

**4ch 32Bit Up/Down
High-Speed Counter Board for Low Profile PCI
CNT32-4MT(LPCI)**



- * 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 February, 2026.

Features

It is equipped with four channels of 32-bit up/down counters. 32-bit up/down count for 4 channels can be performed with one board. Input the pulse signal at 10MHz maximum(non-insulation LVTTTL level). (The minimum distinguishable phase of a two-phase input is 25nsec.)

Two-phase and single-phase signals can be counted

A two-phase signal such as a rotary encoder or a linear scale and a single-phase signal can be counted.

It can converted into differential input interface by using differential unit [CTP-4D] and connection cable [CNT-68M/50M] sold separately

Can be converted to a differential input interface using the differential unit (CTP-4D) and connection cable (CNT-68M/50M) which are sold separately.

It puts one point of control signal for each channel

One control signal input pin per channel (counter start/stop/preset).

Bus master transfer function is provided

Supporting bus mastering, can count values sampling at a maximum sampling rate of 20 MHz (when using the internal clock).

Interrupt generation or external signal output is possible

Can generate an interrupt, issuing an external signal, or presetting/zero-clearing the count value when it matches an arbitrary predefined value.

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.

Support for both of Low Profile and standard size slots

Support for both of Low Profile and standard size slots (interchangeable with a bundled bracket).

Product Lineup

- Product...1
- Please read the following...1
- Standard-sized bracket...1

This product is a PCI bus-compliant interface board that counts input pulse signals from external devices.

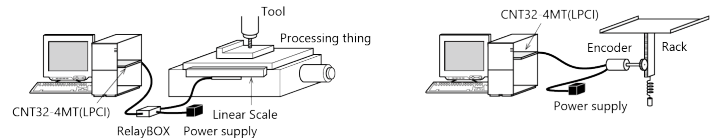
The 32 bit up-and-down counter could have four channels and up to 10MHz maximum high speed pulse input. Moreover, it can be used to connect a rotary encoder and a linear scale, etc.

The pulse signal inputting interface is unisolated LVTTTL-level input that can input pulse signals at high speed. The application for this board can transfer data between the board and the PC at high speed using PCI bus mastering.

This product supports a Low Profile size slot and, if replaced with the supplied bracket, supports a standard size slot, too.

Windows/Linux device driver is supported with this product.

- Detecting a position of the table of a machine tool
- Detecting a change in weight



Specifications

Function specification < 1 / 2 >

Item	Specifications
Input	
Counter	
Channel count	4 channels
Count system	Up/down counting (2-phase/Single-phase/Single-phase Input with Gate Control Attached)
Max. count	FFFFFFFF(binary data, 32Bit)
Input type	Unisolated LVTTTL level input
Input signal	Phase-A/UP 1 x 4 channels, Phase-B/DOWN 1 x 4 channels, Phase-Z/CLR 1 x 4 channels
Response frequency	10MHz 50% duty
Digital filter	0.1µsec - 1.6384msec or not used (can be independently set for each channel.)
Timer	1msec - 6553msec 1msec unit
Counter start trigger	Software/External start input/Sampling start trigger
Counter stop trigger	Software/External stop input/Sampling stop trigger
Sampling *1	
Sampling start trigger	Software/External start input/Count match
Sampling stop trigger	Software/External stop input/Specification number/Bus master transfer error/Count match
Sampling clock	Sampling timer/External clock input
Sampling timer	50nsec - 107sec 25nsec unit (can not be independently set for each channel.)
External sampling start signal	Unisolated LVTTTL level input (Select Rise or Fall)
External sampling stop signal	Unisolated LVTTTL level input (Select Rise or Fall)
External sampling clock signal	Unisolated LVTTTL level input (Fall)
Response frequency	10MHz 50% duty
Control *1	
Control input signal type	Unisolated LVTTTL level input
Control input channel	1 x 4 channels
Control input signal	- Preset (Select Rise or Fall) - Zero-clear (Select Rise or Fall) - Counter start/stop (Select Rise or Fall) - General-purpose input (positive logic) Software-selected from among the above four options
Response time	100nsec (Max.)
Interrupt event	Count match (8 points), Counter error (2 points), Sampling factor (6 points), Carry/Borrow (1 points), Timer (1 points)

Function specification < 2 / 2 >

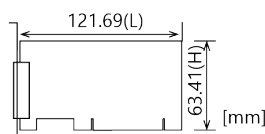
Item	Specifications
Output *1	
Control	
Control output signal type	Unisolated LVTTTL level output
Control output channel	1 x 4 channels
Control output signal	- Count match 0 output(one-shot pulse output) - Count match 1 output(one-shot pulse output) - Digital filter error output(one-shot pulse output) - Abnormal input error output(one-shot pulse output) - General-purpose output(Level output) Software-selected from among the above five options (Positive/negative logic is selected with the software.)
One shot output signal amplitude	Selected between 10μsec, 100μsec, 1msec, 10msec and 100 msec (Can be set for each channel, within precision + 1μsec)
Response time	100nsec (Max.)
Rated output current	IOL=8mA(Max.) IOH=-8mA(Max.)
Test pulse	
Test pulse output signal type	Unisolated LVTTTL level output
Test pulse output point	One for each of phases-A and B
Output frequency	100kHz fixed
Sampling	
Sampling output signal type	Unisolated LVTTTL level output
Output point	Sampling start trigger, sampling stop trigger, Sampling clock trigger 1 point each
One-shot output signal width	Negative logic 100nsec width (fixed)
Response speed	100nsec (Max.)
Rated output current	IOL = 8mA(Max.) IOH = -8mA(Max.)
Bus master	
DMA channel	1 channel
Transfer bus width	32-Bit width
Transfer data length	8 PCI Words length (Max.)
Transfer rate	80MB/sec (Max.133MB/sec)
FIFO	1K-DWord
Scatter/Gather function	64MB
Interrupt event	Bus master event (7 points)
Common	
Max. board count for connection	16 boards including the master board
I/O address	Occupies 2 locations, any 32-bytets and 64-byte boundary
Power consumption	5VDC 300mA
PCI bus specification	33bit, 33MHz, Universal key shapes supported *2
Dimension (mm)	121.69(L) x 63.41(H)
Weight	60g

- *1 Please use the shielded cable to meet "CE EMC Directive".
- *2 This board 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

Physical Dimensions



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

Support Software

Name	Contents	How to get
Windows Version Counter Driver software API-CNT(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 Counter Driver software API-CNT(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. <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

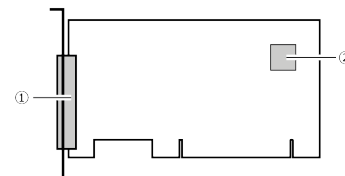
Product Name	Model type	Description
Cable with 68-Pin D-sub Connector at either Ends (Mold Type)	PCB68PS-0.5P	0.5m
	PCB68PS-1.5P	1.5m
Shielded cable with single connector for 68-pin 0.8mm pitch connector	PCA68PS-0.5P	0.5m
	PCA68PS-1.5P	1.5m
Shielded cable for CardBus counter input card	CNT-68M/50M	0.5m
Termination Panel with Differential Receivers for Counter Input	CTP-4D	*1
Screw Terminal (M3 * 50P)	EPD-50A	*1 *3
Screw Terminal (M3 * 68)	EPD-68A	*2 *3

- *1 CNT-68M/50M optional cable is required separately.
- *2 PCB68PS-0.5P or PCB68PS-1.5P optional cable is required separately.
- *3 "Spring-up" type terminal is used to prevent terminal screws from falling off.

Visit the CONTEC website for the latest optional products.

Nomenclature of Product Components

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



No.	Name	No.	Name
1	Interface Connector (CN1) (page エラー! ブックマークが定義されていません。)	2	Board ID Setting Switch (SW1)

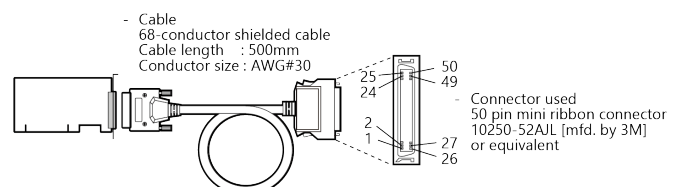
Connecting to an External Device

Connecting an Interface Connector

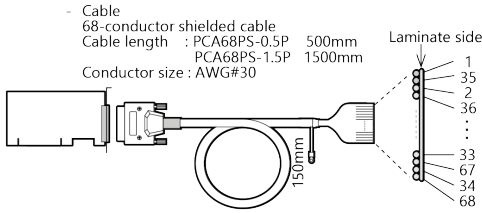
The on-board interface connector (CN1) is used when connecting this product and the external devices.

This shows the connection example of this product and optional cables (CNT-68M/50M or PCA68PS-***P, PCB68PS-***P)

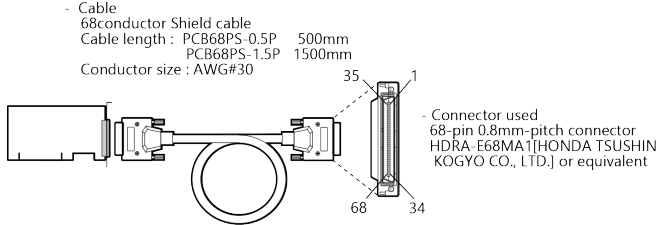
<CNT-68M/50M >



<PCA68PS-**P>



<PCB68PS-**P>



Layout on the Interface Connector (CN1)

CH0 Phase-A input	A0	1	35	GND	Ground
CH0 Phase-B input	B0	2	36	GND	Ground
CH0 Phase-Z input	Z0	3	37	GND	Ground
CH0 control input *1	DI0	4	38	GND	Ground
Unconnection	N.C.	5	39	N.C.	Unconnection
CH1 Phase-A input	A1	6	40	GND	Ground
CH1 Phase-B input	B1	7	41	GND	Ground
CH1 Phase-Z input	Z1	8	42	GND	Ground
CH1 control input *1	DI1	9	43	GND	Ground
Unconnection	N.C.	10	44	N.C.	Unconnection
CH2 Phase-A input	A2	11	45	GND	Ground
CH2 Phase-B input	B2	12	46	GND	Ground
CH2 Phase-Z input	Z2	13	47	GND	Ground
CH2 control input *1	DI2	14	48	GND	Ground
Unconnection	N.C.	15	49	N.C.	Unconnection
CH3 Phase-A input	A3	16	50	GND	Ground
CH3 Phase-B input	B3	17	51	GND	Ground
CH3 Phase-Z input	Z3	18	52	GND	Ground
CH3 control input *1	DI3	19	53	GND	Ground
Unconnection	N.C.	20	54	N.C.	Unconnection
Sampling clock input	CLKIN	21	55	GND	Ground
Sampling stop input	STOPIN	22	56	STARTIN	Sampling start input
Unconnection	N.C.	23	57	N.C.	Unconnection
Sampling clock output	CLKOUT	24	58	GND	Ground
Sampling stop output	STOPOUT	25	59	STARTOUT	Sampling start output
Unconnection	N.C.	26	60	N.C.	Unconnection
Test pulse Phase-A output	TPOA	27	61	TPOB	Test pulse Phase-B output
Unconnection	N.C.	28	62	N.C.	Unconnection
CH0 control output *2	DO0	29	63	DO1	CH1 control output *2
CH2 control output *2	DO2	30	64	DO3	CH3 control output *2
Unconnection	N.C.	31	65	N.C.	Unconnection
Counter input signal pull up	PUP1	32	66	PUP2	Control input signal pull up
Unconnection	N.C.	33	67	N.C.	Unconnection
+3.3V output *3	Vcc	34	68	Vcc	+3.3V output *3

- *1 The control input can serve as the general-input, counter start / stop, preset and zero-clear.
- *2 The control output can serve as the general-output, count match, abnormal input error and digital filter error.
- *3 The total available current capacity is 500mA (Max).

Signal assignment with the CNT-68M/50M used (50-pin connector side)

+3.3V Output *3	Vcc	25	50	Vcc	+3.3V Output *3
Counter Input signal pull-up	PUP1	24	49	PUP2	Counter Input signal pull-up
CH2 control output *2	DO2	23	48	DO3	CH3 control output *2
CH0 control output *2	DO0	22	47	DO1	CH1 control output *2
Test pulse Phase-A output	TPOA	21	46	TPOB	Test pulse Phase-B output
Sampling Stop Output	STOPOUT	20	45	STARTOUT	Sampling Start Output
Sampling Clock Output	CLKOUT	19	44	GND	Ground
Sampling Stop Input	STOPIN	18	43	STARTIN	Sampling Start Input
Sampling Clock Input	CLKIN	17	42	GND	Ground
CH3 Control Input *1	DI3	16	41	GND	Ground
CH3 Phase-Z input	Z3	15	40	GND	Ground
CH3 Phase-B input	B3	14	39	GND	Ground
CH3 Phase-A input	A3	13	38	GND	Ground
CH2 Control Input *1	DI2	12	37	GND	Ground
CH2 Phase-Z input	Z2	11	36	GND	Ground
CH2 Phase-B input	B2	10	35	GND	Ground
CH2 Phase-A input	A2	9	34	GND	Ground
CH1 Control Input *1	DI1	8	33	GND	Ground
CH1 Phase-Z input	Z1	7	32	GND	Ground
CH1 Phase-B input	B1	6	31	GND	Ground
CH1 Phase-A input	A1	5	30	GND	Ground
CH0 Control Input *1	DI0	4	29	GND	Ground
CH0 Phase-Z input	Z0	3	28	GND	Ground
CH0 Phase-B input	B0	2	27	GND	Ground
CH0 Phase-A input	A0	1	26	GND	Ground

- *1 The control input can serve as the general-input, counter start / stop, preset and zero-clear.
- *2 The control output can serve as the general-output, count match, abnormal input error and digital filter error.
- *3 The total available current capacity is 500mA (Max).

How to Connect the Counter Input Signal

Connection of a Counter Input

You can connect to a rotary encoder or linear scale with a TTL level output circuit, or to an open-collector output circuit. The signal must be an LVTTTL level input and can be up to 10MHz. If you do not pull up to the input point, it will affect the counter input channel, so pull up even if you are connecting to either the open collector output circuit or the TTL level output circuit. Adjust the pull-up voltage to match the drive voltage of the output IC. If you pull up at 3.3 V, you can also use the VCC terminal of the board.

A pull-up resistor (10 kΩ) is installed inside the board. 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.

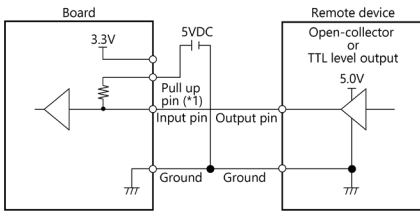
Remarks

The pull-up pins are PUP1 (pin 32 *1) for the counter input signal and PUP2 (pin 66 *1) for the control input signal.
 PUP1 (pin 32): Pull-up for A, B, and Z phase input signal (A0, B0, Z0, A1, B1, Z1, A2, B2, Z2, A3, B3, Z3).
 PUP2 (pin 66): Pull-up for the control input signals and for the sampling input signals (DI0, DI1, DI2, DI3, CLKIN, STARTIN, STOPIN).

- *1 Connector pin number on the board.

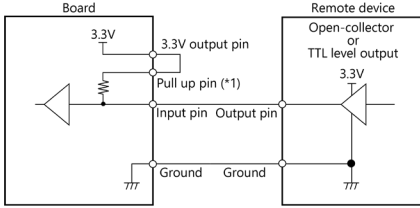
Example Connection for Counter Input Circuit

Connection when it is pull-up by external 5-V power (Counter Input)



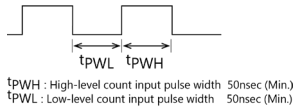
*1 The pull-up pins are PUP1 for the counter input signal and PUP2 for the control input signal.

Connection when it is pull-up by internal 3.3-V output power (Counter Input)



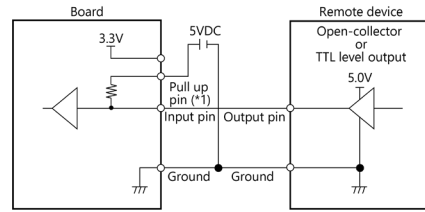
*1 The pull-up pins are PUP1 for the counter input signal and PUP2 for the control input signal.

Input signal



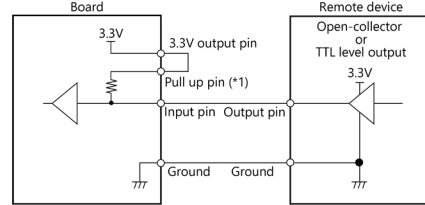
CAUTION

- The connection cable length should be within 1.5 m.
- To prevent noise from causing a malfunction, arrange the connection cable as away from any other signal conductor or noise source as possible.
- Please use the shielded cable to meet "CE EMC Directive".



*1 The pull-up pins are PUP1 for the counter input signal and PUP2 for the control input signal.

Connection when it is pull-up by internal 3.3-V output power (Control input DI0, DI1, DI2, DI3, CLKIN, STARTIN, STOPIN)



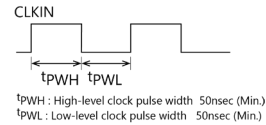
*1 The pull-up pins are PUP1 for the counter input signal and PUP2 for the control input signal.

CAUTION

- The connection cable length should be within 1.5 m.
- To prevent noise from causing a malfunction, arrange the connection cable as away from any other signal conductor or noise source as possible.
- Please use the shielded cable to meet "CE EMC Directive".

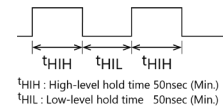
External sampling clock signal (CLKIN)

Pin used to input the external pacer clock. The maximum frequency is 10MHz. If the external clock input is selected as the sampling clock, sampling occurs on the falling edge of the signal.



Other control input signals (DI0 - DI3, STARTIN, STOPIN)

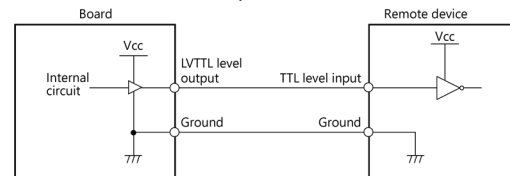
These signals are TTL level compatible and the trigger edge is software-programmable at either the rising or falling edge. High- and low-level hold times of at least 50 nsec are required to detect an edge of the signal.



Connection of a control output

This outputs a general-purpose output signal (level output) or a one-shot pulse output to indicate a hardware event such as a count match. The signal is an LVTTTL level output and can be set to positive or negative logic by software.

Control output circuit and its sample connection(DO0 - DO3, CLKOUT, STARTOUT, STOPOUT)



CAUTION

Please use the shielded cable to meet "CE EMC Directive".

Connecting the control signal input/output

Connection of a control input

The control input signals consist of one pin per channel that can be selected as the channel's counter start/stop or preset, and one pin per board that can be used as the start, stop, and clock for sampling. The signals are LVTTTL-level (3.3V) inputs.

If you do not pull up to the input point, it will affect the counter input channel, so pull up even if you are connecting to either the open collector output circuit or the TTL level output circuit. Adjust the pull-up voltage to match the drive voltage of the output IC.

If you pull up at 3.3 V, you can also use the VCC terminal of the board.

A pull-up resistor (10 kΩ) is installed inside the board.

Remarks

The pull-up pins are PUP1 (pin 32 *1) for the counter input signal and PUP2 (pin 66 *1) for the control input signal.

PUP1 (pin 32) : Pull-up for A, B, and Z phase input signal (A0, B0, Z0, A1, B1, Z1, A2, B2, Z2, A3, B3, Z3).

PUP2 (pin 66) : Pull-up for the control input signals and for the sampling input signals (DI0, DI1, DI2, DI3, CLKIN, STARTIN, STOPIN)

*1 Connector pin number on the board.

Control input circuit and its sample connection

Connection when it is pull-up by external 5-V power (Control input DI0, DI1, DI2, DI3, CLKIN, STARTIN, STOPIN)