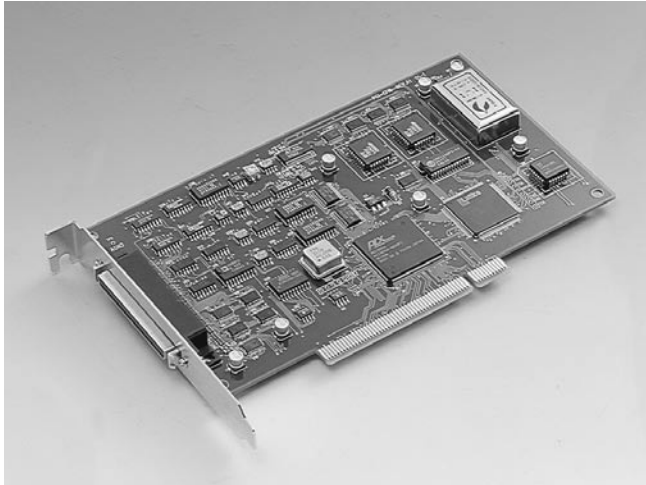


PCI-1716 PCI-1716L

250 kS/s, 16-bit High-Resolution
Multifunction Card

250 kS/s, 16-bit High-Resolution
Multifunction Card w/o AO function



CE

Features

- 16-bit high resolution
- 250 kS/s sampling rate
- Auto calibration function
- PCI-bus mastering for data transfer
- 16 analog input channels with 1024 K FIFO
- 16 S.E. or 8 Diff. AI, or a combination
- Unipolar/Bipolar input range
- 2 analog output channels (PCI-1716 only)
- 16 digital input channels
- 16 digital output channels
- One 10 MHz 16-bit resolution counter
- BoardID™ Switch

Introduction

PCI-1716 and PCI-1716L are powerful high-resolution multifunction cards for the PCI bus. They feature a 250 kS/s 16-bit A/D converter, and an on-board 1K sample FIFO buffer for A/D. The cards can also have up to sixteen single-ended or eight differential A/D input channels or a combination of these; two 16-bit D/A output channels, 16 digital input/output channels, and one 10 MHz 16-bit counter channel. PCI-1716 and PCI-1716L provide specific functions for different user requirements.

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (SW programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate*** 250 kS/s max.
- **FIFO Size** 1024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** Off: 100 M Ω /10 pF, On: 100 M Ω /100 pF
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Trigger Modes** Pre-trigger, Post-trigger, Delay-trigger, About-trigger
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Accuracy (% of FSR ± 1LSB)	0.15	0.03	0.03	0.05	0.1

*Note:

The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and other factors.

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	± 5 V, ± 10 V
External Reference	0 ~ +x V @ +x V (-10 \leq x \leq 10)	
	-x ~ +x V @ +x V (-10 \leq x \leq 10)	

- **Slew Rate** 20 V/ μ s
- **Driving Capability** ± 20 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Software polling
- **Accuracy** INLE: ± 1 LSB

Digital Input

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

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.8 mA @ 0.8 V
Source: -2.4 mA @ 2.0 V

Pacer/Counter

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

General

- **Bus Type** PCI 2.2
- **I/O Connector** 68-pin SCSI-II female
- **Dimensions** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: +5 V @ 850 mA, +12 V @ 600 mA
Max.: +5 V @ 1 A, +12 V @ 700 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (refer to IEC 68-2-1, 2)
- **Storing Temperature** -20 ~ 85° 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-1716** 250 kS/s, 16-bit, 16-ch High-resolution Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1716L** 250 kS/s, 16-bit, 16-ch High-resolution Multifunction Card w/o analog output, user's manual and driver CD-ROM. (cable not included)
- **PCLD-8710** Industrial Wiring Terminal Board with CJC circuit for DIN-rail Mounting. (cable not included)
- **PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- **ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

Feature Details

PCI-Bus Mastering Data Transfer

PCI-1716 and PCI-1716L support PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, PCI-1716 and PCI-1716L 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.

Auto-calibration Function

PCI-1716 and PCI-1716L provide an auto-calibration function by using a calibration utility. The built-in calibration circuitry of the PCI-1716 and PCI-1716L corrects gain and offset errors in analog input and analog output channels thereby eliminating the need for external equipment and user adjustments.

Easy Configuration with BoardID™ Switch and Plug & Play

PCI-1716 cards have a built-in BoardID™ DIP switch that helps define each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

The cards are also Plug & Play devices, which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug & Play function.

Automatic Channel/Gain/SD*/BU* Scanning

PCI-1716 and PCI-1716L feature an automatic channel/gain/SD/BU scanning circuit. This circuit controls multiplexer switching during sampling in a way that is more efficient than software implementation. On-board SRAM stores different gain, SD and BU values for each channel. This combination lets users perform multi-channel high-speed sampling with different gain, SD and BU values for each channel.

SD: Single-Ended/Differential; BU: Bipolar/Unipolar

On-board FIFO Memory

PCI-1716 and PCI-1716L provide 1K sample on-board FIFO (First In First Out) memory buffer for AD. This is an important feature for faster data transfer and more predictable performance under the Windows system.

On-board Programmable Timer/Counter

PCI-1716 and PCI-1716L provide a programmable timer counter for generating a pacer trigger for the A/D conversion. The timer/counter chip is 82C54, which includes three 16-bit counter 10 MHz clocks. One counter is used as an event counter for counting events coming from the input channel. The other two are cascaded together to make a 32-bit timer for a pacer trigger time base.

Pin Assignments

AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
AO0_REF	59	25	AO1_REF
AO0_OUT	58	24	AO1_OUT
AOGND	57	23	AOGND
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

*: Pins 23~25 and pins 57~59 are not defined for the PCI-1742U