

## Digital I/O Board for PCI PIO-32/32T(PCI)H



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

### Features

#### Non-isolated TTL level input, non-isolated open-collector output

The product has the 32ch of non-isolated TTL level input and 32ch of non-isolated open-collector output whose response speed is 200nsec. The output rating is max. 30VDC, 40mA per ch.

#### 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.

#### 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.

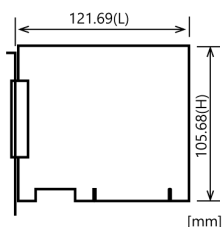
#### Windows/Linux support device driver

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.

### Included Items

Product [PIO-32/32T(PCI)H] ...1  
Please read the following ... 1

### Physical Dimensions



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

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

The product features 32 non-isolated TTL level inputs and 32 non-isolated open-collector outputs.

You can use all of input signals as interrupt inputs. In addition, 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 September, 2023.

### Specifications

#### Function specification

Item		Specifications
Input	Type	Non-isolated TTL-Level Input (Negative logic *1)
	Number of Channels	32ch (All available for interrupts)
	Pull up resistance	10kΩ (1TTL load)
	Interrupt	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	200nsec within
Output	Type	Non-isolated Open collector output (Negative logic *1)
	Number of Channels	32ch
	Output rated voltage	30VDC (Max)
	Output rated current	40mA (par/channel) (Max)
	Response time	200nsec within
Common	Connecting distance	1.5m(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.
	Power consumption	5VDC 350mA (Max)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
	Dimension (mm)	121.69(L) x 105.68(H)
	Weight	100g

\*1 Data "0" and "1" 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

## Support Software

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++ and 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.

<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
Shielded Cable with Two 96-Pin Half-Pitch Connectors	PCB96PS-0.5P	0.5m
	PCB96PS-1.5P	1.5m
Flat Cable with 96-pin Half-Pitch Connectors at Both Ends	PCB96P-1.5	1.5m
Shielded Cable with One 96-pin Half-Pitch Connector	PCA96PS-0.5P	0.5m
	PCA96PS-1.5P	1.5m
Flat Cable with One 96-pin Half-Pitch Connector	PCA96P-1.5	1.5m
Connection Conversion Shield Cable (96P→37P x 2)	PCB96WS-1.5P	1.5m
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
General Purpose Terminal	DTP-3C	*3
Screw Terminal	DTP-4C	*3
Signal monitor Accessory for Digital I/O (64bits)	CM-64L	*2
Signal monitor Accessory for Digital I/O (32bits)	CM-32L	*3
Connector Conversion Board (96pin→37pinx2)	CCB-96	*2

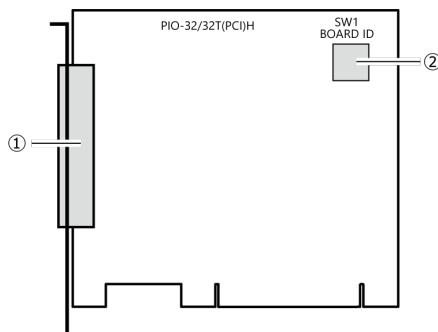
\*1 "Spring-up" type terminal is used to prevent terminal screws from falling off.

\*2 PCB96P or PCB96PS optional cable is required separately.

\*3 PCB96WS optional cable is required separately.

\* Information about the option products, see the Contec's website.

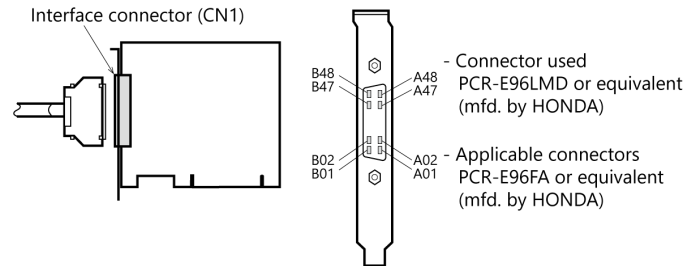
## Component Name



No.	Name
1	Interface Connector
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)

+5V	Vcc	B48		A48	Vcc	+5V
	Vcc	B47		A47	Vcc	
+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	
+6 port (Output)	O-70	B39		A39	I-30	+2 port (Input)
	O-67	B38		A38	I-27	
	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	
Signal common	GND	B30		A30	GND	Signal common
	GND	B29		A29	GND	
Unconnected	N.C.	B28		A28	N.C.	Unconnected
	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.	
	N.C.	B20		A20	N.C.	
	N.C.	B19		A19	N.C.	
	N.C.	B18		A18	N.C.	
	N.C.	B17		A17	N.C.	
+5V	Vcc	B20		A20	Vcc	+5V
	Vcc	B19		A19	Vcc	
+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	
	O-47	B10		A10	I-07	
	O-46	B09		A09	I-06	
+4 port (Output)	O-45	B08		A08	I-05	+0 port (Input)
	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	
Signal common	GND	B02		A02	GND	Signal common
	GND	B01		A01	GND	

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

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

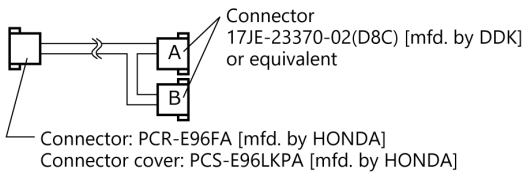
Signal name	Description
I-00 - I-37	32 input signal pins. Connect output signals from the external device to these pins.
O-40 - O-77	32 output signal pins. Connect these pins to the input signal pins of the external device.
Vcc	These pins output power at +5 V.
GND	These pins are connected to the slot's GND.
N.C.	These pins are 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.

## Pin Assignments of Optional Connector PCB96WS

\* Optional cable PCB96WS-\*\*

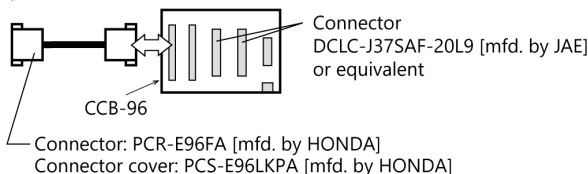


\*\* represents the cable length (1.5m).

CNA for PCB96WS									
Signal common	GND	1	20	GND	Signal common	GND	1	20	GND
+0 port (Input)	I-00	2	21	I-20	+2 port (Input)	O-40	2	21	O-60
	I-01	3	22	I-21		O-41	3	22	O-61
	I-02	4	23	I-22		O-42	4	23	O-62
	I-03	5	24	I-23		O-43	5	24	O-63
	I-04	6	25	I-24		O-44	6	25	O-64
	I-05	7	26	I-25		O-45	7	26	O-65
	I-06	8	27	I-26		O-46	8	27	O-66
+1 port (Input)	I-07	9	28	I-27	+3 port (Input)	O-47	9	28	O-67
	I-10	10	29	I-30		O-50	10	29	O-70
	I-11	11	30	I-31		O-51	11	30	O-71
	I-12	12	31	I-32		O-52	12	31	O-72
	I-13	13	32	I-33		O-53	13	32	O-73
	I-14	14	33	I-34		O-54	14	33	O-74
	I-15	15	34	I-35		O-55	15	34	O-75
+5V	I-16	16	35	I-36	+5V	O-56	16	35	O-76
	I-17	17	36	I-37		O-57	17	36	O-77
	Vcc	18	37	Vcc		Vcc	18	37	Vcc
N.C.		19			N.C.		19		

## Pin Assignments of Optional Connector CCB-96

\* Optional cable PCB96PS-\*\* + connector conversion board CCB-96

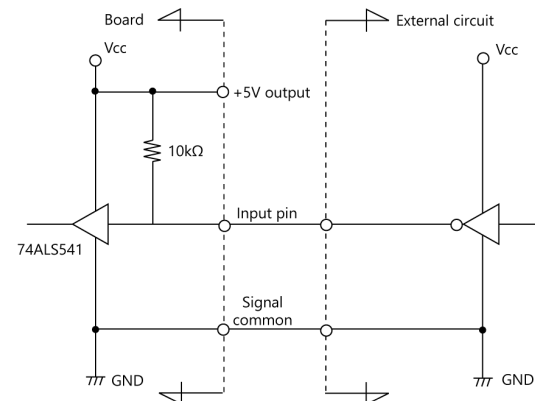


\*\* represents the cable length (0.5, or 1.5m).

CN3(CNA) for CCB96									
Signal common	GND	1	20	GND	Signal common	GND	1	20	GND
+0 port (Input)	I-00	2	21	I-20	+2 port (Input)	O-40	2	21	O-60
	I-01	3	22	I-21		O-41	3	22	O-61
	I-02	4	23	I-22		O-42	4	23	O-62
	I-03	5	24	I-23		O-43	5	24	O-63
	I-04	6	25	I-24		O-44	6	25	O-64
	I-05	7	26	I-25		O-45	7	26	O-65
	I-06	8	27	I-26		O-46	8	27	O-66
+1 port (Input)	I-07	9	28	I-27	+3 port (Input)	O-47	9	28	O-67
	I-10	10	29	I-30		O-50	10	29	O-70
	I-11	11	30	I-31		O-51	11	30	O-71
	I-12	12	31	I-32		O-52	12	31	O-72
	I-13	13	32	I-33		O-53	13	32	O-73
	I-14	14	33	I-34		O-54	14	33	O-74
	I-15	15	34	I-35		O-55	15	34	O-75
+5V	I-16	16	35	I-36	+5V	O-56	16	35	O-76
	I-17	17	36	I-37		O-57	17	36	O-77
	Vcc	18	37	Vcc		Vcc	18	37	Vcc
N.C.		19			N.C.		19		

## Connecting Input and Output Signal

### Input Circuit



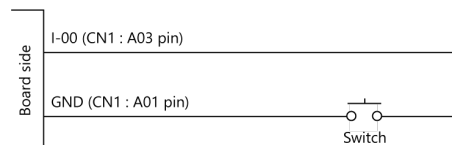
\* I-xx represent an input pin.

External digital signals given to signal inputs are TTL levels.

The individual input signals are passed to the personal computer as active low signals.

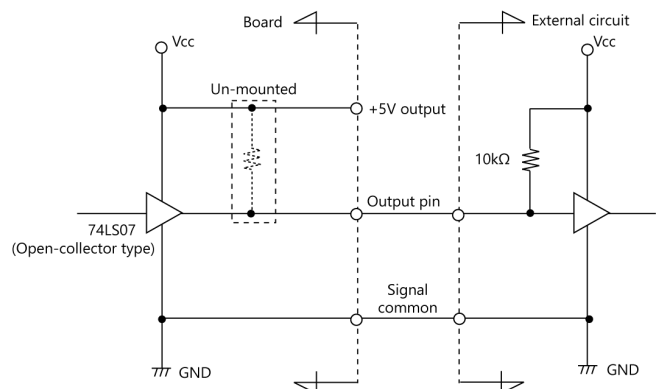
As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.

### 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.

### Output Circuit



\* O-xx represents the output pin.

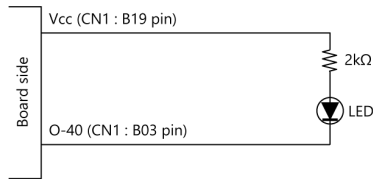
Signal outputs are open-collector outputs; individual output signals are sent to the external device as active low signals.

Note that each signal output must be pulled up at the external device as it is not pulled up internally.

### CAUTION

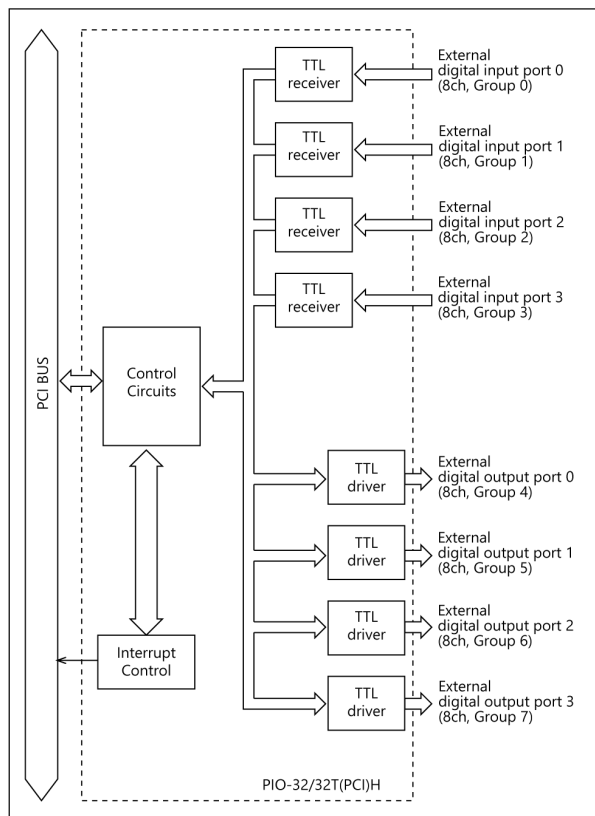
When the PC is turned on, all outputs are reset to OFF.

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



When "1" is output to a relevant bit, the corresponding LED comes on.  
When "0" is output to the bit, in contrast, the LED goes out.

## Block Diagram



## Differences from Conventional Products

### Differences between the PIO-32/32T(PCI)H and PIO-32/32T(PCI)

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

- (1) Different in the number of input signals available to interrupt requests  
 PIO-32/32T(PCI)H : All of 32 channels  
 PIO-32/32T(LPCI) : 4 channels
- (2) Different in the expression to calculate the digital filter time  
 (n: setting value)  
 PIO-32/32T(PCI)H :  $2^n / (8 \times 10^6)$   
 PIO-32/32T(PCI) :  $2^n / (16 \times 10^6)$
- (3) Different in interrupt level resource allocation  
 PIO-32/32T(PCI)H : Automatically allocates on interrupt level.  
 PIO-32/32T(PCI) : Uses a jumper switch to select whether to allocate interrupt levels.
- (4) The external dimensions of the board differ.  
 PIO-16/16T(LPCI)H : 121.69(L) x 105.68(H) mm  
 PIO-16/16T(LPCI) : 121.69(L) x 106.68(H) mm
- (5) Different in current consumption (Max.)  
 PIO-32/32T(PCI)H : 5VDC 350mA (Max.)  
 PIO-32/32T(PCI) : 5VDC 500mA (Max.)