

Digital I/O Board for PCI  
**PIO-16/16T(PCI)H**



\* 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 16ch of unisolated TTL level input and 16ch of unisolated 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.

**Functions and connectors are compatible with PCI compatible board PIO-16/16T(PCI).**

The functions same with PCI compatible board PIO-16/16T(PCI) are provided. In addition, as there is compatibility in terms of connector shape and pin assignments, it is easy to migrate from the existing system.

**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 applic

This product is a PCI bus-compliant interface board used to provide a digital signal I/O function on a PC. This product features 16 unisolated TTL level inputs and 16 unisolated open-collector outputs. You can use 16 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.

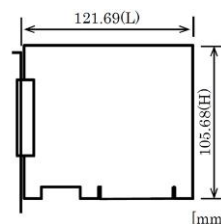
**Specification**

Item	Specification	
<b>Input</b>		
Input format	Unisolated TTL input (Negative logic *1)	
Number of input signal channels	16 channels (all available for interrupts)	
Pull Up resistance	10kΩ(1TTL load)	
Interrupt	16 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	Within 200nsec	
<b>Output</b>		
Output format	Unisolated open collector output (Negative logic *1)	
Number of output signal channels	16 channels	
Output rating	Output voltage	30VDC (Max.)
	Output current	40mA (par channel) (Max.)
Response time	200nsec within	
<b>Common</b>		
Power consumption	5VDC 200mA(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**



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 programs 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-16/16T(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 (this guide)

## Cable & Connector (Option)

Shield Cable with 37-Pin D-sub Connector at either Ends (Mold Type)  
: PCB37PS-0.5P (0.5m)  
: PCB37PS-1.5P (1.5m)  
Flat Cable with 37-Pin D-sub Connectors at either Ends  
: PCB37P-1.5 (1.5m)  
Shield Cable with 37-Pin D-sub Connector at One End (Mold Type)  
: PCA37PS-1.5P (1.5m)  
Flat Cable with 37-Pin D-sub Connector at One End  
: PCA37P-1.5 (1.5m)  
D-SUB37P Male Connector Set (5 Pieces)  
: CN5-D37M

## Accessories (Option)

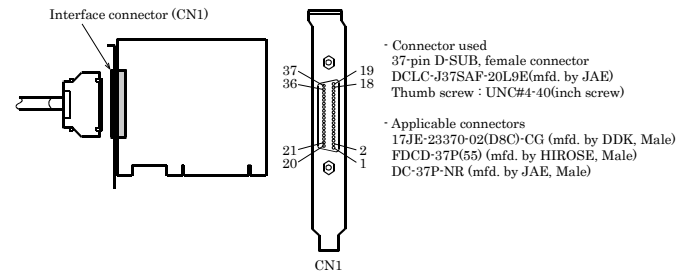
Screw Terminal (M3 x 37P) : EPD-37A \*1\*2  
Screw Terminal (M3.5 x 37P) : EPD-37 \*1  
General Purpose Terminal : DTP-3A \*1  
Screw Terminal : DTP-4A \*1  
Signal Monitor for Digital I/O (32Bits) : CM-32(PC)E \*1

\*1 A PCB37P or PCB37PS optional cable 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.

## How to connect the connectors

### Connector shape

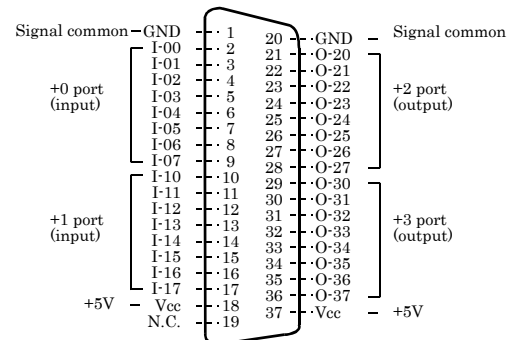
The on-board interface connector (CN1) is used when connecting this product and the external devices.



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

### Connector Pin Assignment

Pin Assignments of Interface Connector (CN1)

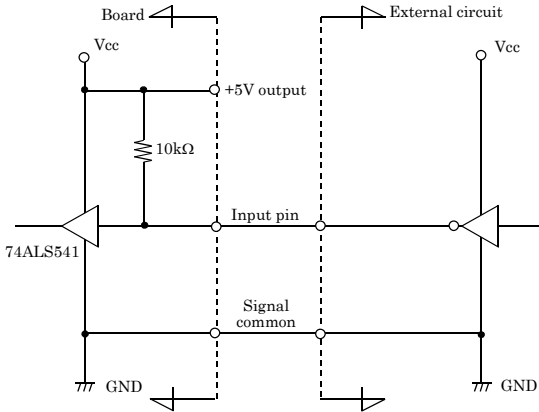


I-00 - I-17	16 input signal pins. Connect output signals from the external device to these pins.
O-20 - O-37	16 output signal pins. Connect these pins to the input signal pins of the external device.
Vcc	+5V supply. The total current of all two Vcc pins is 1A(Max).
GND	Connected to slot GND
N.C.	This pin is left unconnected.

## Connecting Input Signals

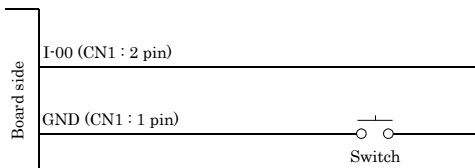
The input circuits of interface blocks of the PIO-16/16T(PCI)H are illustrated below. The inputs are negative-logic TTL-level signals. These inputs have been pulled up with on board resistors, therefore you can connect these inputs directly to relay or semiconductor switches.

### Input Circuit



\* I-xx represents the input pin.

### Connecting a Switch

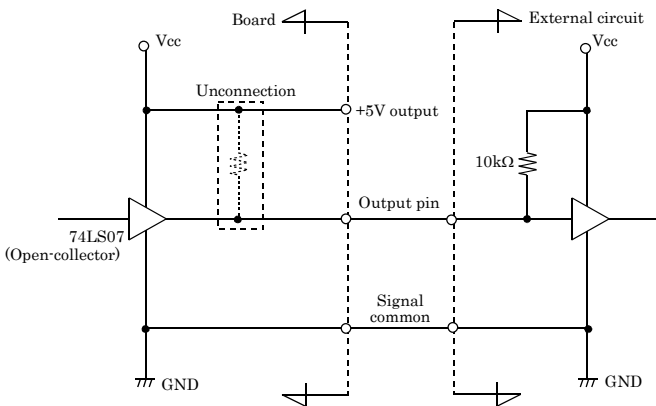


When switch is "ON", the corresponding bit is "1".  
When switch is "OFF" in contrast, the corresponding bit is "0".

## Connecting Input Signals

The output circuits of interface blocks of the PIO-16/16T(PCI)H are illustrated 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 circuit externally.

### Output Circuit

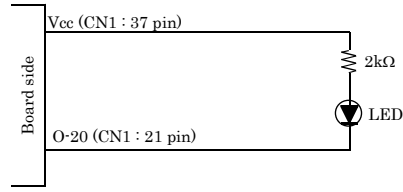


\* O-xx represents the output pin.

### CAUTION

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

## Connection to the LED



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.

## A Protection Function of the +5V Outputs

A protection function, which prevents excessive current flow from the +5V outputs, is attached to this board. In case of accidental short of the +5V output and GND, for example, the function works, and the board operation may become impossible temporarily. In such a case, you should turn the PC off and wait for several minutes before you use the board again.

## Block Diagram

