



# High-quality Industrial Data Acquisition and Control Products for PC-based I/O Boards Catalog

Vol. IOC 5.2.0

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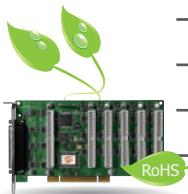


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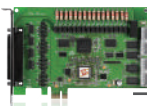


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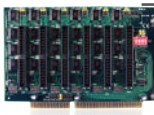
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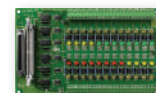
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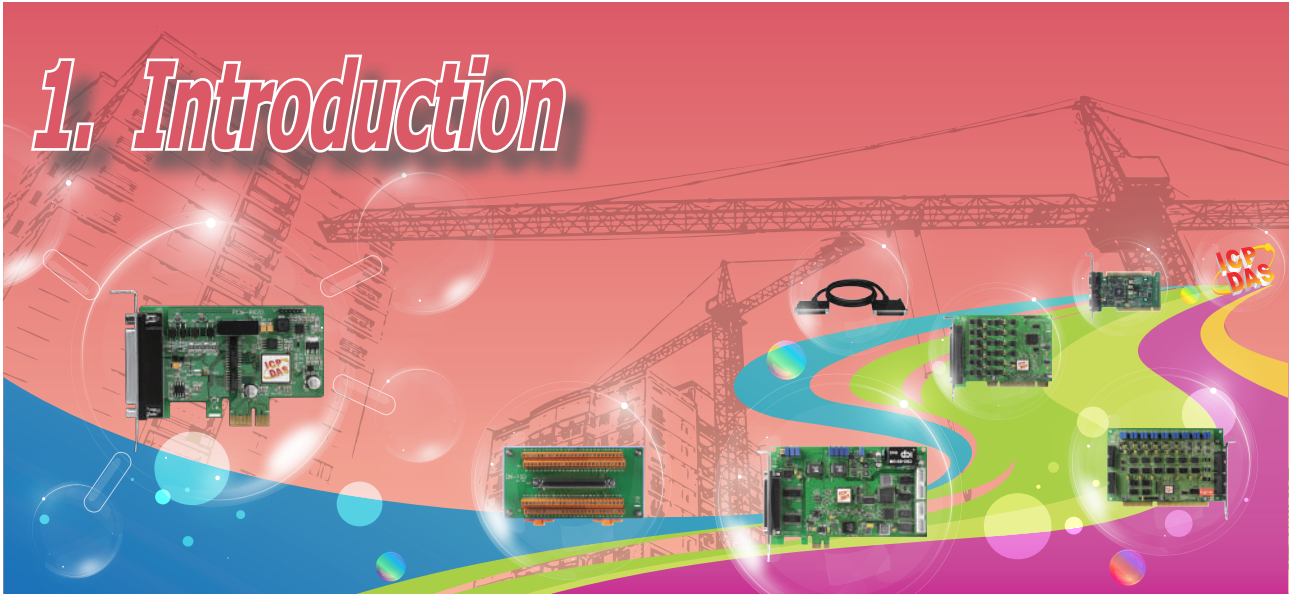
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# 1. Introduction

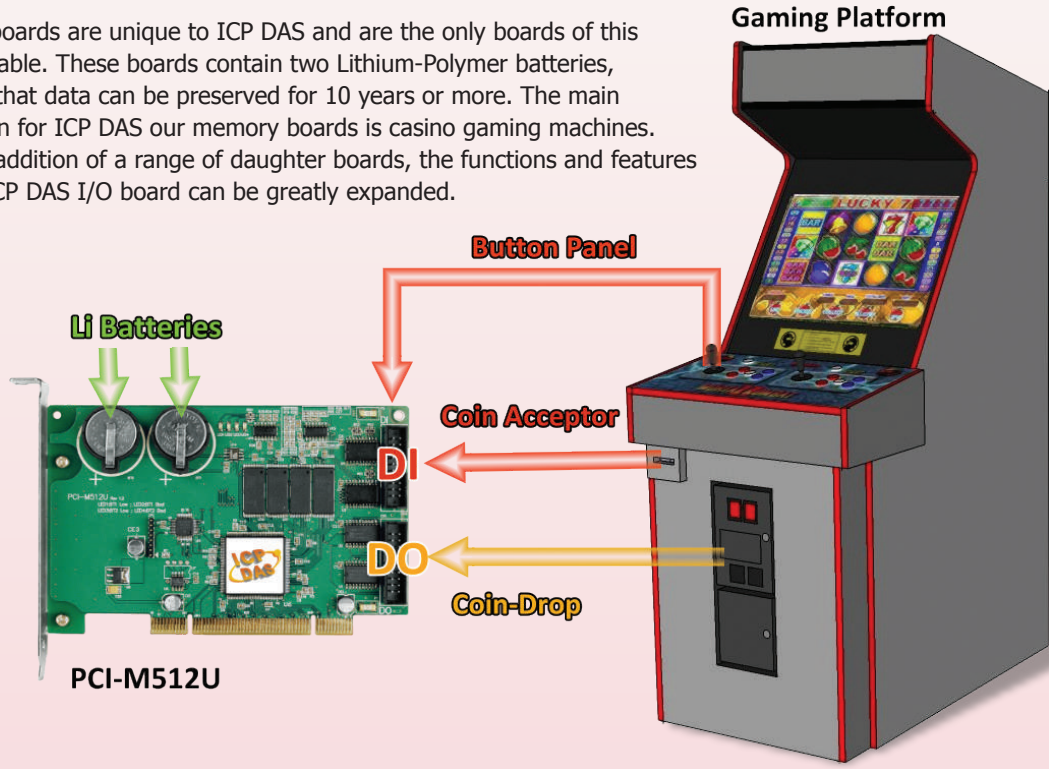
## 1-1 Presentation

ICP DAS is your one-stop shopping location for a range of more than 170 high-quality industrial data acquisition and control products that can satisfy virtually any requirement. The ICP DAS range not only includes boards that support the ISA and PCI bus, but now offers products that are compatible with the PCI Express (PCIe) standard.

By way of example, PCI boards are categorized into three different varieties: the PCI series, the PISO series and the PIO series. PCI series boards are the top-of-the-line products that can achieve remarkably high performance levels and provide multiple I/O functions and allow high data resolutions. The emphasis of the PISO series is focused on its ability to provide protection to the Host PC against the direct impact of external noise. Finally, the PIO series offers a cost-effective solution for general use and are well-suited for high-speed transmission applications.

ICP DAS I/O boards can be integrated into a wide variety of automation systems. For example, digital I/O boards can be used for monitoring and controlling logic signals such as buttons, switches, and relays, and for on/off, high/low or open/close situations. Analog I/O boards are primarily used for applications requiring the acquisition or transmission of analog signals, while timer, counter and frequency boards are used for measuring pulse signals.

Memory boards are unique to ICP DAS and are the only boards of this type available. These boards contain two Lithium-Polymer batteries, ensuring that data can be preserved for 10 years or more. The main application for ICP DAS our memory boards is casino gaming machines. With the addition of a range of daughter boards, the functions and features of each ICP DAS I/O board can be greatly expanded.



## 1-2 Features

# 1010

### Digital Input/Output

A wide variety of digital input/output signals, such as switch closures, relay contacts, or TTL-compatible interfaces, can be directly read using digital I/O cards.



### Analog Input/Output

For industrial applications, voltage, temperature, strain, current or resistance can be used as the source for the analog input (AI or AD) signals, while analog output (AO or DA) signals can be either voltage or current.



### Timer/Counter

Timer/counter boards can be used for applications such as counting external pulse signals, accurate time measurement, or as the pacer trigger source for the analog input. Frequency measurement is also possible by simply computing the number of pulses and the value of the time measured.



### Isolation Protection

Isolated input/output boards help to eliminate ground loop problems, and isolate the Host PC from potentially damaging voltages.



### Relay

Relay boards can be used to control circuits that use low-power signals requiring complete electrical isolation between the control and the controlled circuits.



### Pull-High/Pull-Low

If the digital input channels become disconnected from the signals, the value of the reading can be held at a predefined state based on the value set for the pull-high/low jumpers, rather than letting the reading float.



### Card ID Function

The Card ID feature is useful for distinguishing individual boards if multiple I/O boards are installed in a single Host PC.



### Accessories

A wide range of optional accessories are available for ICP DAS I/O cards, including as cable, connectors and daughter boards, making wiring and installation very easy.



### Half-size Design

The half-size design of ICP DAS I/O boards is particularly suitable for compact computers, especially for those based on Industrial Personal Computer (IPC) specifications.



### Universal PCI (3.3 V/5 V)

ICP DAS Universal PCI boards work with both the new 3.3 V PCI bus as well as the traditional 5 V bus.



### PCI Express

PCI Express (PCIe) is a computer expansion bus standard that is available on more recent computers, and is the replacement for the older PCI/PCI-X bus.



### Temperature Range

ICP DAS I/O boards can operate in temperatures ranging from 0 to 60°C, ensuring reliable performance in the harshest of environments.

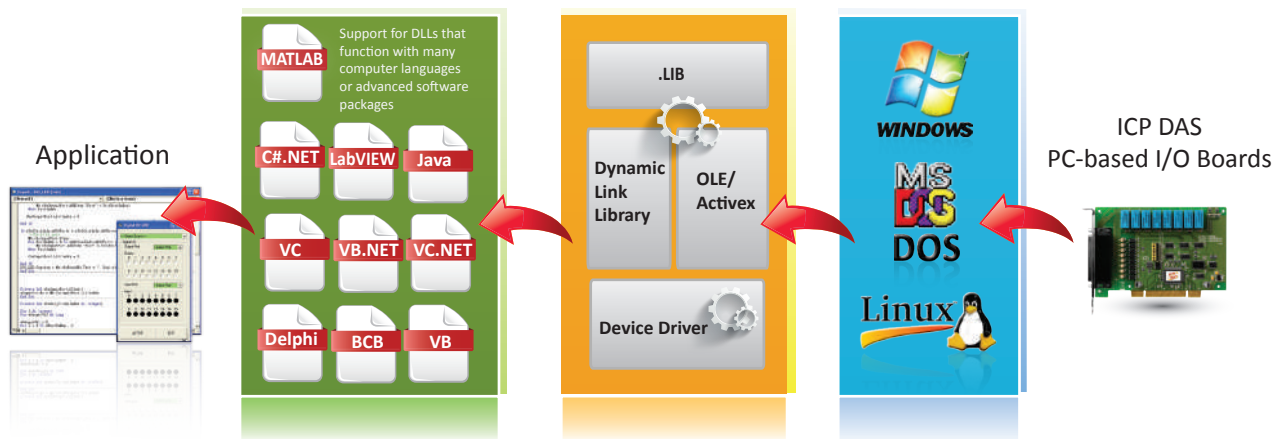
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Introduction

## 1-3 Software

ICP DAS provides a full-featured Software Development Kit (SDK) and reliable drivers for all our I/O boards (AD, DA, DI, DO and Timer/Counter series), with support for a variety of operating systems, such as Linux, DOS, Windows 98/NT/2000, and 32-/64-bit Windows XP/2003/2008/Vista/7, as well as supporting Microsoft's latest 32-/64-bit Windows 8. The Windows SDK for the I/O boards contain DLL (Dynamic Link Library) files, ActiveX (OCX) control components, and a large number of sample programs with source code written in Microsoft Visual C++, Visual Basic, Borland C++ Builder, Delphi, VB.NET, C#.NET and MATLAB. By using the SDK and the sample programs, complex hardware-register-based operations are not required, meaning that custom applications can be developed quickly and easily.



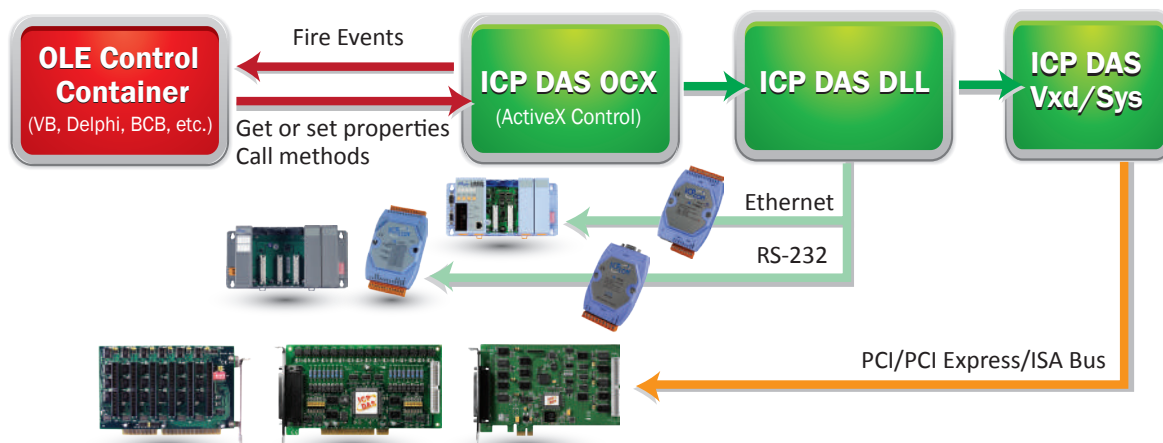
These software packages are designed so that it is easy for users to learn and use. Most contain a variety of sample programs, including the source code, that can be freely modified and used. The included shared libraries developed by ICP DAS can be distributed with no licensing fees, providing a cost-effective method for deploying custom run-time applications.

### Activex Control (OCX)



ActiveX Control (OCX) is a software component standard introduced by Microsoft to allow easy and user-friendly program development. Any OCX control can be inserted into an application so that the properties, methods and events provided by the object can be used to develop custom applications without needing to understand how it actually works. The ICP DAS OCX supports Windows 98/NT/2000 and 32-bit Windows XP/2003/2008/Vista/7/8, and sample programs with source code are also provided for VB, VC, Delphi, and BCB, etc. With this OCX, users from a variety of backgrounds and expertise can bring their creativity to any kind of application.

The ICP DAS OCX communicates with PCI, ISA, PCI Express cards and DCON series modules to perform digital, analog and timer/counter operations, and is designed to minimize the need to manipulate the hardware details, meaning that data acquisition operations can be achieved using only a few lines of code. The following figure illustrates the programming system architecture for the ActiveX Control (OCX) component.

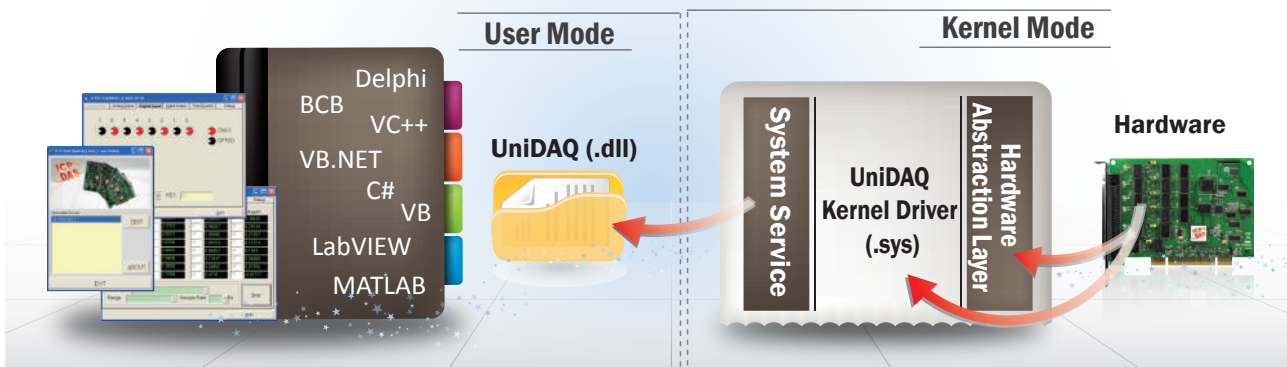


## UniDAQ Driver & SDK for Windows



UniDAQ is a uniform SDK interface that operates on the Windows OS and is used to implement common data access functionality on ICP DAS I/O boards. UniDAQ supports the majority of I/O cards based on either the PCI or Universal PCI bus in addition to future products based on the PCI Express bus. The UniDAQ SDK makes it easy to integrate different kinds of I/O boards in the same system, upgrade to new hardware, expand the number of channels in your system, and develop numerous applications based on the various I/O boards.

The UniDAQ SDK includes functions related to the Driver, Digital I/O, Interrupts, Analog I/O, Timer/Counter processes and Memory I/O, and supports both 32- and 64-bit Windows systems. sample programs, including the source code, are also provided for a range of common programming languages, such as Microsoft Visual C++ 6.0, Microsoft Visual Basic 6.0, Borland Delphi 6.0, Borland C Builder++ 6.0, Microsoft Visual Basic .NET, Microsoft Visual C#.NET, LabVIEW and MATLAB.



### Get Ready for Windows 8 >>>>

Windows 8 is the latest operating system from Microsoft and ICP DAS provides both 32-bit and 64-bit versions of the kernel drivers for most of its DAQ cards, meaning that you can take advantage of the new Windows 8 functionality. UniDAQ also supports 64-bit extended versions of Windows XP and Windows Server 2003 systems, including both AMD64 and Intel x86-64 system architecture.

### .NET Support >>>>

For .NET programmers who require direct calling of UniDAQ DLL libraries, ICP DAS provides sample programs for C# and Visual Basic .NET that can help to speed up the development of custom applications in Microsoft Visual Studio .NET 2003/2005/2008/2010.

**Features**

- ★ Provides easy-to-use API functions
- ★ Support for 32- and 64-bit Windows
- ★ Supports most ICP DAS boards
- ★ Includes DLL and ActiveX Controls (OCX)
- ★ Includes sample programs with source code

**Data Acquisition Functions**

- ★ Single-point Analog Input
- ★ Buffered Data Acquisition
- ★ Double-buffered Data Acquisition
- ★ Single-point Analog Output
- ★ Digital I/O Control
- ★ Counter, Timer I/O

**Supported Operating Systems**

- ★ Windows 2000
- ★ Windows XP
- ★ Windows Server 2003
- ★ Windows Vista
- ★ Windows Server 2008
- ★ Windows 7
- ★ Windows 2012
- ★ Windows 8



## Driver & SDK for Linux

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Introduction

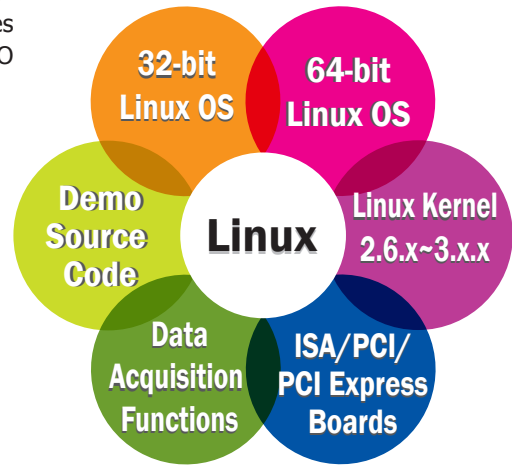


One of the major benefits of using the Linux operating system is the huge level of support provided by the open source development community. Linux has a well-deserved reputation for stability and flexibility, together with no licensing fees or use-restrictions to speak of, meaning that Linux is an ideal operating environment. As Linux has continued to gain ground in industry and enterprise applications, ICP DAS provides drivers and libraries to enable users to take advantage of Linux for their industry control projects.

The Linux operating system has been widely adopted by many users in numerous industrial applications because of its stability, and the fact that it is open source and is free. The I/O Boards driver for Linux supports x86 32-bit and 64-bit Linux distributions with Linux Kernel 2.6.x to 3.x.x (for examples, Fedora Core, Ubuntu, OpenSUSE, etc.) and the SDK includes libraries and sample programs with source code. Users can develop I/O control applications on Linux easily by the SDK and GNU C Language.

### Features >>>>

- ✓ Supports x86 32/64-bit Linux OS with Linux Kernel 2.6.x to 3.x.x
- ✓ Supports most ICP DAS ISA/PCI/PCI Express I/O series cards
- ✓ Includes Linux drivers and sample programs with source code
- ✓ Provides data acquisition functions: single-point Analog I/O, buffered data acquisition, double-buffered data acquisition, Digital I/O control and counter/timer I/O



## Java I/O Driver



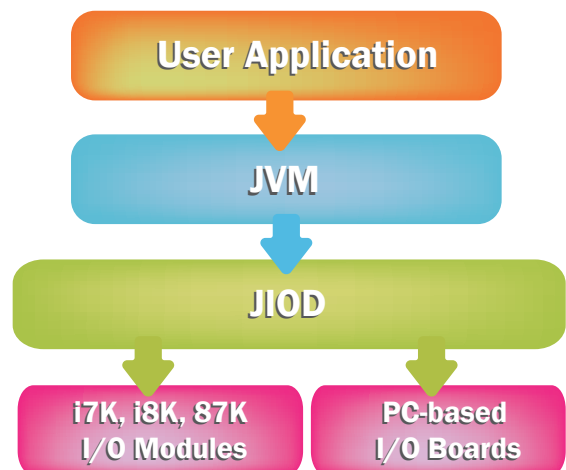
The Java technology features a complete network support and write-once, run everywhere solution, which makes it the ideal solution for industry control project. It reduces the developing and maintaining cost, satisfies the time-to-market requirement. However the Java technology does not implement the low level I/O access in nature. To help user to involve the Java technology and obtain the benefit from it, ICP DAS develops the Java I/O Driver (JIOD) package.

### Features >>>>

The JIOD is a Java platform technology chosen for JVM extension and makes many industry control applications. The JIOD includes packages for i7K, i8K and 87K I/O modules and ICP DAS I/O cards working on PCI bus. It provides developers a simple and easy mechanism to extend the JVM functionality to access the ICP DAS products. JIOD is now available and distributed for Linux and Windows operation systems.

### JIOD >>>>

The JIOD contains three packages - com.icpdas.IxPIO, com.icpdas.IxPCI and com.icpdas.comm. The IxPIO and IxPCI projects support PC-based I/O Boards. The comm packages support the i7K, i8K and 87K I/O modules. They provide powerful, easy-to-use facilities for developing the data acquisition applications. They could also be used in application, applet and servlet easily.





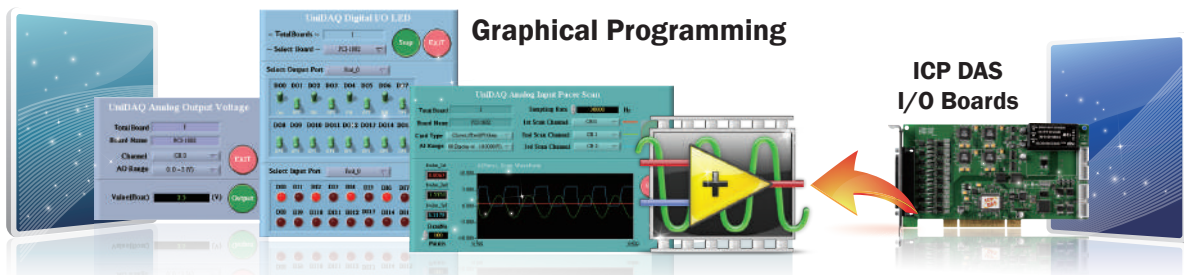
## LabVIEW



LabVIEW delivers a graphical development environment that enables data acquisition, instrumentation and control systems to be quickly created, boosting productivity and saving development time. An added advantage is that it is scalable across multiple operating systems and includes hundreds of built-in libraries.

LabVIEW provides a single development environment that allows easy access and integration with a variety of measurement and control hardware, including data acquisition devices, bench top systems and modular instruments. Hundreds of drag-and-drop control and graph options can be used to quickly create a custom GUI. In addition, custom imagery and logos can be incorporated, or the default controls can be modified, to provide a customized appearance, meaning that dynamic user interfaces can be quickly created to provide interactive control of your software system.

LabVIEW toolkit can be used with ICP DAS I/O series boards operating in a Windows 98/NT/2000 and 32-/64-bit Windows XP/2003/2008/Vista/7/8 environment. ICP DAS also provides an LLB Library together with sample programs, including the source code, meaning that your hardware and software can easily be integrated in the LabVIEW graphical development environment to provide data acquisition, measurement and control.



## DOS Lib



DOS includes many valuable features, such as high performance, stability, easy installation and deployment, etc., for industrial control and measurement applications.

ICP DAS continues to support DOS-based systems by providing useful function libraries and a wide variety of C sample programs, including the source code, which can be freely modified and used as required.

### Features >>>

- Useful function libraries for TC/BC/MSC with a large range of modes
- Wide variety of sample programs for TC/BC/MSC, including source code
- Integrated diagnostics application
- Complete functions descriptions
- Easy to learn and use
- No licensing fees for shared libraries



```

Command Prompt - bc t2.c
File Edit Search Run Compile Debug Project Options Window Help
1:EST.C
2:
3=[ ]
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <dos.h>

#include "f:\lining\1\project\iso\nda\20\new_io.h"

#define PI 3.1415926
#define SAMPLE_RATE 800

#define OK 1 /* No error return */
#define ERROR -1 /* Error return */
#define QUIT -2

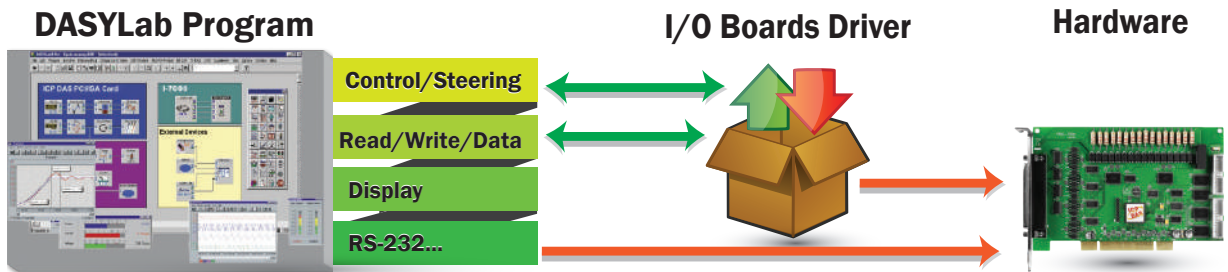
1:1 Message
F1 Help F2 Save F3 Open Alt-F9 Compile F9 Make F10 Menu
    
```



DASYLab is a popular and easy-to-use software package for data acquisition systems that is compatible with a wide range of interface options, providing connections to hardware such as RS-232, IEEE, USB, and Parallel ports, and ISA and PCI bus, etc. A large variety of functional modules for measurement and control are also supplied with DASYLab, meaning that it only takes a few minutes to create customized acquisition and analysis applications. Consequently, the most sophisticated data acquisition and control tasks can quickly be solved using DASYLab without the need for additional complex programming tools. To take advantage of this state-of-the-art software, ICP DAS has developed a series of drivers for PCI, ISA and DCON series products, allowing easy integration of hardware and software in the data acquisition, measurement and control system loop.

### Features >>>>

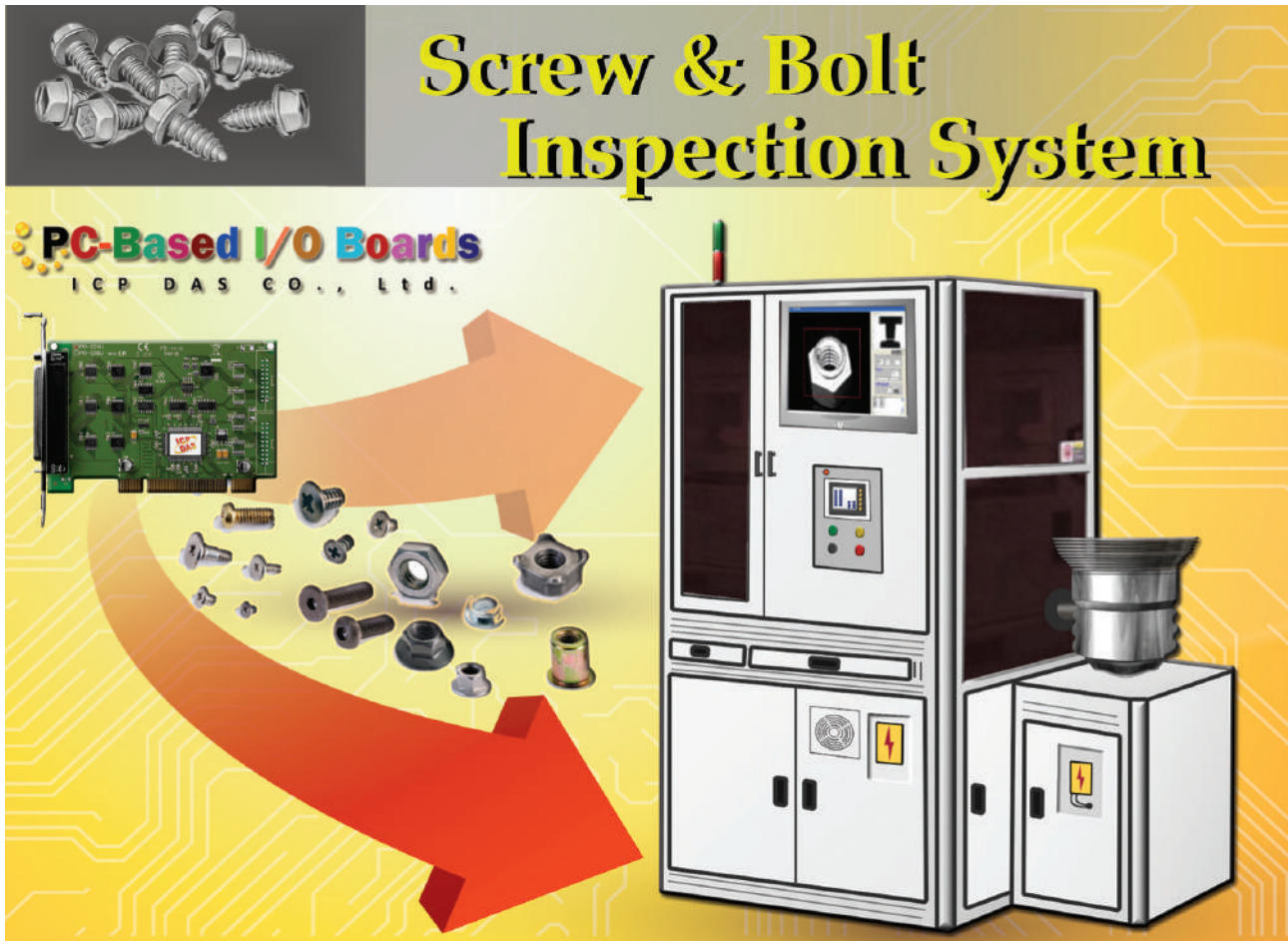
- Easy-to-use graphical programming environment
- Support for a wide range of functions and modules, including Input/Output modules, control modules, signal processing modules, and display modules, etc.
- Fast data acquisition and display
- Supports more than 40 DAQ drivers



## 1-4 Applications

# PCB Testing

ICP DAS CO., LTD.



**Screw & Bolt Inspection System**

**PC-Based I/O Boards**  
ICP DAS CO., Ltd.

The advertisement features a collection of various screws and bolts on the left, with a large orange arrow pointing towards a large industrial inspection machine on the right. The machine has a control panel with a screen and buttons. The background is a yellow grid pattern.

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Introduction

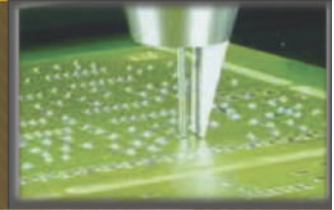


**LED Testing & Sorting**

**PC-Based I/O Boards**  
ICP DAS CO., Ltd.

The advertisement shows a computer workstation with two monitors displaying data, connected to a large industrial testing and sorting machine. The machine has a control panel with a red emergency stop button. The background is a light blue grid with circular arrows. There are several circular inset images showing close-ups of LED testing and sorting processes.

# Dispensing Robot



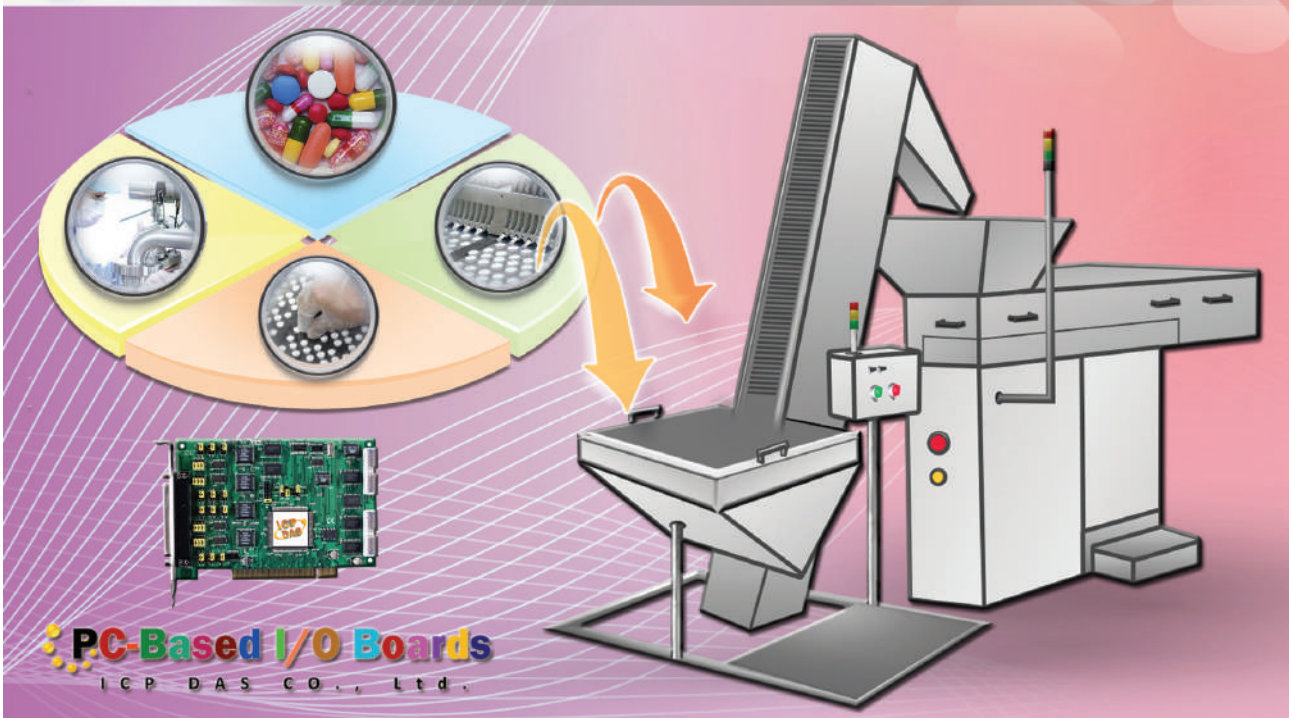
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Introduction



# Pharmaceutical Machine



# Optical Lens Cutter



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4

Introduction

# Sorting Machine



# 2. PCI Express Data Acquisition Boards

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PCI Express Data Acquisition Boards



## Multifunction and Analog Output Board Selection Guide

### 2-1 High Speed Multifunction Board

### 2-2 Multifunction Board

### 2-3 Analog Input/Output Board

Model	Available soon PCIe-813	NEW PCIe-8620	NEW PCIe-8622	PEX-1202L	PEX-1202H	PEX-1002L	PEX-1002H	PEX-DA4/DA8/DA16
Interface	PCI Express							
<b>Analog Input</b>								
Isolation Voltage	3750 V <sub>rms</sub>	2500 V <sub>dc</sub>		-		-		-
Resolution	16-bit			12-bit		12-bit		-
Channels	32 SE	8 SE	16 SE	32 SE/16 Diff.		32 SE/16 Diff.		-
Sampling Rate	1 MS/s	200 kS/s (Per Channel)		110 kS/s	44 kS/s	110 kS/s	44 kS/s	-
Bipolar Input	±2.56 V, ±5.12 V, ±10.24 V	±5 V, ±10 V	±5 V, ±10 V	±0.625 V, ±1.25 V, ±2.5 V, ±5 V, ±10 V	±0.005 V, ±0.01 V, ±0.05 V, ±0.1 V, ±1 V, ±5 V, ±10 V	±1.25 V, ±2.5 V, ±5 V, ±10 V	±0.01 V, ±0.1 V, ±1 V, ±10 V	-
Unipolar Input	-	-	-	0 ~ +10 V, 0 ~ +5 V, 0 ~ +2.5 V, 0 ~ +1.25 V	0 ~ +10 V, 0 ~ +0.1 V, 0 ~ +0.01 V	-	-	-
FIFO Size	8 K	2 K	2 K	1 K		-		-
Accuracy	0.05% of FSR ±1 LSB @ 25°C, ±10.24 V	0.05% of FSR ±1 LSB @ 25°C, ±10 V		0.01% of FSR ±1 LSB @ 25°C, ±10 V		0.01% of FSR ±1 LSB @ 25°C, ±10 V		-
<b>Analog Output</b>								
Resolution	-	-	16-bit	12-bit		-		14-bit
Channels	-	-	2	2		-		4/8/16
Accuracy	-	-	-	0.06% of FSR ± 1 LSB @ 25°C, ±10 V		-		0.04% of FSR ±2 LSB @ 25°C, ±10 V
Output Range	-	-	±5 V, ±10 V	±5 V, ±10 V		-		Voltage: ±10 V Current: 0 ~ +20 mA
Slew Rate	-	-	-	8.33 V/μs		-		0.71 V/μs
<b>Non-isolated Digital Input/Output</b>								
DI Channels	-	-	-	16 (5 V/TTL)		16 (5 V/TTL)		16 (5 V/TTL)
DO Channels	-	-	-	16 (5 V/TTL)		16 (5 V/TTL)		16 (5 V/TTL)
<b>Isolated Digital Input/Output</b>								
DI Channels	-	4	12	-		-		-
DO Channels	-	4	12	-		-		-
Isolation Voltage	-	2500 V <sub>dc</sub>	2500 V <sub>dc</sub>	-		-		-
<b>Timer/Counter</b>								
Channels	-	-	-	3		3		3
Resolution	-	-	-	16-bit		16-bit		16-bit
Clock Source	-	-	-	8 MHz		4 MHz (Internal)		4 MHz (Internal)
Page	2-2	2-3	2-4	2-5		2-6		2-7

## 2-1 High Speed Multifunction Board

### PCIe-813 *Available soon*

PCI Express, 1 MS/s High-speed, 16-bit, 32-channel Bus-isolated Analog Input Board



### Features

- PCI Express x1 Interface
- 32 Single-ended Isolated Analog Input Channels
- 16-bit, ADC with Max. 1 MS/s Sampling Rate
- 8192-sample Hardware FIFO for Analog Input
- Programmable Gain Control: 0.4, 0.8, 1.6
- Bipolar Input:  $\pm 10.24\text{ V}$ ,  $\pm 5.12\text{ V}$ ,  $\pm 2.56\text{ V}$
- Built-in MagicScan Controller
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Protection
- 3750 V<sub>rms</sub> Bus Isolation Protection
- AD Trigger: Software, Pacer, External Triggers
- High Performance DMA Data Transfer
- Supports Card ID (SMD Switch)

### Introduction

The PCIe-813 is a bus-type isolated 16-bit AD board that supports the PCI Express bus and provides 32 single-ended 16-bit Analog Input channels with an 8 k Sample hardware FIFO. Analog Input sampling rates of up to 1 MS/s can be achieved, and the board also includes DMA channels that allow the streaming of Analog Input data without significantly impacting processor resources. The isolation range of the board has been increased to 3750 V<sub>rms</sub>, making it the most cost-effective solutions when considering isolated AD boards.

The PCIe-813 board provides a variety of programmable trigger methods, including software and pacer, as well as external triggers that include Post, Pre, Middle, Delay and Analog triggers. Even in channel scan mode, a different gain code can be used for each channel, and a total sampling rate of 1 MS/s can still be achieved, making the PCIe-813 board well-suited to the demands of high-end applications. Synchronization of the data acquisition process relative to an external event is an important criterion in many applications.

### Hardware Specifications

Analog Input	
Isolation Voltage	3750 V <sub>rms</sub> (Bus-type)
Channels	32 Single-ended
A/D Converter	16-bit, 1 $\mu$ s conversion time
Sampling Rate	1 MS/s
FIFO Size	8192 Samples
Over voltage Protection	Continuous +/-35 Vp-p
Input Impedance	10,000 M $\Omega$ /6 pF
Trigger Modes	Software, Pacer, External
Data Transfer	Polling, Interrupt, DMA
Accuracy	0.05 % of FSR $\pm 1$ LSB @ 25 °C, $\pm 10.24\text{ V}$
Input Range	Gain: 0.4, 0.8, 1.6, Bipolar Range: $\pm 10.24\text{ V}$ , $\pm 5.12\text{ V}$ , $\pm 2.56\text{ V}$
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1
Power Consumption	1 A @ +5 V (Max.)
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

### Ordering Information

PCIe-813 CR	PCI Express, 1 MS/s High-speed, 16-bit, 32-ch Bus-Isolated Analog Input Board (RoHS). Includes one CA-4002 D-sub connector.
PCIe-813/S CR	PCIe-813 CR with DN-37 Daughterboard. Includes one CA-4002 D-sub connector.

### Software

#### Drivers

- 32-bit Windows XP/2003/2008/Vista/7/8
- 64-bit Windows XP/2003/2008/Vista/7/8

#### Sample Programs

- LabVIEW Toolkit
- VB/VC/Delphi/BCB/MATLAB Demo
- VB.NET/C#.NET/VC.NET Demo

### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_1
AI_2	02	21 AI_3
AI_4	03	22 AI_5
AI_6	04	23 AI_7
AI_8	05	24 AI_9
AI_10	06	25 AI_11
AI_12	07	26 AI_13
AI_14	08	27 AI_15
A.GND	09	28 A.GND
A.GND	10	29 Ext_Trg
AI_16	11	30 AI_17
AI_18	12	31 AI_19
AI_20	13	32 AI_21
AI_22	14	33 AI_23
AI_24	15	34 AI_25
AI_26	16	35 AI_27
AI_28	17	36 AI_29
AI_30	18	37 AI_31
A.GND	19	

2  
1  
PCI Express Data Acquisition Boards

# PCIe-8620 **NEW**

PCI Express, 200 KS/s High-speed, 16-bit, 8-channel Simultaneously Sampled Analog Input with 4-channel Isolated DI/O Board



## Features ▶▶▶▶

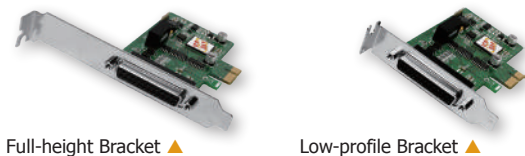
- PCI Express x1 Interface, Full-profile or Low-profile
- 4-channel Isolated Digital Input
- 4-channel Isolated Digital Output
- 8 Single-ended Analog Input channels
  - Synchronous Sample and Hold
  - Analog Input Range:  $\pm 10$  V,  $\pm 5$  V
  - 16-bit, 200 kS/s Sampling Rate for each channel
  - Hardware FIFO for Analog Input with a total of 2048 Samples
  - Built-in MagicScan Controller

## Introduction

The PCIe-8620 is a bus-type, isolated high-speed Analog Input board with isolated DI/O. The simultaneously sampled AD offers a mix of up to 8 single-ended 16-bit Analog Input channels with a 2 k Sample hardware FIFO. All channels feature a programmable input range of  $\pm 10$  V or  $\pm 5$  V with a sampling rate up to 200 kS/s per channel. The PCIe-8620 provides 4 isolated Digital Input channels and 4 isolated Digital Output channels. The isolation range of the board has been increased to 2500 Vdc, making it one of the most cost-effective solutions when considering isolated AD with DI/O boards.

PCIe-8620 also includes a second-order anti-alias analog filter where the -3 dB frequency for the  $\pm 5$  V input range is typically 15 kHz, and is typically 23 kHz for the  $\pm 10$  V input range.

The PCIe-8620 is a low-profile PCI Express board that is suitable for computers with limited space, and is also suitable for standard-size computers since the board is shipped with both full-height and low-profile brackets.



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AD0	01	14 AGND
AD1	02	15 AGND
AD2	03	16 AGND
AD3	04	17 AGND
AD4	05	18 AGND
AD5	06	19 AGND
AD6	07	20 AGND
AD7	08	21 DGND
DGND	09	22 DIN0
DIN1	10	23 DIN2
DIN3	11	24 DOUT0
DOUT1	12	25 DOUT2
DOUT3	13	

CON1

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8

### Sample Programs

- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Analog Input	
Isolation Voltage	2500 Vdc (Bus-type)
Channels	8 Single-ended
Resolution	16-bit
Sampling Rate	200 KS/s (Each Channel)
Bipolar Input	$\pm 10$ V, $\pm 5$ V
FIFO Size	2 K Samples (Total)
Accuracy	0.05% of FSR $\pm 1$ LSB @ 25°C, $\pm 10$ V
Digital Input	
Channels	4
Isolation Voltage	2500 Vdc
Digital Output	
Channels	4
Isolation Voltage	2500 Vdc
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	Female DB25 x 1
Dimensions (L x W x D)	Full-profile: 107 mm x 120 mm x 22 mm Low-profile: 107 mm x 80 mm x 22 mm
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

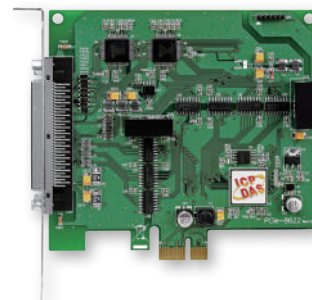
## Ordering Information

PCIe-8620 CR	PCI Express, 200 kS/s, 16-bit, 8-ch Simultaneously Sampled Analog Input Board and 4-ch Isolated DI/O (RoHS). Includes one CA-PC25M D-sub Connector and one Low-profile Bracket.
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# PCIe-8622 **NEW**

PCI Express, 200 KS/s High-speed, 16-bit, 16-channel Simultaneously Sampled Analog Input with 12-channel Isolated DI/O Board Board



## Features

- PCI Express x1 Interface, Full-profile
- 12-channel Isolated Digital Input
- 12-channel Isolated Digital Output
- 2-channel 16-bit Analog Output
- 8 Single-ended Analog Input channels
- Synchronous Sample and Hold
- Analog Input Range:  $\pm 10$  V,  $\pm 5$  V
- 16-bit, 200 kS/s Sampling Rate for each channel
- Hardware FIFO for Analog Input with a total of 2048 Samples
- Built-in MagicScan Controller

## Introduction

The PCIe-8622 is a bus-type, isolated high-speed AD multifunction board with 16-bit DA and isolated DI/O. The simultaneously sampled AD offers a mix of up to 16 single-ended, 16-bit Analog Input channels with a 2 k Sample hardware FIFO and 2500 Vdc bus-typed isolation protection. All channels feature a programmable input range of  $\pm 10$  V or  $\pm 5$  V with a sampling rate up to 200 kS/s per channel.

The PCIe-8622 supports the PCI Express bus and provides 12 isolated Digital Input channels, 12 isolated Digital Output channels and 2 Analog Output channels at 16-bit resolution. The board has a single high-density connector that reduces the amount of space required for installation.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
Output +5 V	01	Output +15 V
CNT1_GATE	02	CNT0_GATE
CNT1_OUT	03	CNT0_OUT
CNT1_CLK	04	CNT0_CLK
DGND	05	DGND
DOUT11	06	DOUT10
DOUT9	07	DOUT8
DOUT7	08	DOUT6
DOUT5	09	DOUT4
DOUT3	10	DOUT2
DOUT1	11	DOUT0
DIN11	12	DIN10
DIN9	13	DIN8
DGND	14	DGND
DIN7	15	DIN6
DIN5	16	DIN4
DIN3	17	DIN2
DIN1	18	DIN0
N/A	19	N/A
AI_CONV	20	N/A
DTRG1	21	DTRG0
AGND	22	AGND
AGND	23	AGND
AO1	24	AO0
AGND	25	AGND
AGND	26	AGND
AI15	27	AI14
AI13	28	AI12
AI11	29	AI10
AI9	30	AI8
AI7	31	AI6
AI5	32	AI4
AI3	33	AI2
AI1	34	AI0

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8

### Sample Programs

- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Analog Input	
Isolation Voltage	2500 Vdc (Bus-type)
Channels	16 Single-ended
Resolution	16-bit
Sampling Rate	200 kS/s (Each Channel)
Bipolar Input	$\pm 10$ V, $\pm 5$ V
FIFO Size	2 k Samples (Total)
Accuracy	0.05% of FSR $\pm 1$ LSB @ 25°C, $\pm 10$ V
Analog Output	
Channels	2
Resolution	16-bit
Output Range	$\pm 5$ V, $\pm 10$ V
Digital Input	
Channels	12
Isolation Voltage	2500 Vdc
Digital Output	
Channels	12
Isolation Voltage	2500 Vdc
Timer/Counter	
Channels	2
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	68-pin Female SCSI II x 1
Dimensions (L x W x D)	125 mm x 120 mm x 22 mm
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Ordering Information

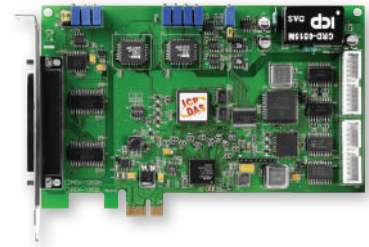
PCIe-8622 CR	PCI Express, 200 KS/s , 16-bit, 16-ch Simultaneously Sampled Analog Input, 2-channel 16-bit Analog Output and 12-ch Isolated DI/O Board (RoHS).
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2  
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PCI Express Data Acquisition Boards

## 2-2 Multifunction Boards

### PEX-1202L/PEX-1202H

PCI Express, 32-channel, 12-bit, 110 kS/s or 44 kS/s  
Multi-function (1 K word FIFO) Board



#### Features

- PCI Express x1 Interface
- 16-channel 5 V/TTL Digital Input
- 16-channel 5 V/TTL Digital Output
- Pull-high/Pull-low Jumpers for DI Channels
- 12-bit, 32 Single-ended/16 Differential Analog Input channels
- Three External Triggers: Pre-trigger, Middle-trigger, Post-trigger
- 110 or 44 kS/s AD Sampling Rate
- Supports Card ID (SMD Switch)

#### Introduction

The PEX-1202L/H series utilizes the PCI Express bus and is designed as an easy replacement for the PCI-1202 series without requiring any modification to either the software or the driver.

The PEX-1202L/H provides 32 single-ended or 16 differential Analog Input channels at 12-bit resolution, together with 16 TTL Digital Input and 16 TTL Digital Output channels. Data acquisition under DOS is gap-free and continuous, at 110 kHz for low gain and 44 kHz for high gain. The PEX-1202L/H also features "Magic Scan" and Continuous Capture functions.

The PEX-1202L/H includes a Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The pull-high/low jumpers allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or line broken.

#### Software

##### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

##### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



#### Hardware Specifications

Model	PEX-1202L	PEX-1202H
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
Resolution	12-bit, 8.5 $\mu$ s Conversion Time	
FIFO Size	1024 Samples	
Accuracy	0.01% of FSR $\pm$ 1 LSB @ 25°C, $\pm$ 10 V	
Sampling Rate	110 kS/s	44 kS/s
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.06% of FSR $\pm$ 1 LSB @ 25°C, $\pm$ 10 V	
Output Range	$\pm$ 5 V, $\pm$ 10 V	
<b>Digital Input</b>		
Channels	16	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.	
Response Speed	500 kHz (Typical)	
<b>Digital Output</b>		
Channels	16	
Compatibility	5 V/CMOS	
Output Voltage	Logic 0: 0.1 V Max., Logic 1: 4.4 V Min.	
Output Capability	Sink: 6 mA @ 0.33 V, Source: 6 mA @ 4.77 V	
Response Speed	500 kHz (Typical)	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Reference Clock	Internal: 8 MHz	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	300 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

#### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 Da2 out
Da1 out	18	37 D.GND
Ext_Trg	19	

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

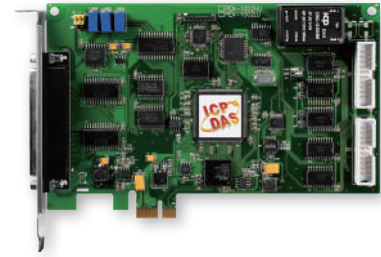
#### Ordering Information

PEX-1202L CR	PCI Express, 32-channel, 12-bit, 110 kS/s. Low Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
PEX-1202H CR	PCI Express, 32-channel, 12-bit, 44 kS/s. High Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.

## 2-3 Analog Input/Output Boards

### PEX-1002L/PEX-1002H

PCI Express, 32-channel, 12-bit, 110 kS/s or 44 kS/s  
Multi-function Board



#### Features

- PCI Express x1 Interface
- 16-channel 5 V/TTL Digital Input
- 16-channel 5 V/TTL Digital Output
- Pull-high/Pull-low Jumpers for DI Channels
- 12-bit, 32 Single-ended/16 Differential Analog Input channels
- Internal/External Trigger
- 110 or 44 kS/s AD Sampling Rate
- Supports Card ID (SMD Switch)

#### Introduction

The PEX-1002L/H series utilizes the PCI Express bus and is designed as an easy replacement for the PCI-1002 series without requiring any modification to either the software or the driver.

The PEX-1002L/H provides 32 single-ended or 16 differential Analog Input channels at 12-bit resolution, together with 16 TTL Digital Input and 16 TTL Digital Output channels.

The PEX-1002L/H includes a Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The pull-high/low jumpers allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or line broken.

#### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 N.C.
N.C.	18	37 D.GND
Ext_Trg	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

#### Software

##### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

##### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

#### Hardware Specifications

Model	PEX-1002L	PEX-1002H
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
Resolution	12-bit, 8 μs Conversion Time	
Accuracy	0.01% of FSR ±2 LSB @ 25°C, ±10 V	
Sampling Rate	110 kS/s	44 kS/s
<b>Digital Input</b>		
Channels	16	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.	
Response Speed	500 kHz (Typical)	
<b>Digital Output</b>		
Channels	16	
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max., Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V, Source: 0.8 mA @ 2.0 V	
Response Speed	500 kHz (Typical)	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Reference Clock	Internal: 4 MHz	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	800 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

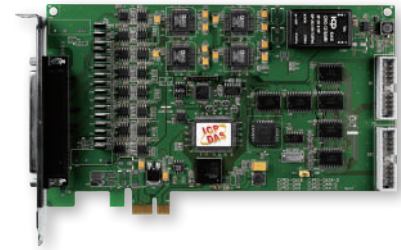
#### Ordering Information

PEX-1002L CR	PCI Express, 32-channel, 12-bit, 110 kS/s. Low Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
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PEX-1002H CR	PCI Express, 32-channel, 12-bit, 44 kS/s. High Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
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# PEX-DA4/PEX-DA8/PEX-DA16

PCI Express, 14-bit, 4/8/16-channel Analog Output Board



## Features

- PCI Express x1 Interface
- 16-channel 5 V/TTL Digital Input
- 16-channel 5 V/CMOS Digital Output
- Pull-high/Pull-low Jumpers for DI Channels
- Supports Card ID (SMD Switch)
- 4, 8 or 16-channel 14-bit Analog Output
- Voltage Output:  $\pm 10$  V
- Current Output:  $0 \sim +20$  mA (sink)
- Double-buffered DA Latch

## Introduction

The PEX-DA4/DA8/DA16 series Analog Output boards utilize the PCI Express interface, and are equipped with 4, 8, or 16 Analog Output channels at 14-bit resolution with each DA channel featuring a double-buffered latch.

The voltage output for the PEX-DA series can range from -10 V to +10 V, and the current output range can be from 0 to 20 mA. In addition, the PEX-DA series also provides the following advantages:

- 1. Accurate and easy-to-use calibration:** ICP DAS provides a software calibration function, meaning that jumpers and trimpots are no longer required. The calibration data is saved in EEPROM for long-term use.
- 2. Individual channel configuration:** Each channel can be individually configured as either voltage or current output.
- 3. Card ID:** The PEX-DA series includes a Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer.

The PEX-DA series is designed as an easy replacement for the PIO-DA series without requiring any modification to either the software or the driver.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Model	PEX-DA4	PEX-DA8	PEX-DA16
<b>Analog Outputs</b>			
Channels	4	8	16
Resolution	14-bit		
Accuracy	0.01% of FSR $\pm 2$ LSB @ 25°C, $\pm 10$ V		
Output Range	$\pm 10$ V, $0 \sim +20$ mA		
Output Driving	$\pm 5$ mA		
Slew Rate	0.71 V/ $\mu$ s		
<b>Digital Inputs</b>			
Channels	16		
Compatibility	5 V/TTL		
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.		
Response Speed	200 kHz (Typical)		
<b>Digital Outputs</b>			
Channels	16		
Compatibility	5 V/CMOS		
Output Voltage	Logic 0: 0.1 V Max., Logic 1: 4.4 V Min.		
Output Capability	Sink: 6 mA @ 0.33 V, Source: 6 mA @ 4.77 V		
Response Speed	200 kHz (Typical)		
<b>General</b>			
Bus Type	PCI Express x1		
Card ID	Yes (4-bit)		
Connectors	Female DB37 x 1, 20-pin Box Header x 2		
Power Consumption	600 mA @ +5 V	800 mA @ +5 V	1400 mA @ +5 V
Operating Temperature	0°C to +60°C		
Humidity	5 to 85% RH, Non-condensing		



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
VO_0	01	20 IO_0
VO_1	02	21 IO_1
VO_2	03	22 IO_2
VO_3	04	23 IO_3
A.GND	05	24 N/A
VO_4	06	25 IO_4
VO_5	07	26 IO_5
VO_6	08	27 IO_6
VO_7	09	28 IO_7
A.GND	10	29 N/A
VO_8	11	30 IO_8
VO_9	12	31 IO_9
VO_10	13	32 IO_10
VO_11	14	33 IO_11
A.GND	15	34 IO_12
VO_12	16	35 IO_13
VO_13	17	36 IO_14
VO_14	18	37 IO_15
VO_15	19	

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	11	12 DO 11
DO 12	13	14 DO 13
DO 14	15	16 DO 15
GND	17	18 GND
+5 V	19	20 +12 V

CON1

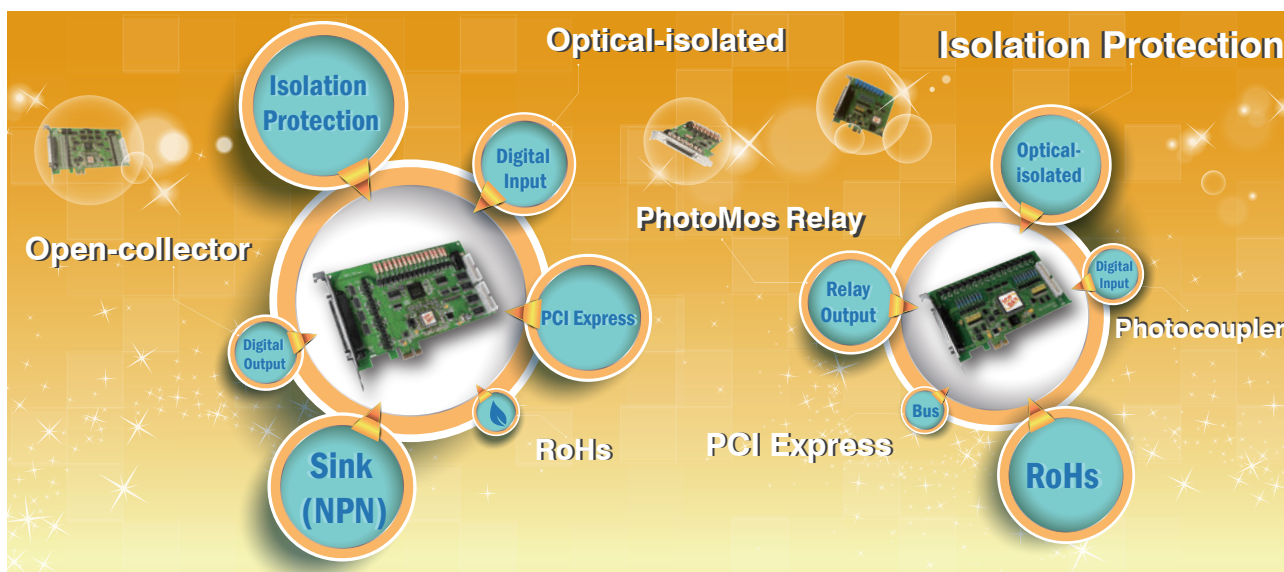
Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	10	12 DI 11
DI 12	12	14 DI 13
DI 14	14	16 DI 15
GND	16	18 GND
+5 V	18	20 +12 V

CON2

## Ordering Information

PEX-DA4 CR	PCI Express, 4-channel Analog Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PEX-DA8 CR	PCI Express, 8-channel Analog Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PEX-DA16 CR	PCI Express, 16-channel Analog Output board (RoHS). Includes one CA-4002 D-sub Connector.

## 2-4 Isolated Digital I/O Boards



### Selection Guide

Model	PEX-P8R8i PEX-P16R16i	PEX-P8POR8i PEX-P16POR16i	PEX-P64		PEX-C64	PEX- P32C32	NEW PEX- P32A32	NEW PEX-730	
			-	-24V				Isolated	Non-isolated
Interface	PCI Express								
<b>Digital Input</b>									
Channels	8/16	8/16	64		-	32	16	16	
Isolation Voltage	3750 V <sub>rms</sub>	2000 V <sub>DC</sub>	3750 V <sub>rms</sub>		-	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>		
Compatibility	Photocoupler	Photocoupler	Photocoupler		-	Photocoupler	Optical	TTL	
Input Voltage	Logic 0	AC/DC 0 ~ +1 V		0 ~ +1 V		-	0 ~ +1 V	0 ~ +1 V	0.8 V Max.
	Logic 1	AC/DC +5 ~ +24 V		+5 ~ +15 V	+20 ~ +28 V	-	+9 ~ +24 V	+9 ~ +24 V	2.0 V Min.
Input Impedance	1.2 K $\Omega$ , 0.5 W	1.2 K $\Omega$ , 0.5 W	1.2 K $\Omega$ , 1 W	3 K $\Omega$ , 1 W	-	3 K $\Omega$ , 0.25 W	1.2 K $\Omega$ , 1 W		
<b>Relay Output</b>									
Channels	8/16	8/16	-		-	-	-		
Relay Type	4 SPDT, 4 SPST/ 8 SPDT, 8 SPST	PhotoMos Relay (Form A)	-		-	-	-		
Contact Rating	AC: 120 V @ 0.5 A  DC: 24 V @ 1 A	Load Voltage: 300 V (AC Peak or DC)  Load Current: 130 mA	-		-	-	-		
Insulation Resistance	1000 M $\Omega$ @ 500 V <sub>DC</sub>		-		-	-	-		
<b>Digital Output</b>									
Channels	-	-	-		64	32	16	16	
Isolation Voltage	-	-	-		3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>		
Compatibility	-	-	-		Sink, Open Collector	Sink, Open Collector	Source, Open Collector	Sink, Open Collector	5 V/TTL
Output Capability	-	-	-		100 mA/+30 V for each channel @ 60% duty	100 mA/+30 V for each channel @ 100% duty	100 mA/+30 V for each channel @ 100% duty	Sink: 2.4 mA @ 0.8 V  Source: 0.8 mA @ 2.0 V	
Page	2-9	2-10	2-11		2-12	2-13	2-14		

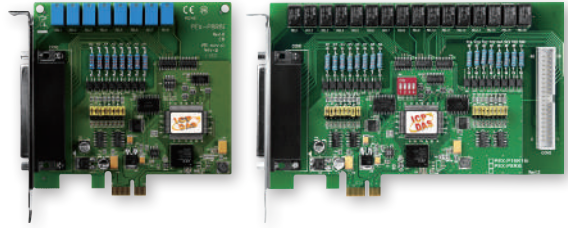
# PEX-P8R8i/PEX-P16R16i

PCI Express, 8/16-channel Isolated Digital Input and 8/16-channel Relay Output Board



PEX-P8R8i

PEX-P16R16i



## Features

- PCI Express x1 Interface
- Supports Card ID (SMD Switch)
- 8/16-channel Relay Output
  - 7 ms Relay Release Time
- 8/16-channel Isolated Digital Input
  - Selectable DC Signal Input Filter
  - AC Signal Input with Filter
  - 2000 V<sub>DC</sub> Photo-isolation Protection

## Introduction

The PEX-P8R8i/PEX-P16R16i series utilizes the PCI Express bus and is designed as an easy replacement for the PISO-P16R16U board without requiring any modification to either the software or the driver.

The PEX-P8R8i/PEX-P16R16i provides 8/16 photocoupler Digital Input channels with 3750 V<sub>rms</sub> isolation protection, and allows the input signals to be completely floated to prevent ground loops. The boards are also equipped with 8/16 Relay Output channels that can be used for controlling the ON/OFF state of external devices, for driving external relays or small power switches, or for activating alarms, etc.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PEX-P8R8i	PEX-P16R16i
<b>Digital Input</b>		
Isolation Voltage	2000 V <sub>DC</sub> (Photocoupler)	
Channels	8	16
Input Voltage	Logic 1: AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz) Logic 0: AC/DC 0 ~ +1 V	
Response Speed	Without Filter: 50 kHz (Typical) With Filter: 0.455 kHz (Typical)	
<b>Relay Output</b>		
Channels	8	16
Relay Type	4 SPDT, 4 SPST	8 SPDT, 8 SPST
Contact Rating	Voltage: 120 V <sub>AC</sub> /24 V <sub>DC</sub> Current: 1 A	
Operating Time	1 ms (Typical)	
Lifetime	Mechanical: 5,000,000 ops. Electrical: 100,000 ops.	
Insulation Resistance	1000 MΩ @ 500 V <sub>DC</sub>	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1	Female DB37 x 1, 40-pin Box Header x 1
Power Consumption	800 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
NO_0	01	NO_3
COM_0	02	COM_3
NC_0	03	NC_3
NO_1	04	NO_4
COM_1	05	COM_4
NC_1	06	NO_5
NO_2	07	COM_5
COM_2	08	NO_6
NC_2	09	COM_6
NO_7	10	GND
COM_7	11	DIB_0
DIA_0	12	DIB_1
DIA_1	13	DIB_2
DIA_2	14	DIB_3
DIA_3	15	DIB_4
DIA_4	16	DIB_5
DIA_5	17	DIB_6
DIA_6	18	DIB_7
DIA_7	19	

Pin Assignment	Terminal No.	Pin Assignment
NO_8	01	NO_11
COM_8	03	COM_11
NC_8	05	NC_11
NO_9	07	NO_12
COM_9	09	COM_12
NC_9	11	NO_13
NO_10	13	COM_13
COM_10	15	NO_14
NC_10	17	COM_14
NO_15	19	GND
COM_15	21	DIB_8
DIA_8	23	DIB_9
DIA_9	25	DIB_10
DIA_10	27	DIB_11
DIA_11	29	DIB_12
DIA_12	31	DIB_13
DIA_13	33	DIB_14
DIA_14	35	DIB_15
DIA_15	37	N/A
N/A	39	N/A

CON2 (PEX-P16R16i only)

## Ordering Information

PEX-P8R8i CR	PCI Express, 8-channel Isolated Digital Input, 8-channel Relay Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PEX-P16R16i CR	PCI Express, 16-channel Isolated Digital Input, 16-channel Relay Output Board (RoHS). Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.

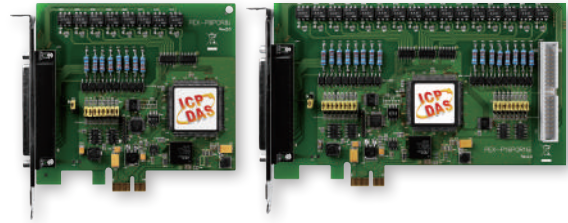
# PEX-P8POR8i/PEX-P16POR16i

PCI Express, 8/16-channel Isolated Digital Input and 8/16-channel PhotoMOS Relay Output Board



PEX-P8POR8i

PEX-P16POR16i



## Features

- PCI Express x1 Interface
- Supports Card ID (SMD Switch)
- LED Power Indicator
- 8/16-channel Isolated Digital Input
  - Selectable DC Signal Input Filter
  - AC Signal Input with Filter
  - 2000 V<sub>DC</sub> Photo-isolation Protection
- 8/16-channel PhotoMOS Relay Output
  - Supports DO Status Readback (Register Level)
  - 0.05 ms Release Time
  - Long Life and High Reliability PhotoMos Relay
  - Low Leakage Current when PhotoMos Relay is OFF
  - No Contact Bounce, No Sparking

## Introduction

The PEX-P8POR8i/PEX-P16POR16i series utilizes the PCI Express bus and designed as an easy replacement for the PCI-P8POR8/P16POR16 series without requiring any modification to either the software or the driver.

The PEX-P8POR8i/PEX-P16POR16i provides 8/16 photocoupler Digital Input channels with 2000 V<sub>DC</sub> isolation protection, and allows the input signals to be completely floated to prevent ground loops. It is also equipped with 8/16 PhotoMOS Relay Outputs channels that can be used for controlling the ON/OFF state of external devices, for driving external relays or small power switches, or for activating alarms, etc.

## Hardware Specifications

Model	PEX-P8POR8i	PEX-P16POR16i
<b>Digital Input</b>		
Isolation Voltage	2000 V <sub>DC</sub> (Photocoupler)	
Channels	8	16
Input Voltage	Logic 1: AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz) Logic 0: AC/DC 0 ~ +1 V	
Response Speed	Without Filter: 50 kHz (Typical) With Filter: 0.455 kHz (Typical)	
<b>Relay Output</b>		
Channels	8	16
Relay Type	PhotoMos, Form A	
Contact Rating	Voltage	300 V (AC peak or DC)
	Current	130 mA
Operating Time	0.7 ms (Typical)	
Insulation Resistance	1000 MΩ @ 500 V <sub>DC</sub>	
Electrical Endurance	Long Life and No Spike	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1	Female DB37 x 1, 40-pin Box Header x 1
Power Consumption	800 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.	Pin Assignment		
NO_0	01	CM_0	20	02	CM_8	
NO_1	02	CM_1	21	03	04	CM_9
NO_2	03	CM_2	22	04	06	CM_10
NO_3	04	CM_3	23	05	08	CM_11
NO_4	05	CM_4	24	06	10	CM_12
NO_5	06	CM_5	25	07	12	CM_13
NO_6	07	CM_6	26	08	14	CM_14
NO_7	08	CM_7	27	09	16	CM_15
N/A	09	N/A	28	10	18	N/A
N/A	10	N/A	29	11	20	N/A/ GND
N/A	11	N/A	30	12	22	DIB_8
DIA_0	12	DIB_0	31	13	24	DIB_9
DIA_1	13	DIB_1	32	14	26	DIB_10
DIA_2	14	DIB_2	33	15	28	DIB_11
DIA_3	15	DIB_3	34	16	30	DIB_12
DIA_4	16	DIB_4	35	17	32	DIB_13
DIA_5	17	DIB_5	36	18	34	DIB_14
DIA_6	18	DIB_6	37	19	36	DIB_15
DIA_7	19	DIB_7	38	N/A	38	N/A
			39	N/A	40	N/A

CON2 (PEX-P16POR16i only)

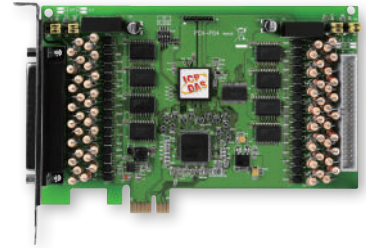
## Ordering Information

PEX-P8POR8i CR	PCI Express, 8-channel Isolated Digital Input, 8-channel PhotoMos Relay Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PEX-P16POR16i CR	PCI Express, 16-channel Isolated Digital Input, 16-channel PhotoMos Relay Output Board (RoHS). Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.

2  
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PCI Express Data Acquisition Boards

# PEX-P64/PEX-P64-24V

PCI Express, 64-channel Optically-isolated Digital Input Board



## Features

- PCI Express x1 Interface
- 64-channel Optically-isolated Digital Input
  - Internal Power (3000 V<sub>DC</sub> Isolation) for Dry-Contact Input
- Supports Card ID (SMD Switch)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Digital Input Arranged into Four Isolated Banks when using Four Isolated External Power Supplies
- Selectable Internal or External Power for Digital Input

## Introduction

The PEX-P64/P64-24V series utilizes the PCI Express bus and provides 64 optically-isolated Digital Input channels that use either an internal or external power supply that can be selected via a jumper. The internal power is provided by an onboard isolated DC/DC converter that provides 3000 V<sub>DC</sub> isolation and is used for connecting dry-contact input devices. The DI channels are arranged into four isolated banks when using four isolated external power supplies, where DI channels 0 to 15 are allocated to bank A, DI channels 16 to 31 are allocated to bank B, DI channels 32 to 47 are allocated to bank C, and DI channels 48 to 63 are allocated to bank D. The onboard photocouplers provide 3750 V<sub>rms</sub> isolation, and act as an interface between field logic signals, eliminating ground loop problems and isolating the host computer from potentially damaging voltage spikes.

The PEX-P64/P64-24V series also include an onboard Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The PEX-P64/P64-24V series is designed as an easy replacement for the PISO-P64U board without requiring any modification to either the software or the driver.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PEX-P64	PEX-P64-24V
<b>Digital Input</b>		
Isolation Voltage	3750 V <sub>rms</sub>	
Channels	64	
Compatibility	Photocoupler Isolated	
Input Logic Low	0 ~ 1 V	0 ~ 1 V
Input Logic High	+5 ~ +15 V (+24 V Max.)	+20 ~ +28 V (+30 V Max.)
Impedance	1.2 KΩ, 1 W	3 KΩ, 1 W
Response Speed	4 kHz (Typical)	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1 40-pin Box Header x 1	
Power Consumption	400 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment	
IGND0	01	20	IGND1	02	IGND3	
DI_0	02	21	DI_16	03	04	DI_48
DI_1	03	22	DI_17	05	06	DI_49
DI_2	04	23	DI_18	07	08	DI_50
DI_3	05	24	DI_19	09	10	DI_51
DI_4	06	25	DI_20	11	12	DI_52
DI_5	07	26	DI_21	13	14	DI_53
DI_6	08	27	DI_22	15	16	DI_54
DI_7	09	28	DI_23	17	18	DI_55
DI_8	10	29	DI_24	19	20	DI_56
DI_9	11	30	DI_25	21	22	DI_57
DI_10	12	31	DI_26	23	24	DI_58
DI_11	13	32	DI_27	25	26	DI_59
DI_12	14	33	DI_28	27	28	DI_60
DI_13	15	34	DI_29	29	30	DI_61
DI_14	16	35	DI_30	31	32	DI_62
DI_15	17	36	DI_31	33	34	DI_63
ECOM0	18	37	ECOM1	35	36	ECOM3
N.C.	19			37	38	N.C.
				39	40	N.C.

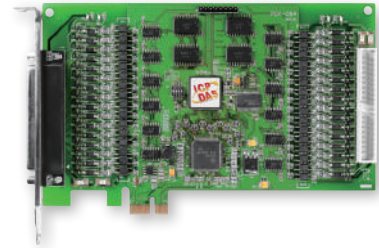
## Ordering Information

PEX-P64 CR	PCI Express, 64-channel Optically-isolated Digital Input Board (High: 5 ~ 15 V, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
PEX-P64-24V CR	PCI Express, 64-channel Optically-isolated Digital Input Board (High: 20 ~ 28 V, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.



# PEX-C64

PCI Express, 64-channel Open-collector Digital Output (Sink, NPN) Board



## Features

- PCI Express x1 Interface
- 64-channel Optically-isolated Digital Output (Sink, NPN)
  - Supports Output Status Readback
- Supports Card ID (SMD Switch)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Digital Input Arranged into Four Isolated Banks when using Four Isolated External Power Supplies

## Introduction

The PEX-C64 board utilizes the PCI Express bus and provides 64 optically-isolated Digital Output channels, each of which includes a Darlington transistor that provides 3750 V<sub>rms</sub> isolation, and an integrated suppression diode for the inductive load. The DO channels are allocated into four isolated banks when using four isolated external power supplies, and act as an interface between field logic signals, eliminating ground loop problems and isolating the host computer from potentially damaging voltage spikes.

The PEX-C64 board also includes an onboard Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The PEX-C64 board is designed as an easy replacement for the PISO-C64U board without requiring any modification to either the software or the driver.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Digital Output	
Isolation Voltage	3750 V <sub>rms</sub>
Channels	64
Compatibility	Sink, Open Collector
Output Capability	100 mA/+30 V for each channel @ 100% duty
Response Speed	4 kHz (Typical)
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1 40-pin Box Header x 1
Power Consumption	800 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND0	01	Ext. GND1
DO_0	02	DO_16
DO_1	03	DO_17
DO_2	04	DO_18
DO_3	05	DO_19
DO_4	06	DO_20
DO_5	07	DO_21
DO_6	08	DO_22
DO_7	09	DO_23
DO_8	10	DO_24
DO_9	11	DO_25
DO_10	12	DO_26
DO_11	13	DO_27
DO_12	14	DO_28
DO_13	15	DO_29
DO_14	16	DO_30
DO_15	17	DO_31
Ext. PWR0	18	Ext. PWR1
N.C.	19	

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND2	01	Ext. GND3
DO_32	03	DO_48
DO_33	05	DO_49
DO_34	07	DO_50
DO_35	09	DO_51
DO_36	11	DO_52
DO_37	13	DO_53
DO_38	15	DO_54
DO_39	17	DO_55
DO_40	19	DO_56
DO_41	21	DO_57
DO_42	23	DO_58
DO_43	25	DO_59
DO_44	27	DO_60
DO_45	29	DO_61
DO_46	31	DO_62
DO_47	33	DO_63
Ext. PWR2	35	Ext. PWR3
N.C.	37	N.C.
N.C.	39	N.C.

## Ordering Information

PEX-C64 CR	PCI Express, 64-channel Optically-isolated Digital Output Board (Sink, NPN, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
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PCI Express Data Acquisition Boards

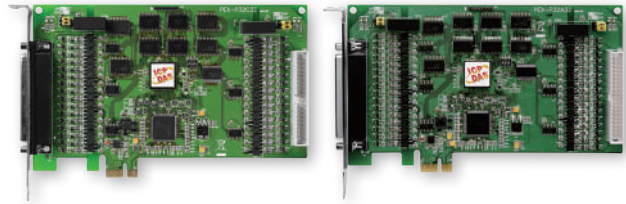
# PEX-P32C32/PEX-P32A32 **NEW**

PCI Express, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output (Sink/Source) Board



PEX-P32C32

PEX-P32A32



## Features

- PCI Express x1 Interface
- 32-channel Optically-isolated Digital Input
  - Internal Power (3000 V<sub>DC</sub> Isolation) for Dry-Contact Input
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Supports Card ID (SMD Switch)
- 32-channel Optically-isolated Digital Output
  - PEX-P32C32: Current Sinking (NPN)
  - PEX-P32A32: Current Sourcing (PNP)
  - Supports Output Status Readback (Register Level)

## Introduction

The PEX-P32C32/P32A32 series provides 32 optically-isolated Digital Input channels and 32 optically-isolated Digital Output channels, arranged into four isolated banks. Each input channel uses a photocoupler input that allows either an internal isolated power supply or an external power supply to be connected, and can be selected via a jumper.

Each Digital Output channel includes either a Darlington (PEX-P32C32) or a PNP (PEX-P32A32) transistor and an integrated suppression diode for the inductive load. The input port may use either an external power source or can be powered from the Host PC via a DC/DC converter. The output port should use an external power source. The board helps eliminate ground loop problems and isolates the host computer from potentially damaging voltage spikes.

The PEX-P32C32/P32A32 series also includes an onboard Card ID switch that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The PEX-P32C32/P32A32 series is designed as an easy replacement for the PISO-P32C32U/P32A32U series without requiring any modification to either the software or the driver.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
Ext. GND0	01	20	Ext. GND0	01	02
DI_0	02	21	DO_0	03	04
DI_1	03	22	DO_1	05	06
DI_2	04	23	DO_2	07	08
DI_3	05	24	DO_3	09	10
DI_4	06	25	DO_4	11	12
DI_5	07	26	DO_5	13	14
DI_6	08	27	DO_6	15	16
DI_7	09	28	DO_7	17	18
DI_8	10	29	DO_8	19	20
DI_9	11	30	DO_9	21	22
DI_10	12	31	DO_10	23	24
DI_11	13	32	DO_11	25	26
DI_12	14	33	DO_12	27	28
DI_13	15	34	DO_13	29	30
DI_14	16	35	DO_14	31	32
DI_15	17	36	DO_15	33	34
ECOM0	18	37	Ext. PWR0	35	36
IGND0	19			37	38
				39	40

## Hardware Specifications

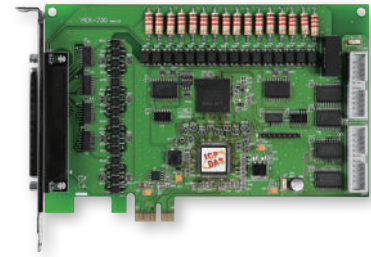
Model	PEX-P32C32	PEX-P32A32
<b>Digital Input</b>		
Isolation Voltage	3750 Vrms	
Channels	32	
Compatibility	Sink or Source, Photocoupler isolated channel with common power or ground	
Input Voltage	Logic 0: 0 ~ +1 V, Logic 1: +9 ~ +24 V	
Impedance	3 KΩ, 0.25 W	
<b>Digital Output</b>		
Isolation Voltage	3750 Vrms	
Channels	32	
Compatibility	Sink, Open-collector	Source, Open-collector
Output Capability	100 mA/+30 V for each channel @ 100% duty	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 40-pin Box Header x 1	
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PEX-P32C32 CR	PCI Express, 32-ch Optically-isolated Digital Input and 32-ch Optically-isolated Open-collector Digital Output Board (Sink, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
PEX-P32A32 CR	PCI Express, 32-ch Optically-isolated Digital Input and 32-ch Optically-isolated Open-collector Digital Output Board. (Source, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.

# PEX-730 **NEW**

PCI Express, 32-channel Isolated Digital Input/Output and 32-channel TTL Digital Input/Output (Sink, NPN) Board



## Features

- PCI Express x1 Interface
- 16-channel Optically-isolated Digital Input
- 16-channel Optically-isolated Digital Output (Sink, NPN)
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
- Supports Card ID (SMD Switch)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Internal Power (3000 V<sub>DC</sub> isolation) for Dry-contact Input
- Supports Output Status Readback
- Two Interrupt Sources

## Introduction

PEX-730 cards provide 32 isolated digital I/O channels (16 x DI and 16 x DO) and 32 TTL-level digital I/O channels (16 x DI and 16 x DO). Both the isolated DI and DO channels use a short optical transmission path to transfer an electronic signal between the elements of a circuit and keep them electrically isolated. With 3750 V<sub>rms</sub> isolation protection, these DI/O channels allow the input signals to be completely floated so as to prevent ground loops and isolate the host computer from damaging voltages. Each digital output offers a Darlington (NPN) transistor and integrated suppression diode for the inductive load. The open collector outputs (DO channels) are typically used for alarm and warning notification, signal output control, control for external circuits that require a higher voltage level, and signal transmission applications, etc.

The PEX-730 also adds a Card ID switch. Users can set Card ID on a board and recognize the board by the ID via software when using two or more cards in one computer. The PEX-730 is designed as easy replacement for the PISO-730U without any software/driver modification.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
IDI_0	01	20 IDI_1
IDI_2	02	21 IDI_3
IDI_4	03	22 IDI_5
IDI_6	04	23 IDI_7
IDI_8	05	24 IDI_9
IDI_10	06	25 IDI_11
IDI_12	07	26 IDI_13
IDI_14	08	27 IDI_15
EI.COM1	09	28 EI.COM2
EO.COM1	10	29 IGND
IDO_0	11	30 IDO1
IDO_2	12	31 IDO3
IDO_4	13	32 IDO5
IDO_6	14	33 IDO7
IDO_8	15	34 IDO9
IDO_10	16	35 IDO11
IDO_12	17	36 IDO13
IDO_14	18	37 IDO15
EO.COM2	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

## Ordering Information

PEX-730 CR	PCI Express, 32-channel Isolated Digital Input/Output and 32-channel TTL Digital Input/Output Board. (Current Sinking, RoHS). Includes one CA-4002 D-sub Connector.
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## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Isolated Digital Input	
Channels	16
Compatibility	Optical
Isolation Voltage	3750 V <sub>rms</sub>
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +9 ~ +24 V
Input Impedance	1.2 KΩ, 1 W
Response Speed	4 kHz (Typical)
Isolated Digital Output	
Channels	16
Compatibility	Sink (NPN), Open-collector
Isolation Voltage	3750 V <sub>rms</sub>
Output Capability	100 mA/+30 V for each channel @ 100% duty
Response Speed	4 kHz (Typical)
Non-isolated Digital Input	
Channels	16
Compatibility	5 V/TTL
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.
Response Speed	500 kHz
Non-isolated Digital Output	
Channels	16
Compatibility	5 V/TTL
Output Voltage	Logic 0: 0.4 V Max., Logic 1: 2.4 V Min.
Output Capability	Sink: 2.4 mA @ 0.8 V, Source: 0.8 mA @ 2.0 V
Response Speed	500 kHz
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1, 20-pin Box Header x 2
Power Consumption	600 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

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PCI Express Data Acquisition Boards

## 2-5 Non-isolated Digital I/O Boards



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PCI Express Data Acquisition Boards

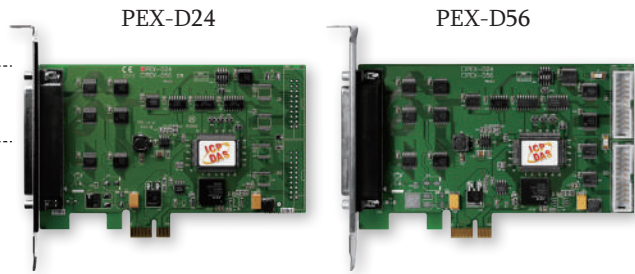


### Selection Guide

Model	PEX-D24	PEX-D48	PEX-D56	PEX-D96S <small>NEW</small>	PEX-D144S <small>NEW</small>
Interface	PCI Express				
<b>Programmable DI/O</b>					
Channels	24	48	24	96	144
<b>Digital Input</b>					
Channels	-	-	16	-	-
Compatibility	5 V/TTL	5 V/TTL	5 V/TTL	5 V/CMOS	5 V/CMOS
Input Voltage	Logic 0: 0.8 Max. Logic 1: 2.0 Min.	Logic 0: 0.8 Max. Logic 1: 2.0 Min.	Logic 0: 0.8 Max. Logic 1: 2.0 Min.	Logic 0: 0.8 Max. Logic 1: 2.0 Min.	Logic 0: 0.8 Max. Logic 1: 2.0 Min.
<b>Digital Output</b>					
Channels	-	-	16	-	-
Compatibility	5 V/TTL	5 V/TTL	5 V/TTL	5 V/CMOS	5 V/CMOS
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	Logic 0: 0.1 V Max. Logic 1: 4.4 V Min.	Logic 0: 0.1 V Max. Logic 1: 4.4 V Min.
<b>Timer/Counter</b>					
Channels	-	2	-	-	-
<b>Connector</b>					
100-pin SCSI II	-	-	-	1	1
50-pin Header	-	1	-	-	1
37-pin D-Sub	1	1	1	-	-
20-pin Header	-	-	2	-	-
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# PEX-D24/PEX-D56

PCI Express, 24/56-channel Digital I/O Board



## Features

- PCI Express x1 Interface
- Supports Card ID (SMD Switch)
- Emulates two Industrial-standard 8255 PPI Ports (Mode 0)
- DI/O Response Time approximately 2 μs (500 kHz Max.)
- 24/56 Buffered TTL Digital Input/Output Lines
- Three 8-bit Bi-directional I/O Ports
- DO Provides Higher Driving Capability
- Four Interrupt Sources

## Introduction

The PEX-D24/D56 series utilizes the PCI Express bus and is designed as an easy replacement for the PIO-D24/PIO-D24U/PIO-D56/PIO-D56U series without requiring any modification to either the software or the driver.

The PEX-D24/D56 provides 24/56 buffered TTL Digital Input/Output lines, which are grouped into three 8-bit bi-directional ports: Port A (PA), Port B (PB) and Port C (PC), and are configured as input mode during power-on or after a reset.

The PEX-D24/D56 also includes an onboard Card ID that enables the board to be easily recognized via software if two or more cards are installed in the same computer.

## Hardware Specifications

Model	PEX-D24	PEX-D56
<b>Programmable DI/O</b>		
Channels	24	
<b>Digital Input</b>		
Channels	-	16
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.	
Response Speed	500 kHz	
<b>Digital Output</b>		
Channels	-	16
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	
Output Capability	Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V	CN1 Sink: 2.4 mA @ 0.8 V Source: 0.8 mA @ 2.0 V
		CN3 Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V
Response Speed	500 kHz	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1	Female DB37 x 1, 20-pin Male Box Header x 2
Power Consumption	420 mA @ +5 V	580 mA @ +5 V
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
N.C.	01	20 +5V
N.C.	02	21 GND
PB_7	03	22 PC_7
PB_6	04	23 PC_6
PB_5	05	24 PC_5
PB_4	06	25 PC_4
PB_3	07	26 PC_3
PB_2	08	27 PC_2
PB_1	09	28 PC_1
PB_0	10	29 PC_0
GND	11	30 PA_7
N.C.	12	31 PA_6
GND	13	32 PA_5
N.C.	14	33 PA_4
GND	15	34 PA_3
N.C.	16	35 PA_2
GND	17	36 PA_1
+5V	18	37 PA_0
GND	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

CON2 (PEX-D56 only)

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

CON1 (PEX-D56 only)

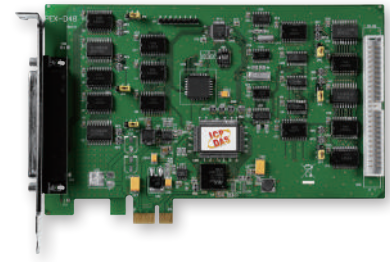
## Ordering Information

PEX-D24 CR	PCI Express, 24-channel Digital I/O Board (RoHS)
PEX-D56 CR	PCI Express, 56-channel Digital I/O Board (RoHS)

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PCI Express Data Acquisition Boards

# PEX-D48

PCI Express, 48-channel Digital I/O Board



## Features

- PCI Express x1 Interface
- Supports Card ID (SMD Switch)
- Emulates two Industrial-standard 8255 PPI Ports (Mode 0)
- DI/O Response Time approximately 2 μs (500 kHz Max.)
- DO Provides Higher Driving Capability
- One 16-bit Event Counter
- 48 Buffered TTL Digital Input/Output Lines
- Six 8-bit Bi-directional Input/Output Ports
- One 32-bit Programmable Internal Timer
- Pull-high/Pull-low Jumpers for DI Channels
- Four Interrupt Sources

## Introduction

The PEX-D48 board utilizes the PCI Express bus and is designed as an easy replacement for the PIO-D48/PIO-D48U/PIO-D48SU series without requiring any modification to either the software or the driver.

The PEX-D48 provides 48 buffered TTL Digital Input/Output lines, which are grouped into six 8-bit bi-directional ports: Port A (PA), Port B (PB) and Port C (PC). Port C can also be split into two nibble-wide (4-bit) segments. All ports are configured as input mode during power-on or after a reset.

The PEX-D48 also includes an onboard Card ID that enables the board to be easily recognized via software if two or more cards are installed in the same computer. The pull-high/low jumpers allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or line broken.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
N.C	01	20 +5 V
N.C	02	21 GND
PB_7	03	22 PC_7
PB_6	04	23 PC_6
PB_5	05	24 PC_5
PB_4	06	25 PC_4
PB_3	07	26 PC_3
PB_2	08	27 PC_2
PB_1	09	28 PC_1
PB_0	10	29 PC_0
GND	11	30 PA_7
N.C	12	31 PA_6
GND	13	32 PA_5
N.C	14	33 PA_4
GND	15	34 PA_3
N.C	16	35 PA_2
GND	17	36 PA_1
+5 V	18	37 PA_0
GND	19	

Pin Assignment	Terminal No.	Pin Assignment
PC_7	01	02 GND
PC_6	03	04 GND
PC_5	05	06 GND
PC_4	07	08 GND
PC_3	09	10 GND
PC_2	11	12 GND
PC_1	13	14 GND
PC_0	15	16 GND
PB_7	17	18 GND
PB_6	19	20 GND
PB_5	21	22 GND
PB_4	23	24 GND
PB_3	25	26 GND
PB_2	27	28 GND
PB_1	29	30 GND
PB_0	31	32 GND
PA_7	33	34 GND
PA_6	35	36 GND
PA_5	37	38 GND
PA_4	39	40 GND
PA_3	41	42 GND
PA_2	43	44 GND
PA_1	45	46 GND
PA_0	47	48 GND
+5 V	49	50 GND

## Hardware Specifications

Programmable DI/O	
Channels	48
Compatibility	5 V/TTL
Digital Input	
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.
Response Speed	500 kHz
Digital Output	
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.
Output Capability	Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V
Response Speed	500 kHz
Timer/Counter	
Channels	2 (Event Timer x 1/32-bit Timer x 1)
Resolution	16-bit
Reference Clock	Internal: 4 MHz
General	
Bus Type	PCI Express x1
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1 50-pin Box Header x 1
Power Consumption	900 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Ordering Information

PEX-D48 CR	PCI Express, 48-channel Digital I/O Board (RoHS)
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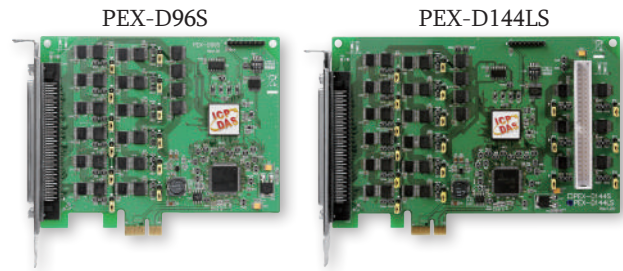
# PEX-D96S/PEX-D144LS

PCI Express, 96/144-channel Digital I/O Board



## Features

- PCI Express x1 Interface
- Supports Card ID (SMD Switch)
- DI/O Response Time approximately 2 μs (500 kHz Max.)
- DO Provides Higher Driving Capability
- 96/144 Buffered CMOS Digital Input/Output Lines
- Twelve/Eighteen 8-bit Bi-directional I/O Ports
- Four Interrupt Sources
- Pull-high/Pull-low Jumpers for DI Channels



## Introduction

The PEX-D96S/D144LS utilizes the PCI Express bus and designed as an easy replacement for the PIO-D96U/D96SU/D144U/D144LU without requiring any modification to the software or the driver.

The PEX-D96S/D144LS provides a high-density connector that reduces the amount of installation space required for the card in the computer.

The PEX-D96S/D144LS supports the 96/144 CMOS digital I/O lines that consist of twelve/eighteen 8-bit bi-direction ports: port A (PA), port B (PB) and port C (PC) in a connector. All ports are configured as input ports during power-on or after a reset.

The PEX-D96S/D144LS also includes an onboard Card ID that enables the board to be recognized via software if two or more cards are installed in the same computer.

## Hardware Specifications

Model	PEX-D96S	PEX-D144LS
<b>Programmable DI/O</b>		
Channels	96	144
<b>Digital Input</b>		
Compatibility	5 V/CMOS	
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.	
Response Speed	500 kHz	
<b>Digital Output</b>		
Compatibility	5 V/CMOS	
Output Voltage	Logic 0: 0.1 V Max. Logic 1: 4.4 V Min.	
Output Capability	Sink: 6 mA @ 0.33 V Source: 6 mA @ 4.77 V	
Response Speed	500 kHz	
<b>General</b>		
Bus Type	PCI Express x1	
Card ID	Yes (4-bit)	
Connectors	Female SCSI II 100-pin x 1	Female SCSI II 100-pin x 1, 50-pin Box Header x 1
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PEX-D96S CR	PCI Express, 96-channel Digital I/O Board (RoHS)
PEX-D144LS CR	PCI Express, 144-channel Digital I/O Board (RoHS)

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.	Pin Assignment
PA_00	01	51	PA_10	02
PA_01	02	52	PA_11	03
PA_02	03	53	PA_12	04
PA_03	04	54	PA_13	05
PA_04	05	55	PA_14	06
PA_05	06	56	PA_15	07
PA_06	07	57	PA_16	08
PA_07	08	58	PA_17	09
PB_00	09	59	PB_10	10
PB_01	10	60	PB_11	11
PB_02	11	61	PB_12	12
PB_03	12	62	PB_13	13
PB_04	13	63	PB_14	14
PB_05	14	64	PB_15	15
PB_06	15	65	PB_16	16
PB_07	16	66	PB_17	17
PC_00	17	67	PC_10	18
PC_01	18	68	PC_11	19
PC_02	19	69	PC_12	20
PC_03	20	70	PC_13	21
PC_04	21	71	PC_14	22
PC_05	22	72	PC_15	23
PC_06	23	73	PC_16	24
PC_07	24	74	PC_17	25
GND	25	75	GND	26
PA_20	26	76	PA_30	27
PA_21	27	77	PA_31	28
PA_22	28	78	PA_32	29
PA_23	29	79	PA_33	30
PA_24	30	80	PA_34	31
PA_25	31	81	PA_35	32
PA_26	32	82	PA_36	33
PA_27	33	83	PA_37	34
PB_20	34	84	PB_30	35
PB_21	35	85	PB_31	36
PB_22	36	86	PB_32	37
PB_23	37	87	PB_33	38
PB_24	38	88	PB_34	39
PB_25	39	89	PB_35	40
PB_26	40	90	PB_36	41
PB_27	41	91	PB_37	42
PC_20	42	92	PC_30	43
PC_21	43	93	PC_31	44
PC_22	44	94	PC_32	45
PC_23	45	95	PC_33	46
PC_24	46	96	PC_34	47
PC_25	47	97	PC_35	48
PC_26	48	98	PC_36	49
PC_27	49	99	PC_37	50
+5 V	50	100	+5 V	

CON2 (PEX-D144LS only)

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PCI Express Data Acquisition Boards

# 3. PCI Bus Data Acquisition Boards

Harsh Environment Operation

Sensor Interface

Digital Pattern Generator from Digital I/O Port

Vibration Analysis

High-speed Data Acquisition System

Production Test

Process Monitor and Control

## Selection Guide

### 3-1 High Speed Multifunction Board

### 3-2 Multifunction Board

Model	NEW		PCI-826		PCI-822		PCI-1802		PCI-1800		PCI-1602		PCI-1202		PCI-1002		NEW		NEW		
	PCI-2602U	LU	LU	LU	HU	LU	HU	U	FU	LU	HU	LU	HU	LU	HU	LU	HU	LU	HU	PISO-813U	
Interface	Universal PCI																				
<b>Analog Input</b>																					
Resolution	16-bit	16-bit	12-bit	12-bit	12-bit	12-bit	16-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	
Channels	SE	16	32	32	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
	Diif.	8	16	16	8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
Sampling Rate	1 MS/s	250 KS/s	330 KS/s	44 KS/s	330 KS/s	44 KS/s	100 KS/s	200 KS/s	110 KS/s	40 KS/s	110 KS/s	44 KS/s	45 KS/s	10 KS/s	10 KS/s	10 KS/s	10 KS/s	10 KS/s	10 KS/s	10 KS/s	
FIFO Size	8 k	8 k	8 k	1 k	8 k	1 k	8 k	1 k	-	-	-	-	-	-	-	-	-	-	-	-	
Unipolar Input	-	-	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Bipolar Input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Analog Output</b>																					
Resolution	16-bit	16-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit	
Channels	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Output Voltage	±10 V, ±5 V, ±EXT_REF, 0 ~ +10 V, 0 ~ +5 V, 0 ~ EXT_REF	±5 V, ±10 V, 0 ~ +5 V, 0 ~ +10 V	±5, ±10	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V	±5 V, ±10 V
<b>Digital I/O</b>																					
DI Channels	-	-	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
DO Channels	-	-	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
Programmable DIO Channels	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Compatibility	DI: 5 V/TTL DO: 5 V/CMOS	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	
<b>Timer/Counter</b>																					
Channels	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Resolution	-	-	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	
Clock Source	-	-	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	8 MHz	
Page	3-2	3-6	3-7	3-8	3-9	3-10	3-11	3-12	3-13	3-14	3-15	3-16	3-17	3-18	3-19	3-20	3-21	3-22	3-23	3-24	



## 3-1 High Speed Multifunction Board

### PCI-2602U **NEW**

Universal PCI , 1 MS/s High-speed, 16-channel Analog Input, 2-channel Analog Output and 32-channel DI/O Multifunction Board



### Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel 16-bit Voltage Output
  - 512-sample Hardware FIFO for Analog Pattern Generator
- 32-channel Programmable DI/O
  - Supports DO Status Readback (Register Level)
  - 512-sample Hardware FIFO for Digital Pattern Generator
  - Digital Input Filter Function
- 16 Single-ended/8 Differential Analog Input Channels
  - 16-bit ADC with Max. 1 MS/s Sampling Rate
  - 8192-sample Hardware FIFO for Analog Input
  - Supports Variety of Programmable AD Trigger Mode
  - AD Data Transfer: Polling, Interrupt, DMA
  - AD R/L Filter Function
  - AD Continuous Capture
  - AD Auto-calibration Function

### Introduction

The PCI-2602U is a high-performance multifunction card that provides Analog and Digital I/O functions for high-speed data transfer, analog signal measurement, I/O control and pattern generation applications, etc. The card features a continuous, 1 MS/s 16-bit resolution AD converter, an 8 K-sample hardware FIFO, a 2-channel 16-bit DA converter, and 32-channel programmable Digital I/O with Digital Output readback. The PCI-2602U provides either 16-channel single-ended or 8-channel differential Analog Input, which is selectable via software, and is equipped with a high speed PGA featuring programmable gain.

In addition, the PCI-2602U card also provides the following advantages:

#### ● Card ID

The PCI-2602U also includes an onboard Card ID that enables the board to be recognized via software if two or more PCI-2602U cards are installed in the same computer.

#### ● Programmable Digital Input Filters (DI)

Programmable Digital Input filters can be employed to remove noise, glitches, and spikes on Digital Input ports, as well as to denounce the signal from the switch and relays in noisy industrial environments to prevent false readings caused by noise. The filter for the Digital Input channel can be configured by setting the filter time in seconds, preventing invalid readings and false triggers related to status change detection events.

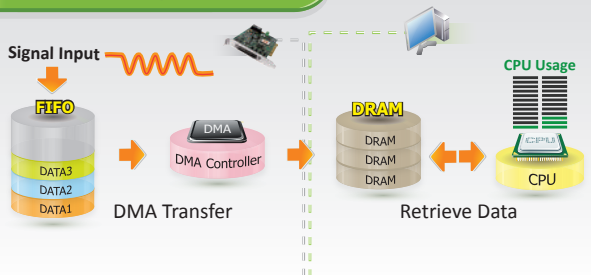
#### ● Analog Pattern Generator (DA)

The PCI-2602 can be used to generate arbitrary wave shapes on a single Analog Output port based on user-defined waveform patterns. The Analog Pattern Generator operates at a full 20 MHz rate and is suitable for control systems or radar simulation, etc. The user-defined waveform pattern is stored in the onboard memory with a length of 512 samples of 16-bit data for simple- or complex-pattern applications.

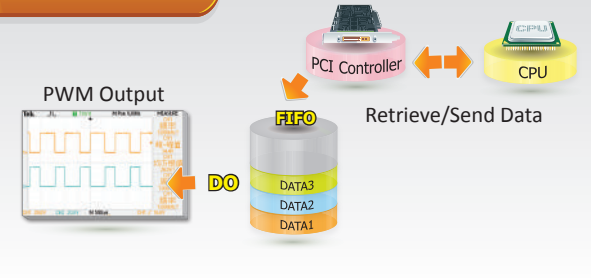
#### ● Digital Pattern Generator (DO)

The PCI-2602U can be used to continuously output a digital pattern on the Digital Output port by utilizing a user-defined data pattern and rate that is based on 100 ns high-resolution timing (10 MHz).

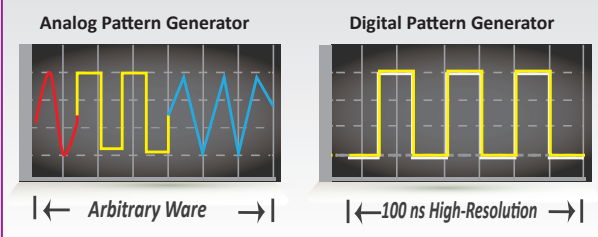
### AD DMA Operation

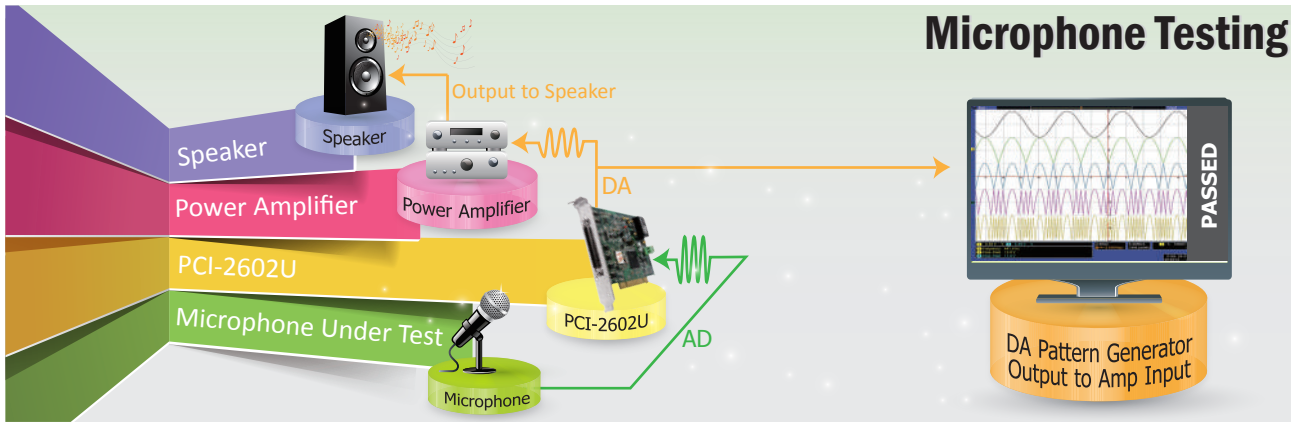


### DO FIFO



### Pattern Generator



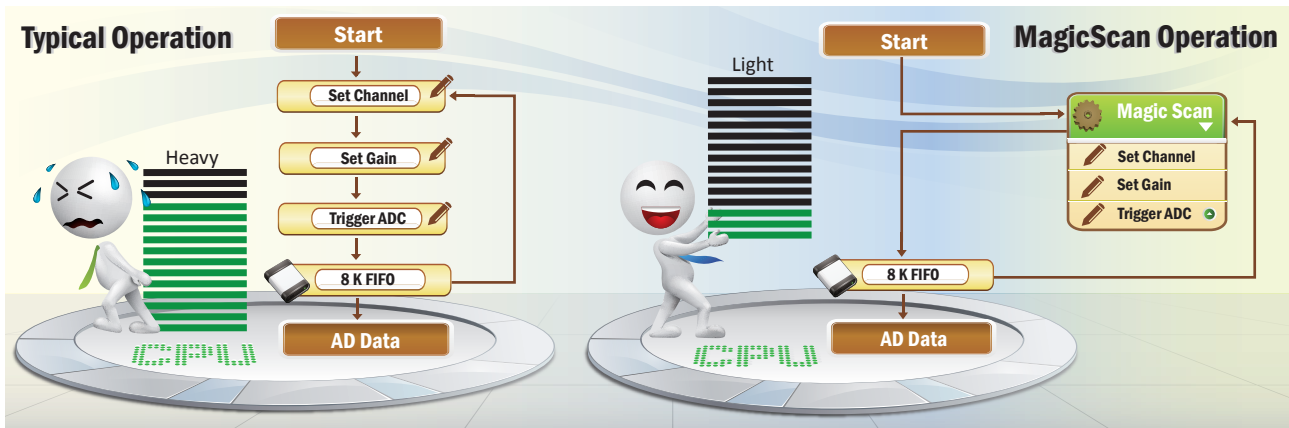


**AD Continuous Capture**

PCI-2602U provides the AD continuous capture function. The continuous capture refers to the acquisition of an unspecified number of samples. Instead of acquiring a set number of data samples and stopping, a continuous acquisition continues until you stop the operation.

**MagicScan (AD)**

The AD channel scan function, called MagicScan, eliminates the majority of the effort required to acquire the AD value, such as selecting the channel, setting the gain values and the settling time, triggering the ADC, and acquiring the data. Using the built-in MagicScan and the interrupt features, these complex tasks are effectively offloaded from the CPU. Even in channel scan mode, a different gain code can be used for each channel, and the sampling rate can still achieve a total of 1 MS/s.



**Pulse Width Modulation (PWM, DO)**

PCI-2602U is capable of producing PWM signals. PWM signals can be generated as a digital signal, using digital output line(s) from PA. PWM signals are most commonly used to control from controlling valves or pumps to adjusting the brightness of an LED.

**SCSI II Connector**

PCI-2602U provides a single SCSI II 68-pin high-density connector that reduces the required installation space and slot of the card in the computer and incorporates 32 programmable Digital I/O channels, 16 analog input channels and 2 analog output channels.

- Incorporates any DI/DO/AD/DA
- Reduce Internal Cable Clutter
- High-Density Connector
- Space-Saving Design
- Slot-Saving Design

### LED Brightness Adjustment

Duty Cycle 20%

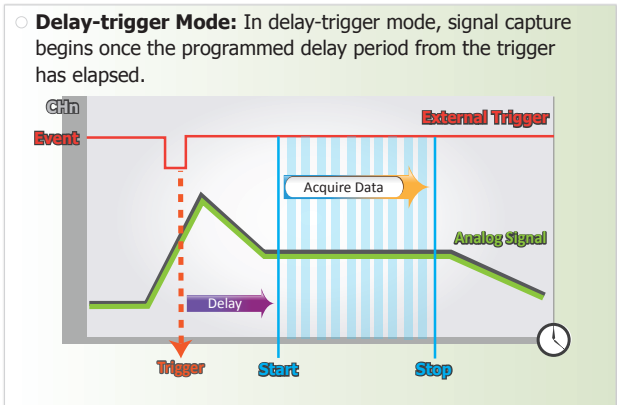
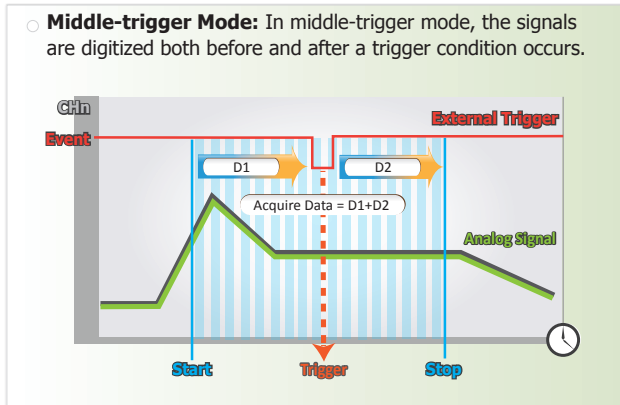
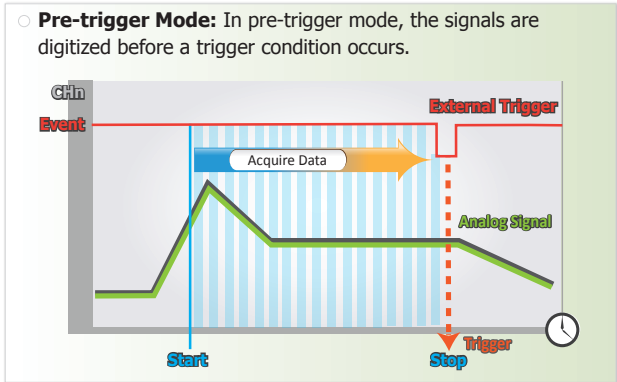
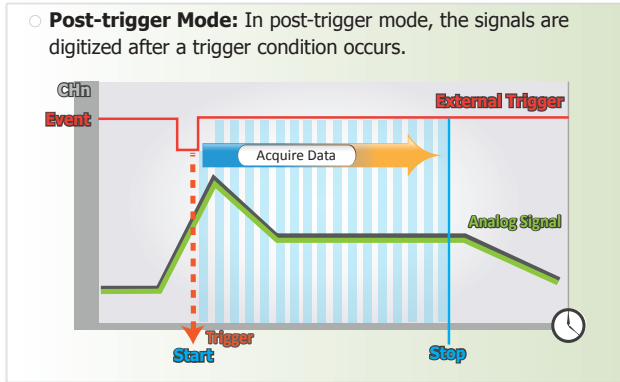
Duty Cycle 50%

Duty Cycle 80%

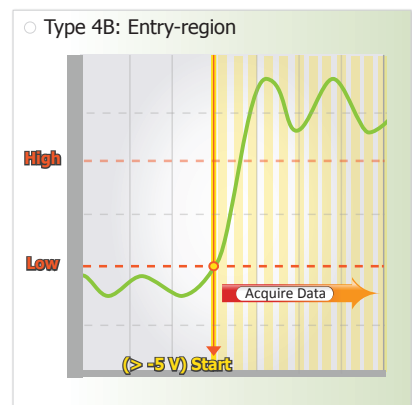
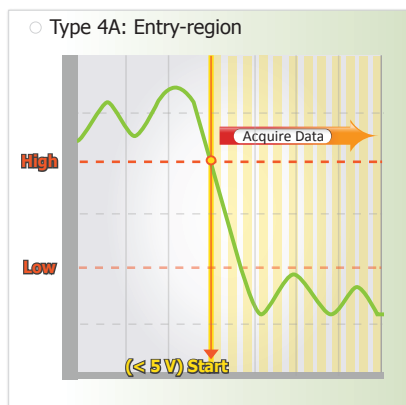
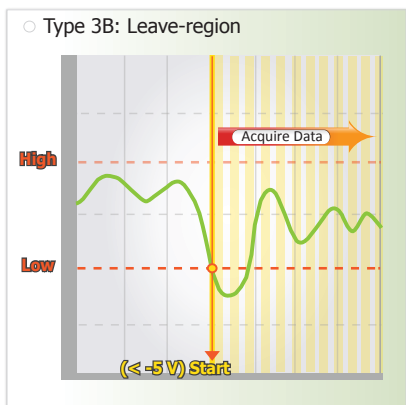
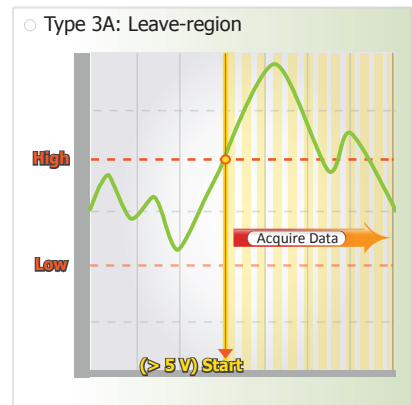
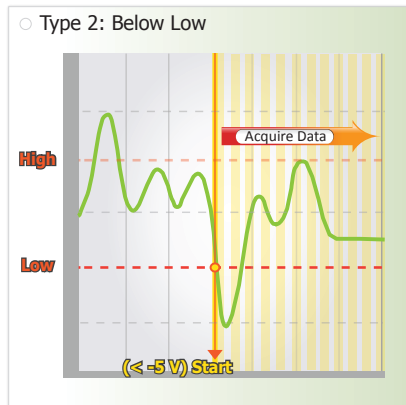
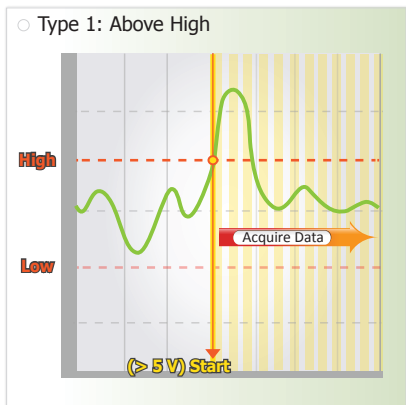
AD External Trigger

Synchronization of the data acquisition process relative to an external event is an important criterion in many applications. For example, user may want to collect data after receiving a pulse signal from an encoder or when the temperature of a chamber exceeds a critical value. In such instances, the PCI-2602U must be set up to start the ADC as soon as the external event, or trigger, occurs. PCI-2602U supports both analog and digital triggers.

Digital Trigger: Post-trigger, Middle-trigger, Pre-trigger and Delay-trigger



Analog Trigger: There are six different types of analog trigger, as illustrated below:



## Software

### Drivers

32/64-bit Windows XP/2003/2008/Vista/7/8

### Sample Programs

LabVIEW Toolkit

VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Terminal No.	Pin Assignment
+5 V (Output)	01	35	+12 V (Output)
Ext_TRG	02	36	Cnt0_GATE
Trg_GATE	03	37	Cnt0_OUT
Pacer_OUT	04	38	Cnt0_CLK
D_GND	05	39	D_GND
PD7	06	40	PD6
PD5	07	41	PD4
PD3	08	42	PD2
PD1	09	43	PD0
PC7	10	44	PC6
PC5	11	45	PC4
PC3	12	46	PC2
PC1	13	47	PC0
D_GND	14	48	D_GND
PB7	15	49	PB6
PB5	16	50	PB4
PB3	17	51	PB2
PB1	18	52	PB0
PA7	19	53	PA6
PA5	20	54	PA4
PA3	21	55	PA2
PA1	22	56	PA0
AO_GND	23	57	AO_GND
AO1_OUT	24	58	AO0_OUT
AO1_REF	25	59	AO0_REF
AI_GND	26	60	AI_GND
AI15	27	61	AI14
AI13	28	62	AI12
AI11	29	63	AI10
AI9	30	64	AI8
AI7	31	65	AI6
AI5	32	66	AI4
AI3	33	67	AI2
AI1	34	68	AI0

Female SCSI 68-pin (CON1)

## Hardware Specifications

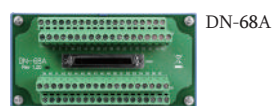
Analog Input	
Channels	16 Single-ended/8 Differential
AD Converter	16-bit, 1 $\mu$ s conversion time
Sampling Rate	1 MS/s (Max.)
FIFO Size	8192 Samples
Bipolar Range	$\pm 10.24$ V, $\pm 5.12$ V, $\pm 2.56$ V
Analog Output	
Channels	2
Resolution	16-bit
FIFO Size	512 Samples
Output Rate	20 MS/s (Max.)
Output Range	$\pm 10$ V, $\pm 5$ V, $\pm$ EXT_REF, 0 ~ +10 V, 0 ~ +5 V, 0 ~ EXT_REF
Programmable Digital I/O	
Channels	32 (4-port Programmable)
Digital Input	
Compatibility	5 V/TTL
FIFO Size	512 Samples
Input Voltage	Low: 0.8 V Max.; High: 2.0 V Min.
Digital Output	
Compatibility	5 V/CMOS
DO FIFO Size	512 Samples
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.
Output Voltage	Sink: 6 mA @ 0.33 V Source: 6 mA @ 4.77 V
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female SCSI II 68-pin x 1
Power Consumption	1 A @ +5 V (Max.)
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Ordering Information

PCI-2602U CR	Universal PCI, 1 MS/s High-Speed, 16-channel Analog Input, 2-channel Analog Output and 32-channel DI/O (RoHS)
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## Accessories

DN-68A CR	DIN-Rail Mountable I/O Connector Block with 68-pin SCSI II Female Connector. (RoHS)
CA-SCSI15-H	68-pin SCSI-II Connector Cable, 1.5 m



## 3-2 Multifunction Boards

### PCI-822LU/PCI-826LU

Universal PCI, 250 kS/s, 32-channel 12-/16-bit AD, 2-channel 16-bit DA and 32-channel Programmable DI/O Multifunction Board



#### Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 32 Single-ended/16 Differential Analog Input Channels
  - 12-bit 250 kS/s High-speed AD for PCI-822LU
  - 16-bit 250 kS/s High-speed AD for PCI-826LU
  - Built-in MagicScan Controller
  - Supports Software-trigger and Pacer-trigger
  - 8 K-sample Hardware FIFO
- 2-channel, 16-bit Analog Output
- 32-channel programmable DI/O
  - Pull-high and Pull-low Resistors for DI Channels
  - Supports Digital Output Status Readback (Register Level)

#### Introduction

The PCI-822LU/826LU is a series of multifunction boards that provides high-speed Analog and Digital I/O functions, and features a continuous 250 kS/s, 12- or 16-bit resolution AD converter, an 8-kSample hardware FIFO, a 2-channel, 16-bit DA converter, and 32 programmable Digital I/O channels with DO readback. The PCI-822LU/826LU series provides either 32 single-ended or 16 differential Analog Input channels that are jumper selectable, and is equipped with a high-speed PGA featuring programmable gain (1, 2, 4 or 8).

The PCI-822LU/826LU series also includes an onboard Card ID switch that enables the board to be easily recognized via software if two or more boards are installed in the same computer. The pull-high/low jumpers allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

The PCI-822LU/826LU series includes an AD channel scan function called MagicScan, which eliminates the majority of the effort required to acquire AD values, such as selecting the channel, setting the gain values and the settling time, triggering the ADC, and acquiring the data. Using the built-in MagicScan and the interrupt features, these complex tasks are effectively offloaded from the CPU. Even in MagicScan mode, a different gain code can be used for each channel, and the sampling rate can still reach a total of 250 kS/s, making the PCI-822LU/826LU series especially suitable for high-end applications.

#### Software

##### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8  Linux

##### Sample Programs

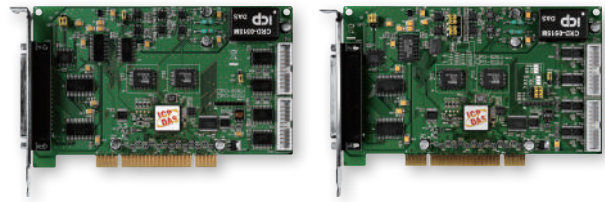
- DOS Lib and TC Demo  LabVIEW Toolkit  
 VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

#### Ordering Information

PCI-822LU CR	Universal PCI, 250 kS/s, 32-channel 12-bit Analog Input, 2-channel 16-bit Analog Output and 32-channel Programmable DI/O (RoHS). Includes one CA-4002 D-sub connector.
PCI-826LU CR	Universal PCI, 250 kS/s, 32-channel 16-bit Analog Input, 2-channel 16-bit Analog Output and 32-channel Programmable DI/O (RoHS). Includes one CA-4002 D-sub connector.

PCI-822LU

PCI-826LU



#### Hardware Specifications

Model	PCI-822LU	PCI-826LU
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
Resolution	12-bit	16-bit
Sampling Rate	250 kS/s Max.	
FIFO Size	8192 Samples	
Accuracy	0.1% of FSR ±1 LSB @ 25°C, ±10 V	
<b>Analog Output</b>		
Channels	2	
Resolution	16-bit	
Accuracy	±6 LSB	
Output Driving	±5 mA	
Output Range	±5 V, ±10 V, 0 ~ +10 V, 0 ~ +5 V	
Slew Rate	8.33 V/μs	
<b>Programmable Digital I/O</b>		
Channels	32	
Compatibility	5 V/TTL	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	800 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

#### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 Da2 out
Da1 out	18	37 D.GND
Ext_Trg	19	

CON3

Pin Assignment	Terminal No.	Pin Assignment
PB 0	01	02 PB 1
PB 2	03	04 PB 3
PB 4	05	06 PB 5
PB 6	07	08 PB 7
PB 8	09	10 PB 9
PB 10	11	12 PB 11
PB 12	13	14 PB 13
PB 14	15	16 PB 15
GND	17	18 GND
+5 V	19	20 +12 V

CON1

Pin Assignment	Terminal No.	Pin Assignment
PA 0	01	02 PA 1
PA 2	03	04 PA 3
PA 4	05	06 PA 5
PA 6	07	08 PA 7
PA 8	09	10 PA 9
PA 10	10	12 PA 11
PA 12	12	14 PA 13
PA 14	14	16 PA 15
GND	16	18 GND
+5 V	18	20 +12 V

CON2

# PCI-1802LU/PCI-1802HU

Universal PCI, 32-channel, 12-bit, 330 or 44 kS/s  
Multifunction Board (8 K word FIFO)



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel, 12-bit Analog Output
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 32 Single-ended/16 Differential Analog Input Channels
  - 12-bit, 330 kS/s or 44 kS/s AD Converter
  - Built-in MagicScan Controller
  - Internal Trigger: Software-trigger, Pacer-trigger
  - External Trigger: Post-trigger, Pre-trigger, Middle-trigger
- High-speed data transfer rate up to 2.7 M words/sec.

## Introduction

The PCI-1802LU/HU card is designed as an easy replacement for the PCI-1802L/H without requiring any modification to the software or the driver.

The PCI-1802LU/HU is a high-performance multifunction card that provides high-speed Analog and Digital I/O functions. The PCI-1802LU/HU is based on the Universal PCI interface, supporting both the 3.3 V and the 5 V PCI bus, and features a continuous 330 kS/s or 44 kS/s 12-bit resolution AD converter, an 8 K-sample hardware FIFO, a MagicScan controller (for multi-channel scanning), a 2-channel 12-bit DA converter, and 16-channel Digital Input and 16-channel Digital Output.

The PCI-1802LU/HU provides either 32-channel single-ended or 16-channel differential Analog Inputs that are jumper selectable, and a programmable high-speed PGA that is equipped for gain controls (0.5/1/2/4/8 for Low Gain, and 0.5/1/5/10/50/100/500/1000 for High Gain).

The PCI-1802LU/HU also includes an onboard Card ID switch and pull-high/low DI resistors. The Card ID enables the board to be recognized via software if two or more PCI-1802LU/HU cards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 Da2 out
Da1 out	18	37 D.GND
Ext_Trg	19	

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Model	PCI-1802LU	PCI-1802HU
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
AD Conversion	12-bit, 3 μs Conversion Time	
Accuracy	0.01% of FSR ±1 LSB @ 25 °C, ±10 V	
FIFO Size	8192 Samples	
Sampling Rate	330 kS/s	44 kS/s
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.06% of FSR ±1 LSB @ 25°C, ±10 V	
Output Driving	±5 mA	
Output Range	±5 V, ±10 V	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 8 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	300 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PCI-1802LU CR	Universal PCI, 32-channel, 12-bit, 330 kS/s Low Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
PCI-1802HU CR	Universal PCI, 32-channel, 12-bit, 44 kS/s High Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.

# PCI-1800LU/PCI-1800HU

Universal PCI, 16-channel, 12-bit, 330 or 44 kS/s  
Multifunction Board (1 K word FIFO)



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel, 12-bit Analog Output
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 16 Single-ended/8 Differential Analog Input Channels
  - 12-bit, 330 kS/s or 44 kS/s AD Converter
  - Built-in MagicScan Controller
  - Internal Trigger: Software-trigger, Pacer-trigger
  - External Trigger: Post-trigger, Pre-trigger, Middle-trigger
- High-speed data transfer rate up to 2.7 M words/sec.

## Introduction

The PCI-1800LU/HU card is designed as an easy replacement for the PCI-1800L/H without requiring any modification to the software or the driver.

The PCI-1800LU/HU is a high-performance multifunction card that provides high-speed Analog and Digital I/O functions. The PCI-1800LU/HU is based on the Universal PCI interface, supporting both the 3.3 V and the 5 V PCI bus, and features a continuous 330 kS/s or 44 kS/s 12-bit resolution AD converter, a 1 K-sample hardware FIFO, a MagicScan controller (for multi-channel scanning), a 2-channel 12-bit D/A converter, and 16-channel Digital Input and 16-channel Digital Output.

The PCI-1800LU/HU provides either 16-channel single-ended or 8-channel differential Analog Inputs that are jumper selectable, and a programmable high-speed PGA that is equipped for gain controls (0.5/1/2/4/8 for Low Gain, and 0.5/1/5/10/50/100/500/1000 for High Gain).

The PCI-1800LU/HU also includes an onboard Card ID switch and pull-high/low DI resistors. The Card ID enables the board to be recognized via software if two or more PCI-1800LU/HU cards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20	AI_8	02	DO 1
AI_1	02	21	AI_9	03	DO 2
AI_2	03	22	AI_10	04	DO 3
AI_3	04	23	AI_11	05	DO 4
AI_4	05	24	AI_12	06	DO 5
AI_5	06	25	AI_13	07	DO 6
AI_6	07	26	AI_14	08	DO 7
AI_7	08	27	AI_15	09	DO 8
A.GND	09	28	A.GND	10	DO 9
A.GND	10	29	A.GND	11	DO 10
N.C.	11	30	DA out0	12	DO 11
N.C.	12	31	N.C.	13	DO 12
+12 V out	13	32	DA out1	14	DO 13
A.GND	14	33	N.C.	15	DO 14
D.GND	15	34	N.C.	16	DO 15
N.C.	16	35	N.C.	17	GND
Ext_Trig	17	36	N.C.	18	+12 V
Da1 out	18	37	N.C.	19	
+5 V out	19				

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PCI-1800LU	PCI-1800HU
<b>Analog Input</b>		
Channels	16 Single-ended/8 Differential	
AD Conversion	12-bit, 3 µs Conversion Time	
Accuracy	0.01% of FSR ±1 LSB @ 25 °C, ±10 V	
FIFO Size	1024 Samples	
Sampling Rate	330 kS/s	44 kS/s
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.06% of FSR ±1 LSB @ 25°C, ±10 V	
Output Driving	±5 mA	
Output Range	±5 V, ±10 V	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 8 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	300 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PCI-1800LU CR	Universal PCI, 16-channel, 12-bit, 330 kS/s Low Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector
PCI-1800HU CR	Universal PCI, 16-channel, 12-bit, 44 kS/s High Gain Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.

3  
2

PCI Bus Data Acquisition Boards

# PCI-1602U/PCI-1602FU

Universal PCI, 32-channel, 16-bit, 100 or 200 kS/s  
Multifunction Board (8 K word FIFO)



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel, 12-bit Analog Output
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 32 Single-ended/16 Differential Analog Input Channels
  - 12-bit, 100 kS/s or 200 kS/s AD Converter
  - Built-in MagicScan Controller
  - Internal Trigger: Software-trigger, Pacer-trigger
  - External Trigger: Post-trigger, Pre-trigger, Middle-trigger
- High-speed data transfer rate up to 2.1 M words/sec.

## Introduction

The PCI-1602U/FU is a high-performance multifunction card providing high-speed Analog and Digital I/O functions. The PCI-1602U/FU is based on the Universal PCI interface, supporting both the 3.3 V and the 5 V PCI bus, and features a continuous 100 kS/s (200 kS/s for the F version) 16-bit resolution AD converter, an 8 K-sample hardware FIFO, a MagicScan controller (for multi-channel scanning), a 2-channel 16-bit DA converter, and 16-channel Digital Input and 16-channel Digital Output.

The PCI-1602U/FU provides either 32-channel single-ended or 16-channel differential Analog Inputs that are jumper selectable, and a programmable high-speed PGA that is equipped for gain controls (1, 2, 4 and 8). The PCI-1602U/FU is fully compatible with the PCI-1602/F, and is designed as a direct replacement without requiring any modification to the software or the driver.

The PCI-1602U/FU also includes an onboard Card ID switch that enables the board to be recognized via software if two or more PCI-1602U/FU cards are installed in the same computer. The pull-high/low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PCI-1602U	PCI-1602FU
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
AD Conversion	16-bit, 2 $\mu$ s Conversion Time	
Accuracy	0.01% of FSR $\pm$ 1 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
FIFO Size	8192 Samples	
Sampling Rate	100 kS/s	200 kS/s
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.06% of FSR $\pm$ 1 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
Output Driving	$\pm$ 5 mA	
Output Range	Bipolar: $\pm$ 5 V, $\pm$ 10 V	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 8 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	300 mA @ +5 V	
Operating Temperature	0 $^{\circ}$ C to +60 $^{\circ}$ C	
Humidity	5 to 85% RH, Non-condensing	

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 Da2 out
Da1 out	18	37 D.GND
Ext_Trg	19	

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

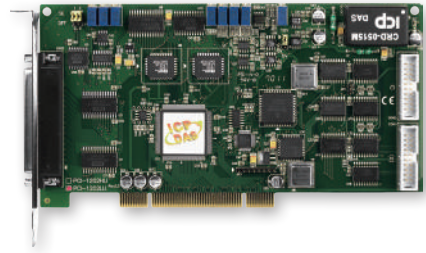
## Ordering Information

PCI-1602U CR	Universal PCI, 32-channel 16-bit, 100 kS/s Low Gain, Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub connector
PCI-1602FU CR	Universal PCI, 32-channel 16-bit, 200 kS/s Low Gain, Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub connector



# PCI-1202LU/PCI-1202HU

Universal PCI, 32-channel, 12-bit, 110 or 44 kS/s  
Multifunction Board (1 K word FIFO)



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel, 16-bit Analog Output
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 32 Single-ended/16 Differential Analog Input Channels
  - 12-bit, 110 kS/s or 44 kS/s AD Converter
  - Built-in MagicScan Controller
  - Internal Trigger: Software-trigger, Pacer-trigger
  - External Trigger: Post-trigger, Pre-trigger, Middle-trigger
- High-speed data transfer rate up to 2.1 M words/sec.

## Introduction

The PCI-1202 series is a family of high performance data acquisition boards that feature continuous gap-free data acquisition in DOS at 110 kHz for low gain or 44 kHz for high gain. The PCI-1202 family has the same hardware architecture as the PCI-1802, and provides 32-channel single-ended or 16-channel differential Analog Inputs. As with the PCI-1802 family, the PCI-1202 series features both the Magic Scan and Continuous Capture functions.

The PCI-1202LU/HU Universal PCI card supports both the 3.3 V and the 5 V PCI bus. The PCI-1202LU/HU cards are fully compatible with PCI-1202L/H cards and are designed as direct replacements without requiring any modification to the software or the driver, with the main difference being the addition of DI pull-high/low resistors and a Card ID switch on the PCI-1202LU/HU.

The PCI-1202LU/8K and PCI-1202HU/8K cards are equipped with an 8K-sample hardware FIFO that reduces data overflow issues in multi-tasking environments such as Windows and Linux.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20	AI_16	DO 0	01
AI_1	02	21	AI_17	DO 2	03
AI_2	03	22	AI_18	DO 4	05
AI_3	04	23	AI_19	DO 6	07
AI_4	05	24	AI_20	DO 8	09
AI_5	06	25	AI_21	DO 10	10
AI_6	07	26	AI_22	DO 12	12
AI_7	08	27	AI_23	DO 14	14
AI_8	09	28	AI_24	GND	16
AI_9	10	29	AI_25	+5 V	18
AI_10	11	30	AI_26	CON1	
AI_11	12	31	AI_27	DI 0	01
AI_12	13	32	AI_28	DI 2	03
AI_13	14	33	AI_29	DI 4	05
AI_14	15	34	AI_30	DI 6	07
AI_15	16	35	AI_31	DI 8	09
A.GND	17	36	Da2 out	DI 10	11
Da1 out	18	37	D.GND	DI 12	13
Ext_Trg	19			DI 14	15
				GND	17
				+5 V	19
				CON2	

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PCI-1202LU	PCI-1202HU
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
AD Conversion	12-bit, 8.5 $\mu$ s Conversion Time	
Accuracy	0.01% of FSR $\pm$ 1 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
FIFO Size	1024 Samples	
Sampling Rate	110 kS/s	44 kS/s
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.06% of FSR $\pm$ 1 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
Output Driving	$\pm$ 5 mA	
Output Range	$\pm$ 5 V, $\pm$ 10 V	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 8 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	300 mA @ +5 V	
Operating Temperature	0 $^{\circ}$ C to +60 $^{\circ}$ C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PCI-1202LU CR	Universal PCI, 32-channel 12-bit, 110 kS/s Low Gain, Multifunction DAQ Board (1 K word FIFO) (RoHS). Includes one CA-4002 D-sub connector.	PCI-1202LU/8K CR	Universal PCI, 32-channel 12-bit, 110 kS/s Low Gain, Multifunction DAQ Board (8 K word FIFO) (RoHS). Includes one CA-4002 D-sub connector.
PCI-1202HU CR	Universal PCI, 32-channel 12-bit, 44 kS/s High Gain, Multifunction DAQ Board (1 K word FIFO) (RoHS). Includes one CA-4002 D-sub connector.	PCI-1202HU/8K CR	Universal PCI, 32-channel 12-bit, 44 kS/s High Gain, Multifunction DAQ Board (8 K word FIFO) (RoHS). Includes one CA-4002 D-sub connector.

3  
2  
PCI Bus Data Acquisition Boards

# PCI-1002LU/PCI-1002HU

Universal PCI, 32-channel, 12-bit, 110 or 44 kS/s  
Multifunction Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 32 Single-ended/16 Differential Analog Input Channels
  - 12-bit, 110 kS/s or 44 kS/s AD Converter
  - Internal Pacer-trigger
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- Supports Card ID (SMD Switch)

## Introduction

The PCI-1002LU/HU card is designed as an easy replacement for the PCI-1002L/H without requiring any modification to the software or the driver.

The PCI-1002LU/PCI-1002HU is an AD board that supports both the 3.3 V and the 5 V PCI bus and features low gain Analog Input at 110 kS/s or high gain at 44 kS/s. The PCI-1002LU/PCI-1002HU provides 32 single-ended or 16 differential 12-bit Analog Input channels, 16 Digital Input channels, and 16 Digital Output channels. The pull-high/low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASYLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PCI-1002LU	PCI-1002HU
<b>Analog Input</b>		
Channels	32 Single-ended/16 Differential	
A/D Converter	12-bit, 8 $\mu$ s Conversion Time	
Accuracy	0.01% of FSR $\pm$ 2 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
Sampling Rate	110 kS/s	44 kS/s
<b>Digital Inputs</b>		
Channels	16	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.	
Response Speed	1.0 MHz (Typical)	
<b>Digital Outputs</b>		
Channels	16	
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max., Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V, Source: 0.8 mA @ 2.0 V	
Response Speed	1.0 MHz (Typical)	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 4 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	800 mA @ +5 V	
Operating Temperature	0 $^{\circ}$ C to +60 $^{\circ}$ C	
Humidity	5 to 85% RH, Non-condensing	

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_16
AI_1	02	21 AI_17
AI_2	03	22 AI_18
AI_3	04	23 AI_19
AI_4	05	24 AI_20
AI_5	06	25 AI_21
AI_6	07	26 AI_22
AI_7	08	27 AI_23
AI_8	09	28 AI_24
AI_9	10	29 AI_25
AI_10	11	30 AI_26
AI_11	12	31 AI_27
AI_12	13	32 AI_28
AI_13	14	33 AI_29
AI_14	15	34 AI_30
AI_15	16	35 AI_31
A.GND	17	36 N.C.
N.C.	18	37 D.GND
Ext_Trg	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

CON2

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

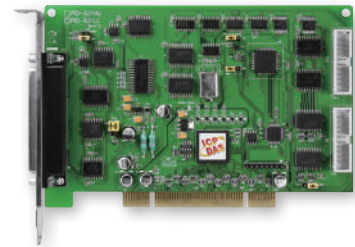
CON1

## Ordering Information

PCI-1002LU CR	Universal PCI, 32-channel 12-bit, 110 kS/s Low Gain, Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
PCI-1002UH CR	Universal PCI, 32-channel, 12-bit, 44 kS/s High Gain, Multifunction DAQ Board (RoHS). Includes one CA-4002 D-sub Connector.
PCI-1002LU/S CR	PCI-1002LU with DB-1825 Daughterboard and Cable (RoHS). Includes one CA-3710 D-sub Cable.
PCI-1002UH/S CR	PCI-1002HU with DB-1825 Daughterboard and Cable (RoHS). Includes one CA-3710 D-sub Cable.

# PIO-821LU/PIO-821HU **NEW**

Universal PCI, 16-channel, 12-bit, 45 kS/s Multifunction Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 16 Single-ended/8 Differential Analog Input Channels
  - 12-bit, 45 kS/s AD Converter
  - AD Trigger: Software-trigger, Pacer-trigger, External-trigger
  - Interrupt Handling
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 1-channel, 12-bit Analog Output
- Supports Card ID (SMD Switch)

## Introduction

The PIO-821LU/HU card is designed as an easy replacement for the PIO-821L/H without requiring any modification to the software or the driver.

The PIO-821LU/HU is a multifunction board for PC/AT compatible computers. The PIO-821LU provides for low gain (1, 2, 4, 8), and the PIO-821HU supports high gain (1, 10, 100, 1000). The PIO-821L/H contains a 12-bit ADC with up to 16 single-ended or 8 differential Analog Input channels. The cards also have a 12-bit DAC voltage output and 16 TTL-compatible Digital Input and Digital Output channels, respectively. The maximum sampling rate for the AD converter is around 45 kS/s.

The PIO-821LU/HU also includes an onboard Card ID switch and pull-high/low DI resistors. The Card ID enables the board to be recognized via software if two or more PIO-821LU/HU cards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_8	DI 0	01	02 DI 1
AI_1	02	21 AI_9	DI 2	03	04 DI 3
AI_2	03	22 AI_10	DI 4	05	06 DI 5
AI_3	04	23 AI_11	DI 6	07	08 DI 7
AI_4	05	24 AI_12	DI 8	09	10 DI 9
AI_5	06	25 AI_13	DI 10	11	12 DI 11
AI_6	07	26 AI_14	DI 12	13	14 DI 13
AI_7	08	27 AI_15	DI 14	15	16 DI 15
A.GND	09	28 A.GND	GND	17	18 GND
A.GND	10	29 A.GND	+5 V	19	20 +12 V
N.C.	11	30 A.GND	CON1		
N.C.	12	31 N.C.	Pin Assignment	Terminal No.	Pin Assignment
+12V	13	32 GATE0	DO 0	01	02 DO 1
A.GND	14	33 N.C.	DO 2	03	04 DO 3
D.GND	15	34 GATE2	DO 4	05	06 DO 5
COUT0	16	35 COUT2	DO 6	07	08 DO 7
N.C.	17	36 EXT_INT	DO 8	09	10 DO 9
COUT1	18	37 EXT_CLK	DO 10	10	12 DO 11
VCC	19		DO 12	12	14 DO 13
			DO 14	14	16 DO 15
			GND	16	18 GND
			+5 V	18	20 +12 V
			CON2		

## Hardware Specifications

Model	PIO-821LU	PIO-821HU
<b>Analog Input</b>		
Channels	16 Single-ended/8 Differential	
AD Conversion	12-bit, 8 μs Conversion Time	
Accuracy	0.01% of FSR ±1 LSB @ 25 °C, ±10 V	
Sampling Rate	45 kS/s	
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.01% of FSR ±1/2 LSB @ 25°C, ±10 V	
Output Driving	±5 mA	
Output Range	Unipolar: 0 ~ +5 V, 0 ~ +10 V, 0 ~ Ext Ref	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
Response Speed	1.2 MHz (Typical)	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 2 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	960 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

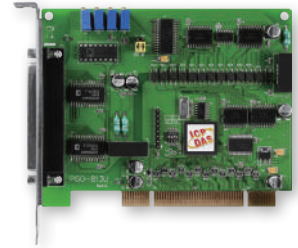
## Ordering Information

PIO-821LU CR	Universal PCI, 16-channel, 12-bit, 45 kS/s Low Gain, Multifunction DAQ Board.
PIO-821HU CR	Universal PCI, 16-channel, 12-bit, 45 kS/s High Gain, Multifunction DAQ Board.

3  
2  
PCI Bus Data Acquisition Boards

# PISO-813U **NEW**

Universal PCI, 32-channel, 12-bit, 10 kS/s Isolated AD Board



## Features >>>>

- Universal PCI (3.3 V/5 V) Interface
- 32 Single-ended Analog Input Channels
  - Bipolar Input:  $\pm 0.625$  V,  $\pm 1.25$  V,  $\pm 2.5$  V,  $\pm 5$  V,  $\pm 10$  V
  - Unipolar Input:  $0 \sim +0.625$  V,  $0 \sim +1.25$  V,  $0 \sim +2.5$  V,  $0 \sim +5$  V,  $0 \sim +10$  V
  - Programmable Gain Control: 1, 2, 4, 8, 16
- AD Trigger: Software-trigger
- 12-bit, 10 kS/s AD Converter
- 3750 V<sub>rms</sub> Bus Isolation Protection
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Protection
- Supports Card ID (SMD Switch)

## Introduction

The PISO-813U card is designed as an easy replacement for the PISO-813 without requiring any modification to the software or the driver.

The PISO-813U is a bus-type isolated 12-bit AD board that supports both the 3.3 V and the 5 V PCI bus and features 10 kHz data acquisitions under both DOS and Windows, and provides 32 single-ended Analog Input channels. The isolation range of the board has been increased to 3000 V, making it the most cost effective solution when considering isolated AD boards for the PCI bus.

The PISO-813U also includes an onboard Card ID that enables the board to be recognized via software if two or more PISO-813U cards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Analog Input	
Isolation Voltage	3750 V <sub>rms</sub> (Bus Type)
Channels	32 Single-ended
A/D Converter	12-bit, 8 $\mu$ s Conversion Time
Accuracy	0.01% of FSR $\pm 1$ LSB @ 25°C, $\pm 10$ V
Sampling Rate	10 kS/s
Input Impedance	10 M $\Omega$ /6 pF
Trigger Modes	Software
Data Transfer	Polling
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1
Power Consumption	850 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Pin Assignments

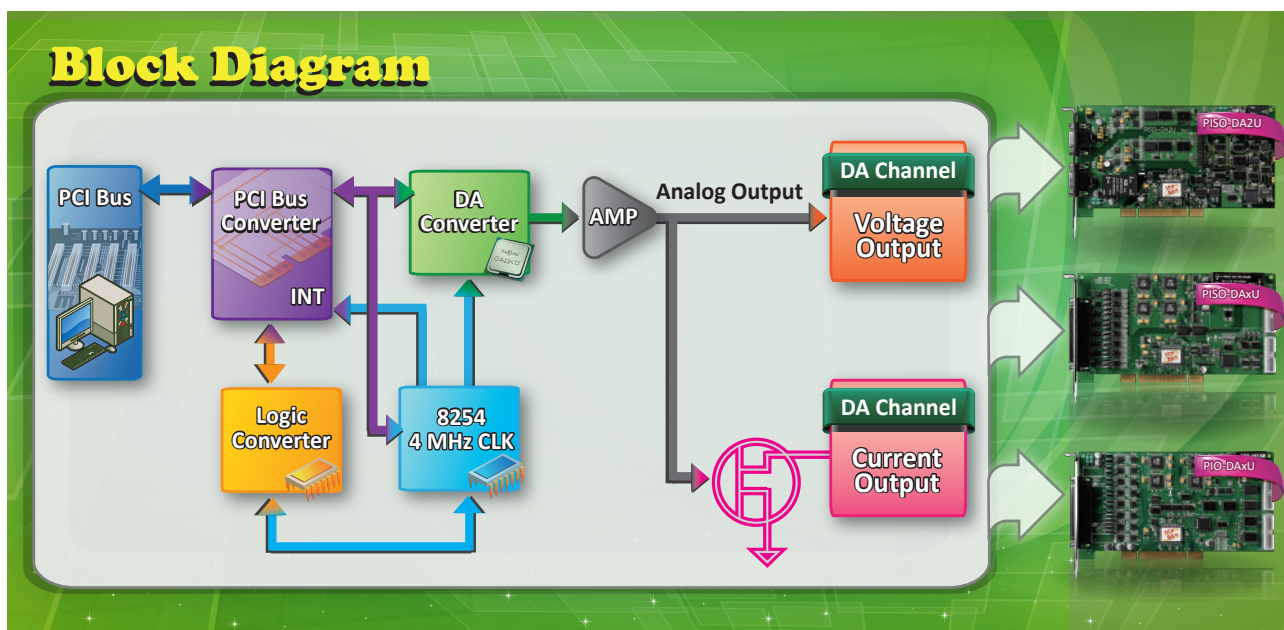
Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_1
AI_2	02	21 AI_3
AI_4	03	22 AI_5
AI_6	04	23 AI_7
AI_8	05	24 AI_9
AI_10	06	25 AI_11
AI_12	07	26 AI_13
AI_14	08	27 AI_15
A.GND	09	28 A.GND
A.GND	10	29 A.GND
AI_16	11	30 AI_17
AI_18	12	31 AI_19
AI_20	13	32 AI_21
AI_22	14	33 AI_23
AI_24	15	34 AI_25
AI_26	16	35 AI_27
AI_28	17	36 AI_29
AI_30	18	37 AI_31
A.GND	19	

CON1

## Ordering Information

PISO-813U CR	Universal PCI, 12-bit, 10 kS/s, 32-channel Isolated Analog Input Board (RoHS). Includes one CA-4002 D-sub connector.
PISO-813U/S CR	PISO-813U CR with DB-8325 daughterboard. Includes one CA-4002 D-sub connector.

## 3-3 Analog Output Boards



### Selection Guide

Model	PISO-DA2U	PISO-DA4U	PISO-DA8U	PISO-DA16U	PIO-DA4U	PIO-DA8U	PIO-DA16U
Interface	Universal PCI						
<b>Analog Output</b>							
Channels	2	4	8	16	4	8	16
Resolution	12-bit	14-bit	14-bit	14-bit	14-bit	14-bit	14-bit
Isolation Voltage	3750 V <sub>DC</sub>	2500 V <sub>DC</sub>	2500 V <sub>DC</sub>	2500 V <sub>DC</sub>	-	-	-
Isolation Type	Bus Type, cH-to-cH	Bus Type	Bus Type	Bus Type	-	-	-
Built-in DC/DC Converter	3000 V <sub>DC</sub>	3000 V <sub>DC</sub>	3000 V <sub>DC</sub>	3000 V <sub>DC</sub>	-	-	-
Output Voltage	±5 V ±10 V 0 ~ +5 V 0 ~ +10 V	±10 V	±10 V	±10 V	±10 V	±10 V	±10 V
Output Current	0 ~ +20 mA +4 ~ +20 mA	0 ~ +20 mA	0 ~ +20 mA	0 ~ +20 mA	0 ~ +20 mA	0 ~ +20 mA	0 ~ +20 mA
Output Driving	±5 mA	±5 mA	±5 mA	±5 mA	±5 mA	±5 mA	±5 mA
<b>Digital I/O</b>							
DI Channels	-	16	16	16	16	16	16
DO Channels	-	16	16	16	16	16	16
Compatibility	-	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL
<b>Timer/Counter</b>							
Channels	-	3	3	3	3	3	3
Resolution	-	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
Clock Source	-	4 MHz	4 MHz	4 MHz	4 MHz	4 MHz	4 MHz
Page	<b>3-15</b>	<b>3-16</b>			<b>3-17</b>		

# PISO-DA2U

Universal PCI, 12-bit, 2-channel Isolated Analog Output Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 12-bit, 2-channel Analog Output
  - 3750 V<sub>DC</sub> Bus and Channel Isolation Protection
  - 3000 V<sub>DC</sub> Power Isolation Protection
  - Unipolar or Bipolar Analog Output
- Software Calibration
- Two Timer-triggered Interrupt Sources
- Calibration data stored in EEPROM
- Double-buffered DA Latch
- Supports Card ID (SMD Switch)

## Introduction

The PISO-DA2U has 2 Analog Output channels with high-voltage isolation protection and is based on the Universal PCI interface (3.3 V/5V). The PISO-DA2U is fully compatible with the PISO-DA2, and is designed as a direct replacement without requiring any modification to the software or the driver.

The built-in high-quality isolation components on the PISO-DA2U provide 3750 V<sub>DC</sub> bus-type and channel-to-channel isolation, and offer durable abilities. The voltage output range for the PISO-DA2U can be set to ±10 V, ±5 V, 0 to 10 V, or 0 to 5 V, and the current output range can be either 0 to 20 mA or 4 to 20 mA.

In addition, the PISO-DA2U also features the following innovative advantages:

### 1. Accurate and easy-to-use calibration:

ICP DAS provides a software calibration function rather than manual calibration so that jumpers and trim-pots are no longer required for calibration, and the calibration data can be saved in the EEPROM for long-term use.

### 2. Channel-to-channel configuration:

Each channel can be individually configured as either voltage or current output and can be set to a different output range.

### 3. Card ID:

ICP DAS has also included an onboard Card ID switch on the PISO-DA2U that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Analog Output	
Channels	2
Isolation Voltage	3750 V (Bus Type, Channel-to-Channel)
Resolution	12-bit
Accuracy	0.015% of FSR ±1/2 LSB @ 25°C, ±10 V
Output Range	Voltage ±10 V, ±5 V, 0 ~ +10 V, 0 ~ +5 V
	Current 0 ~ +20 mA, +4 ~ +20 mA
Output Driving	±5 mA
Slew Rate	0.15 V/μs
Output Impedance	0.1 Ω Max.
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Male DB9 x 2
Power Consumption	1350 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing



## Pin Assignments

Pin Assignment		Pin Assignment	Pin Assignment
GND	05	09	+15 V
GND	04	08	GND
ExtREF V Int	03	07	I OUT
GND	02	06	GND
V OUT	01		

CN1

Pin Assignment		Pin Assignment	Pin Assignment
GND	05	09	+15 V
GND	04	08	GND
ExtREF V Int	03	07	I OUT
GND	02	06	GND
V OUT	01		

CN2

## Ordering Information

PISO-DA2U CR	Universal PCI, 12-bit, 2-channel Isolated Analog Output Board (RoHS). Includes two CA-PC09M D-sub Connectors.
PISO-DA2U/S	PISO-DA2U with DB-8425 daughterboard.

# PISO-DA4U/DA8U/DA16U

Universal PCI, 14-bit, 4/8/16-channel Isolated Analog Output Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 14-bit, 4/8/16-channel Analog Output
  - 2500 V<sub>DC</sub> Bus and Power Isolation Protection
  - Built-in DC/DC Converter with 3000 V<sub>DC</sub> Protection
  - Software Calibration
  - Two Timer-triggered Interrupt Sources
- Double-buffered DA Latch
- Supports Card ID (SMD Switch)
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Function for DI Channels

## Introduction

The PISO-DA4U/DA8U/DA16U card is designed as an easy replacement for the PIO-DA4/DA8/DA16 without requiring any modification to the software or the driver.

The PISO-DA4U/DA8U/DA16U series provides an additional high-voltage isolation design that protects the Host PC from damage due to unexpected power surges, while the built-in high-quality isolation components provide the boards with 2500 V<sub>DC</sub> bus-type isolation. The voltage output range for the PISO-DA4U/DA8U/DA16U series is from -10 V to +10 V, and the current output range is from 0 to 20 mA.

In addition, the PISO-DA4U/DA8U/DA16U series also features the following innovative advantages:

### 1. Accurate and easy-to-use calibration:

ICP DAS provides a software calibration function rather than manual calibration so that jumpers and trim-pots are no longer required for calibration, and the calibration data can be saved in the EEPROM for long-term use.

### 2. Individual channel configuration:

Each channel can be individually configured as either voltage or current output.

### 3. Card ID:

ICP DAS has also included an onboard Card ID switch on the PISO-DAxU series that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
VO_0	01	20	IO_0	DO 0	01
VO_1	02	21	IO_1	DO 2	03
VO_2	03	22	IO_2	DO 4	05
VO_3	04	23	IO_3	DO 6	07
A.GND	05	24	A.GND	DO 8	09
VO_4	06	25	IO_4	DO 10	11
VO_5	07	26	IO_5	DO 12	13
VO_6	08	27	IO_6	DO 14	15
VO_7	09	28	IO_7	GND	17
A.GND	10	29	A.GND	+5V	19
VO_8	11	30	IO_8		
VO_9	12	31	IO_9		
VO_10	13	32	IO_10		
VO_11	14	33	IO_11		
A.GND	15	34	IO_12		
VO_12	16	35	IO_13		
VO_13	17	36	IO_14		
VO_14	18	37	IO_15		
VO_15	19				

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PISO-DA4U	PISO-DA8U	PISO-DA16U
<b>Analog Output</b>			
Channels	4	8	16
Isolation Voltage	2500 V <sub>DC</sub> (Bus Type)		
Resolution	14-bit		
Accuracy	0.04% of FSR ±2 LSB @ 25°C, ±10 V		
Output Driving	±5 mA		
Output Range	Voltage	±10 V	
	Current	0 ~ +20 mA	
Output Impedance	0.1 Ω Max.		
<b>Digital I/O</b>			
Channels	DI	16, 5 V/TTL	
	DO	16, 5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.		
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.		
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V		
<b>Timer/Counter</b>			
Channels	3		
Resolution	16-bit		
Input Frequency	10 MHz Max.		
Reference Clock	Internal: 4 MHz		
<b>General</b>			
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz		
Card ID	Yes (4-bit)		
Connectors	Female DB37 x 1, 20-pin Box Header x 2		
Power Consumption	2200 mA @ +5 V	2400 mA @ +5 V	3000 mA @ +5 V
Operating Temperature	0°C to +60°C		
Humidity	5 to 85% RH, Non-condensing		

## Ordering Information

PISO-DA4U CR	Universal PCI, 4-channel Isolated DA Board (RoHS). Includes one CA-4002 D-sub Connector.
PISO-DA8U CR	Universal PCI, 8-channel Isolated DA Board (RoHS). Includes one CA-4002 D-sub Connector.
PISO-DA16U CR	Universal PCI, 16-channel Isolated DA Board (RoHS). Includes one CA-4002 D-sub Connector.

3  
3  
PCI Bus Data Acquisition Boards

# PIO-DA4U/DA8U/DA16U

Universal PCI, 14-bit, 4/8/16-channel Analog Output Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 14-bit, 4/8/16-channel Analog Output
  - Software Calibration
  - Two Timer-triggered Interrupt Sources
  - Double-buffered DA Latch
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Function for DI Channels
- Supports Card ID (SMD Switch)

## Introduction

The PIO-DA4U/DA8U/DA16U series cards are compatible with the PCI versions of the PIO-DA4/DA8/DA16 cards and, in most cases, the PIO-DA4U/DA8U/DA16U series can be used as a direct replacement for the PIO-DA4/DA8/DA16 series without requiring any modification to the software or the driver.

The voltage output range for the PIO-DA4U/DA8U/DA16U series is from -10 V to +10 V, and the current output range is from 0 to 20 mA.

In addition, the PIO-DA4U/DA8U/DA16U series also features the following innovative advantages:

### 1. Accurate and easy-to-use calibration:

ICP DAS provides a software calibration function rather than manual calibration so that jumpers and trim-pots are no longer required for calibration, and the calibration data can be saved in the EEPROM for long-term use.

### 2. Individual channel configuration:

Each channel can be individually configured as either voltage or current output.

### 3. Card ID:

ICP DAS has also included an onboard Card ID switch on the PIO-DA4U/DA8U/DA16U series that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASYLab

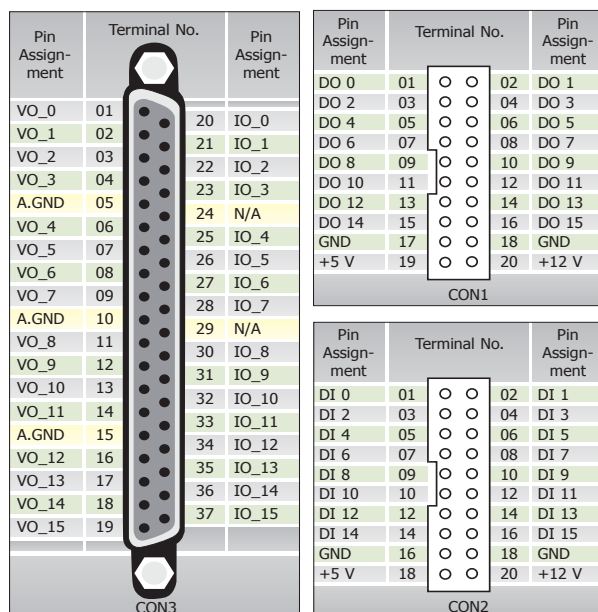
### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PIO-DA4U	PIO-DA8U	PIO-DA16U
<b>Analog Output</b>			
Channels	4	8	16
Resolution	14-bit		
Accuracy	0.04% of FSR ±2 LSB @ 25°C, ±10 V		
Output Driving	±5 mA		
Output Range	Voltage	±10 V	
	Current	0 ~ +20 mA	
Output Impedance	0.1 Ω Max.		
<b>Digital I/O</b>			
Channels	DI	16, 5 V/TTL	
	DO	16, 5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.		
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.		
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V		
<b>Timer/Counter</b>			
Channels	3		
Resolution	16-bit		
Input Frequency	10 MHz Max.		
Reference Clock	Internal: 4 MHz		
<b>General</b>			
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz		
Card ID	Yes (4-bit)		
Connectors	Female DB37 x 1, 20-pin Box Header x 2		
Power Consumption	600 mA @ +5 V	800mA @ +5 V	1400 mA @ +5 V
Operating Temperature	0°C to +60°C		
Humidity	5 to 85% RH, Non-condensing		

## Pin Assignments



## Ordering Information

PIO-DA4U CR	Universal PCI, 4-channel DA Board (RoHS). Includes one CA-4002 D-sub Connector.
PIO-DA8U CR	Universal PCI, 8-channel DA Board (RoHS). Includes one CA-4002 D-sub Connector.
PIO-DA16U CR	Universal PCI, 16-channel DA Board (RoHS). Includes one CA-4002 D-sub Connector.



## 3-4 Isolated Digital I/O Boards



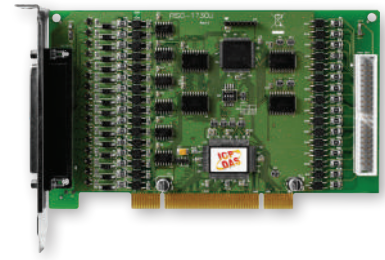
### Selection Guide

Model	PISO-1730U	PISO-P32C32U		PISO-P32A32U		PISO-P32S32WU	PISO-P64U		PISO-C64U	PISO-A64	PISO-730		PISO-730A	
		-	-5V	-	-5V		-	-24V			U	-5V	-	-5V
Interface	Universal PCI					Universal PCI				PCI	Universal PCI	PCI		
<b>Isolated Digital Input</b>														
Channels	32	32		32		32	64		-	-	16		16	
Isolation Voltage	3750 V <sub>rms</sub>										3750 V <sub>rms</sub>			
Input Voltage	Logic 0	0 ~ +1 V												
	Logic 1	+9 ~ +24 V	+5 ~ +12 V	+9 ~ +24 V	+5 ~ +12 V	+9 ~ +24 V	+5 ~ +15 V	+20 ~ +28 V	-	-	+9 ~ +24 V	+5 ~ +12 V	+9 ~ +24 V	+5 ~ +12 V
Input Impedance	3 KΩ, 0.5 W						1.2 KΩ, 1 W	3 KΩ, 1 W	-	-	1.2 KΩ, 1 W			
Built-in DC/DC Converter	3000 V <sub>dc</sub>					-	3000 V <sub>dc</sub>		-	-	3000 V <sub>dc</sub>		-	
<b>Isolated Digital Output</b>														
Channels	32	32		32		32	-		64	64	16		16	
Type	Sink (NPN)		Source (PNP)		Sink (NPN)		-		Sink (NPN)	Source (PNP)	Sink (NPN)		Source (PNP)	
Isolated Voltage	3750 V <sub>rms</sub>										3750 V <sub>rms</sub>			
Output Range	100 mA/+30 V for each channel @ 100% duty					500 mA (Max.)	-		100 mA/+30 V for each channel @ 60% duty		100 mA/+30 V for each channel @ 100% duty			
<b>Non-isolated Digital I/O</b>														
DI Channels	-	-		-		-	-		-	-	16		16	
DO Channels	-	-		-		-	-		-	-	16		16	
Compatibility	-	-		-		-	-		-	-	5 V/TTL		5 V/TTL	
Page	<b>3-19</b>	<b>3-20</b>		<b>3-21</b>		<b>3-22</b>	<b>3-23</b>		<b>3-24</b>		<b>3-25</b>		<b>3-26</b>	

Model	PCI-P8R8U	PCI-P16R16U	PCI-P16C16	PCI-P16POR16U	PISO-P8R8U	PISO-P8SSR8AC	PISO-P8SSR8DC	PISO-P16R16U	PISO-725	
Interface	Universal PCI		PCI	Universal PCI	Universal PCI	PCI		Universal PCI	PCI	
<b>Isolated Digital Input</b>										
Channels	8 (Optical)	16 (Optical)	16 (Optical)	16 (Optical)	8 (Optical)	8 (Optical)	8 (Optical)	16 (Optical)	8 (Optical)	
Isolation Voltage	5000 V <sub>rms</sub>							3750 V <sub>rms</sub>		
Input Voltage	Logic 0	AC/DC 0 ~ +1 V								
	Logic 1	AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz)								
<b>Isolated Digital Output</b>										
Channels	4 x Form C 4 x Form A	8 x Form C 8 x Form A	16 (Sink, NPN)	16 x Form A	5 x Form C 3 x Form A	8 x Form A	8 x Form A	8 x Form C 8 x Form A	8 x Form C	
Type	Relay	Relay	Open-collector	PhotoMos Relay	Relay	AC Type Solid-state Relay	DC Type Solid-state Relay	Relay	Relay	
Isolated Voltage	-	-	5000 V <sub>rms</sub>	-	-	-	-	-	-	
Contact Rating	DC	24 V @ 1 A		Load Voltage: 300 V (AC Peak or DC)	30 V @ 5 A		3 ~ 30 V		24 V @ 1 A	
	AC	120 V @ 0.5 A			250 V @ 1.6 A		24 ~ 265 V		120 V @ 0.5 A	1 A/30 V
Page	<b>3-27</b>		<b>3-28</b>	<b>3-29</b>	<b>3-30</b>	<b>3-30</b>		<b>3-31</b>	<b>3-32</b>	

# PISO-1730U

Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board (Sink, NPN)



## Features

- Universal PCI (3.3 V/5 V) Interface
- 32 Optically-isolated Digital Input Channels
- 32 Optically-isolated Digital Output Channels (Sink, NPN)
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Four Isolated Banks
- Supports Card ID (SMD Switch)

## Introduction

The PISO-1730U card offers 32 optically-isolated Digital Input channels and 32 optically-isolated Digital Output channels, arranged into four isolated banks. Each input channel uses a photocoupler, while each output channel contains a Darlington transistor. Both the output port and the input port should use an external power supply. The board eliminates ground-loop problems and isolates the host computer from potentially damaging voltage spikes.

The PISO-1730U card also includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Digital Input	
Channels	32
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)
Compatibility	Photocoupler (Bi-directional)
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: 9 ~ +24 V
Input Impedance	3 KΩ, 0.5 W
Response Speed	4 kHz (Typical)
Digital Output	
Channels	32
Isolation Voltage	3750 V <sub>rms</sub>
Compatibility	Sink, Open Collector
Output Capability	100 mA/+30 V for one channel @ 100% duty
Response Speed	4 kHz (Typical)
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1 40-pin Box Header x 1
Power Consumption	600 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
IDO_0	01	20	IDO_1	02	IDO_1
IDO_2	02	21	IDO_3	03	IDO_3
IDO_4	03	22	IDO_5	04	IDO_5
IDO_6	04	23	IDO_7	05	IDO_7
PCOM	05	24	IDO_8	06	IDO_8
IDO_9	06	25	IDO_10	07	IDO_10
IDO_11	07	26	IDO_12	08	IDO_12
IDO_13	08	27	IDO_14	09	IDO_14
IDO_15	09	28	PCOM	10	IDO_16
IDO_16	10	29	IDO_17	11	IDO_17
IDO_18	11	30	IDO_19	12	IDO_19
IDO_20	12	31	IDO_21	13	IDO_21
IDO_22	13	32	IDO_23	14	IDO_23
PCOM	14	33	IDO_24	15	IDO_24
IDO_25	15	34	IDO_26	16	IDO_26
IDO_27	16	35	IDO_28	17	IDO_28
IDO_29	17	36	IDO_30	18	IDO_30
IDO_31	18	37	PCOM	19	PCOM
EGND	19				

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.	Pin Assignment	Terminal No.
IDI_0	01	02	IDI_1	03	04
IDI_2	03	04	IDI_3	05	06
IDI_4	05	06	IDI_5	07	08
IDI_6	07	08	IDI_7	09	10
PCOM	09	10	IDI_8	11	12
IDI_9	11	12	IDI_10	13	14
IDI_11	13	14	IDI_12	15	16
IDI_13	15	16	IDI_14	17	18
IDI_15	17	18	PCOM	19	20
IDI_16	19	20	IDI_17	21	22
IDI_18	21	22	IDI_19	23	24
IDI_20	23	24	IDI_21	25	26
IDI_22	25	26	IDI_23	27	28
PCOM	27	28	IDI_24	29	30
IDI_25	29	30	IDI_26	31	32
IDI_27	31	32	IDI_28	33	34
IDI_29	33	34	IDI_30	35	36
IDI_31	35	36	PCOM	37	N/A
EGND	37	N/A		38	N/A
N/A	39	N/A		40	N/A

CON2 (40-pin Box Header)

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.
CON1	Female DB-37		

## Ordering Information

PISO-1730U CR	Universal PCI Board with 32 Optically-isolated Digital Input Channels and 32 Optically-isolated Open-collector Digital Output Channels (Sink, NPN) (RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
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# PISO-P32C32U/PISO-P32C32U-5V

Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board (Sink)



## Features

- Universal PCI (3.3 V/5 V) Interface
- 32 Optically-isolated Digital Input Channels
- 32 Optically-isolated Digital Output Channels (Sink, NPN)
  - Supports DO Status Readback (Register Level)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Four Isolated Banks
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- Supports Card ID (SMD Switch)

## Introduction

The PISO-P32C32U/P32C32U-5V card features 32 optically 32 optically-isolated Digital Input channels and 32 optically-isolated Digital Output channels, arranged into four isolated banks. Each input channel uses a photocoupler, while each output channel contains a Darlington transistor. Either an external power supply or an isolated internal power supply from the PC via a DC/DC converter can be used for the input port, which is selected via a jumper, whereas the output port should use an external power supply. The board eliminates ground-loop problems and isolates the host computer from potentially damaging voltage spikes.

The PISO-P32C32U/P32C32U-5V cards also include an onboard Card ID switch (version 1.1 or above) that enables the board to be recognized via software if two or more boards are installed in the same computer.

The PISO-P32C32U-5V uses lower input impedance that is suitable for 5 V signal applications, while the PISO-P32C32U uses higher input impedance that is suitable for 12 or 24 V signal applications and produces less heat.

## Software

### Drivers

- ✓ 32/64-bit Windows XP/2003/2008/Vista/7/8
- ✓ Linux
- ✓ DASyLab

### Sample Programs

- ✓ DOS Lib and TC/BC/MSC Demo
- ✓ LabVIEW Toolkit
- ✓ VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND0	01	20 Ext. GND0
DI_0	02	21 DO_0
DI_1	03	22 DO_1
DI_2	04	23 DO_2
DI_3	05	24 DO_3
DI_4	06	25 DO_4
DI_5	07	26 DO_5
DI_6	08	27 DO_6
DI_7	09	28 DO_7
DI_8	10	29 DO_8
DI_9	11	30 DO_9
DI_10	12	31 DO_10
DI_11	13	32 DO_11
DI_12	14	33 DO_12
DI_13	15	34 DO_13
DI_14	16	35 DO_14
DI_15	17	36 DO_15
ECOM0	18	37 Ext. PWR0
IGND0	19	

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND1	01	02 Ext. GND1
DI_16	03	04 DO_16
DI_17	05	06 DO_17
DI_18	07	08 DO_18
DI_19	09	10 DO_19
DI_20	11	12 DO_20
DI_21	13	14 DO_21
DI_22	15	16 DO_22
DI_23	17	18 DO_23
DI_24	19	20 DO_24
DI_25	21	22 DO_25
DI_26	23	24 DO_26
DI_27	25	26 DO_27
DI_28	27	28 DO_28
DI_29	29	30 DO_29
DI_30	31	32 DO_30
DI_31	33	34 DO_31
ECOM1	35	36 Ext. PWR1
IGND1	37	38 N/A
N/A	39	40 N/A

## Hardware Specifications

Model	PISO-P32C32U	PISO-P32C32U-5V
<b>Digital Input</b>		
Channels	32	
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)	
Compatibility	Photocoupler (Bi-directional)	
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +9 ~ +24 V	Logic 0: 0 ~ +1 V Logic 1: +5 ~ +12 V
DI Power	External	Internal/External
Input Impedance	3 KΩ, 0.5 W	
Response Speed	4 kHz (Typical)	
<b>Digital Output</b>		
Channels	32	
Isolation Voltage	3750 V <sub>rms</sub>	
Compatibility	Sink, Open-collector	
Output Capability	100 mA/+30 V for each channel @ 100% duty	
Response Speed	4 kHz (Typical)	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 40-pin Box Header x 1	
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PISO-P32C32U CR	Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Digital Open-collector Digital Output Board. (Sink, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
PISO-P32C32U-5V CR	Universal PCI, 32-channel Optically-isolated Digital Input (Logic High: +5 ~ +12 V) and 32-channel Optically-isolated Digital Open-collector Digital Output Board. (Sink, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.

# PISO-P32A32U/PISO-P32A32U-5V

Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board (Source)



## Features

- Universal PCI (3.3 V/5 V) Interface
- 32 Optically-isolated Digital Input Channels
- 32 Optically-isolated Digital Output Channels (Source, PNP)
  - Supports DO Status Readback (Register Level)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- Supports Card ID (SMD Switch)

## Introduction

The PISO-P32A32U/P32A32-5V card features 32 optically-isolated Digital Input channels and 32 optically-isolated Digital Output channels, arranged into four isolated banks.

Each Digital Output channel includes a PNP transistor and an integral suppression diode for the inductive load. Isolated input channels 0 - 15 are allocated to Group A, while channels 16 - 31 are allocated to Group B. Isolated output channels are allocated to Groups C and D. The photocoupler input for the PISO-P32A32-5V can be powered by using either an internal current source or an external power supply, while the input for the PISO-P32A32U operates using an external power supply only.

The PISO-P32A32U/P32A32-5V cards also include an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

The PISO-P32A32-5V uses lower input impedance that is suitable for 5 V signal applications, while the PISO-P32A32U uses higher input impedance that is suitable for 12 or 24 V signal applications and produces less heat.

## Hardware Specifications

Model	PISO-P32A32U	PISO-P32A32U-5V
<b>Digital Input</b>		
Channels	32	
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)	
Compatibility	Photocoupler (Bi-directional)	
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +9 ~ +24 V	Logic 0: 0 ~ +1 V Logic 1: +5 ~ +12 V
DI Power	External	Internal/External
Input Impedance	3 KΩ, 0.5 W	
Response Speed	4 kHz (Typical)	
<b>Digital Output</b>		
Channels	32	
Isolation Voltage	3750 V <sub>rms</sub>	
Compatibility	Source, Open-collector	
Output Capability	100 mA/+30 V for each channel @ 100% duty	
Response Speed	4 kHz (Typical)	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 40-pin Box Header x 1	
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

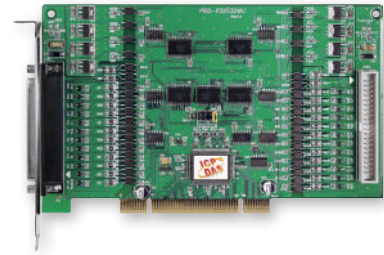
Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment	
Ext. GND0	01	20	Ext. GND0	02	Ext. GND1	
DI_0	02	21	DO_0	03	04	DO_16
DI_1	03	22	DO_1	04	05	DO_17
DI_2	04	23	DO_2	05	06	DO_18
DI_3	05	24	DO_3	06	07	DO_19
DI_4	06	25	DO_4	07	08	DO_20
DI_5	07	26	DO_5	08	09	DO_21
DI_6	08	27	DO_6	09	10	DO_22
DI_7	09	28	DO_7	10	11	DO_23
DI_8	10	29	DO_8	11	12	DO_24
DI_9	11	30	DO_9	12	13	DO_25
DI_10	12	31	DO_10	13	14	DO_26
DI_11	13	32	DO_11	14	15	DO_27
DI_12	14	33	DO_12	15	16	DO_28
DI_13	15	34	DO_13	16	17	DO_29
DI_14	16	35	DO_14	17	18	DO_30
DI_15	17	36	DO_15	18	19	DO_31
ECOM0	18	37	Ext. PWR0	19	20	Ext. PWR1
IGND0	19	38		21	22	N/A
		39		23	24	N/A
				25	26	
				27	28	
				29	30	
				31	32	
				33	34	
				35	36	
				37	38	
				39	40	

## Ordering Information

PISO-P32A32U CR	Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board. (Source, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
PISO-P32A32U-5V CR	Universal PCI, 32-channel Optically-isolated Digital Input (Logic High: +5 ~ +12 V) and 32-channel Optically-isolated Open-collector Digital Output Board. (Source, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.

# PISO-P32S32WU

Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board (Sink)



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Input Range up to 30 V<sub>DC</sub>
- 32 Optically-isolated Digital Input Channels
- 32 Optically-isolated Digital Output Channels (Sink, NPN)
  - 100 mA (24 Channels) Low Driving
  - 500 mA (8 Channels) High Driving

## Introduction

PISO-P32S32WU card supports both 3.3 V and 5 V PCI slots and provides 32 optically-isolated Digital Input channels and 32 optically-isolated open-collector Digital Output channels (8 channels for 500 mA and 24 channels for 100 mA current sinking output, NPN), arranged into four isolated banks. Each Digital Input channel uses a photocoupler to isolate the card and the computer from external signals, while each Digital Output channel includes an NPN transistor and an integral suppression diode for the inductive load. The PISO-P32S32WU requires an external power supply to drive the DI and DO ports, and supports Card ID (jumper) features for multi-board identification if two or more boards are installed in the same computer.

The board interfaces to field logic signals, eliminating ground-loop problems and isolating the host computer from potentially damaging voltage spikes.

PISO-P32S32WU contains a single 37-pin D-sub connector and a single 40-pin male header. A 40-pin to DB-37 flat cable is used to fix with the case. The digital signal can be connected through the second D-sub connector, and each D-sub connector supports 16 input and 16 output channels.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND0	01	20 Ext. GND0
DI_0	02	21 DO0 for high drive
DI_1	03	22 DO1 for high drive
DI_2	04	23 DO2 for high drive
DI_3	05	24 DO3 for high drive
DI_4	06	25 DO_4
DI_5	07	26 DO_5
DI_6	08	27 DO_6
DI_7	09	28 DO_7
DI_8	10	29 DO_8
DI_9	11	30 DO_9
DI_10	12	31 DO_10
DI_11	13	32 DO_11
DI_12	14	33 DO_12
DI_13	15	34 DO_13
DI_14	16	35 DO_14
DI_15	17	36 DO_15
GND for High drive	18	37 Ext. PWRO
GND for High drive	19	

Pin Assignment	Terminal No.	Pin Assignment
Ext. GND1	01	02 Ext. GND1
DI_16	03	04 DO16 for high drive
DI_17	05	06 DO17 for high drive
DI_18	07	08 DO18 for high drive
DI_19	09	10 DO19 for high drive
DI_20	11	12 DO_20
DI_21	13	14 DO_21
DI_22	15	16 DO_22
DI_23	17	18 DO_23
DI_24	19	20 DO_24
DI_25	21	22 DO_25
DI_26	23	24 DO_26
DI_27	25	26 DO_27
DI_28	27	28 DO_28
DI_29	29	30 DO_29
DI_30	31	32 DO_30
DI_31	33	34 DO_31
GND for High drive	35	36 Ext. PWRI
GND for High drive	37	38 N/A
N/A	39	40 N/A

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Digital Input	
Channels	32
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)
Compatibility	Photocoupler (Bi-directional)
Input Voltage	Logic 0: 0 ~ +1 V; Logic 1: +9 ~ +24 V
Input Impedance	3 KΩ, 0.5 W
Response Speed	4 kHz (Typical)
Digital Output	
Channels	32
Isolation Voltage	3750 V <sub>rms</sub>
Compatibility	Sink, Open-collector
Output Capability	500 mA for one high-driving channel @ 100% duty 500 mA for all high-driving channels @ 100% duty 100 mA for one low-driving channel @ 100% duty 100 mA for all low-driving channels @ 100% duty
Response Speed	4 kHz (Typical)
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1; 40-pin Box Header x 1
Power Consumption	600 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Ordering Information

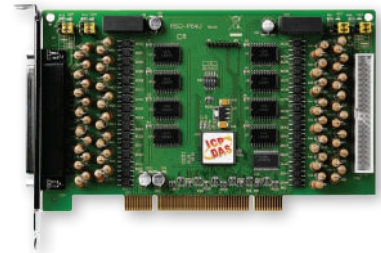
PISO-P32S32WU CR	Universal PCI, 32-channel Optically-isolated Digital Input and 32-channel Optically-isolated Open-collector Digital Output Board (8 channels for 500 mA and 24 channels for 100 mA Current Sinking Output, NPN, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.
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PCI Bus Data Acquisition Boards

# PISO-P64U/PISO-P64U-24V

Universal PCI, 64-channel Optically-isolated Digital Input Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 64-channel Optically-isolated Digital Input
  - Jumper-selectable Internal or External Power Source for DI
  - 4 Isolated Banks when using 4 Isolated External Power Supplies

## Introduction

The PISO-P64U/P64U-24V Universal PCI card supports the 3.3 V/5 V PCI bus and provides 64 optically-isolated Digital Input channels. Either an internal or an external power supply can be used, which can be selected via a jumper. The internal power is provided by an onboard isolated DC/DC converter that provides 3000 V<sub>DC</sub> isolation and is used for connecting dry-contact input devices. The Digital Input channels are arranged into four isolated banks when using four isolated external power supplies. DI channels 0 - 15 are allocated to Bank A, DI channels 16 - 31 are allocated to Bank B, DI channels 32 - 47 are allocated to Bank C, and DI channels 48 - 63 are allocated to Bank D.

The onboard photocouplers provide 3750 V<sub>rms</sub> isolation, and act as an interface to field logic signals, eliminate ground-loop problems, and isolate the host computer from potentially damaging voltage spikes. The PISO-P64U/P64U-24V card contains a single DB-37 connector and a single 40-pin male header, each supporting 32 input channels.

The PISO-P64U/P64U-24V card also includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASYLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PISO-P64U	PISO-P64U-24V
<b>Digital Input</b>		
Channels	64	
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)	
Compatibility	Photocoupler (Bi-directional)	
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +5 ~ +15 V (Max. +24 V)	Logic 0: 0 ~ +1 V Logic 1: +20 ~ +28 V (Max. +30 V)
Input Impedance	1.2 KΩ, 1 W	3 KΩ, 1 W
Response Speed	4 kHz (Typical)	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1; 40-pin Box Header x 1	
Power Consumption	400 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment	
IGND0	01	20	IGND1	02	IGND3	
DI_0	02	21	DI_16	03	04	DI_48
DI_1	03	22	DI_17	04	06	DI_49
DI_2	04	23	DI_18	05	07	DI_50
DI_3	05	24	DI_19	06	08	DI_51
DI_4	06	25	DI_20	07	09	DI_52
DI_5	07	26	DI_21	08	10	DI_53
DI_6	08	27	DI_22	09	11	DI_54
DI_7	09	28	DI_23	10	12	DI_55
DI_8	10	29	DI_24	11	13	DI_56
DI_9	11	30	DI_25	12	14	DI_57
DI_10	12	31	DI_26	13	15	DI_58
DI_11	13	32	DI_27	14	16	DI_59
DI_12	14	33	DI_28	15	17	DI_60
DI_13	15	34	DI_29	16	18	DI_61
DI_14	16	35	DI_30	17	19	DI_62
DI_15	17	36	DI_31	18	20	DI_63
ECOM0	18	37	ECOM1	19	21	DI_64
N.C.	19	38	ECOM2(+)	20	22	DI_65
		39	ECOM2(-)	21	23	DI_66
		40	N.C.	22	24	DI_67
			N.C.	23	25	DI_68
				24	26	DI_69
				25	27	DI_70
				26	28	DI_71
				27	29	DI_72
				28	30	DI_73
				29	31	DI_74
				30	32	DI_75
				31	33	DI_76
				32	34	DI_77
				33	35	DI_78
				34	36	DI_79
				35	37	DI_80
				36	38	DI_81
				37	39	DI_82
				38	40	DI_83
				39		DI_84
				40		DI_85

## Ordering Information

PISO-P64U CR	Universal PCI, 64-channel Optically-isolated Digital Input Board (RoHS). Includes one CA-4037B cable and two CA-4002 D-sub Connectors.
PISO-P64U-24V CR	Universal PCI, 64-channel Optically-isolated Digital Input (Logic High: +20 ~ +28 V) Board (RoHS). Includes one CA-4037B cable and two CA-4002 D-sub Connectors

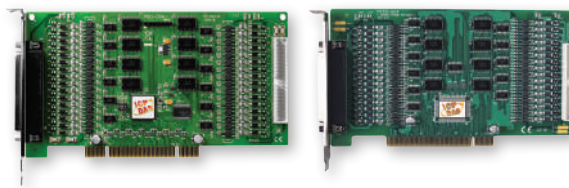
# PISO-C64U/PISO-A64

Universal PCI/PCI, 64-channel Optically-isolated Digital Output Board (Sink/Source)



PISO-C64U

PISO-A64



## Features

- PISO-C64U: Universal PCI (3.3 V/5 V) Interface
  - 64-channel Optically-isolated Open-collector Digital Output
  - Current Sinking, NPN type
  - Supports Card ID (SMD Switch)
  - Supports DO Status Readback (Register Level)
- PISO-A64: PCI (5 V) Interface
  - 64-channel Optically-isolated Open-collector Digital Output
  - Current Sourcing, PNP type
  - 3750 V<sub>rms</sub> Photo-isolation Protection
  - 4 Isolated Banks when using 4 Isolated External Power Supplies

## Introduction

The PISO-C64U Universal PCI card supports the 3.3 V/5 V PCI bus while the PISO-A64 only supports the 5 V PCI bus. These cards provide 64 optically-isolated Digital Output channels, each of which includes a PNP transistor (PISO-A64) or a Darlington transistor (PISO-C64U) and an integrated suppression diode for the inductive load.

The Digital Output channels are allocated to four isolated banks when using four isolated external power supplies, and act as an interface to field logic signals, eliminating ground-loop problems, and isolating the host computer from potentially damaging voltage spikes. The open-collector Digital Output channels are typically used for alarm and warning notifications, signal output control, control for external circuits that require a higher voltage level, or signal transmission applications, etc.

The PISO-C64U card also includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer. Both cards contain a single DB-37 connector and a single 40-pin male header, each supporting 32 output channels.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
Ext. GND0	01	20	Ext. GND1	01	Ext. GND3
DO_0	02	21	DO_16	02	DO_48
DO_1	03	22	DO_17	03	DO_49
DO_2	04	23	DO_18	04	DO_50
DO_3	05	24	DO_19	05	DO_51
DO_4	06	25	DO_20	06	DO_52
DO_5	07	26	DO_21	07	DO_53
DO_6	08	27	DO_22	08	DO_54
DO_7	09	28	DO_23	09	DO_55
DO_8	10	29	DO_24	10	DO_56
DO_9	11	30	DO_25	11	DO_57
DO_10	12	31	DO_26	12	DO_58
DO_11	13	32	DO_27	13	DO_59
DO_12	14	33	DO_28	14	DO_60
DO_13	15	34	DO_29	15	DO_61
DO_14	16	35	DO_30	16	DO_62
DO_15	17	36	DO_31	17	DO_63
Ext. PWR0	18	37	Ext. PWR1	18	Ext. PWR3
N.C.	19			19	N.C.
				20	N.C.
				21	N.C.
				22	N.C.
				23	N.C.
				24	N.C.
				25	N.C.
				26	N.C.
				27	N.C.
				28	N.C.
				29	N.C.
				30	N.C.
				31	N.C.
				32	N.C.
				33	N.C.
				34	N.C.
				35	N.C.
				36	N.C.
				37	N.C.
				38	N.C.
				39	N.C.
				40	N.C.

## Software

- Drivers**
- 32/64-bit Windows XP/2003/2008/Vista/7/8
  - Linux
  - DASyLab
- Sample Programs**
- DOS Lib and TC/BC/MSC Demo
  - LabVIEW Toolkit
  - VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PISO-C64U	PISO-A64
<b>Digital Output</b>		
Channels	64	
Isolation Voltage	3750 V <sub>rms</sub> (Using external power)	
Compatibility	Sink, Open-collector	Source, Open-collector
Output Capability	100 mA/+30 V for each channel @ 100% duty	100 mA/+30 V for each channel @ 60% duty
Response Speed	4 kHz (Typical)	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	5 V PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)	No
Connectors	Female DB37 x 1 40-pin Box Header x 1	
Power Consumption	800 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PISO-C64U CR	Universal PCI, 64-channel Optically-isolated Open-collector Digital Output Board (Sink, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors
PISO-A64 CR	PCI Bus, 64-channel Optically-isolated Open-collector Digital Output Board (Source, RoHS). Includes one CA-4037B Cable and two CA-4002 D-sub Connectors.

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4  
PCI Bus Data Acquisition Boards

# PISO-730U/PISO-730U-5V

Universal PCI, 32-channel Isolated Digital I/O and 32-channel TTL Digital I/O Board (Sink, NPN)



## Features

- Universal PCI (3.3 V/5 V) Interface
- 16-channel Optically-isolated Digital Input
- 16-channel Optically-isolated Digital Output (Sink, NPN)
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Supports Card ID (SMD Switch)
- Supports DO Status Readback (Register Level)
- 2 Interrupt Sources

## Introduction

The PISO-730U/730U-5V cards provide 32 isolated Digital I/O channels (16 x DI and 16 x DO) and 32 TTL-level Digital I/O channels (16 x DI and 16 x DO). Both the isolated Digital Input and the Digital Output channels use a short optical transmission path to transfer an electronic signal between the elements of a circuit and keep them electrically isolated. With 3750 V<sub>rms</sub> isolation protection, the DI/O channels allow the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes.

Each Digital Output includes a Darlington (NPN) transistor and an integrated suppression diode for the inductive load. The open-collector Digital Output channels are typically used for alarm and warning notifications, signal output control, control for external circuits that require a higher voltage level, or signal transmission applications, etc.

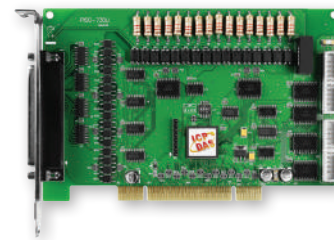
The PISO-730U/730U-5V cards also include an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
IDI_0	01	20 IDI_1
IDI_2	02	21 IDI_3
IDI_4	03	22 IDI_5
IDI_6	04	23 IDI_7
IDI_8	05	24 IDI_9
IDI_10	06	25 IDI_11
IDI_12	07	26 IDI_13
IDI_14	08	27 IDI_15
EI.COM1	09	28 EI.COM2
EO.COM1	10	29 INGD
IDO_0	11	30 IDO1
IDO_2	12	31 IDO3
IDO_4	13	32 IDO5
IDO_6	14	33 IDO7
IDO_8	15	34 IDO9
IDO_10	16	35 IDO11
IDO_12	17	36 IDO13
IDO_14	18	37 IDO15
EO.COM2	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V



## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PISO-730U	PISO-730U-5V
<b>Isolated Digital Input</b>		
Channels	16	
Compatibility	Optical	
Isolation Voltage	3750 V <sub>rms</sub>	
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +9 ~ +24 V	Logic 0: 0 ~ +1 V Logic 1: +5 ~ +12 V
Input Impedance	1.2 KΩ, 1 W	
Response Speed	4 kHz (Typical)	
<b>Isolated Digital Output</b>		
Channels	16	
Compatibility	Sink (NPN), Open-collector	
Isolation Voltage	3750 V <sub>rms</sub>	
Output Capability	100 mA/+30 V for each channel @ 100% duty	
Response Speed	4 kHz (Typical)	
<b>Non-isolated Digital Input</b>		
Channels	16	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.	
Response Speed	1.2 MHz (Typical)	
<b>Non-isolated Digital Output</b>		
Channels	16	
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max., Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V, Source: 0.8 mA @ 2.0 V	
Response Speed	1.2 MHz (Typical)	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PISO-730U CR	Universal PCI, 32-channel Isolated Digital I/O and 32-channel TTL Digital I/O Board (Sink, RoHS). Includes one CA-4002 D-sub Connector.
PISO-730U-5V CR	Universal PCI, PCI, 32-channel Isolated Digital I/O (Input Logic High: +5 ~ +12 V) and 32-channel TTL Digital I/O Board (Sink, RoHS). Includes one CA-4002 D-sub Connector.



# PISO-730A PISO-730A-5V

**Available soon**

PCI Bus, 32-channel Isolated Digital I/O and 32-channel TTL Digital I/O Board (Source, PNP)



## Features

- PCI (5 V) Interface
- 16-channel Optically-isolated Digital Input
- 16-channel Optically-isolated Digital Output (Source, NPN)
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
- 3750 V<sub>rms</sub> Photo-isolation Protection
- 2 Interrupt Sources

## Introduction

The PISO-730A/730A-5V cards provide 32 isolated Digital I/O channels (16 x DI and 16 x DO) and 32 TTL-level Digital I/O channels (16 x DI and 16 x DO). Both the isolated Digital Input and the Digital Output channels use a short optical transmission path to transfer an electronic signal between the elements of a circuit and keep them electrically isolated. With 3750 V<sub>rms</sub> isolation protection, the DI/O channels allow the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes.

Each Digital Output includes a PNP transistor and an integral suppression diode for the inductive load. The open-collector Digital Output channels are typically used for alarm and warning notifications, signal output control, control for external circuits that require a higher voltage level, or signal transmission applications, etc.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
IDI_0	01	IDI_1
IDI_2	02	IDI_3
IDI_4	03	IDI_5
IDI_6	04	IDI_7
IDI_8	05	IDI_9
IDI_10	06	IDI_11
IDI_12	07	IDI_13
IDI_14	08	IDI_15
EI.COM1	09	EI.COM2
EO.COM1	10	IGND
IDO_0	11	IDO1
IDO_2	12	IDO3
IDO_4	13	IDO5
IDO_6	14	IDO7
IDO_8	15	IDO9
IDO_10	16	IDO11
IDO_12	17	IDO13
IDO_14	18	IDO15
EO.COM2	19	

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	DI 1
DI 2	03	DI 3
DI 4	05	DI 5
DI 6	07	DI 7
DI 8	09	DI 9
DI 10	11	DI 11
DI 12	13	DI 13
DI 14	15	DI 15
GND	17	GND
+5 V	19	+12 V

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	DO 1
DO 2	03	DO 3
DO 4	05	DO 5
DO 6	07	DO 7
DO 8	09	DO 9
DO 10	10	DO 11
DO 12	12	DO 13
DO 14	14	DO 15
GND	16	GND
+5 V	18	+12 V

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Model	PISO-730A	PISO-730A-5V
<b>Isolated Digital Input</b>		
Channels	16	
Compatibility	Optical	
Isolation Voltage	3750 V <sub>rms</sub>	
Input Voltage	Logic 0: 0 ~ +1 V Logic 1: +9 ~ +24 V	Logic 0: 0 ~ +1 V Logic 1: +5 ~ +12 V
Input Impedance	1.2 KΩ, 1 W	
Response Speed	4 kHz (Typical)	
<b>Isolated Digital Output</b>		
Channels	16	
Compatibility	Source (PNP), Open-collector	
Isolation Voltage	3750 V <sub>rms</sub>	
Output Capability	100 mA/+30 V for each channel @ 100% duty	
Response Speed	4 kHz (Typical)	
<b>Non-isolated Digital Input</b>		
Channels	16	
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.	
Response Speed	1.2 MHz (Typical)	
<b>Non-isolated Digital Output</b>		
Channels	16	
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max., Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V, Source: 0.8 mA @ 2.0 V	
Response Speed	1.2 MHz (Typical)	
<b>General</b>		
Bus Type	5 V PCI, 32-bit, 33 MHz	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	640 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PISO-730A CR	PCI bus, 32-channel Isolated DI/O and 32-channel TTL DI/O Board (Source, RoHS). Includes one CA-4002 D-sub Connector
PISO-730A-5V CR	PCI bus, 32-channel Isolated DI/O (Input Logic High: +5 ~ +12 V) and 32-channel TTL DI/O Board (Source, RoHS). Includes one CA-4002 D-sub Connector.

3  
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PCI Bus Data Acquisition Boards

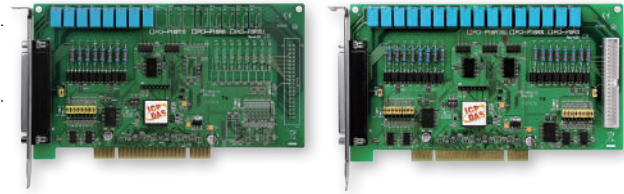
# PCI-P8R8U/PCI-P16R16U **NEW**

Universal PCI, 8/16-channel Isolated Digital Input and 8/16-channel Relay Output Board



PCI-P8R8U

PCI-P16R16U



## Features ▶▶▶▶

- Universal PCI (3.3 V/5 V) Interface
- 8/16-channel Optically-isolated Digital Input
- 8/16-channel Relay Output
- Selectable DC Signal Input Filter
- AC Signal Input with Filter
- 5000 V<sub>rms</sub> Photo-isolation Protection

## Introduction

The PCI-P8R8U/P16R16U Universal PCI card supports the 3.3 V/5 V PCI bus and provides 8 or 16 optically-isolated Digital Input channels and 8 or 16 Relay Output channels. The DI channels provide 5000 V<sub>rms</sub> isolation protection that allows the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes. The Relay Output channels can be used where it is necessary to control a circuit using a low-power signal, with complete electrical isolation between the control and the controlled circuits, or where several circuits need to be controlled by a single signal.

The PCI-P8R8U/P16R16U cards also includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

PCI-P8R8U/P16R16U cards can be used in a variety of applications, such as controlling the ON/OFF state of external devices, driving external relays or small power switches, activating alarms, contact closure, or sensing external voltages or switches, etc.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Models	PCI-P8R8U	PCI-P16R16U
<b>Digital Input</b>		
Channels	8	16
Isolation Voltage	5000 V <sub>rms</sub> (Photocoupler)	
Input Voltage	Logic 1: AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz) Logic 0: AC/DC 0 ~ +1 V	
Response Speed	Without Filter: 50 kHz (Typical) With Filter: 0.455 kHz (Typical)	
<b>Digital Output</b>		
Channels	8	16
Relay Type	4 SPDT, 4 SPST	8 SPDT, 8 SPST
Contact Rating	AC: 120 V @ 0.5 A DC: 24 V @ 1 A	
Operating Time	5 ms (Typical)	
Release Time	10 ms (Typical)	
Insulation Resistance	100 MΩ	
Lifetime	Mechanical: 5,000,000 ops. Electrical: 100,000 ops.	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
I/O Connector	Female DB37 x 1	Female DB37 x 1 40-pin Box Header x 1
Power Consumption	500 mA @ +5 V	800 mA @ +5 V
Operating Temperature	0 to +60 °C	
Humidity	5 to 85% RH, Non-condensing	



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
NO_0	01	20	NO_3	02	NO_11
COM_0	02	21	COM_3	03	COM_11
NC_0	03	22	NC_3	04	NC_11
NO_1	04	23	NO_4	05	NO_12
COM_1	05	24	COM_4	06	COM_12
NC_1	06	25	NC_4	07	NC_12
NO_2	07	26	NO_5	08	NO_13
COM_2	08	27	COM_5	09	COM_13
NC_2	09	28	NC_5	10	NC_13
NO_7	10	29	NO_6	11	NO_14
COM_7	11	30	COM_6	12	COM_14
DIA_0	12	31	GND	13	GND
DIA_1	13	32	DIB_0	14	DIB_8
DIA_2	14	33	DIB_1	15	DIB_9
DIA_3	15	34	DIB_2	16	DIB_10
DIA_4	16	35	DIB_3	17	DIB_11
DIA_5	17	36	DIB_4	18	DIB_12
DIA_6	18	37	DIB_5	19	DIB_13
DIA_7	19	38	DIB_6	20	DIB_14
		39	DIB_7	21	DIB_15
		40		22	N/A
				23	N/A
				24	N/A
				25	N/A
				26	N/A
				27	N/A
				28	N/A
				29	N/A
				30	N/A
				31	N/A
				32	N/A
				33	N/A
				34	N/A
				35	N/A
				36	N/A
				37	N/A
				38	N/A
				39	N/A
				40	N/A

CON2 (PCI-P16R16 only)

## Ordering Information

PCI-P8R8U CR	Universal PCI, 8-channel Isolated Digital Input and 8-channel Relay Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PCI-P16R16U CR	Universal PCI, 16-ch Isolated Digital Input and 16-channel Relay Output Board (RoHS). Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.

# PCI-P16C16

PCI Bus, 16-channel Isolated Digital Input and 16-channel Open-collector Digital Output Board (Sink, NPN)



## Features

- PCI (5 V) Interface
- 16-channel Optically-isolated Digital Input
- 16-channel Open-collector Digital Output (Sink, NPN)
- Selectable DC Signal Input Filter
- AC Signal Input with Filter
- External Power Status LED Indicator

## Introduction

The PCI-P16C16 is a 5 V PCI card that support Plug & Play functionality for automatic allocation of I/O resources from the BIOS. The card provides 16 optically-isolated Digital Input channels and 16 open-collector (Sink, NPN) Digital Output channels. The DI channels provide 5000 V<sub>rms</sub> isolation protection that allows the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes. The open-collector DO channels are typically used for alarm and warning notifications, control of signal output, control of external circuits that require a higher voltage level, or signal transmission applications, etc. The PCI-P16C16 contains a single DB-37 connector and a single 40-pin box header, and includes a 40-pin to DB-37 flat cable for easy wiring.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Digital Input	
Channels	16
Isolation Voltage	5000 V <sub>rms</sub> (Photocoupler)
Input Voltage	Logic 1: AC/DC +5 ~+ 24 V (AC 50 ~ 1 kHz) Logic 0: AC/DC 0 ~ +1 V
Response Speed	Without Filter: 50 kHz (Typical) With Filter: 0.455 kHz (Typical)
Digital Output	
Channels	16
Isolation Voltage	5000 V <sub>rms</sub>
Compatibility	Transistor (Sink, Open-collector)
Output Capability	DC: 600 mA/+30 V for each channel @ 100% duty
Response Speed	1 kHz (Typical)
General	
Bus Type	5 V PCI, 32-bit, 33 MHz
I/O Connector	Female DB37 x 1 40-pin Box Header x 1
Power Consumption	800 mA @ +5 V
Operating Temperature	0 to +60 °C
Humidity	5 to 85% RH, Non-condensing

## Hardware Specifications

Pin Assignment	Terminal No.	Pin Assignment
OUT_0	01	20 Ext. Power 1
OUT_1	02	21 Ext. Power1
OUT_2	03	22 GND_1
OUT_3	04	23 GND_1
OUT_4	05	24 Ext. Power2
OUT_5	06	25 Ext. Power2
OUT_6	07	26 GND_2
OUT_7	08	27 GND_2
N/A	09	28 N/A
N/A	10	29 N/A
N/A	11	30 DIB_0
DIA_0	12	31 DIB_1
DIA_1	13	32 DIB_2
DIA_2	14	33 DIB_3
DIA_3	15	34 DIB_4
DIA_4	16	35 DIB_5
DIA_5	17	36 DIB_6
DIA_6	18	37 DIB_7
DIA_7	19	

Pin Assignment	Terminal No.	Pin Assignment
DO_8	01	02 Ext. Power3
DO_9	03	04 Ext. Power3
DO_10	05	06 GND3
DO_11	07	08 GND3
DO_12	09	10 Ext. Power4
DO_13	11	12 Ext. Power4
DO_14	13	14 GND4
DO_15	15	16 GND4
N/A	17	18 N/A
N/A	19	20 N/A
N/A	21	22 DIB_8
DIA_8	23	24 DIB_9
DIA_9	25	26 DIB_10
DIA_10	27	28 DIB_11
DIA_11	29	30 DIB_12
DIA_12	31	32 DIB_13
DIA_13	33	34 DIB_14
DIA_14	35	36 DIB_15
DIA_15	37	38 N/A
N/A	39	40 N/A

CON2

## Ordering Information

PCI-P16C16	PCI bus, 16-channel Isolated Digital Input and 16-channel Open-collector Digital Output Board (Sink, NPN). Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.
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# PISO-P8R8U/PISO-P8SSR8AC/PISO-P8SSR8DC

Universal PCI/PCI, 8-channel Isolated Digital Input and 8-channel Electromechanical/Solid-state Relay Output Board



## Features

- PISO-P8R8U: Universal PCI (3.3 V/5 V) Interface
  - Supports Card ID (SMD Switch)
  - 8-channel Electromechanical Relay Output
- PISO-P8SSR8AC/P8SSR8DC: PCI (5 V) Interface
  - 8-channel Solid-state Relays (SSR) Output
  - Decreased Electrical Noise During Relay Switching
- 8-channel Optically-isolated Digital Input
  - AC Signal Input with Filter
  - Selectable DC Signal Input Filter
  - 5000 V<sub>rms</sub> Photo-isolation Protection
- Onboard Relay Output Status LED Indicators

## Introduction

The PISO-P8R8U Universal PCI card supports the 3.3 V/5 V PCI bus while the PISO-P8SSR8AC/P8SSR8DC card supports the 5 V PCI bus, and offers 8 optically-isolated Digital Input channels and 8 electromechanical Relay or 8 solid-state Relay Output channels. The DI channels provide 5000 V<sub>rms</sub> isolation protection that allows the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes. The Relay Output channels are used where it is necessary to control a circuit using a low-power signal, with complete electrical isolation between the control and the controlled circuits, or where several circuits must be controlled by a single signal.

The PISO-P8R8U/PISO-P8SSR8AC/P8SSR8DC can be used in a variety of applications, such as controlling the ON/OFF state of external devices, driving external relays or small power switches, activating alarms, contact closure, or sensing external voltages or switches, etc.

The PISO-P8R8U cards also include an onboard Card ID switch that enables the board to be recognized via software if two or more PISO-P8R8U cards are installed in the same computer. The PISO-P8R8U is designed as a direct replacement for the PISO-P8R8 without requiring any modification to the software or the driver.

## Hardware Specifications

Models	PISO-P8R8U	PISO-P8SSR8AC	PISO-P8SSR8DC
<b>Digital Input</b>			
Channels	8		
Isolation Voltage	5000 V <sub>rms</sub> (Photocoupler)		
Input Voltage	Logic 1: AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz), Logic 0: AC/DC 0 ~ +1 V		
Response Speed	Without Filter: 50 kHz (Typical); With Filter: 0.455 kHz(Typical)		
<b>Digital Output</b>			
Channels	8		
Relay Type	SPST N.O. (Form A)		
Contact Rating	AC: 250 V @ 1.6 A, DC: 30 V @ 5 A	AC: 24 ~ 265 V	DC: 3 ~ 30 V
Release Time	3 ms	0.5 cycle +1 ms	1 ms
Lifetime	Mechanical: 2,000,000 ops., Electrical: 100,000 ops.		
<b>General</b>			
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	5 V PCI, 32-bit, 33 MHz	
I/O Connector	Female DB37 x 1		
Power Consumption	300 mA @ +5 V		
Operating Temperature	0 to +60 °C		
Humidity	5 to 85% RH, Non-condensing		

## Ordering Information

PCI-P8R8U CR	Universal PCI, 8-channel Isolated Digital Input and 8-channel Relay Output Board (RoHS). Includes one CA-4002 D-sub Connector.
PISO-P8SSR8AC CR	PCI bus, 8-channel Isolated AC-type SSR Output and 8-channel Isolated Digital Input Board (RoHS). Includes one CA-4002 D-sub Connector.
PISO-P8SSR8DC CR	PCI bus, 8-channel Isolated DC-type SSR Output and 8-channel Isolated Digital Input Board (RoHS). Includes one CA-4002 D-sub Connector.

PISO-P8R8U



PISO-P8SSR8AC

PISO-P8SSR8DC



## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/MATLAB Demo
- VB.NET/C#.NET/VC.NET Demo

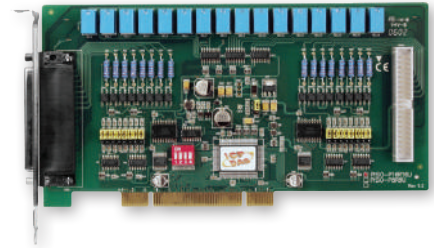


## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
NO_0	01	20 NO_3
COM_0	02	21 COM_3
N/A	03	22 N/A
NO_1	04	23 NO_4
COM_1	05	24 COM_4
N/A	06	25 NO_5
NO_2	07	26 COM_5
COM_2	08	27 NO_6
N/A	09	28 COM_6
NO_7	10	29 N/A
COM_7	11	30 DIB_0
DIA_0	12	31 DIB_1
DIA_1	13	32 DIB_2
DIA_2	14	33 DIB_3
DIA_3	15	34 DIB_4
DIA_4	16	35 DIB_5
DIA_5	17	36 DIB_6
DIA_6	18	37 DIB_7
DIA_7	19	

# PISO-P16R16U

Universal PCI, 16-channel Isolated Digital Input and 16-channel Relay Output Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 16-channel Relay Output
- 16-channel Optically-isolated Digital Input
  - 3750 V<sub>rms</sub> Photo-isolation Protection
  - Selectable DC Signal Input Filter
  - AC Signal Input with Filter

## Introduction

The PISO-P16R16U is a Universal PCI card supporting both the 3.3 V and 5 V PCI bus, and contains 16 photocoupler Digital Input channels that provide 3750 V<sub>rms</sub> isolation protection, allowing the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes. The cards are also equipped with 16 Relay Output channels to enable the control of the ON/OFF state of external devices, drive external relays or small power switches, or activate alarms, etc.

The PISO-P16R16U card is fully compatible with the PISO-P16R16 card, and is designed as a direct replacement without requiring any modification to the software or the driver.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Digital Input	
Channels	16
Isolation Voltage	3750 V <sub>rms</sub> (Photocoupler)
Input Voltage	Logic 1: AC/DC +5 ~ +24 V (AC 50 ~ 1 kHz) Logic 0: AC/DC 0 ~ +1 V
Input Impedance	1.2 KΩ, 0.5 W
Response Speed	Without Filter: 50 kHz (Typical) With Filter: 0.455 kHz (Typical)
Digital Output	
Channels	16
Relay Type	8 SPDT, 8 SPST
Contact Rating	AC: 120 V @ 0.5 A DC: 24 V @ 1 A
Operating Time	1 ms (Typical)
Release Time	7 ms (Typical)
Insulation Resistance	1000 MΩ
Lifetime	Mechanical: 5,000,000 ops. Electrical: 100,000 ops.
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
I/O Connector	Female DB37 x 1 40-pin box header x 1
Power Consumption	800 mA @ +5 V
Operating Temperature	0 to +60 °C
Humidity	5 to 85% RH, Non-condensing

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
NO_0	01	NO_3
COM_0	02	COM_3
NC_0	03	NC_3
NO_1	04	NO_4
COM_1	05	COM_4
NC_1	06	NO_5
NO_2	07	COM_5
COM_2	08	NO_6
NC_2	09	COM_6
NO_7	10	NO_7
COM_7	11	DIB_0
DIA_0	12	DIB_1
DIA_1	13	DIB_2
DIA_2	14	DIB_3
DIA_3	15	DIB_4
DIA_4	16	DIB_5
DIA_5	17	DIB_6
DIA_6	18	DIB_7
DIA_7	19	

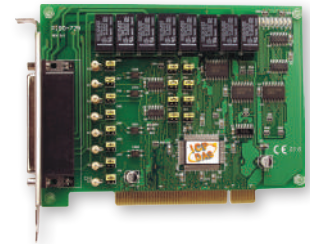
Pin Assignment	Terminal No.	Pin Assignment
NO_8	01	NO_11
COM_8	03	COM_11
NC_8	05	NC_11
NO_9	07	NO_12
COM_9	09	COM_12
NC_9	11	NO_13
NO_10	13	COM_13
COM_10	15	NO_14
NC_10	17	COM_14
NO_15	19	GND
COM_15	21	DIB_8
DIA_8	23	DIB_9
DIA_9	25	DIB_10
DIA_10	27	DIB_11
DIA_11	29	DIB_12
DIA_12	31	DIB_13
DIA_13	33	DIB_14
DIA_14	35	DIB_15
DIA_15	37	N/A
N/A	39	N/A

## Ordering Information

PISO-P16R16U	Universal PCI, 16-channel Isolated Digital Input and 16-channel Relay Output. Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.
PISO-P16R16U CR	Universal PCI, 16-channel Isolated Digital Input and 16-channel Relay Output (RoHS). Includes one CA-4037W Cable and two CA-4002 D-sub Connectors.

# PISO-725

PCI Bus, 8-channel Isolated Digital Input and 8-channel Relay Output Board



## Features

- PCI (5 V) Interface
- 8-channel Electromechanical Relay Output
  - Supports Relay Output Status Readback
  - Onboard Relay Output Status LED Indicators
- 8-channel Optically-isolated Digital Input
  - 3750 V<sub>rms</sub> Photo-isolation Protection
  - State-changed Interrupt for all Digital Inputs
  - Jumper-selectable Isolated or Non-isolated Digital Input

## Introduction

The PISO-725 card supports the 5 V PCI bus, and provides 8 isolated or non-isolated Digital Input channels and 8 electromechanical Relay Output channels. The DI channels can be set to either isolated or non-isolated via a hardware jumper, and each channel will generate an interrupt signal if the state is changed, which is very useful when monitoring contact openings/closures as it is not necessary to continuously poll the inputs. The isolated DI channels use a short optical transmission path to transfer an electronic signal between elements of a circuit and keep them electrically isolated. With 3750 V<sub>rms</sub> isolation protection, the DI channels allow the input signals to be completely floated so as to prevent ground loops and isolate the host computer from potentially damaging voltage spikes.

The Relay Output channels are used where it is necessary to control a circuit using a low-power signal, with complete electrical isolation between the control and the controlled circuits, or where several circuits must be controlled by a single signal. All relays are de-energized (switched off) during power-on, and support ON/OFF status read back.

The PISO-725 can be used in a variety of applications, including contact closure, external voltage sensing, load sensing and I/O control, etc.

## Software

**Drivers**

32/64-bit Windows XP/2003/2008/Vista/7/8     Linux     DASYLab

**Sample Programs**

DOS Lib and TC Demo     LabVIEW Toolkit

VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Hardware Specifications

Digital Input	
Channels	8
Isolation Voltage	3750 V <sub>rms</sub> (Photocoupler)
Input Voltage	Logic 0: 0 ~ +1 V, Logic 1: +9 ~ +24 V
Input Impedance	1.2 KΩ, 1 W
Response Speed	4 kHz (Typical)
Digital Output	
Channels	8
Relay Type	Form C
Contact Rating	AC: 0.3 A/120 V, DC: 1 A/30 V
Operating Time	5 ms (Typical)
Release Time	10 ms (Typical)
Lifetime	Mechanical: 100,000 ops. (30 V/1 A)
General	
Bus Type	5 V PCI, 32-bit, 33 MHz
I/O Connector	Female DB37 x 1
Power Consumption	300 mA @ +5 V
Operating Temperature	0 ~ 60 °C
Humidity	5 ~ 85% RH, non-condensing

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
NO_0	01	20 NO_3
COM_0	02	21 COM_3
NC_0	03	22 NC_3
NO_1	04	23 NO_4
COM_1	05	24 COM_4
NC_1	06	25 NO_5
NO_2	07	26 COM_5
COM_2	08	27 NO_6
NC_2	09	28 COM_6
NO_7	10	29 GND
COM_7	11	30 DIB_0
DIA_0	12	31 DIB_1
DIA_1	13	32 DIB_2
DIA_2	14	33 DIB_3
DIA_3	15	34 DIB_4
DIA_4	16	35 DIB_5
DIA_5	17	36 DIB_6
DIA_6	18	37 DIB_7
DIA_7	19	

CON1

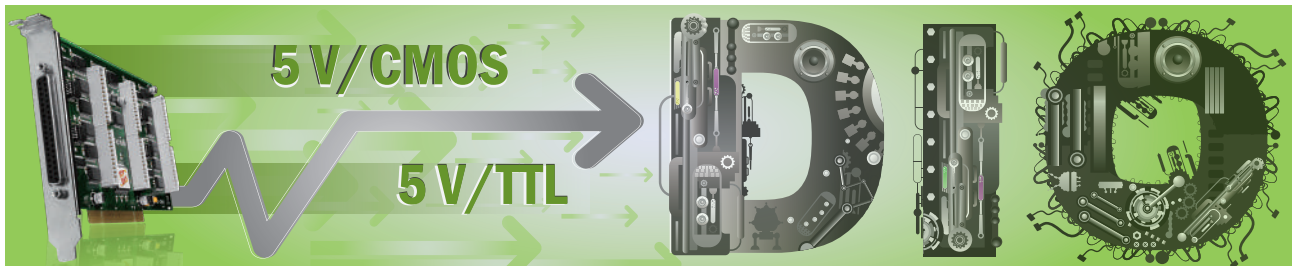
## Ordering Information

PISO-725	PCI, 8-channel Isolated Digital Input and 8-channel Relay Output Board. Includes one CA-4002 D-sub Connector.
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3  
4

PCI Bus Data Acquisition Boards

## 3-5 Non-isolated Digital I/O Boards



### Selection Guide

Model	PCI-D64HU	PIO-D24U	PIO-D48U	PIO-D48SU	PIO-D56U	PIO-D64U	PIO-D96U	PIO-D96SU	PIO-D144U	PIO-D144LU	PIO-D168U	PCI-TMC12A	
Interface	Universal PCI											PCI Bus	
<b>Programmable DI/O</b>													
Channels	-	24	48		24	-	96		144		168	-	
<b>Digital Input</b>													
Channels	32	-	-		16	32	-		-		-	16	
Compatibility	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/TTL	5 V/CMOS	5 V/TTL	5 V/CMOS	5 V/TTL	5 V/TTL	
Input Voltage	Logic 0	0.8 V Max.											
	Logic 1	2.0 V Min.											
<b>Digital Output</b>													
Channels	32	-	-		16	32	-		-		-	16	
Compatibility	5 V/TTL	5 V/TTL	5 V/TTL		5 V/TTL	5 V/TTL	5 V/TTL	5 V/CMOS	5 V/TTL	5 V/CMOS	5 V/TTL	5 V/TTL	
Output Voltage	Logic 0 (Max.)	0.55 V	0.4 V	0.4 V		0.4 V	0.4 V	0.4 V	0.1 V	0.4 V	0.1 V	0.4 V	0.4 V
	Logic 1 (Min.)	2.0 V	2.4 V	2.4 V		2.4 V	2.4 V	2.4 V	4.4 V	2.4 V	4.4 V	2.4 V	2.4 V
Output Capability	Sink	64 mA @ 0.55 V	64 mA @ 0.8 V	64 mA @ 0.8 V		CN1: 2.4 mA @ 0.8 V CN3: 64 mA @ 0.8 V	24 mA @ 0.8 V	64 mA @ 0.8 V	6 mA @ 0.33 V	64 mA @ 0.8 V	6 mA @ 0.33 V	64 mA @ 0.8 V	24 mA @ 0.8 V
	Source	-32 mA @ 2.0 V	32 mA @ 2.0 V	32 mA @ 2.0 V		CN1: 0.8 mA @ 2.0 V CN3: 32 mA @ 2.0 V	15 mA @ 2.0 V	32 mA @ 2.0 V	6 mA @ 4.77 V	32 mA @ 2.0 V	6 mA @ 4.77 V	32 mA @ 2.0 V	15 mA @ 2.0 V
<b>Timer/Counter</b>													
Channels	3	-	2		-	6	-		-		-	12	
Resolution	16-bit	-	16-bit		-	16-bit	-		-		-	16-bit	
Clock Source	-	-	4 MHz		-	4 MHz	-		-		-	8 MHz	
<b>Connector</b>													
100-pin SCSI II	-	-	-	1	-	-	-	1	-	-	-	-	
50-pin Header	-	-	1	-	-	-	3	-	5	6	-	-	
40-pin Header	1	-	-	-	-	-	-	-	-	-	-	-	
37-pin D-sub	1	1	1	-	1	-	1	-	1	1	1	1	
20-pin Header	-	-	-	-	2	5	-	-	-	-	-	2	
Page	<b>3-34</b>	<b>3-35</b>	<b>3-36</b>		<b>3-35</b>	<b>3-37</b>	<b>3-38</b>		<b>3-39</b>		<b>3-40</b>		



# PCI-D64HU

Universal PCI, 40 MB/s High-speed 32-channel DI and 32-channel DO Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 32-channel, 5 V/TTL Digital Output
- Data Transfer Rate up to 40 MB/s for each DMA Channel
- Onboard 1 k/2 k DWORD FIFO for DI/DO, respectively
- DO FIFO Supports Ring Buffer Mode
- No Bus Loading in Repetitive Pattern Generation Applications
- 32-channel, 5 V/TTL Digital Input
- 2-channel Bus Mastering Scatter/Gather
- 8-channel Optically-isolated Digital Input
- Data Transfer Modes:
  - Direct Program Control, Internal Timer Pacer
  - External Clock (DI only), Handshaking

## Introduction

The PCI-D64HU is a high-speed digital I/O card containing 32 Digital Input channels and 32 Digital Output channels. The high-performance design makes this card perfect for high-speed data transfer and pattern generation applications.

The PCI-D64HU performs high-speed data transfer using a bus-mastering DMA via the 32-bit PCI bus, with a maximum data transfer rate of up to 40 MB per second. A variety of digital I/O transfer modes are supported, including direct programmed I/O control, timer pacer control, external clock mode and handshaking mode.

The PCI-D64HU also features a programmable digital filter for all input signals, including handshaking and trigger signals. The PCI-D64HU is a reliable and cost-effective interface that can be used to control any high-speed peripherals connected to your computer system.

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
DI_0	01	20 DO_0
DI_1	02	21 DO_1
DI_2	03	22 DO_2
DI_3	04	23 DO_3
DI_4	05	24 DO_4
DI_5	06	25 DO_5
DI_6	07	26 DO_6
DI_7	08	27 DO_7
DI_8	09	28 DO_8
DI_9	10	29 DO_9
DI_10	11	30 DO_10
DI_11	12	31 DO_11
DI_12	13	32 DO_12
DI_13	14	33 DO_13
DI_14	15	34 DO_14
DI_15	16	35 DO_15
+5 V	17	36 GND
I_ACK	18	37 I_TRG
I_REQ	19	

CON1

Pin Assignment	Terminal No.	Pin Assignment
DI_16	01	02 DO_16
DI_17	03	04 DO_17
DI_18	05	06 DO_18
DI_19	07	08 DO_19
DI_20	09	10 DO_20
DI_21	11	12 DO_21
DI_22	13	14 DO_22
DI_23	15	16 DO_23
DI_24	17	18 DO_24
DI_25	19	20 DO_25
DI_26	21	22 DO_26
DI_27	23	24 DO_27
DI_28	25	26 DO_28
DI_29	27	28 DO_29
DI_30	29	30 DO_30
DI_31	31	32 DO_31
+5 V	33	34 GND
O_ACK	35	36 O_TRG
O_REQ	37	38 N.C.
N.C.	39	40 N.C.

CON2

## Software

### Drivers

- 32-bit Windows 2000/XP/2003/2008/Vista/7/8

### Sample Programs

- VB/VC/BCB Demo

## Hardware Specifications

Digital Input	
Channels	32
Compatibility	5 V/TTL
Input Voltage	Logic 0: 0.8 V Max., Logic 1: 2.0 V Min.
Handshaking Signals	I_REQ Input , I_ACK Output , I_TRG Input
Digital Output	
Channels	32
Compatibility	5 V/TTL
Output Voltage	Logic 0: 0.55 V Max., Logic 1: 2.0 V Min.
Output Capability	Sink: 64 mA @ 0.55 V, Source: 32 mA @ 2.0 V
Handshaking Signals	O_REQ Output, O_ACK Input, O_TRG Output
Transfer Speed	40 MB/s (Max.) for DI and DO simultaneously
Timer/Counter	
Channels	3
Resolution	16-bit
Input Frequency	2.5 ~ 20 MHz
Timer 0	DI Clock Source
Timer 1	DO Clock Source
Timer 2	Base Clock for Timer 0 and Timer 1
Interrupts	
Sources	O_ACK, I_REQ, Timer 0, Timer 1 and Timer 2
Onboard FIFO	
Size	1 k DWORD (32-bit) for DI 2 k DWORD (32-bit) for DO
Size in Ring Buffer Mode	2 ~ 2 k DWORD (32-bit), DO only
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Connectors	Female DB37 x 1, 40-pin Box Header x 1
Power Consumption	200 mA @ +5 V Typical (no output load)
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Ordering Information

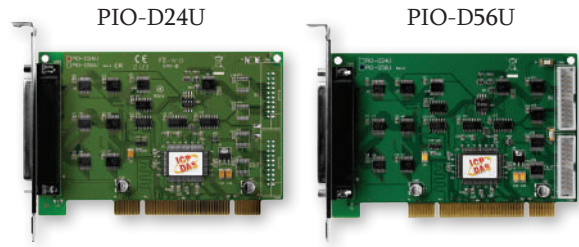
PCI-D64HU CR	Universal PCI, 40 MB/s High-speed 32-channel DI and 32-channel DO (RoHS). Includes one CA-4037W cable and two CA-4002 D-sub connectors.
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3  
5

PCI Bus Data Acquisition Boards

# PIO-D24U/PIO-D56U

Universal PCI, 24/56-channel Digital I/O Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 24/56 Buffered TTL Digital I/O Lines
- Three 8-bit Bi-directional Programmable I/O Ports
- Emulates two Industrial-standard 8255 PPI Ports (Mode 0)
- 4-channel Interrupt Source
- Supports Card ID (SMD Switch)
- Supports DO Status Readback (Register Level)
- DI/O Response Time approximately 1  $\mu$ s (1 MHz)

## Introduction

The PIO-D24U/D56U cards are designed to be fully compatible with PIO-D24/D56 boards. The PIO-D24U/D56U series can be used as a direct replacement for PIO-D24/D56 boards without requiring any modification to the software or the driver.

The PIO-D24U/D56U supports the 3.3 V/5 V PCI bus, and contains three 8-bit bi-directional I/O ports, referred to as Port A (PA), Port B (PB) and Port C (PC), respectively. Each port is configured as an input on power-up or after a reset. In addition, the PIO-D56U also provides 16 Digital Input channels and 16 Digital Output channels.

The PIO-D24U/D56U cards also include an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
N.C	01	20 +5 V
N.C.	02	21 GND
PB_7	03	22 PC_7
PB_6	04	23 PC_6
PB_5	05	24 PC_5
PB_4	06	25 PC_4
PB_3	07	26 PC_3
PB_2	08	27 PC_2
PB_1	09	28 PC_1
PB_0	10	29 PC_0
GND	11	30 PA_7
N.C.	12	31 PA_6
GND	13	32 PA_5
N.C.	14	33 PA_4
GND	15	34 PA_3
N.C.	16	35 PA_2
GND	17	36 PA_1
+5 V	18	37 PA_0
GND	19	

CON3

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02 DI 1
DI 2	03	04 DI 3
DI 4	05	06 DI 5
DI 6	07	08 DI 7
DI 8	09	10 DI 9
DI 10	11	12 DI 11
DI 12	13	14 DI 13
DI 14	15	16 DI 15
GND	17	18 GND
+5 V	19	20 +12 V

CON2 (PIO-D56U only)

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02 DO 1
DO 2	03	04 DO 3
DO 4	05	06 DO 5
DO 6	07	08 DO 7
DO 8	09	10 DO 9
DO 10	10	12 DO 11
DO 12	12	14 DO 13
DO 14	14	16 DO 15
GND	16	18 GND
+5 V	18	20 +12 V

CON1 (PIO-D56U only)

## Hardware Specifications

Model	PIO-D24U	PIO-D56U
<b>Programmable DIO</b>		
Channels	24	
<b>Digital Input</b>		
Channels	-	16
Compatibility	5V/TTL	
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.	
Response Speed	1 MHz	
<b>Digital Output</b>		
Channels	-	16
Compatibility	5V/TTL	
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.	
Output Capability	Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V	CN1 Sink: 2.4 mA @ 0.8 V Source: 0.8 mA @ 2.0 V CN3 Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V
Response Speed	1 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1	Female DB37 x 1, 20-pin Male Box Header x 2
Power Consumption	420 mA @ +5 V	580 mA @ +5 V
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PIO-D24U CR	Universal PCI, 24-channel Digital I/O Board (RoHS).
PIO-D56U CR	Universal PCI, 56-channel Digital I/O Board (RoHS).

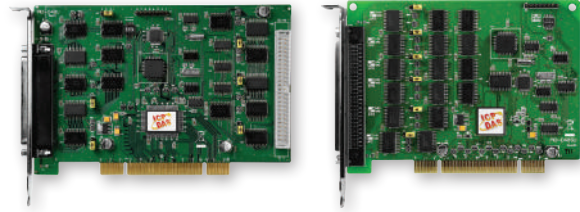
# PIO-D48U/PIO-D48SU

Universal PCI, 48-channel Digital I/O Board



PIO-D48U

PIO-D48SU



## Features

- Universal PCI (3.3 V/5 V) Interface
- 48 Buffered TTL Digital I/O Lines
- Six 8-bit Bi-directional Programmable I/O Ports
- Emulates two Industrial-standard 8255 PPI Ports (Mode 0)
- All I/O Lines Buffered on the Board
- 4-channel Interrupt Source
- Supports Card ID (SMD Switch)
- Supports DO Status Readback (Register Level)
- Buffer Output for Higher Driving Capability
- DI/O Response Time approximately 1 μs (1 MHz)

## Introduction

The PIO-D48U/D48SU card is designed to be fully compatible with the PIO-D48, meaning that a PIO-D48 card can be directly replaced with a PIO-D48U/D48SU without requiring any modification to the software or the driver.

The PIO-D48U provides two connectors for I/O wiring, while the PIO-D48SU provides a single high-density connector that reduces the amount of installation space required for the card in the computer.

The PIO-D48U/D48SU supports the 3.3 V/5 V PCI bus, and provides 48 TTL Digital I/O lines that are grouped into six 8-bit bi-directional ports. Each group of three 8-bit ports is arranged on the connector as Port A (PA), Port B (PB) and Port C (PC), and Port C can be split into two nibble-wide (4-bit) parts. All ports are configured as inputs on power-up or after a reset.

The PIO-D48U/D48SU card also includes an onboard Card ID switch and pull-high/low resistors for the Digital Input. The Card ID switch can be set so that the board is able to be recognized via software if two or more boards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined as either high or low instead of remaining floating if the DI channels are disconnected or interrupted.



## Hardware Specifications

Model	PIO-D48U	PIO-D48SU
<b>Programmable DIO</b>		
Channels	48	
<b>Digital Input</b>		
Compatibility	5 V/TTL	
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Response Speed	1 MHz	
<b>Digital Output</b>		
Compatibility	5 V/TTL	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 64 mA @ 0.8 V; Source: 32 mA @ 2.0 V	
Response Speed	1 MHz	
<b>Timer/Counter</b>		
Channels	2 (Event timer x1/ 32-bit Timer x1)	
Resolution	16-bit	
Reference Clock	Internal: 4 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1 50-pin Box Header x 1	Female SCSI II 100-pin x 1
Power Consumption	900 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	



## Ordering Information

PIO-D48U CR	Universal PCI, 48-channel Digital I/O Board (RoHS).
PIO-D48SU CR	Universal PCI, 48-channel Digital I/O Board (SCSI II Connector, RoHS).



## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux
- DASYLab

### Sample Programs

- DOS Lib and TC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/MATLAB Demo
- VB.NET/C#.NET/VC.NET Demo



## Pin Assignments

• PIO-D48U			• PIO-D48SU		
Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
N.C.	01	20	PA_00	01	51
N.C.	02	21	PA_01	02	52
PB_7	03	22	PA_02	03	53
PB_6	04	23	PA_03	04	54
PB_5	05	24	PA_04	05	55
PB_4	06	25	PA_05	06	56
PB_3	07	26	PA_06	07	57
PB_2	08	27	PA_07	08	58
PB_1	09	28	PB_00	09	59
PB_0	10	29	PB_01	10	60
GND	11	30	PB_02	11	61
N.C.	12	31	PB_03	12	62
GND	13	32	PB_04	13	63
N.C.	14	33	PB_05	14	64
GND	15	34	PB_06	15	65
N.C.	16	35	PB_07	16	66
GND	17	36	PC_00	17	67
+5 V	18	37	PC_01	18	68
GND	19		PC_02	19	69
			PC_03	20	70
			PC_04	21	71
			PC_05	22	72
			PC_06	23	73
			PC_07	24	74
			GND	25	75
				26	76
				27	77
				28	78
				29	79
				30	80
				31	81
				32	82
				33	83
				34	84
				35	85
				36	86
				37	87
				38	88
				39	89
				40	90
				41	91
				42	92
				43	93
				44	94
				45	95
				46	96
				47	97
				48	98
				49	99
				+ 5 V	100
					+ 5 V

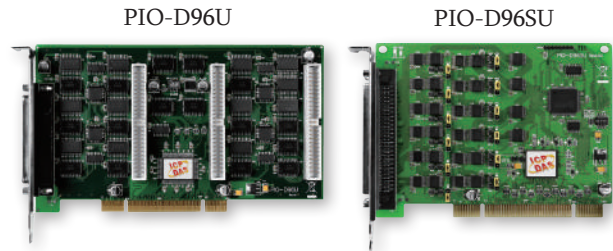
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PCI Bus Data Acquisition Boards



# PIO-D96U/PIO-D96SU

Universal PCI, 96-channel Digital I/O Board



## Features

- Universal PCI (3.3 V/5 V) Interface
- 96-channel Digital I/O
- Twelve 8-bit Bi-directional Programmable I/O Ports
- All I/O Lines Buffered on the Board
- 4-channel Interrupt Source
- Buffer Output for Higher Driving Capability
- Supports Card ID (SMD Switch)
- DI/O Response Time approximately 1 μs (1 MHz)

## Introduction

The PIO-D96U/D96SU card is designed as a direct replacement for the PIO-D96, without requiring any modification to the software or the driver.

The PIO-D96U provides four connectors for I/O wiring, while the PIO-D96SU provides a single high-density connector that reduces the amount of installation space required for the card in the computer.

The PIO-D96U/D96SU Universal PCI card supports the 3.3 V/5 V PCI bus, and provides 96 TTL Digital I/O lines that consist of twelve 8-bit bi-directional ports. Each group of three 8-bit ports is arranged on the connector as Port A (PA), Port B (PB) and Port C (PC), respectively, and all ports are configured as inputs on power-up or after a reset.

The PIO-D96U/D96SU card also includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Hardware Specifications

Models	PIO-D96U	PIO-D96SU
<b>Programmable DIO</b>		
Channels	96	
<b>Digital Input</b>		
Compatibility	5 V/TTL	5 V/CMOS
Input Voltage	Logic 0: 0.8 V Max. ; Logic 1: 2.0 V Min.	
Response Speed	1 MHz	
<b>Digital Output</b>		
Compatibility	5 V/TTL	5 V/CMOS
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	Logic 0: 0.1 V Max. Logic 1: 4.4 V Min.
Output Capability	Sink: 6 mA @ 0.33 V Source: 6 mA @ 4.77 V	Sink: 64 mA @ 0.8 V Source: 32 mA @ 2.0 V
Response Speed	1 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1 50-pin Box Header x 3	Female SCSI II 100-pin x 1
Power Consumption	600 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

## Ordering Information

PIO-D96U CR	Universal PCI, 96-channel Digital I/O Board (RoHS).
PIO-D96SU CR	Universal PCI, 96-channel Digital I/O Board (SCSI II Connector, RoHS)

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/MATLAB Demo
- VB.NET/C#.NET/VC.NET Demo

## Pin Assignments

• PIO-D96U			• PIO-D96SU		
Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
N.C.	01	20	PA_00	01	51
N.C.	02	21	PA_01	02	52
PB_7	03	22	PA_02	03	53
PB_6	04	23	PA_03	04	54
PB_5	05	24	PA_04	05	55
PB_4	06	25	PA_05	06	56
PB_3	07	26	PA_06	07	57
PB_2	08	27	PA_07	08	58
PB_1	09	28	PB_00	09	59
PB_0	10	29	PB_01	10	60
GND	11	30	PB_02	11	61
N.C.	12	31	PB_03	12	62
GND	13	32	PB_04	13	63
N.C.	14	33	PB_05	14	64
GND	15	34	PB_06	15	65
N.C.	16	35	PB_07	16	66
GND	17	36	PC_00	17	67
+5 V	18	37	PC_01	18	68
GND	19		PC_02	19	69
			PC_03	20	70
			PC_04	21	71
			PC_05	22	72
			PC_06	23	73
			PC_07	24	74
			GND	25	75
			PA_20	26	76
			PA_21	27	77
			PA_22	28	78
			PA_23	29	79
			PA_24	30	80
			PA_25	31	81
			PA_26	32	82
			PA_27	33	83
			PB_20	34	84
			PB_21	35	85
			PB_22	36	86
			PB_23	37	87
			PB_24	38	88
			PB_25	39	89
			PB_26	40	90
			PB_27	41	91
			PC_20	42	92
			PC_21	43	93
			PC_22	44	94
			PC_23	45	95
			PC_24	46	96
			PC_25	47	97
			PC_26	48	98
			PC_27	49	99
			+ 5 V	50	100

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PCI Bus Data Acquisition Boards

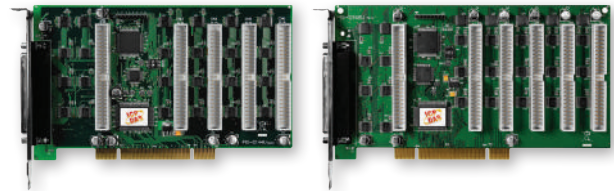
# PIO-D144U/PIO-D144LU PIO-D168U

Universal PCI, 144/168-channel Digital I/O Board



PIO-D144U/PIO-D144LU

PIO-D168U



## Features

- Universal PCI (3.3 V/5 V) Interface
- 144/168 Digital I/O Channels
- 18/21 8-bit Bi-directional Programmable I/O Ports
- Emulates 6/7 Industrial-standard 8255 PPI Ports (Mode 0)
- All I/O Lines Buffered on the Board
- 4-channel Interrupt Source
- Supports Card ID (SMD Switch)
- Supports DO Status Readback (Register Level)
- DI/O Response Time approximately 1  $\mu$ s (1 MHz)

## Introduction

The PIO-D144U/D144LU/D168U cards are designed as direct replacements for PIO-D144/D168 cards without requiring any modification to the software or the driver.

The PIO-D144U/D144LU/D168U Universal PCI cards support the 3.3 V/5 V PCI bus, and provide 144/168 TTL Digital I/O lines that are grouped into 18/21 8-bit bi-directional ports. Each group of three 8-bit ports is arranged on the connector as Port A (PA), Port B (PB) and Port C (PC), respectively, and all ports are configured as inputs Channels on power-up or after a reset.

The PIO-D144U uses 5V/TTL to provide high DO driving capability. The PIO-D144LU uses 5V/CMOS to provide low power consumption and producing less heat.

The PIO-D144U/D144LU/D168U cards also include an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux  DASyLab

### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo



## Hardware Specifications

Models	PIO-D144LU	PIO-D144U	PIO-D168U
<b>Programmable DIO</b>			
Channels	144		168
<b>Digital Input</b>			
Compatibility	5 V/CMOS		5 V/TTL
Input Voltage	Logic 0	0.8 V Max.	
	Logic 1	2.0 V Min.	
Response Speed	1 MHz		
<b>Digital Output</b>			
Compatibility	5 V/CMOS		5 V/TTL
Output Voltage	Logic 0	0.1 V Max.	0.4 V Max.
	Logic 1	4.4 V Min.	2.4 V Min.
Output Capability	Sink	6 mA @ 0.33 V	64 mA @ 0.8 V
	Source	6 mA @ 4.77 V	32 mA @ 2.0 V
Response Speed	1 MHz		
<b>General</b>			
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz		
Card ID	Yes (4-bit)		
Connectors	Female DB37 x 1, 50-pin Box Header x 5		Female DB-37 x 1, 50-pin Box Header x 6
Power Consumption	250 mA @ +5 V	600 mA @ +5 V	1300 mA @ +5 V
Operating Temperature	0°C to +60°C		
Humidity	5 to 85% RH, Non-condensing		



## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
N.C	01	20	+5 V	PC_7	01
N.C.	02	21	GND	PC_6	03
PB_7	03	22	PC_7	PC_5	05
PB_6	04	23	PC_6	PC_4	07
PB_5	05	24	PC_5	PC_3	09
PB_4	06	25	PC_4	PC_2	11
PB_3	07	26	PC_3	PC_1	13
PB_2	08	27	PC_2	PC_0	15
PB_1	09	28	PC_1	PB_7	17
PB_0	10	29	PC_0	PB_6	19
GND	11	30	PA_7	PB_5	21
N.C.	12	31	PA_6	PB_4	23
GND	13	32	PA_5	PB_3	25
N.C.	14	33	PA_4	PB_2	27
GND	15	34	PA_3	PB_1	29
N.C.	16	35	PA_2	PB_0	31
GND	17	36	PA_1	PB_0	32
+5 V	18	37	PA_0	PA_7	33
GND	19			PA_6	35
				PA_5	37
				PA_4	39
				PA_3	41
				PA_2	43
				PA_1	45
				PA_0	47
				+5 V	49

## Ordering Information

PIO-D144U CR	Universal PCI, 144-channel Digital I/O Board (5 V/TTL, RoHS).
PIO-D144LU CR	Universal PCI, 144-channel Digital I/O Board (5 V/CMOS, RoHS).
PIO-D168U CR	Universal PCI, 168-channel Digital I/O Board (RoHS)

# PCI-TMC12A

PCI Bus, 12-channel Timer/Counter Board with Digital I/O



## Features

- PCI (5 V) Interface
- 4 Onboard 8254 Timer/Counter Chips
- 12 Independent 16-bit Timers/Counters
- 12 External Clock Input Channels
- 12 Timer/Counter Output Channels
- 4 Interrupt Sources
- 16-bit Timer/Counter can be cascaded to create a 32/48-bit Timer/Counter
- 16-channel, 5 V/TTL Digital Input and 16-channel, 5 V/TTL Digital Output
- Gate Input can be sourced from External or Previous Timer/Counter Output
- 2 Internal Clock Sources
- More Flexible Interrupt Mechanism
- Hardware Mechanism to generate two Starting Clocks

## Introduction

The PCI-TMC12A is a general purpose timer/counter card that supports the 5 V PCI bus and "Plug & Play" functionality to automatically obtain I/O resources from the BIOS. This card contains twelve 16-bit timers/counters (four 82C54 chips x 3 timers/counters), 16 TTL Digital Input channels and 16 TTL Digital Output channels. The two onboard clocks (8 M/1.6 M and 0.8 M/80 K) are jumper selectable and provide a high-resolution clock source for timers/counters. Counters/timers can be used for industrial and laboratory applications such as pulse/event/switch-toggle counting, frequency readings, elapsed time measurement, pulse-width measurement, PWM (pulse-width-modulated) output, and pulse (square wave) and rate generation, etc.

## Software

### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Linux

### Sample Programs

- DOS Lib and TC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/MATLAB Demo
- VB.NET/C#.NET/VC.NET Demo

## Hardware Specifications

Digital Input	
Channels	16
Compatibility	5 V/TTL
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.
Response Speed	2.0 MHz (Typical)
Digital Output	
Channels	16
Compatibility	5 V/TTL
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.
Output Capability	Sink: 24 mA @ 0.8 V Source: 15 mA @ 2.0 V
Response Speed	2.0 MHz (Typical)
Timer/Counter	
Channels	12 (Independent x 12)
Resolution	16-bit
Input Frequency	10 MHz Max.
Reference Clock	Internal: 8 MHz
General	
Bus Type	5 V PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female DB37 x 1 20-pin Box Header x 2
Power Consumption	500 mA @ +5 V
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

## Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
ECLK1	01	20	EXTG1	02	DI 1
COUT1	02	21	ECLK2	04	DI 3
EXTG2	03	22	COUT2	06	DI 5
ECLK3	04	23	EXTG3	08	DI 7
COUT3	05	24	ECLK4	10	DI 9
EXTG4	06	25	COUT4	12	DI 11
ECLK5	07	26	EXTG5	14	DI 13
COUT5	08	27	ECLK6	16	DI 15
EXTG6	09	28	COUT6	18	GND
ECLK7	10	29	EXTG7	20	+12 V
COUT7	11	30	ECLK8		
EXTG8	12	31	COUT8		
ECLK9	13	32	EXTG9		
COUT9	14	33	ECLK10		
EXTG10	15	34	COUT10		
ECLK11	16	35	EXTG11		
COUT11	17	36	ECLK12		
EXTG12	18	37	COUT12		
GND	19				

Pin Assignment	Terminal No.	Pin Assignment
DI 0	01	02
DI 2	03	04
DI 4	05	06
DI 6	07	08
DI 8	09	10
DI 10	11	12
DI 12	13	14
DI 14	15	16
GND	17	18
+5 V	19	20

Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	02
DO 2	03	04
DO 4	05	06
DO 6	07	08
DO 8	09	10
DO 10	10	12
DO 12	12	14
DO 14	14	16
GND	16	18
+5 V	18	20

## Ordering Information

PCI-TMC12A	PCI Bus, 12-channel Timer/Counter Board. Includes one CA-4002 D-sub Connector.
PCI-TMC12A CR	PCI Bus, 12-channel Timer/Counter Board (RoHS). Includes one CA-4002 D-sub Connector.

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PCI Bus Data Acquisition Boards

# 4. ISA Bus Data Acquisition Boards

## Multifunction Board Selection Guide

Model	A-826PG	A-823PGL A-823PGH	A-822PGL A-822PGH	A-821PGL A-821PGH	A-812PG	A-8111
Interface	ISA Bus					
<b>Analog Input</b>						
Channels	16 SE/ 8 Diff.	16 SE/ 8 Diff.	16 SE/ 8 Diff.	16 SE/ 8 Diff.	16 S.E.	8 S.E.
Resolution	16-bit	12-bit	12-bit	12-bit	12-bit	12-bit
Sampling Rate	100 kS/s	125 kS/s	125 kS/s	45 kS/s	62.5 kS/s	35 kS/s
<b>Analog Output</b>						
Channels	2	2	2	1	2	1
Resolution	12-bit	12-bit	12-bit	12-bit	12-bit	12-bit
<b>Digital I/O (5 V/TTL)</b>						
DI Channels	16	16	16	16	16	16
DO Channels	16	16	16	16	16	16
<b>Timer/Counter</b>						
Channels	3	3	3	3	3	3
Page	4-2					

## Isolated Data Acquisition Board Selection Guide

Model	ISO-AD32		ISO-813	ISA-DA		Model	ISO-P64	ISO-C64	ISO-P32C32	ISO-P32S32W	ISO-730	P8R8 DIO	P16R16 DIO
	L	H		8	16								
Interface	ISA Bus												
<b>Analog Input</b>													
Channels	32 SE/ 16 Diff.		32 SE	-		Channels	64	-	32	32	16	8	16
Resolution	12-bit		12-bit	-		Isolation Voltage	3750 V <sub>rms</sub>	-	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	5000 V <sub>rms</sub>	
Sampling Rate	200 kS/s		10 kS/s	-		Input Voltage	9 ~ 24 V	-	9 ~ 24 V	5 ~ 24 V	9 ~ 24 V	5 ~ 24 V	
Isolation Voltage	500 V <sub>rms</sub>		3000 V <sub>rms</sub>	-		<b>Isolated Digital Output</b>							
FIFO Size	1 kB		-	-		Channels	-	64	32	32	16	8	16
<b>Analog Output</b>													
Channels	-	-	-	8	16	Isolated Voltage	-	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	3750 V <sub>rms</sub>	-	
Isolated Voltage	-		-	2500 V <sub>DC</sub>		Compatibility	-	Sink	Sink	Sink	Sink	-	
Resolution	-		-	14-bit		Relay Type	-	-	-	-	-	4 SPDT, 4 SPST	8 SPDT, 8 SPST
Output Range	-		-	±10 V, 0~+20 mA		<b>Digital I/O (5 V/TTL)</b>							
Page	4-3					DI Channels	-	-	-	-	16	-	-
						DO Channels	-	-	-	-	16	-	-
						Page	4-3						

## Non-isolated Data Acquisition Board Selection Guide

Model	A-726	A-626	A-628	DIO-24	DIO-48	DIO-64/3	DIO-64/6	DIO-96	DIO-144	TMC-10
Interface	ISA Bus									
<b>Analog Output</b>										
Channels	6	6	8	-	-	-	-	-	-	-
Resolution	12-bit	12-bit	12-bit	-	-	-	-	-	-	-
<b>Digital I/O (5 V/TTL)</b>										
DI Channels	16	16	16	-	-	32	-	-	-	8
DO Channels	16	16	16	-	-	32	-	-	-	8
Programmable DI/O	-	-	-	24	48	-	-	96	144	-
<b>Timer/Counter</b>										
Channels	-	-	-	-	3	3	6	-	-	10
Page	4-4									



## 4-1 Multifunction Boards

### 16-channel, 100 kS/s 16-bit AD, 2-channel 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-826PG**

- ISA Bus Interface
- 16 Single-ended/8 Differential Analog Input Channels
- 16-bit, 100 kS/s Sampling Rate
- 2-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain: 0.5, 1, 2, 4, 8
- Trigger Mode: Software, Pacer, External, Event
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

### 16-channel, 125 kS/s 12-bit AD, 2-channel Unipolar/Bipolar 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-823PGL  
A-823PGH**

- ISA Bus Interface
- 16 Single-ended/8 Differential Analog Input Channels
- 12-bit, 125 kS/s Sampling Rate
- 2-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V, ±5 V, ±10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain:
  - PGL: 0.5, 1, 2, 4, 8
  - PGH: 0.5, 1, 5, 10, 50, 100, 500, 1000
- Trigger Mode: Software, Pacer, External, Event
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

### 16-channel, 125 kS/s 12-bit AD, 2-channel Unipolar 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-822PGL  
A-822PGH**

- ISA Bus Interface
- 16 Single-ended/8 Differential Analog Input Channels
- 12-bit, 125 kS/s Sampling Rate
- 2-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain:
  - PGL: 0.5, 1, 2, 4, 8
  - PGH: 0.5, 1, 5, 10, 50, 100, 500, 1000
- Trigger Mode: Software, Pacer, External, Event
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

### 16-channel, 45 kS/s 12-bit AD, 1-channel 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-821PGL  
A-821PGH**

- ISA Bus Interface
- 16 Single-ended/8 Differential Analog Input Channels
- 12-bit, 45 kS/s Sampling Rate
- 1-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain:
  - PGL: 1, 2, 4, 8
  - PGH: 1, 10, 100, 1000
- Trigger Mode: Software, Pacer
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

### 16-channel, 62.5 kS/s 12-bit AD, 2-channel 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-812PG**

- ISA Bus Interface
- 16 Single-ended Analog Input Channels
- 12-bit, 62.5 kS/s Sampling Rate
- 2-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain: 0.5, 1, 2, 4, 8
- Trigger Mode: Software, Pacer, External
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

### 8-channel, 35 kS/s 12-bit AD, 1-channel 12-bit DA and 16-channel TTL DIO Multifunction Board



**A-8111**

- ISA Bus Interface
- 8 Single-ended Analog Input Channels
- 12-bit, 35 kS/s Sampling Rate
- 1-channel, 12-bit Analog Output
- Analog Output Range: 0 ~ +5 V, 0 ~ +10 V
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Software Programmable Gain: 1, 2, 4, 8, 16
- Trigger Mode: Software, Pacer
- Data Transfer Mode: Polling, Interrupt
- 1-channel General-purpose Programmable 16-bit Counter/Timer

## 4-2 Isolated Data Acquisition Boards

### 32-channel, 12-bit, 200 kS/s Isolated Analog Input Board



**ISO-AD32L**  
**ISO-AD32H**

- ISA Bus Interface
- 32 Single-ended/16 Differential Analog Input Channels
- Built-in DC/DC Converter with 1000 V<sub>DC</sub> Isolation
- 5000 V<sub>rms</sub> Photo-isolation Protection
- 12-bit Sampling Rate, 200 kHz Max.
- Built-in 1 KB FIFO
- Gap-free AD Conversion
- Automatic Channel/Gain Scan

### 32-channel, 12-bit, 10 kS/s Isolated Analog Input Board



**ISO-813**

- ISA Bus Interface
- 32 Single-ended Analog Input Channels
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 3000 V<sub>rms</sub> Photo-isolation Protection
- 12-bit Sampling Rate, 10 kHz Max.
- Trigger Mode: Software
- Transfer Mode: Polling
- Programmable Gain: 1, 2, 4, 8, 16

### 8/16-channel, 14-bit, Isolated Analog Output Board



**ISO-DA8**  
**ISO-DA16**

- ISA Bus Interface
- 8/16-channel, 14-bit Analog Output
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 2500 V<sub>rms</sub> Photo-isolation Protection
- Software Calibration
- 0 ~ 20 mA Current Sink
- Double-buffered DA Latch

### 64-channel, Optically-isolated Digital I/O Board



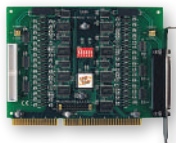
**ISO-C64**



**ISO-P64**

- ISA Bus Interface
- ISO-P64:
  - > 64-channel Optically-isolated DI
  - > Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- ISO-C64:
  - > 64-channel Optically-isolated Open-collector DO (Sink, NPN)
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Two Interrupt Sources

### 32-channel, Optically-isolated DI and 32-channel Optically-isolated Open-collector Output Board



**ISO-P32C32**

- ISA Bus Interface
- 32-channel Optically-isolated Open-collector Output (Sink, NPN)
- 32-channel Optically-isolated Digital Input
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- Two Interrupt Sources

### 32-channel, Optically-isolated DI and 32-channel Optically-isolated Open-collector Output Board (8-ch for 500 mA)



**ISO-P32S32W**

- ISA Bus Interface
- 32-channel Optically-isolated Open-collector Output (Sink, NPN)
  - > 100 mA (24-channel) Low Driving
  - > 500 mA (8-channel) High Driving
- 32-channel Optically-isolated Digital Input
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Two Interrupt Sources

### 32-channel, Isolated Digital I/O and 32-channel TTL Digital I/O Board



**ISO-730**

- ISA Bus Interface
- 16-channel Optically-isolated Open-collector Output (Sink, NPN)
- 16-channel Optically-isolated Digital Input
- 3750 V<sub>rms</sub> Photo-isolation Protection
- Built-in DC/DC Converter with 3000 V<sub>DC</sub> Isolation
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Two Interrupt Sources

### 8/16-channel, Isolated Digital Input and 8/16-channel Relay Output Board



**P8R8DIO**



**P16R16DIO**

- ISA Bus Interface
- 8/16-channel Optically-isolated Digital Input
- 8/16-channel Relay Output
- AC/DC Signal Input
- AC Signal Input with Filter
- Relay Status LED Indicators
- Power Requirements:
  - > 200 mA @ +5 V (Max.)
  - > 260 mA @ +12 V (Max.)

## 4-3 Non-isolated Data Acquisition Boards

### 6-channel, 12-bit Analog Output Board



**A-726**

- ISA Bus Interface
- 6-channel, 12-bit Analog Output
- Voltage Output Range:  
0 ~ +5 V, 0 ~ +10 V,  $\pm 5$  V,  $\pm 10$  V
- Current Output Range: 4 ~ 20 mA
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Connectors: 20-pin Box Header x 4

### 6-channel, 12-bit Analog Output Board



**A-626**

- ISA Bus Interface
- 6-channel, 12-bit Analog Output
- Voltage Output Range:  
0 ~ +5 V, 0 ~ +10 V,  $\pm 5$  V,  $\pm 10$  V
- Current Output Range: 4 ~ 20 mA
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Connectors: Female DB-37 x 1 and  
20-pin Box Header x 4

### 8-channel, 12-bit Analog Output Board



**A-628**

- ISA Bus Interface
- 8-channel, 12-bit Analog Output
- Voltage Output Range:  
0 ~ +5 V, 0 ~ +10 V,  $\pm 5$  V,  $\pm 10$  V
- Current Output Range: 4 ~ 20 mA
- 16-channel, 5 V/TTL Digital Input
- 16-channel, 5 V/TTL Digital Output
- Connectors: Female DB-37 x 1 and  
20-pin Box Header x 4

### 24-channel, OPTO-22 Compatible Digital I/O Board



**DIO-24**

- ISA Bus Interface
- 24-channel Digital Input/Output
- All I/O lines are buffered on the Board
- Emulates one Industrial-standard  
8255 PPI Ports (Mode 0)
- Direct Interface with OPTO-22  
Compatible I/O Modules
- Programmable Interrupt Source
- Supports Output Status Readback

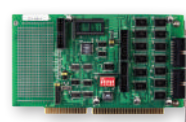
### 48-channel, OPTO-22 Compatible Digital I/O Board



**DIO-48**

- ISA Bus Interface
- 48-channel Digital Input/Output
- All I/O lines are buffered on the Board
- Emulates one Industrial-standard  
8255 PPI Ports (Mode 0)
- Direct Interface with OPTO-22  
Compatible I/O Modules
- 1-channel 16-bit Timer/Counter
- 4 Clock Sources
- Programmable Interrupt Source

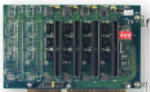
### 32-channel DI, 32-channel DO with Timer/Counter Board



**DIO-64/3  
DIO-64/6**

- ISA Bus Interface
- 32-channel Digital Input
- 32-channel Digital Output
- DIO-64/3: 3 Independent Programmable  
16-bit Down Counters
- DIO-64/6: 6 Independent Programmable  
16-bit Down Counters
- 4 Clock Sources
- 3 Frequency Dividers: 100, 10, 1
- 1-channel 16-bit Counter, 1-channel 32-bit Timer with a 4 MHz  
Clock Source
- Interrupt Source Triggers: Timer, Event, External

### 96/144-channel, OPTO-22 Compatible Digital I/O Board



**DIO-96**



**DIO-144**

- ISA Bus Interface
- DIO-96: 96-channel Digital Input/Output
- DIO-144: 144-channel Digital Input/Output
- Direct Interface with OPTO-22 Compatible  
I/O Modules
- Emulates 6/4 Industrial-standard 8255  
PPI Ports (Mode 0)
- Supports Output Status Readback
- Programmable Interrupt Source

### 10-channel, Timer/Counter Board



**TMC-10**

- ISA Bus Interface
- Four 8254 Timer/Counter Chips
- 2 Internal Clock Sources:  
8 MHz /1.6 MHz, and 0.8 MHz/80 kHz
- 8 Independent 16-bit Timers/Counters
- 8 External Clock Inputs
- 8 External Gate Control Signals
- 8-bit General purpose Digital Output
- 2 Cascaded 32-bit Timers/Counters
- 11 Jumper-selectable Interrupt Levels

# 5. Special Function Boards

## 5-1 Memory Board

### PCI-M512U

Universal PCI, 512 KB Memory Board with Digital I/O



#### Features

- Universal PCI (3.3 V/5 V) Interface
- Two Li-ion Batteries to prevent Loss of SRAM Data
- 16-channel, 5 V/TTL Digital Output
- 12-channel, 5 V/TTL Digital Input
- 512 KB SRAM Onboard
- LED Indicators to monitor Battery Status (Low Voltage/Fault)
- 4-bit Battery Status Readback (DI0~3)

#### Introduction

The PCI-M512U is a 512 KB SRAM Memory Board with battery backup and supports both the 3.3 V and the 5 V Universal PCI bus. The PCI-M512U provides 12 Digital Input channels and 16 Digital Output channels, and is designed as a direct replacement for the PCI version of the PCI-M512 board without requiring any modification to the software or the driver

The PCI-M512U is equipped with two Li-ion batteries to ensure that the content of the SRAM is maintained if a power loss occurs. The batteries can continue supplying power to the SRAM for 10 years, ensuring any important data is retained. The main benefit of the double-battery design is that either of the batteries can be replaced without losing data, so when one battery is removed, the other continues to provide power to the SRAM.

Four LED indicators are included on the board to provide a clear visual indication of whether the batteries are operating normally, whether the voltage is low, or whether the battery is bad or has encountered a fault. The PCI-M512U is an ideal solution for improving system reliability.

#### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
DO 0	01	○ ○	DO 1	02	
DO 2	03	○ ○	DO 3	04	
DO 4	05	○ ○	DO 5	06	
DO 6	07	○ ○	DO 7	08	
DO 8	09	○ ○	DO 9	10	
DO 10	10	○ ○	DO 11	12	
DO 12	12	○ ○	DO 13	14	
DO 14	14	○ ○	DO 15	16	
GND	16	○ ○	GND	18	
+5 V	18	○ ○	+12 V	20	

CN1

Pin Assignment	Terminal No.	Pin Assignment	Pin Assignment	Terminal No.	Pin Assignment
	01	○ ○	DI 4	05	
	03	○ ○	DI 6	07	
	05	○ ○	DI 8	09	
	07	○ ○	DI 10	11	
	09	○ ○	DI 12	13	
	11	○ ○	DI 14	15	
	13	○ ○	GND	17	
	15	○ ○	+5 V	19	
	17	○ ○		20	
	19	○ ○			

CN2



#### Software

##### Drivers

- 32/64-bit Windows XP/2003/2008/Vista/7/8  Linux

##### Sample Programs

- DOS Lib and TC/BC/MSC Demo  LabVIEW Toolkit  
 VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

#### Hardware Specifications

Digital Input	
Channels	12
Compatibility	5 V/TTL
Input Voltage	Logic 0: 0.8 V Max. Logic 1: 2.0 V Min.
Response Speed	1.4 MHz (Typical)
Digital Output	
Channels	16
Compatibility	5 V/TTL
Output Voltage	Logic 0: 0.4 V Max. Logic 1: 2.4 V Min.
Output Capability	Sink: 2.4 mA @ 0.8 V Source: 0.8 mA @ 2.0 V
Response Speed	1.4 MHz (Typical)
Special	
SRAM Size	512 KB
Li-ion Battery	BT1 and BT2
Battery Status Bits	BT1 Low, BT1 Bad, BT2 Low, BT2 Bad (Low Voltage = 2.3 V, Fault = 2.1 V)
LED Indicators	BT1 Low (Green), BT1 Bad (Red) BT2 Low (Green), BT2 Bad (Red)
General	
Bus Type	3.3 V/ 5 V Universal PCI, 32-bit, 33 MHz
Connectors	20-pin Box Header x2
Power Consumption	420 mA @ +5 V
Operating Temperature	-20°C to +60°C
Humidity	0 to 90% RH, Non-condensing

#### Ordering Information

PCI-M512U CR	Universal PCI, 512 KB Memory Board with DI/O (RoHS).
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## 5-2 Counter/Frequency Board

### PCI-FC16U

Universal PCI, 16-channel Counter/Frequency with 32-channel Programmable Digital I/O Board



### Features

- Universal PCI (3.3 V/5 V) Interface
- 32-channel Programmable Digital I/O
- 16-channel Up Counter or Frequency Measurement (Pulse Width = 2  $\mu$ s Min.)
- Digital Filter: 1 to 32767 ( $\mu$ s)
- Pull-high and Pull-low Resistors for DI Channels
- Supports Card ID (SMD Switch)

### Introduction

PCI-FC16U is a 32-bit hardware-type high-speed Counter/Frequency card that supports both the 3.3 V and the 5 V Universal PCI bus. The card provides 16 channels that can be individually configured for either frequency measurement or up-counter applications, and can support high-frequency signals up to 250 kHz. The PCI-FC16U also includes 32 programmable Digital I/O channels.

The PCI-FC16U card includes an onboard Card ID switch that enables the board to be recognized via software if two or more boards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined as either high or low instead of remaining floating if the DI channels are disconnected or interrupted.

### Software

- Drivers**
- 32/64-bit Windows XP/2003/2008/Vista/7/8
- Sample Programs**
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET Demo

### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment
C0+	01	C0-
C1+	02	C1-
C2+	03	C2-
C3+	04	C3-
C4+	05	C4-
C5+	06	C5-
C6+	07	C6-
C7+	08	C7-
N.C.	09	N.C.
C8+	10	C8-
C9+	11	C9-
C10+	12	C10-
C11+	13	C11-
C12+	14	C12-
C13+	15	C13-
C14+	16	C14-
C15+	17	C15-
N.C.	18	N.C.
N.C.	19	N.C.

Pin Assignment	Terminal No.	Pin Assignment
PB 0	01	PB 1
PB 2	03	PB 3
PB 4	05	PB 5
PB 6	07	PB 7
PB 8	09	PB 9
PB 10	10	PB 11
PB 12	12	PB 13
PB 14	14	PB 15
GND	16	GND
+5 V	18	+12 V

Pin Assignment	Terminal No.	Pin Assignment
PA 0	01	PA 1
PA 2	03	PA 3
PA 4	05	PA 5
PA 6	07	PA 7
PA 8	09	PA 9
PA 10	11	PA 11
PA 12	13	PA 13
PA 14	15	PA 15
GND	17	GND
+5 V	19	+12 V

### Hardware Specifications

Counter/Frequency		
Counter/Frequency	16-channel Up Counter 16-channel Frequency	
Resolution	32-bit	
Digital Noise Filter	1~32767 $\mu$ s	
Min. Pulse Width	2 $\mu$ s (250 kHz Max.)	
Isolated Input Level	ON Voltage	+4.5 ~ +30 V <sub>DC</sub>
	OFF Voltage	+1 V <sub>DC</sub> Max.
Isolation Voltage	2500 V <sub>DC</sub>	
ESD Protection	2 KV (Contact for each Channel)	
Programmable I/O		
Channels	32	
Digital I/O		
Input Voltage	Logic 0	0.8 V (Max.)
	Logic 1	2.0 V (Min.)
Output Voltage	Logic 0	0.4 V (Max.)
	Logic 1	2.4 V (Min.)
Output Capability	Sink	2.4 mA @ 0.8 V
	Source	0.8 mA @ 2.0 V
General		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1 20-pin Box Header x 2	
Power Consumption	700 mA @ +5 V	
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

### Ordering Information

PCI-FC16U CR	Universal PCI, 16-channel Counter/Frequency with 32-channel Programmable Digital I/O (RoHS). Includes one CA-4002 D-sub Connector.
--------------	--

5  
2  
Special Function Boards

# 5-3 Watchdog Boards

## WDT-01/WDT-02

### Intelligent Watchdog Timer Board



### Features

- No need to modify the original program
- Can be used in either an ISA bus or a printer port interface
- Early detection and warning prevents system failure in harsh environments
- Cost-effective Solution

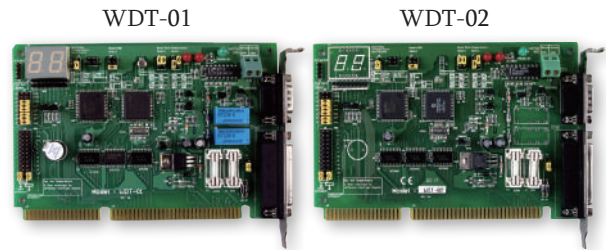
### Introduction

The WDT-01 and WDT-02 are watchdog cards that provide watchdog timer, temperature monitoring and power monitoring functions. They also provide a variety of signals and mechanisms, such as relay control, reset signal, and power-good signal, which allow the system to be controlled as soon as an error occurs. There are also many signals available, such as IRQ, I/O status, RS-232, LED, and Buzzer, etc., to advise the user or operator that an error has occurred. Once the WDT-01 has been powered on, it will automatically monitor the power and the temperature of the PC.

After enabling the WDT-01 via software, the watchdog timer will monitor the software and hardware operations, providing the most cost-efficient solution with high-quality protection. The WDT-02 provides the same functionality as the WDT-01, but is a lower-cost version.

### Pin Assignments

Pin Assignment	Terminal	No.	Pin Assignment	Terminal	No.
GND	05	09	NC	NO_TIM	01
NC	04	08	NC	NC_TIM	02
NC	03	07	NC	TIM_COM	03
TxD	02	06	NC	Reserved	04
NC	01			NO_TEM	05
				NC_TEM	06
				TEM_COM	07
				Reserved	08
				SPK_OUT	09
				NH_TEM	10
				NL_TIM	11
				EX_GND	12
				EX_12 V	13
					14
					15
					16
					17
					18
					19
					20
					21
					22
					23
					24
					25



### Software

#### Drivers

- Windows 95/98/NT/200
- Linux
- 32-bit Windows XP
- DOS

### Hardware Specifications

Analog Input		
Watchdog Timer	Software programmable from 0.01 second to 167772.15 seconds	
Computer Power Monitor	PC Power +5 V	
	External Power +12 V	
RS-232 Output (Speed)	9600/4800/2400/1200 bps	
Printer-like I/O Interface	LPT0 (3bch), LPT1 (378h), LPT (278h) or user-defined ports	
IRQ	3/4/5/6/7/9/10/11/12/14/15	
4-bit TTL Output		
Output Voltage	Logic 0	0.5 V <sub>DC</sub> (Max.)
	Logic 1	24 V <sub>DC</sub> (Min.)
Output Capability	Sink	-10 mA
	Source	400 μA
Two Relay for Watchdog or Temperature Failure	Contacts: FORM c.	
Max. Switched Current	1 A 30 V <sub>DC</sub>	
Max. Switched Voltage	120 V <sub>AC</sub> /60 V <sub>DC</sub>	
Max. Carry Current	1.25 AC/DC	
General		
Bus Type	ISA bus	
Connectors	Male DB9 x 1; Male DB25 x 1	
Power Required	External	3 W @ +12 V
	Internal	3 W @ +12 V
Operating Temperature	0°C to +60°C	
Humidity	5 to 85% RH, Non-condensing	

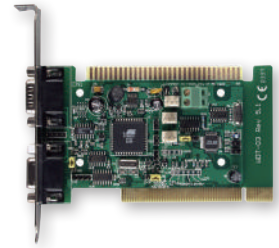
Output Signals			
Signal/Function	WDT Timeout	Over-temperature Protection	Power Failure
Reset	✓	✗	✗
IRQ	✓	✓	✗
I/O Status	✓	✓	✓
Relay	✓	✓	✗
TTL	✓	✓	✗
LED	✓	✓	✓
RS-232	✓	✓	✓
Buzzer	✓	✓	✓

### Ordering Information

WDT-01	Intelligent Watchdog Timer Card with Terminal Board and 1 meter Cable. Includes one CA-0205 (2-pin Black & Red Cable, 0.5 m) and one CA-2520 (25-pin D-sub Cable, 2.0 m).
WDT-02	Intelligent Watchdog Timer Card (No Terminal Board, Cable, Buzzer Relay, LED, or Temperature Sensor). Includes one CA-0205 (2-pin Black & Red Cable, 0.5 m) and one CA-2520 (25-pin D-sub Cable, 2.0 m).

# WDT-03

## Intelligent Watchdog Timer Board



### Features ▶▶▶▶

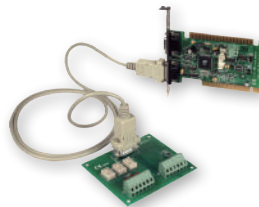
- No need to modify the original program
- Can be used in ISA bus, PCI bus or any system with an RS-232 interface
- Early detection and warning prevents system failure in harsh environments
- Cost-effective Solution

### Introduction

PC hardware and/or software may sometimes fail for whatever reason. To prevent failure, a wide variety of different solutions have been proposed. However, none of these solutions can offer a 100% assurance. Since preventing a failure is difficult, detecting a failure becomes increasingly important. The WDT-03 is used to detect failures in both the software and the hardware, and can also be used to reduce the risks involved in potential PC failures. The WDT-03 is useful even for those systems that include a built-in watchdog circuit.

The WDT-03 includes a software utility for windows that can be used to monitor the status of the system. If the system malfunctions, the WDT-03 can send an alarm via the Digital Output, and if the system fails, the WDT-03 can automatically reset the system. The WDT-03 Utility is executed when Windows starts and can be accessed from the Taskbar Notification Area ("System Tray"). On a Windows NT system, the WDT-03 utility will record an event so that, when Windows NT is restarted, the system automatically logs into the administrator account. The WDT-03 Utility uses very few system resources, but can be used to monitor a variety of the system information, such as the voltage, the temperature, and the fan speed and system errors.

The WDT-03 is able to control a 3-channel Digital Input terminal and a 3-channel signal relay output from its attached DB-3R daughterboard.



### Software

#### Drivers

- Windows 95/98/NT/200
- 32-bit Windows XP
- Linux
- DOS

### Pin Assignments

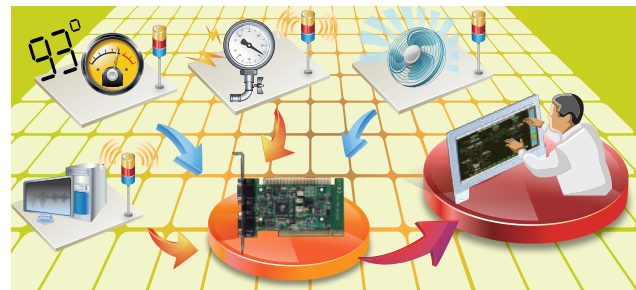
Pin Assignment	Terminal	No.	Pin Assignment	Pin Assignment	Terminal	No.	Pin Assignment
GND	05	09	NC	GND	05	09	DO_3
NC	04	08	NC	DO_2	04	08	DO_1
RxD	03	07	NC	Power	03	07	DI_1
TxD	02	06	NC	TxD	02	06	DI_2
NC	01			DI_3	01	06	DI_2

CN1 (RS-232) 9-pin Male D-sub Connector

CN2 (RS-232) 9-pin Female D-sub Connector

### Ordering Information

WDT-03	Intelligent Watchdog Timer Card. Includes one CA-0205 (2-pin Black and Red Cable, 0.5 m) and one CA-0910F (9-pin Female-Female D-sub Cable, 1.0 m).
--------	---



### Hardware Specifications

Interface	RS-232 x 1 for Local CPU RS-232 x 1 for Remote Host (for monitoring the Local) Four through-hole mounting for any system with RS-232
Watchdog Timer	Enabled/Disabled via Software; from 0.03 to 1966.05 seconds
Baud Rate	2400 ~ 115200 bps
Data Bit	8
Stop Bit	1
Parity	None
Bus Voltage Monitoring	-12 V, -5 V, +3.3 V, +5 V, +12 V
Fan Speed Monitoring	3 channels
Temperature Monitoring	3 channels
EEPROM	63 Bytes
Read/Write Cycles	100,000 Times
Reset Mechanism	Power-good Signal for the PC System Reset Signal that simulates when an external Reset Key is pressed
<b>General</b>	
Bus Type	ISA bus and PCI bus
Connectors	Male DB9 x 1 Female DB9 x 1
Power Consumption	2 W
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

# 6. Daughter Boards and Accessories

## 6-1 Daughter Boards (Screw Terminal Boards)

### Digital I/O Daughter Board Selection Guide

★: Full-function Support    ☆: Uses a 20-pin Header, 16-channel Support only (Cable Option: /F)

Model	DB-16R	DB-24R	DB-24PR	DB-24C	DB-24OD	DB-24POR	DB-24SSR	DB-16P8R	DB-16P	DB-24P
<b>Function</b>	Digital Output (DO)							DI/DO	Digital Input (DI)	
DIN-Rail Mounting	-	Option	Option	Option	Option	Option	Option	Option	Option	-
<b>Page</b>	<b>6-4</b>	<b>6-4</b>	<b>6-4</b>	<b>6-4</b>	<b>6-4</b>	<b>6-5</b>	<b>6-5</b>	<b>6-5</b>	<b>6-4</b>	<b>6-4</b>
<b>PCI Express/PCI Bus, Non-isolated AD, DA Board</b>										
PEX-1002L/H	★	-	☆	☆	☆	☆	-	-	★	-
PEX-1202L/H	★	-	☆	☆	☆	☆	-	-	★	-
PEX-DA4/DA8/DA16	★	-	☆	☆	☆	☆	-	-	★	-
PCI-1802LU/HU	★	-	☆	☆	☆	☆	-	-	★	-
PCI-1800LU/HU	★	-	☆	☆	☆	☆	-	-	★	-
PCI-1602U/FU	★	-	☆	☆	☆	☆	-	-	★	-
PCI-1202LU/HU	★	-	☆	☆	☆	☆	-	-	★	-
PCI-1002LU/HU	★	-	☆	☆	☆	☆	-	-	★	-
PIO-821H/L	★	-	☆	☆	☆	☆	-	-	★	-
PIO-DA4U/DA8U/DA16U	★	-	☆	☆	☆	☆	-	-	★	-
PISO-DA4U/DA8U/DA16U	★	-	☆	☆	☆	☆	-	-	★	-
<b>PCI Express/PCI Bus, Digital I/O Board</b>										
PEX-D24	-	★	★	★	★	★	★	★	-	★
PEX-D48	-	★	★	★	★	★	★	★	-	★
PEX-D56	★	★	☆	★	★	★	★	★	★	★
PEX-730	★	-	☆	☆	☆	☆	-	-	★	-
PIO-D24U	-	★	★	★	★	★	★	★	-	★
PIO-D48U	-	★	★	★	★	★	★	★	-	★
PIO-D56U	★	★	☆	★	★	★	★	★	★	★
PIO-D64U	★	-	☆	☆	☆	☆	-	-	★	-
PIO-D96U	-	★	★	★	★	★	★	★	-	★
PIO-D144U/D144LU	-	★	★	★	★	★	★	★	-	★
PIO-D168U	-	★	★	★	★	★	★	★	-	★
PCI-M512U	★	-	☆	☆	☆	☆	-	-	★	-
PISO-730U/730-5V	★	-	☆	☆	☆	☆	-	-	★	-
PISO-730A(-5V)	★	-	☆	☆	☆	☆	-	-	★	-
PCI-TMC12A	★	-	☆	☆	☆	☆	-	-	★	-
<b>ISA Bus, Non-isolated AD, DA Board</b>										
A-826PG	★	-	☆	☆	☆	☆	-	-	★	-
A-823PGL/PGH	★	-	☆	☆	☆	☆	-	-	★	-
A-822PGL/PGH	★	-	☆	☆	☆	☆	-	-	★	-
A-821PGL/PGH	★	-	☆	☆	☆	☆	-	-	★	-
A-812PG	★	-	☆	☆	☆	☆	-	-	★	-
A-8111	★	-	☆	☆	☆	☆	-	-	★	-
A-726/626/628	★	-	☆	☆	☆	☆	-	-	★	-
<b>ISA Bus, Isolated DA Board</b>										
ISO-DA8/DA16	★	-	☆	-	-	☆	-	-	★	-
<b>ISA Bus, Digital I/O Board</b>										
DIO-96/144	-	★	★	★	★	★	★	★	-	★
DIO-64	★	-	☆	☆	☆	☆	-	-	★	-
DIO-48	-	★	★	★	★	★	★	★	-	★
DIO-24	-	★	★	★	★	★	★	★	-	★
ISO-730	★	-	☆	☆	☆	☆	-	-	★	-





## General Purpose Daughter Board Selection Guide for PCI Bus I/O Boards

●: Recommended Daughter Board    ○: Connects to 20-pin Header only (Digital I/O)

Model	DB-32R DB-16P16R	DB-8025	DB-8125	DB-8225	DB-8325	DB-8425	DB-1825	DB-889D	DB-37	DN-20	DN-37	DN-50	DN-68A	DN-100	
<b>Function</b>	Relay Output	Analog Input Screw Terminal Board							MUX		General Purpose Screw Terminal Board				
DIN-Rail Mounting	Option	-	-	Option	-	-	Option	-	-	Standard					
<b>Page</b>	<b>6-4</b>	<b>6-5</b>	<b>6-5</b>	<b>6-5</b>	<b>6-6</b>	<b>6-6</b>	<b>6-5</b>	<b>6-5</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	
<b>PCI Express/PCI Bus, Non-isolated AD, DA Board</b>															
PEX-1002L/H	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PEX-1202L/H	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PEX-DA4/DA8/DA16	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PCI-2602U	-	-	-	-	-	-	-	-	-	-	-	-	●	-	
PCI-1802LU/HU	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PCI-1800LU/HU	-	○	○	●	-	-	-	●	●	○	●	-	-	-	
PCI-1602U/FU	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PCI-1202LU/HU	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PCI-1002LU/HU	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PCI-822LU/826LU	-	○	○	-	-	-	●	-	●	○	●	-	-	-	
PIO-821H/L	-	○	○	●	-	-	-	●	●	○	●	-	-	-	
PIO-DA4U/DA8U/DA16U	-	○	○	-	-	-	-	-	●	○	●	-	-	-	
<b>PCI Bus, Isolated AD, DA Board</b>															
PISO-813	-	-	-	-	●	-	-	-	●	-	●	-	-	-	
PISO-DA2U	-	-	-	-	-	●	-	-	-	-	-	-	-	-	
PISO-DA4U/DA8U/DA16U	-	○	○	-	-	-	-	-	●	-	●	-	-	-	
<b>PCI Express/PCI Bus, Isolated Digital I/O Board</b>															
PEX-P8R8i/P16R16i	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-P8POR8i/P16POR16i	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-P64(-24V)	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-C64	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-P32C32/P32A32	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-730	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PCI-P16R16U	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PCI-P16C16	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PCI-P16POR16U	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-P8R8U/P8SSR8	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-P32A32U(-5V)	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-P32C32U(-5V)	●DB-16P16R	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-P64U(-24V)	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-C64U	●DB-32R	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-A64	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PISO-730U(-5V)	-	○	○	-	-	-	-	-	●	○	●	-	-	-	
PISO-730A(-5V)	-	○	○	-	-	-	-	-	●	○	●	-	-	-	
PISO-725	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
<b>PCI Express/PCI Bus, Digital I/O Board</b>															
PEX-D24	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PEX-D48	-	-	-	-	-	-	-	-	●	-	●	●	-	-	
PEX-D56	-	○	○	-	-	-	-	-	●	○	●	●	-	-	
PEX-D96S	-	-	-	-	-	-	-	-	-	-	-	-	-	●	
PEX-D144S	-	-	-	-	-	-	-	-	-	-	-	●	-	●	
PIO-D24U	-	-	-	-	-	-	-	-	●	-	●	-	-	-	
PIO-D48U	-	-	-	-	-	-	-	-	●	-	●	●	-	-	
PIO-D48SU	-	-	-	-	-	-	-	-	-	-	-	-	-	●	
PIO-D56U	-	○	○	-	-	-	-	-	●	○	●	●	-	-	
PIO-D64U	-	●	●	-	-	-	-	-	●	●	●	-	-	-	
PIO-D96U	-	-	-	-	-	-	-	-	●	-	●	●	-	-	
PIO-D96SU	-	-	-	-	-	-	-	-	-	-	-	-	-	●	
PIO-D144U/D144LU	-	-	-	-	-	-	-	-	●	-	●	●	-	-	
PIO-D168U	-	-	-	-	-	-	-	-	●	-	●	●	-	-	
PCI-M512	-	●	●	-	-	-	-	-	-	●	-	-	-	-	
<b>PCI Bus, Timer/Counter Board</b>															
PCI-TMC12A	-	○	○	-	-	-	-	-	●	○	●	-	-	-	



## General Purpose Daughter Board Selection Guide for ISA Bus I/O Boards

●: Recommended Daughter board ○: Connects to 20-pin Header only (Digital I/O)

Model	DB-32R DB-16P16R	DB-8025	DB-8125	DB-8225	DB-8325	DB-1825	DB-889D	DB-37	DN-20	DN-25	DN-37	DN-50	
<b>Function</b>	Relay Output	Analog Input Screw Terminal Board					MUX		General Purpose Screw Terminal Board				
DIN-Rail Mounting	Option	-	-	Option	-	Option	-	Option	Standard				
<b>Page</b>	<b>6-4</b>	<b>6-5</b>	<b>6-5</b>	<b>6-5</b>	<b>6-6</b>	<b>6-5</b>	<b>6-5</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	<b>6-6</b>	
<b>ISA Bus, Non-isolated AD, DA Board</b>													
A-826PG	-	○	○	●	-	-	●	●	○	-	●	-	
A-823/822/821 PGL/PGH	-	○	○	●	-	-	●	●	○	-	●	-	
A-812PG	-	●	●	-	-	-	-	-	●	-	-	-	
A-8111	-	○	○	●	-	-	●	●	○	-	●	-	
A-628/626	-	○	○	-	-	-	-	●	○	-	●	-	
A-726	-	○	○	-	-	-	-	-	●	-	-	-	
<b>ISA Bus, Isolated AD, DA Board</b>													
ISA-AD32L/H	-	-	-	-	-	●	-	●	-	-	●	-	
ISO-813	-	-	-	-	●	-	-	●	-	-	●	-	
ISO-DA8/DA16	-	○	○	-	-	-	-	●	○	-	●	-	
<b>ISA Bus, Isolated Digital I/O Board</b>													
P16R16DIO/P8R8DIO	-	-	-	-	-	-	-	●	-	-	●	-	
ISO-P32C32	●DB-16P16R	-	-	-	-	-	-	●	-	-	●	-	
ISO-P64	-	-	-	-	-	-	-	●	-	-	●	-	
ISO-C64	●DB-32R	-	-	-	-	-	-	●	-	-	●	-	
ISO-730	-	○	○	-	-	-	-	●	○	-	●	-	
<b>PCI Express/PCI Bus, Digital I/O Board</b>													
DIO-24/48	-	-	-	-	-	-	-	-	-	-	-	●	
DIO-64	-	●	●	-	-	-	-	●	●	●	-	-	
DIO-96/144	-	-	-	-	-	-	-	-	-	-	-	●	
<b>ISA Bus, Timer/Counter Board</b>													
TMC-10	-	-	-	-	-	-	-	●	-	-	●	-	



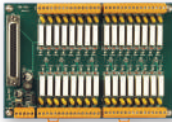
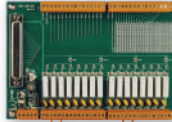
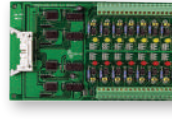
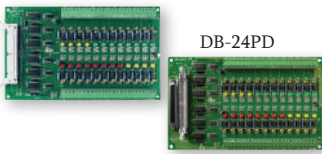
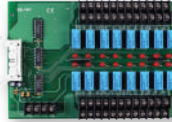
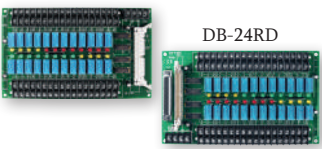
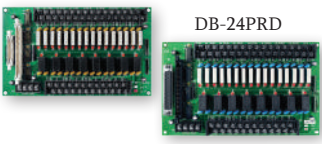
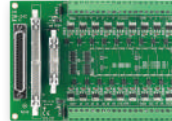
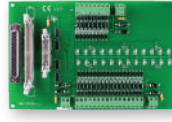
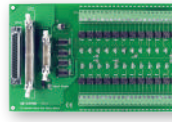
## Option Table for Digital I/O Daughter Boards

Model	External Power Input (Relay Coil Voltage)		Cable Option				Without DIN-Rail Mount	With DIN- Rail Mount (/DIN)	Remarks
	/12 V	/24 V	CA-5015	CA-3710	CA-2010	/D	/F	/DIN	
DB-24R	✓	✓	✓	-	-	-	✓	✓	Example:  <b>1. DB-24PRD/24V/DIN:</b> DB-24PRD, with 24 V Coil Voltage, 37-pin D-sub Cable and DIN-Rail Mounting.  <b>2. DB-24PR/12/DIN:</b> DB-24PR, with 12 V Coil Voltage, 50-pin Flat Cable and DIN-Rail Mounting.  <b>3. DB-16P8R/D/DIN:</b> DB-16P8R, with 37-pin D-sub Cable and DIN-Rail Mounting.
DB-24RD	-	-	-	✓	-	-	✓	✓	
DB-24PR	✓	✓	✓	-	-	✓	✓	✓	
DB-24PRD	✓	✓	-	✓	-	-	✓	✓	
DB-24C	-	-	✓	-	✓	✓	✓	✓	
DB-24SSR	-	-	✓	-	✓	-	✓	✓	
DB-24POR	-	-	✓	-	✓	✓	✓	✓	
DB-16P8R	-	-	✓	-	✓	✓	✓	✓	
DB-24P	-	-	✓	-	-	-	✓	✓	
DB-24PD	-	-	-	✓	-	-	✓	✓	



## Option Table for Daughter Boards

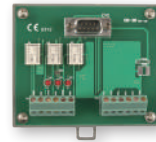
Model	1 Meter Cable	2 Meter Cable	Without DIN-Rail Mount		With DIN-Rail Mount		Remarks
	-	/2	-	/N	-	/DIN	
DB-8225	✓	✓	✓	-	-	✓	Example:  <b>1. DN-37/N:</b> DN-37 without DIN-Rail Mounting.  <b>2. DB-1825/2/DIN:</b> DB-1825, with 37-pin D-sub Cable (2 m) and DIN-Rail Mounting.
DB-1825	✓	✓	✓	-	-	✓	
DB-8325	✓	✓	-	-	-	-	
DB-8425	-	-	✓	-	-	✓	
DN-20	✓	-	-	✓	✓	-	
DN-25	✓	-	-	✓	✓	-	
DN-37	✓	✓	-	✓	✓	-	
DN-50	✓	-	-	✓	✓	-	

<p><b>DB-32R</b> 32-channel Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 32-channel Relay Output (Form A)</li> <li>⊗ LED Indicator for Relay Status</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul> <ul style="list-style-type: none"> <li>⊗ The DB-32R uses a DB37 Connector to control 32 Form A Relay channels for use with PISO-C64 and ISO-C64 Boards.</li> </ul>	
<p><b>DB-16P16R</b> 16-channel Input Terminal and 16-channel Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 16-channel Digital Input (Pin-to-Pin)</li> <li>⊗ 16-channel Relay Output (Form A)</li> <li>⊗ LED Indicator for Relay Status</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul> <ul style="list-style-type: none"> <li>⊗ The DB-16P16R uses a DB37 Connector to control 16 Form A Relay channels and a 16-channel Input Terminal for use with PISO-P32C32 and ISO-P32C32 Boards.</li> </ul>	
<p><b>DB-16P</b> 16-channel Bi-directional Isolated Input Board</p> <ul style="list-style-type: none"> <li>⊗ 16-channel Optically-isolated Input</li> <li>⊗ AC/DC Signal Input</li> <li>⊗ AC Signal Input with Filter</li> </ul> <ul style="list-style-type: none"> <li>⊗ Input Buffer with Voltage Comparators</li> <li>⊗ 3000 V Isolation Voltage</li> <li>⊗ Input Status LED Indicators</li> </ul>	
<p><b>DB-24P/DB-24PD</b> 24-channel Bi-directional Isolated Input Board</p> <ul style="list-style-type: none"> <li>⊗ 24-channel Optically-isolated Input</li> <li>⊗ AC/DC Signal Input</li> <li>⊗ AC Signal Input with Filter</li> <li>⊗ Input Buffer with Voltage Comparators</li> </ul> <ul style="list-style-type: none"> <li>⊗ 3000 V Isolation Voltage</li> <li>⊗ Input Status LED Indicators</li> <li>⊗ DB-24PD includes one CA-3710 Cable</li> <li>⊗ DB-24P includes one CA-5015 Cable</li> </ul>	<p>DB-24P</p>  <p>DB-24PD</p>
<p><b>DB-16R</b> 16-channel Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 16 Form C Relay Output Channels</li> <li>⊗ Relay Output Status LED Indicators</li> </ul> <ul style="list-style-type: none"> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul>	
<p><b>DB-24R/DB-24RD</b> 24-channel Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 24 Form C Relay Output Channels</li> <li>⊗ Relay Output Status LED Indicators</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul> <ul style="list-style-type: none"> <li>⊗ DB-24R includes one CA-5015 Cable</li> <li>⊗ DB-24RD includes one CA-3710 Cable</li> </ul>	<p>DB-24R</p>  <p>DB-24RD</p>
<p><b>DB-24PR/DB-24PRD</b> 24-channel Power Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 8 Form C Relay Output Channels</li> <li>⊗ 16 Form A Relays Output Channels</li> <li>⊗ Relay Output Status LED Indicators</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul> <ul style="list-style-type: none"> <li>⊗ Built-in Varistors protect the Input Channels from being damaged by External High-voltage Spikes</li> </ul>	<p>DB-24PR</p>  <p>DB-24PRD</p>
<p><b>DB-24C</b> 24-channel Open-collector Output Board</p> <ul style="list-style-type: none"> <li>⊗ 24 Open-collector Output Channels (NPN)</li> <li>⊗ Max. Load Voltage: 30 V<sub>DC</sub></li> <li>⊗ Max. Load Current: 600 mA/Channel</li> </ul> <ul style="list-style-type: none"> <li>⊗ Output Status LED Indicators</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul>	
<p><b>DB-240D</b> 24-channel Open-drain Output Board</p> <ul style="list-style-type: none"> <li>⊗ 24-channel Open-drain Output</li> <li>⊗ Max. Load Current: 400 mA/Channel</li> <li>⊗ Max. Load Voltage: 35 V<sub>DC</sub></li> </ul> <ul style="list-style-type: none"> <li>⊗ Output Status LED Indicators</li> </ul>	
<p><b>DB-24POR</b> 24-channel PhotoMos Relay Output Board</p> <ul style="list-style-type: none"> <li>⊗ 24 Form A PhotoMos Relay Output Channels</li> <li>⊗ Switch up to 0.13 A @ 350 V<sub>AC</sub> (Max.)</li> <li>⊗ 5 V<sub>DC</sub> Logic Level</li> </ul> <ul style="list-style-type: none"> <li>⊗ 5000 V Optical Isolation</li> <li>⊗ Relay Output Status LED Indicators</li> <li>⊗ Screw Terminals for easy Field Wiring</li> </ul>	

### DB-3R

#### Daughterboard for WDT-03

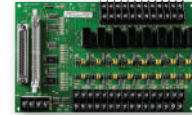
- ⊗ 3-channel Relay Output (Form A)
- ⊗ 3-channel Digital Input
- ⊗ The DB-3R is equipped with one DB9 connector and 3 Relay Output Channels



### DB-16P8R

#### 16-channel Isolated Digital Input and 8-channel Relay Output Board

- ⊗ 16 OPTO-isolated Digital Input Channels
- ⊗ 8 Form C Relay Output channels (SPDT)
- ⊗ Switch up to 5 A @ 250 V<sub>AC</sub>/30 V<sub>DC</sub>
- ⊗ Input and Output Status LED Indicators
- ⊗ Voltage Input or Dry Contact Input Mode
- ⊗ Optional Varistors protect the Input Channels from being damaged by External High-voltage Spikes
- ⊗ Screw Terminals for easy Field Wiring

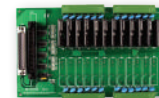


### DB-12SSR/DB-24SSR/DB-24SSRDC

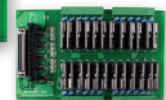
#### 12/24-channel Solid-state (AC/DC) Relay Output Board

- ⊗ DB-12SSR/DB-24SSR:
  - 12/24 Form A Solid-state (AC) Relay Output Channels
  - Switch up to 4 A @ 250 V<sub>AC</sub>
- ⊗ 5 V<sub>DC</sub> Logic Level
- ⊗ 2500 V Optical Isolation
- ⊗ DB-24SSRDC:
  - 24 Form A Solid-state (DC) Relay Output Channels
  - Switch up to 4 A @ 50 V<sub>DC</sub>
- ⊗ Relay Output Status LED Indicators
- ⊗ Screw Terminals for easy Field Wiring

DB-12SSR



DB-24SSR  
DB-24SSRDC



### DB-889D

#### 16-channel Analog Multiplexer Board

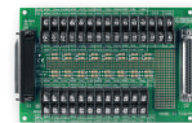
- ⊗ 16-channel Differential Analog Input
- ⊗ Input Filtering
- ⊗ Connects directly to A-82x and PCI-1800 Series Boards
- ⊗ Cold-junction Compensation for Thermocouples, Thermocouple Open Detection Daisy chain up to eight DB-889D Daughter Boards



### DB-1825

#### Daughterboard for PCI-1802 with 1 Meter DB37 Cable

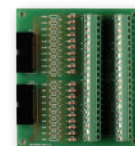
- ⊗ 32 Single-ended/16 Differential
- ⊗ Screw Terminal Board using a DB37 Connector for PEX/PCI-1202, PCI-1602, PCI-1802, PCI-822 and PCI-826 Series Boards
- ⊗ Blank Pads for Break Detection, Low-pass Filter, Current Shut and Voltage Attenuation



### DB-8025

#### Daughterboard with two 20-pin Flat Cables

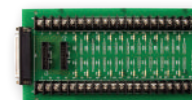
- ⊗ Two 20-pin Box Header Connectors
- ⊗ Blank Pads for Break Detection, Low-pass Filter, Current Shut and Voltage Attenuation



### DB-8125

#### Daughterboard with 1 m DB37 Cable

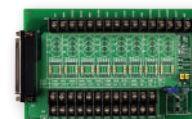
- ⊗ Screw Terminal Board using two 20-pin Cable Connectors or one DB37 Connector
- ⊗ Blank Pads for Break Detection, Low-pass Filter, Current Shut and Voltage Attenuation



### DB-8225

#### Daughterboard for A-82x/PCI-1800 Series with 1 m DB37 Cable

- ⊗ 16 Single-ended/8 Differential Input Channels
- ⊗ Blank Pads for Break Detection, Low-pass Filter, Current Shut and Voltage Attenuation
- ⊗ Onboard Cold-junction Circuit on AI Channel 1 (Single-ended or Differential)
- ⊗ Includes one DB37 Connector for A-82x and PCI-1800 Series Boards

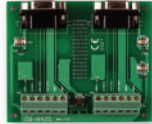
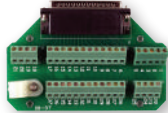
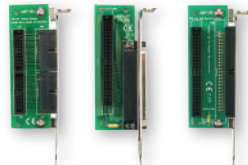
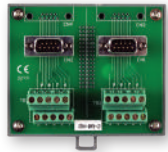
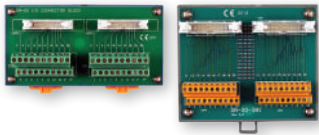
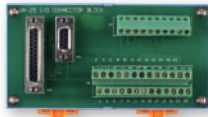
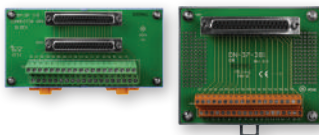
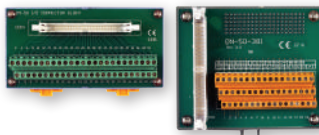
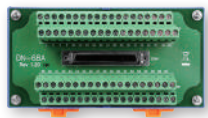
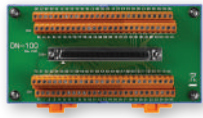


### DB-8325






#### Daughterboard with 1 m DB37 Cable


- ⊗ The DB-8325 includes one DB37 Connector for ISO-813 or PISO-813 Series Boards
- ⊗ Blank Pads for Break Detection, Low-pass Filter, Current Shut and Voltage Attenuation

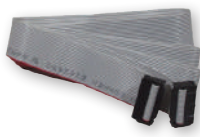






<p><b>DB-8425</b> Daughterboard for PISO-DA2U with 1.5 m DB9 Cable</p> <ul style="list-style-type: none"> <li>Pin-to-Pin Screw Terminal for PISO-DA2U Boards</li> <li>Screw Terminals for easy Field Wiring with DB9 Connector</li> </ul>	
<p><b>DB-37</b> Direct Connection Board</p> <ul style="list-style-type: none"> <li>Pin-to-Pin Screw Terminal for any I/O Board that uses a DB37 Connector</li> </ul>	
<p><b>ADP-20/ADP-37/ADP-50</b> Connector Extender</p> <ul style="list-style-type: none"> <li>ADP-20: 20-pin to 20-pin Connector Extender for PCI/ISA Board and includes one CA-2002 Cable</li> <li>ADP-37: 50-pin OPTO-22 Connector to Female DB37 Connector Extender for PCI/ISA Board and include one CA-5002 Cable</li> <li>ADP-50: 50-pin to 50-pin Connector Extender for PCI/ISA Board and include one CA-5002 Cable</li> </ul>	<p>ADP-20    ADP-37    ADP-50</p> 
<p><b>DN-09-2/DN-09-2F</b> I/O Connector Block with DIN-Rail Mounting and two DB9 Male Headers</p> <ul style="list-style-type: none"> <li>Two Male DB9 Connectors</li> <li>DN-09-2 includes two CA-0915 Cables</li> <li>DN-09-2F includes two CA-0910F Cables</li> <li>Pitch: 5.08 m/m</li> <li>Pin-to-Pin Screw Terminal</li> </ul>	
<p><b>DN-20/DN-20-381</b> I/O Connector Block with DIN-Rail Mounting and two 20-pin Headers</p> <ul style="list-style-type: none"> <li>Two 20-pin Headers</li> <li>Includes one CA-2010 Cable</li> <li>Pin-to-Pin Screw Terminal</li> <li>Pitch: <ul style="list-style-type: none"> <li>DN-20: 5.08 mm</li> <li>DN-20-381: 3.81 mm</li> </ul> </li> </ul>	<p>DN-20    DN-20-381</p> 
<p><b>DN-25</b> I/O Connector Block with DIN-Rail Mounting and DB9/DB25 Connector</p> <ul style="list-style-type: none"> <li>One DB9 Connector</li> <li>One DB25 Connector</li> <li>Includes one CA-0920 Cable and one CA-2520 Cable</li> <li>Pin-to-Pin Screw Terminal</li> <li>Pitch: 5.08 mm</li> </ul>	
<p><b>DN-37/DN-37-381</b> I/O Connector Block with DIN-Rail Mounting and DB37 Connector</p> <ul style="list-style-type: none"> <li>DN-37 contains two DB37 Connectors</li> <li>DN-37-381 contains one DB37 Connector</li> <li>Pin-to-Pin Screw Terminal</li> <li>Includes one CA-3710 DB37 Cable</li> <li>Pitch: <ul style="list-style-type: none"> <li>DN-37: 5.08 mm</li> <li>DN-37-381: 3.81 mm</li> </ul> </li> </ul>	<p>DN-37    DN-37-381</p> 
<p><b>DN-50/DN-50-381</b> I/O Connector Block with DIN-Rail Mounting and 50-pin Header</p> <ul style="list-style-type: none"> <li>One 50-pin Header</li> <li>Pin-to-Pin Screw Terminal</li> <li>Includes one CA-5015 Cable</li> <li>Pitch: <ul style="list-style-type: none"> <li>DN-50: 5.08 mm</li> <li>DN-50-381: 3.81 mm</li> </ul> </li> </ul>	<p>DN-50    DN-50-381</p> 
<p><b>DN-68A</b> I/O Connector Block with DIN-Rail Mounting and 68-pin SCSI II Header</p> <ul style="list-style-type: none"> <li>One 68-pin SCSI II Female Connector</li> <li>Screw Terminals for easy Field Wiring</li> <li>Pin-to-Pin Screw Terminal</li> </ul>	<p><b>NEW</b></p> 
<p><b>DN-100</b> I/O Connector Block with DIN-Rail Mounting and 100-pin SCSI II Header</p> <ul style="list-style-type: none"> <li>One 100-pin SCSI II Female Connector</li> <li>Screw Terminals for easy Field Wiring</li> <li>Pitch: 3.81 mm</li> <li>Pin-to-Pin Screw Terminal</li> <li>DN-100-CA includes one CA-SCSI100-15 Cable</li> </ul>	<p><b>NEW</b></p> 






## 6-2 Accessories and Cables


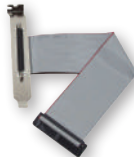
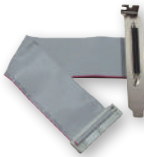

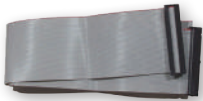
2-pin	9-pin			
CA-0205	CA-0910F	CA-0910N	CA-0915	CA-0920
				
2-pin Black and Red Cable Length: 0.5 m	DB9 Female-to-Female Cable Length: 1 m	DB9 Female-to-Female Null Modem Cable Length: 1 m	DB9 Male-to-Female Cable Length: 1.5 m	DB9 Male-to-Male Cable Length: 2 m






			20-pin		
CA-0909	CA-PC09F	CA-PC09M	CA-2002	CA-2010	
					
DB9 Female-to-Female Connector	DB9 Female Connector with Plastic Cover	DB9 Male Connector with Plastic Cover	Two 20-pin Flat Cables for ADP-20 and ADP-20/PCI Length: 20 cm	20-pin Flat Cable Length: 1 m	

		25-pin	37-pin	
CA-2020	CA-20006	CA-2520	CA-2520D	CA-3710
				
20-pin Flat Cable Length: 2 m	Two 20-pin Flat Cables Pitch: 2.0 mm Length: 6 cm	DB25 Male-to-Male Cable Length: 2 m (45°)	DB25 Male-to-Male Cable Length: 2 m (180°)	DB37 Male-to-Male Cable Length: 1 m (45°)

CA-3710D	CA-3720	CA-3720D	CA-3710DM	CA-3730DM
				
DB37 Male-to-Male Cable Length: 1 m (180°)	DB37 Male-to-Male Cable Length: 2 m (45°)	DB37 Male-to-Male Cable Length: 2 m (180°)	Thin Monolithic DB37 Male-to-Male Cable (RoHS) Length: 1 m (180°)	Thin Monolithic DB37 Male-to-Male Cable (RoHS) Length: 3 m (180°)

CA-3750DM	CA-3705A	CA-3710A	CA-3715A	CA-4002
				
Thin Monolithic DB37 Male-to-Male Cable (RoHS) Length: 5 m (180°)	DB37 Male-to-Female Cable Length: 0.5 m	DB37 Male-to-Female Cable Length: 1 m	DB37 Male-to-Female Cable Length: 1.5 m	DB37 Male Connector with Plastic Cover

	40-pin		50-pin	
CA-4002F	CA-4037B	CA-4037W	CA-5002	CA-5015
				
DB37 Female Connector with Plastic Cover	40-pin Flat to DB37 Female Cable for PISO-DIO Series Cards Length: 24 cm	40-pin Flat to DB37 Female Cable for PCI-DIO/ISO-DIO Series Cards Length: 24 cm	50-pin Flat Cable Length: 20 cm	50-pin Flat Cable Length: 1.5 m

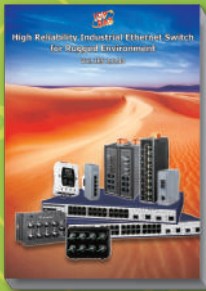
68-pin				100-pin
CA-SCSI15	CA-SCSI15-H	CA-SCSI30	CA-SCSI50	CA-SCSI100-15
				
68-pin SCSI-II Male-to-Male Cable Length: 1.5 m	68-pin SCSI-II Male-to-Male Cable Length: 1.5 m	68-pin SCSI-II Male-to-Male Cable Length: 3 m	68-pin SCSI-II Male-to-Male Cable Length: 5 m	100-pin SCSI-II Male-to-Male Cable Length: 1.5 m

**A variety of optional cables, connectors and daughter boards are available with ICP DAS I/O cards to make wiring easy.**



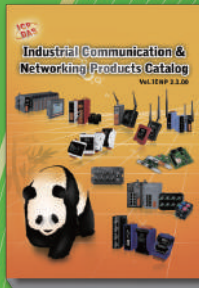
The image features a vibrant background with a rainbow, a city skyline, and butterflies. In the center, the ICP DAS logo is prominently displayed. Surrounding the logo are several I/O cards and cables, including a 68-pin SCSI-II cable, a 100-pin SCSI-II cable, and various daughter boards connected to I/O cards. The overall scene is bright and colorful, emphasizing the variety of products available.

# ICP DAS Catalogs & Brochures



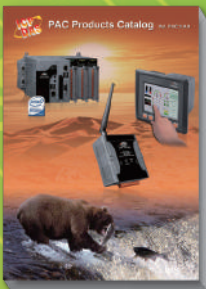
## High Reliability Industrial Ethernet Switch Catalog

- Managed Ethernet Switches
- Unmanaged Ethernet Switches
- PoE Ethernet Switches
- Media Converters
- Real-time Redundant Ring Ethernet Switches
- IP67 Waterproof Switches
- Cyber-Ring Ethernet Self-healing Technology



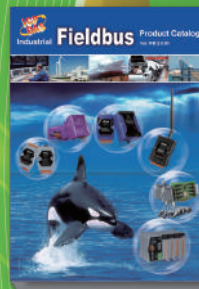
## Industrial Communication & Networking Products Catalog

- Multi-port Serial Cards
- Programmable Device Servers (Serial-to-Ethernet)
- Converters, Repeaters and Hubs
- Fieldbus Solutions
- Ethernet Switches



## PAC Products Catalog

- XP-8000-Atom Series
- XP-8000 Series
- WP-8000 Series
- LP-8000 Series
- iP-8000 Series
- ViewPAC Series
- MotionPAC Series
- I/O Expansion Units
- I/O Modules
- 5000 Series
- 7188/7186 Series



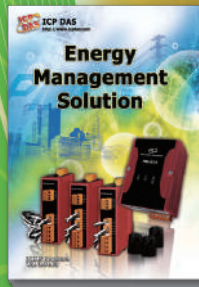
## Industrial Fieldbus

- RS-485
- Industrial Ethernet
- Profinet
- CAN Bus
- CANopen
- DeviceNet
- J1939
- PROFIBUS
- HART
- Ethernet/IP
- BACnet



## Remote I/O Modules and I/O Expansion Units Products Catalog

- RS-485 Products
- Ethernet Remote I/O Modules
- FRnet I/O Modules
- CAN Bus Products
- PROFIBUS Remote I/O Modules
- HART Products
- Smart Power Meters
- WISE I/O Modules



## Energy Management Solution - PMMS Brochure

- Smart Power Meter Concentrator
- Smart Power Meter
- True RMS Input Module
- TouchPAD Devices - VPD Series
- GPS Solutions



## A Web-based Intelligent PAC Controller - WISE Brochure

- Intelligent Multifunction IoT Controller
- Intelligent Data Logger I/O Controller
- Intelligent I/O Module

## Local Distributor



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