TTL-Level Digital I/O Board for PCI

PIO-32/32T(PCI)H

This product is a PCI bus-compliant interface board used to provide a digital signal I/O function on a PC.
This product features 32 unisolated TTL level inputs and 32 unisolated open-collector outputs.   You can use 32 input signals as interrupt inputs.   In addition, the digital filter function to prevent wrong recognition of input signals is provided.
Windows/Linux driver is bundled with this product.
Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

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

Features

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

You can use all of the input signals as interrupt request signals.
You can use all of the 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.

This product has a 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 compatible driver libraries are attached.
Using the attached driver library API-PAC(W32) makes it possible to create applications of Window/Linux.   In addition, a diagnostic program by which the operations of hardware can be checked is provided.

LabVIEW is supported by a plug-in of dedicated library VI-DAQ.
Using the dedicated library VI-DAQ makes it possible to make a LabVIEW application.

Specification

Item		Specification
Input		
	Input format	Unisolated TTL level input (Negative logic *1)
	Number of input signal channels	32 channels (all available for interrupts)
	Pull Up resistance	10kΩ(1TTL load)
	Interrupt	32 interrupt input signals are arranged into a single output of interrupt signal INTA. An interrupt is generated at the rising edge (HIGH-to-LOW transition) or falling edge (LOW-to-HIGH transition).
	Response time	200nsec within
Output		
	Output format	Unisolated Open collector output (Negative logic *1)
	Number of output signal channels	32 channels
	Output rating — Output voltage	30VDC (Max.)
	Output rating — Output current	40mA (par channel) (Max.)
	Response time	200nsec within
Common		
	I/O address	Any 32-byte boundary
	Interrupt Level	Level 1
	Max. board count for connection	16 boards including the master board
Common		
	Power consumption	5VDC 350mA(Max.)
	Operating condition	0 - 50°C, 10 - 90%RH(No condensation)
	Allowable distance of signal extension	Approx. 1.5m (depending on wiring environment)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
	Dimension (mm)	121.69(L) x 105.68(H)
	Weight	100g
Certification		RoHS,CE,VCCI

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

Board Dimensions

121.69(L)
105.68(H)
[mm]
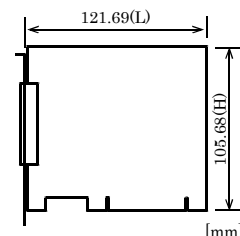
The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

Windows version of digital I/O driver API-DIO(WDM) / API-DIO(98/PC)
[Stored on the bundled Disk driver library API-PAC(W32)]

The API-DIO(WDM) / API-DIO(98/PC) is the Windows version driver library software that provides products in the form of Win32 API functions (DLL).   Various sample programms such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.

You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/).   For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Linux version of digital I/O driver API-DIO(LNX)
[Stored on the bundled Disk driver library API-PAC(W32)]

The API-DIO(LNX) is the Linux version driver software which provides device drivers (modules) by shared library and kernel version.   Various sample programs of gcc are provided.

You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/).   For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Data acquisition VI library for LabVIEW VI-DAQ
(Available for downloading (free of charge) from the CONTEC web site.)

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.com/vidaq/ for details and download of VI-DAQ.

Packing List

Board [PIO-32/32T(PCI)H]…1
First step guide …1
Disk *1 [API-PAC(W32)] …1
Serial number label…1
Product Registration Card & Warranty Certificate…1

*1   The Disk contains the driver software and User's Guide.

Cable & Connector

Cable (Option)

Shielded Cable with 96-pin
Half-Pitch Connectors at Both Ends : 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 cables with single-ended connector
for 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
(96-pin→37-pin D-SUB x 2)   : PCB96WS-1.5P (1.5m)

Connector (Option)

Half Pitch 96-pin Female Connector Set
(5Pieces)   : CN5-H96F

Accessories

Accessories (Option)

Screw Terminal (M3 x 96P)   : EPD-96A *1*3
Screw Terminal (M3.5 x 96P)   : EPD-96 *1
Screw Terminal   : DTP-64(PC) *1
Signal Monitor for Digital I/O (64Bits)   : CM-64(PC)E *1
Connector Conversion Board (96P→37P x 2) : CCB-96 *1
Screw Terminal (M3 x 37P)   : EPD-37A *2*3
Screw Terminal (M3.5 x 37P)   : EPD-37 *2
General Purpose Terminal   : DTP-3A *2
Screw Terminal   : DTP-4A *2
Signal Monitor for Digital I/O   : CM-32(PC)E *2

*1   PCB96P-1.5 or PCB96PS-0.5P, 1.5P optional cable is required separately.
*2   PCB96WS optional cable is required separately.
*3   "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.

Block Diagram

PIO-32/32T(PCI)H
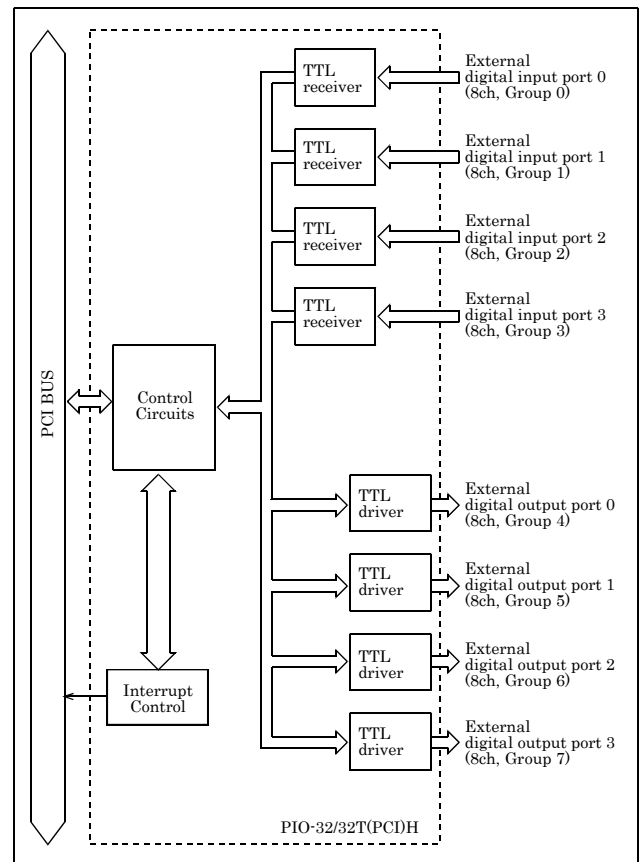
How to connect the connectors

Connector shape

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

- Connector used PCR-E96LMD (mfd. by HONDA)
- Applicable connectors PCR-E96FA (mfd. by HONDA)

*   Please refer to page 2 for more information on the supported cable and accessories.

Connector Pin Assignment
Pin Assignments of Interface Connector (CN1)

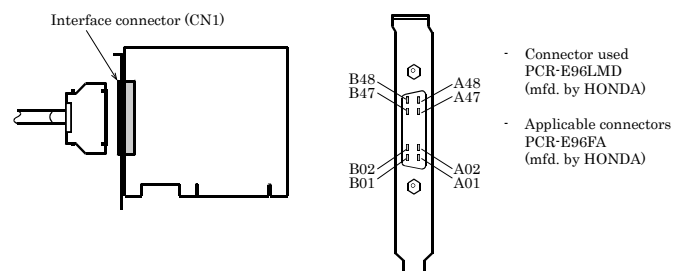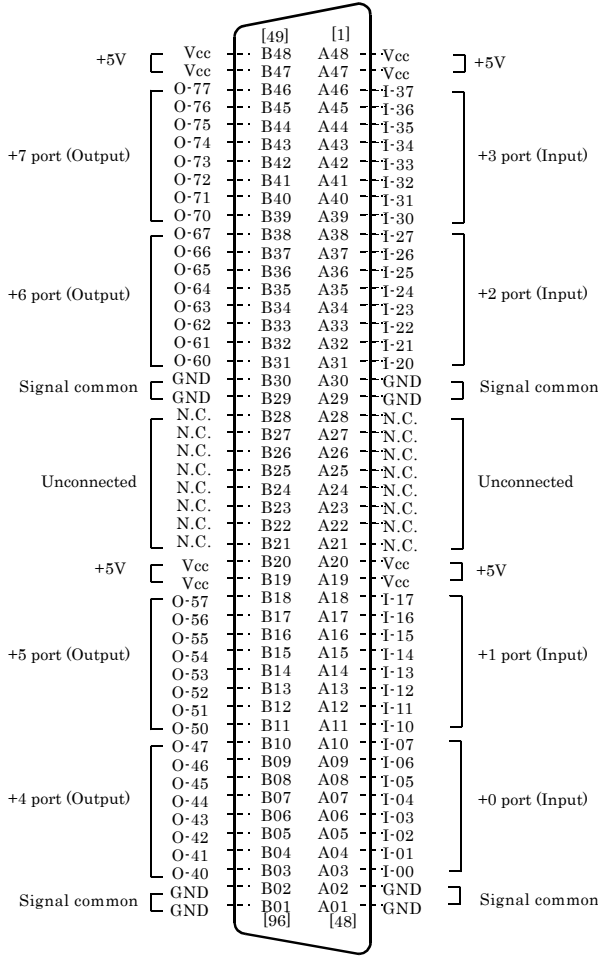|		[49]	[1]		
+5V	Vcc	B48	A48	Vcc	+5V
	Vcc	B47	A47	Vcc	
	O-77	B46	A46	I-37	
	O-76	B45	A45	I-36	
+7 port (Output)	O-75	B44	A44	I-35	+3 port (Input)
	O-74	B43	A43	I-34	
	O-73	B42	A42	I-33	
	O-72	B41	A41	I-32	
	O-71	B40	A40	I-31	
	O-70	B39	A39	I-30	
	O-67	B38	A38	I-27	
	O-66	B37	A37	I-26	
	O-65	B36	A36	I-25	
+6 port (Output)	O-64	B35	A35	I-24	+2 port (Input)
	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	
	N.C.	B28	A28	N.C.	
	N.C.	B27	A27	N.C.	
	N.C.	B26	A26	N.C.	
Unconnected	N.C.	B25	A25	N.C.	Unconnected
	N.C.	B24	A24	N.C.	
	N.C.	B23	A23	N.C.	
	N.C.	B22	A22	N.C.	
	N.C.	B21	A21	N.C.	
+5V	Vcc	B20	A20	Vcc	+5V
	Vcc	B19	A19	Vcc	
	O-57	B18	A18	I-17	
	O-56	B17	A17	I-16	
	O-55	B16	A16	I-15	
+5 port (Output)	O-54	B15	A15	I-14	+1 port (Input)
	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	
	O-45	B08	A08	I-05	
+4 port (Output)	O-44	B07	A07	I-04	+0 port (Input)
	O-43	B06	A06	I-03	
	O-42	B05	A05	I-02	
	O-41	B04	A04	I-01	
	O-40	B03	A03	I-00	
	GND	B02	A02	GND	
Signal common	GND	B01	A01	GND	Signal common
		[96]	[48]		

- [ ] shows the pin numbers specified by HONDA.

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	+5V supply.*The total current of all eight Vcc pins is 1A(Max).
GND	Connected to slot GND
N.C.	This pin is left unconnected.

Pin Assignments of Optional Connector PCB96WS

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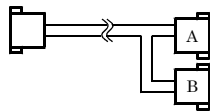
		CNA							CNB		
Signal common	GND	20		1	GND	Signal common	Signal common	GND	20	1	GND	Signal common
	I-20	21		2	I-00			O-60	21	2	O-40	
	I-21	22		3	I-01			O-61	22	3	O-41	
+2 port (input)	I-22	23		4	I-02	+0 port (input)	+6 port (output)	O-62	23	4	O-42	+4 port (output)
	I-23	24		5	I-03			O-63	24	5	O-43	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

Pin Assignments of Optional Connector CCB-96

- "Optional cable PCB96PS"
+ "Connector conversion board CCB-96"

Connector DCLC-J37SAF-20L9 or equivalence to it (mfd by JAE)

CCB-96
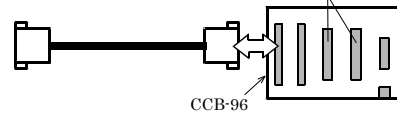
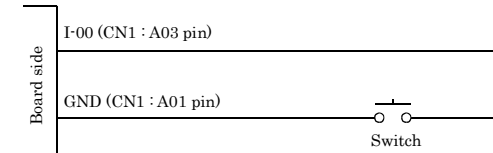|		CN3(CNA)								CN4(CNB)			
Signal common	GND	1		20	GND	Signal common	Signal common	GND	1		20	GND	Signal common
	I-00	2		21	I-20			O-40	2		21	O-60	
	I-01	3		22	I-21			O-41	3		22	O-61	
+0 port (input)	I-02	4		23	I-22	+2 port (input)	+4 port (output)	O-42	4		23	O-62	+6 port (output)
	I-03	5		24	I-23			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	
	I-07	9		28	I-27			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	
+1 port (input)	I-12	12		31	I-32	+3 port (input)	+5 port (output)	O-52	12		31	O-72	+7 port (output)
	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	
	I-16	16		35	I-36			O-56	16		35	O-76	
	I-17	17		36	I-37			O-57	17		36	O-77	
+5V	Vcc	18		37	Vcc	+5V	+5V	Vcc	18		37	Vcc	+5V
	N.C.	19						N.C.	19				

Connecting Input Signals

The input circuits of interface blocks of the PIO-32/32T(PCI)H are illustrated in the image below. The inputs are negative-logic TTL-level signals. These inputs have been pulled up with on board resisters, therefore you can connect these inputs directly to relay or semiconductor switches.

Input Circuit

Board

External circuit

Vcc

Vcc

+5V output

10kΩ

Input pin

74ALS541

Signal common

GND

GND
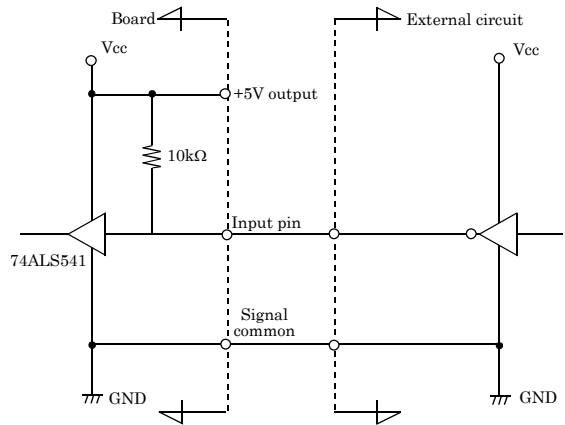
* I-xx represents the input pin.

Connecting a Switch

Board side

I-00 (CN1 : A03 pin)

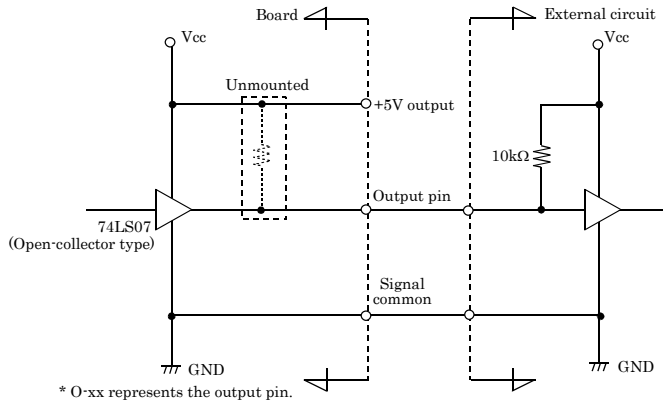GND (CN1 : A01 pin)

Switch

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

Connecting Output Signals

The output circuits of interface blocks of the PIO-32/32T(PCI)H are illustrated in the image below.   The signal output section is an open-collector output (current sink type).   Because it is not pulled up on board, you have to add pull-up resister externally.
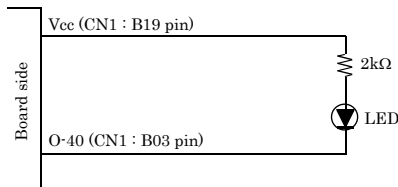
Output Circuit

Board — External circuit
Vcc — Vcc
Unmounted
+5V output
10kΩ
Output pin
74LS07
(Open-collector type)
Signal common
GND — GND
* O-xx represents the output pin.

⚠ CAUTION
   When the PC is turned on, all output are reset to OFF.

Connection to the LED

Vcc (CN1 : B19 pin)
Board side
2kΩ
LED
O-40 (CN1 : B03 pin)

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.

Differences between 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(PCI)   : 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) Different in board dimensions

   PIO-32/32T(PCI)H   : 121.69(L) x 105.68(H)mm
   PIO-32/32T(PCI)   : 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.)