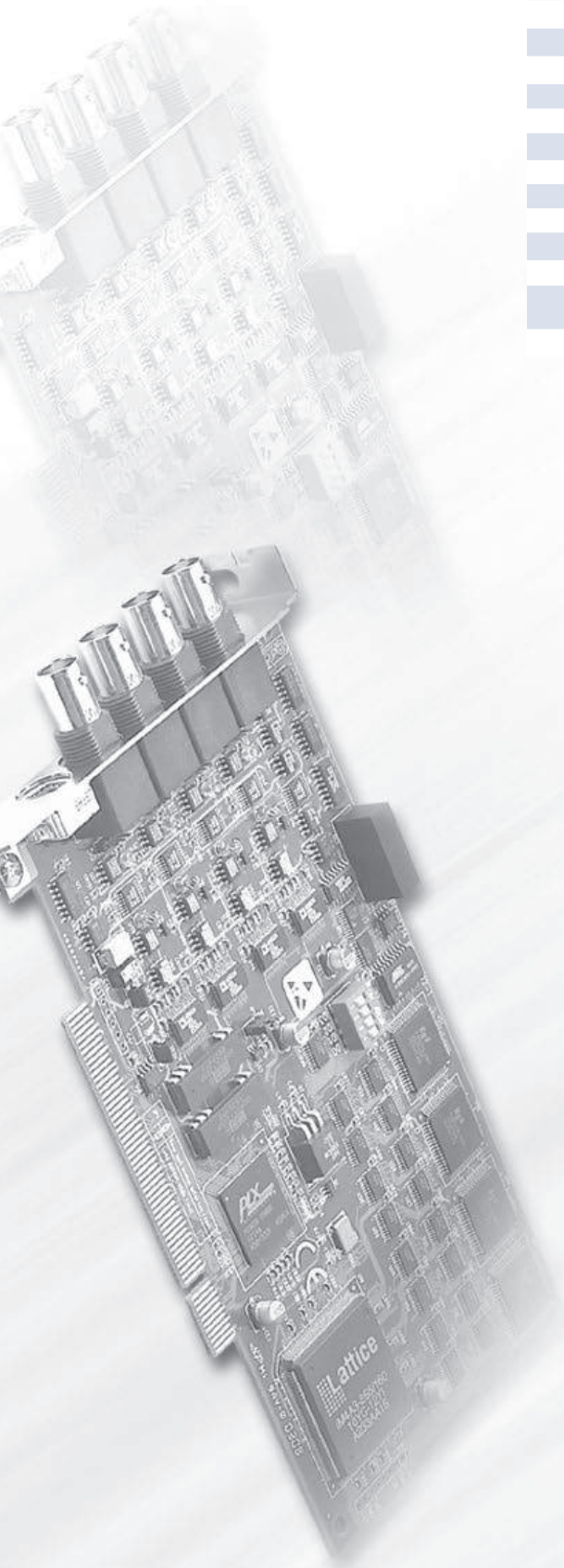
18 Data Acquisition Boards



To view all of Advantech's Data Acquisition Boards, please visit www.advantech.com/products.

Data Acquisition and Control Tutorial & Software

PC-based Data Acquisition (DAQ) System Overview

Because industrial PC I/O interface products have become increasingly reliable, accurate, and affordable in the last few years, PC-based data acquisition and control systems are nowadays widely used in industrial and laboratory applications such as monitoring, control, data acquisition and automated testing.

It requires know-how of electrical and computer engineering to select and build a data acquisition (DAQ) and control system that actually does what you want. This tutorial gives a brief introduction to what data acquisition and control systems do and how to configure them. Here, we cover:

- Transducers and Actuators
- Signal Conditioning
- Data Acquisition and Control Hardware
- Getting Started

Transducers and Actuators

A transducer converts temperature, pressure, level, length, position, etc. into voltage, current, frequency, pulses or other signals.

Thermocouples, thermistors and resistance temperature detectors (RTDs) are common transducers for temperature measurements. Other types of transducers include flow sensors, pressure sensors, strain gauges, load cells and LVDTs, which measure flow rate, pressure variances, force or displacement.

An actuator is a device that activates process control equipment by using pneumatic, hydraulic or electrical power. For example, a valve actuator can open and close a valve to control fluid rates.

Signal Conditioning

Signal conditioning circuits improve the quality of signals generated by transducers before they are converted into digital signals by the PC's data-acquisition hardware. Examples of signal conditioning are signal scaling, amplification, linearization, cold-junction compensation, filtering, attenuation, excitation, common-mode rejection, and so on.

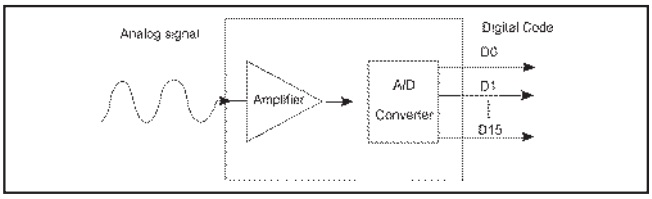
One of the most common signal conditioning functions is amplification. For maximum resolution, the voltage range of the input signals should be approximately equal to the maximum input range of the A/D converter. Amplification expands the range of the transducer signals so that they match the input range of the A/D converter. For example, a x10 amplifier maps transducer signals that range from 0 to 1 V into the range 0 to 10 V before they go into the A/D converter.

Data Acquisition & Control Hardware

Data acquisition and control hardware generally performs one or more of the following functions: analog input, analog output, digital input, digital output and counter/timer functions. This section will discuss each function and list some considerations that are important when you select a data acquisition and control system.

Analog Inputs (A/D)

Analog to digital (A/D) conversion changes analog voltage or current levels into digital information. The conversion is necessary to enable a computer to process or store the signals.

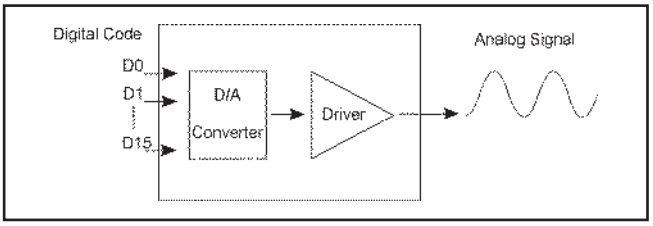


The most significant criteria when selecting A/D hardware are:

1. Number of input channels
2. Single-ended or differential input signals
3. Sampling rate (in samples per second)
4. Resolution (usually measured in bits of resolution)
5. Input range (specified in full-scale volts)
6. Noise and nonlinearity

Analog Outputs (D/A)

The opposite of analog to digital conversion is digital to analog (D/A) conversion. This operation converts digital information into analog voltage or current. D/A devices allow a computer to control real-world events.



Analog output signals may directly control process equipment. The process can give feedback in the form of analog input signals. This is referred to as a closed loop control system with PID control. Analog outputs can also be used to generate waveforms. In this case, the device behaves as a function generator.

Digital Inputs and Outputs

Digital input/output functions are useful in applications such as contact closure and switch status monitoring, industrial On/Off control and digital communications.

Counter/Timer

A counter/timer can be used for event counting, flowmeter monitoring, frequency counting, pulse width measurement, time period measurement, and so on.

Getting Started

Advantech: The Source For What You Need

Advantech manufactures data acquisition hardware and software for measurement, monitoring and applications control. The following guide is provided to help you choose components for your data acquisition system.

Step 1: Know Your Fundamental Goal

Decide whether your DAQ system will be used primarily for measurement, monitoring, control, or analysis. Know the data requirements of your process, and know the number of data collection points in your system. Know the required data collection speed, the sampling rate, the type of measurement, the voltage or current being produced, the desired accuracy and the output resolution at each data collection point. Finally, know the timing of events in your system, and any special environmental conditions that exist.

Step 2: Hardware Selection

Select the hardware required to achieve your fundamental goal. Advantech provides plug-in boards for Analog-to-Digital, Digital-to-Analog, Digital I/O needs. Both ISA and PCI bus products are available. Your hardware selection should be based on five major criteria:

1. Number and types of channels
2. Differential or single-ended inputs
3. Resolution
4. Speed
5. Software compatibility with hardware

Step 3: Accessory Selection

Most applications require additional accessories which are available as separate items. These include:

1. Expansion peripherals to add channels to your system
2. Cables, signal conditioners and external boxes such as screw terminals or BNC accessories

Step 4: Software Selection

More than any other single factor, software will determine your system start-up time, as well as its effectiveness, suitability for your application, and ease of modification.

Three major criteria should determine the choice of software:

1. Operating system used
2. User programming expertise
3. Software compatibility with hardware

DAQNavi Introduction

What is DAQNavi?

DAQNavi is a Advantech next-generation driver package, for programmers to develop their application programs using Advantech DAQ boards or devices. This integrated driver package includes device drivers, SDK, tutorial and utility. With the user-friendly design, even the beginner can quickly get familiar with how to utilize DAQ hardware and write programs through the intuitive "Advantech Navigator" utility environment. Many example codes for different development environment dramatically decrease users' programming time and effort.

You can go to www.advantech.com/DAQNavi for more information about Advantech DAQNavi.

Multiple Operating System Support

DAQNavi supports many popular operating systems (OS) used in automation applications. For different OSs, API functions will be the same, so users can simply install the driver without modifying their program again when migrating between two different OSs.

DAQNavi supports latest Windows 8/7/Vista/XP and Windows CE (both 32-bit and 64-bit).

Besides Windows operating system, Linux is famous for its openness and flexibility. DAQNavi software package also support Linux OS including Ubuntu, Fedora, Debian, Susi distributions. For other distributions, please contact the local Advantech branch or dealer in your area.

Note: DAQNavi only supports Windows 8 desktop version. Windows RT version is not supported.

LabVIEW and Matlab Support

LabVIEW is popular graphical development environment used for measurement and automation. For LabVIEW user, DAQNavi offers two options for programming: Express VI and Polymorphic VIs. Express VI helps user quickly complete his programming without extra wiring. When user drags the Express VI on LabVIEW Block Diagram, a pop-up intuitive wizard window will appear and user can perform configurations. After that, the programming is done. So it is similar to the .NET Component DAQ Wizard used in Microsoft Visual Studio environment, making programming more easily. As for the Polymorphic VI, user can use several VIs and wiring to build more complex program. Except LabVIEW, DAQNavi also support Matlab programming.

.NET Support

DAQNavi offers a series of **.NET Component** object, that you can benefit from platform-unified feature by latest .NET technology. User can simply drag and drop the .NET Components within .NET programming environment, such as Microsoft Visual C# and VB .NET. An intuitive window (called "DAQNavi Wizard") will pop-up, and user can perform all configurations by sequence. It is so-called "Configure & Run" programming. Programmers also can choose writing code manually with the .NET Component, to have a more flexible object calling. With Advantech CSCL technology, engineers can do the similar programming in an native environment such as Visual C++.

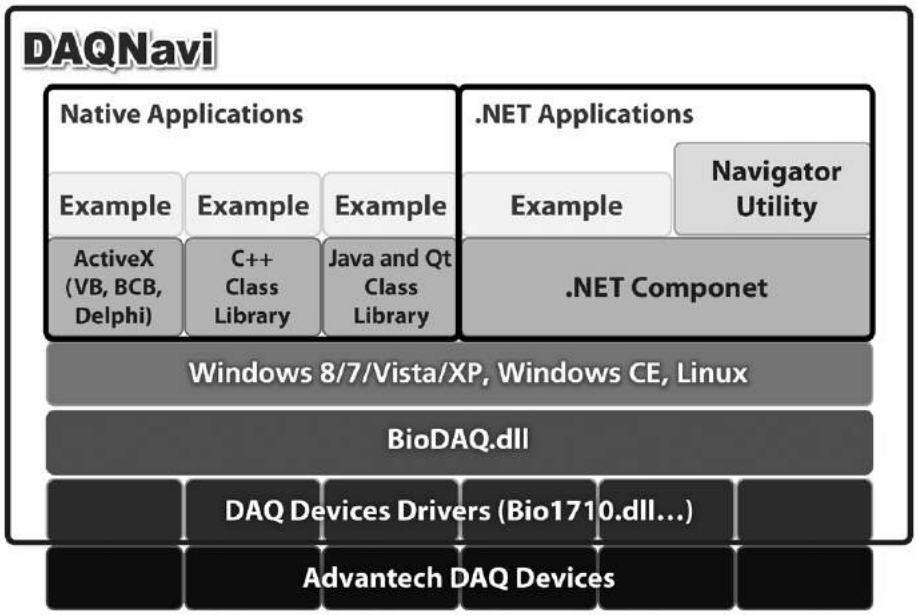
C++, Delphi, VB, BCB, Java and Qt Support

DAQNavi offers C++ Class Library (for VC++ and Borland C++ Builder) and ActiveX (for Visual Basic, Delphi, and BCB) for Native programming environment with the same calling interface as .NET Class Library. With DAQNavi Java class library and Qt class library, users can develop Java and Qt programs to migrate between different operating systems (including Windows and Linux).

Support Modules

DAQNavi supports all PCI Express, PCI, PC/104, and PCI-104 cards, as well as all USB DAQ devices.

DAQNavi Driver Package Architecture



Note: When you visit Advantech DAQNavi download website, you can find two software: (1) DAQNavi SDK (2) individual DAQNavi driver for specific hardware. You need to install these two software on your computer to utilize the hardware.

Powerful Intuitive Utility: Advantech Navigator

Devices

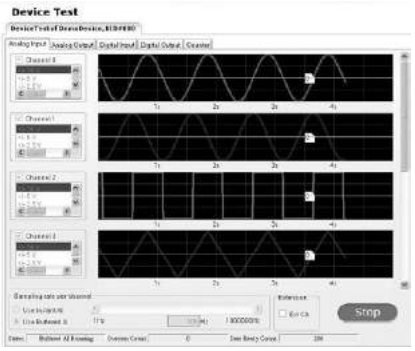
You can see all your installed Advantech DAQ devices here, including the simulated DAQ device called “DemoDevice”. In other words, you don’t need any hardware installed on your computer to test all operations within DAQNavi. For each device, there are four items you can select.

1. Device Setting

You can perform all hardware configurations for the selected device.

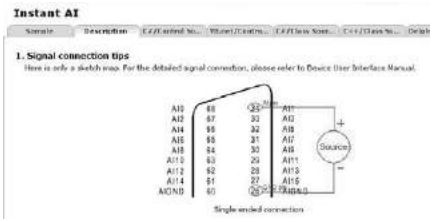
2. Device Test

You can test all hardware functionality here, without any programming.



3. Scenarios

Advantech defines commonly-used measurement and automation applications, named "scenarios" for users to refer. For each scenario, one example program is embedded within Advantech Navigator that you can execute it directly. Corresponding source code for each scenario is provided, written by different language (C#, VB .NET, C++, Delphi , Qt, VB6, and Java). Besides, wiring diagram for each scenario is available here.



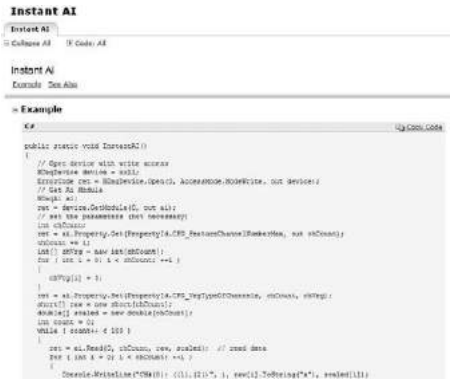
4. Reference

You can find the detailed user manual for the selected device.

SDKs

1. DAQ User Interface Manual

To shorten the development time, Advantech offer a lot of tutorial and reference documentation.There are two programming ways you can refer: (1) Class Library (2) Device Control. You can find instructions for programming. It not only teaches you how to create one application project, but also how to write the program with a programming chart and example code.



2.Tutorial Video

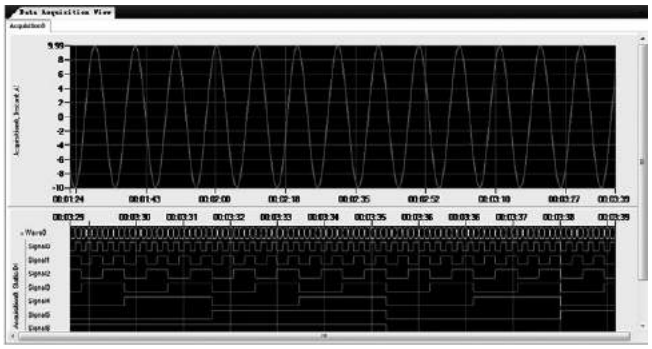
If you don't know how to start creating a project, Advantech offers a tutorial video for your programming reference.

Scenarios: Commonly-used for Measurement and Automation Applications

Category	Scenario	Description
Analog Input	Instant AI	Read single AI value once
	Asynchronous One Buffered AI	Read a buffer of AI values once (Don’t need to wait the acquisition is done to run other program)
	Synchronous One Buffered AI	Read a buffer of AI values once (Need to wait the acquisition is done to run other program)
	Streaming AI	Continuously read a buffer of AI values
Analog Output	Static AO	Change AO values once
	Asynchronous One Waveform AO	Change AO value based on a pre-defined waveform once (Don’t need to wait the generation is done to run other program)
	Synchronous One Waveform AO	Change AO value based on a pre-defined waveform once (Need to wait the generation is done to run other program)
	Streaming AO	Continuously change AO value based on a pre-defined waveform
Digital Input	Static DI	Read the selected DI port value once
	DI Interrupt	When DI bit meets a pre-defined edge change (rising or falling), an interupt is generated
	DI Pattern Match Interrupt	When selected DI port meets pre-defined pattern, an interupt is generated
	DI Status Change Interrupt	When the status of certain selected channel of DI port changes, an interupt is generated
Digital Output	Static DO	Change DO values once
Timer/ Counter	Delayed Pulse Generation	When a trigger from coutner gate is met, a pulse is generated after a specific period
	Pulse Output with Timer Interrupt	Continuously generate a periodic pulse train (using counter internal clock), and an event will be sent out at the same time.
	Event Counter	Continously count the pulse number of signal from counter input
	Frequency Measurement	Meaure frequency of singal from counter input
	Pulse Width Measurement	Meaure pulse width of signal from counter input
	PWM Output	Generate PWM (Pulse Width Modulation) signal

DAQNavi Data Logger

Configurable Data Logging Software



Features

- Data logging, display and recording without programming
- Instant AI, buffered AI and static DI data logging
- Intuitive hardware channel parameters configuration wizard
- Supports simulated device operation
- Save configurations into a project file for future re-use
- Real-time display with zoom and pan operation
- Supports data recording to store as file to local disk
- Recorded data playback to view historical data
- Supports both analog graph and digital graph display

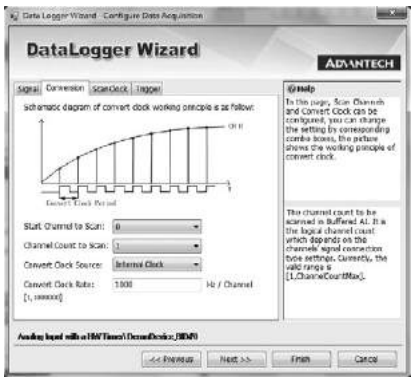
Introduction

Advantech DAQNavi Data Logger is ready-to-use application software that engineers can leverage its easy-to-use interface to perform data logging, display and recording. Without spending any time on programming, engineers can benefit from flexibility to acquire and store data from various Advantech data acquisition devices for their data logging tasks.

Features Details

Data Acquisition Devices Configuration

Before data logging measurement, engineers can do all necessary analog and digital input channels configuration using built-in DAQNavi wizard. Step-by-step instructions by intuitive window can help engineer easily complete related settings. Except real data acquisition devices, DAQNavi Data Logger also offer simulated device that engineers can do all operation without any hardware installed on computer.



Configuration Management by Project Files

Engineer can create and edit a project to include one or several data logging tasks.

Within one project, data can be acquired and displayed from one or multiple data acquisition devices. Current input channels configurations and logging settings can be saved as a specific project file. Afterwards, engineer can open previous project file to load all configurations and start data logging tasks immediately.

Real-time Data Logging, Display and Recording

After data acquisition configuration is done, engineers can immediately start data acquisition and display the logging data on a real-time graph. The graph can be zoom in, zoom out or pan dynamically during data logging. Engineers can decide if they want to record the data (save data into a pre-defined file) during data logging.

Historical Data Playback

Previous recorded data can be loaded back to DANNavi Data Logger software and viewed by Playback function. Related zoom in, zoom out and pan operation is also available for historical data display.

Specifications

Supported Hardware

- PCI Express multifunction, analog input and digital input cards
- PCI multifunction, analog input and digital input cards
- USB multifunction, analog input and digital input modules
- PC/104 and PCI-104 multifunction, analog input and digital input cards

Analog I/O & Multifunction Card Selection Guide

Category			Multifunction						
Bus			PCI						
Model			PCI-1710U/UL	PCI-1710HGU	PCI-1711U/UL	PCI-1712/L	PCI-1716/L	PCI-1706U/UL	PCI-1718HDU
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	16 bits	12 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE	16 SE/8 Diff.	16 SE/8 Diff.	8 Diff.	16 SE/8 Diff.
		Onboard FIFO	4,096 samples	4,096 samples	1,024 samples	1,024 samples	1,024 samples	8,192 samples	1,024 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s	1 MS/s	250 kS/s	250 kS/s	100 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25	±10, 5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	✓	-	✓	-
		Advanced Trigger	-	-	-	✓	-	✓	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	-	-	-	Bus-mastering	Bus-mastering	✓	-
Analog Output	Resolution		12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	12 bits
	Channels		2 (PCI-1710U only)	2	2 (PCI-1711U only)	2 (PCI-1712 only)	2 (PCI-1716 only)	2 (PCI-1706U only)	1
	Onboard FIFO		-	-	-	32,768 samples	-	-	-
	Output Range (V)		0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 0 ~ 24 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10
	Output Rate		Static update	Static update	Static update	1 MS/s	Static update	Static update	Static update
	DMA Transfer		-	-	-	✓	-	-	-
Digital I/O	Input Channels		16	16	16	16 (shared)	16	16 (shared)	16
	Output Channels		16	16	16		16		16
Timer/ Counter	Channels		1	1	1	3	1	2	1
	Resolution		16 bits	16 bits	16 bits	16 bits	16 bits	32 bits	16 bits
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			-	-	-	✓	✓	✓	-
BoardID Switch			✓	✓	✓	-	✓	✓	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	DB37
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	-	-	-
	Linux		✓	✓	✓	✓	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	-	-	-
	Linux		-	-	✓	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-23	19-23	19-24	19-25	19-26	online	online

* All channels should be set to the same range.
** SS: Single DMA channel, Single A/D channel scan; SM: Single DMA channel, Multiple A/D channel scan

Category			Multifunction						
Bus			PCI		ISA				
Model			PCI-1741U	PCI-1742U	PCL-711B	PCL-812PG	PCL-818L	PCL-818HD	PCL-818HG
Analog Input	General Spec.	Resolution	16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	8 SE	16 SE	16 SE/8 Diff	16 SE/8 Diff	16 SE/8 Diff
		Onboard FIFO	1,024 samples	1,024 samples	-	-	-	1,024 samples	1,024 samples
		Sampling Rate	200 kS/s	1 MS/s	40 kS/s	30 kS/s	40 kS/s	100 kS/s	100 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25*	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	-	-	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625*	±10, 5, 2.5, 1.25,0.625	±5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005
		Configurable Per-Channel	-	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	-	-	-	-
		Advanced Trigger	-	-	-	-	-	-	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	-	Bus-mastering	-	SS**	SM**	SM**	SM**
Analog Output	Resolution		16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
	Channels		1	2	1	2	1	1	1
	Onboard FIFO		-	-	-	-	-	-	-
	Output Range (V)		±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±10	0 ~ 5, 0 ~ 10, ±10
	Output Rate		Static update	Static update	Static update	Static update	Static update	Static update	Static update
	DMA Transfer		-	-	-	-	-	-	-
Digital I/O	Input Channels		16	16	16	16	16	16	16
	Output Channels		16	16	16	16	16	16	16
Timer/ Counter	Channels		1	1	-	1	1	1	1
	Resolution		16 bits	16 bits	-	16 bits	16 bits	16 bits	16 bits
	Max. Input Frequency		10 MHz	10 MHz	-	2 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			✓	✓	-	-	-	-	-
BoardID Switch			✓	✓	-	-	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	185 x 100	155 x 100	185 x 100	185 x 100
Connector			68-pin SCSI	68-pin SCSI	3 x 20-pin	5 x 20-pin	DB37	DB37	DB37
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	✓	-	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	-	-	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	-	-	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-27	19-27	online	online	online	online	online

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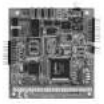


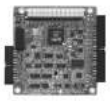


Category			Multifunction						
Bus			PC/104			PCI-104	PCIE		
Model			PCM-3718H	PCM-3718HG	PCM-3718HO	PCM-3810I	PCIE-1810	PCIE-1816	PCIE-1816H
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	12 bits	16 bits	16 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Duff.	16 SE/8 Duff.	16 SE/8 Duff.
		Onboard FIFO	-	-	1,024 samples	4,096 samples	4,096 samples	4,096 samples	4,096 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s*	250 kS/s	800 kS/s	1 MS/s	5 MS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1 0 ~ 0.1, 0 ~ 0.01	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/ Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	-	✓	✓	✓
		Advanced Trigger	-	-	-	✓	Start/ Stop/ Delay to Start/ Delay to Stop	Start/ Stop/ Delay to Start/ Delay to Stop	Start/ Stop/ Delay to Start/ Delay to Stop
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	SS**	SS**	SS**	-	Bus-mastering	Bus-mastering	Bus-mastering
Analog Output	Resolution		-	-	12 bits	12 bits	12 bits	16 bits	16 bits
	Channels		-	-	1	2	2 (Waveform Output)	2 (Waveform Output)	2 (Waveform Output)
	Onboard FIFO		-	-	-	-	4,096 samples	4,096 samples	4,096 samples
	Output Range (V)		-	-	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10
	Output Rate		-	-	Static update	250 kS/s	500 kS/s/s	3 MS/s	3 MS/s
	DMA Transfer		-	-	-	-	Bus-mastering	Bus-mastering	Bus-mastering
Digital I/O	Input Channels		16 (shared)	16 (shared)	16 (shared)	16 (shared)	24 (shared)	24 (shared)	24 (shared)
	Output Channels								
Timer/ Counter	Channels		1	1	1	3	2	2	2
	Resolution		16 bits	16 bits	16 bits	16 bits	32-bit	32-bit	32-bit
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			-	-	-	✓	✓	✓	✓
BoardID Switch			-	-	-	-	✓	✓	✓
Dimensions (mm)			96 x 90	96 x 90	96 x 90	96 x 90	168 x 100	168 x 100	168 x 100
Connector			2 x 20-pin	2 x 20-pin	2 x 20-pin	50-pin/26-pin box header	68-pin SCSI	68-pin SCSI	68-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	-	-	-
	WinCE		✓	✓	✓	-	-	-	-
	Linux		✓	✓	✓	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-49	19-49	19-49	19-47	19-21	19-22	19-22

* 80 kHz on Pentium 4-based (or upper) system

** SS: Single DMA channel, Single A/D channel scan

Category			Analog Input							Analog Output	
Bus			PCI					ISA	PCI-104	PCI	
Model			PCI-1713U	PCI-1714U	PCI-1714UL	PCI-1715U	PCI-1747U	PCL-813B	PCM-3813I	PCI-1720U	PCI-1721
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	12 bits	-	-
		Channels	32 SE/16 Diff.	4 SE	4 SE	32 SE/16 Diff.	64 SE/32 Diff.	32 SE	32 SE/16 Diff.	-	-
		Onboard FIFO	4,096 samples	32,768 samples	8,192 samples	1,024 samples	1,024 samples	-	1,024 samples	-	-
		Sampling Rate	100 kS/s	30 MS/s	10 MS/s	500 kS/s	250 kS/s	25 kS/s	100 kS/s	-	-
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-	0 ~10, 0 ~ 5 0 ~ 2.5, 0 ~1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1, 0.5	±5, 2.5, 1, 0.5	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	-	-
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓	-	-
	Trigger Modes	Pacer/ Software/ External Pulse	✓	✓	✓	✓	Pacer/ Software	Software	✓	-	-
		Analog Slope	-	✓	✓	-	-	-	-	-	-
		Advanced Trigger	-	✓	✓	-	-	-	-	-	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓	-	-
		DMA	-	Bus-mastering	Bus-mastering	Bus-mastering	Bus-mastering	-	-	-	-
Analog Output	Resolution		-	-	-	-	-	-	-	12 bits	12 bits
	Channels		-	-	-	-	-	-	-	4	4 (Waveform Output)
	Onboard FIFO		-	-	-	-	-	-	-	-	1,024 samples
	Output Range (V)		-	-	-	-	-	-	-	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
	Output Rate		-	-	-	-	-	-	-	Static update	10 MS/s
	DMA Transfer		-	-	-	-	-	-	-	-	Bus-mastering
Digital I/O	Input Channels		-	-	-	-	-	-	-	-	16 (shared)
	Output Channels		-	-	-	-	-	-	-	-	
Timer/ Counter	Channels		-	-	-	-	-	-	-	-	1
	Resolution		-	-	-	-	-	-	-	-	16 bits
	Max. Input Frequency		-	-	-	-	-	-	-	-	10 MHz
Isolation Voltage			2,500 V_{DC}	-	-	2,500 V_{DC}	-	500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-
Auto Calibration			-	✓	✓	-	✓	-	-	-	✓
BoardID Switch			-	✓	✓	✓	✓	-	-	✓	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	219 x 100	96 x 90	175 x 100	175 x 100
Connector			DB37	4 x BNC	4 x BNC	DB37	68-pin SCSI	DB37	40-pin	DB37	68-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	✓	-	-	✓	-
	Linux		✓	v	✓	-	✓	-	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-	✓	-
	Linux		-	✓	✓	✓	✓	-	-	-	✓
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓	✓	✓
Page			19-29	19-28	19-28	19-29	19-30	online	19-47	19-31	19-32

* 80 kHz on Pentium 4-based (or upper) system

** SS: Single DMA channel, Single A/D channel scan

Digital I/O & Counter Card Selection Guide






Category			Analog Output					
Bus			PCI			ISA		
Model			PCI-1723	PCI-1724U	PCI-1727U	PCL-726	PCL-727	PCL-728
Analog Input	General Spec.	Resolution	-	-	-	-	-	-
		Channels	-	-	-	-	-	-
		Onboard FIFO	-	-	-	-	-	-
		Sampling Rate	-	-	-	-	-	-
	Input Ranges	Unipolar Inputs (V)	-	-	-	-	-	-
		Bipolar Inputs (V)	-	-	-	-	-	-
		Configurable Per-Channel	-	-	-	-	-	-
	Trigger Modes	Pacer/Software/ External Pulse	-	-	-	-	-	-
		Analog Slope	-	-	-	-	-	-
		Advanced Trigger	-	-	-	-	-	-
	Data Transfer Modes	Software	-		-	-	-	-
		DMA	-	-	-	-	-	-
Analog Output	Resolution		16 bits	14 bits	14 bits	12 bits	12 bits	12 bits
	Channels		8	32	12	6	12	2
	Onboard FIFO		-	-	-	-	-	-
	Output Range (V)		±10, 0 ~ 20 mA, 4 ~ 20 mA	±10, 0 ~ 20 mA	±10, 0~20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
	Output Rate		Static update	Static update	Static update	Static update	Static update	Static update
	DMA Transfer		-	-	-	-	-	-
Digital I/O	Input Channels		16 (shared)	-	16	16	16	-
	Output Channels			-	16	16	16	-
Timer/ Counter	Channels		-	-	-	-	-	-
	Resolution		-	-	-	-	-	-
	Max. Input Frequency		-	-	-	-	-	-
Isolation Voltage			-	1,500 V_{DC}	-	-	-	2,500 V_{DC}
Auto Calibration			✓	-	-	-	-	-
BoardID Switch			✓	✓	✓	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	337 x 112	337 x 112	185 x 120
Connector			68-pin SCSI	DB62	2 x 2-pin, DB37	4 x 20-pin	2 x 20-pin, DB37	2 x DB9
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	✓	-	-	-	-
	Linux		✓	✓	✓	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	-	-	-
	WinCE		-	-	-	-	-	-
	Linux		-	✓	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
Page			19-33	19-31	19-33	online	online	online

Category			Non-Isolated Digital I/O						
Bus			PCI						
Model			PCI-1735U	PCI-1737U	PCI-1739U	PCI-1751	PCI-1753	PCI-1755	PCI-1757UP
TTL DI/O	Input Channels		32	24 (shared)	48 (shared)	48 (shared)	96 (shared)	32 (shared)	24 (shared)
	Output Channels		32						
	Output Channel	Sink Current	24 mA @ 0.5V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.44 V	24 mA @ 0.5V	24 mA @ 0.5 V
		Source Current	15 mA @ 2.0V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	24 mA @ 3.76 V	15 mA @ 2.0V	24 mA @ 3.7 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	3	-	3	-
	Resolution		16 bits	-	-	16 bits	-	16 bits	-
	Max. Input Frequency		10 MHz	-	-	10 MHz	-	10 MHz	-
Advanced Function	Pattern Match		-	-	-	-	✓	✓	-
	Change of State		-	-	-	-	✓	✓	-
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		-	-	-	-	-	✓	-
	Output Status Read Back		✓	✓	✓	✓	✓	-	✓
	Dry/Wet Contact*		-	✓	✓	✓	✓	-	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	120 x 65
Connector			5 x 20-pin	1 x 50-pin	2 x 50-pin	68-pin SCSI	100-pin SCSI	100-pin SCSI-II	1 x DB25
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	✓	✓	✓	✓	-	✓
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	-	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-34	19-34	19-34	19-35	19-36	19-37	19-38

* Dry/wet contact can be mixed at the same time within one group.

Digital I/O & Counter Card Selection Guide






Category			Non-Isolated Digital I/O					
Bus			ISA				PC/104	PCI-104
Model			PCL-720+	PCL-722	PCL-724	PCL-731	PCM-3724	PCM-3753I
TTL DI/O	Input Channels		32	144 (shared)	24 (shared)	48 (shared)	48 (shared)	96 (shared)
	Output Channels		32					
	Output Channel	Sink Current	24 mA @ 0.5 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.5 V	24 mA @ 0.4 V
		Source Current	15 mA @ 2.0 V	-15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.0 V	15 mA @ 2.4 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	-	-	-
	Resolution		16 bits	-	-	-	-	-
	Max. Input Frequency		1 MHz	-	-	-	-	-
Advanced Function	Pattern Match		-	-	-	-	-	✓
	Change of State		-	-	-	-	-	✓
	BoardID Switch		-	-	-	-	-	-
	Channel-Freeze Function		-	-	-	-	-	-
	Output Status Read Back		-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-
Dimensions (mm)			185 x 100	334 x 100	125 x 100	185 x 100	96 x 90	96 x 90
Connector			5 X 20-pin	6 x 50-pin	1 x 50-pin	2 x 50-pin	2 x 50-pin	4 x 50-pin
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	✓	✓
	Linux		-	-	-	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		-	-	-	-	✓	✓
	WinCE		-	-	-	-	-	-
	Linux		-	-	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
Page			online	online	online	online	19-49	19-48

* Dry/wet contact can be mixed at the same time within one group.

Category			Isolated Digital I/O					Non-isolated Digital I/O	
Bus			PCI Express						
Model			PCIE-1730	PCIE-1752	PCIE-1754	PCIE-1756	PCIE-1760	PCIE-1751	PCIE-1753
TTL DI/O	Input Channels		16	-	-	-	-	48 (shared)	96 (shared)
	Output Channels		16	-	-	-	-		
	Output Channel	Sink Current	24 mA @ 0.5 V	-	-	-	-	15 mA @ 0.8 V	15 mA @ 0.8 V
		Source Current	15 mA @ 2.4 V	-	-	-	-	15 mA @ 2.0 V	15 mA @ 2.0 V
Isolated DI/O	Input	Channels	16	-	64	32	8	-	-
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	-
		Input Range	10 ~ 30 V_{DC}	-	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}	4.5 ~ 12 V_{DC}	-	-
	Output	Channels	16 (Sink)	64 (Sink)	-	32 (Sink)	6 x Form A 2 x Form C	-	-
		Isolation Voltage	2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	-	-
		Output Range	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	1 A @ 125 V_{AC} 2 A @ 30 V_{AC}	-	-
		Max. Sink Current	500 mA	500 mA	-	500 mA		-	-
Timer/ Counter	Channels		-	-	-	-	8 x UP CTR 2 x PWM	3	-
	Resolution		-	-	-	-	16 bits	32 bits	-
	Max. Input Frequency		-	-	-	-	500 Hz	10 MHz	-
Advanced Function	Pattern Match		-	-	-	-	✓	✓	✓
	Change of State		-	-	-	-	✓	✓	✓
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		✓	✓	-	✓	-	-	-
	Output Status Read Back		✓	✓	-	✓	✓	✓	✓
	Dry/Wet Contact*		✓	-	-	-	-	✓	✓
Dimensions (mm)			168 x 100	168 x 100	168 x 100	168 x 100	168 x 100	168 x 100	168 x 100
Connector			1 x DB37 4 x 20-pin	100-pin SCSI	100-pin SCSI	100-pin SCSI	1 x DB37	68-pin SCSI	68-pin SCSI
Legacy Driver	Windows XP/2000		-	-	-	-	-	-	-
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	-	✓	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-17	19-19	19-19	19-19	19-20	19-18	19-18

* Dry/wet contact can be mixed at the same time within one group.

Digital I/O & Counter Card Selection Guide






Category			Isolated Digital I/O					
Bus			PCI					
Model			PCI-1730U	PCI-1733	PCI-1734	PCI-1750	PCI-1752U	PCI-1754
TTL DI/O	Input Channels		16	-	-	-	-	-
	Output Channels		16	-	-	-	-	-
	Output Channel	Sink Current	24 mA @ 0.5 V	-	-	-	-	-
		Source Current	15 mA @ 2.4 V	-	-	-	-	-
Isolated DI/O	Input	Channels	16	32	-	16	-	64
		Isolation Voltage	2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}	-	2,500 V_{DC}
		Input Range	5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	5 ~ 50 V_{DC}	-	10 ~ 50 V_{DC}
	Output	Channels	16 (Sink)	-	32 (Sink)	16 (Sink)	64 (Sink)	-
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-
		Output Range	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	-
		Max. Sink Current	300 mA	-	200 mA	200 mA	200 mA	-
Timer/ Counter	Channels		-	-	-	1	-	-
	Resolution		-	-	-	16 bits	-	-
	Max. Input Frequency		-	-	-	1 MHz	-	-
Advanced Function	Pattern Match		-	-	-	-	-	-
	Change of State		-	-	-	-	-	-
	BoardID Switch		✓	✓	✓	-	✓	✓
	Channel-Freeze Function		✓	-	-	-	✓	-
	Output Status Read Back		✓	-	✓	-	✓	-
	Dry/Wet Contact*		✓	✓	-	✓	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			1 x DB37 4 x 20-pin	1 x DB37	1 x DB37	1 x DB37	100-pin SCSI	100-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		✓	-	✓	✓	✓	✓
	Linux		✓	✓	✓	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-
	Linux		✓	-	-	✓	✓	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
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* Dry/wet contact can be mixed at the same time within one group.

Category			Isolated Digital I/O						
Bus			PCI						
Model			PCI-1756	PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO	PCI-1760U	PCI-1761	PCI-1762
TTL DI/O	Input Channels		-	-	-	-	-	-	-
	Output Channels		-	-	-	-	-	-	-
	Output Channel	Sink Current	-	-	-	-	-	-	-
		Source Current	-	-	-	-	-	-	-
Isolated DI/O	Input	Channels	32	128	-	64	8	8	16
		Isolation Voltage	2,500 V_{DC}	2,500 V_{RMS}	-	2,500 V_{DC}	2,500 V_{DC}	3,750 V_{DC}	2,500 V_{DC}
		Input Range	10 ~ 50 V_{DC}	5 ~ 25 V_{DC}	-	5 ~ 25 V_{DC}	4.5 ~ 12 V_{DC}	5 ~ 50 V_{DC}	10 ~ 50 V_{DC}
	Output	Channels	32 (Sink)	-	128	64	6 x Form A 2 x Form C	4 x Form A 4 x Form C	16**
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{RMS}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}
		Output Range	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	1 A @ 125 V_{AC} 2 A @ 30 V_{DC}	8 A @ 250 V_{AC} 2 A @ 30 V_{DC}	0.25 A @ 250 V_{AC} 2 A @ 30 V_{DC}
		Max. Sink Current	200 mA	-	90 mA	90 mA			
Timer/Counter	Channels		-	-	-	-	8 x Up CTR 2 x PWM	-	-
	Resolution		-	-	-	-	16 bits (2,500 Isolation)	-	-
	Max. Input Frequency		-	-	-	-	500 Hz for Up CTR	-	-
Advanced Function	Pattern Match		-	-	-	-	✓	-	-
	Change of State		-	-	-	-	✓	-	-
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		✓	-	-	-	-	-	✓
	Output Status Read Back		✓	-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			100-pin SCSI	Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	1 x DB37	1 x DB37	1 x DB62
Legacy Driver	Windows XP/2000		-	✓	✓	✓	-	✓	✓
	WinCE		✓	✓	✓	✓	✓	✓	✓
	Linux		-	✓	✓	v	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	✓	✓	✓	-	✓	✓
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-41	19-42	19-42	19-42	19-43	19-43	19-43

* Dry/wet contact can be mixed at the same time within one group.

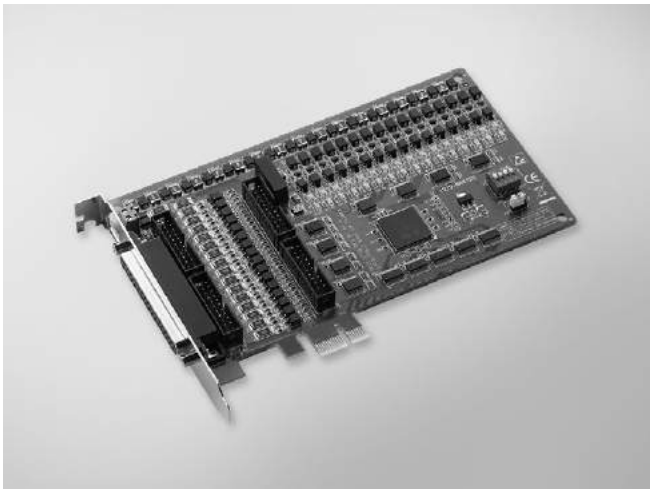
Digital I/O & Counter Card Selection Guide

Category			Isolated Digital I/O						Counter		
Bus			ISA		PC/104		PCI-104		PCI	ISA	PC/104
Model			PCL-725	PCL-735	PCM-3725	PCM-3730	PCM-3730I	PCM-3761I	PCI-1780U	PCL-836	PCM-3780
TTL DI/O	Input Channels		-	-	8	16	-	-	8	16	24 (shared)
	Output Channels		-	-	8	16	-	-	8	16	
	Output Channel	Sink Current	-	-	-	0.5 V @ 8 mA	-	-	24 mA @ 0.5 V	8 mA @ 0.5 V	24 mA @ 0.5 V
		Source Current	-	-	-	0.4 mA @ 2.4 V	-	-	15 mA @ 2.4 V	0.4 mA @ 2.4 V	15 mA @ 2.0 V
Isolated DI/O	Input	Channels	8	-	8	8	16	8	-	-	-
		Isolation Voltage	1,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	-	-
		Input Range	5 ~ 24 V_{DC}	-	10 ~ 50 V_{DC}	5 ~ 24 V_{DC}	5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	-	-
	Output	Channels	4 x Form A 4 x Form C	12 x Form C	8 x Form C	8	16	8 x Form C	-	-	-
		Isolation Voltage	1,000 V_{DC}	1,000 V_{DC}	2,000 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,000 V_{DC}	-	-	-
		Output Range	0.5A @ 120 V_{AC} 1A @ 30 V_{DC}	1A @ 125 V_{AC} 2A @ 30 V_{DC}	0.25A @ 240 V_{DC} 1A @ 30 V_{DC}	5 ~ 40 V_{DC}	5 ~ 30 V_{DC}	0.25 A @ 250 V_{AC} 2 A @ 30 V_{DC}	-	-	-
		Max. Sink Current				200 mA	300 mA		-	-	-
Timer/ Counter	Channels		-	-	-	-	-	-	8 x CTR	6 x CTR 3 x PWM	2
	Resolution		-	-	-	-	-	-	16 bits	16 bits	16 bits
	Max. Input Frequency		-	-	-	-	-	-	20 MHz	10 MHz	20 MHz
Advanced Function	Pattern Match		-	-	-	-	-	-	-	-	-
	Change of State		-	-	-	-	-	-	-	-	-
	BoardID Switch		-	-	-	-	-	✓	✓	-	-
	Channel-Freeze Function		-	-	-	-	-	-	-	-	-
	Output Status Read Back		-	-	-	-	-	✓	-	-	-
	Dry/Wet Contact*		-	-	-	-	-	-	-	-	-
Dimensions (mm)			147 x 95	155 x 100	96 x 90	96 x 90	96 x 90	96 x 90	175 x 100	185 x 100	96 x 90
Connector			1 x DB37	1 x DB37	1 x 20-pin 1 x 50-pin	3 x 20-pin	2 x 20-pin	1 x 20-pin 1 x 50-pin	68-pin SCSI	1 x DB37 2 x 20-pin	1 x 50-pin 1 x 20-pin
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	✓	✓	✓	✓	-	-	✓
	Linux		-	-	✓	✓	✓	✓	✓	-	-
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		-	-	✓	✓	✓	✓	✓	-	✓
	WinCE		-	-	-	-	-	-	-	-	-
	Linux		-	-	-	-	-	✓	-	-	-
LabVIEW I/O Driver			✓	✓	✓	✓	✓	✓	✓	✓	✓
Page			online	online	19-50	19-50	19-50	19-48	19-44	online	19-50

* Dry/wet contact can be mixed at the same time within one group.
** Jumper selectable Form A/Form B-type relay output

PCIE-1730

32-ch TTL and 32-ch Isolated Digital I/O PCI Express Card



FCC CE RoHS

Features

- 32-ch isolated DI/O (16-ch digital input, 16-ch digital output)
- 32-ch TTL DI/O (16-ch digital input,16-ch digital output)
- High output driving capacity
- Interrupt handling capability
- 2 x 20-pin connectors for isolated DI/O channels and 2 x 20-pin connectors for TTL DI/O channels
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels (2,500 V_{DC})

Introduction

PCIE-1730 offers isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL digital I/O channels on PCIE-1730.

Specifications

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2 (DI0, DI8)

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 10 V min. (30 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI8)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 50 µs
- **Input Resistance** 2.7 kΩ @ 1 W

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5V max.
Logic 1: 2.4V min.
- **Output Capability** Sink: 24mA @ 0.5V
Source: 15mA @ 2.4V

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink type (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 500 mA max./channel
- **Opto-Isolator Response** 50 µs

General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 1 x DB37 female connector
4 x 20-pin box header
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical:3.3 V @ 280 mA, 12 V @ 330 mA
Max.: 3.3 V @ 420 mA, 12 V @ 400 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCIE-1730** 32-ch Isolated Digital I/O PCIe Card

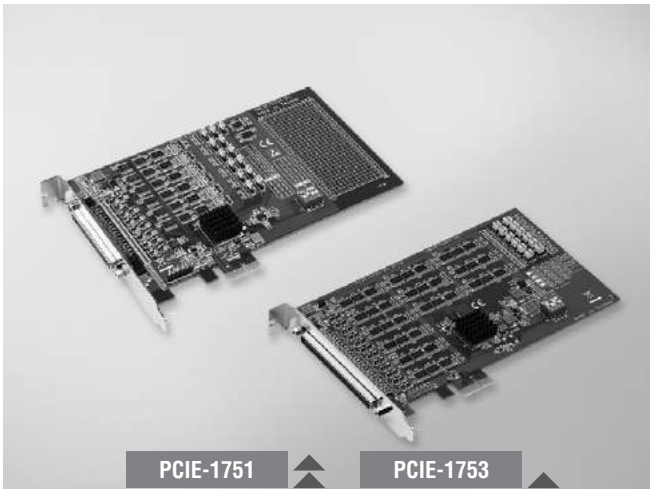
Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

PCIE-1751
PCIE-1753

48-ch Digital I/O and 3-ch Counter PCI Express Card

96-ch Digital I/O PCI Express Card



FCC CE RoHS

Features

- Emulates mode 0 of 8255 PPI (every port with nibble)
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- BoardID switch
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- Programmable digital filter function for DI
- Output status read back

Introduction

PCIE-1751 is a 48-bit digital I/O card for the PCI Express bus. Its 48 channels are divided into six 8-bit I/O ports and users can configure each 4-channel per port (nibble) as input or output via software. PCIE-1751 also provides three 32-bit counters..

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.
- **Interrupt Capable Ch.** 6

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 24mA @ 0.4 V
  Source: 15mA @ 2.4 V

Counter/Timer

- **Channels** 3
- **Resolution** 3 x 32-bit counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 20K / 200K / 2M / 20MHz
  External Clock Frequency: 10 MHz
  External Voltage Range: 5 V/TTL

General

- **Bus Type** Universal PCI Express
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical: 3.3 V @ 850 mA
  Max.: 3.3V @ 2.63 A
  Note: The maximum power consumption includes power consumption for +5 V output (on pin 34 and pin 68, with 0.5 A)
- **Operating Temperature** 0~60°C (32~140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

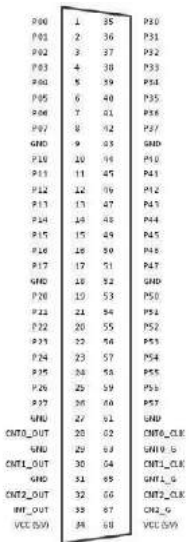
Ordering Information

- **PCIE-1751** 48-ch Digital I/O and 3-ch Counter PCI Express

Accessories

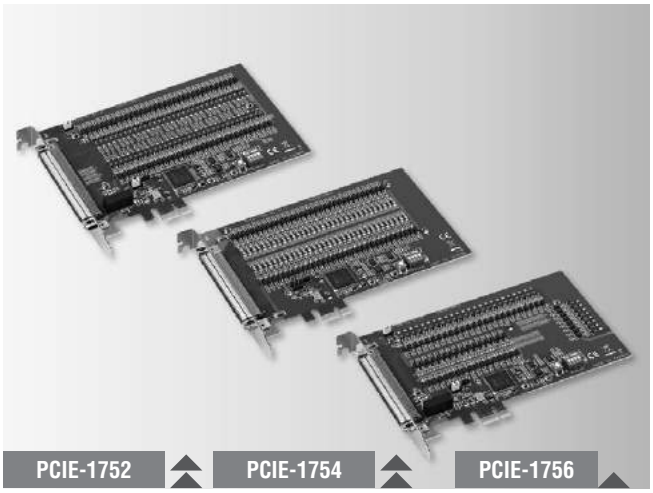
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board

Pin Assignment



PCIE-1752
PCIE-1754
PCIE-1756

64-ch Isolated Digital Output PCI Express Card
64-ch Isolated Digital Input PCI Express Card
64-ch Isolated Digital I/O PCI Express Card



Features

PCIE-1752/1756

- Wide output range (5 ~ 40 V_{DC})
- High sink current on isolated output channels (500mA max./ch)
- 2,000 V_{DC} ESD protection
- High-voltage isolation (2,500 V_{DC})
- Interrupt handling capability

PCIE-1754/1756

- Wide input range (10 ~ 30 V_{DC})
- Either +/- voltage input for DI by group
- High over-voltage protection (70 V_{DC})
- High-voltage isolation (2,500 V_{DC})
- Output status read-back
- Keeps the output settings and values after system hot reset
- Channel-freeze function

Introduction

The Advantech PCIE-1752, PCIE-1754 and PCIE-1756 series products offer 64 isolated digital input and output channels with 2,500 V_{DC} isolation protection. They feature a wide input range (10 ~ 30 V_{DC}), wide output range (5 ~ 40 V_{DC}) and high sink current (500mA max./channel) can make PCIE-1752/1754/1756 series products easily used in industrial automation control systems. With the help of the latest Advantech driver - DAQNavi, users can perform the configuration and setting easily and efficiently in the programming.

Specifications

Isolated Digital Input

- **Channels** — PCIE-1754: 64
PCIE-1756: 32
- **Input Voltage** — Logic 0: 3 V max.
Logic 1: 10 V min. (30 V_{DC} max.)
- **Input Current** — 10 V_{DC} @ 2.97 mA
20 V_{DC} @ 6.35 mA
30 V_{DC} @ 9.73 mA
- **Interrupt Capable Ch.** — PCIE-1754: 4
PCIE-1756: 2
- **Isolation Protection** — 2,500 V_{DC}
- **Overvoltage Protection** — 70 V_{DC}
- **ESD Protection** — 2,000 V_{DC}
- **Opto-Isolator Response** — 50 µs

Isolated Digital Output

- **Channels** — PCIE-1752: 64
PCIE-1756: 32
- **Output Type** — Sink (NPN)
- **Isolation Protection** — 2,500 V_{DC}
- **Output Voltage** — 5 ~ 40 V_{DC}
- **Sink Current** — 500 mA max./channel
- **Opto-isolator Response** — 50 µs

General

- **Bus Type** — PCI Express V1.0
- **I/O Connectors** — 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** — 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** — **PCIE-1752**
Typical: 3.3 V @ 485 mA
Max.: 3.3 V @ 530 mA; 12V @ 90 mA
PCIE-1754
Typical: 3.3 V @ 285 mA
Max.: 3.3 V @ 330 mA
PCIE-1756
Typical: 3.3 V @ 385 mA
Max.: 3.3 V @ 430 mA; 12V @ 55 mA
- **Operating Temperature** — 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** — -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** — 5 ~ 95% RH, non-condensing

Ordering Information

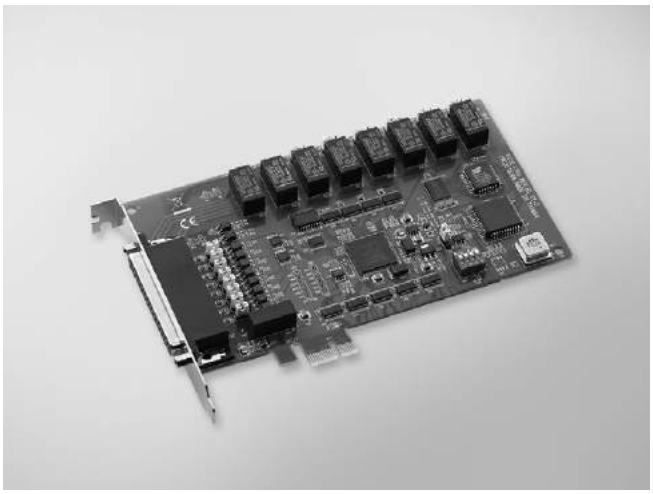
- **PCIE-1752** — 64-ch Isolated Digital Output PCI Express Card
- **PCIE-1754** — 64-ch Isolated Digital Input PCI Express Card
- **PCIE-1756** — 64-ch Isolated Digital I/O PCI Express Card

Accessories

- **PCL-10250-1E** — 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **PCL-10250-2E** — 100-pin SCSI to Two 50-pin SCSI Cable, 2 m
- **ADAM-3951** — 50-pin DIN-rail Wiring Board w/ LED Indicators
- **PCL-101100M-3E** — 100-pin SCSI to 100-pin SCSI Cable, 3 m
- **ADAM-39100** — 100-pin DIN-rail Wiring Board

PCIE-1760

8-ch Relay and 8-ch Isolated Digital Input PCI Express Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- 8 opto-isolated digital input channels with counter/timer function
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- BoardID switch

Introduction

PCIE-1760 relay actuator and isolated digital input card is a PC add-on card for the PCI Express bus. It meets the PCI Express standard Rev. 1.0. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 1.0 V max.
Logic 1: 4.5 V min. (12 V max.)
- **Interrupt Capable Ch.** 8
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2 kΩ 1/4 W

Counter/Timer

- **Channels** 8
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 Hz
- **Isolation Protection** 2,500 V_{DC}
- **PWM Channels** 2
- **Digital Noise Filter** Min. effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
Min. effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms

Relay Output

- **Channels** 8
- **Relay Type** 2 x Form C, and 6 x Form A
- **Contact Rating** 1 A @ 125 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 125 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 2 A
- **Operate/Release Time** 5 / 3.5 ms max
- **Resistance** Contact: 50 mΩ max.
Insulation: 100 MΩ min. @ 500 V_{DC}
- **Life Expectancy (Electrical)** 3 x 10^5 cycles min.: 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
10^6 cycles min.: 1 A @ 30 V_{DC}, 0.5 A @ 125 V_{AC}

General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical: 5 V @ 450 mA
Max.: 5 V @ 850 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

- **PCIE-1760** 8-ch Relay/IDI PCIe Card w/ 10-ch Counter/Timer

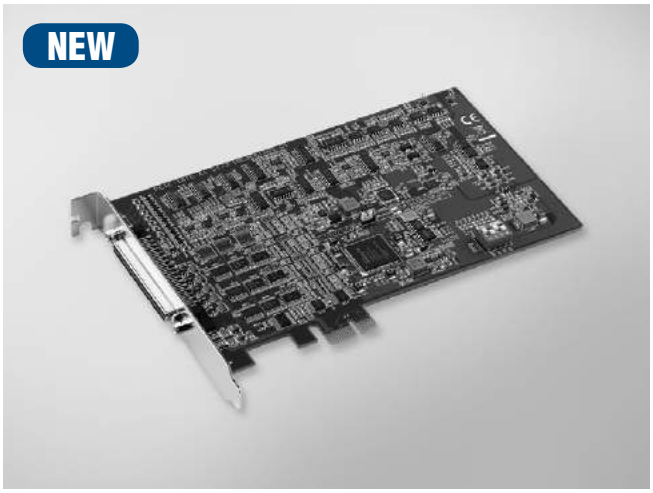
Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCIE-1810

800 kS/s, 12-bit, 16-ch PCI Express Multifunction DAQ Car

NEW



FCC CE RoHS

Features

- 16 analog inputs, up to 800 kS/s, 12-bit resolution
- 2 analog outputs, up to 500 kS/s, 12-bit resolution
- Support for digital trigger and analog trigger
- 24 programmable digital I/O lines
- Two 32-bit programmable counter/timers
- Onboard FIFO memory (4k samples)
- Automatic channel/gain scanning

Introduction

The PCIE-1810 is a multifunction PCI Express card that includes digital I/O, analog I/O and counter functions. It also features a 800 kS/s 12-bit A/D converter and supports analog trigger for A/D data accquisition.

Specifications

Analog Input

- **Channels** Single-end 16-ch
  Differential 8-ch
- **Resolution** 12 bits
- **Sample Rate** Single Channel 800 kS/s max.
  Multi-Channel 500 kS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCIE-1810 are used, the sampling rate is 500k/4 = 125 kS/s per channel.

- **Trigger Reference** Digital Trigger, Analog Trigger
- **Trigger Mode** Start trigger, Delay to Start trigger
  Stop trigger, Delay to Stop trigger
- **FIFO Size** 4k samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software and external clock
- **Input Range** Software programmable

Gain	0.5	1	2	4	8
Bipolar	±10V	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static- Software Polling
  500 KS/s max.
- **Output Range** Software programmable

Internal Reference	Unipolar	0 ~ 5 V 0 ~ 10 V
	Bipolar	-5 V ~ 5 V -10 V ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 5 mA
- **Operation Mode** Static update, Waveform generation
- **Accuracy** INLE: ± 1 LSB, DNLE: ± 1 LSB

Digital I/O

- **Channels** 24
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 15 mA @ 0.8 V
  Source: 15 mA @ 2.0 V

Counter

- **Channels** 2
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Pulse Generation** Yes
- **Timebase Stability** 50 ppm

General

- **Form factor** PCI Express x 1
- **Triggering** 12 bits Analog x 2 / Digital x 2
- **I/O Connector** 68-pin SCSI female connector
- **Dimensions (L x W)** 167 x 100 mm
- **Power Consumption** Typical: 3.3 V @ 488 mA
  12 V @ 112 mA
  Max.: 3.3 V @ 2.25 A
  12 V @ 390 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F) (refer to IEC 60068-2-1, 2)
- **Storage Temperature** -40 ~ 70°C (-40 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 60068-2-3)

Ordering Information

- **PCIE-1810** 800 kS/s, 12-bit Multifunction Card

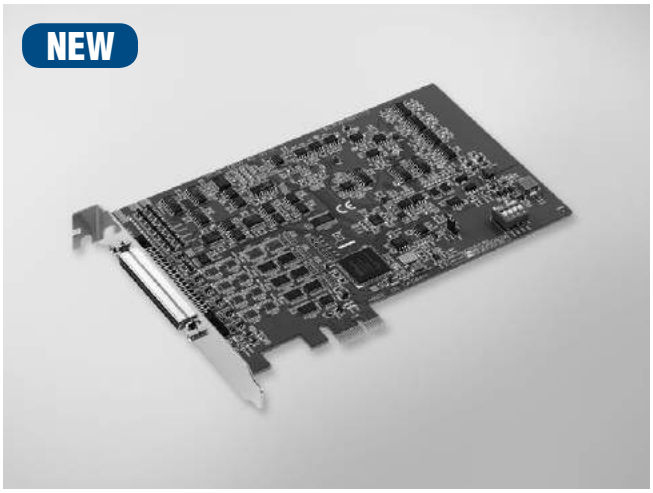
Accessories

- **PCL-10168H-1E** 68-pin SCSI Shielded Cable with Noise Rejecting, 1 m
- **PCL-10168H-2E** 68-pin SCSI Shielded Cable with Noise Rejecting, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCIE-1816
PCIE-1816H

1 MS/s, 16-bit, 16-ch PCI Express Multifunction DAQ Card

5 MS/s, 16-bit, 16-ch PCI Express Multifunction DAQ Card



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Features

PCIE-1816

- 16 analog inputs, up to 1 MS/s, 16-bit resolution

PCIE-1816H

- 16 analog inputs, up to 5 MS/s, 16-bit resolution

PCIE-1816/1816H

- 2 analog outputs up to 3 MS/s, 16-bit resolution
- Support Analog and Digital Trigger for AI/O
- Support Waveform generation for AO
- 24 programmable digital I/O lines
- Two 32-bit programmable counter/timers
- Onboard FIFO memory (4k samples)
- Support for Microsoft Windows 8 (desktop mode only)/7/XP

Introduction

PCIE-1816/1816H is a 16-ch, up to 5 MS/s multi-function DAQ card and integrates digital I/O, analog I/O, and counter functions. The PCIE-1816/1816H also features analog and digital triggering, 2-ch 16 bit analog outputs with waveform generation capability, 24-ch programmable digital I/O lines, and two 32-bit general-purpose timer/counters.

Specifications

Analog Input

Channels	Single-end	16-ch
	Differential	8-ch
Resolution	16 bits	
Sample Rate	PCIE-1816	Single Channel 1 MS/s max.
		Multi-Channel 500 kS/s max.
	PCIE-1816H	Single Channel 5 MS/s max.
		Multi-Channel 1 MS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCIE-1816H are used, the sampling rate is 1M/4 = 250 kS/s per channel.

- **Trigger Reference** Analog Trigger, Digital Trigger
- **FIFO Size** 4k samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Mode** Software and external clock
- **Input Range** Software programmable

PCIE-1816					
Gain	0.5	1	2	4	8
Bipolar	±10V	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)*	0.0075	0.0075	0.0075	0.008	0.008

Analog Output

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** 3 MS/s max.
- **Output Range** Software programmable

Internal Reference	**Unipolar**	0 ~ 5 V 0 ~ 10 V
	Bipolar	-5 V ~ 5 V -10 V ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 5 mA
- **Operation Mode** Static update, Waveform Generation
- **Accuracy** INLE: ± 4 LSB, DNLE: ± 1 LSB

Digital I/O

- **Channels** 24
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 15 mA @ 0.8 V
Source: 15 mA @ 2.0 V

Counter

- **Channels** 2
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Pulse Generation** Yes
- **Timebase Stability** 50 ppm

General

- **Form factor** PCI Express x 1
- **Triggering** 16 bits Analog x 2 / Digital x 2
- **I/O Connector** 68-pin SCSI female connector
- **Dimensions (L x W)** 167 x 100 mm
- **Power Consumption** Typical: 3.3 V @ 488 mA
12 V @ 112 mA
Max.: 3.3 V @ 2.25 A
12 V @ 390 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -40 ~ 70°C (-40 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCIE-1816** 1 MS/s, 16-bit Multifunction Card
- **PCIE-1816H** 5 MS/s, 16-bit Multifunction Card

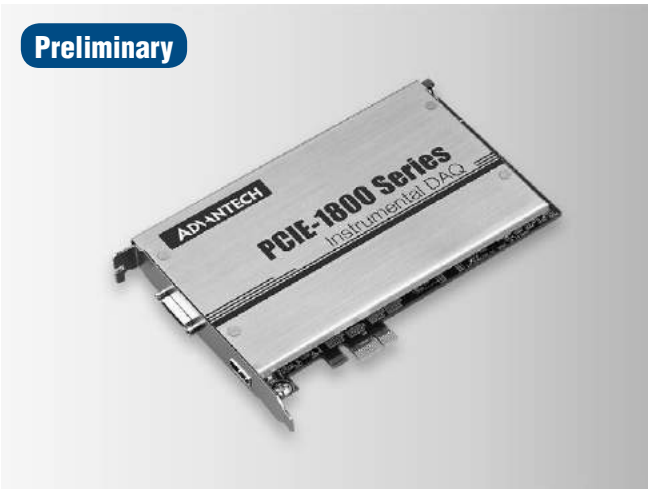
Accessories

- **PCL-10168H-1E** 68-pin SCSI Shielded Cable with Noise Rejecting, 1 m
- **PCL-10168H-2E** 68-pin SCSI Shielded Cable with Noise Rejecting, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCIE-1802

8-ch, 24-Bit, 216 kS/s Dynamic Signal Acquisition PCI Express Card

Preliminary



RoHS COMPLIANT 2002/95/EC CE FC

Features

- 8 simultaneously sampled analog inputs up to 216 kS/s
- 24-bit resolution ADCs with 115 dB dynamic range
- Wide input ranges from ±0.2 V to ±10 V
- Built-in anti-aliasing filter
- Software configurable 4 or 10 mA Integrated Electronic Piezoelectric Excitation (IEPE)
- Software selectable AC/DC coupling
- Full auto-calibration
- Multiple card synchronization

Introduction

The Advantech PCIE-1802 is a 24-bit high-accuracy data acquisition PCI Express module specifically designed for sound and vibration applications. This module has built-in 4 or 10 mA excitation currents for IEPE sensors such as accelerometers and microphones.

Specifications

Analog Input

- **Channels** 8 (simultaneously sample, differential or 50 Ω pseudo-differential)
- **Resolution** 24 bits (Delta-sigma)
- **Max. Sampling Rate** 100 S/s to 204.8 kS/s (with resolution ≤ 363.80 μS/s)
- **Input Coupling** AC/DC, selectable per channel
- **AC Cut-Off Frequency** 0.016 Hz (-3 dB)
- **DC Offset Adjustment** ±50 % of input range
- **Trigger Modes** Start trigger, Delay to Start trigger
  Stop trigger, Delay to Stop trigger
- **Input Range** ±0.2, ±0.5, ±1, ±2, ±5, ±10 Vpp
- **Offset Error** < ±0.002 %
- **Gain Error** < ±0.2 %
- **Total Harmonic Distortion (THD)** 100 dB
- **Dynamic Range** 115 dB
- **IEPE Excitation** 0, 4, or 10 mA, selectable per channel (open/short detect)
- **Data Transfer** Direct memory access (DMA)
- **Multiple Card Synchronization** For more than 8 AI channels

Digital Input/Output

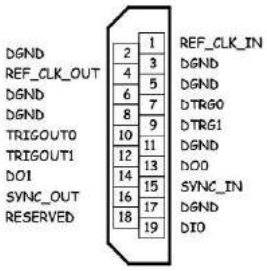
- **DI Channels** 1 (edge detect, noise filter)
- **DO Channels** 2

General

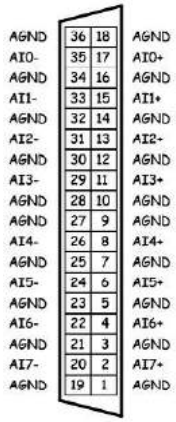
- **Bus Type** PCI Express x1
- **I/O Connectors** CN600 36-pin Mini-SCSI (for AI)
  CN601 HDMI (for clock, trigger, and DI/Os)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -40 ~ 70°C (40 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Pin Assignments

CN601



CN600



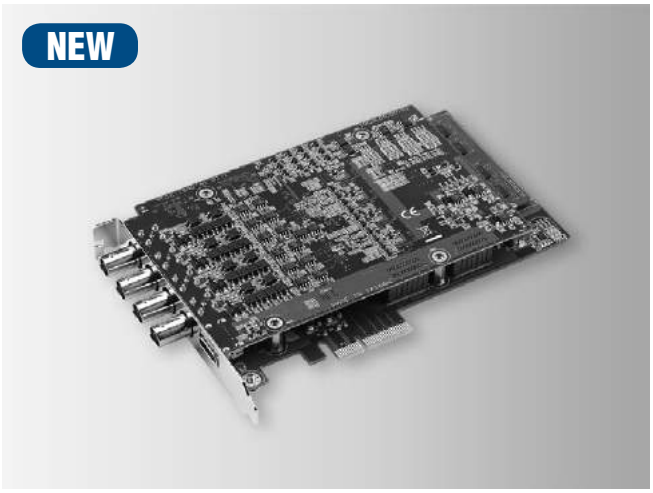
Ordering Information

- **PCI-1802** 8-ch, 24-Bit, 216 kS/s Dynamic Signal Acquisition PCI Express Card

PCIE-1840

4-ch 16-Bit 125 MS/s High-Speed PCI Express Digitizer

NEW



Features

- 4 simultaneously sample analog inputs, up to 125 MS/s, 16-bit resolution
- 500 MS/s Time Interleaved Sampling
- Non-stop data streaming capable
- 2 GB on-board memory
- 1M or 50 Ohm selectable input impedance
- On-Board tunable anti-aliasing filter
- AC/DC Coupling

Introduction

The PCIE-1840 high-speed digitizers feature four 125 MS/s simultaneously sampled analog input channels with 16-bit resolution, 100 MHz bandwidth, and up to 2 GB of memory in a PCI Express device.

Specifications

Analog Input

Channels	4 single-ended , simultaneously sampling
Resolution	16 bits
Max. Sampling Rate	125 MS/s per channel
Memory Size	2GB
Over Voltage Protection	30 Vp-p
Input Impedance	50 Ω / 1M Ω
Input Coupling	AC/DC (only for 1MΩ input impedance)
Sampling Modes	Software and external clock
Trigger Modes	Start trigger, Delay to Start trigger Stop trigger, Delay to Stop trigger
Input Range	0.2 / 0.4 / 1 / 2 / 4 / 10 / 20 Vpp (input Impedance must be 1 MΩ)
Time Interleaved Sampling	- 4 channels combined, 500 MSPS max. - 2 channels combined, 250 MSPS max. - No time interleaved, 125 MSPS max. - Configured automatically by setting sampling rate

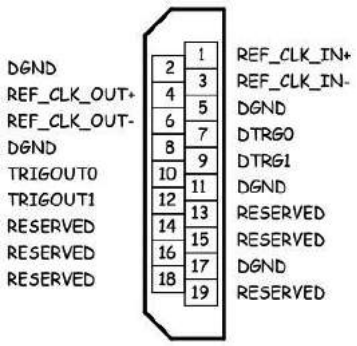
General

Bus Type	PCI Express x 4
I/O Connectors	4 x BNC connector (for AI) 1 x HDMI connector (for Ext. clock and trigger)
Dimensions (L x H)	175 x 100 mm (6.9" x 3.9")
Operating Temperature	0 ~ 50°C (32 ~ 140°F)
Storage Temperature	-40 ~ 70°C (40 ~ 158°F)
Storage Humidity	5 ~ 95% RH, non-condensing

Ordering Information

PCIE-1840	4-ch 16Bit 125 MS/s High-Speed PCI Express Digitizer

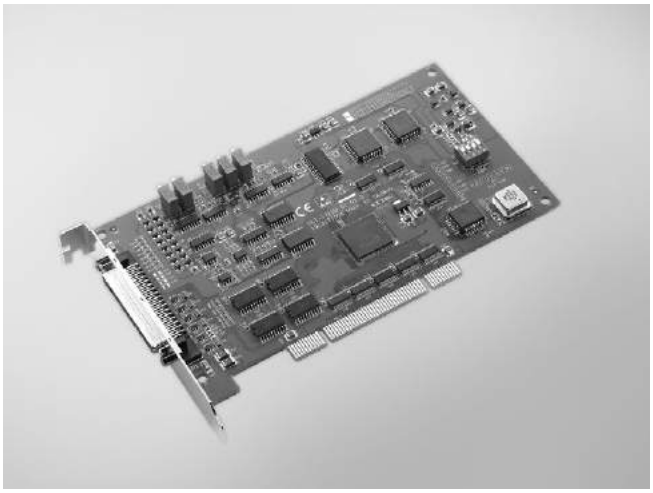
Pin Assignments



PCI-1710U/UL
PCI-1710HGU

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card with High Gain



FCC CE RoHS

Features

- 16-ch single-ended or 8-ch differential or a combination of analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (4,096 samples)
- Two 12-bit analog output channels (PCI-1710U/HGU only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID™ switch

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **FIFO Size** 4,096 samples
- **Overvoltage Protection** 30Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range (V, software programmable) & Absolute Accuracy**

PCI-1710U/UL					
Gain	0.5	1	2	4	8
Bipolar	±10	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

PCI-1710HGU								
Gain	0.5	1	5	10	50	100	500	1000
Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
Unipolar	N/A	0 ~ 10	N/A	0 ~ 1	N/A	0 ~ 0.1	N/A	0 ~ 0.01
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4	0.4	0.8	0.8

* ±1 LSB is added as the derivative for absolute accuracy

- **Maximum Sampling Rate**

Model	Gain	Max. Sampling Rate
PCI-1710U/UL	0.5, 1, 2, 4, 8	100 kS/s
PCI-1710HGU	0.5, 1	100 kS/s
	5, 10	35 kS/s
	20, 100	7 kS/s
	500, 1000	770 S/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1710U are used, the sampling rate is 100k/4 = 25 kS/s per channel.

Analog Output (PCI-1710U/HGU only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Unipolar**	0 ~ 5 V 0 ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 3 mA
- **Operation Mode** Static update
- **Accuracy** INLE: ±1 LSB, DNLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

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: 8.0 mA @ 0.8 V
Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

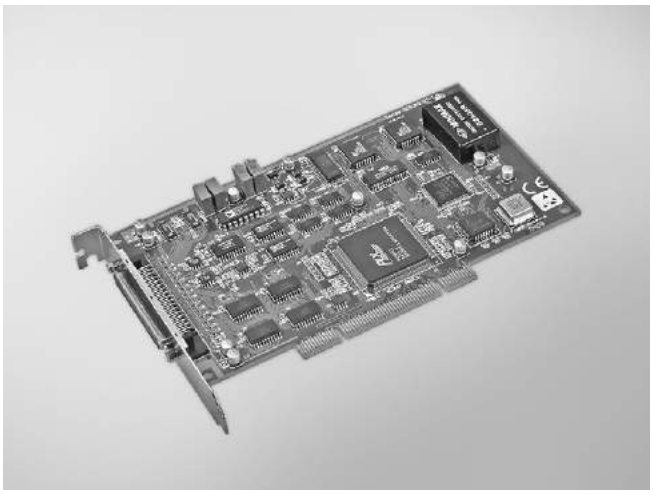
- **PCI-1710U** 100 kS/s, 12-bit Multifunction Card
- **PCI-1710UL** 100 kS/s, 12-bit Multifunction Card w/o AO
- **PCI-1710HGU** 100 kS/s, 12-bit High-gain Multifunction Card

Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1711U/UL

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card



FCC CE RoHS

Features

- 16-ch single-ended analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (1,024 samples)
- Two 12-bit analog output channels (PCI-1711U only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter

Specifications

Analog Input

- **Channels** 16 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 100k/4 = 25 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 2 MΩ/5 pF
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Input Range (V, software programmable) & Absolute Accuracy**

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1711U only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	Unipolar	0 ~ 5 V, 0 ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 11 V/μs
- **Driving Capability** 3 mA
- **Output Impedance** 0.81 Ω
- **Operation Mode** Static update
- **Accuracy** INLE: ±0.5 LSB
  DNLE: ±0.5 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
  PCI-1711U Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
  PCI-1711UL Typical: 5 V @ 700 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

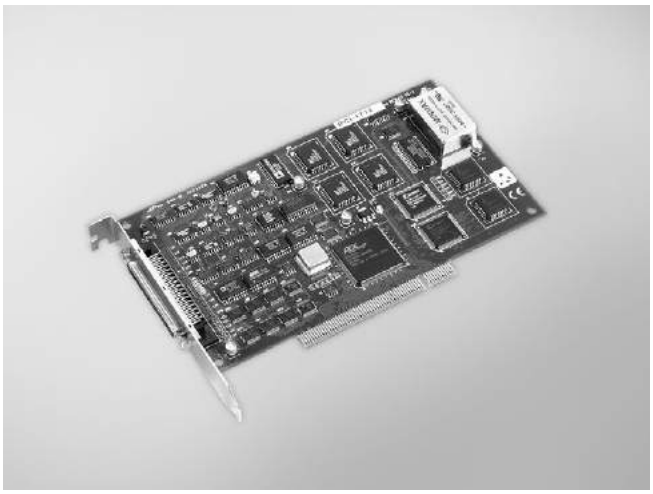
- **PCI-1711U** Entry-level 100 kS/s, 12-bit Multifunction Card
- **PCI-1711UL** Entry-level 100 kS/s, 12-bit Multi. Card w/o AO

Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1712/L

1 MS/s, 12-bit, 16-ch PCI Multifunction DAQ Card



FCC CE RoHS

Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 1 MHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (AI: 1,024 samples AO: 32,768 samples)
- Two 12-bit analog output channels with continuous waveform output function (PCI-1712 only)
- 16-ch digital input or output (programmable)
- Three 16-bit programmable multifunction counter/timers on 10 MHz
- Auto-calibration (AI/AO)
- PCI-Bus mastering data transfer
- Pre-, post-, about- and delay-trigger data acquisition modes for analog input channels
- Flexible triggering and clocking capabilities

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** Multi-channel, single gain: 1 MS/s
  Multi-channel, multi gain: 600 kS/s
  Multi-channel, multi gain, unipolar/bipolar: 400 kS/s
- **FIFO Size** 1,024 samples

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 600k/4 = 125 kS/s per channel. (multi gain, without unipolar/bipolar mixed)

- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (Off), 100 MΩ/100 pF (On)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Trigger Modes** Pre-trigger, post-trigger, delay-trigger and about-trigger
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1712 only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** 1 MS/s max.
- **FIFO Size** 32,768 samples
- **Output Range** (Software programmable)

Internal Reference	**Bipolar**	±5 V, ±10 V
	Unipolar	0 ~ 5 V, 0 ~ 10 V
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Static update, waveform generation
- **Accuracy** INLE: ±1 LSB
  DNLE: ±1 LSB

Digital I/O

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz, 1 MHz, 100 kHz, 10 kHz
  External Frequency: 10 MHz max.

General

- **Bus Type** PCI V 2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1.0 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

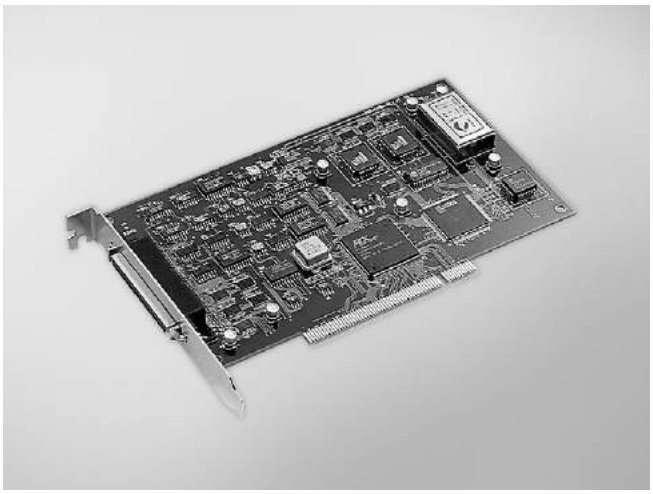
- **PCI-1712** 1 MS/s, 12-bit High-speed Multifunction PCI Card
- **PCI-1712L** 1 MS/s, 12-bit High-speed Multi. PCI Card w/o AO

Accessories

- **PCLD-8712** DIN-rail Wiring Board for PCI-1712/L
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1716/L

250 kS/s, 16-bit, 16-ch PCI Multifunction DAQ Card



FCC CE RoHS

Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Onboard FIFO memory (1,024 samples)
- Auto-calibration
- PCI-Bus mastering data transfer
- 2 analog output channels (PCI-1716 only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID switch

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 250k/4 = 62.5 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (off), 100 MΩ/100 pF (on)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.05	0.03	0.03	0.05	0.1

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1716 only)

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Unipolar**	0 ~ 5 V , 0 ~ 10 V
	Bipolar	±5 V, ±10 V
External Reference	0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)	

- **Slew Rate** 20 V/μs
- **Driving Capability** 20 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Static update
- **Accuracy** INLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

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: 0.8 mA @ 0.8 V
Source: 2.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Reference Clock** Internal: 10 MHz
External Clock Frequency: 10 MHz max.

General

- **Bus Type** PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Operating Humidity** 5 ~ 85% RH non-condensing
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCI-1716** 250 kS/s, 16-bit High-resolution Multi. Card
- **PCI-1716L** 250 kS/s, 16-bit High-res. Multi. Card w/o AO

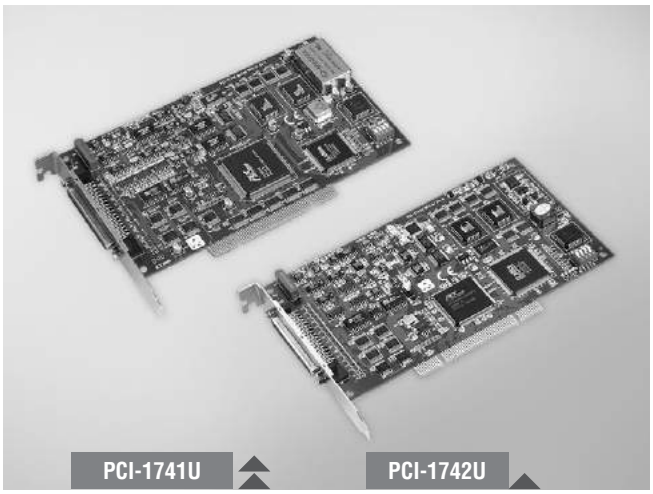
Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1741U
PCI-1742U

200 kS/s, 16-bit, 16-ch Universal PCI Multifunction Card

1 MS/s, 16-bit, 16-ch Universal PCI Multifunction Card



RoHS COMPLIANT 2002/95/EC FCC CE

Features

- 16-ch single-ended or 8-ch differential analog input
- PCI-1741U: 16-bit A/D converter, with up to 200 kHz sampling rate
  PCI-1742U: 16-bit A/D converter, with up to 1 MHz sampling rate
- Onboard FIFO memory (1,024 samples)
- Auto calibration
- PCI-1741U: 1 x 16-bit analog output channel
  PCI-1742U: 2 x 16-bit analog output channels
- 16-ch digital input and 16-ch digital output
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- Onboard programmable counter
- BoardID™ switch

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** PCI-1741U: 200 kS/s
  PCI-1742U: single-channel - 1 MS/s
  multi-channel - 800 kS/s
  unipolar bipolar mixed - 250 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10pF (Off); 100 MΩ/100pF (On)
- **Sampling Mode** Software, onboard programmable pacer and external
- **Input Range*** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.02	0.02	0.02	0.03	0.04

* **Note:** All channels should be set to the same range

Analog Output

- **Channels** PCI-1741U: 1
  PCI-1742U: 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Bipolar**	±5, ±10
	Unipolar	0 ~ 5, 0 ~ 10
External Reference		0 ~ +xV @ +xV (-10 ≤ x ≤ 10) -x ~ +xV @ +xV (-10 ≤ x ≤ 10)

- **Slew Rate** PCI-1741U: 20 V/us
  PCI-1742U: 40 V/us
- **Driving Capability** ±20 mA
- **Output Impedance** 0.1 W max.
- **Operation Mode** Software polling
- **Accuracy** INLE: ±2LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 24 mA @ 0.8 V
  Source: -15 mA @ 2.0 V

Counter/Timer

- **Channels** 1
- **Compatibility** 5 V/TTL
- **Resolution** 16 bits
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector Type** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1741U** 200 kS/s, 16-bit, 16-ch Univ. PCI Multi. Card
- **PCI-1742U** 1 MS/s, 16-bit, 16-ch Univ. PCI Multi. Card

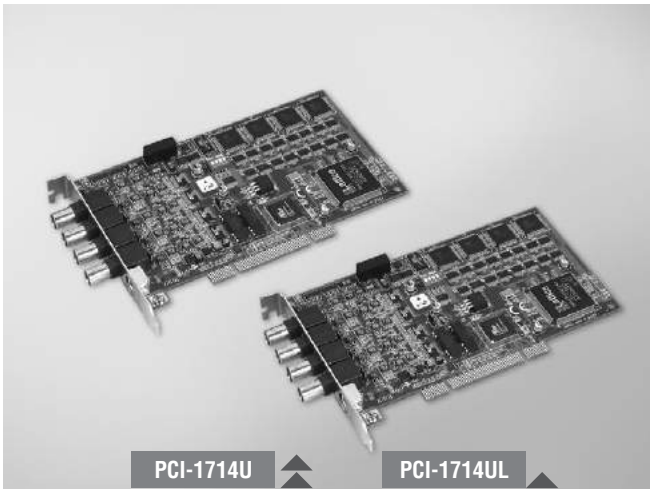
Accessories

- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCLD-8710** DIN-rail Wiring Board w/ CJC

PCI-1714U
PCI-1714UL

30 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card

10 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card



FCC CE RoHS

Features

- 4 single-ended analog input channels
- 12-bit A/D converter, with up to 30 MHz sampling rate
- Programmable gain
- Onboard FIFO memory (PCI-1714U: 32,768 samples each channel; PCI-1714UL: 8,192 samples, each channel)
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/counter
- BoardID™ switch
- Universal PCI Bus (supports 3.3 V or 5 V PCI bus signals)

Introduction

PCI-1714U and PCI-1714UL are advanced high-performance data acquisition cards based on the PCI bus. With a large FIFO of 32,768 for each channel, the maximum sampling rate of PCI-1714U can get up to 30 MS/s, on each channel, with an emphasis on continuous, non-stop, high-speed, streaming data of samples to host memory. The low-cost PCI-1714UL offers 10 MS/s on each channel at a stable rate, and has also been equipped with a universal PCI interface.

Specifications

Analog Input

- **Channels** 4 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** PCI-1741U: 30 MS/s per channel
  PCI-1741UL: 10 MS/s per channel
- **FIFO Size** PCI-1714U: 32,768 samples each channel
  PCI-1714UL: 8,192 samples each channel
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 50 Ω/1 MΩ/Hi Z jumper selectable/100 pF
- **Sampling Modes** Software polling, pacer
- **Trigger Modes** Post-trigger, pre-trigger, delay-trigger, about-trigger
- **Input Range (V, software programmable) & Absolute Accuracy**

Bipolar	±5	±2.5	±1	±0.5
Absolute Accuracy (% of FSR)*	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 4 x BNC connector (for AI)
  1 x PS/2 connector (for Ext. clock and trigger)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA ; 12 V @ 600 mA
  Max.: 5 V @ 1 A; 12 V @ 700m A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

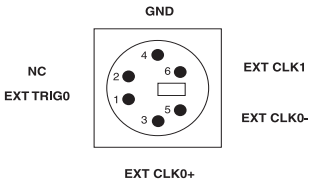
Ordering Information

- **PCI-1714U** 30 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card
- **PCI-1714UL** 10 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card

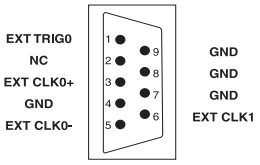
Accessories

- **ADAM-3909** DB9 DIN-rail Wiring Board
- **PCL-1010B-1E** BNC to BNC Wiring Cable, 1 m
- **PCL-10901-1E** DB9 to PS/2 Cable, 1 m
- **PCL-10901-3E** DB9 to PS/2 Cable, 3 m

Pin Assignments



Onboard PS/2 Connector

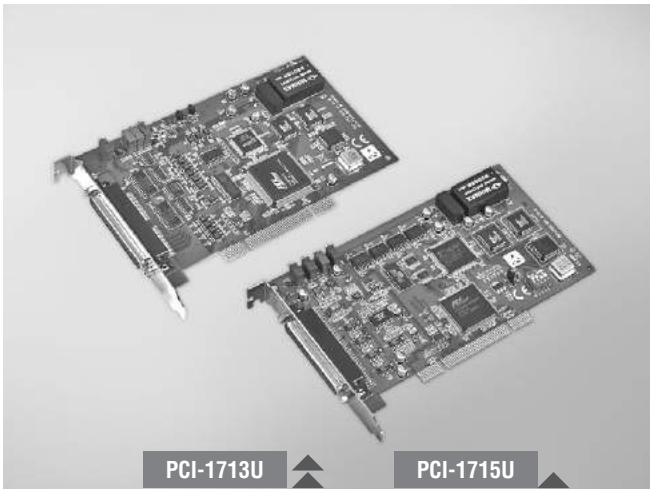


PS/2 To DB9 Cable Connector

PCI-1713U
PCI-1715U

100 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card

500 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card



Features

- 2,500 V_{DC} isolation protection
- 32-ch single-ended or 16-ch differential or a combination of analog input
- 12-bit resolution for A/D conversion
- Programmable gain for each input channel
- Onboard FIFO memory (PCI-1713U: 4,096 samples; PCI-1715U: 1,024 samples)
- Software, internal or external pacer sampling modes supported
- Universal PCI bus
- BoardID™ switch

Specifications

Analog Input

- **Channels** 32 single-ended/16 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** PCI-1713U: 100 kS/s
  PCI-1715U: 500 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1713U are used, the sampling rate is 100k/4 = 25 kS/s per channel.

- **FIFO Size** PCI-1713U: 4,096 samples
  PCI-1715U: 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 2,500 V_{DC}
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external clock (TTL level)
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

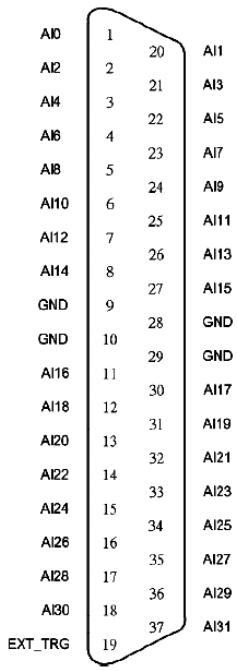
Ordering Information

- **PCI-1713U** 100 kS/s, 12-bit, 32-ch Isolated AI PCI Card
- **PCI-1715U** 500 kS/s, 12-bit, 32-ch Isolated AI PCI Card

Accessories

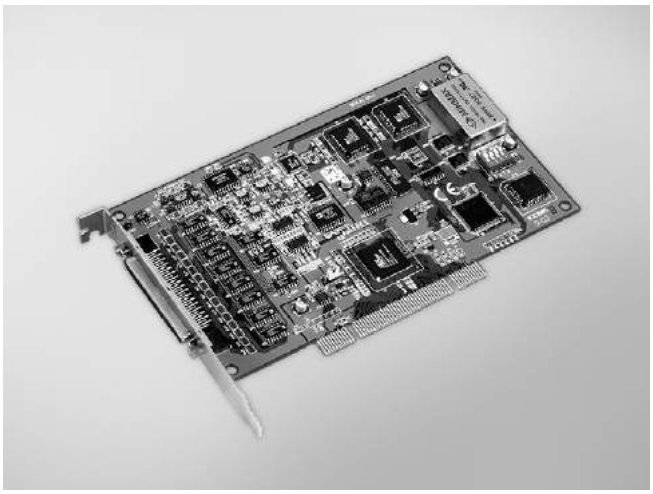
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

Pin Assignments



PCI-1747U

250 kS/s, 16-bit, 64-ch Analog Input Universal PCI Card



Features

- 64-ch single-ended or 32-ch differential or a combination of analog input
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Auto calibration
- Onboard FIFO memory (1,024 samples)
- PCI-Bus mastering data transfer
- Universal PCI Bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

Introduction

PCI-1747U is a high-resolution, high-channel-count analog input card for the PCI bus. Its sampling rate is up to 250 kS/s and 16-bit resolution provides the resolution needed for most data acquisition applications. PCI-1747U provides 64 single-ended, 32 differential analog input channels or a combination of these. It also has built in a 1,024 FIFO buffer for analog input data.

Specifications

Analog Input

- **Channels** 64 single-ended, 32 differential, or combination
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (Off); 100 MΩ/100 pF (On)
- **Sampling Modes** Software and onboard programmable pacer
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.03	0.02	0.02	0.03	0.04

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

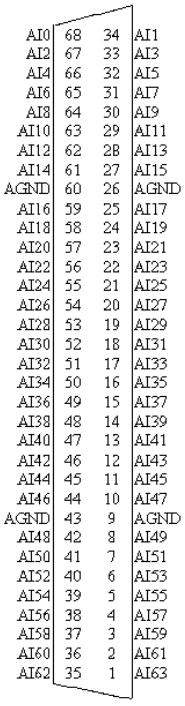
Ordering Information

- **PCI-1747U** 250 kS/s, 16-bit, 64-ch AI Universal PCI Card

Accessories

- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m

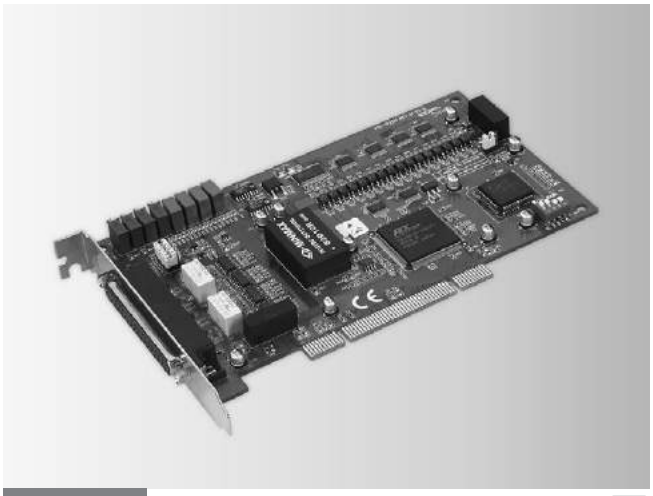
Pin Assignments



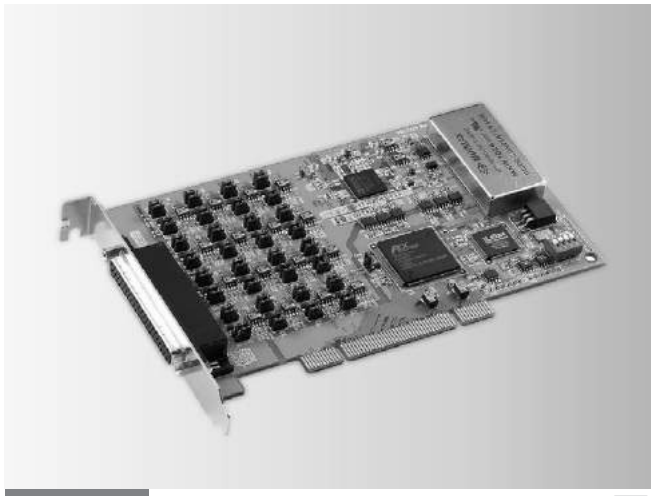
PCI-1720U
PCI-1724U

12-bit, 4-ch Isolated Analog Output Universal PCI Card

14-bit, 32-ch Isolated Analog Output Universal PCI Card



PCI-1720U



PCI-1724U

Specifications

Analog Output

- **Channels** 4 isolated
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±5, ±10
Unipolar (V)	0 ~ 5, 0 ~ 10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Slew Rate** 2 V/μs
- **Isolation Protection** 2,500 V_{DC}
- **Driving Capability** 5 mA
- **Operation Modes** Software polling
- **Accuracy** Relative: ±1 LSB; Differential Non-Linearity: ±1 LSB (monotonic)
- **Excitation Voltage** 50 V (max.)

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** 5 V @ 350 mA (typical), 500 mA (max.) 12 V @ 200 mA (typical), 350 mA (max.)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1720U** 12-bit, 4-ch Isolated AO Universal PCI Card

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

Specifications

Analog Output

- **Channels** 32 isolated
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Isolation Protection** 1,500 V_{DC} system isolation
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±4 LSB Differential Non-linearity: ±2 LSB (monotonic)
- **Driving Capacity** 10 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB62 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption 5** V @ 400 mA, 12 V @ 270 mA max.
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

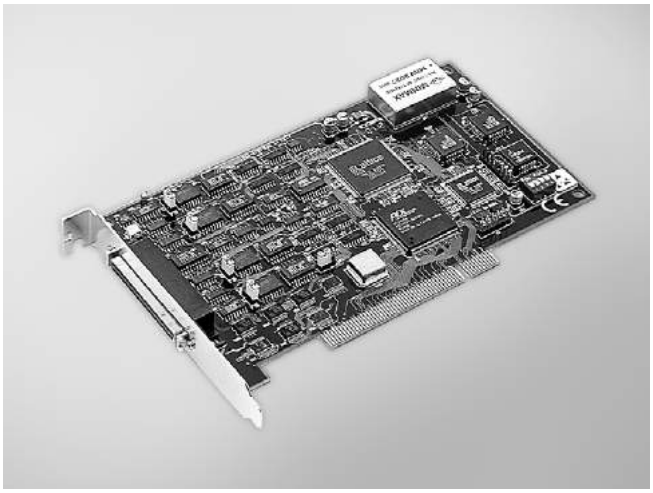
- **PCI-1724U** 14-bit, 32-ch Isolated AO Universal PCI Card

Accessories

- **PCL-10162-1E** DB62 Cable, 1 m
- **PCL-10162-3E** DB62 Cable, 3 m
- **ADAM-3962** DB62 DIN-rail Wiring Board

PCI-1721

12-bit, 4-ch Analog Output PCI Card with 16-ch Digital I/O



Features

- 10 MHz maximum digital update rate
- Auto calibration function
- Four analog output channels with 1,024 samples FIFO buffer
- A 12-bit DAC is equipped for each of analog output channels
- Real-time waveform output function with internal/external pacer
- Synchronized output function
- Flexible output types and range settings
- Keeps the output settings and values after system hot reset
- 16-ch DI/O and one 10 MHz 16-bit resolution counter
- BoardID™ switch

Introduction

PCI-1721 is an advanced high-speed analog output card for the PCI bus, and each of analog output channels are equipped with a 12-bit, double-buffered DAC. It features many powerful and unique functions, like a waveform output function with 10 MHz maximum update rate, auto-calibration and a BoardID switch. PCI-1721 is an ideal solution for industrial applications where high-speed continuous analog output or real-time waveform output functions are required.

Specifications

Analog Output

- **Channels** 4
- **Resolution** 12 bits
- **FIFO Size** 1,024 samples
- **Output Rate** 10 MHz or static update
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max., 2 V min.
- **Output Range**

Internal Reference	**Unipolar**	0 ~ 5 V, 0 ~ 10 V,
	Bipolar	±5 V, ±10 V
	Current Loop	0 ~ 20 mA, 4 ~ 20 mA (software programmable)
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Single/continuous/waveform/synchronized output
- **Accuracy** Relative: ±1 LSB
  Differential Non-linearity: ±1 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ -15 mA

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max, 2.0 V min.

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1721** 12-bit, 4-ch Advanced PCI Analog Output Card

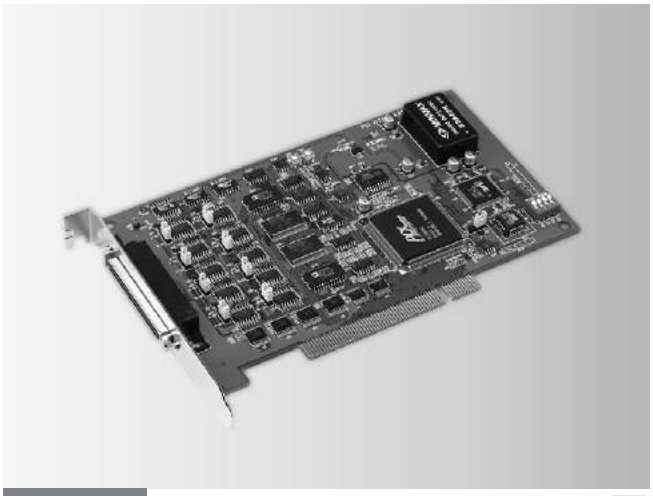
Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

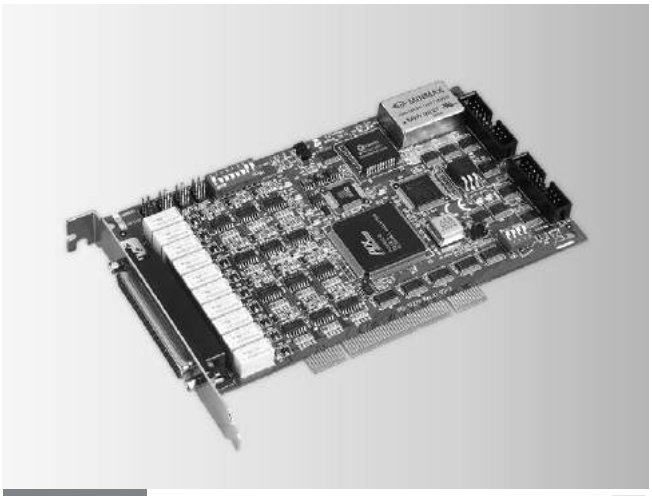
PCI-1723
PCI-1727U

16-bit, 8-ch Analog Output PCI Card with 16-ch Digital I/O

14-bit, 12-ch Analog Output Universal PCI Card with 32-ch Digital I/O



PCI-1723



PCI-1727U

Specifications

Analog Output

- **Channels** 8
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±6 LSB
  Differential Non-linearity: ±6 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability Sink** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ 15 mA

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCI-1723** 16-bit, 8-ch Non-isolated Analog Output PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

Specifications

Analog Output

- **Channels** 12
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±5
Unipolar (V)	0 ~ 5, 0 ~ 10
Current Loop (mA)	0 ~ 20

- **Slew Rate** 0.7 V/μs
- **Driving Capability** 15 mA
- **Operation Modes** Software polling, synchronized output
- **Current Loop Excitation** 8 ~ 36 V

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Input Loading** 0.5 V @ 0.4 mA max. (low)
  2.7 V @ 50 μA max. (high)

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.5 V @ 8 mA
  Source: 2.4 V @ 0.4 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 37-pin D-type female connector
  2 x 20-pin box header
- **Power Consumption** 5 V @ 460 mA typical, 500 mA max
  12 V @ 150 mA typical,100 mA max
- **Dimensions (L x H)** 175 × 100 mm (6.9" ×3.9")
- **Operating Temperature** 0 ~ 50°C (32 ~ 122°F)
- **Storing Temperature** -20 ~ 65°C (-4 ~ 149°F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1727U** 14-bit, 12-ch Universal Analog Output Card

Accessories

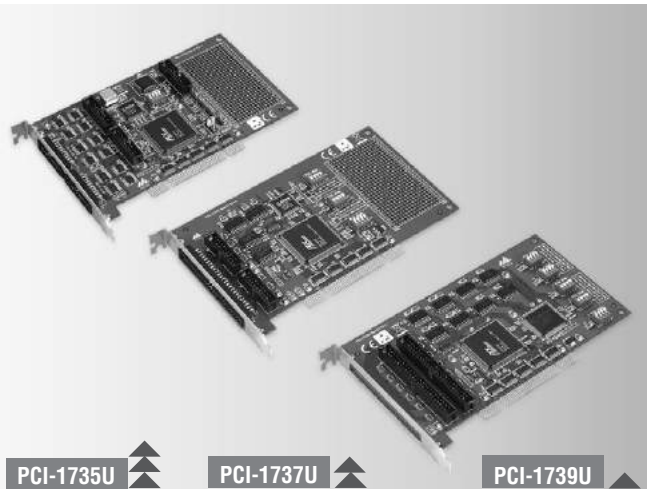
- **PCL-10120-1E** 20-pin flat cable, 1 m
- **PCL-10137-1E** DB37 cable assembly, 1 m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

PCI-1735U
PCI-1737U
PCI-1739U

64-ch Digital I/O and Counter Universal PCI Card

24-ch Digital I/O Universal PCI Card

48-ch Digital I/O Universal PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- ISA-Compatible with PCL-720+ (PCI-1735U), PCL-724 (PCI-1737U) and PCL-731 (PCI-1739U)
- TTL-level digital input and output compatibility
- Emulates mode 0 of 8255 PPI (PCI-1737U and PCI-1739U)
- Interrupt handling capability (PCI-1737U and PCI-1739U)
- Output status readback (PCI-1737U and PCI-1739U)
- 3 programmable counter/timer channels and User configurable clock source (PCI-1735U)
- Breadboard area for custom circuits (PCI-1735U and PCI-1739U)
- PCI universal card

Specifications

Digital Input

- **Channels** PCI-1735U: 32
  PCI-1737U: 24 (shared with output)
  PCI-1739U: 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** PCI-1735: Logic 0: 0.8V max. Logic 1: 2.0V min.
  PCI-1737U/1739U: Logic 0: 0.4V max. Logic 1: 2.4V min.
- **Interrupt Capable Ch.** PCI-1737U: 1
  PCI-1739U: 2

Digital Output

- **Channels** PCI-1735U: 32
  PCI-1737U: 24 (shared with input)
  PCI-1739U: 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** PCI-1735U: Logic 0: 0.5 V max. Logic 1: 2.4 V min.
  PCI-1737U/1739U: Logic 0: 0.4 V max. Logic 1: 2.4 V min.
- **Output Capability** PCI-1735U: Sink: 0.5 V @ 24 mA Source: 2.4 V @ 15 mA
  PCI-1737U/1739U: Sink: 0.4 V @ 24 mA Source: 2.4 V @ 15 mA

Counter/Timer (PCI-1735U)

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Re. Clock Internal** Selectable 1 MHz, 100 kHz, or 10 kHz base clock
- **Ext. Clock Frequency** Jumper selectable divider: x2, x1, x0.5, and x0.25
- **Prog.Counter Modes** 6

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** PCI-1735U: 5 x 20-pin box header
  PCI-1737U: 2 x 20-pin & 1 x 50-pin box header
  PCI-1739U: 2 x 50-pin box header
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** PCI-1735U: 5V @365 mA (max.)
  PCI-1737U: 5V @300 mA (max.)
  PCI-1739U: 5V @720 mA (max.)
- **Operating Temperature** 0 ~ 65°C (32 ~ 149°F)
- **Storage Temperature** -25 ~ 80°C (-13 ~ 176°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

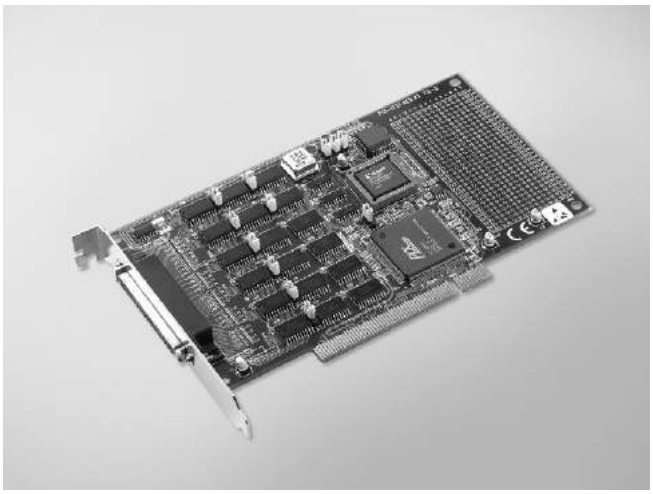
- **PCI-1735U** 64-ch Digital I/O and Counter Card
- **PCI-1737U** 24-ch Digital I/O Universal PCI Card
- **PCI-1739U** 48-ch Digital I/O Universal PCI Card

Accessories

- **PCL-10120-1E** IDC-20 Flat Cable, 1 m
- **PCL-10120-2E** IDC-20 Flat Cable, 2 m
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3920** 20-Pin Flat Cable Terminal, DIN-rail Mount
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

PCI-1751

48-ch Digital I/O and 3-ch Counter PCI Card



FCC CE RoHS

Features

- 48 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- BoardID switch

Introduction

PCI-1751 is a 48-bit digital I/O card for the PCI bus. Its 48 bits are divided into six 8-bit I/O ports and users can configure each port as input or output via software. PCI-1751 also provides one event counter and two 16-bit timers, which can be cascaded to become a 32-bit timer.

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.
- **Interrupt Capable Ch.** 2

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 24 mA
  Source: 2.4 V @ 15 mA

Counter/Timer

- **Channels** 3
- **Resolution** 2 x 16-bit counters, or 1 x 32-bit counter (jumper selectable)
  1 x 16-bit event counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz
  External Voltage Range: 5 V/TTL

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1751** 48-ch Digital I/O and Counter PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board

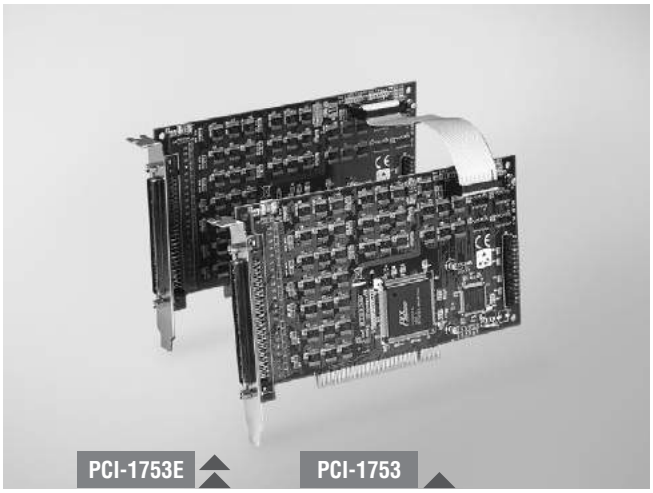
Pin Assignments

PA00	1	35	PA10
PA01	2	36	PA11
PA02	3	37	PA12
PA03	4	38	PA13
PA04	5	39	PA14
PA05	6	40	PA15
PA06	7	41	PA16
PA07	8	42	PA17
GND	9	43	GND
PB00	10	44	PB10
PB01	11	45	PB11
PB02	12	46	PB12
PB03	13	47	PB13
PB04	14	48	PB14
PB05	15	49	PB15
PB06	16	50	PB16
PB07	17	51	PB17
GND	18	52	GND
PC00	19	53	PC10
PC01	20	54	PC11
PC02	21	55	PC12
PC03	22	56	PC13
PC04	23	57	PC14
PC05	24	58	PC15
PC06	25	59	PC16
PC07	26	60	PC17
GND	27	61	GND
CNT0_OUT	28	62	CNT0_CLK
GND	29	63	CNT0_G
CNT1_OUT	30	64	CNT1_CLK
GND	31	65	CNT1_G
CNT2_OUT	32	66	CNT2_CLK
INT_OUT	33	67	CNT2_G
VCC	34	68	VCC

PCI-1753
PCI-1753E

96-ch Digital I/O PCI Card

96-ch Digital I/O Extension Card for PCI-1753



FCC CE RoHS

Features

- Up to 96 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Multiple-source interrupt handling capability
- Interrupt output pin for simultaneously triggering external devices with the interrupt
- Output status read-back
- "Pattern match" and "Change of state" interrupt functions for critical I/O monitoring
- Keeps the output settings and values after system hot reset
- Supports both dry and wet contact
- High-density 100-pin SCSI connector

Introduction

PCI-1753 is a 96-bit digital I/O card for the PCI bus, which can be extended to 192 digital I/O channels by connecting its extension board - PCI-1753E. The card emulates mode 0 of the 8255 PPI chip, but the buffered circuits offer a higher driving capability than the 8255. The 96 I/O lines are divided into twelve 8-bit I/O ports: A0, B0, C0, A1, B1, C1, A2, B2, C2, A3, B3 and C3. You can configure each port as input or output via software.

Specifications

Digital Input/Output

- **Channels** 96 digital I/O lines for PCI-1753
  192 digital I/O lines if extending with PCI-1753E
- **Programming Mode** 8255 PPI mode 0
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.44 V max.
  Logic 1: 3.76 V min.
- **Output Capability** Sink: 0.44 V @ 24 mA
  Source: 3.76 V @ 24 mA

General

- **Bus Type** PCI V2.2
- **I/O Connector** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 400 mA
  Max.: 5 V @ 2.7 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1753** 96-ch Digital I/O PCI Card
- **PCI-1753E** Extension Board for PCI-1753

Accessories

- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board
- **PCL-10268-2E** 100-pin to Two 68-pin SCSI Cables, 1 m and 2 m

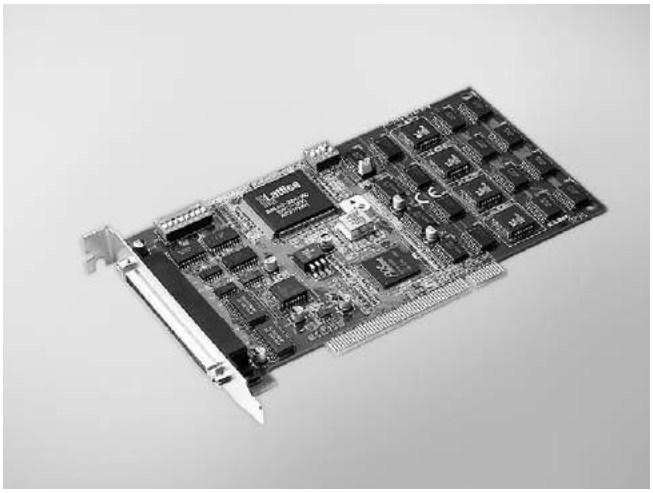
Pin Assignments

PA00	1	51	PA20
PA01	2	52	PA21
PA02	3	53	PA22
PA03	4	54	PA23
PA04	5	55	PA24
PA05	6	56	PA25
PA06	7	57	PA26
PA07	8	58	PA27
PB00	9	59	PB20
PB01	10	60	PB21
PB02	11	61	PB22
PB03	12	62	PB23
PB04	13	63	PB24
PB05	14	64	PB25
PB06	15	65	PB26
PB07	16	66	PB27
PC00	17	67	PC20
PC01	18	68	PC21
PC02	19	69	PC22
PC03	20	70	PC23
PC04	21	71	PC24
PC05	22	72	PC25
PC06	23	73	PC26
PC07	24	74	PC27
GND	25	75	GND
PA10	26	76	PA30
PA 11	27	77	PA31
PA12	28	78	PA32
PA13	29	79	PA33
PA14	30	80	PA34
PA15	31	81	PA35
PA16	32	82	PA36
PA17	33	83	PA37
PB10	34	84	PB30
PB1 1	35	85	PB31
PB12	36	86	PB32
PB13	37	87	PB33
PB14	38	88	PB34
PB15	39	89	PB35
PB16	40	90	PB36
PB17	41	91	PB37
PC10	42	92	PC30
PC1 1	43	93	PC31
PC12	44	94	PC32
PC13	45	95	PC33
PC14	46	96	PC34
PC15	47	97	PC35
PC16	48	98	PC36
PC17	49	99	PC37
VCC	50	100	VCC

PA00 ~PA07: I/O pins of Port A0
PA10 ~PA17: I/O pins of Port A1
PA20 ~PA27: I/O pins of Port A2
PA30 ~PA37: I/O pins of Port A3
PB00 ~PB07: I/O pins of Port B0
PB10 ~PB17: I/O pins of Port B1
PB20 ~PB27: I/O pins of Port B2
PB30 ~PB37: I/O pins of Port B3
PC00 ~PC07: I/O pins of Port C0
PC10 ~PC17: I/O pins of Port C1
PC20 ~PC27: I/O pins of Port C2
PC30 ~PC37: I/O pins of Port C3
GND: Ground
VCC: +5V voltage output

PCI-1755

80 MB/s, 32-ch Digital I/O PCI Card



FCC CE

Features

- Bus-mastering DMA data transfer with scatter gather technology
- 32/16/8-bit pattern I/O with start and stop trigger function, 2 modes handshaking I/O Interrupt handling capability
- Onboard active terminators for high speed and long distance transfer
- Pattern match and change state detection interrupt function
- General-purpose 8-ch digital I/O

Introduction

The PCI-1755 supports PCI-bus mastering DMA for high-speed data transfer. By setting aside a block of memory in the PC, the PCI-1755 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Specifications

Digital Input

- **Channels** General: 8 (shared with output)
High speed: 32 (shared with output)
- **Compatibility** 5V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** DIO0~DIO7

Digital Output

- **Channels** General: 8 (shared with input)
High speed: 32 (shared with input)
- **Compatibility** 5V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
Logic 1: 2.7 V min.
- **Output Capacity** Sink: 0.5 V @ 48 mA
Source: 2.4 V @ 15 mA

Transfer Characteristics

- **Onboard FIFO** 16 KB for DI & 16 KB DO channels
- **Data Transfer Mode** Bus Mastering DMA with Scatter-Gather
- **Data Transfer Bus Width** 8/16/32 bits (programmable)
- **Max. Transfer Rate** DI: 80 M bytes/sec, 32-bit @ 20 MHz
120 M bytes/sec, 32-bit @ 40 MHz
external pacer when data length is less than FIFO size
DO: 80 MBytes/sec, 32-bit @ 20 MHz
- **Operation Mode** Handshaking

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 1 A
Max.: 5 V @ 1 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1755** 80 MB/s, 32-ch Digital I/O PCI Card

Accessories

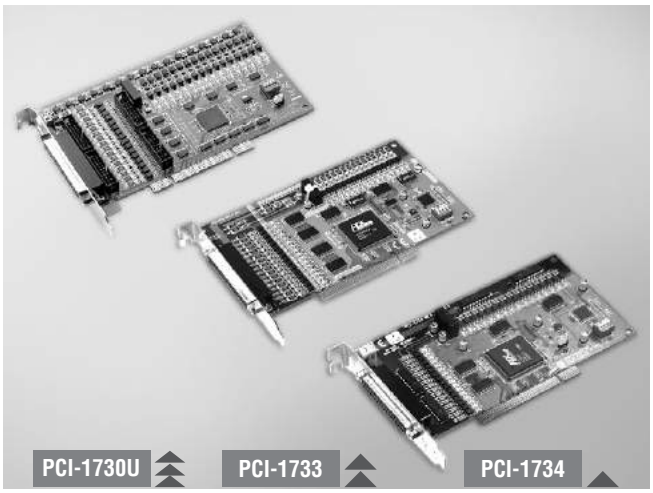
- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board
- **PCL-101100-1E** 100-pin SCSI High-Speed Cable, 1 m

PCI-1730U
PCI-1733
PCI-1734

32-ch Isolated Digital I/O Universal PCI Card

32-ch Isolated Digital Input PCI Card

32-ch Isolated Digital Output PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- ISA-compatible with PCL-730/733/734
- 32-ch isolated DI/O (16-ch digital input, 16-ch digital output)
- 32-ch TTL DI/O (16-ch digital input,16-ch digital output) (PCI-1730U only)
- High output driving capacity
- Interrupt handling capability
- 2 x 20-pin connectors for isolated DI/O channels (PCI-1730U only)
- 2 x 20-pin connectors for TTL DI/O channels (PCI-1730U only)
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels

Introduction

PCI-1730U, PCI-1733, and PCI-1734 offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL digital I/O channels on PCI-1730U.

Specifications

Digital Input (PCI-1730U only)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2 (DI0, DI1)

Isolated Digital Input (PCI-1730U/ PCI-1733)

- **Channels** PCI-1730U: 16
PCI-1733: 32
- **Input Voltage** Logic 0: 1 V max. (2 V max.)
Logic 1: 5V min. (30 V max.)
- **Interrupt Capable Ch.** PCI-1730U: 2 (IDI0, IDI1)
PCI-1733: 4 (IDI0, IDI1, IDI16, IDI17)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2.7 kΩ @ 1 W

Digital Output (PCI-1730U only)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.8 V @ 24 mA
Source: 2.0 V @ 15 mA

Isolated Digital Output (PCI-1730U/ PCI-1734)

- **Channels** 16
- **Output Type** Sink type (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** PCI-1730U: 300 mA max./channel
PCI-1734: 200 mA max./channel
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2 (Universal PCI V2.2 for PCI-1730U)
- **I/O Connectors** 1 x DB37 female connector
4 x 20-pin box header (PCI-1730U only)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 250 mA, 12 V @ 35 mA
Max.: 5 V @ 400 mA, 12 V @ 60 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

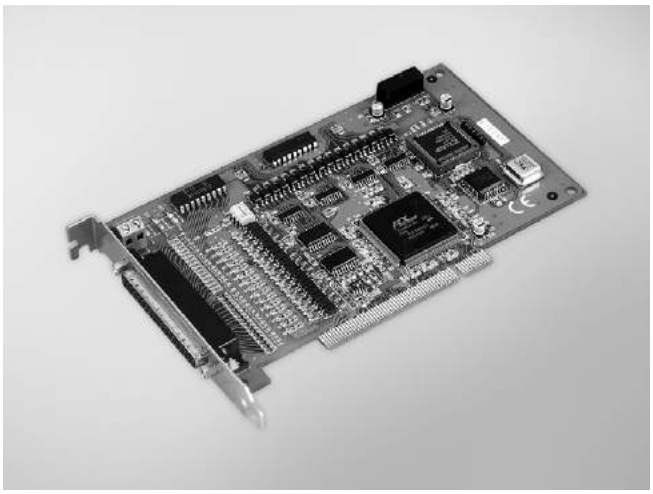
- **PCI-1730U** 32-ch Isolated Digital I/O Univ. PCI Card
- **PCI-1733** 32-ch Isolated Digital Input PCI Card
- **PCI-1734** 32-ch Isolated Digital Output PCI Card

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

PCI-1750

32-ch Isolated Digital I/O and 1-ch Counter PCI Card



FCC CE RoHS

Features

- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all isolated channels (2,500 V_{DC})
- High sink current on isolated output channels (200 mA/channel)
- Supports dry contact or 5 ~ 50 V_{DC} isolated inputs
- Interrupt handling capability
- Timer/counter interrupt capability

Introduction

PCI-1750 offers 16 isolated digital input channels, 16 isolated digital output channels, and one isolated counter/timer for the PCI bus. With isolation protection of 2,500 V_{DC}, and dry contact support, PCI-1750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the PCI-1750 corresponds to a bit in a PC I/O port. This makes PCI-1750 very easy to program. This card also offers a counter or timer interrupt and two digital input interrupt lines to a PC, so you can then easily configure the card with software.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 2 V max.
  Logic 1: 5 V min. (30 V_{DC} max.) or dry contact
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max. per channel
- **Opto-Isolator Response** 100 µs

Counter/Timer

- **Channels** 1
- **Resolution** 1 x 16-bit isolated counter
- **Input Voltage** Logic 0: 2V max.
  Logic 1: 5V min. (30V_{DC} max.)
- **Max. Input Frequency** 1 MHz
- **Isolation Protection** 2,500 V_{DC}

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
  1 x 2-pin terminal block for extended ground
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

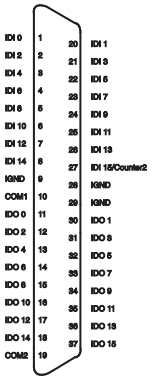
Ordering Information

- **PCI-1750** 32-ch Isolated Digital I/O and Counter PCI Card

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

Pin Assignments

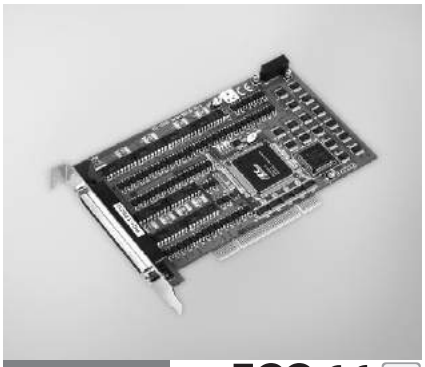


PCI-1752U
PCI-1754
PCI-1756

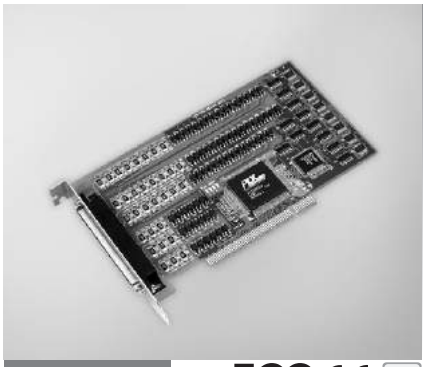
64-ch Isolated Digital Output Universal PCI Card

64-ch Isolated Digital Input PCI Card

64-ch Isolated Digital I/O PCI Card



PCI-1752U



PCI-1754

PCI-1756

Features

- 64 isolated digital output channels
- High-voltage isolation on output channels (2,500 V_{DC})
- Wide output range (5 ~ 40 V_{DC})
- High-sink current on isolated output channels (200 mA max./channel)
- Output status readback
- Keeps the output settings and values after system hot reset
- Channel-freeze function
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Output

- **Channels** 64 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 230 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95%, RH non-condensing

Ordering Information

- **PCI-1752U** 64-ch Isolated Digital Output Universal PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- 64 isolated digital input channels
- Either ± voltage input for DI by group
- High-voltage isolation on input channels (2,500 V_{DC})
- High over-voltage protection (70 V_{DC})
- Wide input range (10 ~ 50 V_{DC})
- 2,000 V_{DC} ESD protection
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 64 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max.
  Logic 1: 10 V min. (50 V max.)
- **Input Current (Typical)** 10 V_{DC} @ 1.7 mA,
  12 V_{DC} @ 2.1 mA
  24 V_{DC} @ 4.4 mA,
  48 V_{DC} @ 9.0 mA
  50 V_{DC} @ 9.4 mA
- **Interrupt Capable Ch.** 4
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 340 mA
  Max.: 5 V @ 450 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1754** 64-ch Isolated Digital Input PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- Either ± voltage input for DI by group
- High-voltage isolation input/output channels (2,500 V_{DC})
- 2,000 V_{DC} ESD protection for DI
- High over-voltage protection (70 V_{DC}) for DI
- High-sink current on isolated output channels (200 mA max./channel)
- Output status readback
- Keeps output settings/ values after system hot reset
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 32 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max.
  Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI16)
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Current** 10 V_{DC} @ 1.7 mA,
  12 V_{DC} @ 2.1 mA
  24 V_{DC} @ 4.4 mA,
  48 V_{DC} @ 9.0 mA
  50 V_{DC} @ 9.4 mA

Isolated Digital Output

- **Channels** 32 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 285 mA
  Max.: 5 V @ 475 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95%, non-condensing

Ordering Information

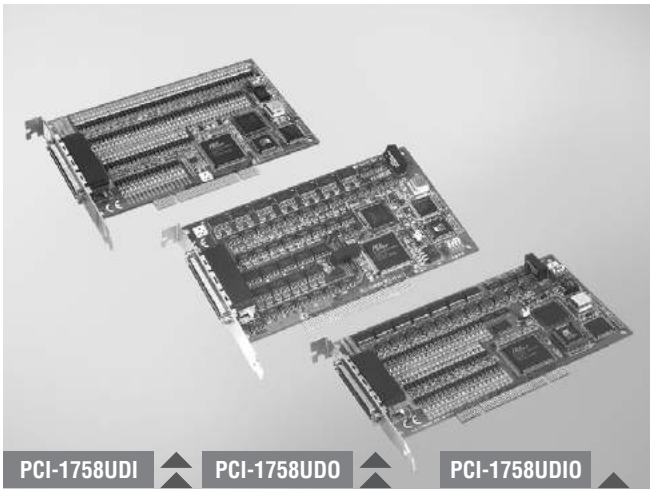
- **PCI-1756** 64-ch Isolated Digital I/O PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

PCI-1758UDI
PCI-1758UDO
PCI-1758UDIO

128-ch Isolated Digital Input Universal PCI Card
128-ch Isolated Digital Output Universal PCI Card
128-ch Isolated Digital I/O Universal PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

PCI-1758UDO and PCI-1758UDIO

- 128 isolated digital output channels (64 channels for PCI-1758UDIO)
- High-voltage isolation on output channels (2,500 V_{DC})
- Wide output range (5 ~ 40 V_{DC})
- High-sink current for isolated output channels (90 mA max./channel)
- Current protection for each port
- BoardID™ switch
- Output status read-back
- Digital output value retained after hot system reset
- Programmable Power-up States
- Watchdog timer

PCI-1758UDI and PCI-1758UDIO

- 128 isolated digital input channels (64 channels for PCI-1758UDIO)
- Wide input range (5 ~ 25 V_{DC})
- High ESD protection (2,000 V_{DC})
- Digital Filter function
- BoardID™ switch
- Interrupt handling capability for each channel

Specifications

Isolated Digital Input

- **Channels** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Input Voltage** Logic 0: 2.5 V max.
Logic 1: 5 V min. (25 V max.)
- **Interrupt Capable Ch.** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 20 µs
- **Input Resistance** 3 kΩ

Isolated Digital Output

- **Channels** PCI-1758UDO: 128
PCI-1758UDIO: 64
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 90 mA max./channel
- **Opto-isolator Response** 20 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x mini-SCSI HDRA-E100 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**

	PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO
Typical	5 V @ 0.3 A	5 V @ 1.1 A	5 V @ 1.2 A
Max.	5 V @ 0.6 A	5 V @ 2.2 A	5 V @ 1.8 A

- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% non-condensing

Ordering Information

- **PCI-1758UDI** 128-ch Isolated DI Universal PCI Card
- **PCI-1758UDO** 128-ch Isolated DO Universal PCI Card
- **PCI-1758UDIO** 128-ch Isolated Digital I/O Universal PCI Card

Accessories

- **PCL-101100S-1E** 100-pin Mini-SCSI Cable, 1 m
- **PCL-101100S-2E** 100-pin Mini-SCSI Cable, 2 m
- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board

Feature Details

Interrupt Function (PCI-1758UDI/PCI-1758UDIO)

PCI-1758UDI and PCI-1758UDIO provide an interrupt function for every digital input channel. You can disable/enable the interrupt functions, and select trigger type by setting the Rising Edge Interrupt Registers or Falling Edge Interrupt Registers of the card. When the interrupt request signals occur, software will service these interrupt requests by ISR. The multiple interrupt sources provide the card with more flexibility.

Digital Filter Function (PCI-1758UDI/PCI-1758UDIO)

The digital filter function is used to eliminate glitches on input data and reduce the number of changes to examine and process. The filter blocks pulses that are shorter than the specified timing interval and passes pulses that are twice as long as the specified interval. Intermediate-length pulses that are longer than half of the interval, but less than the interval, may or may not pass the filter.

Pin Assignments

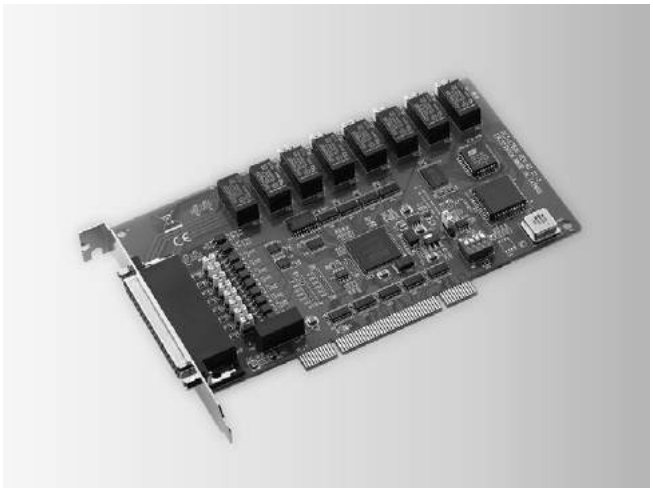
CNB

PEF_COMM	100	50	PAB_COMM	NC	1	51	NC
PEF_COMM	99	49	PAB_COMM	NC	2	52	NC
PF_IDI07	98	48	PB_IDI07	NC	3	53	NC
PF_IDI06	97	47	PB_IDI06	NC	4	54	NC
PF_IDI05	96	46	PB_IDI05	NC	5	55	NC
PF_IDI04	95	45	PB_IDI04	NC	6	56	NC
PF_IDI03	94	44	PB_IDI03	P0_IDI00	7	57	P4_IDI00
PF_IDI02	93	43	PB_IDI02	P0_IDI01	8	58	P4_IDI01
PF_IDI01	92	42	PB_IDI01	P0_IDI02	9	59	P4_IDI02
PF_IDI00	91	41	PB_IDI00	P0_IDI03	10	60	P4_IDI03
PE_IDI07	90	40	PA_IDI07	P0_IDI04	11	61	P4_IDI04
PE_IDI06	89	39	PA_IDI06	P0_IDI05	12	62	P4_IDI05
PE_IDI05	88	38	PA_IDI05	P0_IDI06	13	63	P4_IDI06
PE_IDI04	87	37	PA_IDI04	P0_IDI07	14	64	P4_IDI07
PE_IDI03	86	36	PA_IDI03	P1_IDI00	15	65	P5_IDI00
PE_IDI02	85	35	PA_IDI02	P1_IDI01	16	66	P5_IDI01
PE_IDI01	84	34	PA_IDI01	P1_IDI02	17	67	P5_IDI02
PE_IDI00	83	33	PA_IDI00	P1_IDI03	18	68	P5_IDI03
NC	82	32	NC	P1_IDI04	19	69	P5_IDI04
NC	81	31	NC	P1_IDI05	20	70	P5_IDI05
NC	80	30	NC	P1_IDI06	21	71	P5_IDI06
NC	79	29	NC	P1_IDI07	22	72	P5_IDI07
NC	78	28	NC	P01_COMM	23	73	P45_COMM
NC	77	27	NC	P01_COMM	24	74	P45_COMM
NC	76	26	NC	NC	25	75	NC
NC	75	25	NC	NC	26	76	NC
PCD_COMM	74	24	P89_COMM	NC	27	77	NC
PCD_COMM	73	23	P89_COMM	NC	28	78	NC
PD_IDI07	72	22	P9_IDI07	NC	29	79	NC
PD_IDI06	71	21	P9_IDI06	NC	30	80	NC
PD_IDI05	70	20	P9_IDI05	NC	31	81	NC
PD_IDI04	69	19	P9_IDI04	NC	32	82	NC
PD_IDI03	68	18	P9_IDI03	P2_IDI00	33	83	P6_IDI00
PD_IDI02	67	17	P9_IDI02	P2_IDI01	34	84	P6_IDI01
PD_IDI01	66	16	P9_IDI01	P2_IDI02	35	85	P6_IDI02
PD_IDI00	65	15	P9_IDI00	P2_IDI03	36	86	P6_IDI03
PC_IDI07	64	14	P8_IDI07	P2_IDI04	37	87	P6_IDI04
PC_IDI06	63	13	P8_IDI06	P2_IDI05	38	88	P6_IDI05
PC_IDI05	62	12	P8_IDI05	P2_IDI06	39	89	P6_IDI06
PC_IDI04	61	11	P8_IDI04	P2_IDI07	40	90	P6_IDI07
PC_IDI03	60	10	P8_IDI03	P3_IDI00	41	91	P7_IDI00
PC_IDI02	59	9	P8_IDI02	P3_IDI01	42	92	P7_IDI01
PC_IDI01	58	8	P8_IDI01	P3_IDI02	43	93	P7_IDI02
PC_IDI00	57	7	P8_IDI00	P3_IDI03	44	94	P7_IDI03
NC	56	6	NC	P3_IDI04	45	95	P7_IDI04
NC	55	5	NC	P3_IDI05	46	96	P7_IDI05
NC	54	4	NC	P3_IDI06	47	97	P7_IDI06
NC	53	3	NC	P3_IDI07	48	98	P7_IDI07
NC	52	2	NC	P23_COMM	49	99	P67_COMM
NC	51	1	NC	P23_COMM	50	100	P67_COMM

CNA

PCI-1760U

8-ch Relay and 8-ch Isolated Digital Input Universal PCI Card with 8-ch Counter/Timer



Features

- 8 opto-isolated digital input channels
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- Universal PCI and BoardID switch

Introduction

PCI-1760U relay actuator and isolated digital input card is a PC add-on card for the PCI bus. It meets the PCI standard Rev. 2.2 (Universal PCI expansion card), and works with both 3.3 V and 5 V PCI slots. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 1.0 V max.
  Logic 1: 4.5 V min. (12 V max.)
- **Interrupt Capable** Ch. 8 (IDI0 ~ IDI7)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 2 k Ohm @ 1/4 W

Counter/Timer

- **Channels** 8
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 Hz
- **Isolation Protection** 2,500 V_{DC}
- **PWM Channels** 2
- **Digital Noise Filter** Min. effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
  Min. effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms

Relay Output

- **Channels** 8
- **Relay Type** 2 x Form C, and 6 x Form A
- **Contact Rating** 1 A @ 125 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 125 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 2 A
- **Operate/Release Time** max. 5 / 3.5 ms
- **Resistance** Contact: 50 mW max.
- **Life Expectancy (Electrical)** 3 x 10^5 cycles min.: 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
  10^6 cycles min.: 1 A @ 30 V_{DC}, 0.5 A @ 125 V_{AC}

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 450 mA
  Max.: 5 V @ 850 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

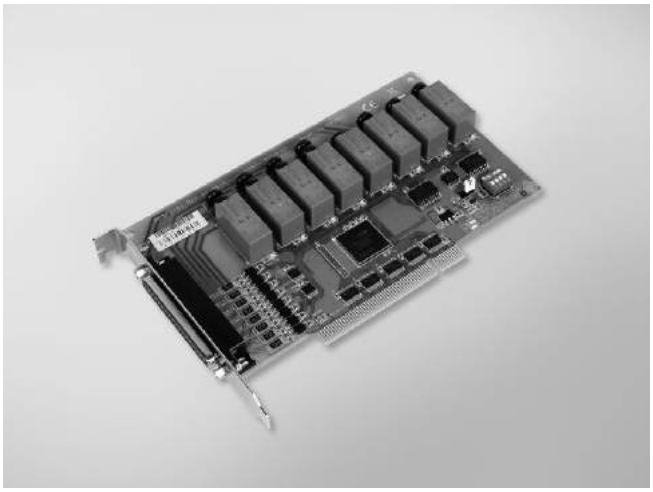
- **PCI-1760U** 8-ch Relay/IDI PCI Card w/ 8-ch Counter/Timer

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCI-1761

8-ch Relay and 8-ch Isolated Digital Input PCI Card



Features

- 8 opto-isolated digital input channels
- 8 relay actuator output channels
- LED indicators to show activated relays
- BoardID switch

Introduction

The PCI-1761 provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3.0 V max.
Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 8 (IDI0 ~ IDI7)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 5.7 k Ohm @ 1 W

Relay Output

- **Channels** 8
- **Relay Type** 4 x Form C, and 4 x Form A
- **Contact Rating** 2 A @ 250 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 500 VA, 60 W
- **Max. Switching Voltage** 400 V_{AC}, 300 V_{DC}
- **Operating Time** Typical: 7 ms, Max: 15 ms
- **Release Time** Typical: 2 ms, Max: 6 ms
- **Resistance** Contact: 100 m Ohm max.
- **Life Expectancy** 2 x 10^5 cycles min. @ 2A/ 250V_{AC}

General

- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 220 mA
Max.: 5 V @ 750 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

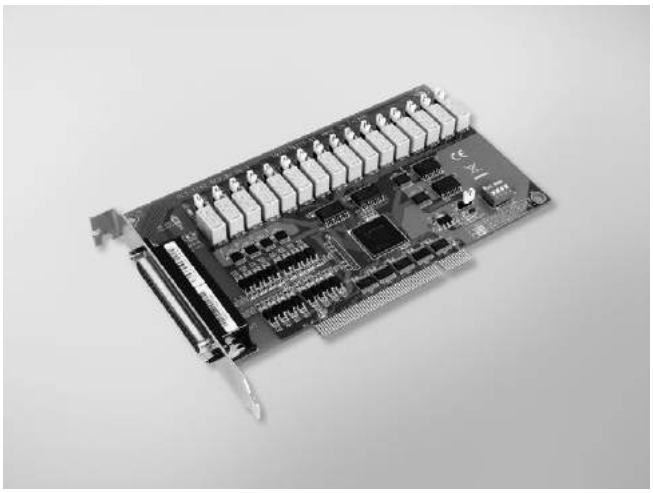
- **PCI-1761** 8-ch Relay and 8-ch Isolated Digital Input PCI Card

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCI-1762

16-ch Relay and 16-ch Isolated Digital Input PCI Card



Features

- 16 opto-isolated digital input channels
- 16 relay actuator output channels
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- BoardID switch

Introduction

The PCI-1762 provides 16 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 16 relay actuators that can be used as a on/off control devices or small power switches.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3.0 V max.
Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 2 (IDI0,IDI8)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 5.7 k Ohm 1 W

Relay Output

- **Channels** 16
- **Relay Type** Form A or Form B (Jumper selectable)
- **Contact Rating** 0.5 A @ 250 V_{AC}, 0.5 A @ 30 V_{DC}
- **Max. Switching Power** 125 VA, 15 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Operate Time** Typical: 3 ms, Max.: 5 ms
- **Release Time** Typical: 2 ms, Max.: 4 ms
- **Resistance** Contact: 50 m Ohm max.
- **Life Expectancy** 2 x 10^5 cycles min. @ 0.5A/ 250V_{AC}

General

- **I/O Connectors** 1 x DB62 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 250 mA
Max.: 5 V @ 620 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

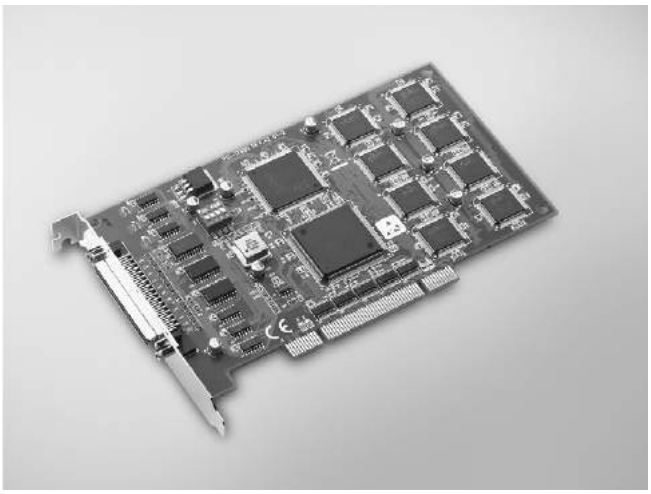
- **PCI-1762** 16-ch Relay and 16-ch Isolated Digital Input PCI Card

Accessories

- **PCL-10162-1E** DB62 Cable, 1 m
- **PCL-10162-3E** DB62 Cable, 3 m
- **ADAM-3962** DB62 DIN-rail Wiring Board

PCI-1780U

8-ch, 16-bit Counter/Timer Universal PCI Card



Features

- 8 independent 16-bit counters
- 8 programmable clock source
- 8 digital TTL outputs and 8 digital TTL inputs
- Up to 20 MHz input frequency
- Multiple counter clock source selectable
- Counter output programmable
- Counter gate function
- Flexible interrupt source select
- BoardID™ switch

Introduction

PCI-1780U is a general purpose multi-channel counter/timer PCI card. It targets the AM9513 to implement the counter/timer function by CPLD. It provides eight 16-bit counter channels, 8 digital outputs and 8 digital inputs. Its powerful counter functions cater to a broad range of industrial and laboratory applications.

The card features 12 programmable counter modes, to provide one shot output, PWM output, periodic interrupt output, time-delay output, and to measure the frequency and the pulse width. The PCL-10168 shielded cable works well with PCI-1780U to reduce noise. Its wires are all twisted pairs, and the input signals and output signals are separately shielded, providing minimal cross talk between signals and the best protection against EMI/EMC problems.

Specifications

Digital Input

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** Ch. 0

Digital Output

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
Logic 1: 2.0 V
- **Output Capability** Sink: 24 mA @ 0.8V
Source: -15 mA @ 2.0V

Counter/Timer

- **Channels** 8 (independent)
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 20 MHz
- **Reference Clock** Internal: 20 MHz
External clock: 20 MHz max.
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 8
- **PWM Channels** 8

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 900 mA
Max.: 5 V @ 1.2 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

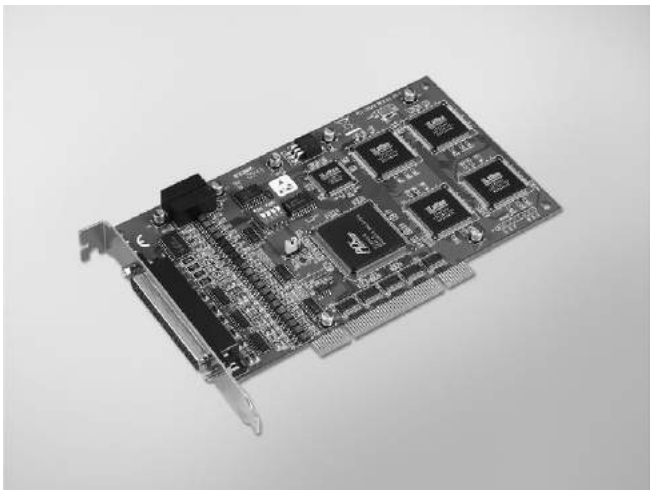
- **PCI-1780U** 8-ch, 16-bit Counter/Timer Universal PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1784U

4-ch, 32-bit Encoder Counter Universal PCI Card with 8-ch Isolated Digital I/O



Features

- Four 32-bit encoder counters
- Single-ended or differential inputs
- Quadrature (x1, x2, x4), pulse/direction, and up/down counting modes
- Optically isolated up to 2,500 VDC
- 4-stage digital filter with selectable sampling rate
- On-board 8-bit timer with wide range time-base selector
- Multiple interrupt sources for precision applications
- 4 isolated digital inputs and 4 isolated digital outputs
- BoardIDTM switch

Introduction

PCI-1784U is a 4-ch encoder counter universal PCI card. It includes four 32-bit encoder counters, 8-bit timer with multiple range time-base selector, 4 isolated digital inputs, and 4 isolated digital outputs. Its flexible interrupt sources are suitable for motor control and position monitoring.

Specifications

Encoder Counter

- **Channels** 4
- **Resolution** 32 bits
- **Counting Modes** Quadrature, pulse/direction, or up/down
- **Max. Input Frequency** 8 MHz for pulse/direction and up/down modes
  2 MHz for quadrature mode without digital filter
  1 MHz for quadrature mode with digital filter
- **Digital Filter** 4 stages
- **Isolation** 2,500 V_{DC}
- **Sample Clock Frequency** 8, 4, 2, or 1 MHz
- **Interrupt Sources** Overflow, underflow, index status, counter over compare, counter under compare
- **Input Voltage** Single-ended:
  Logic 0: 0.8 V max.
  Logic 1: 2.8 V min. (12 V max.)
  Differential:
  Logic 0: -0.2 V max. (-12 V min.)
  Logic 1: 0.2 V min. (12 V max.)

Isolated Digital input

- **Channels** 4
- **Input Voltage** Logic 0: 3 V max
  Logic 1: 10 V min. (30 V max.)
- **Interrupt Capable** All 4 channels
- **Isolation** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Overvoltage Protection** 70 V_{DC}

Isolated Digital Output

- **Channels** 4
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** 50 mA @ 0.8 V
  -50 mA @ 2.0 V
- **Isolation** 2,500 V_{DC}
- **Opto-Isolator Response** 2 µs

General

- **Bus Type** Universal PCI V2.2
- **Connector** 37-pin D-sub female
- **Dimension (L x H)** 175 x 100 mm^2 (6.9" x 3.9")
- **Power Consumption** Typical: +5 V @ 200 mA
  Max.: +5 V @ 450 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certification** CE

Ordering Information

- **PCI-1784U** 4-ch encoder counter universal PCI card
- **PCL-10137H-3E** High-speed DB37 cable, 3 m
- **ADAM-3937** DB37 DIN-rail wiring board