CONTEC

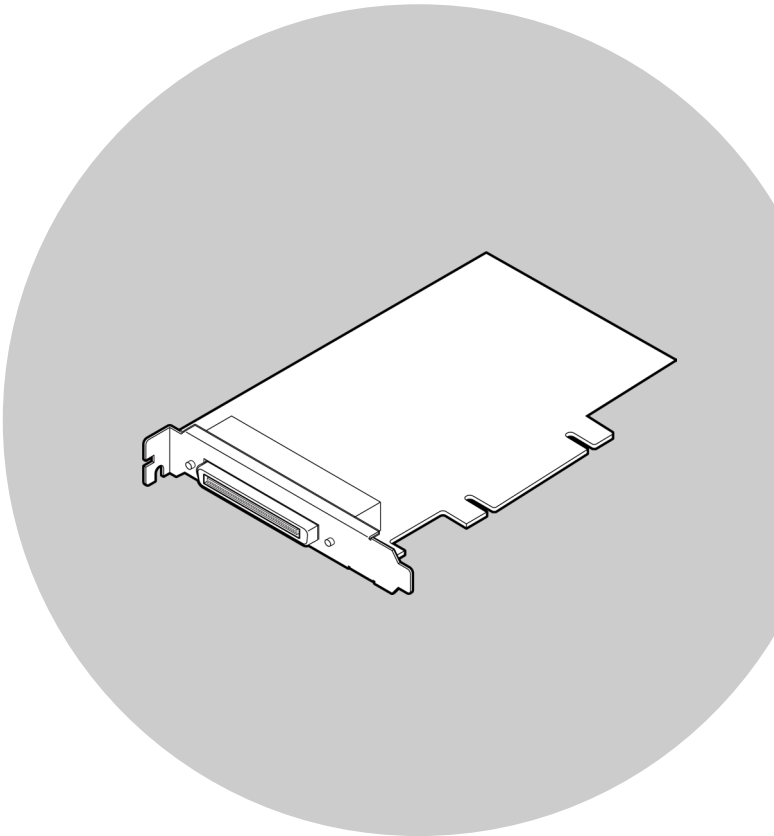
PC-HELPER Series

Reference Manual

Reverse-Common Digital I/O Board with Opto-Isolation

PIO-32/32RL(PCI)H

CONTENTS



CONTEC CO., LTD.

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Table of Contents

Introduction

This section provides necessary information of the product such as the outline, bundled items and manuals before actual use.

1.Related Manuals

The manuals related to the product are listed below.

Read them as necessary along with this document.

◆ Must Read the Followings.

Name	Purpose	Contents	How to get
Please read the following	Must read this after opening the package.	This introduces related materials that are made available on the CONTEC website, such as those for the included items, manuals, and software.	Included in the package (Printed matter)
Reference Manual (This Document)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	 Download from the Contec website (PDF)

◆ Download Manuals

Download the manuals accordingly from the following URL.

Download https://www.contec.com/download/

2.About the Product

This product is a PCI bus-compliant interface board for input/output of digital signals.

The product is a reverse-common typed and insulated digital input/output board and can input and output digital signals at 12 - 24VDC. This product uses opto-coupler isolated input (compatible with current source output) for input and opto-coupler isolated output (current source type) for output. This product can input/output up to 32 channels. You can use all of input signals as interrupt inputs. In addition, this product is equipped with digital filtering, and output transistor protection circuits (surge voltage and overcurrent protection).

Windows/Linux device driver is supported with this product.

3.Features

■ Opto-coupler isolated input (compatible with current source output) and opto-coupler isolated output (current source type)

This product has the 32ch of opto-coupler isolated input (compatible with current source output) and 32ch of opto-coupler isolated output (current source type) whose response time is 200µsec.
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 PCI bus (PC) is isolated from the input and output interfaces by opto-couplers, this product has excellent noise performance.

■ 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.

■ Zener diode for surge voltage protection and the circuit for overcurrent protection.

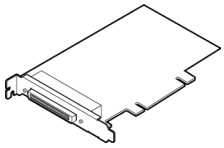
Zener diodes are connected to the output circuits to protect against surge voltages. In addition, the output circuit, it attaches the overcurrent protection circuit at the output 8-channel unit.

4.Product Configuration List

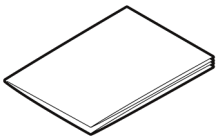
The product consists of the items listed below.

Check, with the following list, that your package is complete.

If you discover damaged or missing items, contact your retailer.



Product…1



Please read the following…1

5.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 Windows device driver is provided as a form of Windows API functions. 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 Digital I/O Driver software API-DIO(LNX)	The Linux device driver is provided as a shared library. 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 Kits (SDK) and Support 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.

Download https://www.contec.com/download/

*2 For supported software, search the CONTEC website for this product and view the product page.

Website https://www.contec.com/

6.Optional Products

Optional product items are as follows:

Use these items with the main product as necessary.

Product Name	Model type	Description
Shielded Cable with Two 96-Pin Half-Pitch Connectors	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
Shielded Cable with One 96-pin 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 * 96)	EPD-96A	*1 *2
Terminal Unit for Relay Terminal Banks	EPD-96	*2
Screw Terminal (M3 * 37P)	EPD-37A	*1 *3
Screw Terminal (M3.5 * 37)	EPD-37	*3
Screw Terminal	DTP-64A	*2
Connector Conversion Board (96P→37P x 2)	CCB-96	*4

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

*2 PCB96P or PCB96PS optional cable is required separately.

*3 PCB96WS optional cable is required separately.

*4 Option cable PCB96P or PCB96PS, and the cable for 37-pin D-SUB are required separately.

Visit the CONTEC website for the latest optional products.

Website https://www.contec.com/

Safety Precautions

Understand the following definitions and precautions to use the product safely.
Never fail to read them before using the product.

1.Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources.

Understand the meanings of these labels to operate the equipment safely.

⚠ **DANGER**	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING**	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

2.Handling Precautions

⚠ DANGER

- Do not use the product in locations exposed to a flammable or corrosive gas.
  It may cause explosion, fire, electrical shock, or malfunction.

⚠ CAUTION

- There are switches and jumpers on this product that need to be set in advance. Be sure to check these before installing this product.
- Only set the switches and jumpers on this product to the specified settings. Otherwise, this product may malfunction, overheat, or cause a failure.
- Do not strike or bend this product. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
- This product contains precision electronic elements and must not be used or store in locations subject to physical shock or strong vibration. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
- Do not use or store this product in high temperature or low temperature surroundings, or do not expose it to extreme temperature changes. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
- Do not use or store this device where it is exposed to direct sunlight or near stoves or other sources of heat. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
- Do not use or store the product in the vicinity of devices that generate strong magnetic force or noise. Otherwise, this product may malfunction, overheat, cause a failure or breakage.
- Do not touch this product's metal plated terminals (edge connector) with your hands. Otherwise, this product may malfunction, overheat, or cause a failure. If the terminals are touched by someone's hands, clean the terminals with industrial alcohol.
- As this product contains components that are designed to operate at high temperature, please do not touch this product when it is in use.
- Do not install this product to the expansion slot and do not plug or unplug the cables which are connected to this product while the PC or expansion unit is still turned on. Otherwise, this product may malfunction, overheat, or cause a failure. Be sure that the personal computer power is turned off.
- Do not touch the external connector when the power is on. Otherwise, this may malfunction, cause a failure due to static electricity.
- Make sure that your PC or expansion unit can supply ample power to all the products installed. Insufficiently energized products could malfunction, overheat, or cause a failure.

- The specifications of this product are subject to change without notice for enhancement and quality improvement. Even when using the product continuously, be sure to read the manual on the website and understand the contents.
- Do not modify the product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying the product.
- Regardless of the foregoing statements, CONTEC is not liable for any damages whatsoever (Including damages for loss of business profits) arising out of the use or inability to use this CONTEC product or the information contained herein.

3.Environment

Use this product in the following environment. If used in an unauthorized environment, this product may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50ºC

Humidity

10 - 90%RH (No condensation)

Corrosive gases

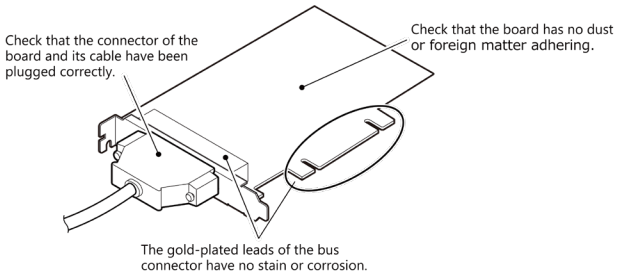
None

Floating dust particles

Not to be excessive

4.Inspection

Inspect the product periodically as follows to use it safely.



5.Storage

When storing this product, keep it in its original packing form.

- Put this product in the storage bag.
- Wrap it in the packing material, and then put it in the box.
- Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

6.Disposal

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

Setup

This section explains how to set up this product.

1.What is Setup?

Setup means a series of steps to take before the product can be used.
Different steps are required for device driver and hardware.

The setup procedure will depend on your combination of OS and device driver. For details, refer to the help for the device driver you will use. This section describes the procedure to start the application program development using the Windows version of the device driver API-DIO(WDM).

The basic procedure is also the same when using the Linux device driver API-DIO(LNX). However, the installation procedure for the device driver and some other steps are different. For details, refer to "Driver Environment Construction" and "Tutorial" in the API-DIO(LNX) help.

Online Help [API-DIO(LNX)]
https://help.contec.com/link/drv/lnx/dio/en/

1. Setup Instructions

Taking the following steps sets up the device driver. You can use the diagnosis program later to check whether the setup function normally.

Step 1 Device driver Installation (page18)
Step 2 Hardware Setting (page19)
Step 3 Hardware Installation (page19)
Step 4 Device driver Initialization (page21)
Step 5 Operation Check (page22)

If Setup fails to be performed properly, see the "**Setup Troubleshooting (page23)**" section at the end of this chapter.

2.Device driver Installation

This manual describes how to install the Windows device driver.
Before connecting this product to a PC, install the device driver.

Download the "Device driver API-DIO(WDM)" from the CONTEC website.

Download https://www.contec.com/download/

For the device driver installation procedure, refer to the help included in the development environment package you downloaded from the CONTEC website or “Installing Device Driver” in the online help made available on the CONTEC website.

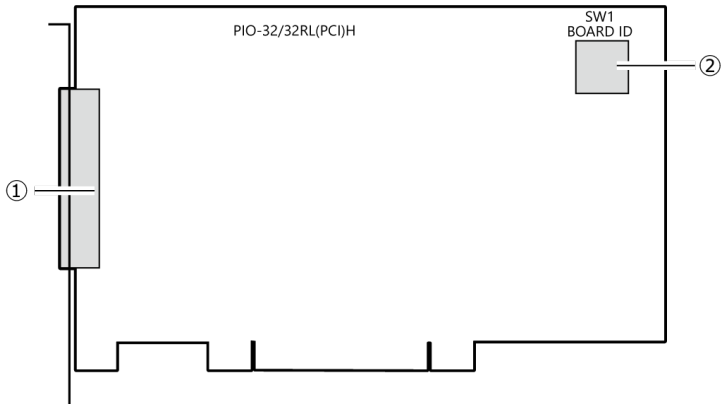
Online Help [Installing Device Driver]
https://help.contec.com/link/drv/wdm/install/en/

3.Hardware Setting

This section describes how to set up the product and how to connect it to a PC.

1. Nomenclature of Product Components

Component names of the product are shown in the figure below.

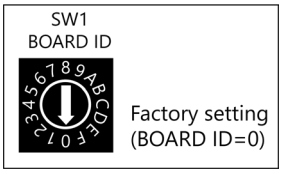


No.	Name
1	Interface Connector (page25)
2	Board ID Setting Switch

2. Board ID Setting Switch

If two or more products of the same model are installed in one PC, set each product to a unique value. The board IDs can be set from 0 - Fh to identify up to sixteen products.

If only one product is used, the original factory setting (Board ID = 0) should be used.



4.Hardware installation

On a PC in a Windows environment, the peripherals need to be recognized by the OS. This is called hardware installation. **When using multiple products, install one product at a time. Complete the setup of the product before starting to install the next one.**

1. Before plugging the product, shut down the system, unplug the power code of your PC.
2. Remove the cover from the PC so that the product can be mounted.
   Plug the product into an expansion slot.
3. Put the cover back into place.
4. Turn on the power to your PC.
5. **After the OS finishes booting, the hardware will be automatically identified and the hardware installation will be complete.**

⚠ CAUTION

- Do not touch the product's metal plated terminals (edge connector) with your hands. Otherwise, the product may malfunction, overheat, or cause a failure.
  If the terminals are touched by someone's hands, clean the terminals with industrial alcohol.
- Do not install or remove the product to or from the slot while the computer's power is turned on. Otherwise, the product may malfunction, overheat, or cause a failure.
  Doing so could cause trouble. Be sure that the personal computer or the I/O expansion unit power is turned off.
- Make sure that your PC or expansion unit can supply ample power to all the products installed. Insufficiently energized boards could malfunction, overheat, or cause a failure.
- The product cannot be properly installed unless the resources (I/O addresses and interrupt level) for the product can be allocated. Before attempting to install the product, first determine what PC resources are free to use.

5.Device driver Initialization

Setting the device name is required to use the device driver. It is called the device driver initialization.

The device name will be assigned automatically during hardware installation. Therefore, if you want to use it, you can skip the setting procedure described below.

How to check the device name and change the device name, refer to the help included in the development environment package you downloaded from the CONTEC website or “Setting and Confirming Device Name” in the online help made available on the CONTEC website.

Online Help [Setting and Confirming Device Name]

https://help.contec.com/link/drv/wdm/devicename/en/

6.Operation Check

You must make sure that this product and device driver operate properly. By taking this step, you can be certain that this product has been set up appropriately. Check operation by using the diagnosis program when the confirmation device is connected. When connecting the product to the actual device to be used, use caution so that malfunctions do not occur during the input/output test.

1. Connection Method

Connect the product to an external target device to test the communication and check the execution environment.

To connect an external target device, see "**Connecting to an External Device (page25)**".

2. Using the Diagnosis Program

◆ Starting the Diagnosis Program

Click [Diagnosis] on the Properties page to start the diagnosis program.

The diagnosis program allows you to check the digital inputs/outputs and to output a diagnosis report.

How to use the diagnostic program and how to output a diagnostic report, refer to the help included in the development environment package you downloaded from the CONTEC website or "Diagnosis Program" in the online help made available on the CONTEC website.

Online Help [Diagnosis Program]

https://help.contec.com/link/drv/wdm/dio/diagnostic/en/

7.Setup Troubleshooting

1. Examples and Solution

◆ The diagnostic program works properly but the application program does not.

The diagnostic program uses the API-DIO(WDM) functions. If the diagnostic program works properly, other applications should also work properly. If you have a problem, recheck your program taking note of the following points.

- Check the return values of the API functions.
- Refer to the source code for the sample programs.

◆ The OS won't normally get started or detect the device.

Refer to the device driver HELP.

◆ If your problem cannot be resolved

Contact your retailer with diagnostic report that outputted by diagnostic programs.

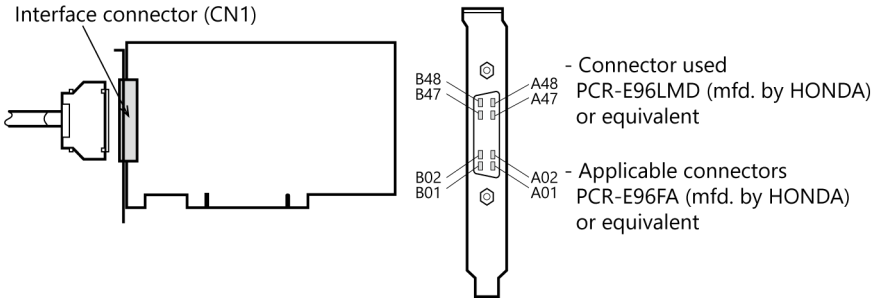
Connection

This section describes how to connect to an external device with a cable.

1.Connecting to an External Device

1. Connecting an Interface Connector

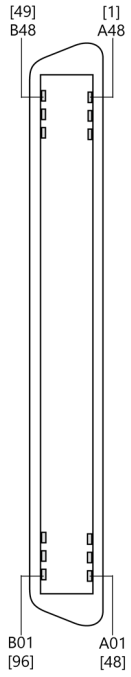
To connect an external device to this product, plug the cable from the device into the interface connector (CN1) shown below.



2. Signal Layout of PIO-32/32RL(PCI)H Interface Connector

◆ Layout on the Interface Connector(CN1)

Common plus pin for +6/+7 output ports	OP-6/7	B48		A48	N.C.	N.C.
	OP-6/7	B47		A47	N.C.	
+7 port (Output)	O-77	B46		A46	I-37	+3 port (Input)
	O-76	B45		A45	I-36	
	O-75	B44		A44	I-35	
	O-74	B43		A43	I-34	
	O-73	B42		A42	I-33	
	O-72	B41		A41	I-32	
	O-71	B40		A40	I-31	
	O-70	B39		A39	I-30	
+6 port (Output)	O-67	B38		A38	I-27	+2 port (Input)
	O-66	B37		A37	I-26	
	O-65	B36		A36	I-25	
	O-64	B35		A35	I-24	
	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.	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.
	N.C.	B27		A27	N.C.	
	N.C.	B26		A26	N.C.	
	N.C.	B25		A25	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	N.C.	
	OP-4/5	B19		A19	N.C.	
+5 port (Output)	O-57	B18		A18	I-17	+1 port (Input)
	O-56	B17		A17	I-16	
	O-55	B16		A16	I-15	
	O-54	B15		A15	I-14	
	O-53	B14		A14	I-13	
	O-52	B13		A13	I-12	
	O-51	B12		A12	I-11	
	O-50	B11		A11	I-10	
+4 port (Output)	O-47	B10		A10	I-07	+0 port (Input)
	O-46	B09		A09	I-06	
	O-45	B08		A08	I-05	
	O-44	B07		A07	I-04	
	O-43	B06		A06	I-03	
	O-42	B05		A05	I-02	
	O-41	B04		A04	I-01	
	O-40	B03		A03	I-00	
N.C.	N.C.	B02		A02	IN-0/1	Common minus pin for +0/+1 input ports
	N.C.	B01		A01	IN-0/1	



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

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

Signal name	Description
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	When the external power supply is selected, its positive side is connected to these pins. These pins are common to 16 output signal pins. Both pins must be connected to the external power supply.
OP-6/7	When the external power supply is selected, its positive side is connected to these pins. These pins are common to 16 output signal pins. Both pins must be connected to the external power supply.
IN-0/1	When the external power supply is selected, its negative side is connected to these pins. These pins are common to 16 input signal pins.
IN-2/3	When the external power supply is selected, its negative side is connected to these pins. These pins are 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 (Page32)"**.

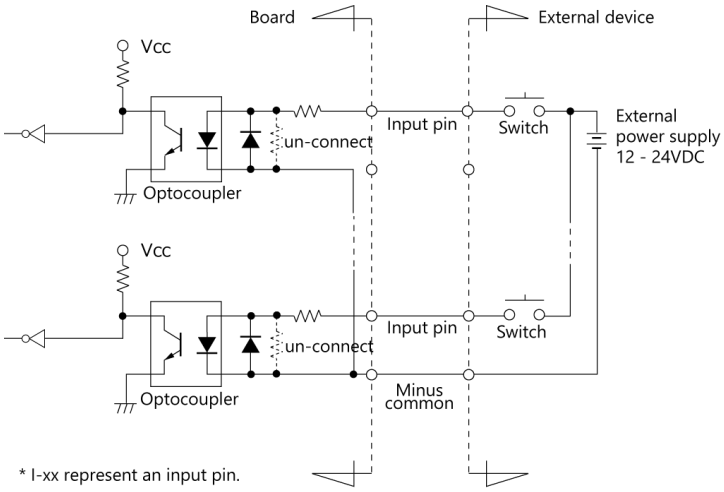
2.Connecting Input and Output Signals

1. Input Circuit

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

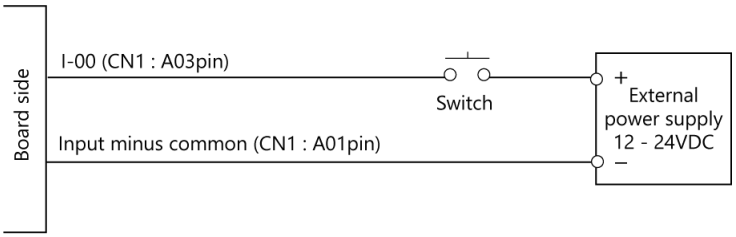
The connection requires an external power supply to feed currents.

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



The signal inputs are isolated by opto-couplers (Compatible with current source output). This product therefore requires 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).

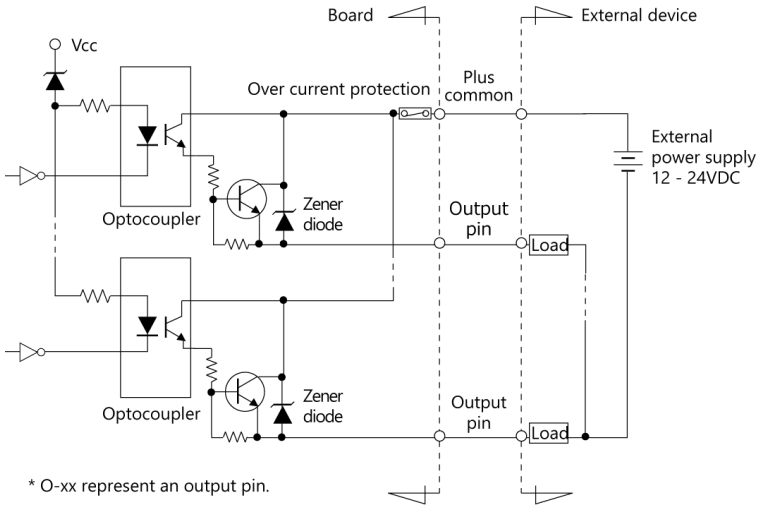
Connecting a Switch (An Example to use Input I-00)



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

2. 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 product controls turning on/off the current-driven controlled device using a digital value.

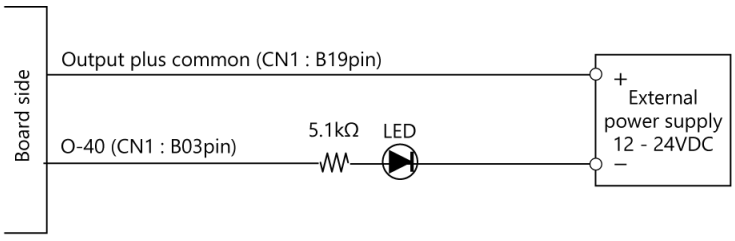


The signal output section is an opto-coupler isolated (current source output type).
The board therefore requires an external power supply to drive the outputs.
The rated output current per channel is 100mA at maximum.
A zener diode is connected to the output transistor for protection from surge voltages.
A overcurrent protection components is provided for every 8 output transistors.

⚠ CAUTION

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

Connection to the LED (An Example to use Output O-40)



When outputting 1 to the corresponding bit, LED is ON.
When outputting 0 to the corresponding bit, by contrast, LED is off.

Function

This section describes the features achieved by combining hardware and device driver functions. These features can be implemented by calling the API functions provided by the device driver. For the functions and the features to use, refer to the help for the device driver.

1.Data I/O Function

1. Data Input

When input data is "ON", "1" is input to the relevant bit.

When the input data is "OFF", in contrast, "0" is input to the relevant bit.

2. Data Output

When "1" is output to the relevant bit, the corresponding transistor is set to "ON".

When "0" is output to the relevant bit, in contrast, the corresponding transistor is set to "OFF".

⚠ CAUTION

When the PC is turned on, all outputs are reset to 0 (OFF).

3. Monitoring Output Data

The Product can read the state of the data currently being output without affecting the output data.

4. Relationships between API-TOOL Logical Ports/Bits and Connector Signal Pins

To perform input/output using this product with the CONTEC device driver, specify logical ports and logical bits when calling each function.

The notation for input/output bits used in input/output with a CONTEC product is different for each product. For this reason, the inputs and the outputs are both renumbered into logical ports and logical bits from bit 0 to eliminate confusion about the layout of ports and bits and to make programming easier. The relationship between the logical port numbers, the logical bit numbers, and the signal pin assignments of the various connectors (pages 26) is shown in the following table. CONTEC products are defined in a format in which eight signals are assigned to one port.

Input logical port	Input logical bit	Input signal
0	0	I-00
	1	I-01
	2	I-02
	3	I-03
	4	I-04
	5	I-05
	6	I-06
	7	I-07
1	8	I-10
	9	I-11
	10	I-12
	11	I-13
	12	I-14
	13	I-15
	14	I-16
	15	I-17
2	16	I-20
	17	I-21
	18	I-22
	19	I-23
	20	I-24
	21	I-25
	22	I-26
	23	I-27
3	24	I-30
	25	I-31
	26	I-32
	27	I-33
	28	I-34
	29	I-35
	30	I-36
	31	I-37

Output logical port	Output logical bit	Output signal
0	0	O-40
	1	O-41
	2	O-42
	3	O-43
	4	O-44
	5	O-45
	6	O-46
	7	O-47
1	8	O-50
	9	O-51
	10	O-52
	11	O-53
	12	O-54
	13	O-55
	14	O-56
	15	O-57
2	16	O-60
	17	O-61
	18	O-62
	19	O-63
	20	O-64
	21	O-65
	22	O-66
	23	O-67
3	24	O-70
	25	O-71
	26	O-72
	27	O-73
	28	O-74
	29	O-75
	30	O-76
	31	O-77

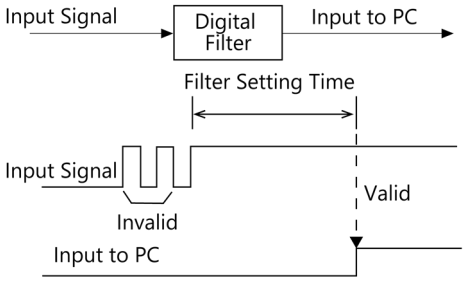
2.Digital Filter

Using this feature, the product can apply a digital filter to all input pins, thereby preventing wrong recognition of input signals from being affected by noise or chattering.

1. Digital Filter Function Principle

The digital filter checks the input signal level during the sampling time of the clock signal. When the signal level remains the same for the digital filter set time, the digital filter recognizes that signal as the input signal and changes the signal level of the PC.

If the signal level changes at a frequency shorter than the set time, therefore, the level change is ignored.



2. Set Digital Filter Time

Set the digital filter time to 0 - 20 (14h).

Setting the digital filter time to 0 disables digital filtering. It is set to 0 when the power is turned on.

Figure shows the relationships between the digital filter time and the setting data.

Digital Filter Time[sec.] = 2^n / (8 x 10^6) n : setting data (0 - 20)

Setting Data (n)	Digital Filter Time	Setting Data (n)	Digital Filter Time	Setting Data (n)	Digital Filter Time
0 (00h	no use	7 (07h)	16µsec	14 (0Eh)	2.048msec
1 (01h)	0.25µsec	8 (08h)	32µsec	15 (0Fh)	4.096msec
2 (02h)	0.5µsec	9 (09h)	64µsec	16 (10h)	8.192msec
3 (03h)	1µsec	10 (0Ah)	128µsec	17 (11h)	16.384msec
4 (04h)	2µsec	11 (0Bh)	256µsec	18 (12h)	32.768msec
5 (05h)	4µsec	12 (0Ch)	512µsec	19 (13h)	65.536msec
6 (06h)	8µsec	13 (0Dh)	1.024msec	20 (14h)	131.072msec

⚠ CAUTION

- If you set the digital filter time, the filter applies to all input pins. You cannot apply the filter only to a specific input pin.
- Do not set a value outside the above range to the Setting Data as doing so can cause the product to malfunction.

3.Interrupt Control Function

The product can generate an interrupt request signal to the PC when the input signal change from High to Low or from Low to High. You can easily create an application that implements specific processing for a change in an input signal since the CONTEC device driver can notify the application of an interrupt request signal from a product that supports the interrupt control function.

The product can use all of input signals as interrupt request signals.

Input signals that trigger an interrupt can be disabled in bits and the rising or falling edge can be specified. When the digital filter (described above) is used, interrupt requests are generated by input signals that have passed through the filter.

⚠ CAUTION

- All of the interrupt mask bits are interrupt-disabled when the power is turned on.
- In addition to the interrupt function, the CONTEC device driver is also equipped with a trigger function to monitor the change in a signal. Consider using this function as well in cases such as the following: to monitor both the rising and falling edges of an input signal and to use a product that does not support interrupts.

Appendix

This section lists the specifications and the physical dimensions of the product.

1.Hardware Specification

Function Specifications

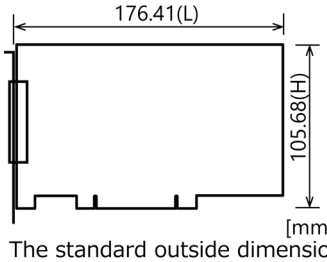
Item		Specifications
Input	Type	Opto-Isolated Input (Compatible with current source output) (Positive logic *1)
	Number of Channels	32ch (All available for interrupts) (One common power supply per 16 channels)
	Input resistance	4.7kΩ
	Current required to turn ON	2.0mA or more
	Current required to turn 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
Output	Type	Opto-Isolated Open Collector Output (Current source type) (Positive logic *1)
	Number of Channels	32ch (One common power supply per 16 channels)
	Output rated voltage	12 - 24VDC (±10%)
	Output rated current	100mA/channel (Max.)
	Maximum voltage drop at ON	1.5V or less
	Surge protector	Zener diode RD47FM(Renesas) or equivalent
	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%)
	Power consumption	5VDC 200mA (Max.)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
	Dimension (mm)	176.41(L) x 105.68(H)
	Weight	215g

*1 Data "1" and "0" correspond to the High and Low levels, respectively.
*2 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

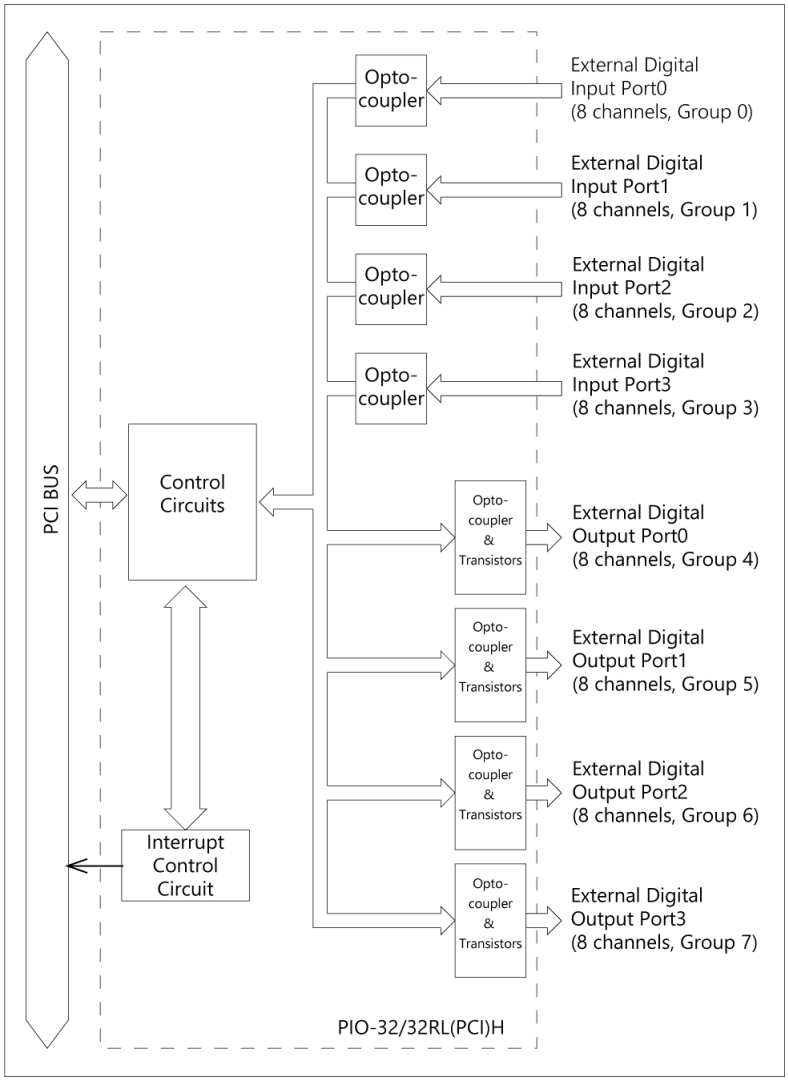
Item	Specifications
Operating ambient temperature	0 - 50°C
Operating ambient humidity	10 - 90%RH (No condensation)
Floating dust particles	Not to be excessive
Corrosive gases	None
Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

2.Physical Dimensions



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

3.Circuit Block Diagram



Customer Support and Inquiry

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

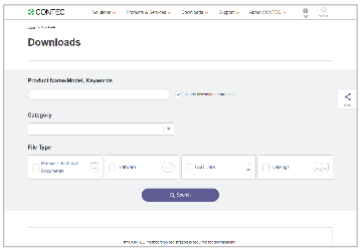
1.Services

CONTEC offers the useful information including product manuals that can be downloaded through the CONTEC website.

Download

https://www.contec.com/download/

You can download updated device driver, firmware, and differential manuals in several languages. Membership registration (myCONTEC) is required to use the services.



Revision History

MONTH YEAR	Summary of Changes
August 2004	The First Edition.
September 2023	Changed the layout of the manual.

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