

4ch 24Bit Differential
Up/Down Counter Board for PCI

CNT24-4D(PCI)H

with Driver Library [API-PAC(W32)]



The CNT24-4D(PCI)H is a PCI bus-compliant interface board that counts input pulse signals from external devices.

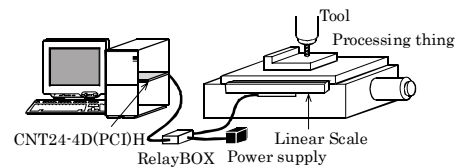
The CNT24-4D(PCI)H has four channels of 24-bit up/down counters, allowing external devices such as a rotary encoder and a linear scale to be connected. Given below are examples of using the board for "detecting a position of the table of a machine tool" and "detecting a change in weight".

The pulse signal inputting interface is line receiver input or TTL-level input.

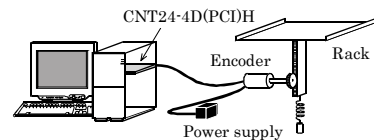
Using the bundled driver library [API-PAC(W32)], you can create Windows application software for this board in your favorite programming language supporting Win32 API functions, such as Visual Basic or Visual C/C++.

< Example >

- Detecting a position of the table of a machine tool



- Detecting a change in weight



Features

- This board is a PCI-compliant interface board for counting input pulse signals.
- 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 line-receiver 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 line-receiver and TTL).
- Protective devices are equipped for line-receiver inputs.

Product Configuration List

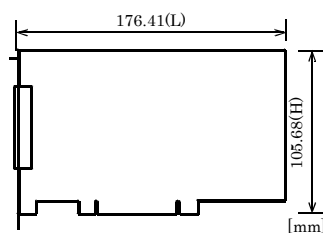
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- First step guide ... 1
- CD-ROM *1 [API-PAC(W32)] ... 1
- *1 The CD-ROM contains the driver software and User's Guide (this guide)

Specification

Item	Specification	
Counter Input		
Number of Channels	4 Channels	
Count system	Up/down counting	
Max. count	FFFFFFH (binary data)	
Counter input type	Line receiver 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
Line receiver input section	Element in use:	Equivalent to the AM26LS32(T.I)
	Terminating resistance:	100Ω(Can be disconnected by switch.)
	Receiver input sensitivity:	±200mV
	In-phase input voltage range:	±7V
TTL level input section	Signal extension distance:	1200m(dependent on wiring environment and input frequency)
	Element in use:	Equivalent to the SN74LS541(T.I)
Response frequency	Line receiver input	1MHz 50% duty(Max.)
	TTL-level input	1MHz 50% duty(Max.)
Interrupt	One Generated when each channel count matches or the timer runs out of time.	
Digital filter	0.1μsec - 1056.1μsec (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	32 ports boundary	
Power consumption	5VDC 500mA Max.	
Operating condition	0 - 50°C, 10 - 90%RH (No condensation)	
PCI bus specification	32bit, 33MHz, Universal key shapes supported *1	
Dimension (mm)	176.41(L) x 105.68(H)	
Weight	120g	

*1 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

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

■ Driver Library 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 (at <http://www.contec.com/apipac/>) 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..
Others	Each piece of library software requires 50 megabytes of free hard disk space.

■ Linux version of general-purpose COUNT driver: API-CNT(LNX) (Supplied within the same CD-ROM of API-PAC(W32))

This driver is used to control CONTEC counter boards (PC Cards). You can control CONTEC counter boards easily using the shared library used by gcc, Kylix, the device driver (module) for each kernel version, and the board (PC Cards) configuration program (config).

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 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
Others	Each piece of library software requires 3 megabytes of free hard disk space.

■ 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.co.jp/vidaq/> for details and download of VI-DAQ.

Cable & Connector

◆ Cable & Connector (Option)

Shield Cable with 96-Pin Half-Pitch Connector at Both Ends	(Mold Type)
	: 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)
	: PCB96P-5 (5m)
Shield Cable with 96-Pin Half-Pitch Connector at One End	(Mold Type)
	: PCA96PS-0.5P (0.5m)
	: PCA96PS-1.5P (1.5m)
	: PCA96PS-3P (3m)
	: PCA96PS-5P (5m)
Flat Cable with 96-Pin Half-Pitch Connector at One End	
	: PCA96P-1.5 (1.5m)
	: PCA96P-3 (3m)
	: PCA96P-5 (5m)
Distribution Shield Cable with 96-Pin Half-Pitch Connector	(96Pin 37Pin x 2)
	: CN5-H96F

Accessories

◆ Accessories (Option)

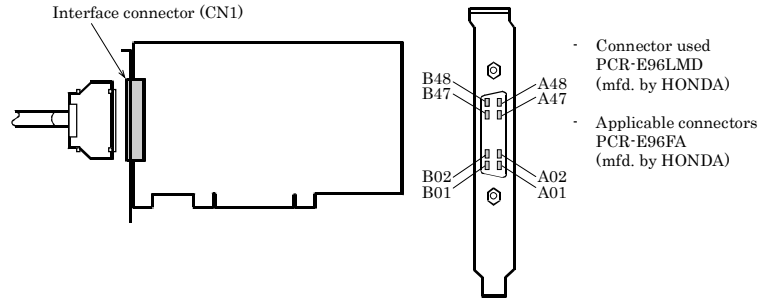
Screw Terminal	: EPD-96 *1
Screw Terminal	: DTP-64(PC) *1
Screw Terminal	: DTP-3(PC) *2
Screw Terminal	: DTP-4(PC) *2
Screw terminal (Screw Up type)	: EPD-37A *2
Screw Terminal	: EPD-37 *2
Connection Conversion Board (96-Pin 37-Pin x 2)	: CCB-96 *3
*1	A PCB96P or PCB96PS optional cable is required separately.
*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.

Using the On-board Connectors

◆ Connecting the Interface 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 < CNT24-4D(PCI)H >

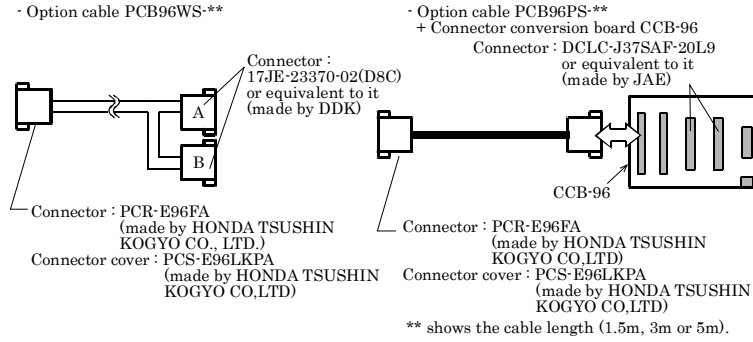
	[49]	[1]		
Ground	GND	B48	A48	N.C.
	GND	B47	A47	N.C.
CH3 line receiver general-purpose input-	L3U-	B46	A46	T3U
CH3 line receiver general-purpose input+	L3U+	B45	A45	T3Z
CH3 line receiver Z phase input-	L3Z-	B44	A44	T3B
CH3 line receiver Z phase input+	L3Z+	B43	A43	T3A
CH3 line receiver B phase input-	L3B-	B42	A42	GND
CH3 line receiver B phase input+	L3B+	B41	A41	T2U
CH3 line receiver A phase input-	L3A-	B40	A40	T2Z
CH3 line receiver A phase input+	L3A+	B39	A39	T2B
CH2 line receiver general-purpose input-	L2U-	B38	A38	T2A
CH2 line receiver general-purpose input+	L2U+	B37	A37	GND
CH2 line receiver Z phase input-	L2Z-	B36	A36	OUT3
CH2 line receiver Z phase input+	L2Z+	B35	A35	OUT2
CH2 line receiver B phase input-	L2B-	B34	A34	OUT1
CH2 line receiver B phase input+	L2B+	B33	A33	OUT0
CH2 line receiver A phase input-	L2A-	B32	A32	N.C.
CH2 line receiver A phase input+	L2A+	B31	A31	N.C.
Ground	GND	B30	A30	N.C.
Ground	GND	B29	A29	N.C.
Ground	GND	B28	A28	GND
Ground	GND	B27	A27	GND
Ground	GND	B26	A26	GND
Ground	GND	B25	A25	GND
Ground	GND	B24	A24	GND
Ground	GND	B23	A23	GND
Ground	GND	B22	A22	GND
Ground	GND	B21	A21	GND
Ground	GND	B20	A20	N.C.
Ground	GND	B19	A19	N.C.
CH1 line receiver general-purpose input-	L1U-	B18	A18	T1U
CH1 line receiver general-purpose input+	L1U+	B17	A17	T1Z
CH1 line receiver Z phase input-	L1Z-	B16	A16	T1B
CH1 line receiver Z phase input+	L1Z+	B15	A15	T1A
CH1 line receiver B phase input-	L1B-	B14	A14	GND
CH1 line receiver B phase input+	L1B+	B13	A13	T0U
CH1 line receiver A phase input-	L1A-	B12	A12	T0Z
CH1 line receiver A phase input+	L1A+	B11	A11	T0B
CH0 line receiver general-purpose input-	L0U-	B10	A10	T0A
CH0 line receiver general-purpose input+	L0U+	B09	A09	N.C.
CH0 line receiver Z phase input-	L0Z-	B08	A08	GND
CH0 line receiver Z phase input+	L0Z+	B07	A07	GND
CH0 line receiver B phase input-	L0B-	B06	A06	GND
CH0 line receiver B phase input+	L0B+	B05	A05	GND
CH0 line receiver A phase input-	L0A-	B04	A04	GND
CH0 line receiver A phase input+	L0A+	B03	A03	GND
Ground	GND	B02	A02	GND
Ground	GND	B01	A01	N.C.

* [Pin numbers specified by HONDA]

◆ PCB96WS and CCB-96 Signal Assignment

This board can be connected to the PCB96WS and CCB-96. (But the GND's pin will be decreased.)

For the optional cable and each signal, please refer to the following parts.



PCB96WS and CCB-96 signal assignment

PCB96WS's CNA and CCB96's CN3 (CNA)

Ground	GND	1	20	N.C.] Not connected
	GND	2	21	N.C.	
	GND	3	22	N.C.	
	GND	4	23	OUT0	
	GND	5	24	OUT1	CH1 one-shot output
	GND	6	25	OUT2	CH2 one-shot output
	GND	7	26	OUT3	CH3 one-shot output
Not connected	N.C.	8	27	GND	Ground
CH0TTLA phase input	T0A	9	28	T2A	CH2TTLA phase input
CH0TTLB phase input	T0B	10	29	T2B	CH2TTLB phase input
CH0TTLZ phase input	T0Z	11	30	T2Z	CH2TTLZ phase input
CH0TTL general-purpose input	T0U	12	31	T2U	CH2TTL general-purpose input
Ground	GND	13	32	GND	Ground
CH1TTLA phase input	T1A	14	33	T3A	CH3TTLA phase input
CH1TTLB phase input	T1B	15	34	T3B	CH3TTLB phase input
CH1TTLZ phase input	T1Z	16	35	T3Z	CH3TTLZ phase input
CH1TTL general-purpose input	T1U	17	36	T3U	CH3TTL general-purpose input
Not connected	N.C.	18	37	N.C.	Not connected
Not connected	N.C.	19			

PCB96WS's CNB and CCB96's CN4 (CNB)

Ground	GND	1	20	GND	Ground
CH0 line receiver A phase input+	L0A+	2	21	L2A+	CH2 line receiver A phase input+
CH0 line receiver A phase input-	L0A-	3	22	L2A-	CH2 line receiver A phase input-
CH0 line receiver B phase input+	L0B+	4	23	L2B+	CH2 line receiver B phase input+
CH0 line receiver B phase input-	L0B-	5	24	L2B-	CH2 line receiver B phase input-
CH0 line receiver Z phase input+	L0Z+	6	25	L2Z+	CH2 line receiver Z phase input+
CH0 line receiver Z phase input-	L0Z-	7	26	L2Z-	CH2 line receiver Z phase input-
CH0 line receiver general-purpose input+	L0U+	8	27	L2U+	CH2 line receiver general-purpose input+
CH0 line receiver general-purpose input-	L0U-	9	28	L2U-	CH2 line receiver general-purpose input-
CH1 line receiver A phase input+	L1A+	10	29	L3A+	CH3 line receiver A phase input+
CH1 line receiver A phase input-	L1A-	11	30	L3A-	CH3 line receiver A phase input-
CH1 line receiver B phase input+	L1B+	12	31	L3B+	CH3 line receiver B phase input+
CH1 line receiver B phase input-	L1B-	13	32	L3B-	CH3 line receiver B phase input-
CH1 line receiver Z phase input+	L1Z+	14	33	L3Z+	CH3 line receiver Z phase input+
CH1 line receiver Z phase input-	L1Z-	15	34	L3Z-	CH3 line receiver Z phase input-
CH1 line receiver general-purpose input+	L1U+	16	35	L3U+	CH3 line receiver general-purpose input+
CH1 line receiver general-purpose input-	L1U-	17	36	L3U-	CH3 line receiver general-purpose input-
Ground	GND	18	37	GND	Ground
Not connected	N.C.	19			

External Connection-Line Receive Input

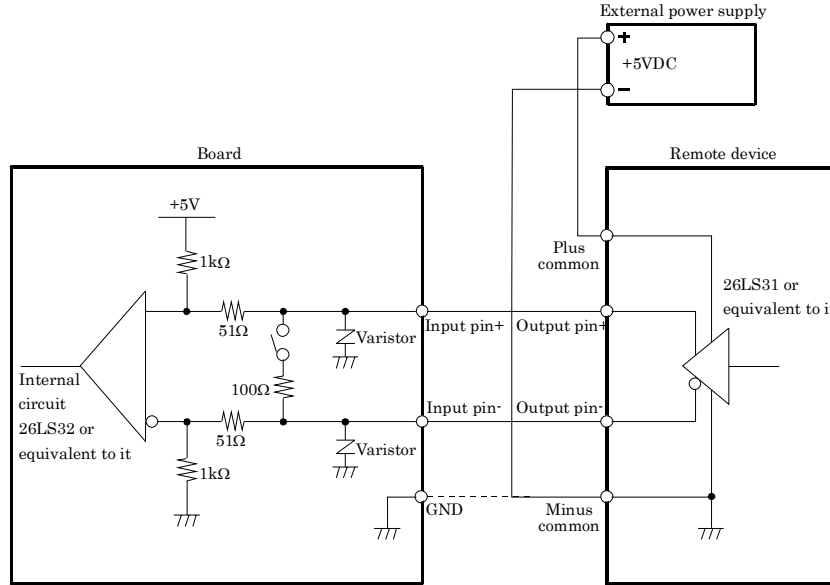
◆ Line Receiver Input Circuit

Use the line receiver input to connect to the line receiver output circuit of a rotary encoder or linear scale. The maximum input frequency is 1 MHz.

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.

You can select whether to use the terminator in case of the line receiver input.

◆ Detailed Line Receiver Input Circuit



▼ CAUTION

The general input signal uses the same circuit structure.

External Connection-TTL-level Input

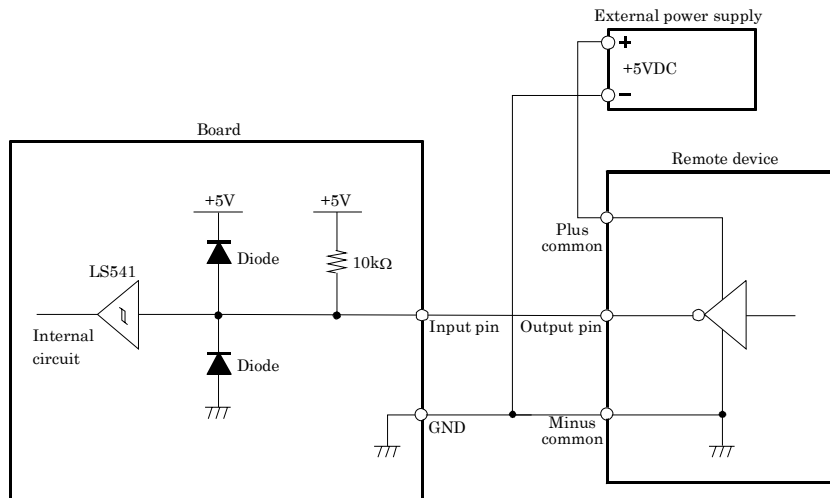
◆ TTL-level Input Circuit

Use the TTL-level input to connect to the TTL-level output circuit of a rotary encoder or linear scale. The maximum input frequency is 1 MHz.

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.

You can select whether to use the terminator in case of the line receiver input.

◆ Detailed 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.

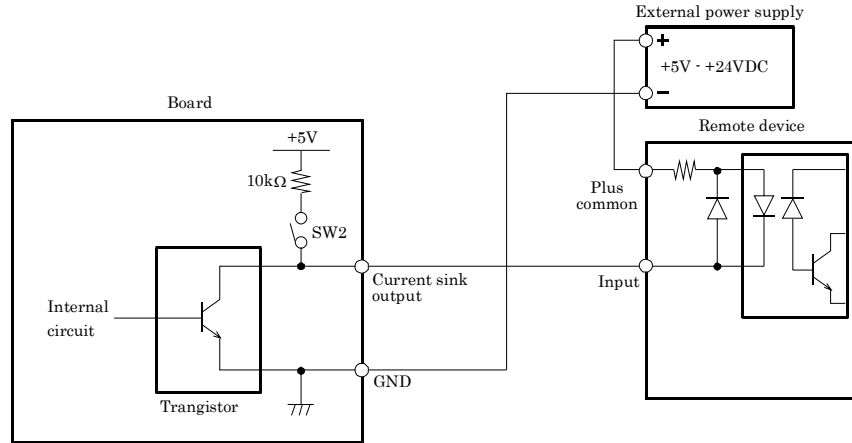
Output Circuit and an Example Connection

◆ One-shot Pulse Output Connection

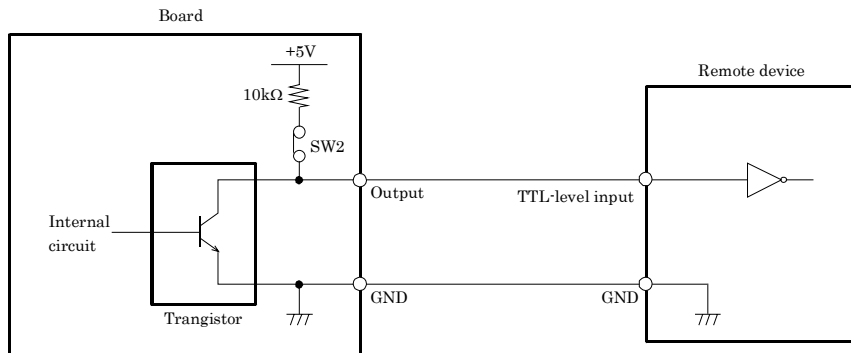
When the count value of each channel matches any specified value, the board outputs a one-shot match signal (for one pulse). The SW2 allows you to select either open-collector output or TTL-level output for the signal output section. If you opt for open-collector output, you need an external power supply source.

◆ Output Circuit and an Example Connection

Open Collector Output Circuit



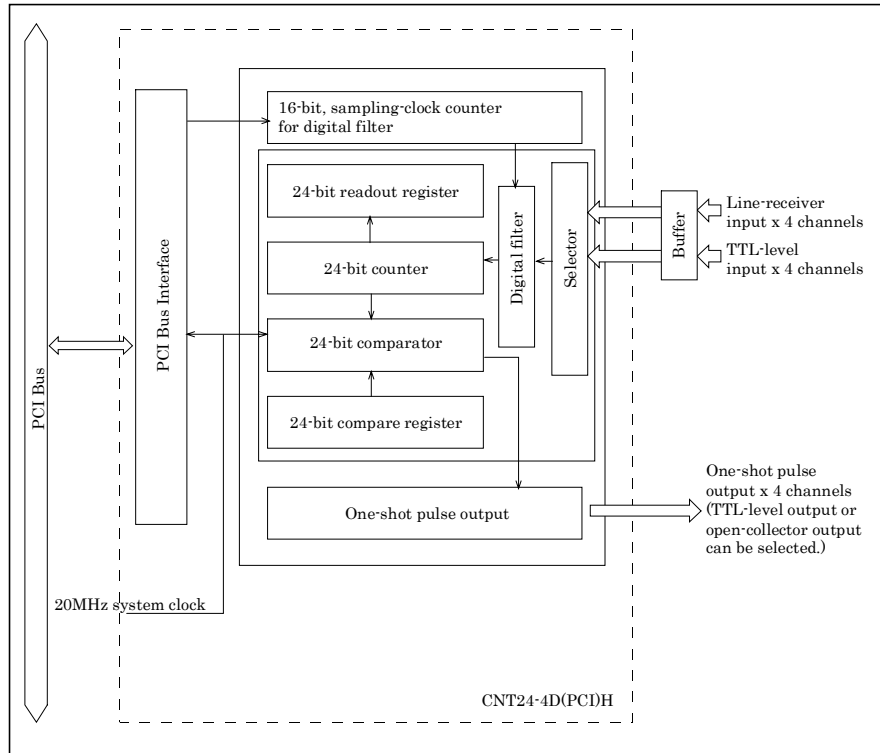
TTL-level Output Circuit



▼ 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.

Block Diagram



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

The CNT24-4D(PCI)H is a partially enhanced version of the conventional products of CNT24-4D(PCI) and is upper compatible with CNT24-4D(PCI).

(1) There are difference in the board's external dimension

CNT24-4D(PCI)	:	176.41(L) x 106.68(H) mm
CNT24-4D(PCI)H	:	176.41(L) x 105.68(H)mm

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