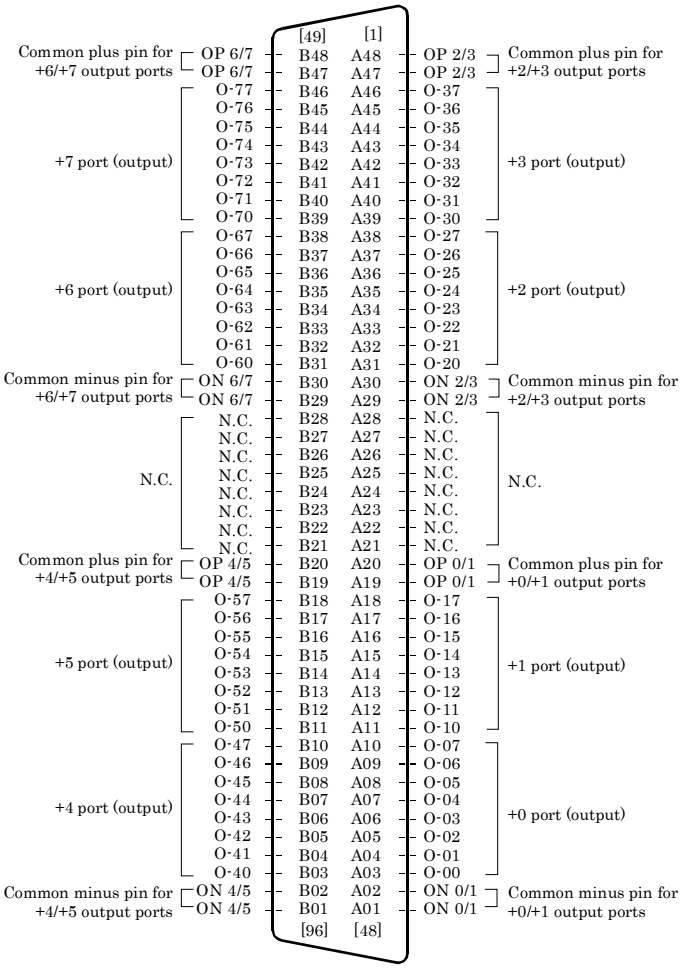
■ Pin Assignments of Interface Connector <PI-64L (PCI)H>



* 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-77	64 input signal pins. Connect output signals from the external device to these pins.
IP 0/1 - IP 6/7	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.

■ Pin Assignments of Interface Connector <PO-64L (PCI)H>



The numbers in square brackets [ ] are pin numbers designated by HONDA TSUSHIN KOGYO CO., LTD.

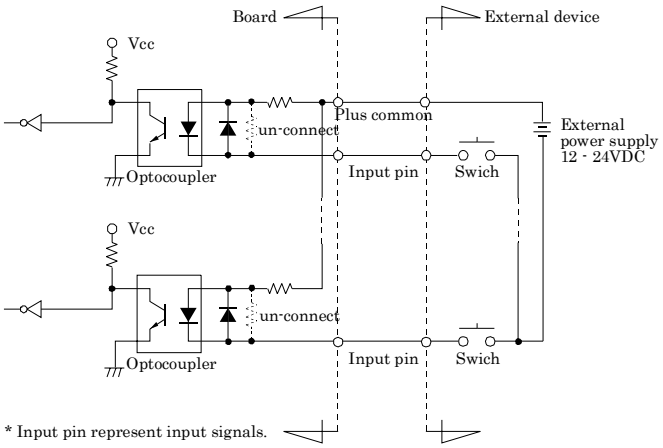
O-00 - O-77	64 output signal pins. Connect input signals from the external device to these pins.
OP 0/1 - OP 6/7	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
ON 0/1 - ON 6/7	Connect the negative side of the external power supply. These pins are common to 16 output 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

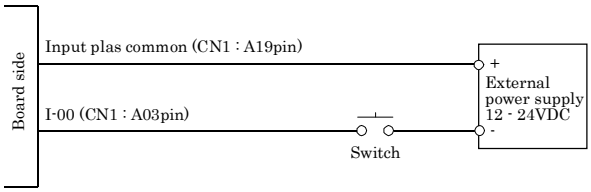
<PIO-32/32L(PCI)H, PI-64L(PCI)H>



The input circuits of interface blocks of the PIO-32/32L(PCI)H and PI-64L(PCI)H are illustrated in Figure 3.5. The signal inputs are isolated by opto-couplers (ready to accept current sinking output signals). The board therefore requires an external power supply to drive the inputs. 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

<PIO-32/32L(PCI)H, PI-64L(PCI)H>



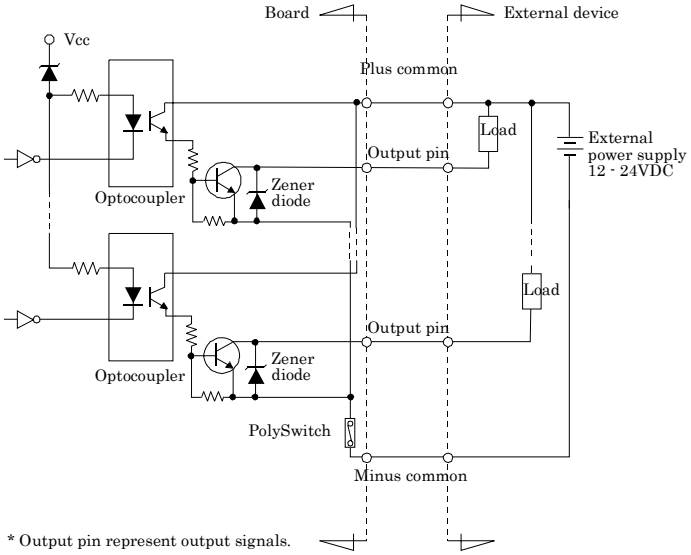
When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

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

<PIO-32/32L(PCI)H, PO-64L(PCI)H>



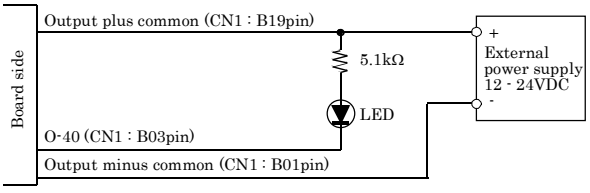
The output circuits of interface blocks of the PIO-32/32L(PCI)H and PO-64L(PCI)H are illustrated in Figure 3.7. The signal output section is an opto-coupler isolated, open-collector output (current sink type). Driving the output section requires an external power supply.
The rated output current per 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 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.

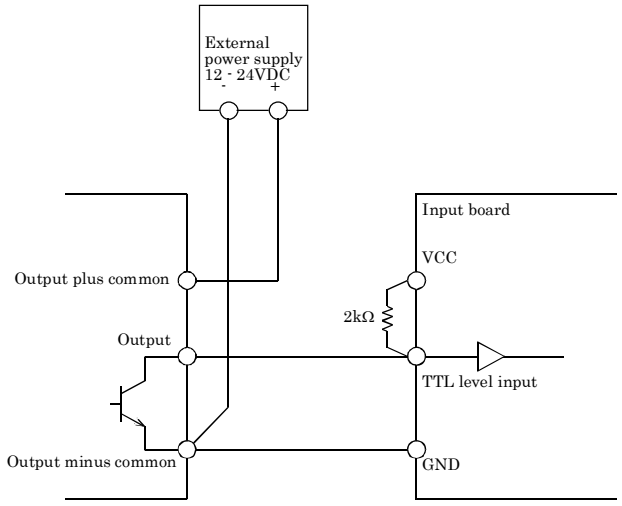
◆ Connection to the LED

<PIO-32/32L(PCI)H, PO-64L(PCI)H>



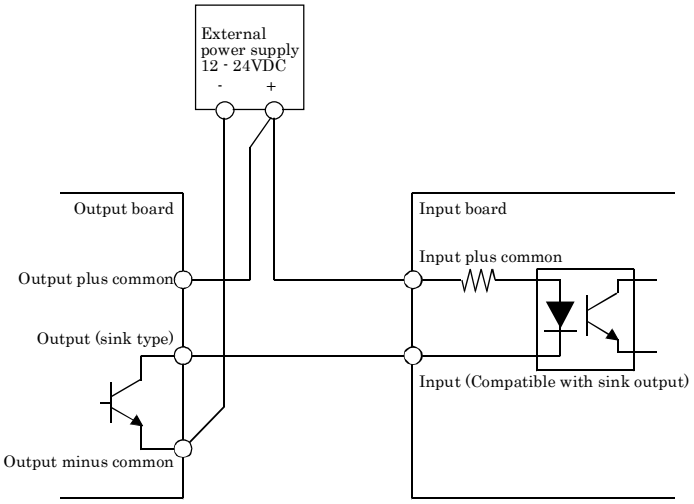
When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.

◆ Example of Connection to TTL Level Input
<PIO-32/32L(PCI)H, PO-64L(PCI)H>



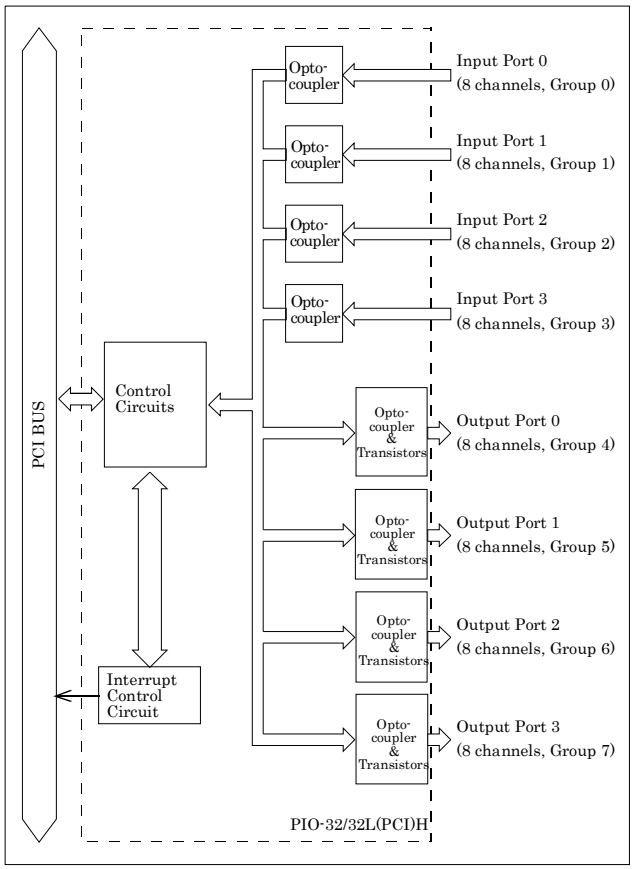
Connecting the Sink Type Output and Sink Output Support Input

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.

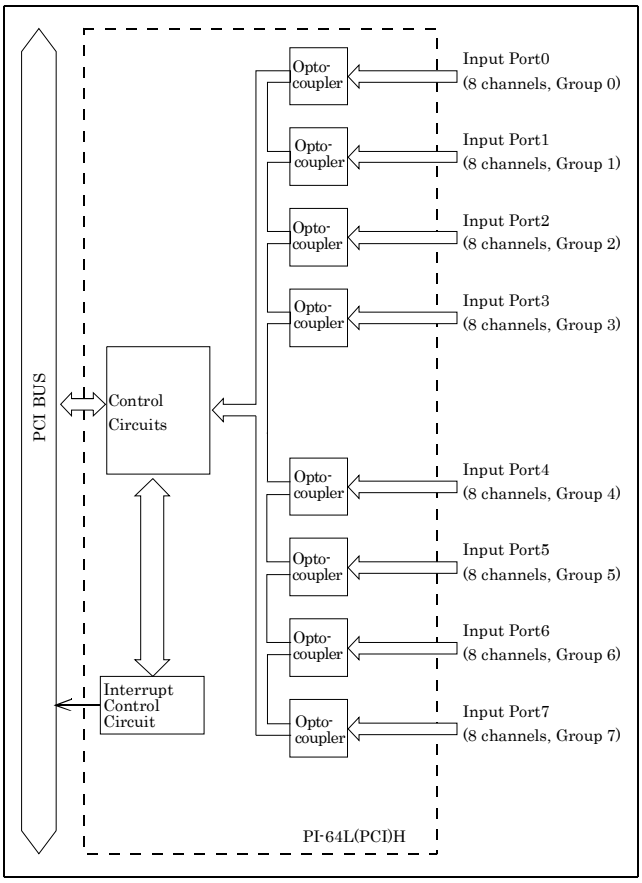


Block Diagram

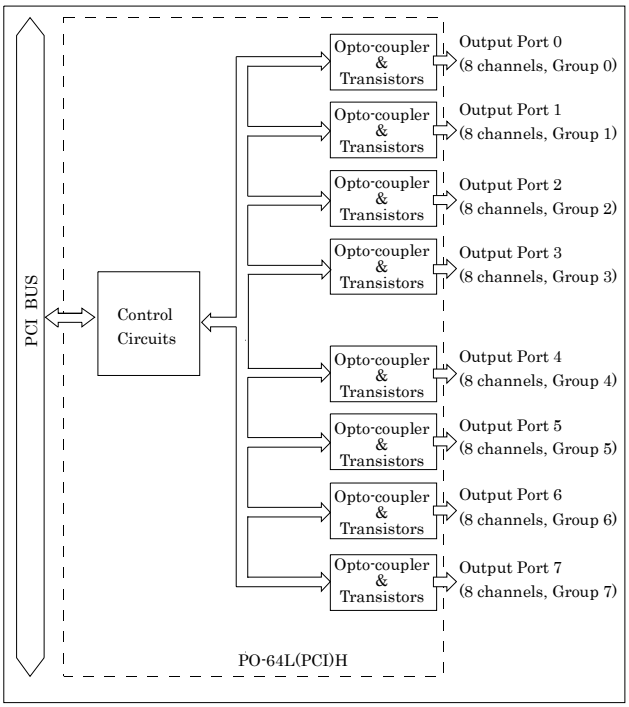
■ PIO-32/32L(PCI)H



■ PI-64L(PCI)H



■ PO-64L(PCI)H



The specification, color, and design of a product may be changed without a preliminary announcement.