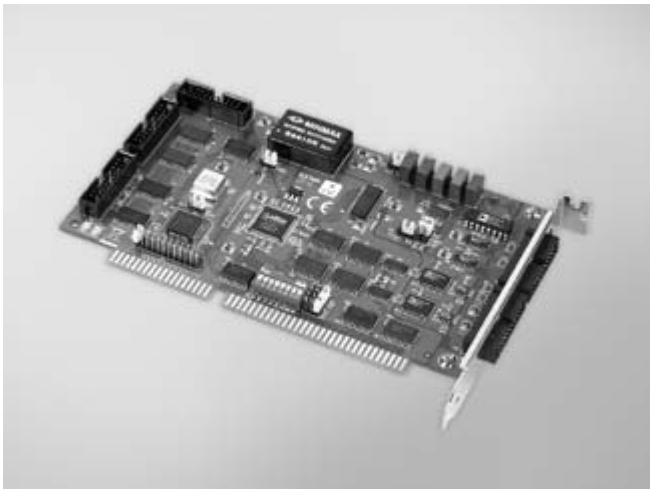
PCL-812PG

30 kS/s, 12-bit, 16-ch ISA Multifunction Card



Features

- 16-ch single-ended analog input
- 12-bit A/D converter, with up to 30 kHz sampling rate
- Programmable gain
- Two 12-bit analog output channels
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- A/D with DMA or interrupt

Introduction

PCL-812PG is a multifunction analog and digital I/O card that features the five most desired measurement and control functions for PC/AT and compatible systems: A/D conversion, D/A conversion, digital input, digital output and counter/timer. This half-size card neatly packages 16 12-bit analog input channels, two 12-bit analog output channels, 16 digital input channels, 16 digital output channels and a programmable counter/timer.

In addition to all the features listed above, PCL-812PG offers the convenience of programmable analog input ranges, where the analog input range can be switched by software commands instead of DIP switches. PCL-812PG also delivers convenience and maximum resolution for applications that need different gains for different channels or different gains for different stages of a process. Comprehensive software support, numerous I/O options and a wide range of available daughterboards make the PCL-812PG ideal for industrial applications that require a combination of analog and digital I/O.

Specifications

Analog Input

- **Channels** 16 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 30 kS/s
- **FIFO Size** 0
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** >10 MΩ
- **Sampling Modes** Software, pacer or external trigger
- **Input Range** (V, software programmable)
  ±10, ±5, ±2.5, ±1.25, ±0.625, ±0.3125
- **Accuracy** 0.4% of reading ±1 LSB

Analog Output

- **Channels** 2 double-buffered
- **Resolution** 12 bits
- **Output Rate** Software polling
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5, 0 ~ 10
External Reference		±10 max.

- **Driving Capability** 5 mA

Digital Input

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

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max., Logic 1: 2.4 V min.
- **Output Capacity** Sink: 8.0 mA, Source: 0.4 mA

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 kHz
- **Reference Clock** Internal: 2 MHz
  External Frequency: 10 MHz
  External Voltage Range: 5V/TTL

General

- **Bus Type** ISA
- **I/O Connectors** 5 x 20-pin box header
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** 5 V @ 500 mA typical, 1.0 A max.
  12 V @ 50 mA typical, 100 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

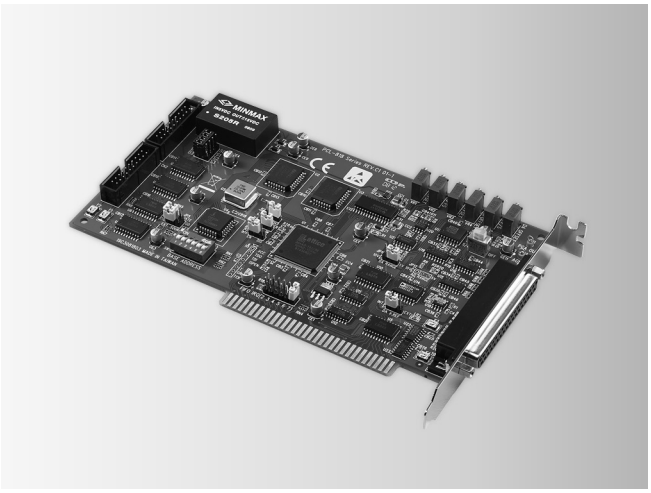
Ordering Information

- **PCL-812PG** 30 kS/s, 12-bit, 16-ch ISA Multifunction Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables

PCL-818HD/HG
PCL-818L

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

40 kS/s, 12-bit, 16-ch ISA Multifunction Card



Features

- 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, PCL-818HD/HG only)
- One 12-bit analog output channel
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter

Introduction

The PCL-818L series was designed for entry-level models to the PCL-818 series. The cards have been designed with the cost-sensitive customer in mind, but still offers the same functions as the rest of the series, except that they have a 40 kHz sampling rate and only accepts bipolar inputs. They are fully software and connector compatible with the PCL-818HD and PCL-818HG. This lets you upgrade your applications to these higher performance cards without hardware or software changes.

The PCL-818LS bundle consists of the PCL-818L card, the PCLD-8115 wiring terminal board and a DB37 cable assembly. The PCLD-8115 accommodates onboard passive signal conditioning components (resistors and capacitors), allowing you to easily implement a low-pass filter, a voltage attenuator or a 4 ~ 20 mA voltage converter.

Specifications

Analog Input

- **Channels** 16 single-ended / 8 differential
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s for all input ranges (PCL-818HD/HG only)
  40 kS/s for all input ranges (PCL-818L only)
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 10 MΩ
- **Sampling Modes** Software, pacer or external
- **Input Range** (V, software programmable)

PCL-818L/818HD					
Bipolar	±10	±5	±2.5	±1.25	±0.625
Unipolar*	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

* **Note:** PCL-818L doesn't support unipolar input range.

PCL-818HG								
Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
Unipolar	N/A	0 ~ 10	N/A	0 ~ 1	N/A	0 ~ 0.1	N/A	0 ~ 0.01
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4	0.4	0.8	0.8

Analog Output

- **Channels** 1
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5, 0 ~ 10
External Reference		0 ~ 10, 0 ~ -10

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 mA
  Source: -0.4 mA

Timer/Counter

- **Channels** 1
- **A/D Pacer** 32-bit with 10 MHz or 1 MHz time base
- **Max. and Min. Rates** 2.5 MHz and 0.00023 Hz
- **Counter** One 16-bit counter with 100 kHz time base

General

- **Power Consumption** 5 V @ 210 mA typical, 500 mA max.
  12 V @ 20 mA typical, 100 mA max.
  -12 V @ 20 mA typical, 40 mA max.
- **I/O Connector** 1 x DB37 female connector
  2 x 20-pin box header
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-818HD** High-performance Half-size Multifunction Card
- **PCL-818HG** High-performance and High-gain Multi. Card
- **PCL-818L** Low-cost High-perform. Half-size Multi. Card
- **PCL-818LS** PCL-818L w/ PCLD-8115 and DB37 Cable

Accessories

- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **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-8115** Wiring Board w/ CJC Circuit & One DB37 Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments

CN1

D/O 0	1	2	D/O 1
D/O 2	3	4	D/O 3
D/O 4	5	6	D/O 5
D/O 6	7	8	D/O 7
D/O 8	9	10	D/O 9
D/O 10	11	12	D/O 11
D/O 12	13	14	D/O 13
D/O 14	15	16	D/O 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

CN2

D/I 0	1	2	D/I 1
D/I 2	3	4	D/I 3
D/I 4	5	6	D/I 5
D/I 6	7	8	D/I 7
D/I 8	9	10	D/I 9
D/I 10	11	12	D/I 11
D/I 12	13	14	D/I 13
D/I 14	15	16	D/I 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

CN3 (Single ended)

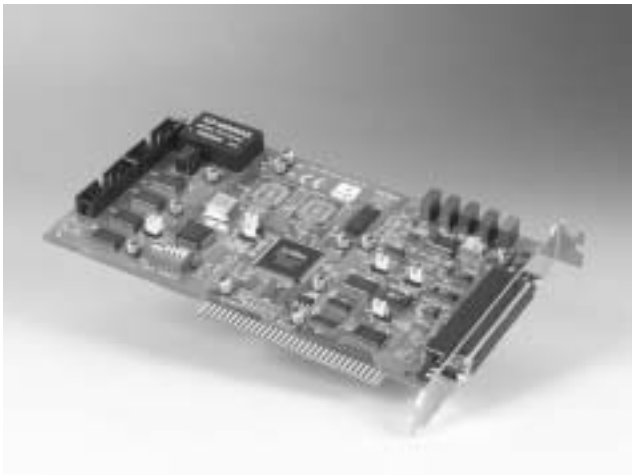
A/D S0	1	20	A/D S8
A/D S1	2	21	A/D S9
A/D S2	3	22	A/D S10
A/D S3	4	23	A/D S11
A/D S4	5	24	A/D S12
A/D S5	6	25	A/D S13
A/D S6	7	26	A/D S14
A/D S7	8	27	A/D S15
A.GND	9	28	A.GND
A.GND	10	29	A.GND
VREF	11	30	DA0.OUT
S0*	12	31	DA0.VREF
+12 V	13	32	S1*
S2*	14	33	S3*
D.GND	15	34	D.GND
NC	16	35	EXT.TRIG
Counter	17	36	Counter 0
Counter	18	37	PACER
+5 V	19		

CN3 (Differential)

A/D H0	1	20	A/D L0
A/D H1	2	21	A/D L1
A/D H2	3	22	A/D L2
A/D H3	4	23	A/D L3
A/D H4	5	24	A/D L4
A/D H5	6	25	A/D L5
A/D H6	7	26	A/D L6
A/D H7	8	27	A/D L7
A.GND	9	28	A.GND
A.GND	10	29	A.GND
VREF	11	30	DA0.OUT
S0*	12	31	DA0.VREF
+12 V	13	32	S1*
S2*	14	33	S3*
D.GND	15	34	D.GND
NC	16	35	EXT.TRIG
Counter	17	36	Counter 0
Counter	18	37	PACER
+5 V	19		

PCL-818L

40 kHz, Low-Cost, Multifunction ISA Cards



Features

- 16 single-ended or 8 differential analog inputs
- 12-bit A/D converter
- Programmable gain for each input channel
- Automatic channel/gain scanning with DMA
- 16 digital inputs and 16 digital outputs
- One 12-bit analog output channel
- Programmable pacer/counter

CE

Introduction

The PCL-818L series was designed for entry-level models to the PCL-818 series. The cards have been designed with the cost-sensitive customer in mind, but still offers the same functions as the rest of the series, except that they have a 40 kHz sampling rate and only accepts bipolar inputs. They are fully software and connector compatible with the PCL-818HD and PCL-818HG. This lets you upgrade your applications to these higher performance cards without hardware or software changes.

The PCL-818LS bundle consists of the PCL-818L card, the PCLD-8115 wiring terminal board and a DB37 cable assembly. The PCLD-8115 accommodates on-board passive signal conditioning components (resistors and capacitors), allowing you to easily implement a low-pass filter, a voltage attenuator or a 4 ~ 20 mA voltage converter.

Specifications

Analog Input

- **Channels** 16 single-ended, or 8 differential
- **Resolution** 12 bits
- **Max. Sampling Rate** 40 kS/s for all input ranges
- **Overvoltage Protection** ±30 V_{DC} max.
- **Input Impedance** 10 MΩ
- **Sampling Modes** Software, pacer or external
- **Input Range** **(V, software programmable)**

Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.01	0.01	0.02	0.02	0.04

Analog Output

- **Channels** 1
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** **(V, software programmable)**

Internal Reference	**Unipolar**	0 ~ 5, 0 ~ 10
External Reference		0~10, 0~ -10

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 mA
  Source: -0.4 mA

Timer/Counter

- **Channels** 1
- **A/D Pacer** 32-bit with 10 MHz or 1 MHz time base
- **Max. and Min. Rates** 2.5 MHz to 0.00023 Hz
- **Counter** One 16-bit counter with 100 kHz time base

General

- **Power Consumption** +5 V @ 210 mA typical, 500 mA max.
  +12 V @ 20 mA typical, 100 mA max.
  -12 V @ 20 mA typical, 40 mA max.
- **I/O Connector** DB37-F
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-818L** Low-cost high-performance half-size multi-function card, user's manual and driver CD-ROM.(cable not included)
- **PCL-818LS** PCL-818L with PCLD-8115 and DB-37 cable assembly (PCL-10137-1)
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-8115** Industrial Wiring Terminal with CJC circuit and DB37 connector
- **PCLD-880** Industrial Wiring Terminal with DB37 connector

Feature Details

Automatic Channel/Gain Scanning

All PCL-818 cards feature an automatic channel/gain scanning circuit. This circuit, instead of your software, controls multiplexer switching during sampling. On-board SRAM stores different gain values for each channel. This combination lets you perform multi-channel high-speed sampling (up to 100 kHz) with different gains for each channel and DMA data transfer.

Unique Technology

PCL-818 cards share a custom-designed 160-pin ASIC chip that has a gate count of over 7,000 and utilizes 1.0 mm CMOS technology. This custom integration gives higher performance and reliability with lower power consumption on a smaller board.

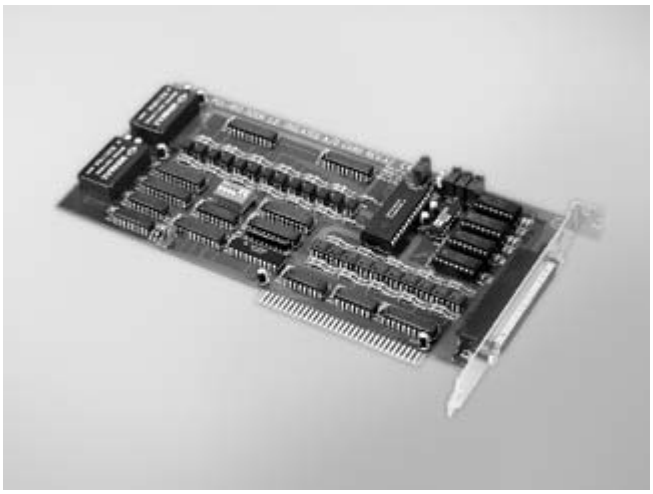
Wide Selection with Migration Path

The PCL-818 series lets you choose the card that exactly matches your application and price range. The PCL-818L is designed for lower budgets, with the best price/performance ratio in the market. If you need more power, you can easily upgrade to any other card in the series.

The PCL-818 cards are connector compatible so all your programs will work with your new card, protecting your investment.

PCL-813B

25 kS/s, 12-bit, 32-ch Isolated Analog Input ISA Card



Features

- 32 single-ended analog input channels
- 12-bit A/D converter, with up to 25 kHz sampling rate
- Isolation protection (500 V_{DC})
- Program-controlled A/D trigger and data transfer

Introduction

PCL-813B is a 12-bit 32-channel analog input card that offers high-voltage isolation on each analog input. It is an extremely cost effective solution for applications in industrial measurement and monitoring. The card offers 32 analog input channels with software programmable gain on each channel and two DC-to-DC converters on a 4-layer PCB with an integral ground plane. Optically-isolated inputs provide over 500 V_{DC} of isolation between the analog inputs and the PC, protecting the PC and peripherals from damage due to high voltages on the input lines. PCL-813B is ideal for situations where the budget-conscious user requires flexibility, stability and a high level of isolation protection. PCL-813B comes with the PCLD-881B wiring terminal board and a DB37 cable assembly.

Specifications

Analog Input

- **Channels** 32 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 25 kHz
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 500 V_{DC} from analog input to PC
- **Input Impedance** > 10 MΩ
- **Sampling Modes** software trigger
- **Input Range** (V, software programmable)

Unipolar (jumper selection)	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar (software selection)	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.2	0.2	0.4

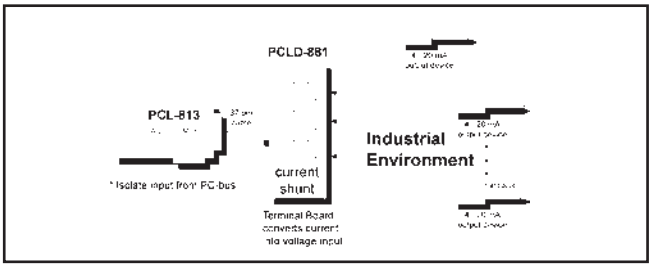
General

- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 219 x 100 mm (8.6" x 3.9")
- **Power Consumption** 5 V @ 660 mA max.
  12 V @ 140 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-813B** 25 kS/s, 12-bit, 32-ch Isolated AI ISA Card
- **PCLD-881B** Wiring Board for PCI-1713U, PCI-1715U & PCL-813B
- **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

Typical application for PCL-813B:

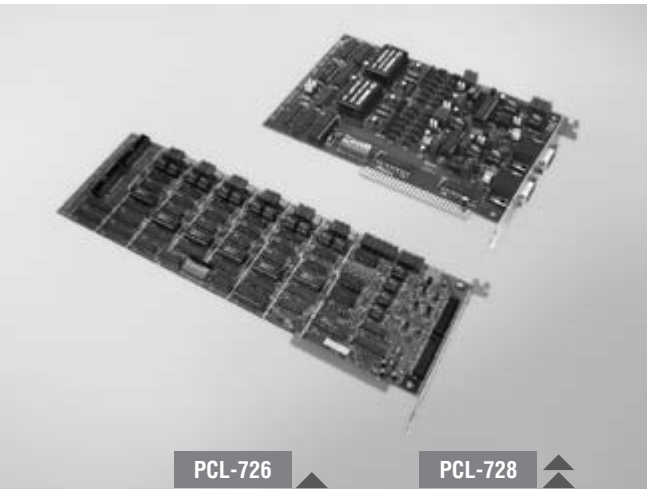


Industrial 4 ~ 20 mA Output Device Monitoring

PCL-726
PCL-728

12-bit, 6-ch Analog Output ISA Card with 32-ch Digital I/O

12-bit, 2-ch Isolated Analog Output ISA Card



Features

- Independent analog output channels
- 12-bit resolution double-buffered D/A converter
- Multiple voltage ranges: ±10 V, ±5 V, 0 ~ 5 V, 0 ~ 10 V and 4 ~ 20 mA current loop (sink)
- 16 digital input and 16 digital output channels (PCL-726)
- Two DB9 connectors for easy wiring (PCL-728)

Introduction

PCL-726, and PCL-728 are analog output cards with 12-bit analog output channels. You can individually configure each channel to any of the following ranges: 0 ~ 5 V, 0~10 V, ±5 V, ±10 V and 4~20 mA current loop (sink). Designed for use in industrial environments, these cards are ideal, economical solutions for applications that require multiple analog outputs or current loops.

Specifications

Analog Output

- **Channels** PCL-726: 6
PCL-728: 2 isolated
- **Resolution** 12 bits, double buffered
- **Output Rate** Static update
- **Reference Voltage** Internal: -5 V (±0.05 V)
-10 V (±0.05 V)
External: DC or AC, ±10V max.
- **Output Range** (Software programmable)

Internal Reference	**Bipolar (V)**	±5
	Unipolar (V)	0 ~ 5, 0 ~10
	Current Loop (mA)	4 ~ 20
External Reference	**Bipolar (V)**	±10

- **Isolation Protection** 500 V_{DC} (PCL-728)
- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω
- **Operation Modes** Software polling
- **Accuracy** 0.012%
- **Excitation Voltage** 8 ~ 36 V for 4 ~ 20 mA current loop

Digital Input (PCL-726)

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

Digital Output (PCL-726)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.5 V @ 0.4 mA max.
Source: 2.7 V @ 50 mA max.

General

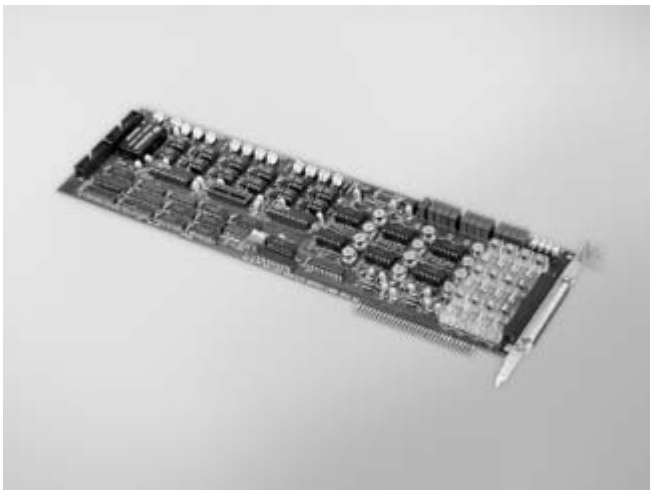
- **Bus Type** ISA
- **I/O Connectors** PCL-726: 4 x 20-pin box header
PCL-728: 2 x DB9 female connector
- **Dimensions (L x H)** PCL-726: 340 x 100 mm (13.4" x 3.9")
PCL-728: 184 x 119 mm (7.25" x 4.7")
- **Power Consumption**
PCI-726: 5 V @ 500 mA typical, 1 A max.
12 V @ 80 mA typical, 110 mA max.
12 V @ 60 mA typical, 90 mA max.
PCL-728: 5V @ 800 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-726** 12-bit, 6-ch AO ISA Card w/ Digital I/O
- **PCL-728** 12-bit, 2-ch Isolated AO ISA Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter
- **ADAM-3909** DB9 DIN-rail Wiring Board
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board

PCL-727

12-bit, 12-ch Analog Output ISA Card with 32-ch Digital I/O



Features

- 12 independent analog output channels
- Fuse on each channel
- BoardID™ switch
- Synchronized output function

Introduction

The PCL-727 provides 12 analog output channels on a full-size add-on card. In additional to its analog output, the PCL-727 provides 16 digital output channels and 16 digital output channels. It is an ideal and economical solution for industrial applications that requires multiple analog and/or current output channels.

Specifications

Analog Output

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

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

- **Driving Capability** 15 mA
- **Operation Modes** Software polling, synchronized output
- **Current Loop Excitation Voltage** 8 ~ 36 V

Digital Input

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

Digital Output

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

General

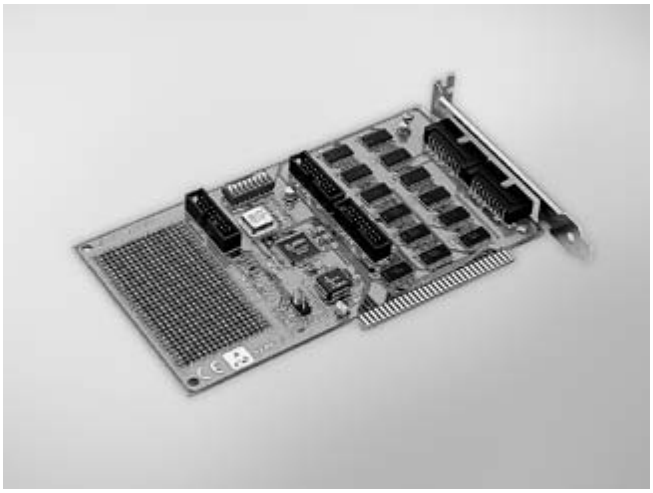
- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
2 x 20-pin box header
- **Power Consumption** 5 V @ 500 mA typical, 1A max.
12 V @50 mA typical, 110 mA max.
-12 V @ 14 mA typical, 90 mA max.
- **Dimensions (L x H)** 340 x 100 mm (13.4" x 3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCL-727** 12-bit, 12-ch AO ISA Card w/ Digital I/O
- **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-3937** DB37 DIN-rail Wiring Board
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable

PCL-720+

64-ch Digital I/O and Counter ISA Card



Features

- 32 TTL-level digital input channels
- 32 TTL-level digital output channels
- High-output driving capacity
- Low-input loading
- 3 programmable counter/timer channels
- User configurable clock source
- Breadboard area for custom circuits

Introduction

The PCL-720+ digital I/O and counter card is PC-compatible add-on cards with 32 digital input channels, 32 digital output channels and three programmable counter/timer channels. Their digital I/O channels are TTL-compatible and use 74LS244 driver/ buffer circuits to provide high output driving capacity. These buffered circuits also require lower input loading current than regular TTL circuits. The cards' 8254 programmable counter/timer provides three flexible 16-bit counter/timer channels. You can generate waves and pulses by programming the 8254. Jumper settings determine the clock crystal frequency. The cards also includes a breadboard area perfect for customized circuits.

Specifications

Digital Input

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V max. @ 24 mA
  Source: 2.0 V min. @ 15 mA

Counter/Timer

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

General

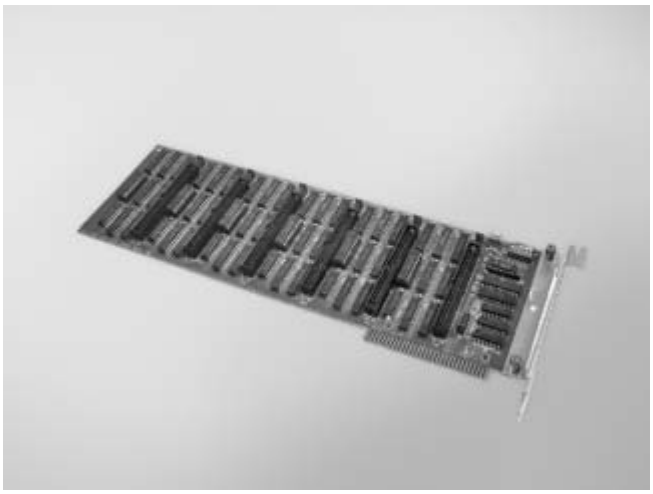
- **Breadboard Area** 540 (30 x 18) plated-through "donuts", each with a .036" hole on 0.10" centers. Further, provide 5 V on the left side, and provide GND on the right side
- **Bus Type** ISA
- **I/O Connectors** 5 x 20-pin box header
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 4")
- **Power Consumption** 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-720+** 64-ch Digital I/O and Counter ISA Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1 m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1 m 20-pin Flat Cable
- **PCLD-786** 8-ch SSR I/O Module Board w/ 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board

PCL-722

144-ch Digital I/O ISA Card



Features

- Emulates 8255 PPI mode 0
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Output status readback
- Pin compatible with Opto-22 I/O module racks

Specifications

Digital Input

- **Channels** 144 (24 channels x 6 ports) shared with output
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** Bits 0 and 3 of Port C can generate an interrupt to IRQ 2, 3, 4, 5, 6 or 7

Digital Output

- **Channels** 144 (24 channels x 6 ports) shared with input
- **Compatibility** 5 V/TTL
- **Output Voltage**
  Port A, B: Logic 0: 0.5 V max.
  Logic 1: 2.4 V min.
  Port C: Logic 0: 0.4 V max.
  Logic 1: 2.0 V min.
- **Output Capability**
  Port A, B: Sink: 12 mA
  Source: 8 mA
  Port C: Sink: 24 mA
  Source: 15 mA

General

- **Bus Type** ISA
- **Power Consumption** Typical: 5 V @ 1.3 A
  Max.: 5 V @ 1.8 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **I/O Connectors** 6 x 50-pin box header
- **Dimensions (L x H)** 334 x 100 mm (13.2" x 3.9")

Ordering Information

- **PCL-722** 144-ch Digital I/O ISA Card
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **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
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

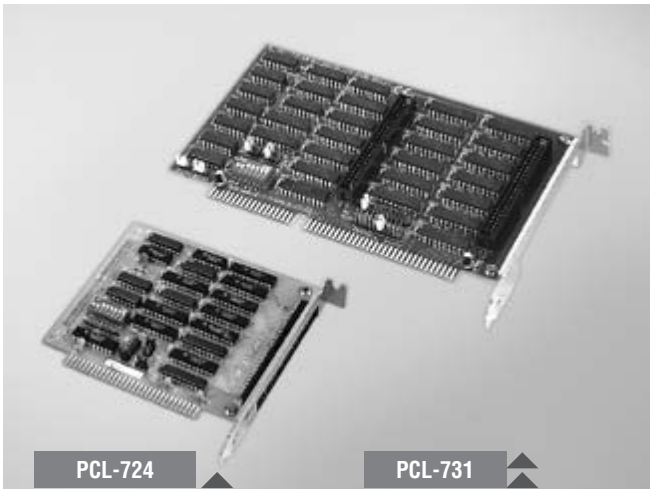
Pin Assignments

PC 7	1	2	GND
PC 6	3	4	GND
PC 5	5	6	GND
PC 4	7	8	GND
PC 3	9	10	GND
PC 2	11	12	GND
PC 1	13	14	GND
PC 0	15	16	GND
PB 7	17	18	GND
PB 6	19	20	GND
PB 5	21	22	GND
PB 4	23	24	GND
PB 3	25	26	GND
PB 2	27	28	GND
PB 1	29	30	GND
PB 0	31	32	GND
PA 7	33	34	GND
PA 6	35	36	GND
PA 5	37	38	GND
PA 4	39	40	GND
PA 3	41	42	GND
PA 2	43	44	GND
PA 1	45	46	GND
PA 0	47	48	GND
+5V	49	50	GND

PCL-724
PCL-731

24-ch Digital I/O ISA Card

48-ch Digital I/O ISA Card



Features

- 24 TTL digital I/O channels for PCL-724 and 48 TTL digital I/O channels for PCL-731
- Emulates mode 0 of 8255 PPI
- Interrupt handling capability
- Opto-22 compatible 50-pin connectors
- Output status readback

Specifications

Digital Input

- **Channels** PCL-724: 24 (shared with output)
  PCL-731: 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.** PCL-724: 1
  PCL-731: 2

Digital Output

- **Channels** PCL-724: 24 (shared with input)
  PCL-731: 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 max. @ 24 mA
  Source: 2.4 V min. @ 15 mA

General

- **Bus Type** ISA
- **I/O Connectors** PCL-724: 1 x DB50 female connector
  PCL-731: 2 x 50-pin box header
- **Dimensions (L x H)** PCL-724: 125 x 100 mm (4.9" x 3.9")
  PCL-731: 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** Typical: 5 V @ 0.5 A
  Max.: 5 V @ 0.8 A
- **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

- **PCL-724** 24-ch Digital I/O ISA Card
- **PCL-731** 48-ch Digital I/O ISA Card
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **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
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

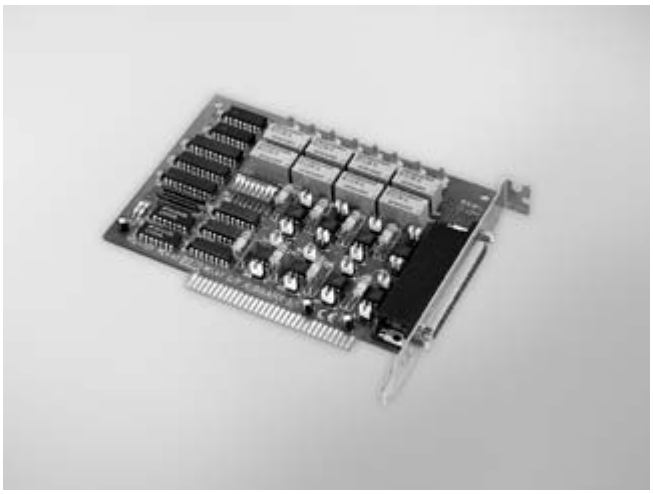
Pin Assignments

CN1				CN2			
PC 07	1	2	GND	PC 17	1	2	GND
PC 06	3	4	GND	PC 16	3	4	GND
PC 05	5	6	GND	PC 15	5	6	GND
PC 04	7	8	GND	PC 14	7	8	GND
PC 03	9	10	GND	PC 13	9	10	GND
PC 02	11	12	GND	PC 12	11	12	GND
PC 01	13	14	GND	PC 11	13	14	GND
PC 00	15	16	GND	PC 10	15	16	GND
PB 07	17	18	GND	PB 17	17	18	GND
PB 06	19	20	GND	PB 16	19	20	GND
PB 05	21	22	GND	PB 15	21	22	GND
PB 04	23	24	GND	PB 14	23	24	GND
PB 03	25	26	GND	PB 13	25	26	GND
PB 02	27	28	GND	PB 12	27	28	GND
PB 01	29	30	GND	PB 11	29	30	GND
PB 00	31	32	GND	PB 10	31	32	GND
PA 07	33	34	GND	PA 17	33	34	GND
PA 06	35	36	GND	PA 16	35	36	GND
PA 05	37	38	GND	PA 15	37	38	GND
PA 04	39	40	GND	PA 14	39	40	GND
PA 03	41	42	GND	PA 13	41	42	GND
PA 02	43	44	GND	PA 12	43	44	GND
PA 01	45	46	GND	PA 11	45	46	GND
PA 00	47	48	GND	PA 10	47	48	GND
+5 V	49	50	GND	+5 V	49	50	GND

***Note: CN2 is only for PCL-731**

PCL-725

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



Features

- 8 x relay output channels and 8 x isolated digital input channels
- LED indicators to show activated relays
- 4 x Form C and 4 x Form A type relay output channels
- Male DB37 matching connector included
- Output status readback

Introduction

The PCL-725 relay actuator and isolated digital input card offers 8 relay actuators and 8 opto-isolated digital inputs on a single board.Typically, the onboard relays can serve as on/off control devices or small power switches. The 8 x opto-isolated DI channels are ideal devices for collecting digital inputs under noisy environment or floating potential. Also, the 8 x isolated inputs provide the best method to prevent any ground loop problems.

For easy monitoring, each relay is equipped with one red LED to reflect its on/off status. Each input channel is jumper selectable to either isolated or non-isolated input. Access to input and output channels is made possible through an onboard 37-pin D type connector.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** 5 ~ 24 V_{DC}
- **Isolation Protection** 1,500 V_{DC}
- **Input Resistance** 560 Ω
- **Input Current** 60 mA max.

Non-isolated Digiteal Input

- **Channels** 8 (Jumper-selectable)
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min. (5.25 V max.)

Relay Output

- **Channels** 8
- **Relay Type** SPDT (4 x Form C and 4 x Form A)
- **Contact Rating** 120 V_{AC} @ 0.5 A, or 30 V_{DC} @ 1 A
- **Relay on Time** 8 ms max.
- **Relay off Time** 8 ms max.
- **Life Span** 1 x 10^7 operations
- **Resistance** Contact: 50 mΩ
  Insulation: 100 MΩ min.

General

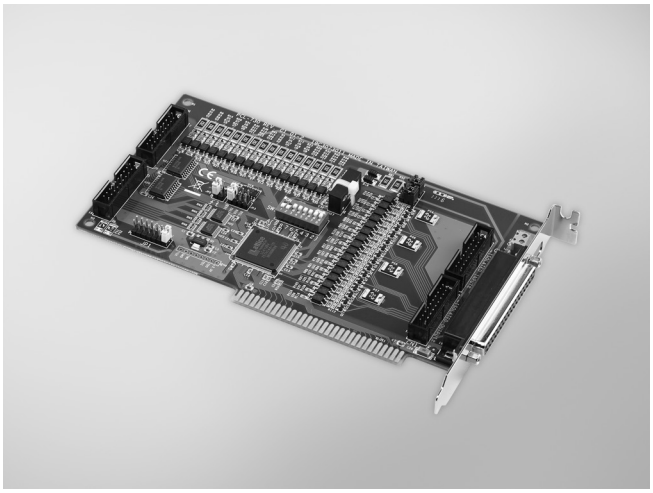
- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 147 x 100 mm (5.75" x 3.9")
- **Power Consumption** 5 V @ < 0.2 A; 12 V @ 33 mA for each relay
  < 0.27 A if all eight relays are energized
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **PCL-725** 8-ch Relay/Isolated Digital Input ISA Card
- **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
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

PCL-730

32-ch Isolated Digital I/O ISA Card



Features

- 32 isolated DIO ch. (16 inputs and 16 outputs)
- 32 TTL-level DIO ch. (16 inputs and 16 outputs)
- High output driving capacity
- Interrupt capability
- Two 20-pin connectors for isolated digital I/O channels and two for TTL digital I/O channels
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels

Introduction

The PCL-730 offers isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL DIO channels.

Specifications

Digital Input

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

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 1 V max.
Logic 1: 5 V min., 24 V max.
- **Interrupt Capable Ch.** 2 (IDI0, IDI1)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 3 KΩ @ 0.2 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: 8 mA
Source: 0.4 mA

Isolated Digital Output

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

General

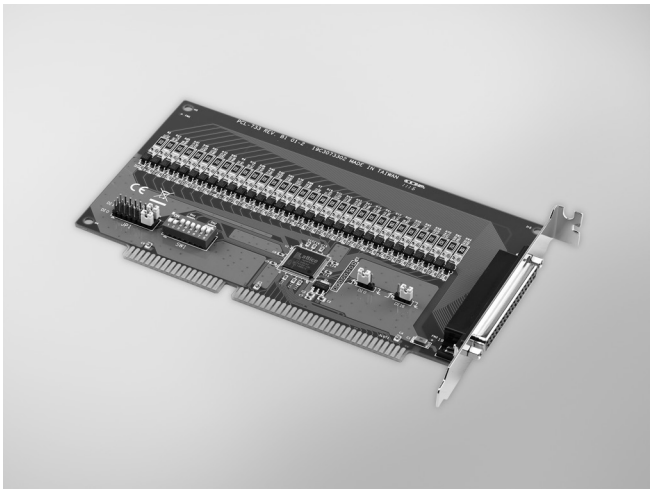
- **Bus Type** ISA
- **I/O Connectors** 1 x 37-pin D-type female
2 x 20-pin box header for fl at cable
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** Typical: 5 V @ 330 mA; 12 V @ 80 mA
Max.: 5 V @ 500 mA; 12 V @ 105 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-730** 32-channel isolated digital I/O card, user's manual and driver CD-ROM (cable not included)
- **PCL-10120-1** 20-pin fl at cable, 1m
- **PCL-10120-2** 20-pin fl at cable, 2m
- **ADAM-3920** 20-pin fl at cable wiring terminal for DIN-rail mounting
- **PCLD-782** 16-channel opto-isolated D/I board
- **PCLD-785** 16-channel relay output board
- **PCLD-885** 16-channel power relay (form A) output board
- **PCL-10137-1** DB37 cable, 1m
- **PCL-10137-2** DB37 cable, 2m
- **PCL-10137-3** DB37 cable, 3m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

PCL-733

32-ch Isolated Digital Input ISA Card



Features

- 32 isolated, digital input channels
- High-voltage isolation (2,500 V_{DC})
- Interrupt capacity
- D-type connectors for isolated input channels
- Reverse voltage protection for isolated input channels (up to 24 V_{DC})

Introduction

The PCL-733 card offers 32 isolated digital input channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required.

Specifications

Isolated Digital Input

- **Channels** 32
- **Input Voltage** Logic 0: 1 V max.
  Logic 1: 5 V min., 24 V max.
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 3 KΩ @ 0.2 W

General

- **Bus Type** ISA
- **I/O Connectors** 1 x 37-pin D-type female
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** Typical: +5 V @ 320 mA
  Max.: +5 V @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

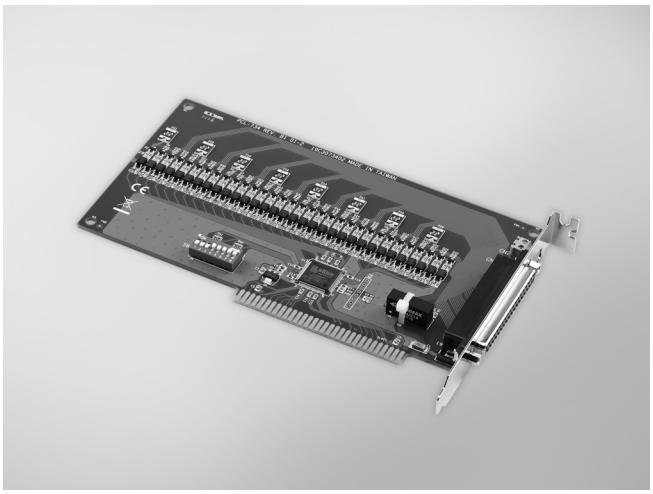
- **PCL-733** 32-channel isolated digital input card, manual and driver CD-ROM (cable not included)
- **PCL-10137-1** DB37 cable, 1m
- **PCL-10137-2** DB37 cable, 2m
- **PCL-10137-3** DB37 cable, 3m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

Pin Assignments

IDI 0	1	20	IDI 1
IDI 2	2	21	IDI 3
IDI 4	3	22	IDI 5
IDI 6	4	23	IDI 7
EI. GND 1	5	24	IDI 8
IDI 9	6	25	IDI 10
IDI 11	7	26	IDI 12
IDI 13	8	27	IDI 14
IDI 15	9	28	EI. GND 2
IDI 16	10	29	IDI 17
IDI 18	11	30	IDI 19
IDI 20	12	31	IDI 21
IDI 22	13	32	IDI 23
EI.GND 3	14	33	IDI 24
IDI 25	15	34	IDI 26
IDI 27	16	35	IDI 28
IDI 29	17	36	IDI 30
IDI 31	18	37	EI. GND 4
NC	19		

PCL-734

32-ch Isolated Digital Output ISA Card



Features

- 32 isolated digital output channels
- High output driving capacity
- High-voltage isolation on output channels
- High sink current on isolated output channels (200 mA/channel)
- Integral suppression diodes for inductive loads
- Wide output range (5 ~ 40 V_{DC})
- D-type connectors for isolated output channels

Introduction

The PCL-734 card offers 32 isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required.

Specifications

Isolated Digital Output

- **Channels** 32
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max. per channel
- **Opto-Isolator Response** 100 µs

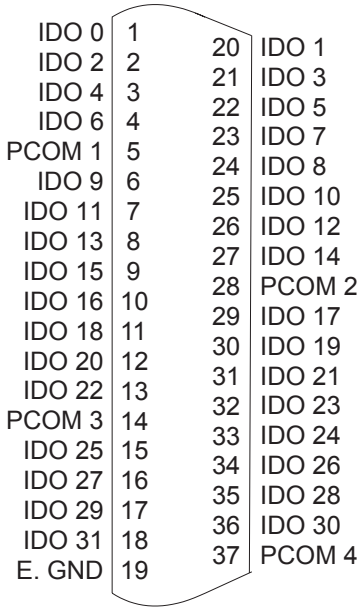
General

- **Bus Type** ISA
- **I/O Connectors** 37-pin D-type female
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** Typical: 5 V @ 330 mA; 12 V @ 80 mA
  Max.: 5 V @ 500 mA; 12 V @ 105 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

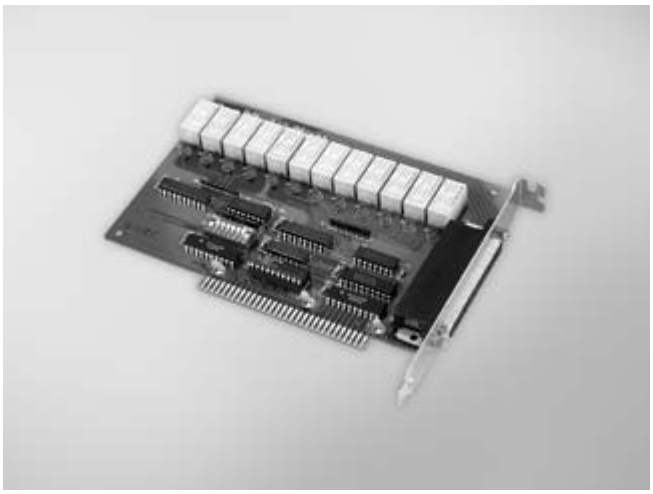
- **PCL-734** 32-channel isolated digital ISA output card, user manual and driver CD-ROM (cable not included)
- **PCL-10137-1** DB37 cable, 1m
- **PCL-10137-2** DB37 cable, 2m
- **PCL-10137-3** DB37 cable, 3m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

Pin Assignments



PCL-735

12-ch Relay ISA Card



Features

- 12 relay outputs
- LED indicators to show activated relays
- Male DB37 matching connector included
- Output status readback

Introduction

Ideal for applications such as on/off control or signal switching, the PCL-735 12-channel relay actuator provides 12 SPDT relays on a half-size card. The on/off status of each relay is easy to monitor. A red LED next to each relay shows its on/off status, and the software can read each relay's status. An onboard DB-37 connector provides access to all output channels.

Specifications

Relay Output

- **Channels** 12
- **Relay Type** SPDT, Form C
- **Contact Rating** 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
- **Relay on Time** 5 ms typical
- **Relay off Time** 5 ms typical
- **Life Span** > 5 x 10^5 operations @ 30 V_{DC} and 2 A
  > 2 x 10^6 operations @ 30 V_{DC} and 1 A
- **Resistance** Contact: 50 mΩ
  Insulation: 1 GΩ @ 500 V_{DC} min.

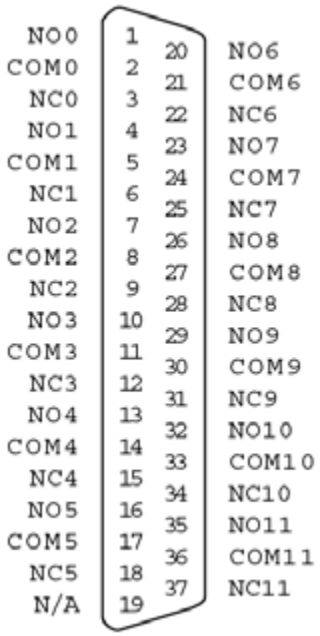
General

- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Power Consumption** Typical: 5 V @ 280 mA
  Max.: 12 V @ 200 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

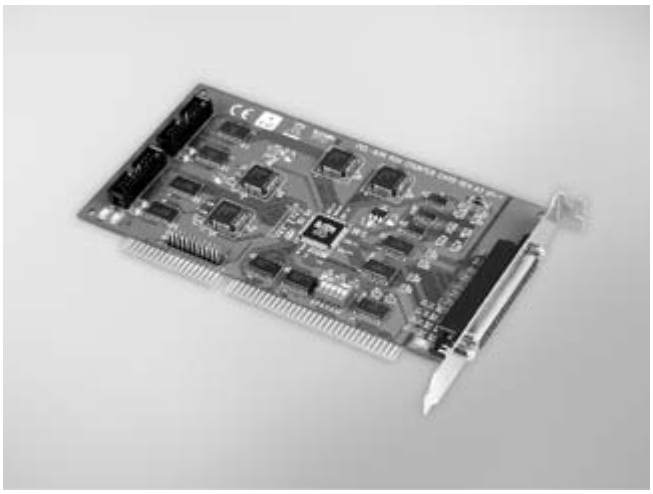
- **PCL-735** 12-ch Relay ISA Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments



PCL-836

6-ch, 16-bit Counter/Timer ISA Card



Features

- Periodic interrupt generation
- 6 independent 16-bit counters
- Digital filter for noise reduction
- Binary or BCD counting
- Programmable frequency output
- Complex duty-cycle output
- Single-shot output
- 16-bit TTL input and 16-bit TTL output ports
- Selectable interrupt input channel
- Up to 10 MHz input frequency
- Pulsewidth and period measurement
- Time-delay generation
- F/V conversion and accumulation

Introduction

PCL-836 is a general purpose counter/timer and digital I/O card for PC/AT compatible computers. It provides six 16-bit counter channels. It also includes 16 digital outputs and 16 digital inputs. Two 8254 chips provide a variety of powerful counter/timer function modes to match your industrial and/or laboratory applications.

Unique Digital Filter

PCL-836 includes a unique digital filter to eliminate noise on the input signal. The frequency can be adjusted to provide more stable output readings.

Specifications

Digital Input

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

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V
- **Output Capability** Sink: 8 mA @ 0.8 V
  Source: -0.4 mA @ 2.0 V

Counter/Timer

- **Channels** 6
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External clock: 10 MHz
- **Counter Modes** 6 programmable counter modes
- **Interrupt Capable Ch.** IRQ 2, 4, 5, 7, 10, 11, 12, 15 (jumper selectable)
- **PWM Channels** 3
- **Digital Noise Filter** 1.6 ms to 52 ms (programmable)

General

- **Power Consumption** Typical: 5 V @ 360 mA
  Max.: 5 V @ 400 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Connector** 1 x DB37 female connector for counter
  2 x 20-pin box header for digital I/O
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

Ordering Information

- **PCL-836** 6-ch, 16-bit Counter/Timer ISA Card
- **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
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments