© CONTEC
www.contec.com.jp

Digital I/O Board for Low Profile PCI

PIO-16/16T(LPCI)H

with Driver Library [API-PAC(W32)]

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

The board can input/output TTL-level digital signals.

The board supports a low-profile PCI slot and, if replaced with the supplied bracket, supports a PCI slot, too.

<PIO-16/16T(LPCI)H> can input and output up to 16 channels.

Using the bundled API function library package [API-PAC(W32)], you can create Windows application software for this board in your favorite programming language supporting Win32 API functions, such as Visual Basic or Visual C/C++.

The specification, color, and design of a product may be changed without a preliminary announcement.
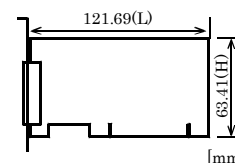
Features

- Unisolated TTL-level input/output enabling fast response.
- Capable of receiving 16-channel TTL 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
Input		
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
Output		
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)
Common		
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 xtension		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

■ Board Dimensions

121.69(L)
63.41(H)
[mm]

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

*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).

Support Software

You should use CONTEC support software according to your purpose and development environment.

■ 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 details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

OS	Windows XP, 2000, NT, Me, 98, etc..
Adaptation language	Visual C/C++, Visual Basic, Delphi, Builder, etc..
Others	Each piece of library software requires 50 megabytes of free hard disk space.

■ Linux version of digital I/O driver API-DIO(LNX)
(Supplied: Stored on the API-PAC(W32) CD-ROM)

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 details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

OS	RedHatLinux, TurboLinux, etc.. (For details on supported distributions, refer to Help available after installation.)
Adaptation language	gcc, Kylix, etc..
Others	Requires 3 megabytes of free hard disk space.

■ 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.

See http://www.contec.com/vidaq/ for details and download of VI-DAQ.

Cable & Connector

◆ Cable & Connector (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-3(PC) *3
Termination Panel   : DTP-4(PC) *3
Signal Monitor for Digital I/O   : CM-32(PC)E *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.

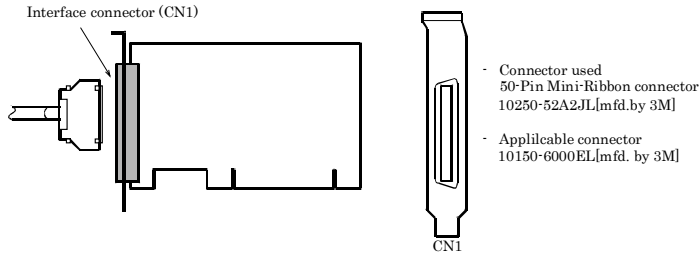* Check the CONTEC's Web site for more information on these options.

Product Configuration List

- Board[PIO-16/16T(LPCI)H]... 1
- First step guide ... 1
- CD-ROM *1 [API-PAC(W32)] ... 1
- Bracket for PCI ... 1
*1 The CD-ROM contains the driver software and User's Guide
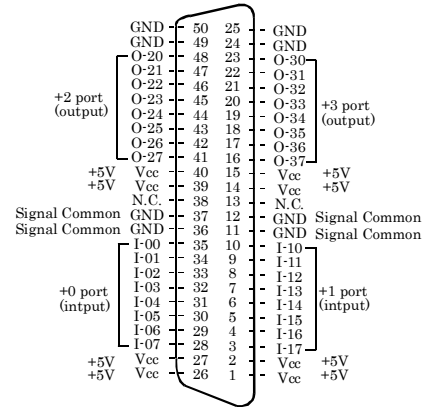
Using the On-board Connectors

◆ 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.

Interface connector (CN1)

- Connector used
  50-Pin Mini-Ribbon connector
  10250-52A2JL[mfd.by 3M]

- Applilcable connector
  10150-6000EL[mfd. by 3M]

CN1

◆ Connector Pin Assignment

Pin Assignments of Interface Connector

+2 port (output)	GND	50	25	GND	+3 port (output)
	GND	49	24	GND	
	O-20	48	23	O-30	
	O-21	47	22	O-31	
	O-22	46	21	O-32	
	O-23	45	20	O-33	
	O-24	44	19	O-34	
	O-25	43	18	O-35	
	O-26	42	17	O-36	
	O-27	41	16	O-37	
	Vcc	40	15	Vcc	+5V
+5V	Vcc	39	14	Vcc	+5V
+5V	N.C.	38	13	N.C.	
Signal Common	GND	37	12	GND	Signal Common
Signal Common	GND	36	11	GND	Signal Common
	I-00	35	10	I-10	
	I-01	34	9	I-11	
	I-02	33	8	I-12	
+0 port (intput)	I-03	32	7	I-13	+1 port (intput)
	I-04	31	6	I-14	
	I-05	30	5	I-15	
	I-06	29	4	I-16	
	I-07	28	3	I-17	
+5V	Vcc	27	2	Vcc	+5V
+5V	Vcc	26	1	Vcc	+5V

I-00 - I-17	16 input signal pins. Connect output signals from the external device to these pins.
O20 - O37	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

Board
Vcc

External device
Vcc

+5V output

10kΩ

Input pin

74ALS541

Signal common

GND   GND
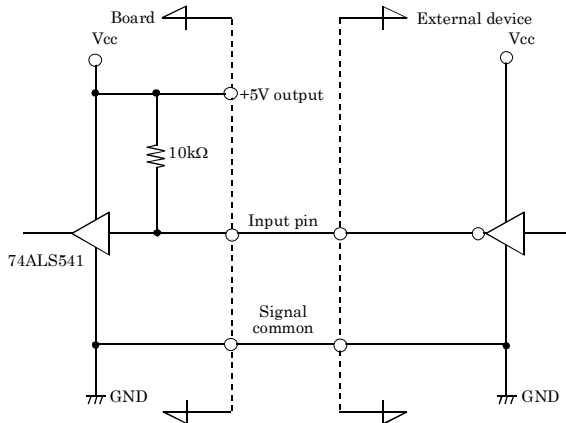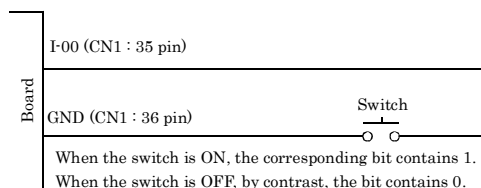
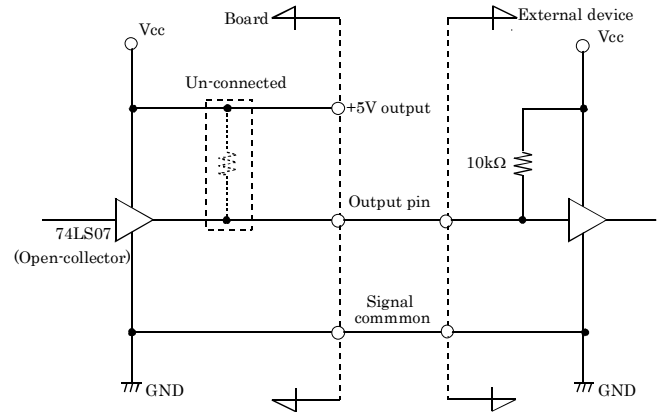* Input pin represent I-xx.

The input circuit of interface is illustrated in Figure.
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

Board

I-00 (CN1 : 35 pin)

GND (CN1 : 36 pin)   Switch

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

Connectiong Output Signals

■ Output Circuit

Vcc   Board   External device
                                                Vcc

Un-connected

+5V output

10kΩ

74LS07
(Open-collector)   Output pin

Signal commmon

GND   GND

* Output pin: O-xx

The output circuit of interface is illustrated in Figure.
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.
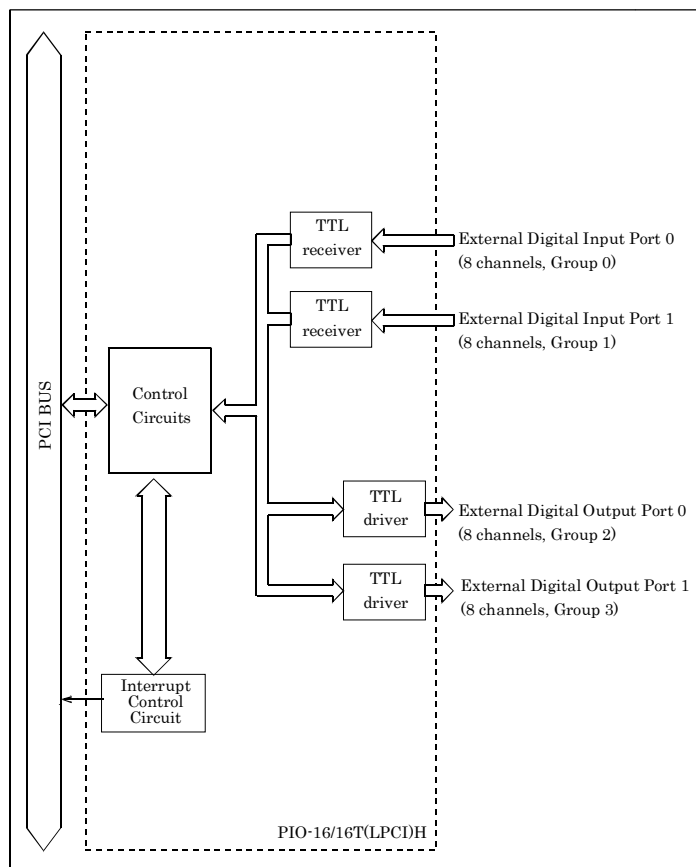
▼ CAUTION

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

■ Connection to the LED

Board side

Vcc (CN1 : 39 pin)

2kΩ

LED

O-20 (CN1 : 48 pin)
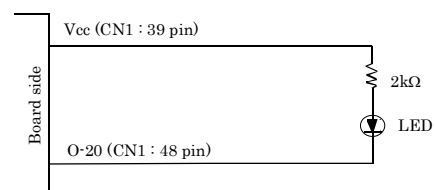
When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.

Block Diagram

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:

(1) 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

(2) 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

(3) 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

(4) 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)   : $2^n / (16 \times 10^6)$

(5) 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.