PCLD-8115
WIRING TERMINAL BOARD

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Contents

Introduction

The PCLD-8115 screw-terminal board provides convenient and reliable signal wiring for any PC-LabCards which have 20-pin flat-cable connectors. The PCLD-8115 is equipped with a DB-37 connector to support PC-LabCards with the same connector.

This screw terminal board also includes cold junction sensing circuitry that allows direct measurement of thermocoupled transducers. Together with software compensation and linearization, every thermocouple type can be accommodated.

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 onto the board's circuit pads.

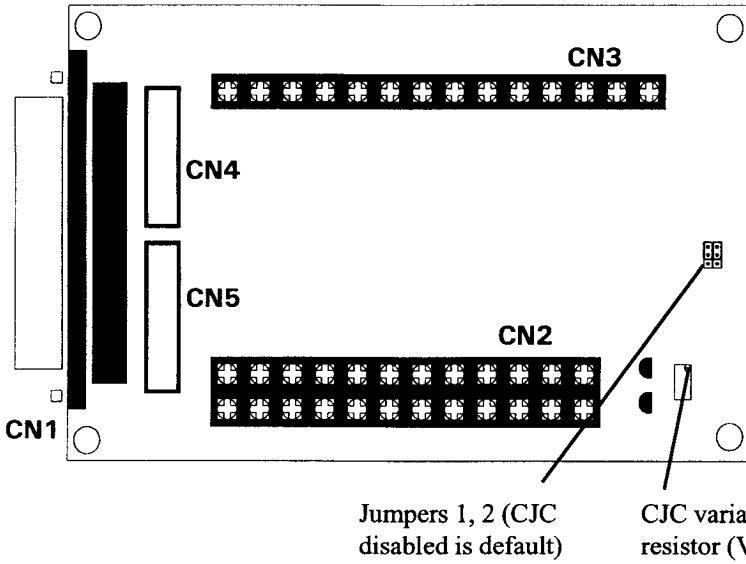
Features

- Low-cost screw-terminal board for PC-LabCards with 20-pin connectors or DB-37 connector
- On-board cold junction compensation circuits for direct thermocouple measurement
- 38 terminal points for two 20-pin ports or DB-37 connectors
- Reserved space for signal-conditioning circuits such as low-pass filter, voltage attenuator and current shunt.
- Industrial-grade terminal blocks (barrier-strip) for heavy-duty and reliable connections
- Nylon standoffs, screws and washers included for easy mounting
- Can be mounted inside the PCLD-ENC enclosure
- Dimensions: 6.7" (L) x 4.53" (W) (170 mm x 115 mm)

Applications

Field wiring for analog I/O channels of PC-LabCards equipped with 20-pin flat cable connectors or DB-37 connectors

Board Layout



CN1: DB-37 for connection with PCL-1800, PCL-818L/818HG/818HD

CN2: 24 screw terminals for connection of either single ended or differential data acquisition signals

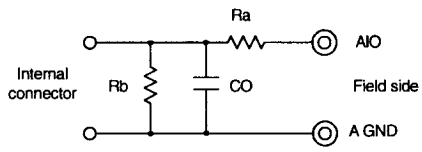
CN3: 14 multipurpose screw terminals that connect external devices

CN4: 20-pin internal connector for connection with PCL-818/818H

CN5: 20-pin internal connector (analog input) for connection with PCL-818/818H

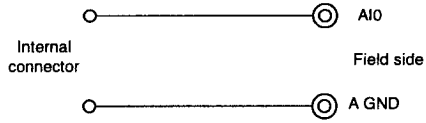
(See page 10 for a more detailed description of each connector.)

Single ended connections

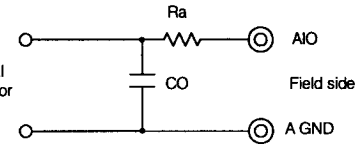


See page 8 for circuit diagram

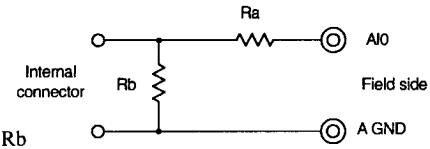
a) Straight-through connection (factory setting):
Ra = 0 Ω (short)
Rb = none
C0 = none



b) 1.6 KHz (3 dB) low pass filter:
Ra = 10 KΩ
Rb = none
C0 = 0.01 µF $f_{3\,dB} = \frac{1}{2\pi RaC0}$

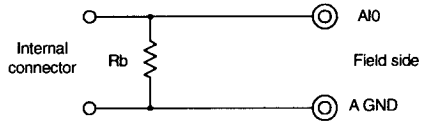


c) 10:1 voltage attenuator:
Ra = 9 KΩ
Rb = 1 KΩ
C0 = none
$\text{Attenuation} = \frac{Rb}{Ra + Rb}$

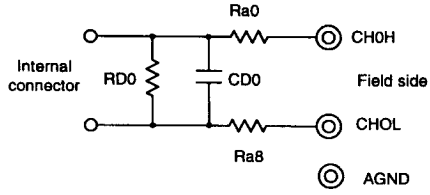


(Assume source impedance « 10 KΩ)

d) 4-20 mA to 1-5 V_{DC} signal converter:
Ra = 0 Ω (short)
Rb = 250 Ω
(0.1% precision resistor)
C0 = none

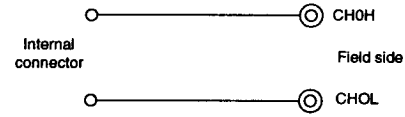


Differential connections



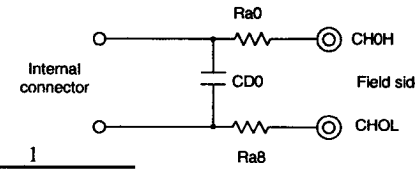
See page 8 for circuit diagram

a) Straight-through connection (factory setting):
Ra0 = 0 Ω (short)
Ra8 = 0 Ω (short)
RD0 = none
CD0 = none



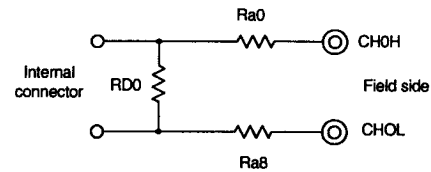
b) 1.6 KHz (3 dB) low pass filter:
Ra0 = 5 KΩ
Ra8 = 5 KΩ
RD0 = none
CD0 = 0.01 μF

$$f_{3\,dB} = \frac{1}{2\pi\, CD0\, (Ra0 + Ra8)}$$



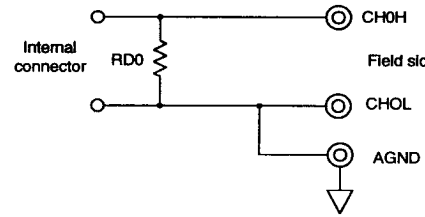
c) 10:1 voltage attenuator:
Ra0 = 4.5 KΩ
Ra8 = 4.5 KΩ
RD0 = 1 KΩ
CD0 = none

$$\text{Attenuation} = \frac{RD0}{Ra0 + Ra8 + RD0}$$



(Assume source impedance «10 KΩ)

d) 4-20 mA to 1-5 V_{DC} signal converter:
Ra0 = 0 Ω (short)
Ra8 = 0 Ω (short)
RD0 = 250 Ω
(0.1% precision resistor)
CD0 = none



CJC Output (Channel 0)

The PCLD-8115 provides on-board cold junction compensation for thermocouple measurement.

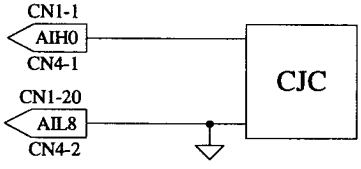
Through the setting of jumpers JP1 and JP2 you control disabling of the CJC circuitry and single-ended or differential mode. The jumper settings are as follows:

Differential mode

JP2 

JP1 

Internal Connector CHO

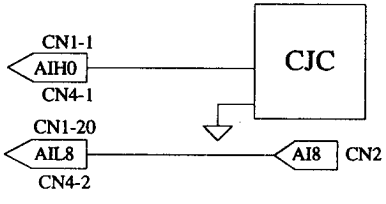


Single ended mode

JP2 

JP1 

Internal Connector CHO



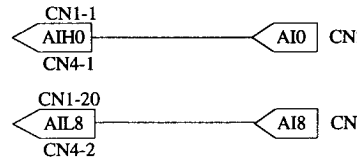
CJC disabled (factory default)

JP2 

JP1 

Internal Connector

CHO



Calibrating the CJC circuitry

When the PCLD-8115 leaves our factory it is calibrated. To maintain accuracy it is necessary to check and/or calibrate the PCLD-8115 on a regular basis. In order to calibrate the board you need the following:

- A temperature sensor that is connected to the PCLD-8115
- DAS card (such as the PCL-818 Series).
- A program that can read the DAS Card's output channels (such as PCLSTEST)
- A digital precision thermometer

1. Jumper settings

Set the PCLD-8115 to single-ended mode: JP2 

JP1 

Notice that the DAS card should also be configured for single -ended mode!

2. Measure temperature

Measure the temperature around the temperature sensor with the digital thermometer.

3. Calculation

Use the following formula to calculate the calibration voltage:

$$Vt = (10\ mV/deg\ K) * measured\ temperature$$

For room temperature (25°C = 298°K) the calibration voltage would be : 10 mV * 298 = 2.98 V

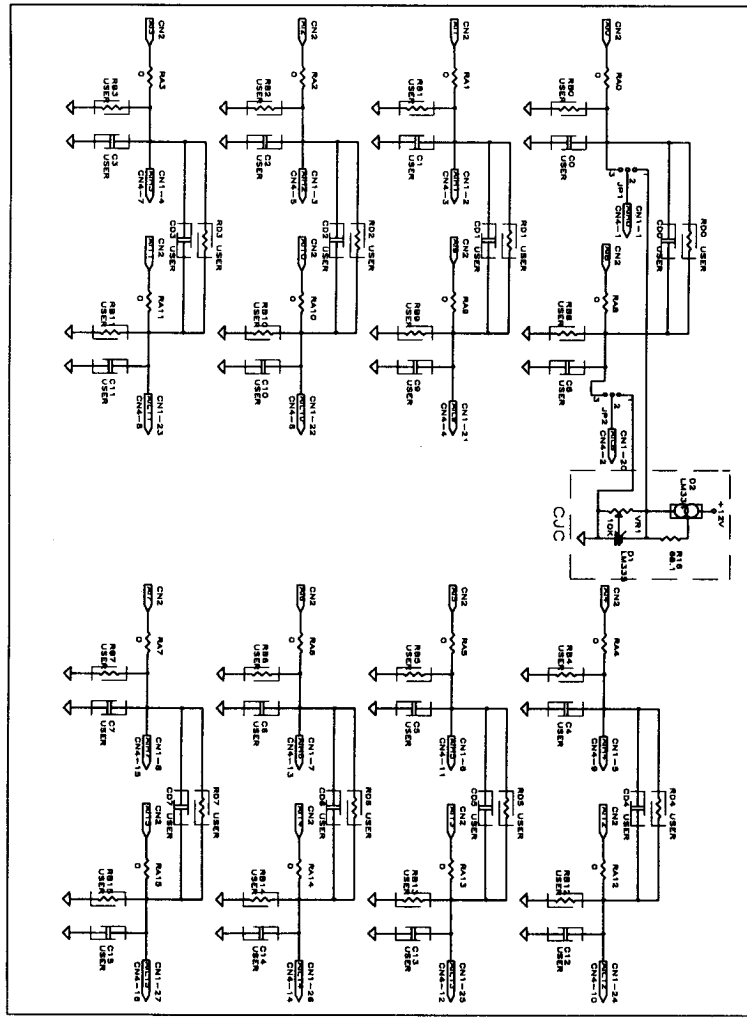
4. Acquire data

Use PCLSTEST to read the voltage output of the PCLD-8115 of the corresponding channel of the DAS card.

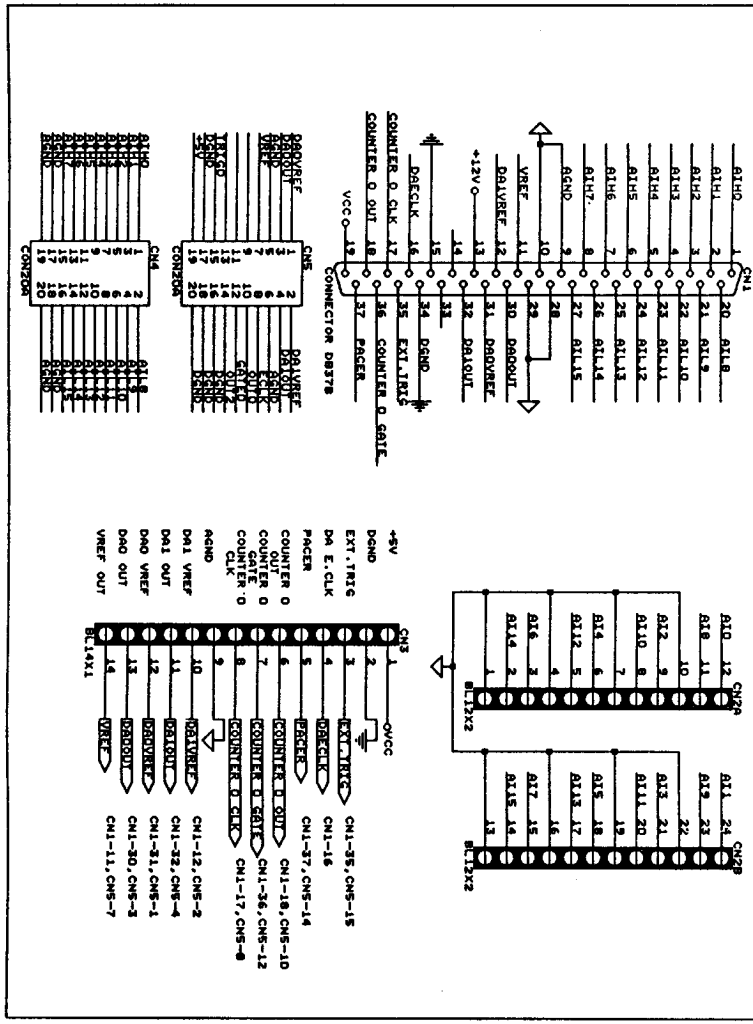
5. Calibrate

Adjust the output voltage until it equals 2.98 V (at 25°C). Adjusting is done by turning the screw of the variable resistor on board the PCLD-8115. See "Board Layout on page 2

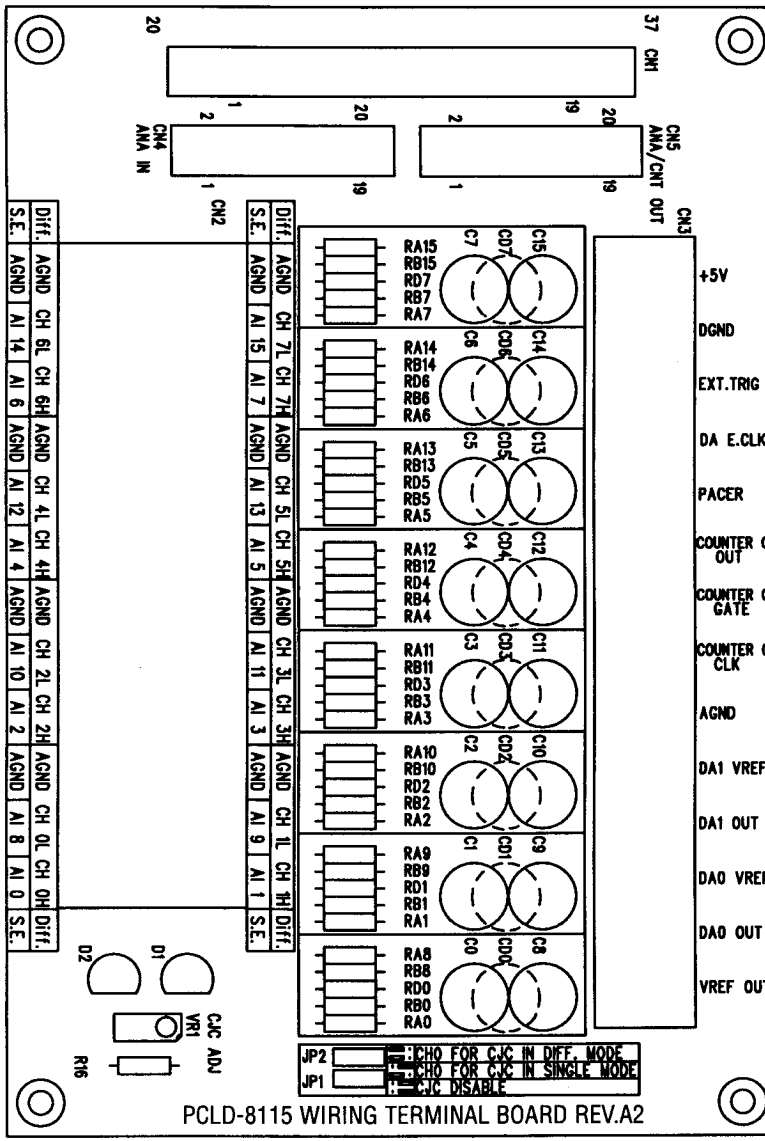
Technical Diagrams



Circuit Diagram



Pin-outs



Board Diagram