

## Digital I/O Board for Low Profile PCI

## PIO-16/16T(LPCI)H



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

## Features

Unisolated TTL-level input/output enabling fast response.

Capable of receiving 16-channel TTL-level digital signals

Capable of sending 16-channel open-collector digitals

You can use all of the input signals as interrupt inputs. You can also select the interrupt trigger edge of the input signal.

The board has a digital filter feature to prevent noise or chatter from causing erroneous inputs.

Up to 30VDC, 40mA per signal, max. output.

Support for both of low-profile and standard PCI slots (interchangeable with a bundled bracket).

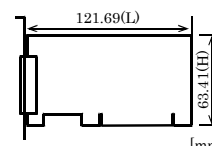
## Specification

Item	Specification
<b>Input</b>	
Input format	TTL-level input (Negative logic *1)
Number of input signal channels	16 channels (all available for interrupts) (1 common)
Input resistance	10kΩ (1 TTL 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	200nsec within
<b>Output</b>	
Output format	Open-collector output (Negative logic*1)
Number of output signal channels	16 channels (1 common)
Output rating	Output voltage
	30VDC (Max.)
	Output current
	40mA (par channel) (Max. )
Response time	200nsec within (Variable with pull-up resistance)
<b>Common</b>	
I/O address	Any 32-byte boundary
Interruption level	1 level use
Max. board count for connection	16 boards including the master board
Power consumption	5VDC 100mA(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 63.41(H)
Weight	60g
Certification	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

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

\*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).

## 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

### Driver Software Package API-PAC(W32) (Available for downloading (free of charge) from the CONTEC web site.)

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 to supply the updated drivers and differential files.

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) (Supplied: Stored on the API-PAC(W32) Disk)

This driver is used to control CONTEC digital I/O boards (cards) from within Linux.

You can control CONTEC I/O boards easily using the shared library used by gcc and Kylix, the device driver (module) for each kernel version, and the board (card) configuration program (config).

CONTEC provides download services to supply the updated drivers and differential files.

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 (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.

For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

## Packing List

Board [PIO-16/16T(LPCI)H] ...1  
First step guide ... 1  
Disk \*1 [API-PAC(W32)] ...1  
Bracket for PCI...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)

Shield Cable with Two 50-Pin Mini-Ribbon Connector  
: PCB50PS-0.5P(0.5m)  
: PCB50PS-1.5P(1.5m)

Shield Cable with One 50-Pin Mini-Ribbon Connector  
: PCA50PS-0.5P(0.5m)  
: PCA50PS-1.5P(1.5m)

Connection Conversion 0.5m Shield Cable  
(50-Pin Ribbon->37-Pin D-SUB) : PCE50/37PS-0.5P(0.5m)

## Accessories

### Accessories (Option)

Screw Terminal Unit (M3 terminal block, 50 points)	: EPD-50A	*1
Screw Terminal Unit (M3 terminal block, 37 points)	: EPD-37A	*2
Screw Terminal Unit (M3.5 terminal block, 37 points)	: EPD-37	*2
Termination Panel (M3)	: DTP-3C	*3
Termination Panel	: DTP-4C	*3
Signal Monitor for Digital I/O	: CM-32L	*2

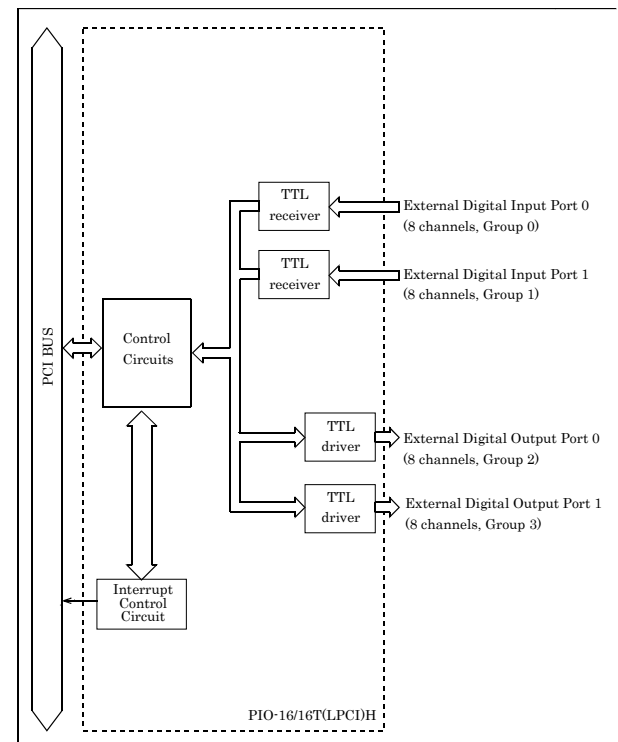
\*1 PCB50PS-\*P optional cable is required separately.

\*2 PCE50/37PS-0.5P and PCB37P or PCB37PS optional cable is required separately.

\*3 PCE50/37PS-0.5P optional cable is required separately.

\* Check the CONTEC's Web site for more information on these options.

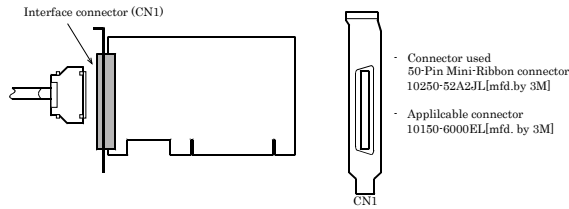
## Block Diagram



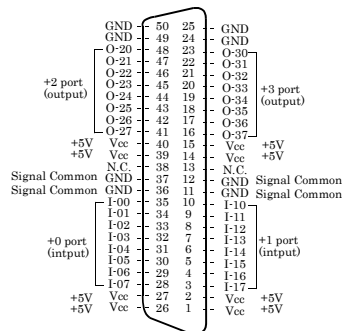
## Using the On-board Connectors

### Connecting a Device to a Connector

To connect an external device to this board, plug the cable from the device into the interface connector shown below.



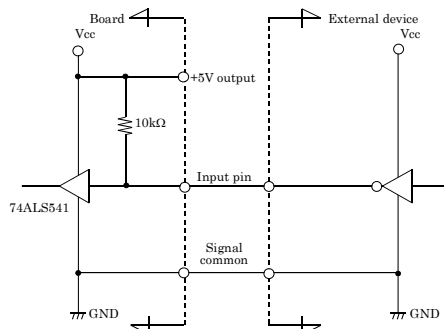
### Pin Assignments of Interface Connector



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	This pin outputs power at +5 V.
GND	This pin is connected to the slot's GND.
N.C.	This pin is left unconnected.

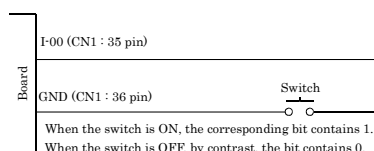
## Connecting Input Signals

### Input Circuit



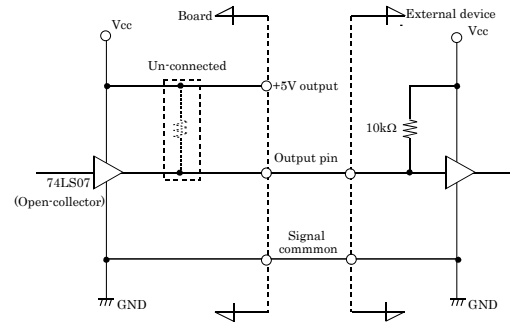
The input circuit of interface is illustrated in the image above. External digital signals given to signal inputs are TTL levels. The individual input signals are passed to the personal computer as active low signals. As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.

### Connecting a Switch



## Connecting Output Signals

### Output Circuit

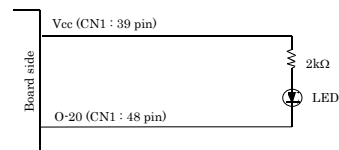


The output circuit of interface is illustrated in the image above. Signal outputs are open-collector outputs; individual output signals are sent to the external device as active low signals. Note that each signal output must be pulled up at the external device as it is not pulled up internally.

### CAUTION

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

### Connection to the LED



## Differences between the PIO-16/16T(LPCI)H and PIO-16/16T(PCI)

The PIO-16/16T(LPCI)H is connector-pin compatible with the conventional PIO-16/16T(PCI) but has the following differences from it:

- Different in connector shape and pin assignment  
PIO-16/16T(LPCI)H : 50-Pin Mini-Ribbon connector  
PIO-16/16T(PCI) : 37-pin D-SUB
- Different in board dimensions  
PIO-16/16T(LPCI)H : 121.69(L) x 63.41(H) mm  
PIO-16/16T(PCI) : 121.69(L) x 106.68(H) mm
- Different in the number of input signals available to interrupt requests  
PIO-16/16T(LPCI)H : All of 16 signals  
PIO-16/16T(PCI) : 4 signals
- Different in the expression to obtain digital filter time. (n: Set value)  
PIO-16/16T(LPCI)H :  $2^n / (8 \times 10^6)$   
PIO-16/16T(PCI) :  $2^n / (16 \times 10^6)$
- Different in interrupt-level resource acquisition  
PIO-16/16T(LPCI)H : Acquires one interrupt level automatically.  
PIO-16/16T(PCI) : Set a jumper switch to select whether to acquire interrupt levels.