# Data Acquisition Boards

## Data Acquisition and Control Tutorial & Software
- [Data Acquisition Tutorial](#)
- [A-DAQ Pro](#)

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

The layout of a typical PC-based data acquisition system
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.

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.
**Data Acquisition Boards**

**DAQNavi Introduction**

**What is DAQNavi?**

DAQNavi is a completed software package, for programmers to develop their application programs using Advantech DAQ boards or devices. This integrated software package includes 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.

**Multiple Operating System Support**

DAQNavi supports many popular operating systems (OSs) 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 7/Vista/XP/Server (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.

**LabVIEW 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.

**.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 and Java 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, users can develop Java programs to work across different platforms (including Windows and Linux) by means of Java engine.

**Support Modules**

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

Note: For the latest information on applicable devices and OSs or new feature, visit http://www.advantech.com/ and search for “DAQNavi”.

**DAQNavi Software 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 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.

   ![Image](image-url)

   **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.

2. **Video Tutorial**
   If you don’t know how to start creating a project, Advantech offers a tutorial video for your reference.

   ![Image](image-url)

   **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.

3. **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 interrupt is generated.

   **DI Pattern Match Interrupt**
   When selected DI port meets pre-defined pattern, an interrupt is generated.

   **DI Status Change Interrupt**
   When the status of certain selected channel of DI port changes, an interrupt is generated.

4. **Digital Output**
   **Static DO**
   Change DO values once.

   **Timer/Counter**
   **Delayed Pulse Generation**
   When a trigger from counter 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**
   Continuously count the pulse number of signal from counter input.

   **Frequency Measurement**
   Measure frequency of signal from counter input.

   **Pulse Width Measurement**
   Measure pulse width of signal from counter input.

   **PWM Output**
   Generate PWM (Pulse Width Modulation) signal.
A-DAQ Pro Introduction

What is A-DAQ Pro?

A-DAQ Pro is a collection of ActiveX controls for performing I/O operations within any compatible ActiveX control container, such as Visual Basic, Delphi, etc. You can easily perform the I/O operations through properties, events and methods. With A-DAQ Pro, you can perform versatile I/O operations to control your Advantech devices.

The A-DAQ Pro package contains the following components:

- Advantech ActiveDAQ Pro Device Control: Enumerate all Advantech devices, direct I/O operation.
- Advantech ActiveDAQ Pro AI Control: Retrieve data from Advantech AI device.
- Advantech ActiveDAQ Pro AO Control: Export data to Advantech AO device.
- Advantech ActiveDAQ Pro Digital I/O Control: Digital I/O operation.
- Advantech ActiveDAQ Pro Thermo Control: Retrieve temperature by thermocouple measurement.
- Advantech ActiveDAQ Pro Counter Control: Counter input signal.
- Advantech ActiveDAQ Pro Pulse Control: Pulse signal output.

You can use these ActiveX controls in any development tool that supports them, including LabView, Microsoft Visual C++, Microsoft Visual Basic, Borland C++ Builder, Borland Delphi, and Microsoft Visual Studio.NET.

What's New in A-DAQ Pro?

In the latest version of the ActiveDAQ series: A-DAQ Pro, efforts have been made to improve on the technical aspects and to provide a clear-cut mode of operation, as explained in the following summary:

Graphical User Interface Control Components

Advantech A-DAQ Pro GUI control collection consists of an abundance of graphical user interface (GUI) control components, which enable users to conveniently and quickly build graphical display modules for data acquisition so as to supervise the changing status of the object. A-DAQ Pro GUI control collection also helps users easily develop prototype vision applications in an interactive environment without programming. These control components include:

- Button Control: It offers various display styles (2D and 3D) and is a Boolean control that displays an on or off state (True or False).
- Graph Control: This control provides abundant graph display functions, which enable the user to display data of various sources simultaneously.
- Intensity Control: It offers two-dimensional display and simple interpolation for scattered 3D data points so that the user can conveniently check the intensity variation trend of scattered 3D data points.
- Knob Control: It is a circular data controlling control that provides various graph styles and can be used to display one or more values on the same interface.
- LED Control: This control provides data display and editing functions with the seven-segment nixie tube mode.
- NumEditor Control: This control provides the user with the functions of data displaying and editing. After the FormatString has been chosen or defined by the user, the values of the control will be adjusted automatically according to the FormatString and displayed in the text editor box.
- Slider Control: It is a linear data controlling control that provides various graph styles. A slider control can be used to set or display one or more values.
A-DAQ Pro Introduction

Supports All Advantech DAQ Devices with High Speed Functions
A-DAQ Pro now fully supports all Advantech DAQ cards and functions with complete high speed data acquisition, including AI (analog input), AO (analog output), DI/O (digital input/output) and counter cards. These high speed functions are performed by interrupt and DMA data transfer.

Easy-to-use Property Sheet Interface for Configuring Controls
The property page will offer selections which will give easy access to all settings and eliminate unnecessary programming. Programming will only be required in specialized situations.

Independent Operation of Controls
A-DAQ Pro offers total independent control operation, needing no support from other existing controls.

Uses Optional Lists Instead of Direct Input
Now lists are provided with values which remain limited over various processes. This option is much more convenient to input and will eliminate a large portion of the direct data input.

Default Settings for Immediate Execution
Proper default settings have now been added to all methods and properties. That means quicker execution for the user, which will offer a prompt response.

Properties and Parameters are Chosen Automatically
When the user opts for some specific methods in A-DAQ Pro it can automatically result in appropriate properties and parameters. For example, A-DAQ Pro control can automatically determine an appropriate data transferring method to perform the data acquisition. (Software, interrupt and DMA transfer)

Parameter Check-up and Correction
Each input parameter has to be within a certain range. As a result it has to have check-up to ensure legitimacy. In most cases the user will be notified and in others there will be an automatic correction.

Better Defined Error Messages and Diagnostic Guide
A-DAQ Pro offers clear error messages description and diagnostic guides for all return errors.

Supports All Widely Known Development Platforms
A-DAQ Pro support Microsoft Windows 2000/XP and Vista operation systems. As with the previous version, ActiveDAQ 1.6x, it continues to support all widely known development platforms based on ActiveX technology. These platforms include LabView, Microsoft Visual Basic, Visual C++, Visual Basic.Net, Visual C#, Borland C++ Builder and Delphi.

What Utilities Does A-DAQ Pro Support?
A-DAQ Pro supports several useful utilities and they can really help you to save time on programming. The WaveScan 2.0 utility, can let you easily do the real-time monitoring with Advantech’s devices including acquire signal and display waveforms. You can also save data as an excel file for further analysis. If you want to measure temperature, voltage and electric current directly, you can choose the Virtual Multimeter. It looks like a multimeter so its interface is very easy and friendly. For the Virtual Oscillograph, it can do the functions that are similar to a Real Digital Storage Oscilloscope. You can adjust VOL/DIV scale, shift cursor, set trigger even do the single seq function with this utility.

System Requirements
- PC with at least a 266 MHz or higher microprocessor
- Microsoft Windows 2000/XP/Vista
- VGA compatible graphics card, supporting at least 256 colors
- Minimum 64 MB of RAM
- 74 MB of free local hard disk space
- One CD-ROM driver

Ordering Information
- PCLS-ADPSTD-AE ActiveX Control-based Software for DAQ

Uses Known Physical Properties
Physical properties like voltage, current and frequency can now be directly applied by the user and will automatically be reassigned to the data needed by GainCode and sampling rate. Making these changes has ensured that A-DAQ Pro has become much more user friendly.

Straightforward User Interface
The new version has become less-hardware dependent and it has relied more on intuition during the user interface. During the redesigned process, the target was to decrease the development difficulties. It has become easier for both entry level and advanced level users to manage.

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## Analog I/O & Multifunction Card Selection Guide

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<td>PCI</td>
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<tr>
<td>Resolution</td>
<td>12 bits</td>
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<td>Channels</td>
<td>16 SE/8 Diff.</td>
<td>16 SE</td>
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<td>±10, 5, 2.5, 0.625</td>
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<tr>
<td>Bipolar Inputs (V)</td>
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<td>±10, 5, 2.5, 1.25</td>
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<td>✓</td>
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<td><strong>Trigger Mode</strong></td>
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<td>✓</td>
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<tr>
<td>Analog Slope</td>
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<td>-</td>
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<tr>
<td>Advanced Trigger</td>
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<td>✓</td>
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<tr>
<td>Software</td>
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<tr>
<td>DMA</td>
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<td><strong>DMA Transfer Mode</strong></td>
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* 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
### Selection Guide

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- **100 kS/s**
- **200 kS/s**
- **1 MS/s**
- **40 kS/s**
- **30 kS/s**
- **40 kS/s**
- **100 kS/s**
- **100 kS/s**

- **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**
- **0 – 10, 0 – 5, 0 – 2.5, 0 – 1.25**
- **0 – 10, 0 – 5, 0 – 2.5, 0 – 1.25**

- **±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**
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- **±10, 5, 2.5, 1.25, 0.625**

**Multifunction**

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<td>PCL-818HD</td>
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- **12 bits**
- **16 bits**
- **16 bits**
- **12 bits**
- **12 bits**
- **12 bits**
- **16 bits**
- **16 bits**
- **12 bits**
- **12 bits**
- **12 bits**
- **12 bits**

- **1 – 2**
- **2 – 1**
- **2 – 1**
- **2 – 1**
- **2 – 1**

- **0 – 5, 0 – 10**
- **0 – 5, 0 – 10, ±5, ±10**
- **0 – 5, 0 – 10**
- **0 – 5, 0 – 10, ±10**
- **0 – 5, 0 – 10, ±10**

- **Static update**
- **Static update**
- **Static update**
- **Static update**
- **Static update**
- **Static update**

- **16**
- **16**
- **16**
- **16**
- **16**
- **16**

- **1**
- **1**
- **1**
- **1**
- **1**

- **16 bits**
- **16 bits**
- **16 bits**
- **16 bits**
- **16 bits**

- **10 MHz**
- **10 MHz**
- **10 MHz**
- **2 MHz**
- **10 MHz**
- **10 MHz**

- **175 x 100**
- **175 x 100**
- **175 x 100**
- **185 x 100**
- **155 x 100**
- **185 x 100**

- **DB37**
- **68-pin SCSI**
- **68-pin SCSI**
- **3 x 20-pin**
- **5 x 20-pin**
- **DB37**

- **18-28**
- **18-29**
- **18-29**
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- **online**
- **online**

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**18-9**

**800-999-7378**
## Analog I/O & Multifunction Card Selection Guide

### Data Acquisition Boards

**Windows 2000/XP Driver and SDK**
- **Windows Vista Driver and SDK**
- **Windows 7 Driver and SDK**
- **Win CE 5.0/6.0 Driver**
- **Linux Driver**
- **A-DMA Pro Software**
- **Labview I/O Driver**

<table>
<thead>
<tr>
<th>Category</th>
<th>Multifunction</th>
<th>Analog Input</th>
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<td>Model</td>
<td>PCM-3718H</td>
<td>PCM-3718HG</td>
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<td>Resolution</td>
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<td>DMA SS**</td>
<td>SS**</td>
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<tr>
<td>Output Range (V)</td>
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<td>±5, 0 ~ 10, ±0.1 ~ 0.01, ±0.01 ~ 0.001</td>
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<td>Max. Input Frequency</td>
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<td>BoardID Switch</td>
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<tr>
<td>Dimensions (mm)</td>
<td>96 x 90</td>
<td>175 x 100</td>
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</table>

### General Specifications

- **Configurable Per-Channel**: ✓ ✓ ✓ ✓ ✓ ✓
- **Pacer/Software/External Pulse**: ✓ ✓ ✓ ✓ ✓ ✓
- **Analog Slope**: - - - - - -
- **Advanced Trigger**: - - - - - -
- **Data Transfer Mode**: DMA SS** SS** SS** - Bus-mastering -

<table>
<thead>
<tr>
<th>Category</th>
<th>Multifunction</th>
<th>Analog Input</th>
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<td>Output Range (V)</td>
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<td>0 ~ 5, 0 ~ 10, ±5, ±10</td>
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<tr>
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<tr>
<td>Output Range (V)</td>
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<td>±5, ±10, ±0.1, ±0.01, ±0.01, ±0.001</td>
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<tr>
<td>Dimensions (mm)</td>
<td>96 x 90</td>
<td>175 x 100</td>
</tr>
</tbody>
</table>

### Digital I/O

- **Input Channels** (16 shared) (16 shared) (16 shared) (16 shared)
- **Output Channels** (16 shared) (16 shared) (16 shared) (16 shared)
- **Channels**: 1 1 1 3
- **Resolution**: 16 bits 16 bits 16 bits 16 bits
- **Max. Input Frequency**: 10 MHz 10 MHz 10 MHz 10 MHz
- **BoardID Switch**: - - - -
- **Dimensions (mm)**: 96 x 90 96 x 90 96 x 90 96 x 90

### Connector

- **2 x 20-pin**: 2 x 20-pin 2 x 20-pin 50-pin/20-pin box header 4 x BNC DB37
- **Windows 2000/XP Driver and SDK**: ✓ ✓ ✓ ✓ ✓ ✓
- **Windows Vista Driver and SDK**: - - - - ✓ ✓ ✓
- **Windows 7 Driver and SDK**: ✓ ✓ ✓ ✓ ✓ ✓
- **Win CE 5.0/6.0 Driver**: ✓ ✓ ✓ ✓ ✓ ✓
- **Linux Driver**: ✓ ✓ ✓ ✓ ✓ ✓
- **A-DMA Pro Software**: ✓ ✓ ✓ ✓ ✓ ✓
- **Labview I/O Driver**: ✓ ✓ ✓ ✓ ✓ ✓

* 80 kHz on Pentium 4-based (or upper) system
** SS: Single DMA channel, Single A/D channel scan

**TH** 

800-999-7378
### Analog Input

<table>
<thead>
<tr>
<th>Category</th>
<th>Model</th>
<th>PCI-1714U</th>
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<th>PCI-1716U</th>
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<td>±10, 5, 2.5, 1.25, 0.625</td>
<td>±5, 2.5, 1.25, 0.625</td>
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### Analog Output

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</tbody>
</table>

### System Requirements

- **SS:** Single DMA channel, Single A/D channel scan
- 80 kHz on Pentium 4-based (or upper) system

### Additional Features

- Digital I/O
- Counter
- Timer
- Windows 7 Driver and SDK (DAQNavi)
- Windows 2000/XP Driver and SDK
- Windows Vista Driver and SDK
- Win CE 5.0/6.0 Driver
- A-DAQ Pro Software
- Labview I/O Driver

### Specifications

- **Max. Input Frequency:**
  - 4 SE: 32 SE/16 Diff.
  - 32 SE: 32 SE/16 Diff.

- **Output Range:**
  - ±5, ±2.5, ±1, ±0.5
  - ±10, ±5, ±2.5, ±1.25

- **Input Channels:**
  - 16

- **Output Channels:**
  - 16

- **Expression:**
  - - 1, 0, 1, 2, 3, 4

- **Connector:**
  - 4 x BNC DB37

- **Dimensions (mm):**
  - 175 x 100

- **Isolation Voltage:**
  - 2,500 Vdc

- **Auto Calibration:**
  - -

- **BoardID Switch:**
  - -

- **Software:**
  - -

- **Operating System:**
  - Windows 7 Driver and SDK (DAQNavi)
  - Windows 2000/XP Driver and SDK
  - Windows Vista Driver and SDK
  - Win CE 5.0/6.0 Driver
  - A-DAQ Pro Software
  - Labview I/O Driver

- **Linux Driver:**
  - -

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# Analog I/O & Multifunction Card Selection Guide

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<tr>
<th>Category</th>
<th>Analog Output</th>
<th>ISA</th>
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**ADVANTECH**

Data Acquisition Boards

SHOP ONLINE at www.airlinehyd.com

800-999-7378
## Digital I/O & Counter Card Selection Guide

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* Dry/wet contact can be mixed at the same time within one group.
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* Dry/wet contact can be mixed at the same time within one group.
## Isolated Digital I/O

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**Dimensions (mm):**

- PCIE-1730: 175 x 100
- PCIE-1752: 175 x 100
- PCIE-1754: 175 x 100
- PCIE-1756: 175 x 100
- PCIE-1760: 175 x 100

**Connector:**

- 1 x DB37: 4 x 20-pin
- 100-pin SCSI
- 100-pin SCSI
- 100-pin SCSI
- 1 x DB37

**Operating Systems:**

- Windows 2000/XP: Driver and SDK
- Windows Vista: Driver and SDK
- Windows 7: Driver and SDK (DAQNavi)
- Win CE 5.0/6.0: Developer Kit
- Linux: Driver

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<td>BoardID Switch</td>
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</tr>
<tr>
<td>Channel-Freeze Function</td>
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</tr>
<tr>
<td>Output Status Read Back</td>
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</tr>
<tr>
<td>Dry/Wet Contact*</td>
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</tr>
<tr>
<td>Dimensions (mm)</td>
<td>175 x 100</td>
</tr>
<tr>
<td>Connector</td>
<td>1 x DB37 4 x 20-pin</td>
</tr>
<tr>
<td>Windows 2000/XP Driver and SDK</td>
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</tr>
<tr>
<td>Windows Vista Driver and SDK</td>
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</tr>
<tr>
<td>Windows 7 Driver and SDK (DAQNavi)</td>
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</tr>
<tr>
<td>Win CE 5.0/8.0 Driver</td>
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</tr>
<tr>
<td>Linux Driver</td>
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</tr>
<tr>
<td>A-DAQ Pro Software</td>
<td>✓</td>
</tr>
<tr>
<td>Labview I/O Driver</td>
<td>✓</td>
</tr>
<tr>
<td>Page</td>
<td>18-41</td>
</tr>
</tbody>
</table>

* Dry/wet contact can be mixed at the same time within one group.
## Isolated Digital I/O

<table>
<thead>
<tr>
<th>PCI</th>
<th>PCI-1754</th>
<th>PCI-1756</th>
<th>PCI-1758UDI</th>
<th>PCI-1758UDO</th>
<th>PCI-1758UDIO</th>
<th>PCI-17580U</th>
<th>PCI-1761</th>
<th>PCI-1762</th>
</tr>
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<tbody>
<tr>
<td>64 (Sink)</td>
<td>32 (Sink)</td>
<td>128</td>
<td>-</td>
<td>64</td>
<td>8 (Sink)</td>
<td>8 (Sink)</td>
<td>16 (Sink)</td>
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<tr>
<td>2,500 VDC</td>
<td>2,500 VDC</td>
<td>2,500 VDC</td>
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<td>2,500 VDC</td>
<td>2,500 VDC</td>
<td>3,750 VDC</td>
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<tr>
<td>-</td>
<td>32 (Sink)</td>
<td>-</td>
<td>128</td>
<td>64</td>
<td>6 x Form A</td>
<td>2 x Form C</td>
<td>4 x Form C</td>
<td>16**</td>
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<td>2,500 VDC</td>
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<td>-</td>
<td>5 – 40 VDC</td>
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<td>5 – 40 VDC</td>
<td>5 – 40 VDC</td>
<td>1 A @ 125 VAC</td>
<td>2 A @ 30 VDC</td>
<td>0.25 A @ 250 VAC</td>
<td>2 A @ 30 VDC</td>
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<td>-</td>
<td>200 mA</td>
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<td>90 mA</td>
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<td>8 x Up CTR</td>
<td>2 x PWM</td>
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</tr>
</tbody>
</table>

### Advanced Function
- Pattern Match
- Change of State
- BoardID Switch
- Channel-Freeze Function
- Output Status Read Back
- Dry/Wet Contact

### Dimensions (mm)
- 175 x 100

### Connector
- 1 x DB37
- 4 x 20-pin
- 1 x DB37
- 100-pin SCSI Dual mini-SCSI
- 1 x DB37
- 1 x DB62

### Windows
- 2000/XP Driver and SDK
- Vista Driver and SDK
- 7 Driver and SDK (DAQNavi)

### Linux
- Driver and SDK

### Windows CE
- 5.0/6.0 Driver

### A-DAQ Pro Software
- Software

### Labview I/O Driver
- Software

### Online Download
[www.advantech.com/products](http://www.advantech.com/products)

---

* Dry/wet contact can be mixed at the same time within one group.
## Digital I/O & Counter Card Selection Guide

**Data Acquisition Boards**

<table>
<thead>
<tr>
<th>Category</th>
<th>Isolated Digital I/O</th>
<th>Counter</th>
</tr>
</thead>
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<tr>
<td><strong>Bus</strong></td>
<td><strong>ISA</strong></td>
<td><strong>PC/104</strong></td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>PCL-725</td>
<td>PCL-735</td>
</tr>
<tr>
<td><strong>Input Channels</strong></td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td><strong>Output Channels</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sink Current</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Source Current</strong></td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Input Channels</strong></td>
<td>4 x Form A</td>
<td>12 x Form C</td>
</tr>
<tr>
<td><strong>Input Range</strong></td>
<td>1,500 VDC</td>
<td>2,500 VDC</td>
</tr>
<tr>
<td><strong>Output Channels</strong></td>
<td>0.5A @ 120 VDC</td>
<td>1A @ 125 VDC</td>
</tr>
<tr>
<td><strong>Output Range</strong></td>
<td>8 x CTR</td>
<td>6 x CTR</td>
</tr>
<tr>
<td><strong>Max. Sink Current</strong></td>
<td>200 mA</td>
<td>300 mA</td>
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<tr>
<td><strong>Isolation Voltage</strong></td>
<td>1,000 VDC</td>
<td>2,000 VDC</td>
</tr>
<tr>
<td><strong>Isolation Voltage</strong></td>
<td>5 – 24 VDC</td>
<td>5 – 24 VDC</td>
</tr>
<tr>
<td><strong>Advanced Function</strong></td>
<td>Pattern Match</td>
<td>-</td>
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<tr>
<td></td>
<td>Change of State</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>BoardID Switch</td>
<td>-</td>
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<tr>
<td></td>
<td>Channel-Freeze Function</td>
<td>-</td>
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<tr>
<td></td>
<td>Output Status Read Back</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Dry/Wet Contact</td>
<td>-</td>
</tr>
<tr>
<td><strong>Dimensions (mm)</strong></td>
<td>147 x 95</td>
<td>155 x 100</td>
</tr>
<tr>
<td><strong>Connector</strong></td>
<td>1 x DB37</td>
<td>1 x DB37</td>
</tr>
</tbody>
</table>

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

PCIE-1744 is an advanced high-performance data acquisition card based on the PCI Express bus. With a large FIFO of 32,768 for each channel, the maximum sampling rate of PCIE-1744 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.

**Specifications**

**Analog Input**
- **Channels**: 4 single-ended
- **Resolution**: 12 bits
- **Max. Sampling Rate**: 30 MS/s
- **FIFO Size**: 32,768 samples each channel
- **Overvoltage Protection**: 14 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**

<table>
<thead>
<tr>
<th>Bipolar</th>
<th>±0.5</th>
<th>±0.25</th>
<th>±0.1</th>
<th>±0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Accuracy (% of FSR)*</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>

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

**General**
- **Bus Type**: PCI Express V1.0
- **I/O Connectors**: 4 x BNC connector (for AI)
- **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 (refer to IEC 68-2-3)

**Ordering Information**

- **PCIE-1744**: 30 MS/s, 12-bit, Simultaneous 4-ch Analog Input PCI Express Card
- **Accessories**
  - **ADAM-3909**: DB9 DIN-rail Wiring Board
  - **PCL-1010B-1**: BNC to BNC Wiring Cable, 1 m
  - **PCL-10901-1**: DB9 to PS/2 Cable, 1 m
  - **PCL-10901-3**: DB9 to PS/2 Cable, 3 m

**Pin Assignments**

**Onboard PS/2 Connector**

- GND
- EXT CLK+ 1
- EXT CLK- 1
- EXT TRIG+ 1
- EXT TRIG- 1

**PS/2 to DB9 Cable Connector**

- GND
- EXT CLK+ 9
- EXT CLK- 9
- EXT TRIG+ 9
- EXT TRIG- 9

---

**Features**

- 4 single-ended analog input channels
- 12-bit A/D converter, with up to 30 MHz sampling rate
- Programmable gain
- Onboard FIFO memory (32,768 samples each channel)
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/clock
- BoardID™ switch
- PCI Express V1.0
Introduction
PCIE-1730 offers isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 VDC, 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.  2 (DIO, DII)
- Interrupt Capable Ch.: 2 (DIO, DII)

Isolated Digital Input
- Channels: 16
- Input Voltage: Logic 0: 1 V max. (3 V max.)  Logic 1: 10 V min. (30 V max.)
- Interrupt Capable Ch.: 2 (DIO, DII)
- Isolation Protection: 2,500 VDC
- Input Resistance: 2.7 kΩ @ 1 W

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  Source: 15 mA

Isolated Digital Output
- Channels: 16
- Output Type: Sink type (NPN)
- Isolation Protection: 2,500 VDC
- Output Voltage: 5 – 40 VDC
- Sink Current: 500 mA max./channel
- Opto-Isolator Response: 50 μs

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

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): 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 (see IEC 68-2-3)

Ordering Information
- PCIE-1730: 32-ch Isolated Digital I/O PCI Express Card

Accessories
- PCL-10120-1: 20-pin Flat Cable, 1 m
- PCL-10120-2: 20-pin Flat Cable, 2 m
- ADAM-3920: 20-pin DIN-rail Flat Cable Wiring Board
- PCLUD-782: 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- PCLUD-685: 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- PCLUD-785: 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- ADAM-3937: DB37 DIN-rail Wiring Board
- PCL-10137-1: DB37 Cable, 1 m
- PCL-10137-2: DB37 Cable, 2 m
- PCL-10137-3: DB37 Cable, 3 m
Introduction

The Advantech PCIE-1752, PCIE-1754 and PCIE-1756 series products offer 64 isolated digital input and output channels with 2,500 VDC isolation protection. They feature a wide input range (10 ~ 30 VDC), wide output range (5 ~ 40 VDC) 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-1752: 4
  - PCIE-1754: 2
- **Input Voltage**: Logic 0: 3 V max.
  - Logic 1: 10 V min. (30 VDC max.)
- **Input Current**: 10 VDC @ 2.97 mA
  - 20 VDC @ 6.35 mA
  - 30 VDC @ 9.73 mA
- **Interrupt Capable Ch.**: PCIE-1754: 4
  - PCIE-1756: 2
- **Isolation Protection**: 2,500 VDC
- **Overvoltage Protection**: 70 VDC
- **ESD Protection**: 2,000 VDC
- **Opto-Isolator Response**: 50 μs

### Isolated Digital Output
- **Channels**: PCIE-1752: 64
  - PCIE-1756: 32
- **Output Type**: Sink (NPN)
- **Isolation Protection**: 2,500 VDC
- **Output Voltage**: 5 ~ 40 VDC
- **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)**: 175 x 100mm (6.9” 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 (refer to IEC 68-2-3)

### 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-10250-1**: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **PCL-10258-2**: 100-pin SCSI to Two 50-pin SCSI Cable, 2 m
- **ADAM-3951**: 50-pin DIN-rail Wiring Board w/ LED Indicators
- **PCL-101100M-3**: 100-pin S conflict to 100-pin S conflict, 3 m
- **ADAM-39100**: 100-pin DIN-rail Wiring Board
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 VDC 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 (Sink)
- **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 VDC
- **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 VDC
- **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 VAC, 2 A @ 30 VDC
- **Max. Switching Power**: 125 VA, 60 W
- **Max. Switching Voltage**: 250 VAC, 220 VDC
- **Max. Switching Current**: 2 A
- **Operate/Release Time**: max. 5 / 3.5 ms
- **Resistance**: Contact: 50 mΩ max.  
  Insulation: 100 MΩ max. @ 500 VAC
- **Life Expectancy (Electrical)**: 3 x 10⁹ cycles min.: 2 A @ 30 VAC, 1 A @ 125 VAC  
  10⁸ cycles min.: 1 A @ 30 VAC, 0.5 A @ 125 VAC

### General

- **Bus Type**: PCI Express V1.0
- **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) (IEC 68 - 2 - 1, 2)
- **Storage Temperature**: -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity**: 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

### Ordering Information

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

### Accessories

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

PCI-1706U is an advanced high-performance multifunction card based on the Universal PCI Bus. With a large FIFO of 8K samples, the maximum sampling rate of PCI-1706U is up to 250 kS/s with 8 A/D converters simultaneously sampling on each channel. If more than 8 analog input channels are required, multiple cards can be synchronized through the Device-to-Device Bus to support more AI channels simultaneously sampling. The PCI-1706U has two 12-bit D/A output channels, 16 digital input/output channels, and two 32-bit Timer/counter channels so that it can provide specific functions for different application requirements.

Specifications

**Analog Input**
- Channels: 8 differential
- Resolution: 16 bits
- Max. Sampling rate: 250 kS/s per channel
- FIFO Size: 8K samples (shared by all AI channels)
- Overvoltage Protection: 30 Vp-p
- Sampling Mode: Delay to Start, Delay to Stop, None
- Trigger Source: Software, Digital, Analog
- Input Range (V, software programmable) & Absolute Accuracy
  - Bipolar: ±10 ±5 ±2.5 ±1.25
  - Absolute Accuracy (% of FSR)*
    - ±1 LSB is added as the derivative for absolute accuracy

**Analog Output (PCI-1706U only)**
- Channels: 2
- Resolution: 12 bits
- Output Range (V/A, software programmable) 0~10V, 0~5V 0~2.5V 0~1.25V
- Output Current 0.2mA, 0.4mA, 0.8mA, 2mA
- Slew Rate: 1 V/μs, 2 mA/μs
- Driving Capability: 10 mA
- Output Impedance: 5 Ω (max)
- Operation Mode: Software polling
- Accuracy: ±1LSB

**Digital Input**
- Channels: 16 (Share with Output)
- Compatibility: 5 V/TTL
- Input Voltage: Logic 0: 0.6V max, Logic 1: 2.0V min

**Digital Output**
- Channels: 16 (Share with Input)
- Compatibility: 5 V/TTL
- Output Voltage: Logic 0: 0.4V max, Logic 1: 2.4V min
- Output Capability: Source: -0.4mA @ 2.4V

**Timer/Counter**
- Channels: 2
- Resolution: 32 bits
- Mode: IN: Event Counting, Frequency In, PWM In
  OUT: OneShot, Pulse Out, PWM Out
- Compatibility: 5 V/TTL
- Max. Input Frequency: 10 MHz
- Reference Clock: Internal: 20 MHz, External: Clock Frequency: 1 Hz – 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: Typical: 5 V @ 850 mA, Max.: 5 V @ 1 A,
- Operating Temperature: -20 – 70°C (-4 – 158°F) (refer to IEC 60068-2-1,2)
- Storage Temperature: -20 – 70°C (-4 – 158°F) (refer to IEC 60068-2-1,2)
- Storage Humidity: 5 – 95% RH non-condensing (refer to IEC 60068-2-3)

**Ordering Information**
- PCI-1706U 250 kS/s, 16-bit Simultaneous Multi-Card
- PCI-1706UL 250 kS/s, 16-bit Simultaneous Multi-Card w/o AO
- 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

---

**Features**
- 8 differential analog inputs
- 9 A/D converters simultaneously sampling
- 16-bit A/D converter, with up to 250kHz sampling rate for each channel
- Programmable gain
- Onboard FIFO memory up to 8K Sample
- Multiple A/D triggering modes
- Programmable pace/counter
- BoardID™ switch
- Universal PCI Bus (supports 3.3V or 5V PCI bus signals)
### Data Acquisition Boards

#### PCI-1710U/UL

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

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

---

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

Note: ±1 LSB is added as the derivative for absolute accuracy

- **Maximum Sampling Rate** (S/s, depending on PGA setting time)
  - **Model**
    - PCI-1710U/UL
      - 0.5, 1, 2, 4, 8: 100 kS/s
      - 0.5, 1: 100 kS/s
      - 5, 10, 50, 100, 500, 1000: 7 kS/s
    - PCI-1710HGU
      - 0.5, 1: 100 kS/s
      - 5, 10, 50, 100, 500, 1000: 770 S/s

Note: The sampling rate for each channel 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**: (V, software programmable)
  - **Model**
    - **Internal Reference**
      - **Gain**: 0.5, 1, 2, 4, 8
      - **External Reference**
        - **Gain**: 0.5, 1
    - **Absolute Accuracy (% of FSR)**
      - Bipolar: ±0.05, ±0.025
      - Unipolar: N/A, ±0.01

- **Slew Rate**: 10 V/μs
- **Driving Capability**: 3 mA
- **Operation Mode**: Software polling
- **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) (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-1710U/UL**
  - 100 kS/s, 12-bit Multifunction Card
  - 100 kS/s, 12-bit Multifunction Card w/o AO
  - 100 kS/s, 12-bit High-gain Multifunction Card

### Accessories
- **PCLD-8710**
  - DIN-rail Wiring Board w/ CJC
- **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

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### Specifications

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

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

- **FIFO Size**: 1,024 samples
- **Overvoltage Protection**: 30 Vpp
- **Input Impedance**: 2 MΩ / 5 pF
- **Sampling Modes**: Software, onboard programmable pacer, or external
- **Input Range (V, software programmable) & Absolute Accuracy**
  - Bipolar: ±10 V, ±5 V, ±2.5 V, ±1.25 V, ±0.625 V
  - Absolute Accuracy (% of FSR)*
    - ±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**: (V, software programmable)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Unipolar</th>
<th>bipolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>0 – 5 V</td>
<td>0 – 5 V</td>
</tr>
<tr>
<td>External</td>
<td>-10 V – 10 V</td>
<td>-10 V – 10 V</td>
</tr>
</tbody>
</table>

- **Slew Rate**: 11 V/μs
- **Driving Capability**: 3 mA
- **Output Impedance**: 81 Ω
- **Operation Mode**: Software polling
- **Accuracy**
  - INL: ±0.5 LSB
  - DNL: ±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.

---

### 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

### Analog Output
- **Channels**: 16
- **Compatibility**: 5 V/TTL
- **Output Voltage**: Logic 0: 0.8 V Logic 1: 2.0 V
- **Output Capability**: 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) (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-1711U**: Entry-level 100 kS/s, 12-bit Multifunction Card
- **PCI-1711UL**: Entry-level 100 kS/s, 12-bit Multifunction Card w/o AO

#### Accessories
- **PCLD-8710**: DIN-rail Wiring Board w/ CJC
- **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

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**Note:** The sampling rate for each channel will be affected by the number of channels used. For example, if 4 channels are used, the sampling rate is \(100 \div 4 = 25\) kS/s per channel.
### Specifications

#### Analog Input
- **Channels**: 16 single-ended or 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
- **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**
<table>
<thead>
<tr>
<th>Unipolar</th>
<th>N/A</th>
<th>0 – 10</th>
<th>0 – 5</th>
<th>0 – 2.5</th>
<th>0 – 1.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipolar</td>
<td>±10</td>
<td>±5</td>
<td>±2.5</td>
<td>±1.25</td>
<td>±0.625</td>
</tr>
<tr>
<td>Absolute Accuracy (% of FSR)*</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

* ±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
- **FIFO Size**: 32,768 samples
- **Output Range**: (V, software programmable)

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

#### Pacer/Counter
- **Channels**: 3
- **Resolution**: 12 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)
  - (refer to IEC 68-2-1, 2)
- **Storage Temperature**: -20 – 85°C (-4 – 185°F)
- **Storage Humidity**: 5 – 95% RH non-condensing (refer to IEC 68-2-3)

### 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-10168-1: 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
PCI-1716/L

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

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)
- Input Range (V, software programmable) & Absolute Accuracy
  | Unipolar | Bipolar |
  | 0 – 10 | ±x 10 |
  | 0 – 5  | ±x 5  |
  | 0 – 2.5| ±x2.5 |
  | 0 – 1.25| ±x1.25 |
  | ±0.25% |
- Absolute Accuracy (% of FSR)*: 0.05, 0.03, 0.03, 0.06, 0.1

Analog Output (PCI-1716 only)
- Channels: 2
- Resolution: 16 bits
- Output Rate: Static update
- Output Range: (V, software programmable)
  | Internal Reference | Unipolar | 0 – 5, 0 – 10 |
  | Bipolar | ±x10 | ±x10 |
  | External Reference | 0 – ±x V @ ±x V (10 ≤ x ≤ 10) |
- Slew Rate: 20 V/μs
- Driving Capability: 20 mA
- Output Impedance: 0 Ω max.
- Operation Mode: Software polling
- Accuracy: INL±: ±1 LSB

Digital Input
- Channels: 16
- Compatibility: 5 V/TTL
- Input Voltage: Logic 0: 0.8 V max.

Digital Output
- Channels: 16
- Compatibility: 5 V/TTL
- Output Voltage: Logic 0: 0.4 V max.
- Output Capability
  | 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) (refer to IEC 68-2-1, 2)
- Storage Temperature: -20 – 85°C (-4 – 185°F)
- Operating Humidity: 5 – 85% RH non-condensing (refer to IEC 68-1, -2, -3)
- Storage Humidity: 5 – 95% RH non-condensing (refer to IEC 68-1, -2, -3)

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-10168-1: 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

* ±1 LSB is added as the derivative for absolute accuracy
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PCI-1718HDU

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

Specifications

Analog Input
- Channels: 16 single-ended/8 differential (software programmable)
- Resolution: 12 bits
- Max. Sampling Rate: 100 kS/s

Note: The sampling rate for each channel 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: 100 MΩ
- Sampling Modes: Software, onboard or external programmable pacer
- 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
- Channels: 1
- Resolution: 12 bits
- Output Rate: Static update
- Output Range (V, software programmable)
  - Internal Reference
    - Unipolar: N/A, 0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
  - External Reference
    - (V, software programmable): 0 ~ 4 V, 0 V ≤ y ≤ 10 (x ≤ 10)
- Slew Rate: 10 V/μs
- Driving Capability: 10 mA
- Output Impedance: 0.1 Ω max.
- Operation Mode: Software polling
- Accuracy: INLE: ±1 LSB

Digital Input
- Channels: 16
- Compatibility: 5 V/TL
- Input Voltage: Logic 0: 0.8 V max., Logic 1: 2 V min.

Features
- ISA-Compatible with PCL-818HD
- 16-ch single-ended or 8-ch differential 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)
- One 12-bit analog output channel
- 16-ch digital input and 16-ch digital output
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

Digital Output
- Channels: 16
- Compatibility: 5 V/TL
- 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

Counter/Timer
- Channels: 1
- Resolution: 16 bits
- Compatibility: 5 V/TL
- 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: 1 x DB37 female connector, 2 x 20-pin box header
- Dimensions (L x H): 175 x 100 mm (6.9" x 3.9")
- Power Consumption
  - Typical: 5 V @ 850 mA
  - Max.: 5 V @ 1 A
- Operating Temperature: 0 ~ 60 °C (32 ~ 140 °F)
- Storage Temperature: -20 ~ 70 °C (-4 ~ 158 °F)
- Operating Humidity: 5 ~ 85% RH non-condensing (refer to IEC 68-1, -2, -3)
- Storage Humidity: 5 ~ 95% RH non-condensing (refer to IEC 68-1, -2, -3)

Ordering Information
- PCI-1718HDU: 100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card

Accessories
- PCL-10120-1: 20-pin Flat Cable, 1 m
- PCL-10120-2: 20-pin Flat Cable, 2 m
- PCL-10137-1: DB37 Cable, 1 m
- PCL-10137-2: DB37 Cable, 2 m
- PCL-10137-3: DB37 Cable, 3 m
- ADAM-3920: 20-Pin Flat Cable Terminal, DIN-rail Mount
- ADAM-3937: DB37 DIN-rail Wiring Board

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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

Specifications

Analog Input
- Channels: 16 single-ended/8 differential (software programmable)
- Resolution: 16 bits
- Max. Sampling Rate
  - PCI-1741U: 200 kS/s
  - PCI-1742U: 1 MS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1742U are used, the sampling rate is 800k/4 = 200 kS/s per channel (without unipolar and bipolar mixed).

- FIFO Size: 1,024 samples
- Overvoltage Protection: 20 Vp-p
- Input Impedance: 100 MΩ/10pF (Off); 100 MΩ/100pF (On)
- Sampling Mode: Software, onboard programmable pacer and external

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
- Resolution: 16 bits
- Max. Input Frequency: 10 MHz
- Reference Clock: Internal: 10 MHz
  External Clock Frequency: 10 MHz

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 x D): 175 x 100 x 25 mm (6.9” x 3.9” x 0.99”)
- 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) (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

Ana Log Output
- Channels: 16
- Resolution: 16 bits
- Output Rate: Static update
- Output Range (V, software programmable)

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

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 x D): 175 x 100 x 25 mm (6.9” x 3.9” x 0.99”)
- 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) (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)
### 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; 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)

### Specifications

<table>
<thead>
<tr>
<th>Analog Input</th>
<th>PCI-1714U</th>
<th>PCI-1714UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channels</td>
<td>4 single-ended</td>
<td>4 single-ended</td>
</tr>
<tr>
<td>Resolution</td>
<td>12 bits</td>
<td>12 bits</td>
</tr>
<tr>
<td>Max. Sampling Rate</td>
<td>30 MS/s per channel</td>
<td>10 MS/s per channel</td>
</tr>
<tr>
<td>FIFO Size</td>
<td>PCI-1714U: 32,768 samples each channel</td>
<td>PCI-1714UL: 8,192 samples each channel</td>
</tr>
<tr>
<td>Overvoltage Protection</td>
<td>30 Vp-p</td>
<td>30 Vp-p</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50 Ω/1 MΩ/Hi Z jumper selectable/100 pF</td>
<td>50 Ω/1 MΩ/Hi Z jumper selectable/100 pF</td>
</tr>
<tr>
<td>Sampling Modes</td>
<td>Software polling, pacer</td>
<td>Software polling, pacer</td>
</tr>
<tr>
<td>Trigger Modes</td>
<td>Post-trigger, pre-trigger, delay-trigger, about-trigger</td>
<td>Post-trigger, pre-trigger, delay-trigger, about-trigger</td>
</tr>
<tr>
<td>Input Range (V, software programmable) &amp; Absolute Accuracy</td>
<td>Bipolar ±5 ±2.5 ±1 ±0.5</td>
<td>Absolute Accuracy (% of FSR) 0.1 0.2 0.2 0.4</td>
</tr>
</tbody>
</table>

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

### 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-1: BNC to BNC Wiring Cable, 1 m
- PCL-10901-1: DB9 to PS/2 Cable, 1 m
- PCL-10901-3: DB9 to PS/2 Cable, 3 m

### Pin Assignments

#### Onboard PS/2 Connector
- GND
- EXT CLK0
- EXT CLK1
- EXT CLR0
- EXT CLR1

#### PS/2 To DB9 Cable Connector
- GND
- GND
- GND
- EXT CLK0
- EXT CLK1

### 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 @ 700mA
- Operating Temperature: 0 ~ 60°C (32 ~ 140°F)
- Storage Temperature: -20 ~ 85°C (-4 ~ 185°F)
- Storage Humidity: 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
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 Vp-p 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 channel will be affected by used channel number. For example, if 4 channels of PCI-1715U are used, the sampling rate is 500k/4 = 125 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 Vp-p
- Input Impedance: 1 GΩ
- Sampling Modes: Software, onboard programmable pacer and external (TTL level)
- Input Range (V, software programmable) & Absolute Accuracy
  | Unipolar | 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) (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-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
- PCI-10137-1: DB37 Cable, 3 m
- PCI-10137-2: DB37 Cable, 2 m
- PCI-10137-3: DB37 Cable, 3 m

Pin Assignments

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
- PCI-10137-1: DB37 Cable, 3 m
- PCI-10137-2: DB37 Cable, 2 m
- PCI-10137-3: DB37 Cable, 3 m

Pin Assignments
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 a built in 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

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: 20 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) & 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)*
  - ±0.02

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

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 mA
- 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)

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

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

<table>
<thead>
<tr>
<th>Unipolar</th>
<th>Bipolar</th>
<th>Absolute Accuracy (% of FSR)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>±0.02</td>
<td>±0.02</td>
</tr>
</tbody>
</table>

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

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### Specifications

#### Analog Output

- **Channels**: 4 isolated
- **Resolution**: 12 bits
- **Output Rate**: Static update
- **Output Range**: (Software programmable)

<table>
<thead>
<tr>
<th>Bipolar (V)</th>
<th>±5, ±10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unipolar (V)</td>
<td>0 ~ 5, 0 ~ 10</td>
</tr>
<tr>
<td>Current Loop (mA)</td>
<td>80 ~ 20, 4 ~ 20</td>
</tr>
</tbody>
</table>

- **Slew Rate**: 2 V/μs
- **Isolation Protection**: 2,500 VDC
- **Driving Capability**: 5 mA
- **Operation Modes**: Software polling
- **Accuracy**: Relative: ±1 LSB; Non-Linear: ±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.)
- **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-1720U**: 12-bit, 4-ch Isolated AO Universal PCI Card

#### Accessories

- PCL-10137-1 DB97 Cable, 1 m
- PCL-10137-2 DB97 Cable, 2 m
- PCL-10137-3 DB97 Cable, 3 m
- ADAM-3937 DB97 DIN-rail Wiring Board

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### PCI-1724U

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

#### Specifications

- **Channels**: 32 isolated
- **Resolution**: 14 bits
- **Output Rate**: Static update
- **Output Range (Software programmable)**

<table>
<thead>
<tr>
<th>Bipolar (V)</th>
<th>±10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Loop (mA)</td>
<td>0 ~ 20, 4 ~ 20</td>
</tr>
</tbody>
</table>

- **Isolation Protection**: 1,500 VDC system isolation
- **Output Impedance**: 0.1 Ω max.
- **Operation Modes**: Software polling, synchronized output
- **Accuracy**: Relative: ±4 LSB
- **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) (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-1724U**: 14-bit, 32-ch Isolated AO Universal PCI Card

#### Accessories

- PCL-10162-1 DB62 Cable, 1 m
- PCL-10162-3 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
- PCI-bus mastering for data transfer
- 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 (Software programmable)
  - Internal Reference: Unipolar 0 ~ 5 V, 0 ~ 10 V
    Bipolar ±5 V ±10 V
  - External Reference: Current Loop
    0 ~ ±20 mA, 4 ~ 20 mA
    0 ~ ±1 V 0 ~ ±1 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)

**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) (refer to IEC 68-2-1, 2)
- Storage Temperature: -20 ~ 85°C (-4 ~ 185°F)
- Storage Humidity: 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

**Ordering Information**
- PCI-1721 12-bit, 4-ch Advanced PCI Analog Output 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
### PCI-1723
#### PCI-1723

**Specifications**

**Analog Output**
- **Channels**: 8
- **Resolution**: 16 bits
- **Output Rate**: Static update
- **Output Range**: (Software programmable)

<table>
<thead>
<tr>
<th>Bipolar (V)</th>
<th>±10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Loop (mA)</td>
<td>0 - 20, 4 - 20</td>
</tr>
</tbody>
</table>

- **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.
  
  0.5 V @ 24 mA
  
  Source: 2.0 V @ -15 mA

- **Output Capability Sink**: 0.5 V @ 0.4 mA max.
  
  2.7 V @ 50 μA max.

**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 ~ 50°C (32 ~ 122°F)
- **Storage Temperature**: -20 ~ 65°C (-4 ~ 149°F)
- **Storage Humidity**: 5 ~ 95% RH non-condensing (IEC 68-2-3)

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

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

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### PCI-1727U
#### PCI-1727U

**Specifications**

**Analog Output**
- **Channels**: 12
- **Resolution**: 14 bits
- **Output Rate**: Static update
- **Output Range**: (Software programmable)

<table>
<thead>
<tr>
<th>Bipolar (V)</th>
<th>±15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Loop (mA)</td>
<td>4 - 20</td>
</tr>
</tbody>
</table>

- **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.
  
  0.5 V @ 0.4 mA max.
  
  2.7 V @ 50 μA max.

**Digital Output**
- **Channels**: 16
- **Compatibility**: 5 V/TTL
- **Output Voltage**: Logic 0: 0.5 V Logic 1: 2.4 V
  
  Sink: 0.8 mA @ 0.5 V
  
  Source: 0.4 mA @ 2.4 V

**General**
- **Bus Type**: Universal PCI V2.2
- **I/O Connectors**: 1 x 37-pin D-type female connector
  
  2 x 20-pin box header
  
  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 x 100 mm (6.9" x 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-10120-1: 20-pin flat cable, 1 m
- PCL-10137-1: DB37 cable assembly, 1 m
- ADAM-3937: DB37 wiring terminal for DIN-rail mounting

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### 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**
  - Logic 0: 0.8 V max.
  - Logic 1: 2.0 V 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.
  - PCI-1737U/1739U: Logic 0: 0.4 V max.
  - PCI-1735U: Logic 1: 2.4 V min.
  - PCI-1737U/1739U: Logic 1: 2.4 V min.
- **Output Capability**
  - PCI-1735U: Sink: 0.5 V max @ 24 mA
  - Source: 2.0 V min. @ 15 mA
  - PCI-1737U/1739U: Sink: 0.4 V max. @ 24 mA
  - Source: 2.4 V min. @ 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: 5 V @ 98.8 mA (max.)
  - PCI-1737U: 5 V @ 294.9 mA (max.)
  - PCI-1739U: 5 V @ 540.8 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 (refer to IEC 68-2-3)

### 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-10120-1**
  - IDC-20 Flat Cable, 1 m
- **PCL-10120-2**
  - IDC-20 Flat Cable, 2 m
- **PCL-10150-1.2**
  - 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
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.: 4

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 (refer to IEC 68-2-3)

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

Ordering Information
- PCI-1751: 48-ch Digital I/O and Counter PCI 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
- ADAM-3968/20: 68-pin SCSI to 2 50-pin Box Header Board
- PCLD-8751: 48-ch Isolated Digital Input Board
- PCLD-8761: 24-ch Relay/Delay Isolated Digital Input Board
- PCLD-8762: 48-ch Relay Board

Pin Assignments

Ordering Information

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
- ADAM-3968/20: 68-pin SCSI to 2 50-pin Box Header Board
- PCLD-8751: 48-ch Isolated Digital Input Board
- PCLD-8761: 24-ch Relay/Delay Isolated Digital Input Board
- PCLD-8762: 48-ch Relay Board

Pin Assignments

Ordering Information

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
- ADAM-3968/20: 68-pin SCSI to 2 50-pin Box Header Board
- PCLD-8751: 48-ch Isolated Digital Input Board
- PCLD-8761: 24-ch Relay/Delay Isolated Digital Input Board
- PCLD-8762: 48-ch Relay Board

Pin Assignments

Ordering Information

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
- ADAM-3968/20: 68-pin SCSI to 2 50-pin Box Header Board
- PCLD-8751: 48-ch Isolated Digital Input Board
- PCLD-8761: 24-ch Relay/Delay Isolated Digital Input Board
- PCLD-8762: 48-ch Relay Board

Pin Assignments
PCI-1753
PCI-1753E

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

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 max. @ 24 mA
  - Source: 3.76 V min. @ 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) (refer to IEC 68-2-1, 2)
- Storage Temperature: -20 ~ -70°C (-4 ~ 158°F) (refer to IEC 68-2-3)
- 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: 100-pin to Two 68-pin SCSI Cables, 1 m and 2 m

Pin Assignments

Rev. C 05/00

FCC

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2002/95/EC

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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.**
  - D100-D107

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 max. @ 48 A
  - Source: 2.4 V min. @ 15 A

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

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 B-ch digital I/O

Ordering Information
- **PCI-1755**
  - Ultra-speed 32-ch Digital I/O Card

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

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.
PCI-1757UP is a 24-channel digital I/O low profile PCI card that meets the PCI standard REV.2.2 (universal PCI expansion card). The card also works with 3.3 V and 5 V PCI slots, and provides you with 24 parallel digital input/output channels that emulate mode 0 of the 8255 PPI chip. However, the buffered circuits offer a higher driving capability than the 8255.

### Specifications

**Digital Input**
- **Channels**: 24 (shared with output)
- **Compatibility**: 5 V/TTL
- **Input Voltage**
  - Logic 0: 0.8 V @ -0.2 mA
  - Logic 1: 2.0 V @ 20 mA
- **Interrupt Capable Ch.**: 2

**Digital Output**
- **Channels**: 24 (shared with input)
- **Compatibility**: 5 V/TTL
- **Output Voltage**
  - Logic 0: 0.5 V max. @ -24 mA
  - Logic 1: 3.7 V max. @ 24 mA
- **Output Capability**
  - Sink: 24 mA
  - Source: 15 mA

**General**
- **Bus Type**: Universal PCI V2.2
- **I/O Connectors**: 1 x DB25 female connector
- **Dimensions (L x H)**: 120 x 64 mm (4.7" x 2.5") Low profile MD1
- **Power Consumption**
  - Typical: 5 V @ 140 mA
  - Max.: 5 V @ 200 mA
- **Operating Temperature**: 0 – 70°C (32 – 158°F)
- **Storage Temperature**: -20 – 80°C (-4 – 176°F)
- **Storage Humidity**: 5 – 95% non-condensing

### Features
- Low profile PCI form factor
- Universal PCI bus
- 24 TTL level digital I/O channels
- Emulates mode 0 of 8255 PPI
- Buffered circuits provide higher driving capability
- Interrupt handling capability
- Output status read-back
- I/O configurable by software or on board DIP switch
- Keeps the output settings and values after system hot reset
- BoardID™ switch
- Convenient DB25 connector
- Supports both dry and wet contact

### Ordering Information
- **PCI-1757UP**: 24-ch Digital I/O Low Profile Universal PCI Card

### Accessories
- **ADAM-3925**: DB25 DIN-rail Wiring Board
- **PCL-10125-1**: DB25 Cable, 1 m
- **PCL-10125-3**: DB25 Cable, 3 m

### Pin Assignments

```
  +---------+  +---------+
  |  CN1    |  |        |
  +---------+  +---------+
     1     |  |  13     |
     2     |  |  12     |
     3     |  |  11     |
     4     |  |  10     |
     5     |  |  9      |
     6     |  |  8      |
     7     |  |  7      |
     8     |  |  6      |
     9     |  |  5      |
    10     |  |  4      |
    11     |  |  3      |
    12     |  |  2      |
    13     |  |  1      |
  +---------+  +---------+
  PB_4     |  | PA_14   |
  PB_3     |  | PA_13   |
  PB_2     |  | PA_12   |
  PB_1     |  | PA_11   |
  PC_7     |  | PA_10   |
  PC_6     |  | PA_9    |
  PC_5     |  | PA_8    |
  PC_4     |  | PA_7    |
  PC_3     |  | PA_6    |
  PC_2     |  | PA_5    |
  PC_1     |  | PA_4    |
  PA_10    |  | PA_3    |
  PA_9     |  | PA_2    |
  PA_8     |  | PA_1    |
  PA_7     |  | PA_15   |
  PA_6     |  | PA_14   |
  PA_5     |  | PA_13   |
  PA_4     |  | PA_12   |
  PA_3     |  | PA_11   |
  PA_2     |  | PA_10   |
  PA_1     |  | PA_9    |
  PA_0     |  | PA_8    |
```

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**2002/95/EC**
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 VDC, 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: 16
- Input Voltage: Logic 0: 1 V max., (2 V max.), Logic 1: 5 V min., (30 V max.)
- Interrupt Capable Ch.: 2 (DI0, DI1)
- Isolation Protection: 2,500 VDC
- 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: 24 mA, Source: 15 mA

Isolated Digital Output (PCI-1730U/PCI-1734)
- Channels: 16
- Output Type: Sink type (NPN)
- Isolation Protection: 2,500 VDC
- Output Voltage: 5 – 40 VDC
- 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 (see IEC 68-2-3)

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-10120-1: 20-pin Flat Cable, 1 m
- PCL-10120-2: 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-10137-1: DB37 Cable, 1 m
- PCL-10137-2: DB37 Cable, 2 m
- PCL-10137-3: DB37 Cable, 3 m

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PCI-1750
32-ch Isolated Digital I/O and 1-ch Counter PCI Card

Features
- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all isolated channels (2,500 VDC)
- High sink current on isolated output channels (200 mA/channel)
- Supports dry contact or 5 ~ 50 VDC 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 VDC, 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. (50 VDC max.) or dry contact
- **Interrupt Capable Ch.**: 2
- **Isolation Protection**: 2,500 VDC
- **Opto-Isolator Response**: 100 μs

### Isolated Digital Output
- **Channels**: 16
- **Output Type**: Sink (NPN)
- **Isolation Protection**: 2,500 VDC
- **Output Voltage**: 5 ~ 40 VDC
- **Sink Current**: 200 mA max. per channel
- **Opto-Isolator Response**: 100 μs

### Counter/Timer
- **Channels**: 1
- **Resolution**: 1 x 16-bit isolated counter
- **Compatibility**: 5 V/TTL
- **Max. Input Frequency**: 1 MHz
- **Isolation Protection**: 2,500 VDC

### 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 (refer to IEC 68-2-3)

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

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

Pin Assignments
## Specifications

### Isolated Digital Output

- **Channels**: 64 (16-ch/group)
- **Input Voltage**: Logic 0: 0 V, Logic 1: 5 V max.
- **Input Current**
  - Typical: 20 mA
  - Max.: 50 mA
- **Over-voltage Protection**: 2,000 VDC
- **Storage Temperature**: 0 ~ 60°C (32 ~ 140°F)
- **Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Dimensions (L x H)**: 175 x 100mm (6.9” x 3.9”)
- **Connector**: 1 x 100-pin SCSI female

### General

- **Bus Type**: PCI V2.2
- **I/O Connectors**: 1 x 100-pin SCSI female connector
- **Power Consumption**: Max.: 5 W @ 450 mA
- **Operating Temperature**: 0 ~ 50°C (32 ~ 140°F)
- **Storage Temperature**: 0 ~ -10°C (-14 ~ 158°F)
- **Storage Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Opto-isolator Response**: 25 μs

### Ordering Information

- **PCI-1752U**: 64-ch Isolated Digital Output Universal PCI Card
- **Accessories**
  - PCI-10258-1: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
  - ADAM-3951: 50-pin DIN-rail Wiring Board w/ LED Indicators

### Isolated Digital Input

- **Channels**: 32 (16-ch/group)
- **Input Voltage**: Logic 0: 0 V, Logic 1: 5 V max.
- **Input Current**
  - Typical: 200 mA
  - Max.: 500 mA
- **Over-voltage Protection**: 2,000 VDC
- **Storage Temperature**: 0 ~ 60°C (32 ~ 140°F)
- **Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Dimensions (L x H)**: 175 x 100mm (6.9” x 3.9”)
- **Connector**: 1 x 100-pin SCSI female

### General

- **Bus Type**: PCI V2.2
- **I/O Connectors**: 1 x 100-pin SCSI female connector
- **Power Consumption**: Max.: 5 W @ 450 mA
- **Operating Temperature**: 0 ~ 50°C (32 ~ 140°F)
- **Storage Temperature**: 0 ~ -10°C (-14 ~ 158°F)
- **Storage Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Opto-isolator Response**: 25 μs

### Ordering Information

- **PCI-1756**: 64-ch Isolated Digital I/O PCI Card
- **Accessories**
  - PCI-10258-1: 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 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 / channel)
- Output status readback
- Keeps the output settings and values after system hot reset
- Channel-freeze function
- High-density 100-pin SCSI connector

**Specifications**

- **Input Voltage**: 12 VDC @ 2.1 mA, 24 VDC @ 4.4 mA, 48 VDC @ 9.0 mA, 50 VDC @ 9.4 mA
- **Sink Current**: 2,500 V_{DC}
- **Over-voltage Protection**: 70 V_{DC}, 48 VDC @ 9.0 mA, 50 VDC @ 9.4 mA
- **Interrupt Handling Capability**
- **High-temperature isolation input/output channels (2,500 V_{DC})
- Either ± voltage input for DI by group
- Either ± voltage input for DI by group
- **64 isolated digital output channels**
- **Either ± voltage input for DI by group**
- **64-ch Isolated Digital Output PCI Card**
- **64-ch Isolated Digital Input PCI Card**
- **64-ch Isolated Digital I/O PCI Card**

**Ordering Information**

- **PCI-1752U**: 64-ch Isolated Digital Output Universal PCI Card
- **Accessories**
  - PCI-10258-1: 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
- 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**

- **Input Voltage**: Logic 0: 0 V, Logic 1: 5 V
- **Input Current**
  - Typical: 200 mA
  - Max.: 500 mA
- **Over-voltage Protection**: 2,000 VDC
- **Storage Temperature**: 0 ~ 60°C (32 ~ 140°F)
- **Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Dimensions (L x H)**: 175 x 100mm (6.9” x 3.9”)
- **Connector**: 1 x 100-pin SCSI female

**General**

- **Bus Type**: PCI V2.2
- **I/O Connectors**: 1 x 100-pin SCSI female connector
- **Power Consumption**: Max.: 5 W @ 450 mA
- **Operating Temperature**: 0 ~ 50°C (32 ~ 140°F)
- **Storage Temperature**: 0 ~ -10°C (-14 ~ 158°F)
- **Storage Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Opto-isolator Response**: 25 μs

**Ordering Information**

- **PCI-1754**: 64-ch Isolated Digital Input PCI Card
- **Accessories**
  - PCI-10258-1: 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 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 / channel)
- Output status readback
- Keeps output settings/values after system hot reset
- Channel-freeze function
- **High-density 100-pin SCSI connector**

**Specifications**

- **Input Voltage**: Logic 0: 0 V, Logic 1: 5 V
- **Input Current**
  - Typical: 200 mA
  - Max.: 500 mA
- **Over-voltage Protection**: 2,000 VDC
- **Storage Temperature**: 0 ~ 60°C (32 ~ 140°F)
- **Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Dimensions (L x H)**: 175 x 100mm (6.9” x 3.9”)
- **Connector**: 1 x 100-pin SCSI female

**General**

- **Bus Type**: PCI V2.2
- **I/O Connectors**: 1 x 100-pin SCSI female connector
- **Power Consumption**: Max.: 5 W @ 450 mA
- **Operating Temperature**: 0 ~ 50°C (32 ~ 140°F)
- **Storage Temperature**: 0 ~ -10°C (-14 ~ 158°F)
- **Storage Humidity**: 5 ~ 95% RH (IEC 68-2-3)
- **Opto-isolator Response**: 25 μs

**Ordering Information**

- **PCI-1756**: 64-ch Isolated Digital I/O PCI Card
- **Accessories**
  - PCI-10258-1: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
  - ADAM-3951: 50-pin DIN-rail Wiring Board w/ LED Indicators

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**Accessories**

- PCI-10258-1: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- ADAM-3951: 50-pin DIN-rail Wiring Board w/ LED Indicators

**Ordering Information**

- **PCI-1754**: 64-ch Isolated Digital Input PCI Card
- **Accessories**
  - PCI-10258-1: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
  - ADAM-3951: 50-pin DIN-rail Wiring Board w/ LED Indicators

**Ordering Information**

- **PCI-1756**: 64-ch Isolated Digital I/O PCI Card
- **Accessories**
  - PCI-10258-1: 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
  - ADAM-3951: 50-pin DIN-rail Wiring Board w/ LED Indicators
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

**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 Vdc
- **Opto-Isolator Response**: 20 μs
- **Input Resistance**: 3 kΩ

### Isolated Digital Output
- **Channels**: PCI-1758UDI: 128
  - PCI-1758UDIO: 64
- **Output Type**: Sink (NPN)
- **Isolation Protection**: 2,500 Vdc
- **Output Voltage**: 5 – 40 Vdc
- **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**
  - **Typical**: 5 V @ 0.3 A
  - 5 V @ 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% (IEC 68-2-3) 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-1**: 100-pin Mini-SCSI Cable, 1 m
- **PCL-101100S-2**: 100-pin Mini-SCSI Cable, 2 m
- **ADAM-3910D**: 100-pin DIN-rail SCSI Wiring Board

**Features**

### PCI-1758UDO and PCI-1758UDIO
- 128 isolated digital output channels (64 channels for PCI-1758UDIO)
- High-voltage isolation on output channels (2,500 Vdc)
- Wide output range (5 – 40 Vdc)
- 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 Vdc)
- High ESD protection (2,000 Vdc)
- Digital Filter function
- BoardID™ switch
- Interrupt handling capability for each channel

**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-1758UDO/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 depending on your settings.

**Pin Assignments**
PCI-1760U
8-ch Relay and 8-ch Isolated Digital Input
Universal PCI Card with 10-ch Counter/Timer

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 VDC for collecting digital inputs in noisy environments, 8 relay actuators that can be used as 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 (Sink)
- **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 VDC
- **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 Vcc
- **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 Vcc, 2 A @ 30 Vcc
- **Max. Switching Power**: 125 VA, 60 W
- **Max. Switching Voltage**: 250 Vcc, 220 VDC
- **Max. Switching Current**: 2 A
- **Operate/Release Time**: max. 5 / 3.5 ms

Features
- Universal PCI card, for 3.3 V and 5 V PCI slot
- 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

Ordering Information
- **PCI-1760U**: 8-ch Relay/IDI PCI Card w/ 10-ch Counter/Timer

Accessories
- **PCL-10137-1**: DB37 Cable, 1 m
- **PCL-10137-2**: DB37 Cable, 2 m
- **PCL-10137-3**: DB37 Cable, 3 m
- **ADAM-3937**: DB37 DIN-rail Wiring Board
PCI-1761 8-ch Relay and 8-ch Isolated Digital Input PCI Card
PCI-1762 16-ch Relay and 16-ch Isolated Digital Input PCI Card

Specifications

Isolated Digital Input
- Channels
  PCI-1761: 8
  PCI-1762: 16
- Input Voltage
  PCI-1761: Logic 0: 3 V max.
  Logic 1: 5 V min. (50 V max.)
  PCI-1762: Logic 0: 3 V max.
  Logic 1: 10 V min. (50 V max.)
- Interrupt Capable Ch.
  PCI-1761: 8
  PCI-1762: 2
- Isolation Protection
  PCI-1761: 3,750 VDC
  PCI-1762: 2,500 VDC
- Overvoltage Protection
  70 VDC
- Opto-Isolator Response
  25 μs
- Input Resistance
  PCI-1761: 5.6 kΩ
  PCI-1762: 4.7 kΩ

Relay Output
- Channels
  PCI-1761: 8
  PCI-1762: 16
- Relay Type
  SPDT
- Contact Rating
  PCI-1761: 8 A @ 250 VAC, 2 A @ 30 VDC
  PCI-1762: 0.25 A @ 250 VAC, 2 A @ 30 VDC
- Max. Switching Power
  PCI-1761: 2,000 VA, 60 W
  PCI-1762: 62.5 VA, 60 W
- Max. Switching Voltage
  PCI-1761: 600 VDC, 300 VAC
  PCI-1762: 250 VDC, 220 VAC
- Max. Switching Current
  PCI-1761: 8 A
  PCI-1762: 5 A
- Min. Switching Load
  PCI-1761: 12 V / 100 mA
  PCI-1762: 100 μV
- Operate/Release Time
  PCI-1761: Typ. 7 / 2 ms, max. 15 / 6 ms
  PCI-1762: Typ. 3 / 2 ms, max. 5 / 4 ms
- Resistance
  Contact: PCI-1761: 100 mΩ max.: 1 A @ 12 VAC
  PCI-1762: 50 mΩ max.: 10 mA @ 20 mV
  Insulation: PCI-1761: 10 GΩ min.: 500 VAC @ 25°C, 50%RH
  PCI-1762: 10 GΩ min.: 500 VAC

Features
- PCI-1761: 8 relay output channels and 8 isolated digital input channels
- PCI-1762: 16 relay output channels and 16 isolated digital input channels
- LED indicators to show activated relays
- Output status readback
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (PCI-1761: 3,750 VDC; PCI-1762: 2,500 VDC)
- High ESD protection (2,000 VDC)
- High over-voltage protection (70 VDC)
- Wide input range (10 – 50 VDC)
- Interrupt handling capability
- BoardID™ switch

General
- Bus Type
  PCI V2.2
- I/O Connectors
  PCI-1761: 1 x DB37 female connector
  PCI-1762: 1 x DB62 female connector
- Dimensions (L x H)
  PCI-1761: 175 x 100 mm (6.9” x 3.9”)
  PCI-1762: 175 x 100 mm (6.9” x 3.9”)
- Power Consumption
  PCI-1761: Typical: 5 V @ 220 mA
  Max.: 5 V @ 750 mA
  PCI-1762: Typical: 5 V @ 220 mA
  Max.: 5 V @ 620 mA
- 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% RH, non-condensing (IEC 68-2-3)

Ordering Information
- PCI-1761
  8-ch Relay/Isolated Digital Input PCI Card
- PCI-1762
  16-ch Relay/Isolated Digital Input PCI Card
- Accessories
  PCL-10137-1 DB37 Cable, 1 m
  PCL-10137-2 DB37 Cable, 2 m
  PCL-10137-3 DB37 Cable, 3 m
  ADAM-3937 DB37 DIN-rail Wiring Board
  PCL-10162-1 DB62 Cable, 1 m
  PCL-10162-3 DB62 Cable, 3 m
  ADAM-3962 DB62 DIN-rail Wiring Board

RoHS COMPLIANT

2002/95/EC

Data Acquisition Boards

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Introduction
PCI-1780U is a general purpose multi-channel counter/timer card for the PCI bus. 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 @ 0.8 V
  Source: -15 mA @ 2.0 V

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) (IEC 68-2-1, 2)
- Storage Temperature: -20 ~ 70°C (-4 ~ 158°F)
- Storage Humidity: 5 ~ 95% RH, non-condensing (IEC 68-2-3)

Ordering Information
- PCI-1780U: 8-ch, 16-bit Counter/Timer Universal PCI 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

RoHS COMPLIANT 2002/95/EC
Introduction

The PCI-1671UP IEEE-488 interface converts any PCI bus personal computer into an instrumentation control and data acquisition system. Connect up to 14 instruments using standard IEEE-488 cables such as the PCL-10488-2, 2 meter IEEE-488 interface cable. The PCI-1671UP transfers data over the GPIB at rates in excess of 1.5 million bytes per second using the maximum IEEE-488 specification cable length (2 meters times the # of devices). A 1,024-word FIFO buffer and the advanced REP-INSW ISR data transfer method provide the horsepower required to then transfer the data between the GPIB board and the host computer. The high-speed state machine also provides byte-to-word packing and unpacking, and because words carry twice the information that bytes do, packed data requires fewer bus cycles to transfer the same GPIB information.

The PCI-1671UP adheres to ANSI/IEEE Standard 488-1978. Often referred to as the IEEE-488.2 bus, GPIB bus or HP-IB bus, the GPIB (General Purpose Interface Bus) is a standard for instrumentation communication and control for instruments from manufacturers the world over. The GPIB provides handshaking and interface communications over an 8-bit data bus employing 5 control and 3 handshake signals. Equipped with PCI-1671UP; a personal computer can control GPIB instruments, gather data from GPIB test equipment, or become a data acquisition station in a GPIB system.

Specifications

**GPIB**
- Compatibility: IEEE 488.1, 488.2
- GPIB Transfer Rate: 1.5 MB/s
- OS Support: Windows® 2000/XP/Vista and Win 7
- Max. GPIB Connections: 15

**General**
- Bus Type: Universal PCI V2.2
- I/O Connectors: 1 x 24-pin IEEE 488
- Dimensions (L x H): 120 x 64 mm (Low profile MD1)
- Power Consumption: 5 Vdc, 375 mA
- Operating Temperature: 0 – 60°C (32 – 158°F) @ 0-90% RH
- Storage Temperature: -40 – 100°C (-40 – 212°F) @ 5-90% RH
- Operating Humidity: 0 – 90% RH, non-condensing

**Ordering Information**
- PCI-1671UP: High-perform. IEEE-488.2 Interface PCI Card
- Accessories:
  - PCL-10488-2: IEEE-488 Cable, 2 m

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**Features**
- IEEE 488.2 Standard interface
- Complete Talker/Listener/Controller
- Industry standard 32-bit PCI bus
- Data transfer rates over 1.5 MB/s
- 1,024-word FIFO buffer
- High-Speed State Machine Bus Manager
- 7 Interrupt lines, shared interrupt capability
- Transparent interrupt enabling/disabling
- Includes GPIB-Library software
- Low profile MD1 size

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IEEE-488.2 Interface Low Profile Universal PCI Card
### PCM-3810I
PCM-3813I

**Specifications**

**Analog Input**
- Channels: 16 single-ended or 8 differential or combination
- Resolution: 12 bits
- Max. Sampling Rate: 250 kS/s
- Ring Buffer Size: 4,096 samples
- Input Range and Gain List
  
<table>
<thead>
<tr>
<th>Gain</th>
<th>0.5</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unipolar</td>
<td>N/A</td>
<td>0 – 10</td>
<td>0 – 5</td>
<td>0 – 2.5</td>
<td>0 – 1.25</td>
</tr>
<tr>
<td>Bipolar</td>
<td>±10</td>
<td>±2.5</td>
<td>±2.5</td>
<td>±1.25</td>
<td>±0.625</td>
</tr>
</tbody>
</table>

- Input Protection: 30 Vp-p
- Sampling Mode: Polling, pacer, double-clock, or external TTL trigger
- Trigger Mode: Pre-trigger, post-trigger, delay-trigger, about-trigger

**Analog Output**
- Channels: 2
- Output Range: Internal Reference (V): 0 ~ 5, 0 ~ 10, ±5, ±10
  - External Reference: 0 ~ +x V @ +x V (-10 ≤ x ≤ 10)
- Resolution: 12 bits
- Ring Buffer Size: 4,096 samples
- Slew Rate: 20 V/μs
- Operation Mode: Software polling, continuous out

**Digital Input/Output**
- Channels: 16
- Compatibility: 5V/TTL

**Counter/Timer**
- Channels: 3 (independent)
- Resolution: 24 bits
- Compatibility: 5 V/TTL
- Max. Input Frequency: 10 MHz
- Counter Modes: 12 (programmable)
- Interrupt Capable Ch.: 3
- PWM Channels: 3

**General**
- Bus Type: PCI-104
- I/O Connectors: 1 x 26-pin, 1 x 50-pin box header
- Dimensions (L x H): 96 x 90 mm (3.8” x 3.5”)
- Operating Temperature: 0 ~ 60°C (-14 ~ 140°F) (refer to IEC 68-2-1, 2)
- Storage Temperature: -20 ~ 70°C (-4 ~ 158°F)

**Ordering Information**
- PCM-3810I: 250 kS/s, 12-bit Multi-PCI-104 Module
- PCM-3813I: 100 kS/s, 12-bit, 32-ch Isolated Analog Input PCI-104 Module

**Accessories**
- PCL-10150-1.2: 50-pin Flat Cable, 1.2 m
- ADAM-3950: 50-pin DIN-rail Flat Cable Wiring Board

---

**PCM-3810I**

250 kS/s, 12-bit, 16-ch Multifunction PCI-104 Module

100 kS/s, 12-bit, 32-ch Isolated Analog Input PCI-104 Module

**Features**
- 32 single-ended or 16 differential analog inputs
- Programmable gain for each input channel
- Automatic channel/gain/SD scanning
- Onboard ring buffer (1,024 samples)
- Isolation protection (2,500 Vrms)
- BoardID™ switch

**Specifications**

**Analog Input**
- Channels: 32 single-ended or 16 differential or combination
- Resolution: 12 bits
- Max. Sampling Rate: 100 kS/s
- Ring Buffer Size: 1,024 samples
- Input Range and Gain List
  
<table>
<thead>
<tr>
<th>Gain</th>
<th>0.5</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unipolar</td>
<td>N/A</td>
<td>0 – 10</td>
<td>0 – 5</td>
<td>0 – 2.5</td>
<td>0 – 1.25</td>
</tr>
<tr>
<td>Bipolar</td>
<td>±10</td>
<td>±2.5</td>
<td>±2.5</td>
<td>±1.25</td>
<td>±0.625</td>
</tr>
</tbody>
</table>

- Input Protect: 30 Vp-p
- Input Impedance: 100 MΩ/10pF (off); 100 MΩ/100pF (on)
- Sampling Mode: Software polling, onboard programmable pacer, or external TTL trigger

**General**
- Bus Type: PCI-104
- I/O Connectors: 1 x 40-pin box header
- Dimensions (L x H): 96 x 90 mm (3.8” x 3.5”)
- Operating Temperature: 0 ~ 60°C (-14 ~ 140°F) (refer to IEC 68-2-1, 2)
- Storage Temperature: -20 ~ 70°C (-4 ~ 158°F)

**Ordering Information**
- PCM-3813I: 100 kS/s, 12-bit Isolated AI PCI-104 Module

**Accessories**
- PCL-10141-0.2: IDE/J2 40-pin to DB37(F) Flat CABLE, 0.2 m
- PCL-10137-1: DB37 Cable, 1 m
- PCL-10137-2: DB37 Cable, 2 m
- PCL-10137-3: DB37 Cable, 3 m
- ADAM-3937: DB37 DIN-rail Wiring Board

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**Accessories**
- PCL-10150-1.2: 50-pin Flat Cable, 1.2 m
- ADAM-3950: 50-pin DIN-rail Flat Cable Wiring Board

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**Ordering Information**

**PCM-3810I**

250 kS/s, 12-bit Multi-PCI-104 Module

**PCM-3813I**

100 kS/s, 12-bit Isolated AI PCI-104 Module
## PCM-3730I

### Features
- High-voltage isolation on both input and output channels (2,500 V<sub>DC</sub>)
- High output driving capacity
- Interrupt handling capability
- Keep digital output values after system reset

### Specifications

#### Isolated Digital Input
- **Channels**: 16
- **Input Voltage**: Logic 0: 3 V max.
  Logic 1: 5 V min.
  30 V max.
- **Input Current**: 2.5 mA @ 5 V
  15 mA @ 30 V
- **Input Resistance**: 2 kΩ
- **Isolation Voltage**: 2,500 V<sub>DC</sub>
- **Over Voltage Protection**: 70 V<sub>DC</sub>
- **Opto-isolator Response Time**: 25 μs
- **Interrupt Capable**: All channels

#### Isolated Digital Output
- **Channels**: 16
- **Output Voltage**: 5 ~ 30 V<sub>DC</sub>
- **Output Sink Current**: 300 mA max.
- **Isolation Voltage**: 2,500 V<sub>DC</sub>
- **Over Voltage Protection**: 1.6 A per 8 channels
- **Opto-isolator Response Time**: 25 μs

### General
- **Bus Type**: PCI-104
- **I/O Connectors**: 2 x 20-pin box header
- **Dimensions (L x H)**: 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature**: -20 ~ 70°C (-4 ~ 158°F)
- **Storage Temperature**: -50 ~ 120°C (-58 ~ 248°F)

### Ordering Information
- **PCM-3730I**: 32-ch Isolated Digital I/O PCI-104 Module
- **Accessories**:
  - ADAM-3920: 20-pin DIN-rail Wiring Board
  - PCL-10120-1: 20-pin Flat Cable, 1 m
  - PCL-10120-2: 20-pin Flat Cable, 2 m

---

## PCM-3753I

### Features
- Supports dry/wet contact
- Keeps the last output value after system hot reset
- Interrupt handling capability
- "Pattern match" and "change of state" interrupt functions
- Output status read-back
- Interrupt output pin for simultaneously triggering external devices

### Specifications

#### Digital Input/Output
- **Channels**: 96 (bi-directional)
- **Compatibility**: 5 V/TTL
- **Input Voltage**: Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage**: Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability**: Sink: 0.4 V @ 24 mA
  Source: 2.4 V @ 15 mA

#### General
- **Bus Type**: PCI-104
- **I/O Connectors**: 4 x 50-pin box header
- **Dimensions (L x H)**: 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature**: -20 ~ 70°C (-4 ~ 158°F)
- **Storage Temperature**: -50 ~ 120°C (-58 ~ 248°F)

### Ordering Information
- **PCM-3753I**: 96-ch Digital I/O PCI-104 Module w/50p Cable
- **Accessories**:
  - PCL-10150-1.2: 50-pin Flat Cable, 1.2 m
  - PCL-10150-1.2: 50-pin Flat Cable, 2 m

---

## PCM-3761I

### Features
- 8 Form C type relay output channels
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (2,500 V<sub>DC</sub>)
- Wide input range (5 ~ 30 V<sub>DC</sub>)
- Interrupt handling capability

### Specifications

#### Isolated Digital Input
- **Channels**: 8
- **Input Voltage**: Logic 0: 3 V max.
  Logic 1: 5 V min.
  30 V max.
- **Input Current**: 2.5 mA @ 5 V
  15 mA @ 30 V
- **Input Resistance**: 2 kΩ
- **Isolation Protection**: 2,500 V<sub>DC</sub>
- **Overvoltage Protection**: 70 V<sub>DC</sub>
- **Interrupt Capable**: All channels
- **Opto-isolator Response Time**: 25 μs

### Ordering Information
- **PCM-3761I**: 8-ch Relay Isolated Digital I/O PCI-104 Module
- **Accessories**:
  - ADAM-3920: 20-pin DIN-rail Flat Cable Wiring Board
  - ADAM-3950: 50-pin DIN-rail Flat Cable Wiring Board
  - PCL-10150-1.2: 50-pin Flat Cable, 1.2 m
  - PCL-10120-1: 20-pin Flat Cable, 1 m
  - PCL-10120-2: 20-pin Flat Cable, 2 m
## Specifications
### Analog Input
- **Channels**: 16 single-ended / 8 differential
- **Resolution**: 12 bits
- **Max. Sampling Rate**: 100 KHz* (DMA transfer)
  - *80 KHz on P4-based (or upper) system
- **Input Impedance**: 10 MΩ
- **Input Range**: Software, pacer or external

### Analog Output (PCM-3718H only)
- **Channels**: 1 (12 bits)
- **Input Range**: 0 - 10 V
- **Output Impedance**: 0.1 W max.

### Digital Input/Output
- **Channels**: 16, 5V/TTL
- **Input Voltage**: Logic 0: 0.8 V max.
  - Logic 1: 2.0 V min.
- **Output Voltage**: Logic 0: 0.5 V max. @ 6 mA
  - Logic 1: 2.0 V min. @ -6 mA

### General
- **Bus Type**: PC/104
- **I/O Connectors**: 2 x 20-pin box header
- **Dimensions (L x H)**: 96 x 90 mm (3.8” x 3.5”)
- **Power Consumption**: 5 V @ 90 mA
- **Operating Temperature**: 0 – 60°C (32 – 140°F)
- **Storage Temperature**: -40 – 85°C (-40 – 185°F)

### Ordering Information
- **PCM-3718H**: 100 kS/s, 12-bit Multi. PC/104 Module
- **PCM-3718HG**: 100 kS/s, 12-bit High-gain Multi. PC/104 Module
- **PCM-3718HO**: 100 kS/s, 12-bit Multi. PC/104 Module w/AO

### Accessories
- **ADAM-3920**: 20-pin DIN-rail Flat Cable Wiring Board
- **PCL-10120-1**: 20-pin Flat Cable, 1 m
- **PCL-10120-2**: 20-pin Flat Cable, 2 m

### Features
- 48 TTL digital I/O lines
- Output status read-back
- Channels simulate 8255 PPI mode 0
- Interrupt triggering, rising/falling edge

### Specifications
#### Digital Input
- **Channels**: 48 (shared with output)
- **Compatibility**: 5 V/TTL
- **Input Voltage**: Logic 0: 0.8 V max.
  - Logic 1: 2.0 V min.
- **Interrupt Capable Ch.**: 2

#### Digital Output
- **Channels**: 48 (shared with input)
- **Compatibility**: 5 V/TTL
- **Output Voltage**: Logic 0: 0.5 V max. @ 6 mA
  - Logic 1: 2.0 V min. @ -6 mA

### Ordering Information
- **PCM-3724**: 48-ch Digital I/O PC/104 Module w/50-pin Cable

### Accessories
- **ADAM-3950**: 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B**: 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B**: 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
- **PCL-10150-1.2**: 50-pin Flat Cable, 1.2 m

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**PCM-3718H/HG/HO**

**PCM-3724**

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**100 kS/s, 12-bit, 16-ch Multifunction PC/104 Module**

**48-ch Digital I/O PC/104 Module**
Specifications

Isolated Digital Input
- Channels: 8
- Input Voltage: Logic 0: 3 V
  Logic 1: 10 V (50 V max.)
- Isolation Protection: 2,500 VDC
- Overvoltage Protection: 70 VDC
- Opto-Isolator Response: 25 µs
- Input Resistance: 4.7 kΩ

Relay Output
- Channels: 8
- Relay Type: SPDT (Form C)
- Contact Rating: 30 VDC @ 1.5 A
- Relay on Time: 4 ms
- Relay off Time: 4 ms
- Life Span: 100,000 min @ 2 A/30 V
- Resistance: Contact: 100 mA
  Insulation: 1 GΩ @ 500 VDC

General
- Bus Type: PC/104
- I/O Connectors: 1 x 20-pin header for I/O
- Dimensions (L x H): 96 x 90 mm (3.8” x 3.5”)
- Power Consumption: Typical: 5 V @ 100 mA
  Max.: 5 V @ 280 mA
- Operating Temperature: 0 – 60°C (32 – 140°F)
- Storage Temperature: -20 – 70°C (-4 – 158°F)
- Storage Humidity: 5 – 95% RH, non-cond.

Ordering Information
- PCM-3725: 8-ch Relay/Isolated Digital Input PC/104 Module
  - Accessories: PCL-10120-1, PCL-10120-2, PCL-10150-1.2, ADAM-3920, ADAM-3950

Specifications

Digital Input
- Channels: 16
- Interrupt Capable Ch.: 4
- Input Voltage: Logic 0: 2 V max.
  Logic 1: 5 V min. (24 V max.)
- Isolation Protection: 2,500 VDC
- Opto-Isolator Response: 0.1 ms
- Input Resistance: 2 kΩ @ 0.5 W

Specifications

Digital Output
- Channels: 8
- Output Capability:
  Sink: 8 mA @ 0.5 V max.
  Source: -0.4 mA @ 2.4 V min.
- Output Voltage: 5 – 40 VDC
- Sink Current: 200 mA max./channel
- Opto-Isolator Response: 100 µs

General
- Bus Type: PC/104
- I/O Connectors: 1 x 50-pin header
- Dimensions (L x H): 96 x 90 mm (3.8” x 3.5”)
- Power Consumption: Typical: 5 V @ 330 mA
  Max.: 5 V @ 0.8 mA
- Operating Temperature: 0 – 60°C (32 – 140°F)
- Storage Temperature: -20 – 70°C (-4 – 158°F)
- Storage Humidity: 5 – 95% RH, non-cond.

Ordering Information
- PCM-3730: 16-ch Isolated DI/O PC/104 Module w/ 20p Cable
  - Accessories: PCL-10120-1, PCL-10120-2, ADAM-3920
  - Counter/Timer: 24 (shared with output)
  - Resolution: 16 bits
  - Compatibility: 5 V/TTL
  - Max. Input Frequency: 20 MHz
  - Counter Modes: 12 (programmable)
  - Interrupt Capable Ch.: 2

Ordering Information
- PCM-3780: 2-ch Counter/Timer, DI/O, PC/104 Module w/Cables
  - Accessories: PCL-10120-1, PCL-10120-2, ADAM-3920
  - Counter/Timer: 24 (shared with input)
  - Resolution: 16 bits
  - Compatibility: 5 V/TTL
  - Output Voltage: Logic 0: 0.5 V max. @ 24 mA (sink)
  - Logic 1: 2.4 V min. @ 15 mA (source)