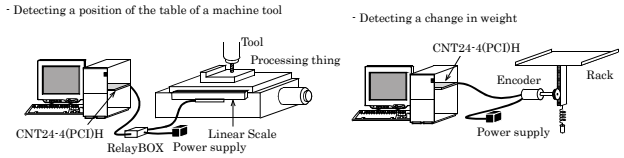
4Ch 24Bit Up/Down Counter Card for PCI

CNT24-4(PCI)H

This product is a PCI bus-compliant interface board that counts input pulse signals from external devices.
This product has four channels of 24-bit up/down counters, allowing external devices such as a rotary encoder and a linear scale to be connected. Given below are examples of using the board for "detecting a position of the table of a machine tool" and "detecting a change in weight".
The pulse signal inputting interface is photo coupler isolated or TTL-level input.
With the Counter Driver [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++.

<Example>



* Specifications, color and design of the products are subject to change without notice.
*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 July, 2022.

Features

It is equipped with four channels of 24-bit up/down counters.

The board can count two-phase signals, which can be outputs of some rotary encoders and linear scales

You can select either a photo coupler isolated input or a TTL-level input for each channel by software command.

Each channel can generate an interrupt request signal and a one-pulse output signal when the count data matches a pre-specified value.

The board is equipped with a programmable timer to allow interrupts to be generated periodically according to a specified timer value.

Each Channel is equipped with a general-purpose input signal (both photo coupler and TTL-level).

Support Software

The name of the documents	Contents	How to get
Counter Driver API-CNT(WDM)	Driver software of counter input	Download (ZIP)
Counter Driver API-CNT(LNX)	Driver software of counter input for Linux.	Download (tgz)

* Download the software from the CONTEC website.

Option

Item	Model	Description
Cable	PCB37P-1.5 (1.5m)	Flat cable with both-ends 37-pin D-SUB connector
	PCB37PS-0.5P (0.5m) PCB37PS-1.5P (1.5m) PCB37PS-3P (3m) PCB37PS-5P (5m)	Shield cable with both-ends 37-pin D-SUB connector
	PCA37P-1.5 (1.5m) PCA37P-3 (3m)	Flat cable with one-end 37-Pin D-SUB connector
	PCA37PS-0.5P (0.5m) PCA37PS-1.5P (1.5m) PCA37PS-3P (3m) PCA37PS-5P (5m)	Shield cable with one-end 37-pin D-SUB connector
	DT/B2 (0.5m)	30-pin Pinhead Connector to 37-pin D-SUB Connector
Accessories	EPD-37A *1*2	Screw terminal
	EPD-37 *1	Screw terminal (Screw Up type)
	DTP-4C*1	Screw Terminal (M2.6 x 37)

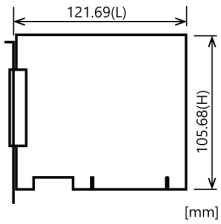
*1 Option cable PCB37P or PCB37PS is required separately.
*2 "Spring-up" type terminal is used to prevent terminal screws from falling off.
* Check the CONTEC's Web site for more information on these options.

Features

Item		Specification
Counter Input		
	Number of Channels	4 Channels
	Count system	Up/down counting
	Max. count	FFFFFFH (binary data)
	Counter input type	Photo coupler isolated input or TTL-level input
	Counter input signal	Phase-A/UP 1 x 4 channels Phase-B/DOWN 1 x 4 channels Phase-Z/CLR 1 x 4 channels General-purpose input 1 x 4 channels
	Input resister	220Ω (photo coupler insulation) or more, 1TTL loading (TTL-level)
	Input protection circuit	None
	Response frequency	Photo coupler isolated input 500KHz duty 50% (Max.) TTL-level input 1MHz duty 50% (Max.) *1
	Interrupt level	One interrupt caused upon channel count match or timer time-out
	External power	5V - 12VDC ±10% Min. 400mA (Required for photo coupler isolated input)
	Photo coupler input current	Photo coupler primary current 15 - 25mA
	Digital filter	0.1□sec - 1056.1□sec (can be independently set for each channel.)
	Timer	1msec - 200sec
Match signal output		
	Output point	1 x 4 channels
	Output type	Photo coupler isolated open collector output
	Output rating	35VDC, 50mA(Max.) (per 1 point)
	Output signal width	0 - 104.45msec (All channels)
	Output protection circuit	None
	External power	5V - 12VDC±10%
Common		
	I/O address	8 bits x 32 ports boundary
	Power consumption	5VDC 250mA Max.
	Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
	Dimension (mm)	121.69(L)×105.68(H) *3
	Weight	130g
	Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), KC, UKCA

*1 Please use the shielded cable to meet "CE EMC Directive" and "KC EMC".
*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).
*3 The size of board No.7293, No.7293A, and No.7293B is 176.41 (L) x 105.68 (H) mm.

Board Dimensions



[mm]

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

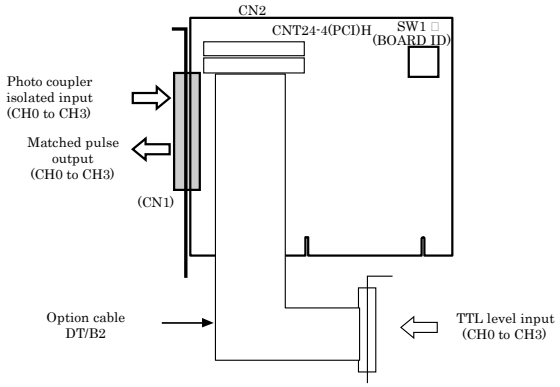
Packing List

Board [CNT24-4(PCI)H] ...1
Please read the following ...1

Using the On-Board Connectors

Connecting a Board to a Connector

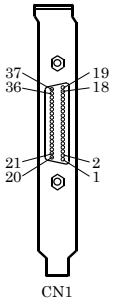
To input external pulse signals, use the interface connector on the board. Use CN1 for the photo coupler isolated input. For TTL level input, connect CN2 to an external device by connecting the optional cable CN2. Matched pulse output is output from CN1. (Photo coupler isolated open collector output)



Interface Connector Signal Assignment

Use the on-board connector to connect the interface board to an external device.

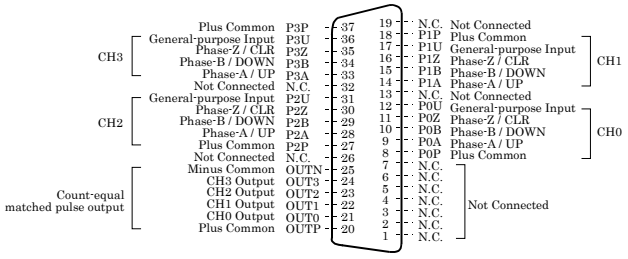
Interface connector for the photo coupler isolated input (CN1)



- Connector used
  37 pin D-SUB connector (Female type)
  DCLC-J37SAF-20L9 (made by JAE) or equivalent to it
  Rock nut UNC#4-40 (Thumbs screw)

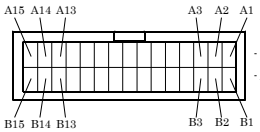
- Applicable connector
  17JE-23370-02 (D8C) [made by DDK, Male type]
  FDCD-37P [made by Hirose, Male type]
  DC-37P-N [made by JAE, Male type]

Pin Assignment of an interface connector (CN1)



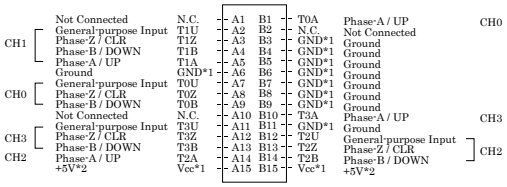
Each channel has an independent plus common. (Same for match output)

Interface connector for the TTL-level input (CN2)



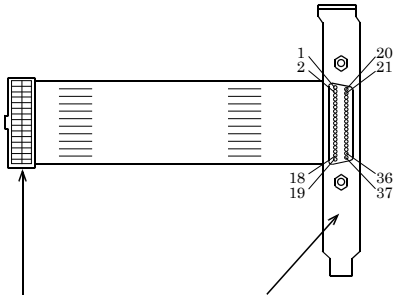
- Connector used
  PS-30PE-D4T1PN1(made by JAE) or equivalent to it
- Applicable connector
  PS-30SEN-D4P1-1C (made by JAE)

Pin Assignment of an interface connector (CN2)



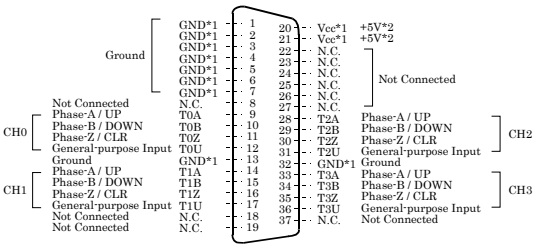
*1: The VCC and GND signals are all common.
*2: Outputs +5V power supplied from the +5V pin in the PC to the external device.
The maximum current flowing through these two Vcc pins together is 500mA.
Use this pin to supply +5V power to an external device (such as an encoder) for simple checking.

Optional Cable DT/B2



* 37 pin D-SUB connector is the same as with the CN1.

Pin Assignments of an optional cable 37-Pin D-SUB



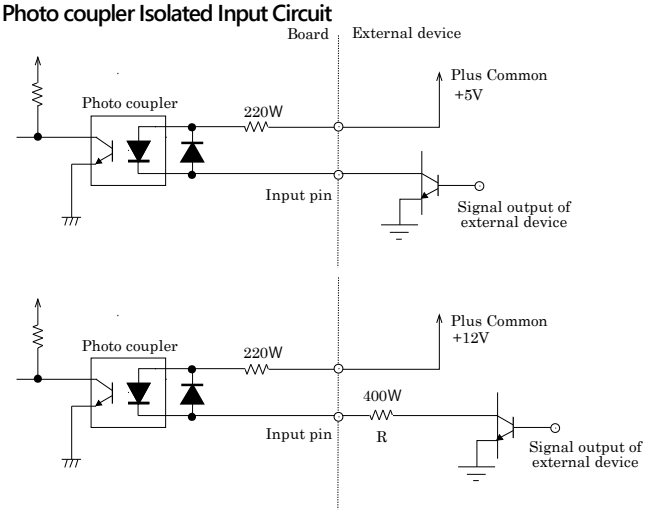
*1: The VCC and GND signals are all common.
*2: Outputs +5V power supplied from the +5V pin in the PC to the external device.
The maximum current flowing through these two Vcc pins together is 500mA.
Use this pin as +5V power supply to an external device (such as an encoder) for simple checking.

Connection Method to the External device 1 -Photo coupler isolated Input-

Photo coupler isolated Input Connection

Photo coupler isolated input connection with a rotary encoder or a linear scale open collector output circuit is shown in the Figure. The maximum input frequency is 500KHz.
For a two-phase input, connect both phase A and phase B. For a single phase input, connect to either phase A or phase B. If not using the Z phase, this does not need to be connected.

Photo coupler Isolated Input Circuit



⚠ CAUTION

The general input signal uses the same circuit structure.
To use external power (other than 5V), insert a current limiting resister at the R position.
The following expression is used to calculate current limiting resister R with the external power supply as PV:

$$\frac{P-5}{20} < Rk\Omega < \frac{P-5}{15}$$

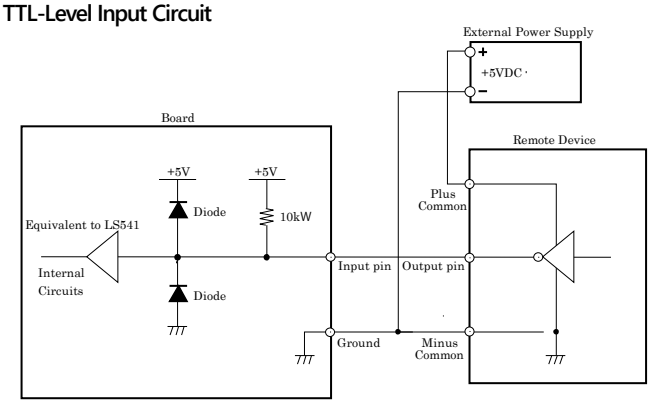
If P=12, use a 350Ω < R < 470Ω resistor.

Connection Method to the External device 2 - TTL-Level Input -

TTL-Level Input Connection

Use the TTL-Level Input for the connection with a rotary encoder or a linear scale TTL-level output circuit. The maximum input frequency is 1MHz.
For a two-phase input, connect both phase A and phase B. For a single phase input, connect to either phase A or phase B. If not using the phase Z, this does not need to be connected.

TTL-Level Input Circuit



⚠ CAUTION

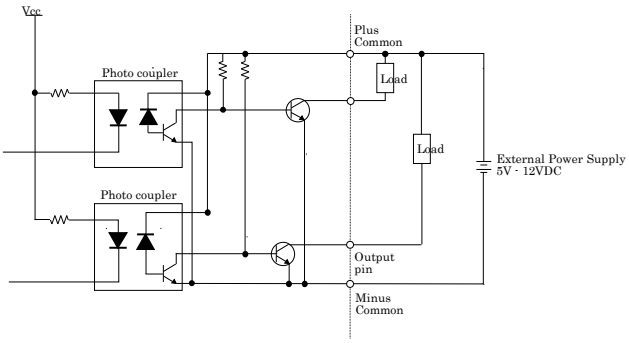
The general input signal uses the same circuit structure.
The cable should be 1.5m or less.
To prevent malfunction caused by noise, separate the circuit as much as possible from other signal cables and noise sources.

One-shot Pulse Output Connection

One-shot Pulse Output Connection

When the count value of each channel and the user set value match, the circuit outputs a matched signal for one shot (1 pulse). The signal output part uses the open collector method by photo coupler insulation. As a result, an external power supply is needed to run the board output.

Output Circuit and an Example Connection



⚠ CAUTION

The output of this board has no surge voltage protector. To drive an inductive load such as a relay or lamp using this board, apply surge voltage protection to the load side. For surge voltage protection, see "Surge Voltage Countermeasures" in the next section.

Differences between the CNT24-4(PCI)H and CNT24-4(PCI)

This product partially enhanced version of the conventional products of CNT24-4(PCI) and it is upper compatible with CNT24-4(PCI).

There are some differences in specifications as shown below.

	CNT24-4(PCI)	CNT24-4(PCI)H Board No.7293, 7293A, 7293B	CNT24-4(PCI)H Board No.7293C later
Interrupt signal resource setting	Set to select whether to use jumper JP1	Automatically set by PC	
I/O address	8 bits x 4 ports boundary	8 bits x 32 ports boundary	
Power consumption	5VDC 400mA (Max.)	5VDC 250mA (Max.)	
PCI bus specification	32bit, 33MHz, 5V	32bit, 33MHz, Universal key shapes supported (Supply 5V to the 5V pin)	
Dimension (mm)	176.41(L) x 106.68(H)	176.41(L) x 105.68(H)	121.69(L) x 105.68(H)