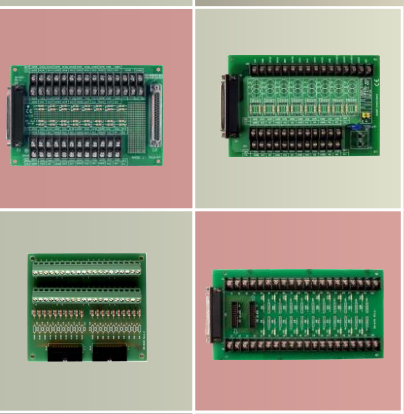


DB-8025/8125/8225/ 8325/1825 Terminal Board User Manual

Version 1.7, Nov. 2015

SUPPORT

This manual relates to the following terminal boards: DB-8025, DB-8125, DB-8225, DB-8325 and DB-1825.

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TABLE OF CONTENTS

1. DB-8025 4

1.1 INTRODUCTION 4
1.2 LAYOUT 4
1.3 PIN ASSIGNMENTS 5
1.4 WRING 6
1.5 CAPACITOR FILTER, VOLTAGE DIVIDER AND CURRENT INPUT 6
1.5.1 Input R/C Filtering 6
1.5.2 Voltage Divider 7
1.5.3 Current Input 8

2. DB-8125 9

2.1 INTRODUCTION 9
2.2 LAYOUT 9
2.3 PIN ASSIGNMENTS 10
2.4 WIRING 11
2.5 CAPACITOR FILTER, VOLTAGE DIVIDER AND CURRENT INPUT 11
2.5.1 Input R/C Filtering 11
2.5.2 Voltage Divider 12
2.5.3 Current Input 13

3. DB-8225 14

3.1 INTRODUCTION 14
3.2 LAYOUT 15
3.3 CJC JUMPER SETTINGS 15
3.3.1 Single-ended Mode 15
3.3.2 Differential Mode 16
3.4 WIRING 17
3.4.1 Single-ended Connections 17
3.4.2 Differential Connections 17
3.5 CJC OUTPUT 18
3.6 OPEN THERMOCOUPLE DETECTION (OTC) AND INPUT FILTERING 19
3.7 VOLTAGE DIVIDER AND CURRENT INPUT 20
3.7.1 Voltage Divider 20
3.7.2 Current Input 20
3.8 CN3: TIMER COUNTER AND D/A OUTPUT CONNECTOR 21

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4. DB-8325 22

4.1 INTRODUCTION 22
4.2 LAYOUT 22
4.3 WIRING 23
4.4 CAPACITOR FILTER, VOLTAGE DIVIDER AND CURRENT INPUT 23
4.4.1 Input R/C Filtering 23
4.4.2 Voltage Divider 24
4.4.3 Current Input 25

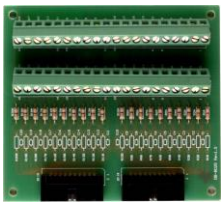
5. DB-1825 26

5.1 INTRODUCTION 26
5.2 LAYOUT 27
5.2.1 PCB Layout for Connecting to ISO-AD32 Series cards 28
5.2.2 PCB Layout for Connecting to PCI-1202/1602/1802/822/826 Series cards 29
5.2.3 PCB Layout for Connecting to PCI-1002 Series cards 30
5.2.4 Connecting to ISO-AD32 and PCI-1002/1202/1602/1802/822/826 Series cards 31
5.2.5 Connecting to PCI-1002/1202/1602/1802/822/826 and multiple DB-889D (16-channel differential) Series cards 31
5.3 WIRING 32
5.3.1 Single-ended Connections for Voltage Input 32
5.3.2 Differential Connections for Voltage Input 32
5.3.3 Single-ended Connections for Current Input 33
5.3.4 Differential Connections for Current Input 33

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1. DB-8025

Terminal Board for A/D cards with a 20-pin Connector



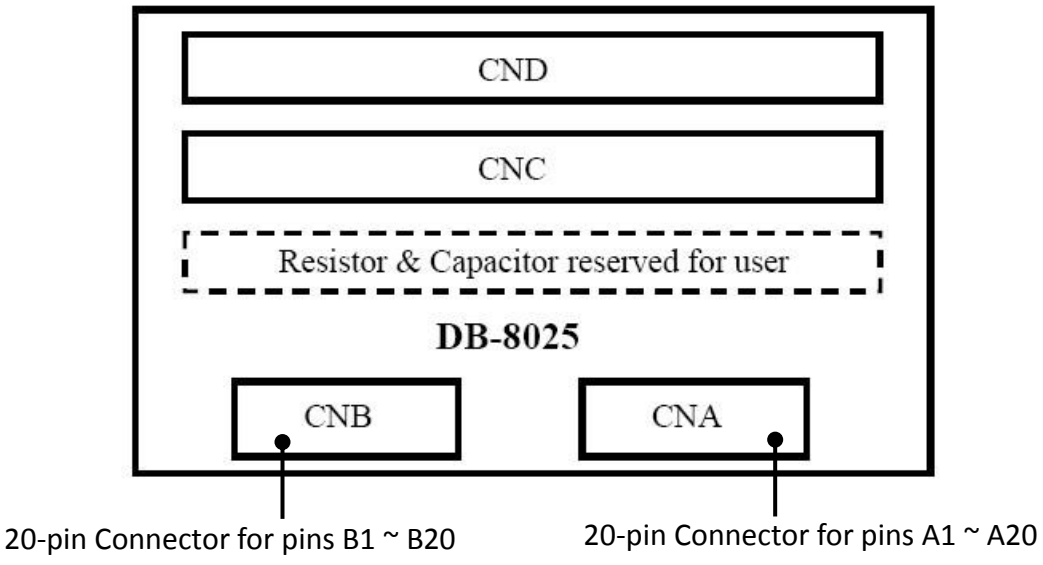
1.1 Introduction

The DB-8025 is cost-effective universal screw terminal board for A/D cards that contain a 20-pin connector. The following is an overview of the general features provided by the DB-8025 terminal board:

- Low-pass Filter
- Blank Pads for Break Detection
- Two 20-pin Box Header Connectors
- Current Shut and Voltage Attenuation

1.2 Layout

The following is an overview of the layout for the DB-8025 Terminal Board.



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1.3 Pin Assignments

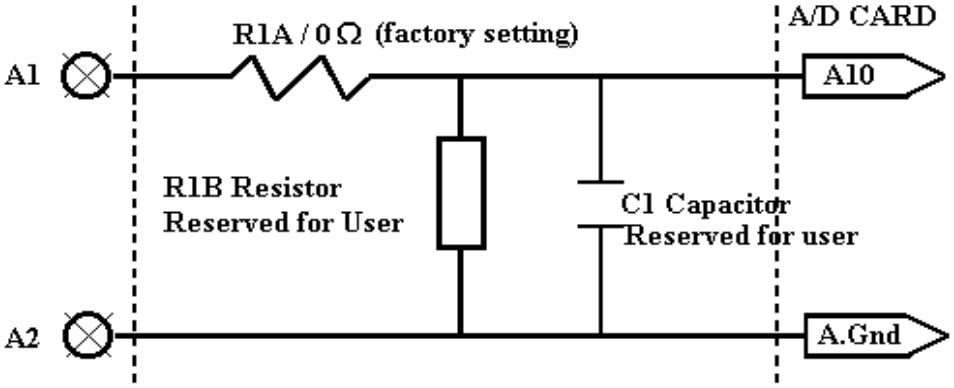
The following is an overview of the pin assignments for the CAN and CNB connectors on the DB-8025 Terminal Board.

CNA		CNB	
Pin	Description	Pin	Description
1	A1	1	B1
2	A2	2	B2
3	A3	3	B3
4	A4	4	B4
5	A5	5	B5
6	A6	6	B6
7	A7	7	B7
8	A8	8	B8
9	A9	9	B9
10	A10	10	B10
11	A11	11	B11
12	A12	12	B12
13	A13	13	B13
14	A14	14	B14
15	A15	15	B15
16	A16	16	B16
17	A17	17	B17
18	A18	18	B18
19	A19	19	B19
20	A20	20	B20

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1.4 Wring

The DB-8025 Terminal Board provides the ability to perform Capacitor Filter, Voltage Driver and Current Input functions, each of which are described in more detail below. The following provides an illustration of the wiring method.



1.5 Capacitor Filter, Voltage Divider and Current Input

The DB-8025 Terminal Board provides the ability to perform Capacitor Filter, Voltage Divider and Current Input functions, each of which are described in more detail below.

1.5.1 Input R/C Filtering

Input Filtering is implemented on the DB-8025 Terminal board by installing both a resistor and a capacitor on the desired input channel.

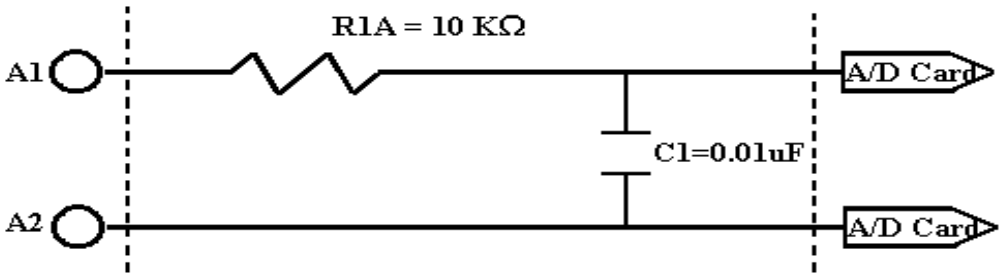
For example, the procedure described below can be used to implement Input Filtering based on the following settings:

1.6 kHz Low-pass Filter
Equation: f3db = 1/(2π · R · C)

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Step1: Change the resistor on R1A (0 Ω) to 10 kΩ
Step2: Install a 0.01 uF Capacitor on C1.

The following is an illustration of the wiring method for implementing Input R/C Filtering on the DB-8025 Terminal board.

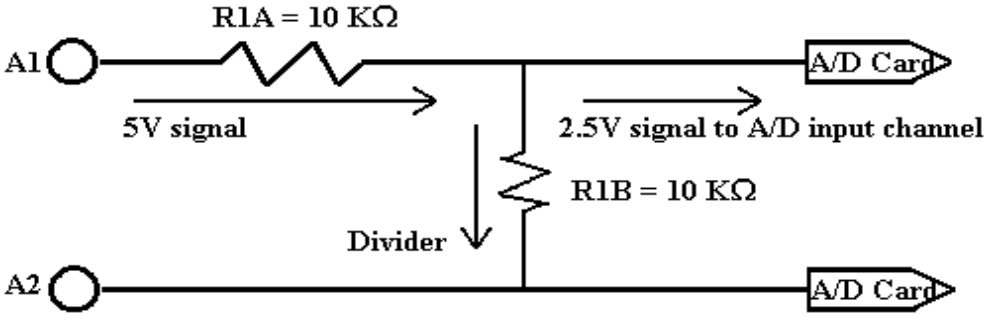


1.5.2 Voltage Divider

The DB-8025 Terminal Board provides two resistors on the input channel that can be used to divide the input voltage signal if the signal level is greater than the input range for the A/D card. The following procedure can be used to implement voltage divider functionality:

Step1: Change R1A (0 Ω) resistor to 10 KΩ. (0.1%)
Step2: Install 10 KΩ (0.1%) on R1B. (Voltage Signal /2)

V/n can be calculated as: **n = R1A/(R1A+R1B)**
The following provides an illustration of the wiring method for implementing voltage divider functionality on the DB-8025 Terminal Board.



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1.5.3 Current Input

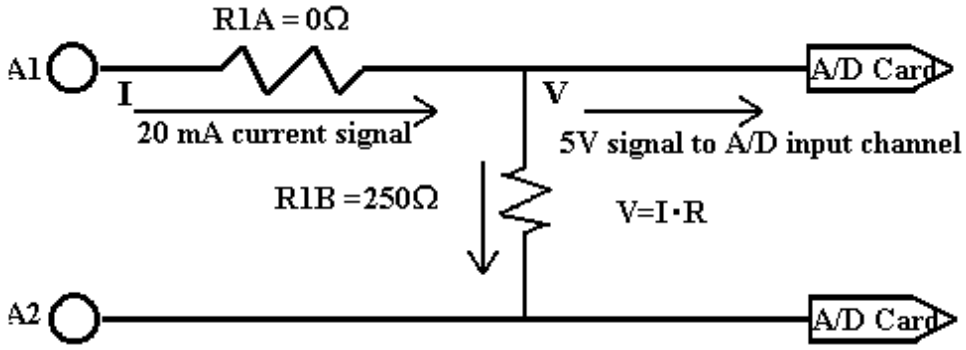
In order to measure the current input signal, a 250 Ω resistor must be installed on R1B. The process for implementing Current Input functions on the DB-8025 Terminal Board is as follows:

Step 1: Set the current signal range. The valid range is: 0 to 20 mA
Step 2: Change the resistor on R1B to 250 Ω
Step 3: Set the voltage using the formula:

Input voltage signal = input current signal x 250 Ω

The valid range is 0 to 5 V. In this case, the voltage is: 20 mA x 250 Ω = 5V

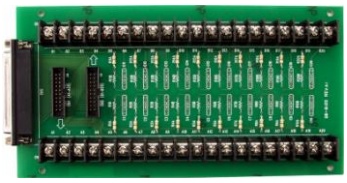
The following provides an illustration of the wiring method for implementing Current Input functions on the DB-8025 Terminal Board.



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2. DB-8125

Terminal Board for A/D cards with a 20-pin or 37-pin D-sub Connectors



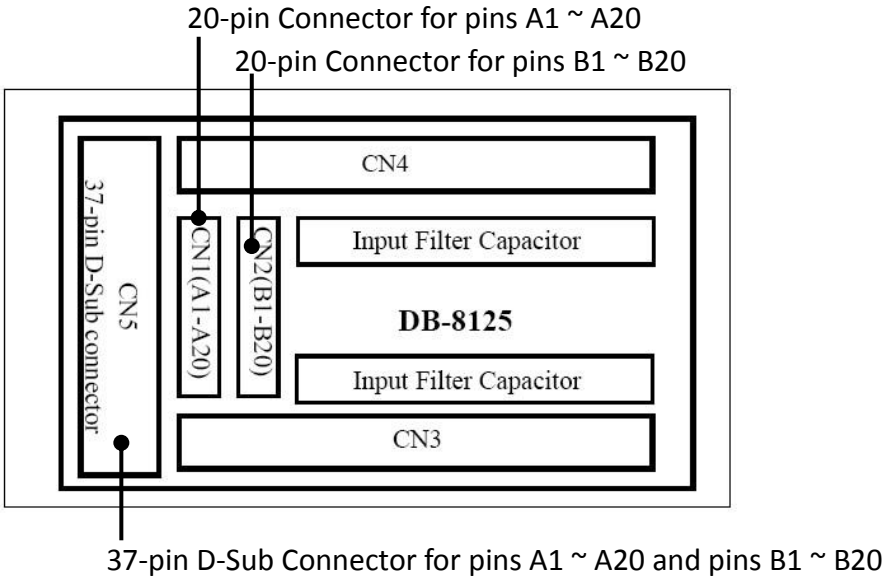
2.1 Introduction

The DB-8125 is a cost-effective universal screw terminal board for A/D cards that contain either a 20-pin connector or a 37-pin D-sub connector. The following is an overview of the general features provided by the DB-8125 terminal board:

- Screw Terminal Board using two 20-pin Cable Connectors or one DB-37 Connector
- Blank Pads for Break Detection
- Low-pass Filter
- Current Shunt and Voltage Attenuation

2.2 Layout

The following is an overview of the layout for the DB-8125 Terminal Board.

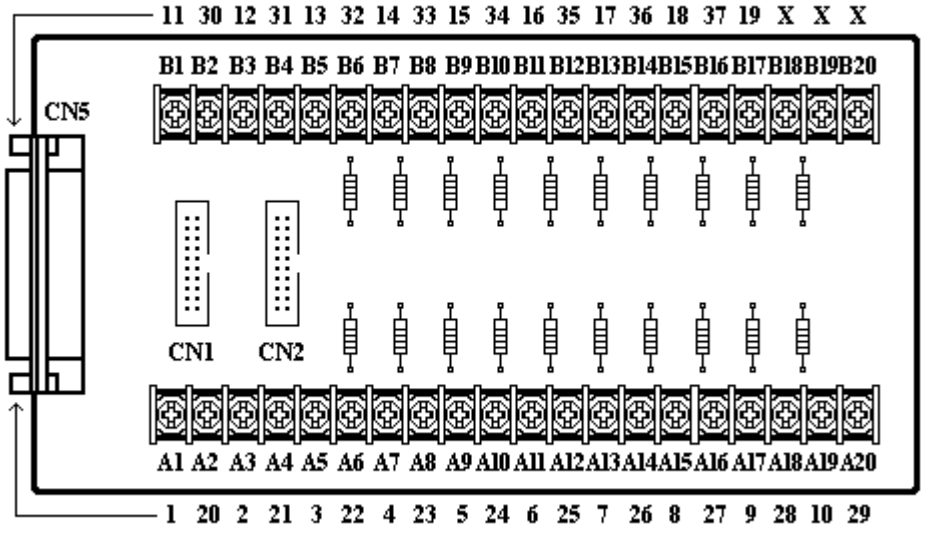


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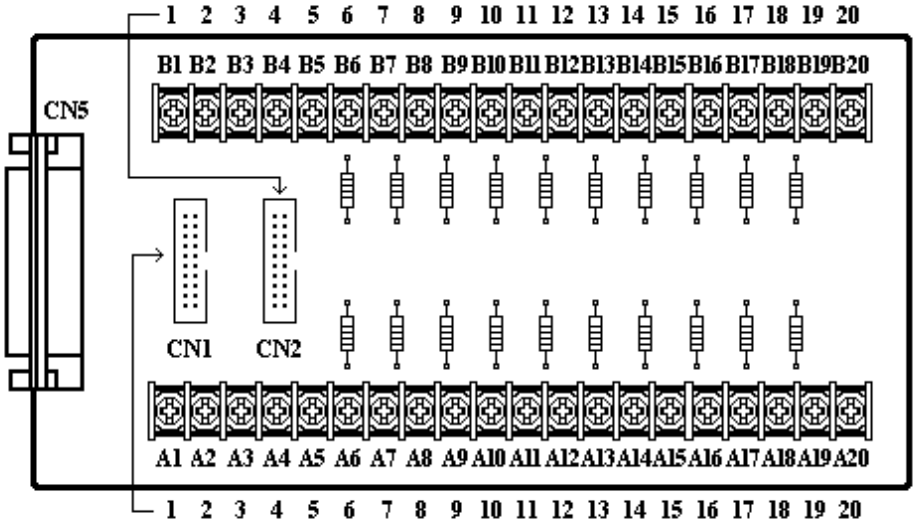
2.3 Pin Assignments

The following is an overview of the pin assignments for the 37-pin D-sub connector (CN5) and the 20-pin connectors (CN1 and CN2) on the DB-8125 Terminal Board.

➢ **37-pin D-sub Connector**



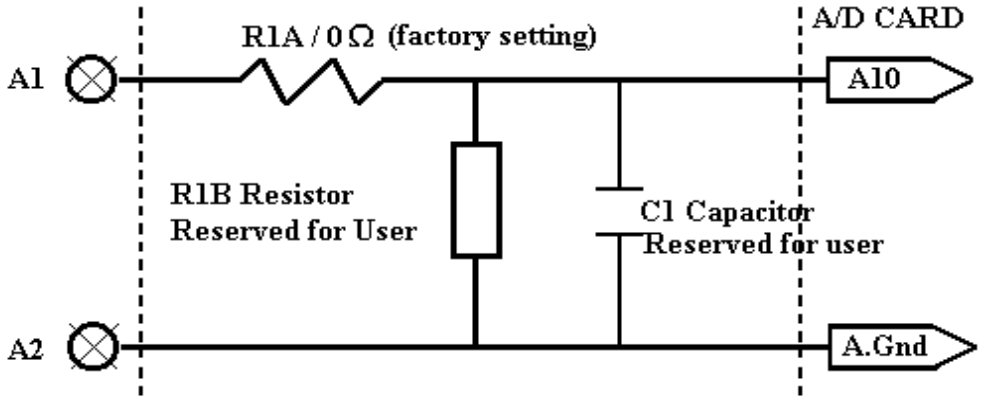
➢ **20-pin Connectors**



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2.4 Wiring

The DB-8125 Terminal Board provides the ability to perform Capacitor Filter, Voltage Driver and Current Input functions, each of which are described in more detail below. The following provides an illustration of the wiring method.



2.5 Capacitor Filter, Voltage Divider and Current Input

The DB-8125 Terminal Board provides the ability to perform Capacitor Filter, Voltage Divider and Current Input functions, each of which are described in more detail below.

2.5.1 Input R/C Filtering

Input Filtering is implemented on the DB-8125 Terminal board by installing both a resistor and a capacitor on the desired input channel.

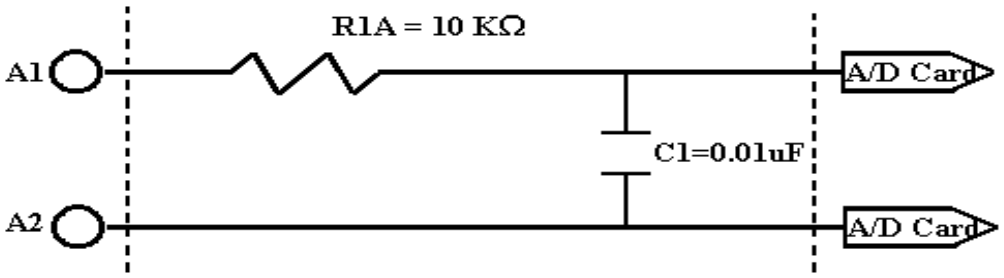
For example, the procedure described below can be used to implement Input Filtering based on the following settings:

1.6 kHz Low-pass Filter
Equation: f3db = 1/(2π · R · C)

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Step1: Change the resistor on R1A (0 Ω) to 10 kΩ
Step2: Install a 0.01 uF Capacitor on C1.

The following is an illustration of the wiring method for implementing Input R/C Filtering on the DB-8125 Terminal board.

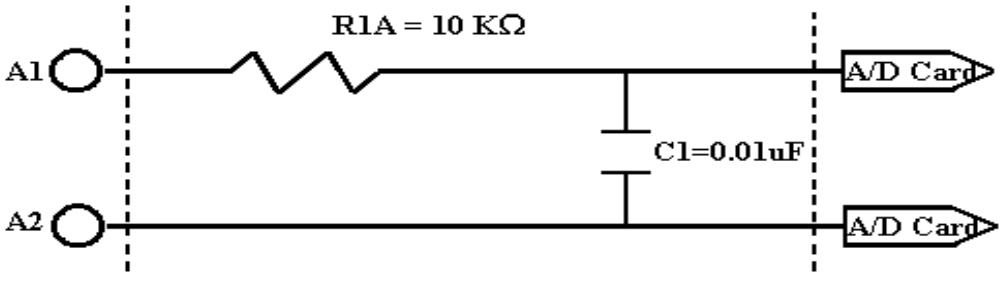


2.5.2 Voltage Divider

The DB-8125 Terminal Board provides two resistors on the input channel that can be used to divide the input voltage signal if the signal level is greater than the input range for the A/D card. The following procedure can be used to implement voltage divider functionality on the DB-8125 Terminal Board:

Step1: Change the resistor on R1A (0 Ω) to 10 KΩ. (0.1%)
Step2: Install a 10 kΩ (0.1%) on R1B. (Voltage Signal/2)

V/n can be calculated as: **n = R1A/(R1A+R1B)**
The following provides an illustration of the wiring method for implementing voltage divider functionality on the DB-8125 Terminal Board.



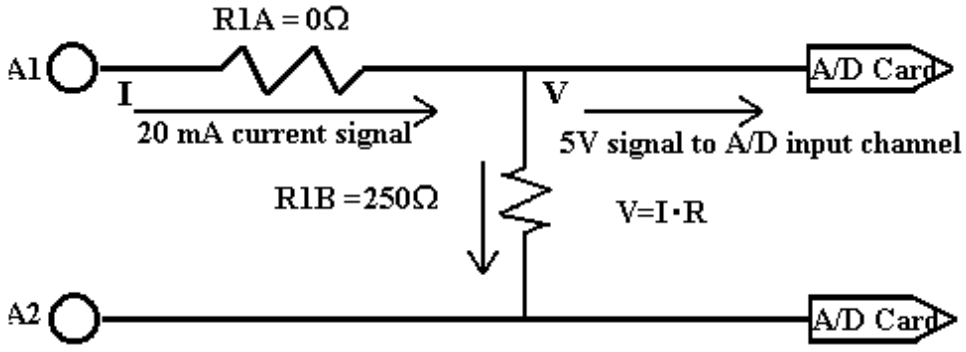
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2.5.3 Current Input

In order to measure the current input signal, a 250 Ω resistor must be installed on R1B (0 Ω). The process for implementing Current Input functions on the DB-8125 Terminal Board is as follows:

Step 1: Set the current signal range. The valid range is: 0 to 20 mA
Step 2: Change the resistor on R1B to 250 Ω
Step 3: Set the voltage using the formula:
Input voltage signal = input current signal x 250 Ω
The valid range is 0 to 5 V. In this case,
the voltage is: 20 mA x 250 Ω = 5V

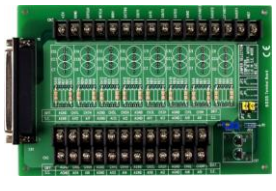
The following provides an illustration of the wiring method for implementing Current Input functions on the DB-8125 Terminal Board.



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3. DB-8225

Daughterboard for A-82x Series cards



3.1 Introduction

The DB-8225 daughterboard is designed for A-82x series cards and provides an onboard CJC (Cold Junction Compensation) circuit that allows thermocouple measurement, together with a terminal block for easy signal connection and measurement as well as convenient wiring. The CJC is connected to A/D channel 0. External boards can be directly connected to the DB-8225 via the CON3 header using a 37-pin D-sub connector.

The following table provides an overview of the supported input modes for A-82x Series cards:

A/D Card Type	Input Mode
A-822 HG	Single-End or Differential
A-822DG	Single-End or Differential
A-821PG	Single-End or Differential
A-826PG	Single-End or Differential

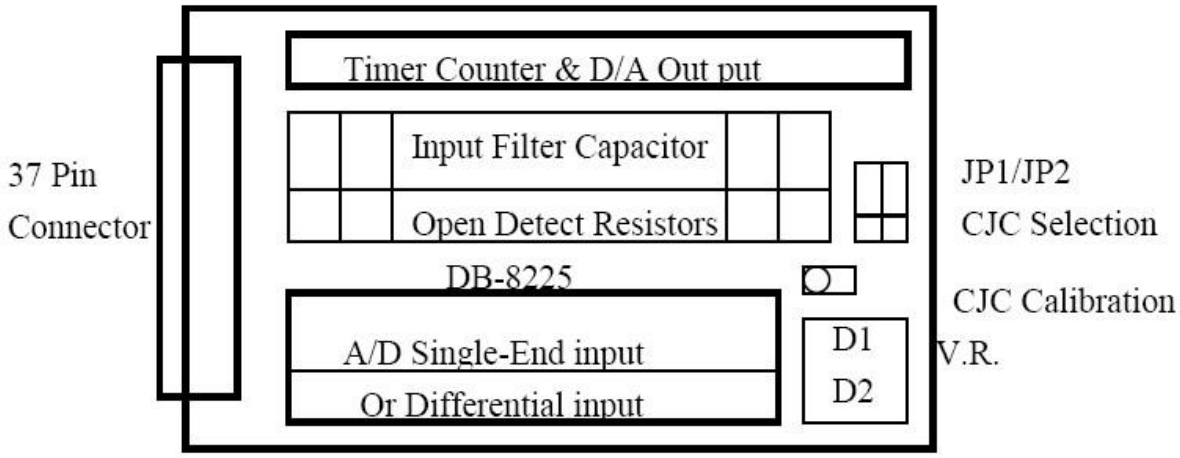
The following is an overview of the general features provided by the DB-8225 terminal board:

- Low-cost screw-terminal board
- Onboard CJC (Cold Junction Compensation) circuit on AI Channel 1 (Single-ended or Differential) for direct thermocouple measurement
- 16 Single-ended/8 Differential Input Channels
- Blank Pads for Break Detection
- Low-pass Filter, Current Shunt and Voltage Attenuation
- Includes one DB37 Connector for A-82x and PCI-1800 Series Boards.

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3.2 Layout

The following is an overview of the layout for the DB-8225 Terminal Board.

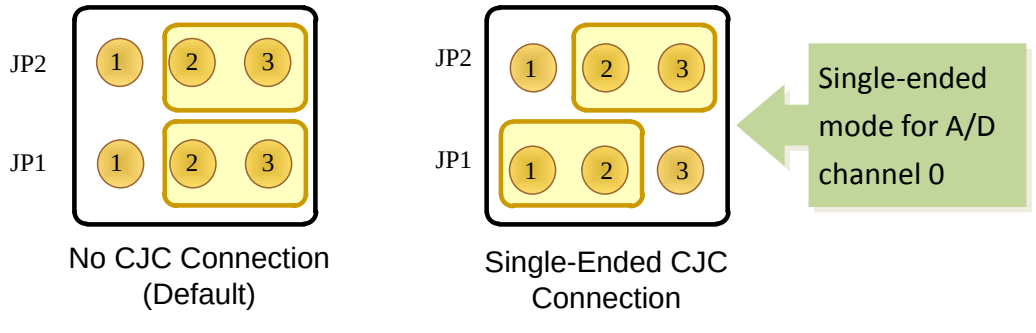


3.3 CJC Jumper Settings

Jumpers JP1 and JP2 are used to select the CJC connection type for A/D channel 0 on A-82x Series cards and can be set to either single-ended or differential mode, as illustrated below. The default configuration is **"No CJC Connection"**. Note that CJC configuration is only applicable to A/D channel 0.

3.3.1 Single-ended Mode

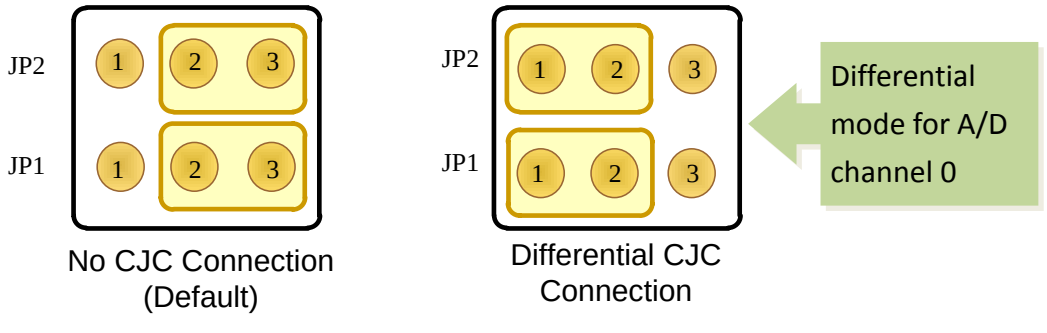
To configure single-ended mode, connect pin 1 to pin 2 on jumper JP1 and connect pin 2 to Pin 3 on jumper JP2, as illustrated in the diagram below.



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3.3.2 Differential Mode

To configure differential mode, connect pin 1 to pin2 on jumper JP1 and connect pin 1 to Pin2 on jumper JP2, as illustrated in the diagram below.



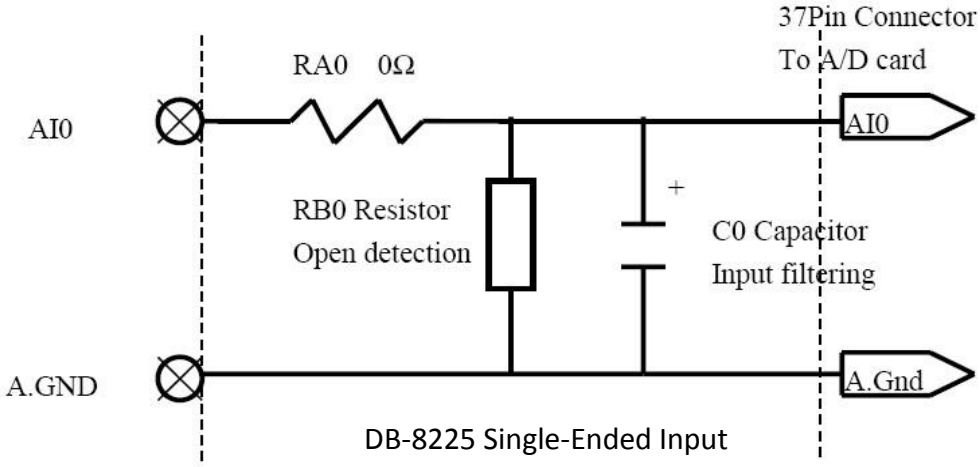
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3.4 Wiring

A-82x Series cards can be used to measure either single-ended or differential Analog Input signals. The following provides an illustration of the wiring method for each connection type.

3.4.1 Single-ended Connections

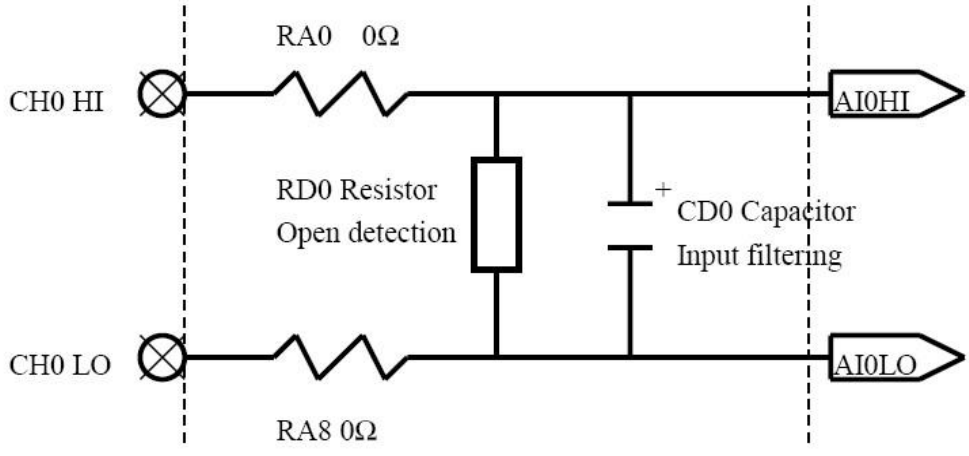
Refer to the diagram below for an illustration of the wiring method for single-ended connections.



DB-8225 Single-Ended Input

3.4.2 Differential Connections

Refer to the diagram below for an illustration of the wiring method for differential connections.



DB-8225 Differential Input

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3.5 CJC Output

The output voltage of the embedded CJC circuitry on the DB-8225 is proportional to the temperature and the output sensitivity is 10 mV per degree Celsius (°C) with 0.0 Volts @ -273°C. To accurately reflect room temperature, the A-82x Series cards should be protected from draughts and direct sunlight.

CJC Calibration:

Use the procedure described below to calibrate the CJC circuit:

(1) Connect the A-82X series card to the CN1 connector on the DB-8225
(2) Set the A-822HG/DG to single-ended Mode (see Section 3.3.1 for details)
(3) Connect pins 1 and 2 on Jumper JP1 and pins2 and 3 on Jumper JP2 (single-ended mode, see Section 3.3.1 for details)
(4) Place a digital thermometer near to the D1/D2 (see the Layout diagram for the DB-8225 in Section 3.2) and read the temperature.
(5) Read the value from the AI0 pin (single-ended channel 0) on the A-82x series card
(6) Adjust VR1 (see Section 3.2 Layout) until a stable reading of 10 mV per degree Celsius (°C) is attained.

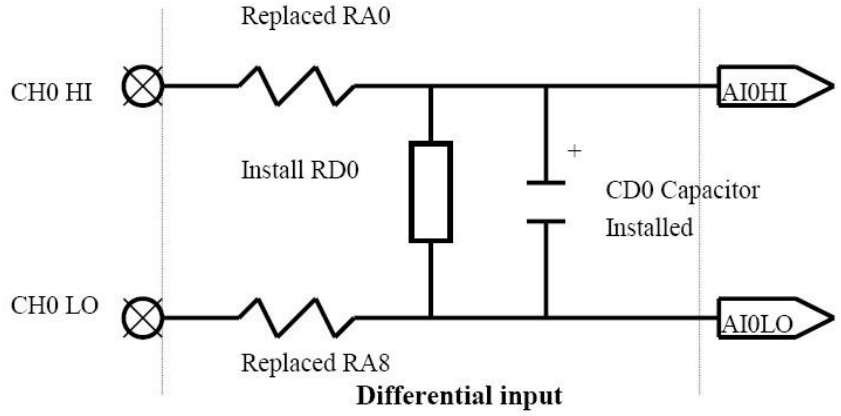
For example, when the temperature of the surrounding environment is 24°C, the value read by the CJC will be 2.97 V,
i.e.,
(273°C **+24**°C **) X 10 mV/**°C **= 2.97 V**

Note that an A/D Channel should be used for CJC calibration. The AI0 pin on the A-82x series card is reserved for single-ended mode, and the CH0-HI and CH0-LO pin are reserved for CJC calibration in differential mode.

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3.6 Open Thermocouple Detection (OTC) and Input Filtering

The DB-8225 daughterboard provides the ability to perform open thermocouple detection (OTD) and input filtering, which can be achieved by installing three resistors and a capacitor on the desired input channel. In the example illustrated in the image below, the desired channel is differential channel 0. In this case, resistors RA0 and RA8 (0Ω) must be replaced with 10 kΩ resistors and a 100 MΩ resistor must be installed on RD0. These biasing resistors will slowly pull an open input channel to 0 V_{DC}, Which can then be sensed and identified using software.



The following is an overview of the resistors/capacitor to be replaced/installed for each channel in differential input mode.

Channel	Replace 0 Ω Resistor with 10 kΩ	Install a 100 MΩ Resistor	Install a 1 uF Capacitor
0	RA0, RA8	RD0	CD0
1	RA1, RA9	RD1	CD1
2	RA2, RA10	RD2	CD2
3	RA3, RA11	RD3	CD3
4	RA4, RA12	RD4	CD4
5	RA5, RA13	RD5	CD5
6	RA6, RA14	RD6	CD6
7	RA7, RA15	RD7	CD7

In singled-ended mode (see Section3.4.1), resistor RA_n (0Ω) should be replaced with a 10 kΩ resistor. A 100 MΩ resistor should be added to resistor RB_n and a 1 uF capacitor should be added to C_n. *Note: n = Channel 0 to 15*

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3.7 Voltage Divider and Current Input

3.7.1 Voltage Divider

The DB-8225 daughterboard provides two resistors on the input channel that can be used to divide the input voltage signal if the signal level is greater than the input range for the A-82x series card.

The following procedure can be used to implement voltage divider functionality:
Step 1: Change the resistor on RA0 (0 Ω) to 10 KΩ (0.1%)
Step 2: Install a 10 kΩ (0.1%) resistor on RB0 (Voltage Signal / 2)

V/n can be calculated as: **n = RB0 / (RA0+RB0)**

3.7.2 Current Input

In order to measure the current input signal, a 250 Ω resistor must be installed on RA0 (0 Ω).
The process for implementing Current Input functions on the DB-8225 daughterboard is as follows:

Step 1: Set the Current Signal range. The valid range is: 0 ~ 20 mA
Step 2: Change the resistor on RA0 to 250 Ω
Step 3: Set the voltage using the formula:
Input voltage signal = input current signal x 250 Ω
The valid range is 0 to 5 V. In this case,
the voltage is: 20 mA x 250 Ω = 5 V

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3.8 CN3: Timer Counter and D/A Output Connector

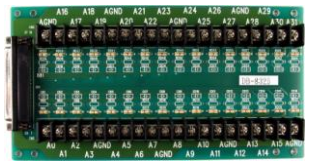
The CN3 connector on the DB-8225 daughterboard is used for performing Timer Counter and D/A Output functions. The following is an overview of the pin connection.

Pin Name	Connector
+ 5 V	+5 V Power Source from the Host computer
D.GND	Digital Ground
EXTCLK	External Clock for A-822HG/DG modules
INTCLK	No Function
DRDY	No Function
EXTTRG	External Trigger for the A/D Converter
COUT1	Output for 8254 Counter1 (used for the Internal Trigger)
GATE	8254 Counter 1 Gate (used for the Internal Trigger)
COUT0	Output from 8254 Counter 0 (Reserved for custom use)
GATE0	8254 Counter 0 Gate (Reserved for custom use)
AGND	Analog Ground
EXTVREF2	External Reference Voltage Input for D/A channel 2
DAOUT2	Output from D/A Channel 2
EXTVREF1	External Reference Voltage Input for D/A Channel 1
DAOUT1	Output from D/A Channel 1
VREF	Output from D/A Internal Reference Voltage

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4. DB-8325

Terminal Board for ISO-813 and PISO-813 Isolated A/D cards



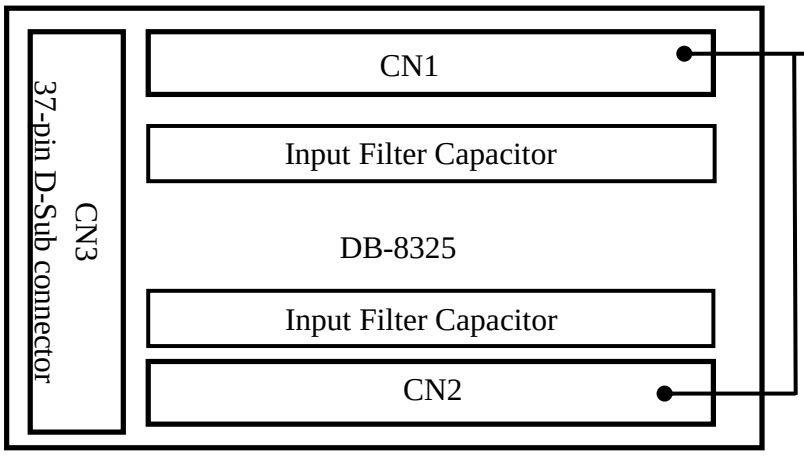
4.1 Introduction

The DB-8325 is a cost-effective universal screw terminal board for ISO-813 Series and PISO-813 Series isolated A/D cards. The board can be used to implement Low-pass Filter, current shunt and voltage attenuation functions, and includes blank pads for break detection as well as a 37-pin connector (CN3).

The following is an overview of the general features provided by the DB-8325 terminal board:

- Low-cost Screw Terminal Board
- Blank Pads for Break Detection
- Low-pass Filter, Current Shunt and Voltage Attenuation
- Includes a DB37 Connector for ISO-813 or PISO-813 Series Cards

4.2 Layout



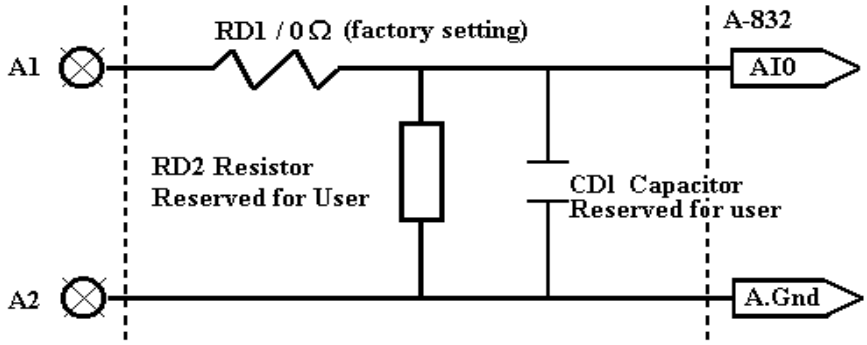
Pins A0 to A31 are for Analog Input channels 0 to 31 on ISO-813 and PISO-813 Series cards.

The **AGND pin** is for the Analog Ground on ISO-813 and PISO-813 Series cards.

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4.3 Wiring

DB-8325 Terminal Board provides the ability to perform Capacitor Filter, Voltage Divider and Current Input functions, each of which are described in more detail below. The following provides an illustration of the wiring method.



4.4 Capacitor Filter, Voltage Divider and Current Input

The DB-8325 Terminal Board provides the ability to perform Capacitor Filter, Voltage Divider and Current Input functions, each of which are described in more detail below.

4.4.1 Input R/C Filtering

Input Filtering can be implemented on the DB-8325 Terminal Board by installing a resistor and a capacitor on the desired input channel.

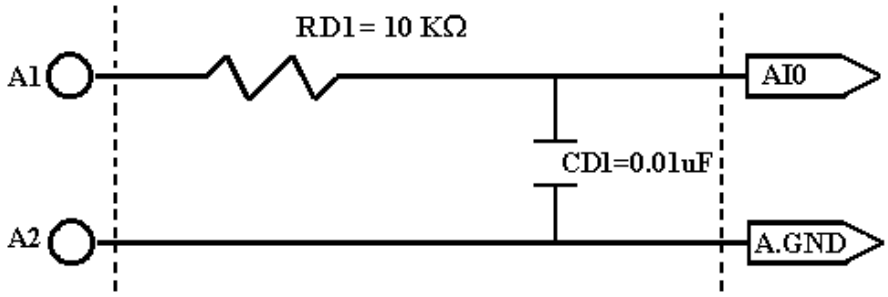
For example, the procedure described below can be used to implement Input Filtering on the DB-8325 Terminal Board based on the following settings.

1.6 kHz Low-pass Filter
Equation: f3db = 1/(2π · R · C)

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Step 1: Change resistor on RD1 (0 Ω) to 10 kΩ
Step 2: Install a 0.01 uF Capacitor on CD1.

The following is an illustration of the wiring method for implementing Input R/C Filtering on the DB-8325 Terminal board.

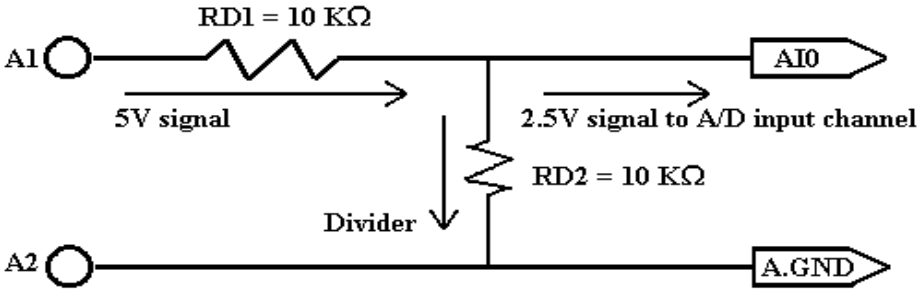


4.4.2 Voltage Divider

The DB-8325 Terminal Board provides two resistors on the input channel that can be used to divide the input voltage signal if the signal level is greater that the input range for the A/D card. The following procedure can be used to implement voltage divider functionality on the DB-8325 Terminal Board:

Step 1: Change the resistor on RD1 (0 Ω) to KΩ (0.1%)
Step 2: Install a 10 a kΩ (0.1%) on RD2. (Voltage Signal/2)
V/n can be calculated as: **n = RD1/(RD1+RD2)**

The following provides an illustration of the wiring method for implementing voltage divider functionality on the DB-8325 Terminal Board.



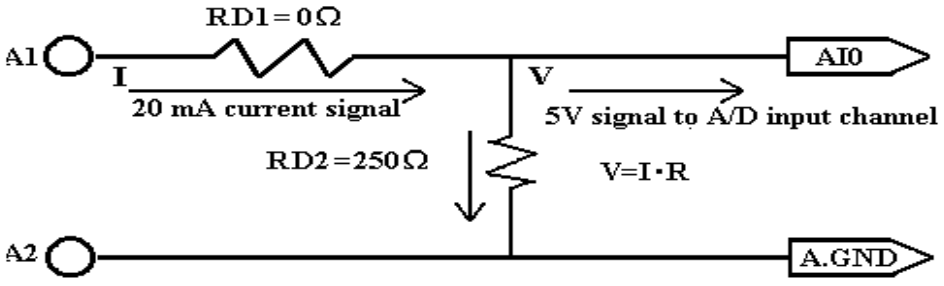
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4.4.3 Current Input

In order to measure the current input signal, a 250 Ω resistor must be installed on RD2. The process for implementing Current Input functions on the DB-8325 Terminal Board is as follows:

Step 1: Set the Current Signal range. The valid range is 0 to 20 mA
Step 2: Change the resistor on RD2 to 250Ω
Step 3: Set the voltage using the formula:
Input voltage signal = input current signal x 250 Ω
The valid range is 0 to 5 V. In this case,
the voltage is: 20 mA x 250 Ω = 5 V

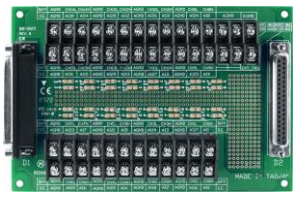
The following provides an illustration of the wiring method for implementing Current Input functions on the DB-8325 Terminal board.



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5. DB-1825

Terminal Board for ISO-AD32 and PCI-1002/1202/1602/1802/822/826 Series A/D cards



5.1 Introduction

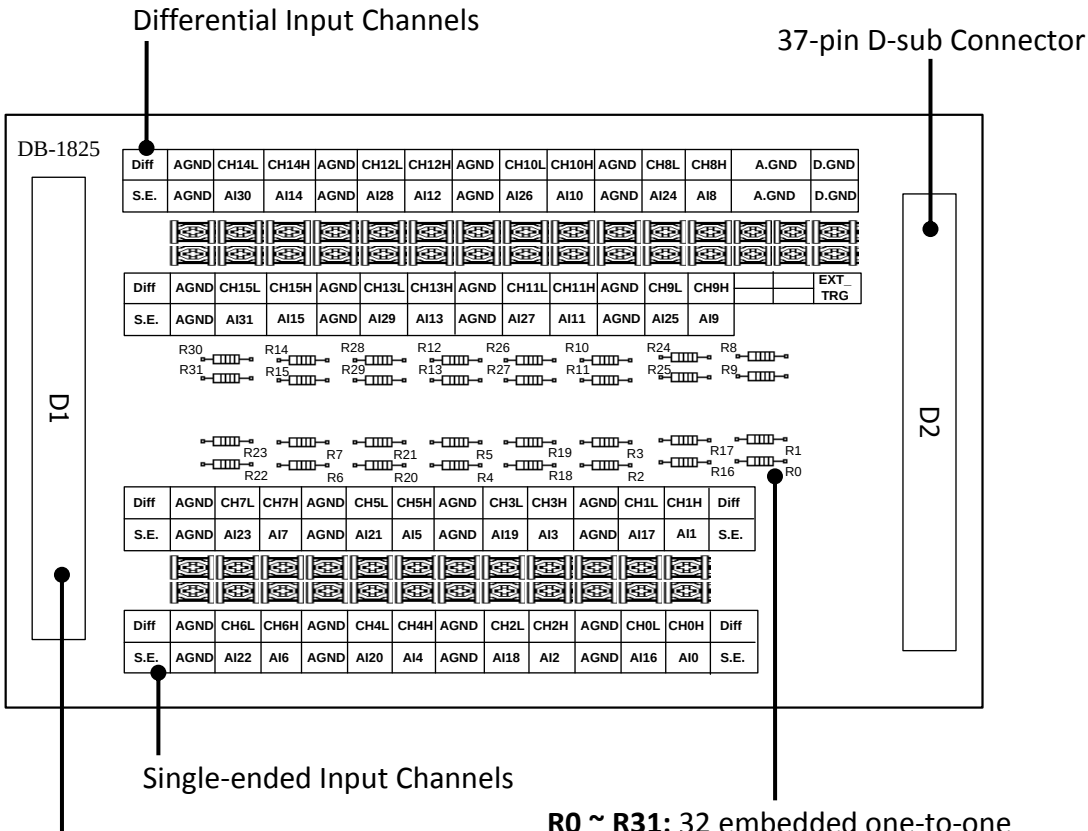
The DB-1825 is a cost-effective universal screw terminal board for ISO-AD32 and PCI-1002/1202/1602/1802 Series A/D cards. The board provides 32 single-ended or 16 differential input channels and can be used to implement low-pass filter, current shunt and voltage attenuation functions. The board also includes black pads for break detection and two 37-pin box header pin cable I/O ports.

The following is an overview of the general features provided by the DB-8325 terminal board:

- Screw Terminal Board including two 37-pin Cable I/O Ports.
- 32 Single-ended Input Channels
- Break Detection
- Low-pass Filter
- Current Shunt
- Voltage Divider
- Dimensions: 170 mm x 114 mm

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5.2 Layout

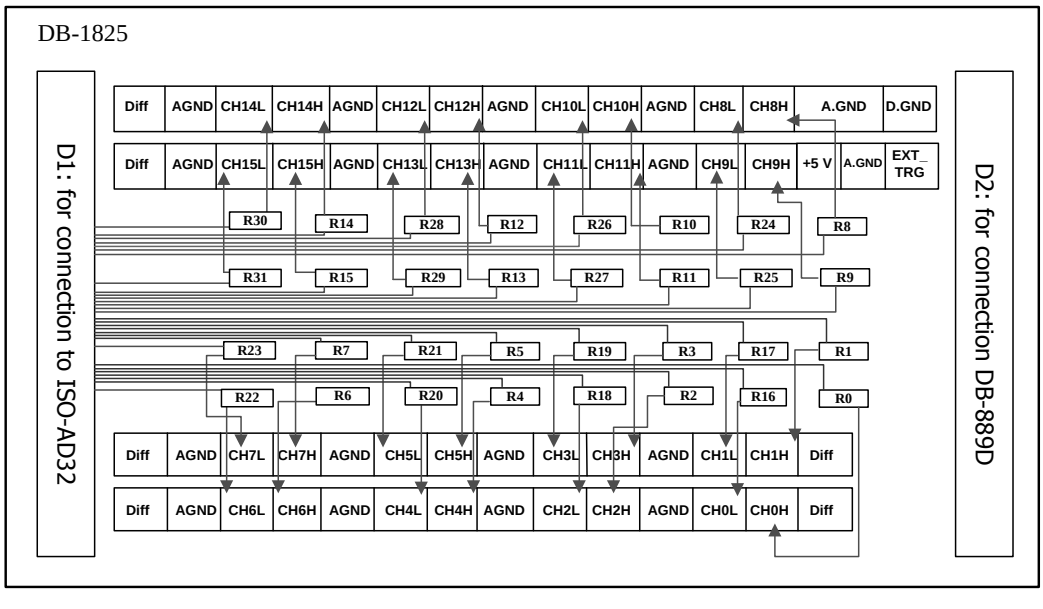


R0 ~ R31: 32 embedded one-to-one resistors corresponding to the 32 A/D channels, which can be changed to adjust the cutoff frequency of the R/C filter for the specified channel.

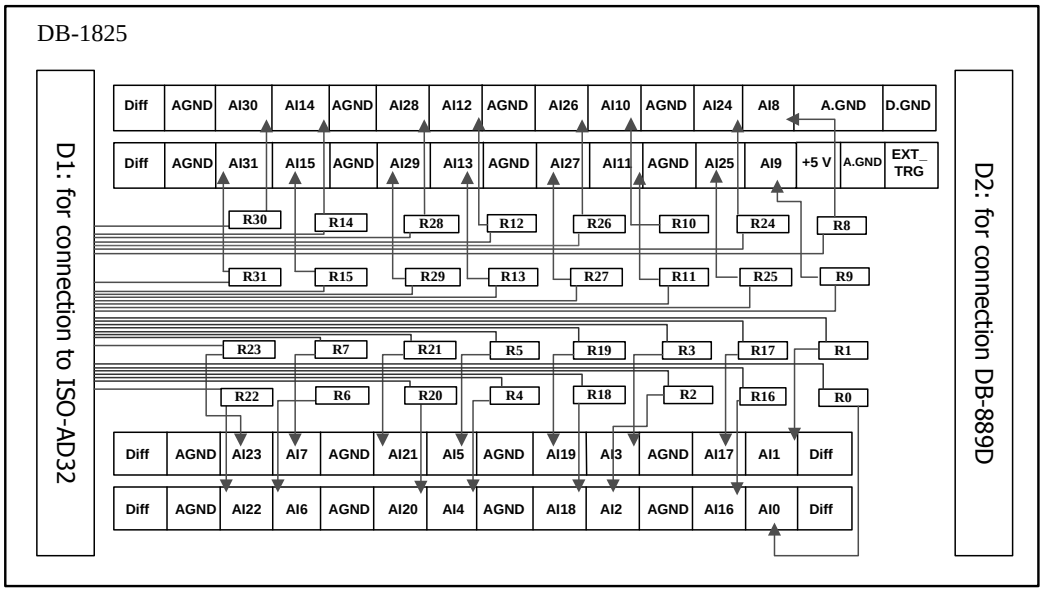
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5.2.1 PCB Layout for Connecting to ISO-AD32 Series cards

➢ For differential input (R = 0 Ω)



➢ For single-ended input (R = 0Ω)



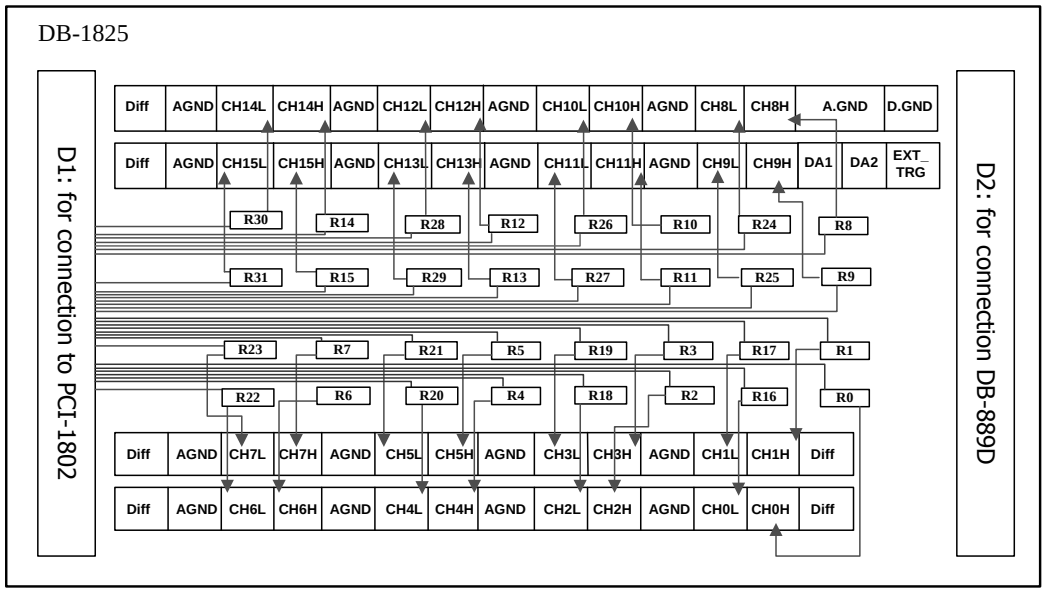
Notes:

1. *The pin assignments for D1 are the same as for the CN1 connector on ISO-AD32 Series cards.*
2. *The pin assignments for D2 are the same as for the CN1 connector on the DB-889D Series cards.*

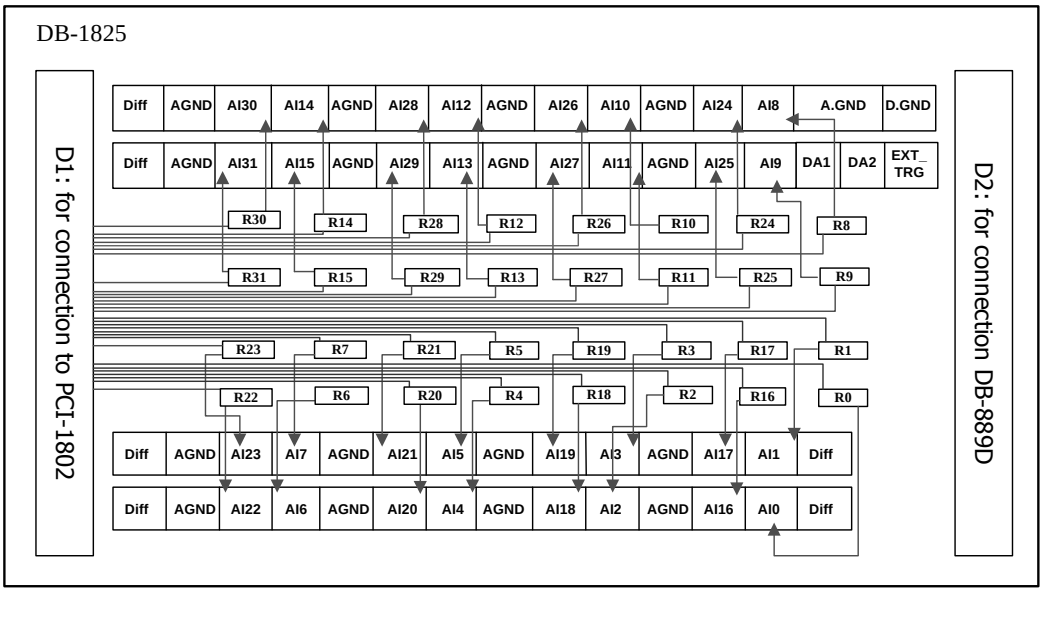
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5.2.2 PCB Layout for Connecting to PCI-1202/1602/1802/822/826 Series cards

➢ For differential input (R = 0 Ω, n = 0 ~ 31)



➢ For single-ended input (R = 0 Ω, n = 0 ~ 31)



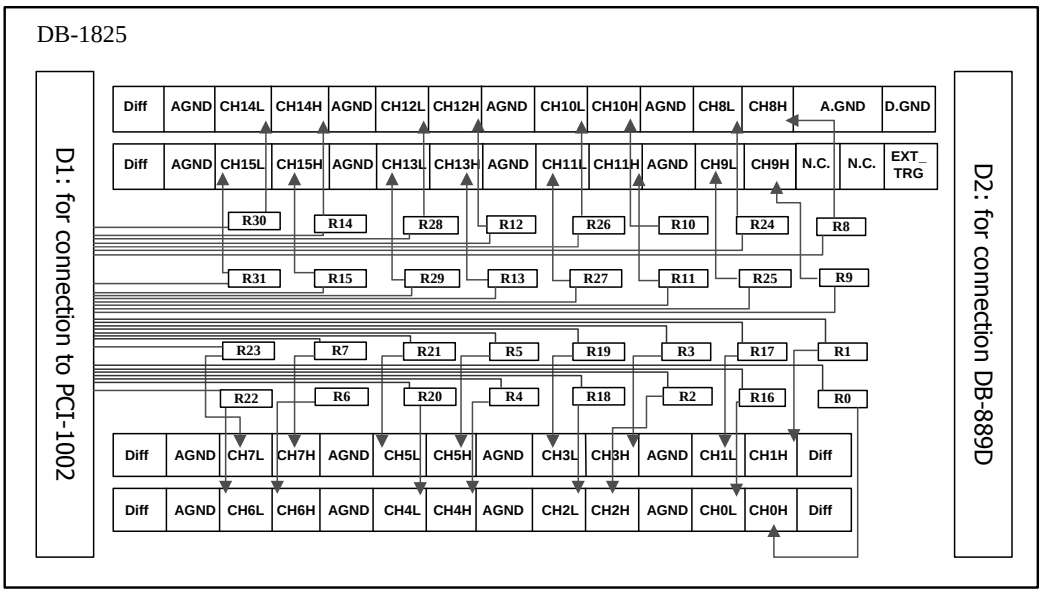
Notes:

1. *The pin assignments for D1 are the same as for the CON3 connector on PCI-1202/1602/1802/822/826 Series cards.*
2. *The pin assignments for D2 are the same as for the CN1 connector on the DB-889D Series cards.*

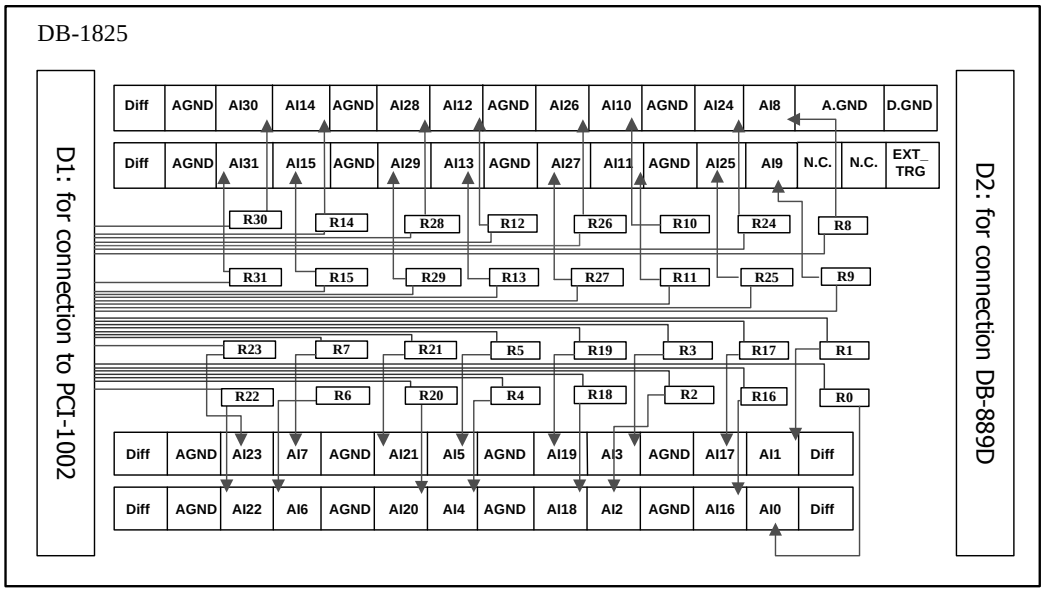
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5.2.3 PCB Layout for Connecting to PCI-1002 Series cards

➢ For differential input (R = 0 Ω, n = 0 ~ 31)



➢ For single-ended input (R = 0 Ω, n = 0 ~ 31)

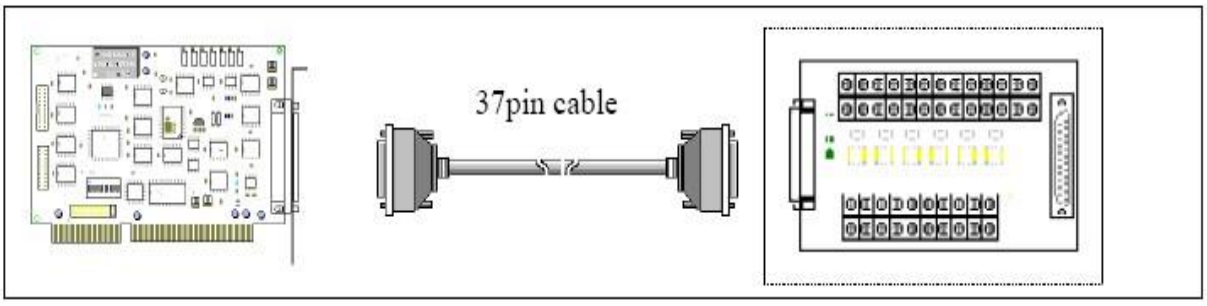


Notes:

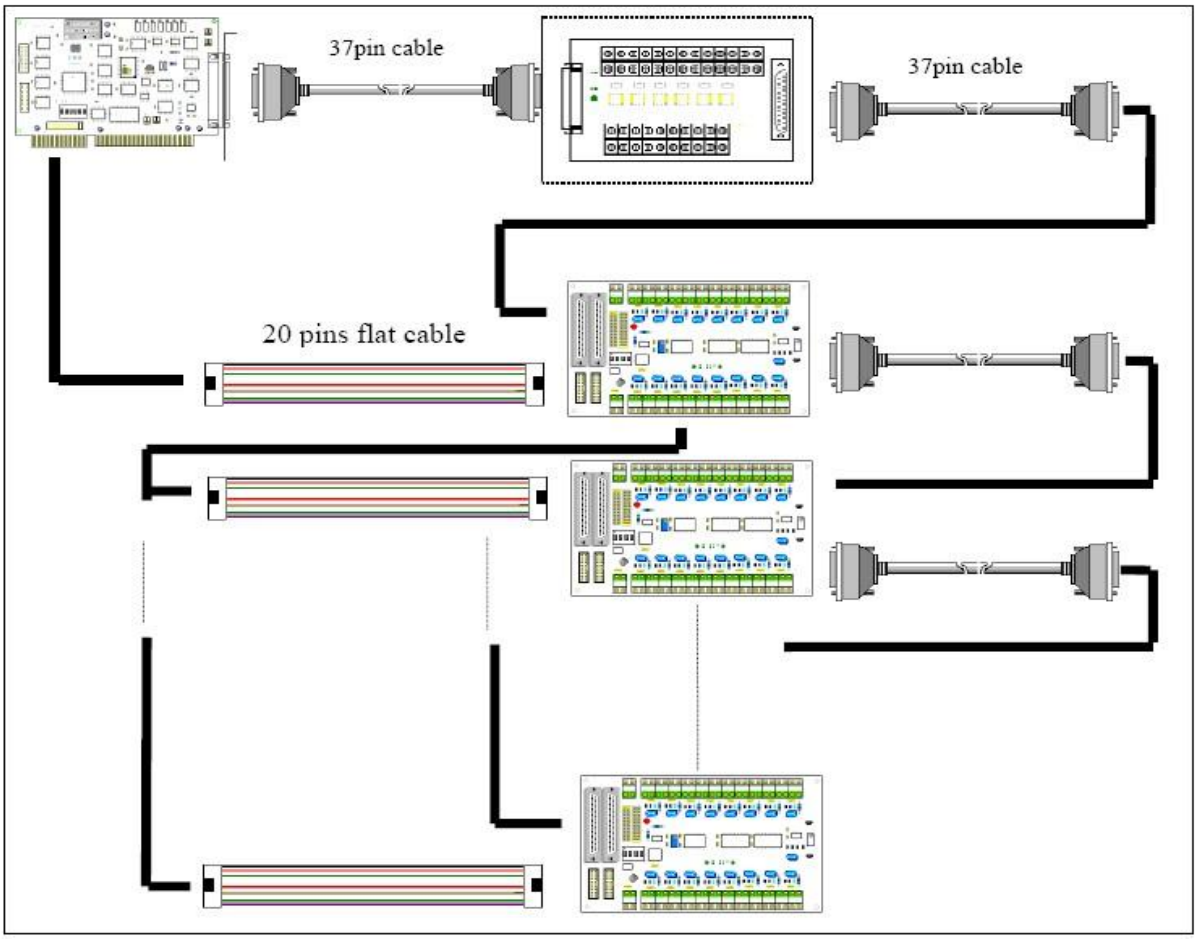
1. *The pin assignments for D1 are the same as for the CON3 connector on PCI-1002 Series cards.*
2. *The pin assignments for D2 are the same as for the CN1 connector on the DB-889D Series cards.*

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5.2.4 Connecting to ISO-AD32 and PCI-1002/1202/1602/1802/822/826 Series cards



5.2.5 Connecting to PCI-1002/1202/1602/1802/822/826 and multiple DB-889D (16-channel differential) Series cards



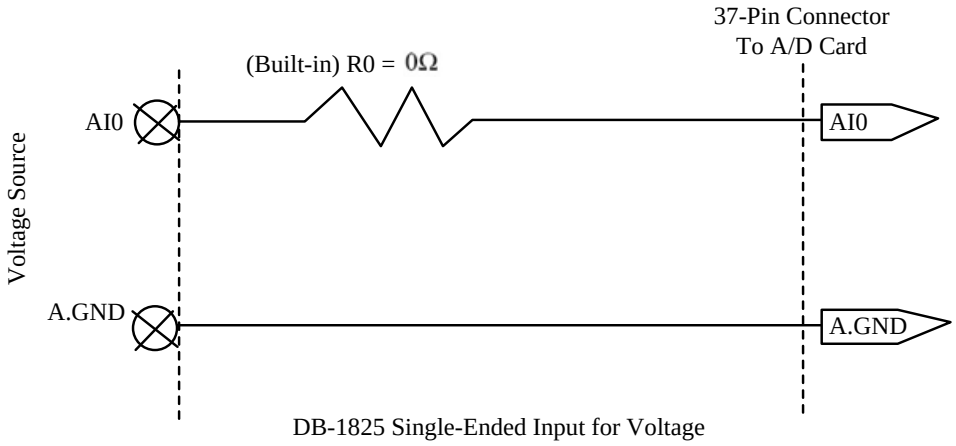
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5.3 Wiring

ISO-AD32 and PCI-1002/1202/1602/1802/822/826 Series cards provide the ability to create either single-ended or differential connections for both voltage and current input. The following provides an illustration of the wiring methods.

5.3.1 Single-ended Connections for Voltage Input

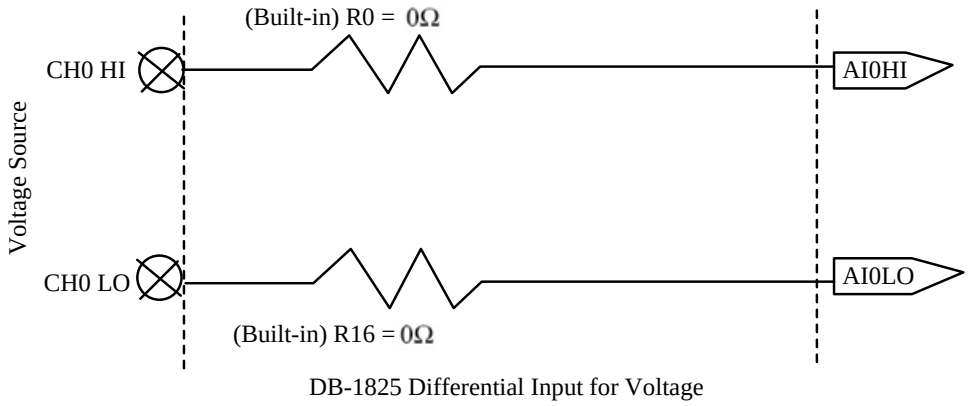
Refer to the circuit diagram below for details of how to create a single-ended connection for voltage input on the DB-1825 Terminal Board.



DB-1825 Single-Ended Input for Voltage

5.3.2 Differential Connections for Voltage Input

Refer to the circuit diagram below for details of how to create a differential connection for voltage in put on the DB-1825 Terminal Board.

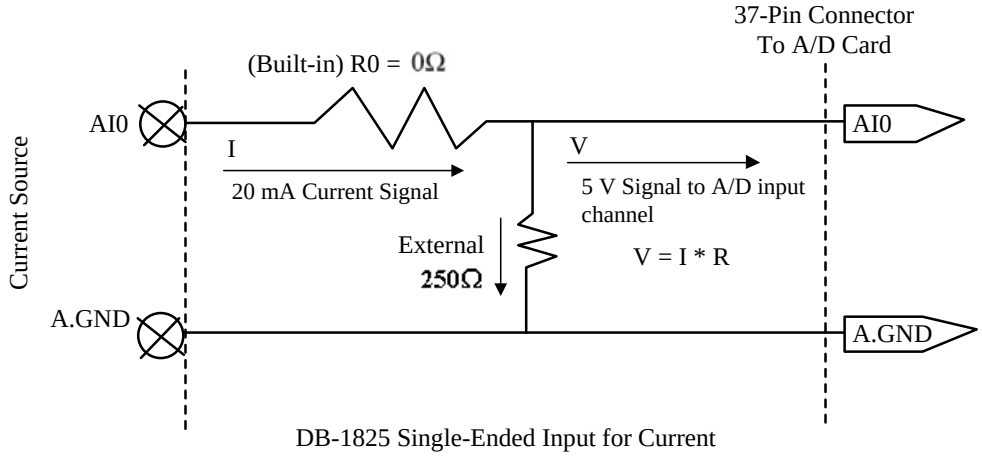


DB-1825 Differential Input for Voltage

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5.3.3 Single-ended Connections for Current Input

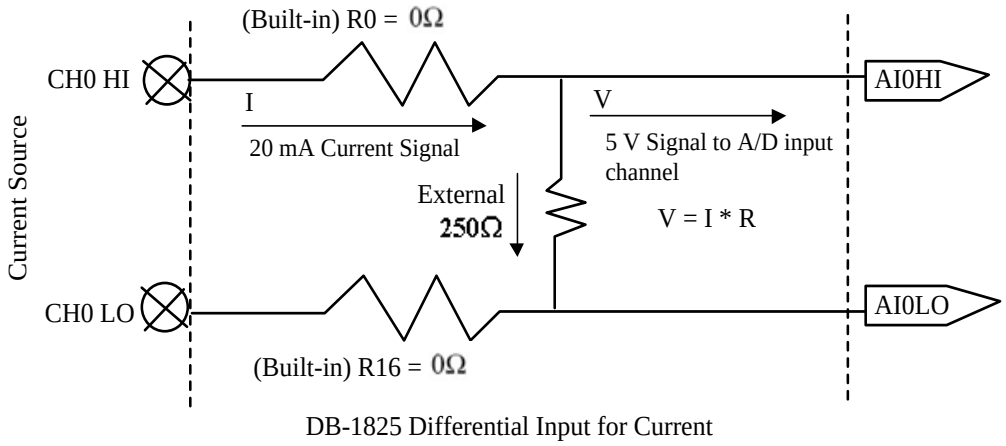
Refer to the circuit diagram below for details of how to create a single-ended connection for current input on the DB-1825 Terminal Board.



DB-1825 Single-Ended Input for Current

5.3.4 Differential Connections for Current Input

Refer to the circuit diagram below for details of how to create a differential connection for current input on the DB-1825 Terminal Board.



DB-1825 Differential Input for Current

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