

Digital I/O Board with Optocoupler Isolation for PCI

## PIO-64/64L(PCI)H



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

### Features

Common power-supply configuration in 16 channel units, capable of supporting different external power supplies.

Optocoupler used to electrically isolated I/O signal interface from the PCI bus, offering good noise immunity.

Capable of using up to 16 channels of input signals as interrupt inputs.  
Also capable of selecting the input signal edge for generating interrupts

Digital filtering that prevents input signal noise and chattering.

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

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

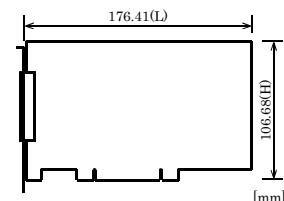
### Specification

Item	Specification
<b>Input</b>	
Type	Optocoupler Isolated Input (for current sinking output) (Negative logic *1)
Number of Channels	64 channels (16 of these 64 can be used as interrupt signal) (16 channels share a positive common)
Resister	4.7kΩ
Current required to turn ON	2.0mA(Min.)
Current required to turn OFF	0.16mA(Max.)
Interrupts	Combine four 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(Max.)
<b>Output</b>	
Type	Optocoupler Isolated Open Collector Output (current sinking type) (Negative logic *1)
Number of Channels	64 channels (16 channels share a negative common)
Rate	Voltage 35VDC(Max.) Current 100mA/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)
Response time	200μsec(Max.)
<b>Common</b>	
I/O address	Any 32-byte boundary
Interrupt level	1 level use
Boards in one system	Maximum of 16 boards can be install in a same system.
Isolated voltage	250Vrms
External power supply	12 - 24VDC (±10%)
Power consumption	5VDC 500mA(Max.)
Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
Connecting distance	50m(Typ.)(depending on wiring environment)
PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
Dimension (mm)	176.41(L) x 106.68(H)
Weight	215g
Certification	RoHS,CE,VCCI

\*1 Data "0" and "1" correspond to the High and Low 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



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

## Support Software

### Driver library API-PAC(W32) (Available for downloading (free of charge) from the CONTEC web site.)

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 (at <http://www.contec.com/apipac/>) to supply the updated drivers and differential files. For details, read Help on the bundled Disk or visit the CONTEC's Web site.

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

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 (at <http://www.contec.com/comm/>) services to supply the updated drivers and differential files. For details, read Help on the bundled Disk or visit the CONTEC's Web site.

### 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.

## Packing List

Board [PIO-64/64L(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.

## Cable & Connector

### Cable (Option)

Connection Conversion Shield Cable (100P→96P)  
: PCB100/96PS-1.5 (1.5m)  
: PCB100/96PS-3 (3m)  
: PCB100/96PS-5 (5m)

Flat Cable with One 100-Pin Connector  
: PCA100P-1.5(1.5m)  
: PCA100P-3(3m)  
: PCA100P-5(5m)

Connection Conversion Shield Cable (100pin→37pin D-SUB x 2)  
: PCB100WS-1.5(1.5m)  
: PCB100WS-3(3m)  
: PCB100WS-3(3m)

## Accessories

### Accessories (Option)

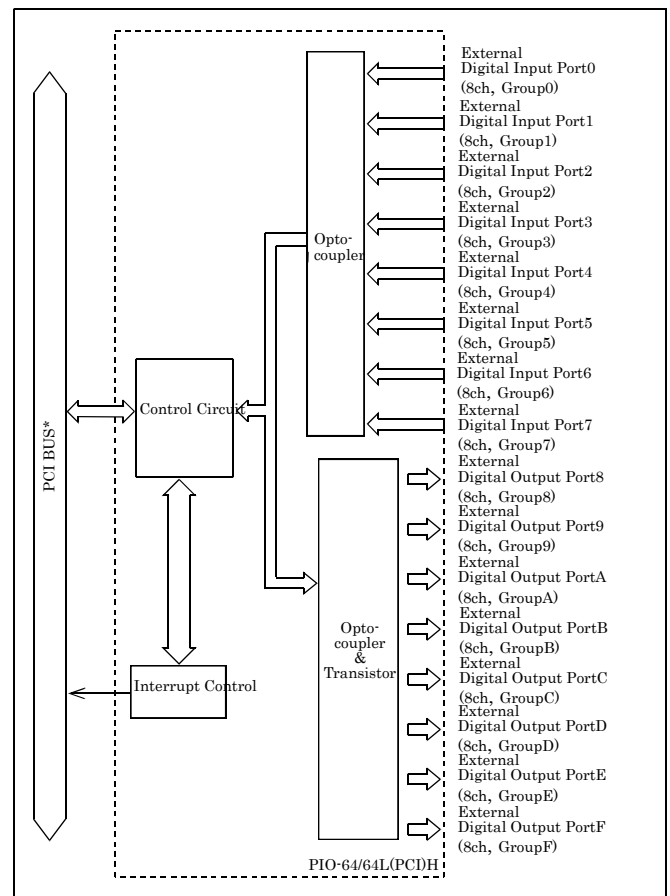
Screw Terminal : EPD-96 \*1  
Digital I/O 64CH Series Terminal Panel : DTP-64(PC) \*1  
96pin half→37pin D-SUB(Female) x 2 conversion terminal : CCB-96 \*1  
Signal Monitor for Digital I/O(64Bits) : CM-64(PC)E \*1  
Termination panel with Screw Terminals for Spade Lugs : DTP-3(PC) \*2  
Termination panel with Screw Terminals : DTP-4(PC) \*2  
Relay Terminal Unit for Crimping : EPD-37 \*2  
Relay Terminal Unit for Crimping : EPD-37A \*2

\*1 A PCB100/96PS optional cable is required separately.

\*2 A PCB100WS optional cable is required separately.

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

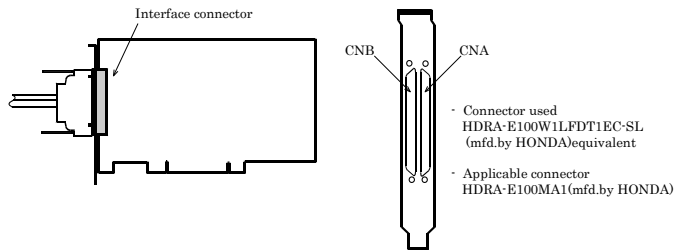
## Block Diagram



## 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 (CNA,CNB) shown below.



### Connector Pin Assignment

#### Pin Assignments of Interface Connector

CNB		CNA	
Common plus pin for +E/+F output ports	P-E/F -100 50	P-A/B -1 51	N.C.
	P-E/F -99 49	P-A/B -2 52	N.C.
	O-F7 -98 48	N.C.	53
	O-F6 -97 47	N.C.	54
	O-F5 -96 46	N.C.	55
	O-F4 -95 45	N.C.	56
	O-F3 -94 44	N.C.	57
	O-F2 -93 43	N.C.	58
	O-F1 -92 42	N.C.	59
	O-F0 -91 41	N.C.	60
	O-E7 -90 40	N.C.	61
	O-E6 -89 39	N.C.	62
	O-E5 -88 38	N.C.	63
	O-E4 -87 37	N.C.	64
	O-E3 -86 36	N.C.	65
	O-E2 -85 35	N.C.	66
	O-E1 -84 34	N.C.	67
	O-E0 -83 33	N.C.	68
	N-E/F -82 32	N.C.	69
	N-E/F -81 31	N.C.	70
	N-E/F -80 30	N.C.	71
	N-E/F -79 29	N.C.	72
	N-E/F -78 28	N.C.	73
	N.C.	N.C.	74
	N.C.	N.C.	75
	N.C.	N.C.	76
	N.C.	N.C.	77
	N.C.	N.C.	78
	N.C.	N.C.	79
	N.C.	N.C.	80
	N.C.	N.C.	81
	N.C.	N.C.	82
	N.C.	N.C.	83
	N.C.	N.C.	84
	N.C.	N.C.	85
	N.C.	N.C.	86
	N.C.	N.C.	87
	N.C.	N.C.	88
	N.C.	N.C.	89
	N.C.	N.C.	90
	N.C.	N.C.	91
	N.C.	N.C.	92
	N.C.	N.C.	93
	N.C.	N.C.	94
	N.C.	N.C.	95
	N.C.	N.C.	96
	N.C.	N.C.	97
	N.C.	N.C.	98
	N.C.	N.C.	99
	N.C.	N.C.	100

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

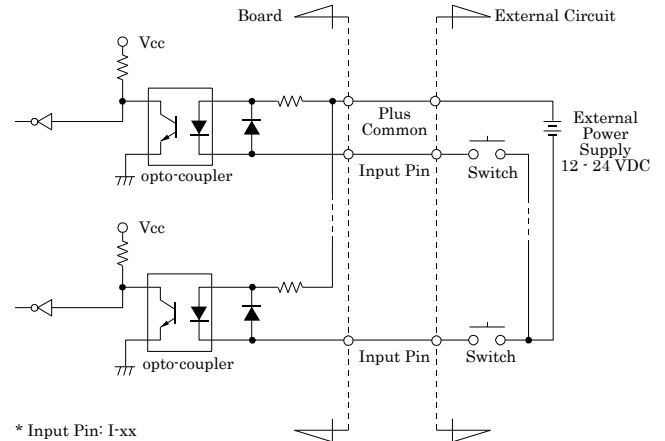
P-0/1 - P-6/7	Connect the positive side of the external power supply. These pins are common to 16 input signal pins.
P-8/9 - P-E/F	Connect the positive side of the external power supply. These pins are common to 16 output signal pins.
N-8/9 - N-E/F	Connect the negative side of the external power supply. These pins are common to 16 output signal pins. A current of 0.3 A is allowable per connector pin. Connect the required number of pins for the total current for the corresponding 16 output signals.
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.

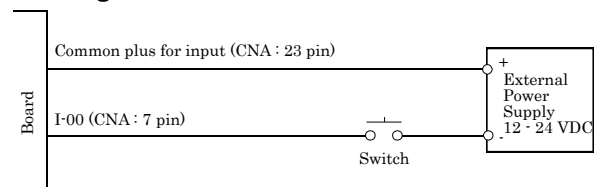
The board inputs the ON/OFF state of the current-driven device as a digital value.

### Input Circuit



The input circuit of this board is illustrated in the image above. The on-board Optocoupler isolated internal input circuits from outside devices. The input channels are to be connected with current sinking output signals. Driving these Optocoupler isolated circuits require an additional power supply isolated from the PC system. When a 12VDC external power is used, each input channel will consume about 2.6mA current; when a 24VDC external power supply is selected, each input channel will consume about 5.1mA current.

### Connecting a Switch



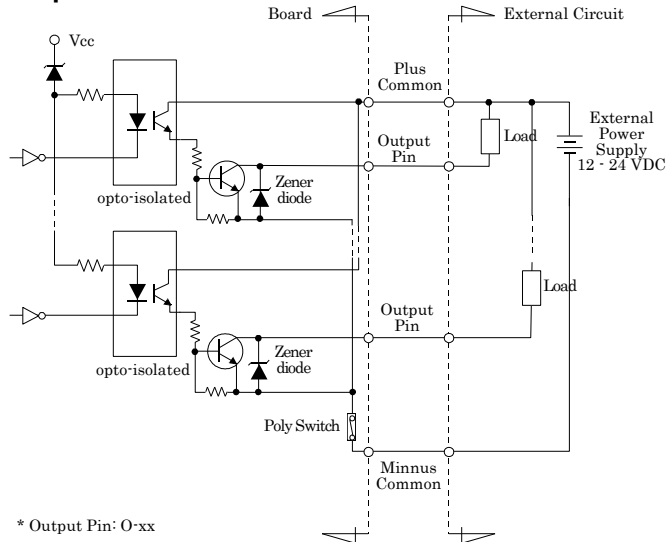
## Connecting Output Signals

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: O-xx

The output circuit of this board is illustrated in the image above. The signal output section is an Optocoupler 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.

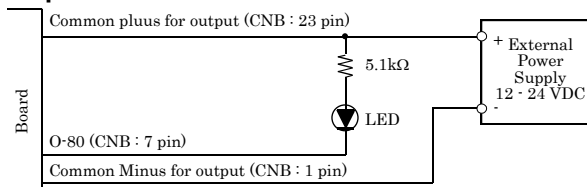
The output section can also be connected to a TTL level input as it uses a low-saturated transistor for output. The residual voltage (low-level voltage) between the collector and emitter with the output on is 0.5 V or less at an output current within 50 mA or at most 1.0 V at an output current within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

A zener diode is connected to the output transistor for protection from surge voltages. A PolySwitch-based over-current protector is provided for every eight output transistors. When the over-current protector works, the output section of the board 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

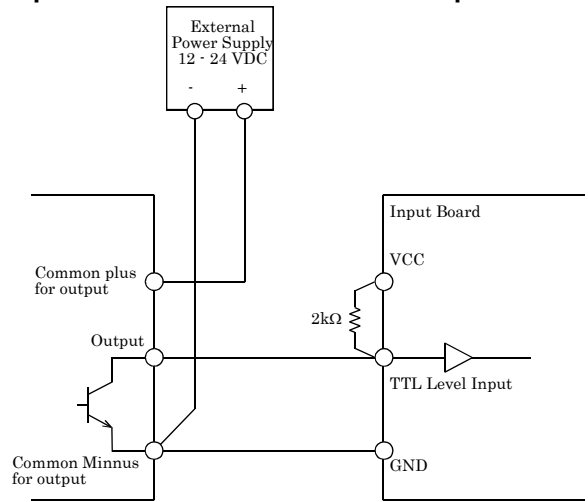
When the PC is turned on, all outputs are reset to OFF.

### Example of Connection to 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.

