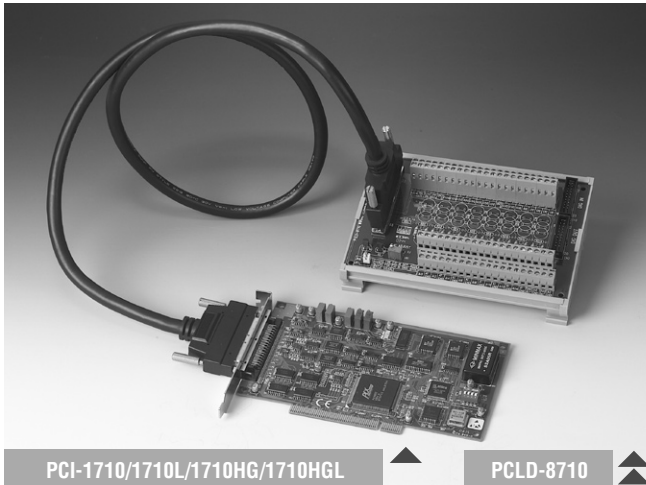


PCI-1710/1710L PCI-1710HG/HGL

**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
- Board ID
- Short circuit protection

Introduction

The PCI-1710/1710L/1710HG/1710HGL is a multifunction card for the PCI bus. Its 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
- **Conversion Time** 8 ms
- **Maximum Input Overvoltage** ± 30 V
- **Input Range** (V, software programmable)

| Model | PCL-1710/1710L | PCI-1710HG/1710HGL |
|-----------------|---|--|
| Bipolar | $\pm 10, \pm 5, \pm 2.5, \pm 1.25, \pm 0.625$ | $\pm 10, \pm 5, \pm 1, \pm 0.5, \pm 0.1 \pm 0.05, \pm 0.01, \pm 0.005$ |
| Unipolar | 0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25 | 0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 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 | Remarks |
| 0.5, 1 | 0.01% of FSR ± 1 LSB | 0.5, 1 | 0.01% of FSR ± 1 LSB | S.E./D |
| 2 | 0.02% of FSR ± 1 LSB | 5, 10 | 0.02% of FSR ± 1 LSB | S.E./D |
| 4 | 0.02% of FSR ± 1 LSB | 50, 100 | 0.04% of FSR ± 1 LSB | D |
| 8 | 0.04% of FSR ± 1 LSB | 500, 1000 | 0.08% of FSR ± 1 LSB | D |

- **Linearity Error** ± 1 LSB
- **Input Impedance** 1 G Ω
- **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** ± 1 LSB
- **Throughput** 38 KS/s (min.)
- **Slow Rate** 10 V/ms
- **Output Range** Internal reference: 0 ~ +5 V @ -5 V, (software programmable) 0 ~ +10 V @ -10 V
External reference: 0 ~ +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

The PCI-1710/1710HG features an automatic channel/gain scanning circuit. The circuit, rather than your software, controls multiplexer switching during sampling. The onboard 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

The PCI-1710/1710/1710HG/1710HGL has an on-board FIFO buffer that can store up to 4 K A/D samples. The PCI-1710/1710HG generates 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 |
| AI GND | 60 | 26 | AI GND |
| *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 PCI-1710L/1710HGL

