

## Digital Input Board with Opto-Isolation for PCI PI-32B(PCI)H



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

### Features

#### Opto-coupler isolated input (supporting current sink output)

PI-32B(PCI)H has the 32ch of opto-coupler isolated input (supporting current sink output) whose response time is 200μsec. Common terminal provided per 16channels, capable of supporting a different external power supply.

#### 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.

#### 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.

#### 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.

This product is a PCI bus-compliant interface board for input of digital signals. This product can input digital signals at 12 - 24VDC.

PI-32B(PCI)H features 32 opto-coupler isolated inputs. You can use all of input signals as interrupt inputs. In addition, this product is equipped with a power supply for driving opto-couplers (12 VDC) and the digital filter function to prevent wrong recognition of input signals is provided.

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 August, 2023.

### Specifications

#### Function specification

| Item   |                               | Specifications   |
|--------|-------------------------------|--|
| Input  | Type                          | Opto-Isolated Input (for current sinking output) (Negative 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   |
| 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%)  |
|        | Internal power                | 5VDC 240mA (Max)   |
|        | Power consumption             | 5VDC 1200mA (Max) (Using the internal power)<br>5VDC 300mA (Max) (Using the External power)  |
|        | PCI bus specification         | 32bit, 33MHz, Universal key shapes supported *2  |
|        | Dimension (mm)                | 176.41 (L) x 105.68(H)   |
|        | Weight                        | 150g   |

\*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 42 mA and the output channel switching section consumes a maximum of 20 mA. In this case, therefore, the output current to be supplied from the board is 178 mA.

\*3 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<br>Digital I/O Driver software<br>API-DIO(WDM)  | The Windows device driver is provided as a form of Windows API functions.<br>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<br>Digital I/O Driver software<br>API-DIO(LNX)    | The Linux device driver is provided as a shared library.<br>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<br>Kits (SDK) and Support<br>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 |
|--|--------------|-------------|
| Shield Cable with 37-pin D-Type Connector at Both Ends (Mold Type) | PCB37PS-0.5P | 0.5m        |
|  | PCB37PS-1.5P | 1.5m        |
|  | PCB37PS-3P   | 3m          |
|  | PCB37PS-5P   | 5m          |
| Flat Cable with 37-Pin D-Type Connector at Both Ends               | PCB37P-1.5   | 1.5m        |
|  | PCB37P-3     | 3m          |
|  | PCB37P-5     | 5m          |
|  | PCB37P-5     | 5m          |
| Shield Cable with 37-pin D-Type Connector at One End (Mold Type)   | PCA37PS-0.5P | 0.5m        |
|  | PCA37PS-1.5P | 1.5m        |
|  | PCA37PS-3P   | 3m          |
|  | PCA37PS-5P   | 5m          |
| Flat Cable with 37-pin D-Type Connector at One End                 | PCA37P-1.5   | 1.5m        |
|  | PCA37P-3     | 3m          |
|  | PCA37P-5     | 5m          |
| Screw Terminal Unit (M3 x 37P)                                     | EPD-37A      | *1 *2       |
| Screw Terminal Unit (M3.5 x 37P)                                   | EPD-37       | *1          |
| Termination Panel (M3 x 37P)                                       | DTP-3C       | *1          |
| Termination Panel (M2.5 x 37P)                                     | DTP-4C       | *1          |
| Signal Monitor for Digital I/O (32bit)                             | CM-32L       | *1          |

\*1 PCB37P or PCB37PS optional cable is required separately.

\*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.

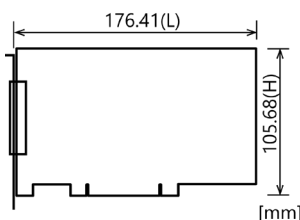
Visit the CONTEC website for the latest optional products.

## Included Items

Product [PI-32B(PCI)H] ...1

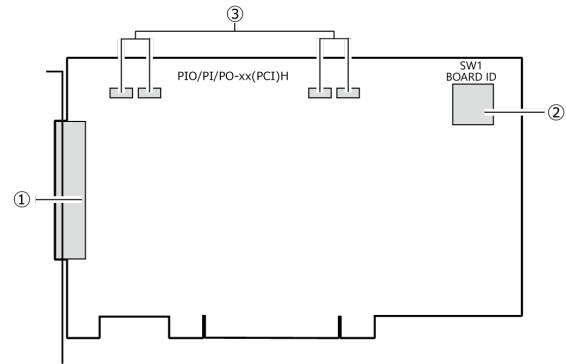
Please read the following ... 1

## External Dimensions



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

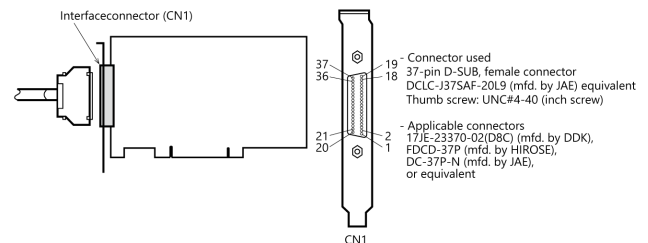
## Component Name



| No. | Name                    | No. | Name                        |
|-----|-------------------------|-----|-----------------------------|
| 1   | Interface Connector     | 3   | Supply power setting jumper |
| 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 minus pin for +0/+1 input ports | N0   | 1  |    | 20 | N1 | Common minus pin for +2/+3 input ports |
|--|------|----|----|----|----|--|
| +0 port (Input)                        | I-00 | 2  | 1  | 20 | 21 | I-20                                   |
|  | I-01 | 3  | 2  | 21 | 22 | I-21                                   |
|  | I-02 | 4  | 3  | 22 | 23 | I-22                                   |
|  | I-03 | 5  | 4  | 23 | 24 | I-23                                   |
|  | I-04 | 6  | 5  | 24 | 25 | I-24                                   |
|  | I-05 | 7  | 6  | 25 | 26 | I-25                                   |
|  | I-06 | 8  | 7  | 26 | 27 | I-26                                   |
|  | I-07 | 9  | 8  | 27 | 28 | I-27                                   |
| +1 port (Input)                        | I-10 | 10 | 9  | 28 | 29 | I-28                                   |
|  | I-11 | 11 | 10 | 29 | 30 | I-29                                   |
|  | I-12 | 12 | 11 | 30 | 31 | I-30                                   |
|  | I-13 | 13 | 12 | 31 | 32 | I-31                                   |
|  | I-14 | 14 | 13 | 32 | 33 | I-32                                   |
|  | I-15 | 15 | 14 | 33 | 34 | I-33                                   |
|  | I-16 | 16 | 15 | 34 | 35 | I-34                                   |
|  | I-17 | 17 | 16 | 35 | 36 | I-35                                   |
|  |      |    | 17 | 36 |    |  |
|  |      |    | 18 |    |    |  |
| Common plus pin for +0/+1 input ports  | P0   | 18 | 19 |    |    |  |
|  | N.C. | 19 |    |    |    |  |
|  |      |    |    | 37 | P1 | Common plus pin for +2/+3 input ports  |

\* I-00 - I-37 can be used as all of interrupt signal.

| Signal name | Description  |
|-------------|--|
| I-00 - I-37 | 32 input signal pins. Connect output signals from the external device to these pins.   |
| P0          | When the external power supply is selected, its positive side is connected to this pin. When the internal power supply is used, this pin output power at +12 V. This pin is common to 16 input signal pins.    |
| P1          | When the external power supply is selected, its positive side is connected to this pin. When the internal power supply is used, this pin output power at +12 V. This pin is common to 16 input signal pins.    |
| N0          | 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. This pin is common to 16 input signal pins. |
| N1          | 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. This pin is common to 16 input signal pins. |
| N.C.        | This pin is left unconnected.  |

**CAUTION**

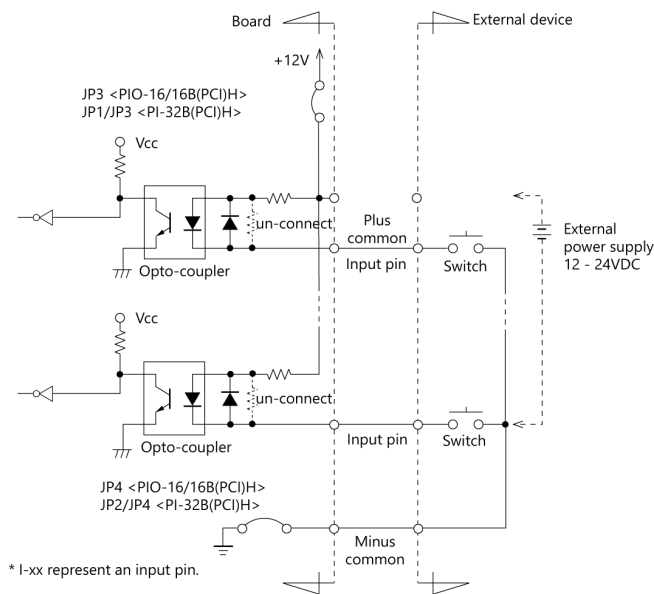
To perform input/output using this product with the CONTEC device driver, specify logical ports and logical bits when calling each function. For details, refer to the "Relationships between API-TOOL Logical Ports/Bits and Connector Signal Pins" of Reference Manual.

## Connecting Input Signal

### Input Circuit

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

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



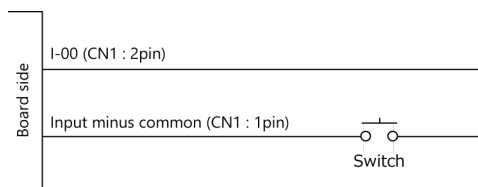
The input circuits of interface blocks of the product are illustrated in the figure above.

The signal inputs are isolated by opto-couplers (ready to accept current sinking output signals). This product therefore requires the on-board internal power supply or 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).

**CAUTION**

Please refer to "Supply power setting jumper" of Reference Manual and choose the proper supply by jumpers.

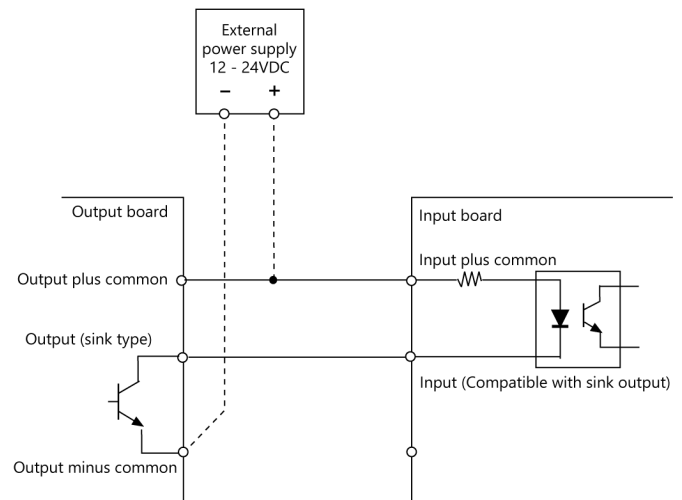
### Connecting a Switch (An Example to use Input I-00)



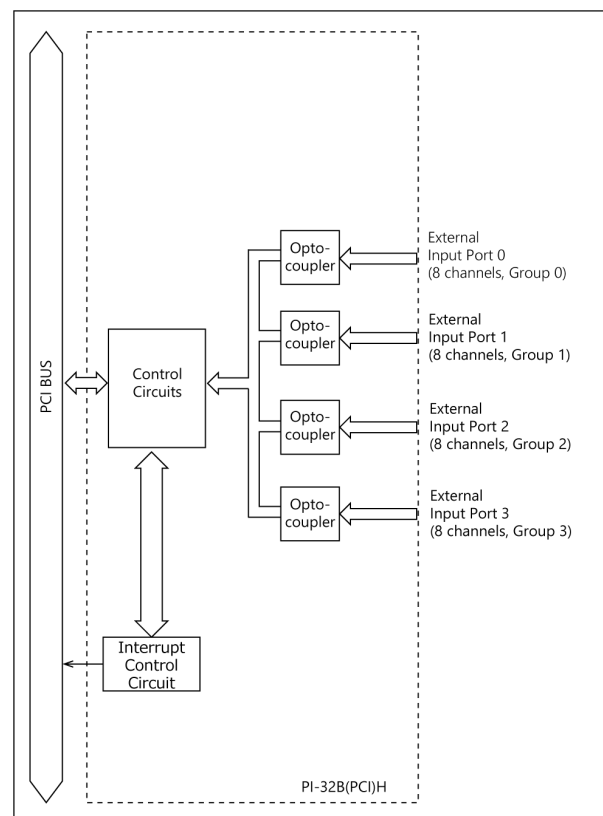
When the switch is ON, the corresponding bit contains 1.  
When the switch is OFF, by contrast, the bit contains 0.

## 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



## Differences from Conventional Products

### Differences between the PI-32B(PCI)H and PI-32B(PCI)

The PI-32B(PCI)H is connector-pin compatible with the conventional PI-32B(PCI) but has the following differences from it:

- (1) Different in the number of input signals available to interrupt requests
 

|              |                      |
|--------------|----------------------|
| PI-32B(PCI)H | : All of 16 channels |
| PI-32B(PCI)  | : 4 channels         |
- (2) Different in the expression to calculate the digital filter time (n: setting value)
 

|              |                            |
|--------------|----------------------------|
| PI-32B(PCI)H | : $2^n / (8 \times 10^6)$  |
| PI-32B(PCI)  | : $2^n / (16 \times 10^6)$ |
- (3) Protective elements provided for outputs
 

|              |                                |
|--------------|--------------------------------|
| PI-32B(PCI)H | : Surge protector: Zener diode |
| PI-32B(PCI)  | : Nothing                      |
- (4) Different in interrupt level resource allocation
 

|              |  |
|--------------|--|
| PI-32B(PCI)H | : Automatically allocates on interrupt level.                          |
| PI-32B(PCI)  | : Uses a jumper switch to select whether to allocate interrupt levels. |
- (5) The external dimensions of the board differ.
 

|              |                            |
|--------------|----------------------------|
| PI-32B(PCI)H | : 121.69(L) x 105.68(H) mm |
| PI-32B(PCI)  | : 176.41(L) x 106.68(H) mm |