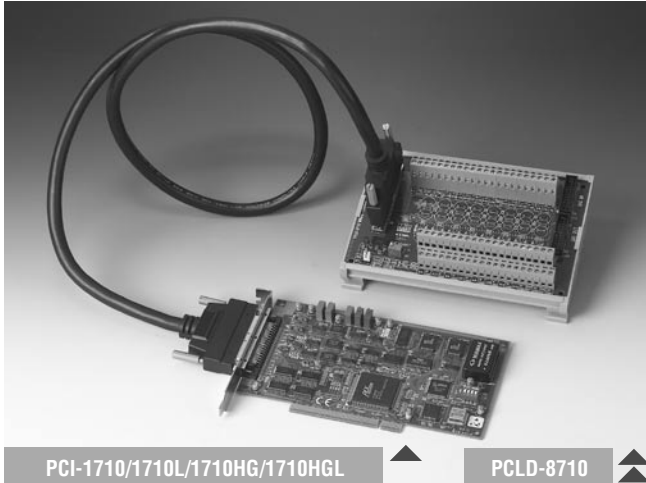


# PCI-1710 PCI-1710HG

**100 kS/s, 12-bit, PCI-bus  
Multifunction Card**

**100 kS/s, 12-bit, (High-gain),  
PCI-bus Multifunction Card**



PCI-1710/1710L/1710HG/1710HGL

PCLD-8710



## Features

- 16 single-ended, 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain for each input channel
- Free combination of single-ended and differential inputs
- On-board 4 K samples FIFO buffer
- Two 12-bit analog output channels
- 16 digital inputs and 16 digital outputs
- Programmable pacer/counter
- BoardID™ Switch
- Short circuit protection

## Introduction

The PCI-1710 Series are multifunction cards for the PCI bus. Their advanced circuit design provides higher quality and more functions, including the five most desired measurement and control functions: 12-bit A/D conversion, D/A conversion, digital input, digital output, and counter/timer.

## Specifications

### Analog Input

- **Channels** 16 single-ended or 8 differential (software programmable)
- **Resolution** 12-bit
- **On-board FIFO** 4 K samples
- **Maximum Input Overvoltage**  $\pm 30$  V
- **Input Range** (V, software programmable)

Model	PCL-1710/1710L	PCI-1710HG/1710HGL
<b>Bipolar</b>	$\pm 10, \pm 5, \pm 2.5, \pm 1.25, \pm 0.625$	$\pm 10, \pm 5, \pm 1, \pm 0.5, \pm 0.1 \pm 0.05, \pm 0.01, \pm 0.005$
<b>Unipolar</b>	$0 \sim 10, 0 \sim 5, 0 \sim 2.5, 0 \sim 1.25$	$0 \sim 10, 0 \sim 1, 0 \sim 0.1, 0 \sim 0.01$

### Common Mode Rejection Ratio (CMRR)

PCI-1710/1710L		PCI-1710HG/1710HGL	
Gain	CMRR	Gain	CMRR
0.5, 1	75 dB	0.5, 1	75 dB
2	80 dB	10	90 dB
4	84 dB	100	106 dB
8	84 dB	1000	106 dB

### Maximum Sampling Rate (S/s, depending on PGIA settling time)

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

**Note:** The sampling rate depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and so on.

- **Accuracy** (depends on gain)
- \* **S.E.:** Single-ended      **D:** Differential

PCI-1710/1710L		PCI-1710HG/1710HGL		
Gain	Accuracy	Gain	Accuracy	Remark
0.5, 1	0.01% of FSR $\pm 1$ LSB	0.5, 1	0.01% of FSR $\pm 1$ LSB	S.E./D
2	0.02% of FSR $\pm 1$ LSB	5, 10	0.02% of FSR $\pm 1$ LSB	S.E./D
4	0.02% of FSR $\pm 1$ LSB	50, 100	0.04% of FSR $\pm 1$ LSB	D
8	0.04% of FSR $\pm 1$ LSB	500, 1000	0.08% of FSR $\pm 1$ LSB	D

- **Linearity Error**  $\pm 1$  LSB
- **Input Impedance** 1 G $\Omega$
- **Trigger Mode** Software, onboard programmable pacer or external

### Analog Output (PCI-1710/1710HG only)

- **Channels** 2
- **Resolution** 12-bit
- **Relative Accuracy**  $\pm 1/2$  LSB
- **Gain Error**  $\pm 1$  LSB
- **Throughput** PC dependent, Software update (direct AO)
- **Slow Rate** 10 V/ms
- **Output Range** Internal reference:  $0 \sim +5$  V @  $-5$  V,  
(software programmable)  $0 \sim +10$  V @  $-10$  V  
External reference:  $0 \sim +x$  V @  $-x$  V ( $-10 \leq x \leq 10$ )
- **Driving Capability** 10 mA

### Digital Input

- **Channels** 16
- **Input Voltage** Low: 0.4 V max.  
High: 2.4 V min.
- **Input Load** Low: -0.2 mA @ 0.4 V  
High: 20 mA @ 2.7 V

## Specifications Cont.

### Digital Output

- **Channels** 16
- **Output Voltage** Low: 0.4 V max. @ 8.0 mA (sink)  
High: 2.4 V min. @ -0.4 mA (source)

### Programmable Timer/Counter

- **Counter Chip** 82C54 or equivalent
- **Counters** 3 channels, 16 bits, 2 channels are permanently configured as a 32-bit programmable pacer; 1 channel is free for user applications
- **Input, gate** TTL/CMOS compatible
- **Time Base** Channel 1: 10 MHz  
Channel 2: Takes input from output of channel 1  
Channel 0: Internal 1 MHz or external clock (10 MHz max.) selected by software.

### General

- **CE Certified to CISPR 22 class B**
- **I/O Connector** 68-pin SCSI-II female connector
- **Power Consumption** +5 V @ 850 mA (Typical),  
+5 V @ 1.0 A (Max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **MTBF** Over 64,770 hrs @ 25° C, grounded-fix environment

## Ordering Information

- **PCI-1710** 100 kS/s, 12-bit Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1710L** 100 kS/s, 12-bit Multifunction Card w/o AO, user's manual and driver CD-ROM. (cable not included)
- **PCI-1710HG** 100 kS/s, 12-bit High-Gain Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1710HGL** 100 kS/s, 12-bit High-Gain Multifunction Card w/o AO, 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 m.
- **PCL-10168-2** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 2 m.
- **ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

## Feature Details

PCI-1710 series provide specific functions for different user requirements:

PCI-1710	100 kS/s, 12-bit Multifunction Card
PCI-1710L	100 kS/s, 12-bit Multifunction Card w/o AO
PCI-1710HG	100 kS/s, 12-bit High-Gain Multifunction Card
PCI-1710HGL	100 kS/s, 12-bit High-Gain Multifunction Card w/o AO

### Mixed Single-ended or Differential Analog Inputs

PCI-1710 and PCI-1710HG feature an automatic channel/gain scanning circuit. The circuit, rather than your software, controls multiplexer switching during sampling. The on-board SRAM stores different gain values and configurations for each channel. This design lets you perform multi-channel high-speed sampling (up to 100 KHz) with different gains for each channel and allows free combination of single-ended and differential inputs.

### On-board FIFO (First In First Out) Memory

PCI-1710, PCI-1710L, PCI-1710HG and PCI-1710HGL have an on-board FIFO buffer that can store up to 4 K A/D samples. PCI-1710 and PCI-1710HG generate an interrupt when the FIFO is half full. This feature provides continuous high-speed data transfer and more predictable performance on Windows systems.

### On-board Programmable Counter

The PCI-1710/1710/1710HG/1710HGL provides a programmable counter to generate a pacer trigger for the A/D conversion. The counter chip is an 82C54 or equivalent, which includes three 16-bit counters on a 10 MHz clock. One counter is used as an event counter for counting events coming from the input channels. The other two are cascaded together to make a 32-bit timer for a pacer trigger.

### Special Shielded Cable for Noise Reduction

The PCL-10168 shielded cable is specially designed for the PCI-1710/1710HG to reduce noise in the analog signal lines. Its wires are all twisted pairs, and the analog lines and digital lines are separately shielded, providing minimal cross talk between signals and great protection against EMI/EMC problems.

## Pin Assignments

A10	68	34	A11
A12	67	33	A13
A14	66	32	A15
A16	65	31	A17
A18	64	30	A19
A110	63	29	A111
A112	62	28	A113
A114	61	27	A115
AIGND	60	26	AIGND
*AO0_REF	59	25	AO1_REF*
*AO0_OUT	58	24	AO1_OUT*
AOGND	57	23	AOGND
D10	56	22	D11
D12	55	21	D13
D14	54	20	D15
D16	53	19	D17
D18	52	18	D19
D110	51	17	D111
D112	50	16	D113
D114	49	15	D115
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 PCI-1710L/1710HGL