### Terminal Board Selection Guide

#### Isolated Signal Conditioning Modules

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| ADAM-3016        | Isolated Strain Gauge Input Module    |
| ADAM-3112        | Isolated AC Voltage Input Module      |
| ADAM-3114        | Isolated AC Current Input Module      |

#### Isolated Digital I/O Terminal Boards

| ADAM-3654        | 4-ch Power Relay Module               |
| ADAM-3964        | 4-ch Solid State Digital I/O Module Carrier Backplane |

#### I/O Wiring Terminal Boards

| PCLD-782/B       | 16/24-ch Opto-Isolated Digital Input Board |
| PCLD-785/B       | 16/24-ch Relay Board                    |
| PCLD-885         | 16-ch Power Relay Board                 |
| PCLD-8751        | 48-ch Opto-Isolated Digital Input Board |
| PCLD-8761        | 24-ch Opto-Isolated DI and 24-ch Relay Output Board |
| PCLD-8762        | 48-ch Relay Output Board                |
| PCLD-796         | 9-ch SSR I/O Module Carrier Board       |
| PCLD-7216        | 16-ch SSR I/O Module Carrier Board      |
| PCLD-8710        | DIN-rail Wiring Terminal Board with CJC Circuit |
| PCLD-8712        | DIN-rail Wiring Terminal for PCI-1712/L |
| PCLD-788         | 16-ch Relay Multiplexer Board           |
| PCLD-789D        | Amplifier and Multiplexer Board         |

To view all of Advantech's Signal Conditioning Modules and Terminal Boards, please visit [www.advantech.com/products](http://www.advantech.com/products).
Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PC/104 & PCI-104 Data Acquisition (DAQ) Products

### PC/104 & PCI-104 Product

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### Model

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For more information, visit: www.advantech.com/products
**Introduction**

The ADAM-3000 Series consist of the most cost-efficient, field configurable, isolation-based, signal conditioners on the market today. The modules are easily installed to protect your instruments and process signals from the harmful effects of ground loops, motor noise, and other electrical interferences.

**Affordable Signal Isolation Solution**

Featuring optical isolation technology, the ADAM-3000 modules provide three-way (input/output/power) 1,000 VDC isolation. Optical isolation provides pin-point accuracy and stability over a wide range of operations at minimal power consumption.

**Flexible Analog Data Conversion**

The input/output range for the ADAM-3000 modules can be configured through switches located inside the module. The modules accept voltage, current, thermocouple or RTD as input, and pass voltage or current as output.

Thermocouple input is handled by the built-in input thermocouple linearization circuitry and a cold junction compensation function. These ensure accurate temperature measurement and accurate conversion of this information to the voltage or current output.

**Configuration**

The ADAM-3000 modules use 24 VDC power. This electrical power wiring can be acquired from adjacent modules, which greatly simplifies wiring and maintenance. The I/O configuration switches are located inside the modules. To reach the switches, simply remove the modules from the DIN-rail bracket by sliding the modules downward.

**Modular Industrial Design**

The ADAM-3000 modules can be easily mounted on a DIN-rail, and signal wires can be connected through screw terminals. The screw terminals and input/output configuration switches are built inside the industrial grade plastic casing. With simple two-wire input/output cables, wiring is easy and reliable in harsh industrial environments.

**Applications**

- Signal isolation
- Signal transmitters
- Thermocouple/RTD/strain gauge measurements
- Signal amplifiers
- Noise filter

**Common Specifications**

- **Isolation**: 1,000 VDC
- **Indicators**: Power LED indicator
- **Power Requirement**: 24 VDC ± 10%
- **Case**: ABS
- **Screw Terminal**: Accepts 0.5 mm² – 2.5 mm², 1- #12 or 2- #14 ~ #22 AWG
- **Operating Temperature**: 0 ~ 70°C (32 ~ 158°F) (ADAM-3011: 0 ~ 50°C (32 ~ 122°F))
- **Storage Temperature**: -25 ~ 85°C (-13 ~ 185°F)
Block Diagram

Three-way Signal Isolation
Three-way (input/output/power) 1,000 VDC isolation.

Field Configurable I/O Range
The I/O range can be configured on site with switches inside the module.

Easy Daisy Chain Power Wiring
Power can be connected conveniently from adjacent modules.

Interfacing to DAQ Cards
A wiring adapter can connect modules to a data acquisition card.

Dimensions

ADAM-3000 Series Modules
### Specifications

#### Thermocouple Input
- **Common Mode Rejection**: 115 dB min
- **Input Type**
  - T/C type
  - Temperature Range (°C)
  - Accuracy at 25°C (°C)
  - J
     - -40 ~ 760
     - ±2
  - K
     - 0 ~ 1,000
     - ±2
  - T
     - -100 ~ 400
     - ±2
  - E
     - 0 ~ 1,000
     - ±2
  - S
     - 500 ~ 1,750
     - ±4
  - B
     - 500 ~ 1,800
     - ±4
- **Isolation**: 1,000 VDC
- **Output Impedance**: 0.5 Ω
- **Stability**: ±2°C (Temperature Drift)
- **Voltage Output**: 0 ~ 10 V

#### General
- **Connectors**: Screw terminal
- **Enclosure**: ABS
- **Indicators**: Power LED indicator
- **Isolation**: 1,000 VDC
- **Power Consumption**: 1.4 W
- **Power Input**: 24 VDC, ±10%
- **Operating Temperature**: 0 ~ 50°C (32 ~ 122°F)
- **Storage Temperature**: -25 ~ 85°C (-13 ~ 185°F)

#### Ordering Information
- **ADAM-3011**: Isolated Thermocouple Input Module

### Specifications

#### RTD Input
- **Accuracy**: ± 0.1% of full range (voltage) or ± 0.15°C (voltage)
- **Bandwidth**: 4 Hz
- **Input CMR at DC**: 92 dB min.
- **Input Connections**: 2, 3 or 4 wires
- **Input Type**
  - RTD type
  - α
  - Temperature Range (°C)
  - Pt 0.00385
    - -100 ~ 100
    - ±0.2%
    - -100 ~ 200
    - ±0.2%
    - -50 ~ 50
    - ±0.2%
    - -50 ~ 150
    - ±0.2%
    - 0 ~ 200
    - ±0.2%
    - 0 ~ 600
    - ±0.2%
    - -100 ~ 0
    - ±0.2%
    - -100 ~ 200
    - ±0.2%
    - -50 ~ 50
    - ±0.2%
    - 0 ~ 150
    - ±0.2%
    - 0 ~ 50
    - ±0.2%
    - 0 ~ 100
    - ±0.2%
    - 0 ~ 200
    - ±0.2%
    - 0 ~ 400
    - ±0.2%
    - 0 ~ 600
    - ±0.2%
    - 0 ~ 100
    - ±0.2%
  - Pt 0.00392
    - 0 ~ 100
    - ±0.2%
    - 0 ~ 200
    - ±0.2%
    - 0 ~ 600
    - ±0.2%
  - Ni
    - N/A
    - 0 ~ 100
    - ±0.2%
  - Ni
    - N/A
    - -80 ~ 100
    - ±0.2%
- **Output Range**: 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA
- **Stability**: ±30 ppm (typical) (Temperature Drift)
- **Voltage Input**: Bipolar input: ±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1.0 V, ±5 V, ±10 V
  - Unipolar input: 0 ~ 5 V, 0 ~ 10 V
  - Input impedance: 2 MΩ
  - Input bandwidth: 2.4 kHz (typical)
- **Voltage Output**: Bipolar: ±5 V, ±10 V
  - Unipolar: 0 ~ 10 V
  - Impedance: < 50 Ω
  - Drive: 10 mA max.

#### General
- **Connectors**: Screw terminal
- **Enclosure**: ABS
- **Indicators**: Power LED indicator
- **Isolation**: 1,000 VDC
- **Power Consumption**: 0.85 W (voltage output)
  - 1.2 W (current output)
- **Power Input**: 24 VDC, ±10%
- **Operating Temperature**: -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**: -25 ~ 85°C (-13 ~ 185°F)

#### Ordering Information
- **ADAM-3013**: Isolated RTD Input Module

### Specifications

#### I/O
- **Accuracy**: ± 0.1% of full range
  - (typical)
- **Common Mode Rejection**: > 100 dB @ 50 Hz/60 Hz
- **Current Input**: Bipolar: ±20 mA
  - Unipolar: 0 ~ 20 mA
  - Input impedance: 250 Ω
- **Current Output**: 0 ~ 20 mA
- **Stability**: 150 ppm (typical) (Temperature Drift)
- **Voltage Input**: Bipolar input:
  - ±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1.0 V, ±5 V, ±10 V
  - Unipolar input:
    - 0 ~ 5 V, 0 ~ 10 V
    - Input impedance: 2 MΩ
    - Input bandwidth: 2.4 kHz (typical)
- **Voltage Output**: Bipolar: ±5 V, ±10 V
  - Unipolar: 0 ~ 10 V
  - Impedance: < 50 Ω
  - Drive: 10 mA max.

#### General
- **Connectors**: Screw terminal
- **Enclosure**: ABS
- **Indicators**: Power LED indicator
- **Isolation**: 1,000 VDC
- **Power Consumption**: 0.85 W (voltage output)
  - 1.2 W (current output)
- **Power Input**: 24 VDC, ±10%
- **Operating Temperature**: -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature**: -25 ~ 85°C (-13 ~ 185°F)

#### Ordering Information
- **ADAM-3014**: Isolated DC Input/Output Module

ADANTECH | Signal Conditioning Modules and Terminal Boards

SHOP ONLINE at www.airlinehyd.com 800-999-7378
### Specifications

#### Voltage Input

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<th>250 V</th>
<th>129 V</th>
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<td>Input Voltage</td>
<td>0 ~ 400</td>
<td>0 ~ 250</td>
<td>0 ~ 120</td>
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<tr>
<td>DC (V)</td>
<td>0 ~ 400</td>
<td>0 ~ 250</td>
<td>0 ~ 120</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>48 kΩ</td>
<td>30 kΩ</td>
<td>14.4 kΩ</td>
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#### Voltage Output

- **Output Signal**: 0 ~ 5 VDC
- **Accuracy**: < ±1.0 % for full range
- **Output Impedance**: < 10 Ω
- **Load**: > 10 kΩ
- **Ripple**: < 120 mVp-p
- **Temperature Coefficient**: 400 ppm/°C
- **Input Bandwidth**: 6 kHz

#### Power Consumption

- **Supply Voltage**: 24 VDC ± 10 %
- **Current Consumption**: 40 mA

### Current Input

- **AC Current Input**: 0 ~ 5 A rms
- **DC Current Input**: 0 ~ 5 A

### Voltage Output

- **Output Signal**: 0 ~ 5 VDC
- **Accuracy**: < ±1.0 % for full range
- **Output Impedance**: < 10 Ω
- **Load**: > 10 kΩ
- **Ripple**: < 120 mVp-p
- **Temperature Coefficient**: 400 ppm/°C
- **Input Bandwidth**: 10 kHz

### Power Consumption

- **Supply Voltage**: 24 VDC ± 10 %
- **Current Consumption**: 40 mA

### Ordering Information

- **ADAM-3016**: Isolated Strain Gauge Input Module
- **ADAM-3112**: Isolated AC Voltage Input Module
- **ADAM-3114**: Isolated AC Current Input Module

#### I/O

- **Accuracy**: ±0.1% of full range
- **Bandwidth**: 2.4 kHz (typical)
- **Isolation Mode**: >100 dB @ 50 Hz/50 Hz
- **Current Output**: Current: 0 ~ 20 mA
  - Current load resistor: 0 ~ 500 Ω (Source)
- **Stability** (Temperature Drift)
- **Voltage Specifications**: Electrical input: ±10 mV, ±20 mV, ±30 mV, ±100 mV
  - Excitation voltage: 1 ~ 10 VDC (60 mA max)
- **Voltage Output**: Bipolar: ±5 V, ±10 V
  - Unipolar: 0 ~ 10 V
  - Impedance: < 50 Ω

### General

- **Connectors**: Screw terminal
- **Enclosure**: ABS
- **Indicators**: Power LED indicator
- **Isolation (Three-way)**: ≤ 1.85 W (voltage output)
  - ≤ 2.15 W (current output)
- **Power Consumption**: 24 VDC ± 10 %
- **Power Input**: 1,000 VDC
- **Operating Temperature**: -10 ~ 70°C (14 – 158°F)
- **Storage Temperature**: -25 ~ 85°C (-13 – 185°F)

### Ordering Information

- **ADAM-3016**: Isolated Strain Gauge Input Module
- **ADAM-3112**: Isolated AC Voltage Input Module
- **ADAM-3114**: Isolated AC Current Input Module
ADAM-3854
4-ch Power Relay Module
ADAM-3864
4-ch Solid State Digital I/O Module Carrier Backplane

Features
- High power relays can handle up to 5 A @ 250 VAC and 5 A @ 30 VDC
- 4 single-pole double-throw (SPDT) relays
- Industrial screw terminals for easy output wiring
- LED status indicators
- Onboard varistor protects relay contact points
- DIN-rail mounting

Specifications
I/O
- Channels: 4
- Contact Rating: 250 VAC @ 5 A
- 30 VDC @ 5 A
- Contact Resistance: 100 mΩ
- Operation Time: 15 ms max.
- Relay Type: SPDT (Form C)
- Release Time: 5 ms max.
- Life Expectancy: 1.7 x 105 at rated load

Varistor
- Clamping Voltage: 760 V (10 A)
- Max. Applied Voltage: 300 Vmax
- Max. Peak Current: 1.200 A for 8 ms
- Varistor Voltage: 470 V (current = 1 mA)

General
- Connectors: Screw terminals
- Dimensions (L x W x H): 112.5 x 118.4 x 46 mm (4.43” x 4.66” x 1.81”)
- LED Indicators: Status displayed for each relay
- Mounting: DIN-rail
- Power Consumption: 2.2 W
- Power Input: 24 VDC

Ordering Information
- ADAM-3854: 4-ch DIN-rail Power Relay Module

Ordering Information
- ADAM-3864: 4-ch Solid State Module Carrier Backplane
- DAC24A: AC Output Module (24-280 VAC, 3 A)
- ODC24: DC Output Module (5-60 VDC, 3 A)
- PCLM-ODC5: Single Piece DC SSR Module (60 VDC, 3 A)
- IAC24A: AC Input Module (180-280 VAC)
- IDC24A: DC Input Module (3-32 VDC)

Features
- 2,500 VRMS optical isolation
- LED status indicators
- Onboard fuse protection
- DIN-rail mounting

Specifications
Input Modules
Field Side:
- Range IDC24B series: 3 – 32 V/1 V
- Input Resistance: IAC24A series: 44 kΩ
- IDC24B series: 1.5 kΩ

Logic Side:
- Breakdown Voltage: 30 VDC
- Output Current: 100 mA max.
- Output Voltage Drop: 0.4 V max.
- Supply Current: 12 mA max.
- Supply Voltage: 24 V

Output Modules
Field Side:
- Contact Voltage Drop: 1.6 V max.
- Current Rating: 3 A max. (at 25°C)

Logic Side:
- Input Resistance: 220 Ω
- Supply Current: 12 mA max.
- Supply Voltage: 24 V

General
- Dimensions (L x H x W): 118.4 x 90 x 59 mm (4.66” x 3.54” x 2.32”)
- Mounting: DIN-rail

Ordering Information
- ADAM-3854: 4-ch DIN-rail Power Relay Module
- ADAM-3864: 4-ch Solid State Digital I/O Module Carrier Backplane
- DAC24A: AC Output Module (24-280 VAC, 3 A)
- ODC24: DC Output Module (5-60 VDC, 3 A)
- PCLM-ODC5: Single Piece DC SSR Module (60 VDC, 3 A)
- IAC24A: AC Input Module (180-280 VAC)
- IDC24A: DC Input Module (3-32 VDC)

ADAM-3854 ADAM-3864

Features
- 2,500 VRMS optical isolation
- LED status indicators
- Onboard fuse protection
- DIN-rail mounting

Specifications
Input Modules
Field Side:
- Range IDC24B series: 3 – 32 V/1 V
- Input Resistance: IAC24A series: 44 kΩ
- IDC24B series: 1.5 kΩ

Logic Side:
- Breakdown Voltage: 30 VDC
- Output Current: 100 mA max.
- Output Voltage Drop: 0.4 V max.
- Supply Current: 12 mA max.
- Supply Voltage: 24 V

Output Modules
Field Side:
- Contact Voltage Drop: 1.6 V max.
- Current Rating: 3 A max. (at 25°C)

Logic Side:
- Input Resistance: 220 Ω
- Supply Current: 12 mA max.
- Supply Voltage: 24 V

General
- Dimensions (L x H x W): 118.4 x 90 x 59 mm (4.66” x 3.54” x 2.32”)
- Mounting: DIN-rail

Ordering Information
- ADAM-3854: 4-ch DIN-rail Power Relay Module
- ADAM-3864: 4-ch Solid State Digital I/O Module Carrier Backplane
- DAC24A: AC Output Module (24-280 VAC, 3 A)
- ODC24: DC Output Module (5-60 VDC, 3 A)
- PCLM-ODC5: Single Piece DC SSR Module (60 VDC, 3 A)
- IAC24A: AC Input Module (180-280 VAC)
- IDC24A: DC Input Module (3-32 VDC)
PCLD-782/B
PCLD-785/B
PCLD-885

Features
- Compatible with all PC-LabCard™ products with DI channels on either 20-pin flat cable or 50-pin Opto-22 compatible connectors
- 16 or 24 optically-isolated digital input channels
- Built-in screw terminals for easy input wiring
- LEDs indicate input logic status
- Inputs buffered with voltage comparators

Specifications
Isolated Digital Input
- Channels: PCLD-782: 16, PCLD-782B: 24
- Input Range: 0 ~ 24 VDC
- Input Resistance: 560 Ω
- Isolation Voltages: 1.500 VDC min.
- Threshold Voltage: 1.5 VDC (VR adjustable)

General
- DI Connectors: Screw terminals (412 ~ 22 AWG)
- Controller Connectors: PCLD-782: 1 x 20-pin box header (CN1), PCLD-782B: 1 x 20-pin box header (CN1) and 1 x 50-pin box header (CN2)
- Dimensions (L x W): PCLD-782: 3U ~ 205 x 114 mm (8.1” x 4.5”), PCLD-782B: 4U ~ 220 x 132 mm (8.7” x 5.2”)
- LED Indicators: Indicates input logic status
- Mounting: 4 x screw holes for flat surface mounting

Ordering Information
- PCLD-782: 16-ch isolated DI Board w/ 1m 20-pin Flat Cable
- PCLD-782B: 16-ch isolated DI Board w/ 1m 20-pin & 50-pin Flat Cables
- Accessories: PCL-10120-1, PCL-10120-2, PCL-10150-1, PCL-10150-1.2

Features
- Compatible with PC-LabCard™ products with 20-pin digital output connector and 50-pin Opto-22 digital output connector (PCLD-785B only)
- Automatic selection of control logic (PCLD-785B only): Negative logic for the Opto-22 connector
- Positive logic for the 20-pin flat cable connector
- Screw terminals for easy output wiring
- LED status indicators

Specifications
Relay
- Channels: PCLD-785: 16 (CN1, 20-pin conn.), PCLD-785B: 16 (CN1, 20-pin conn.), 24 (CN2, 50-pin conn.)
- Contact Ratings: 120 VDC @ 0.5 A, 30 VDC @ 1 A
- Contact Resistance: < 100 mΩ
- Operation Time: 5 ms max.
- Insulation Res. (Min): 1,000 MΩ @ 500 VDC
- Life Expectancy: >100,000 cycles at rated load
- Relay On Time: 6 ms max.
- Relay Off Time: 3 ms max.
- Relay Type: SPST (Single-Pole Single-Throw) Form C
- Release Time: 5 ms max.

General
- Dimensions (L x W): PCLD-785: 114 x 220 mm, PCLD-785B: 132 x 220 mm
- Power Consumption: 5 V @ < 100 mA, 12 V @ 33 mA for each relay
- Power Input: 20-pin connector: 5 VDC: Jumper select PC bus or external supply, 12 VDC: Jumper select PC bus or external supply, 50-pin connector: external 12 VDC supply

Ordering Information
- PCLD-785: 16-ch Relay Board w/ 1m 20-pin Flat Cable
- PCLD-785B: 16-ch Relay Board w/ 1m 20-pin & 30-pin Flat Cables
- Accessories: PCL-10120-1, PCL-10120-2, PCL-10150-1, PCL-10150-1.2

Features
- Accepts 20-pin or 50-pin (Opto-22 compatible) connectors
- 16 single-pole single-throw (SPST) relays
- High-power relay handles up to 5 A @ 250 VAC
- Onboard varistors protect all relay contact points
- Industrial screw terminals for ease of wiring
- LED status indicators
- 5 V/12 V power/status LED indicator

Specifications
Varistor
- Clamping Voltage: 760 V (10 A)
- Max. Peak Current: 1.200 A for 8 msec.
- Max. Applied Voltage: 300 VAC AC continuous
- Varistor Voltage: 470 V (current = 1 mA)

General
- Power Consumption: 12 V @ 22 mA for each relay, 352 mA if all relays energized
- Connectors: 20-pin flat cable or 50-pin Opto-22 compatible connector
- Output: Barrier strip screw terminal
- Dimensions (L x W): 205 x 114 mm (8” x 4.5”)
- Operating Temp.: 0 ~ 60°C (32 ~ 140°F)

Ordering Information
- PCLD-885: 16-ch Power Relay Board w/ 20p & 50p Flat Cables
PCLD-8751 48-ch Opto-Isolated Digital Input Board
PCLD-8761 24-ch Opto-Isolated DI and 24-ch Relay Output Board
PCLD-8762 48-ch Relay Output Board

Features
- 48 optically-isolated digital input channels
- Built-in plug-in screw terminals for easier wiring
- LEDs indicate input logic status
- Input buffered with voltage comparators
- Wet/Dry contact set by DIP switches
- Input logic set by jumper
- Wide input range from 5 to 30 V

Specifications
Digital Input
- Channels: 48 isolated digital inputs
- Contact Mode: Wet contact
- Isolation Voltage: 3,500 V
- Logic Modes: Positive Logic
- Signal Voltage: 0 ~ 30 V

General
- Certification: CE, FCC
- Connectors: Cable: SCSI-68 pin
- Dimensions: 255 x 121 mm (10.04" x 4.76")
- LED Indicators: One for each channel to indicate logic status
- Mounting: DIN-rail

Ordering Information
- PCLD-8751 48-ch Opto-Isolated Digital Input Board

Features
- Built-in plug-in screw terminals for easier wiring
- LED status indicators for D/I and relay output
- Digital inputs buffered with voltage comparators
- Wet/Dry contact set by DIP switches for D/I
- Wide input range from 5 to 30 V
- INT/EXT Power selection by jumper

Specifications
Digital Input
- Channels: 24 IDI with LED and 24 Relay (SPDT) Form C with LED
- Contact Mode: Wet contact and dry contact for each IDI (set by switch)
- Digital Input: 0 ~ 30 V
- Isolation Voltage: 3,500 V (Isolated DI), 1,500 V (Relay)
- Logic Mode: Positive Logic

Relay Output
- Contact Rating: 30 VDC @ 1 A, 120 VAC @ 0.5 A
- Contact Resistance: < 100 Ω
- Electrical Endurance: 5 x 10^7 times at 12 V/10 mA
- Mechanical Endurance: 10^8 times
- Operation Time: 5 ms Max
- Release Time: 6 ms Max

General
- Certification: CE, FCC
- Connectors: Cable: SCSI-68 pin
- Dimensions: 285 x 121 mm (11.22" x 4.76")
- LED Indicators: One for each channel to indicate logic status
- Mounting: DIN-rail
- Power Consumption: +5 V @ < 380 mA, +12 V @ < 240 mA
- Power Selection: PCI Bus or External power (7 ~ 30 V) by jumper

Ordering Information
- PCLD-8762 48-ch Relay (SPDT) Output Board

Features
- Built-in plug-in screw terminals for easier wiring
- LED status indicators for Relay output
- DIN-rail mounting
- Onboard relay driver circuits

Specifications
Relay Output
- Contact Rating: 30 VDC @ 1 A, 120 VAC @ 0.5 A
- Contact Resistance: < 100 Ω
- Electrical Endurance: 5 x 10^7 times at 12 V/10 mA
- Mechanical Endurance: 10^8 times
- Operation Time: 5 ms Max
- Release Time: 6 ms Max

General
- Certification: CE, FCC
- Connectors: Cable: SCSI-68 pin
- Dimensions: 285 x 117 mm (11.22" x 4.61")
- LED Indicators: One for each channel to indicate logic status
- Mounting: DIN-rail
- Power Consumption: +5 V @ < 380 mA, +12 V @ < 240 mA
- Power Selection: PCI Bus or External power (7 ~ 30 V) by jumper

Ordering Information
- PCLD-8761 24-ch Opto-Isolated DI and 24-ch Relay (SPDT) Output Board

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19-10

Signal Conditioning Modules and Terminal Boards

800-999-7378
PCLD-786
PCLD-7216

8-ch SSR I/O Module Carrier Board
16-ch SSR I/O Module Carrier Board

Features

- Up to eight AC or DC solid state relay modules
- Photo-coupler isolated operation
- Eight external relay drivers
- LED status indicators

Specifications

AC Solid State Relays
- 1 Cycle Surge: 40 A
- Blocking Voltage: ±600 V min.
- Off Leakage Current: 8 mA max.
- On-state Voltage: 1.6 V max.
- Output Rating: 24 ~ 280 VAC @ 3.0 A
- Turn On: zero volts
- Turn On/Off Time: < 1/2 cycle
- Type: PCLM-OAC5A

DC Solid State Relays
- 1 Second Surge: 5 A
- Off Leakage Current: 1 mA max.
- On-state Voltage: 1.4 V max.
- Output Rating: 5 ~ 60 VDC @ 3.0 A
- Turn On/Off Time: 750 μs max.
- Type: PCLM-ODC5

External Relay Drivers
- Channels: 8
- Coil Driving Voltage: 5 V, 12 V from PC or external source
- Driver Type: ULN2003, open collector type
- Max. Driving Current: 125 mA each channel

General
- Dimensions (L x W): 205 x 114 mm (8.1" x 4.5")

Ordering Information
- PCLD-786: 8-ch SSR I/O Module Board w/ 20-pin Flat Cable
  Note: PCLD-786 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.
- PCLM-OAC5A: Single Piece AC SSR Module (280 VAC, 3 A)
- PCLM-ODC5: Single Piece DC SSR Module (60 VDC, 3 A)

PCLD-7216

Features

- Channel status reflected by onboard LED for easy monitoring
- Onboard fuse protection

Specifications

Input Modules
- Part No.: PCLM-IAC5A
- Input On Voltage: 180 ~ 280 VAC
- Input Off Voltage: < 80 V
- Output Logic and On/Off Status: TTL low (On)
- TTL high (Off)
- Breakdown Voltage: 30 VDC
- Output Current: 100 mA max.
- Output Voltage Drop: 0.4 V max.
- Supply Current: 12 mA max.
- Supply Voltage: 4 ~ 6 V

Output Modules
- Current Rating: 3 A max. (@ 25°C)
- Contact Voltage Drop: 1.6 V max.
- Turn On/Off Time: PCLM-OAC series: 1/2 AC cycle max.
- PCLM-ODC series: 100 μsec/750 μsec max.
- Input Resistance: 220 Ω
- Supply Voltage: 4 ~ 6 V
- Supply Current: 12 mA max.

General
- Logic Side Connectors: 50-pin edge connector, Opto-22 compatible
- Dimensions (L x W x H): 367 x 111 x 56 mm (14.4" x 4.4" x 2.2")

Ordering Information
- PCLD-7216: 16-ch SSR I/O Module Carrier Board
  Note: PCLD-7216 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.
Introduction

The PCLD-8710 is designed to match multifunction cards with 68-pin SCSI-II connectors, such as the PCI-1710U/UL, PCI-1710HGU, PCI-1711U/UL, PCI-1716/L cards. This screw-terminal board also includes cold junction sensing circuitry that allows direct measurements from thermocouple transducers. Together with software compensation and linearization, every thermocouple type can be accommodated. The PCLD-8712 Screw-terminal Board provides convenient and reliable signal wiring for the PCI-1712/L of which has a 68-pin SCSI-II connector.

Due to its special PCB layout you can install passive components to construct your own signal-conditioning circuits. The user can easily construct a low-pass filter, attenuator or current shunt converter by adding resistors and capacitors on board's circuit pads.

Applications

Field wiring for analog and digital I/O channels of PC-LabCard™ products.

Signal conditioning circuits can be implemented as illustrated in the following examples:

a) Straight-through connection (factory setting)

- **RAn** = 0 Ω (short)
- **RBn** = none
- **Cn** = none

b) 1.6 kHz (3 dB) low pass filter

- **RAn** = 10 KΩ
- **RBn** = none
- **Cn** = 0.01 µF

\[
\text{fs} = \frac{RBn}{RAn + RBn}
\]

where \( n = 0, 1, 2, \ldots, 15 \)

c) 10 : 1 voltage attenuator:

- **RAn** = 9 KΩ
- **RBn** = 1 KΩ
- **Cn** = none

\[
\text{Attenuation} = \frac{RBn}{RAn + RBn}
\]

(Assume source impedance << 10 KΩ)

d) 4 ~ 20 mA to 1 ~ 5 VDC signal converter:

- **RAn** = 0 Ω (short)
- **RBn** = 250 Ω (0.1% precision resistor)
- **Cn** = none

Ordering Information

- PCLD-8710: DIN-rail Wiring Terminal Board with CJC Circuit
- PCLD-8712: DIN-rail Wiring Terminal for PCI-1712/L
- PCL-10120-1: 20-pin Flat Cable, 1 m
- PCL-10120-2: 20-pin Flat Cable, 2 m
- PCL-10168-1: 68-pin SCSI Shielded Cable, 1 m
- PCL-10168-2: 68-pin SCSI Shielded Cable, 2 m
Introduction

PCLD-788 multiplexes 16 channels into a single I/O channel of an A/D converter, voltmeter or IEEE-488-based instrument. Up to 16 PCLD-788s can be cascaded for a total of 256 fully-isolated differential channels. The PCLD-788 can be controlled by any PC-LabCard™ product via a 16-bit 20-pin digital output port, found on cards such as the PCL-711B, PCL-812PG or the PCL-818 series. Channel selection (0-15) and board selection (0-15) are done by programming the high-order four bits and low order four bits of a digital output byte from the main I/O card in use.

Specifications

I/O
- Channel Closed Signal: TTL-level pulse
- Cold-junction Sensor: 24.4 mV/°C, 0 V at 0°C Output
- Contact Rating: Break-before-make with 3 msec. minimum break time
- Contact Resistance: 200 mΩ max.
- Input Channels: 16 isolated differential inputs
- Programming: DO bit 0, 1, 2 and 3 for channel selection, DO bit 4, 5, 6 and 7 for board selection. Onboard DIP switches for board-address setting
- Max. Input Voltage: 100 VDC or 100 V peak AC
- Max. Switching Current: 0.5 A
- Max. Switching Power: 10 VA
- Operating Time: 1 ms max.
- Relay Life Expectancy: 100 million cycles min. at 10 VDC and 1 mA
- Release Time: 1 msec. max.

General
- Connectors: 2 x 20-pin box header, second connector in parallel for daisy chaining
- I/O: Screw terminals
- Dimensions (L x W): 205 x 114 mm (8” x 4.5”)
- Mounting: 4 x screw holes for flat surface mounting
- Power Consumption: 5 V @ 380 mA max.

Features
- 16 to 1 channel expansion
- Differential and fully isolated multiplexing
- Break-before-make relay control
- “Channel closed” signal for precise A/D triggering
- Up to 16 PCLD-788s can be cascaded for 256 channels
- Easy wiring for large channel count configuration
- Onboard cold-junction circuitry for thermocouple measurement

Pin Assignments

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<th>C1</th>
<th>C2</th>
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<td>20</td>
<td>+12V</td>
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Ordering Information
- PCLD-788: 16-ch Relay MUX Board w/ Two 20-pin Flat Cables
- PCL-10128-1: 20-pin Flat Cable, 1 m
- PCL-10128-2: 20-pin Flat Cable, 2 m
PCLD-789D
Amplifier and Multiplexer Board

Features
- Multiplexes 16 differential inputs to one A/D input
- Expands a PC-LabCard™ product’s analog inputs to 128 channels
- High-grade instrumentation amplifier provides switch selectable gains of 1, 2, 10, 50, 100, 200, 1,000
- Onboard cold-junction compensation circuits for direct thermocouple measurement
- Built-in signal conditioning functions include filter, attenuator and current shunt
- Second connectors onboard allow daisy chaining
- Screw-clamp terminal blocks permit easy and reliable connections

Specifications

I/O
- Cold-junction Compensation
  - 24.4 mV/°C, 0 V at 0°C
- Input Channels
  - 16 differential
- Input Conditions
  - Gains CMRR Nonlinearity Setting Time
    - 1,000 125 dB 0.005% FSR 25 µsec.
    - 100 115 dB 0.005% FSR 15 µsec.
    - 10 105 dB 0.007% FSR 15 µsec.
    - 1 85 dB 0.015% FSR 15 µsec.
- Input Range ±10 V max. depending on the selected gain
- Output Range ±10 V max.
- Overvoltage Protection ±30 V continuous

General
- Connectors
  - Controller: 1 x DB37 male connector
  - 2 x 20-pin box header for daisy chaining
  - Screw terminals
- Dimensions (L x W)
  - 205 x 114 mm (8.1” x 4.5”)
- Mounting
  - 4 x screw holes for flat surface mounting
- Power Consumption
  - 5 V @ 30 mA max, 12 V @ 80 mA max.

Ordering Information
- PCLD-789D Amplifier and Multiplexer Board w/ 1m DB37 Cable
- 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

Introduction
PCLD-789D is a front-end signal conditioning and channel multiplexing daughterboard for use with PC-LabCard™ product’s analog input ports. It multiplexes 16 differential input channels into a single A/D converter input channel. You can cascade up to ten PCLD-789Ds, allowing a single data acquisition card to access 160 analog input channels.

PCLD-789D has DB37 and 20-pin flat cable connectors and lets your PCL-818L or PCL-818HD access up to 128 channels without using an additional digital output cable to select channels. The PCLD-789D uses a high-grade instrumentation amplifier that provides switch-selectable gains of 1, 2, 10, 50, 100, 200 and 1,000. This amplifier lets you accurately measure low-level signals with your PC-LabCard™ product. The board also contains a cold-junction sensing circuit that allows direct temperature measurement from thermocouple transducers. A wide variety of thermocouples are supported with software compensation and linearization.

Pin Assignments

PCLD-789D Pin Assignments

Block Diagram