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# DAQPAD CABLE ADAPTER

Thank you for purchasing the DAQPad cable adapter from National Instruments. This guide describes how to install the adapter to connect the DAQPad-MIO-16XE-50 to external accessories.

The DAQPad cable adapter contains the shielded 68-pin E Series I/O connector that connects the DAQPad-MIO-16XE-50 to accessories such as the SCB-68 and the SC-2040 Series. The adapter also contains spring terminals for connection to external current excitation and a temperature sensor for cold-junction compensation with thermocouples. Figure 1 shows the DAQPad cable adapter parts locator diagram.

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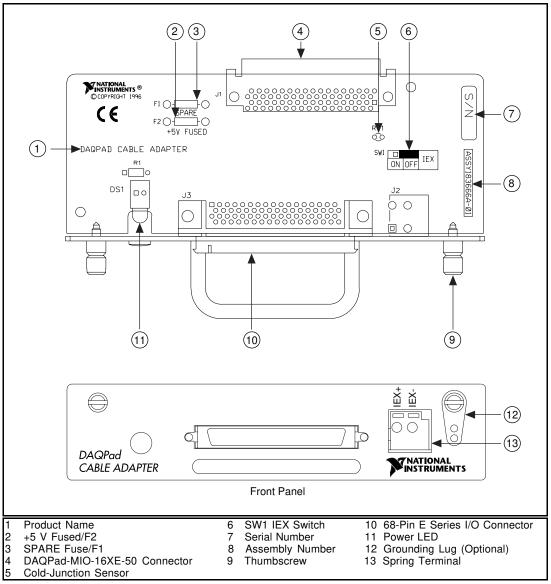


Figure 1. Parts Locator Diagram

#### +5 V Fuses

There are two fuses on the adapter. The fuse labeled +5 V FUSED/F2 limits the +5 V power output current. The fuse labeled *SPARE FUSE/F1* is a replacement.

### **Grounding Lug**

If you are using a shielded cable for external current excitation, you can install a grounding lug to connect the cable shield to the chassis ground of the DAQPad-MIO-16XE-50. Two grounding lugs are included in your adapter kit; one of these is a spare.

To install a lug, remove the thumbscrew nearest the spring terminals. Put the thumbscrew through the hole in the lug and reinstall the thumbscrew, as shown in Figure 1.

### **IEX Spring Terminals**

The spring terminals on the front panel, IEX+ and IEX-, provide external current excitation for temperature measurements using RTDs or thermistors. IEX+ is the current output and IEX- is the current return. The constant current source provides 100  $\mu$ A of external excitation.

To connect to the spring terminal blocks, you can use up to 20 AWG wire with the insulation stripped to 0.5 in. Depress the orange lever using a small screwdriver, then insert the wire and release the lever.

The IEX slide switch, SW1, turns external current excitation on and off. For external current excitation, push SW1 to the ON position.

Figure 2 suggests how you can connect several RTDs in series to the DAQPad-MIO-16XE-50 using four-wire measurement techniques.

■ Note: If you do not externally connect IEX+ to IEX- and you want to perform cold-junction sensor measurements, you must push the slide switch to the OFF position.

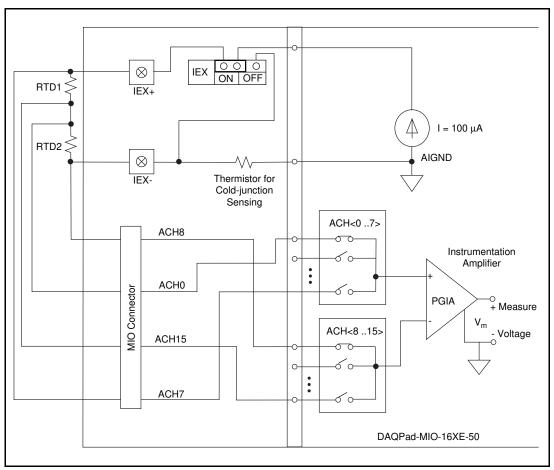


Figure 2. RTD Connection Using External Current Excitation

## **Pin Assignments**

ACH8   34   68   ACH0     ACH1   33   67   AIGND     AIGND   32   66   ACH9     ACH10   31   65   ACH2     ACH3   30   64   AIGND     ACH3   30   64   AIGND     AIGND   29   63   ACH11     ACH3   26   60   ACH12     ACH4   28   62   AISENSE     AIGND   27   61   ACH12     ACH3   26   60   ACH5     ACH12   ACH4   28   62     AIGND   24   58   ACH14     ACH6   25   59   AIGND     AIGND   24   58   ACH7     DACOUT   22   56   AIGND     DACOUT   21   55   AOGND     DACIOUT   21   55   AOGND     DACIOUT   21   55   AOGND     DIO4   19   53   DGND     DIO5   DGND   DGND   DGND				
ACH1     33     67     AIGND       AIGND     32     66     ACH9       ACH10     31     65     ACH9       ACH10     31     65     ACH2       ACH3     30     64     AIGND       AIGND     29     63     ACH11       ACH3     20     64     AIGND       AIGND     27     61     ACH12       ACH3     26     60     ACH5       AIGND     27     61     ACH12       ACH3     26     60     ACH5       AIGND     24     58     ACH4       ACH5     23     57     ACH7       DAC00UT     22     56     AIGND       DAC10UT     21     55     AOGND       DAC10UT     21     55     AOGND       DIO4     19     53     DGND       DON     18     52     DIO0       DIO1     17     51     DIO2       DGND     13	A.0110	2/	68	
AIGND     32     66     ACH9       ACH10     31     65     ACH2       ACH3     30     64     AIGND       ACH3     30     64     AIGND       ACH3     30     64     AIGND       ACH3     30     64     AIGND       ACH3     29     63     ACH11       ACH4     28     62     AISENSE       AIGND     27     61     ACH12       ACH3     26     60     ACH5       ACH6     25     59     AIGND       ACH6     25     59     AIGND       ACH12     ACH14     ACH14       ACH15     23     57     ACH7       DAC0UT     22     56     AIGND       DAC10UT     21     55     AOGND       DAC10UT     21     55     AOGND       DGND     18     52     DIO0       DGND     18     52     DIO2       DGND     15     49		-		
ACH10     31     65     ACH2       ACH3     30     64     AIGND       AIGND     29     63     ACH11       ACH4     28     62     AISENSE       AIGND     27     61     ACH12       ACH3     26     60     ACH5       AIGND     27     61     ACH12       ACH3     26     60     ACH5       ACH6     25     59     AIGND       ACH5     23     57     ACH7       DAC0UT     22     56     AIGND       DAC10UT     21     55     AOGND       DAC10UT     13     52     DIO0       DI01     17     51     DIO5       DGND     13     47     DIO3       DGND     13 <td>_</td> <td></td> <td>-</td> <td></td>	_		-	
ACH3   30   64   AIGND     AIGND   29   63   ACH11     ACH4   28   62   AISENSE     AIGND   27   61   ACH12     ACH3   26   60   ACH5     ACH6   25   59   AIGND     ACH6   25   59   AIGND     ACH15   23   57   ACH7     DAC00UT   22   56   AIGND     DAC10UT   21   55   AOGND     DAC10UT   21   55   DGND     DAC10UT   21   55   DGND     DAC10UT   13   52   DIO0     DIO1   17   51   DIO2     DGND   13   47   DIO3     DGND   14   48   DIO7		-		
AIGND   29   63   ACH11     ACH4   28   62   AISENSE     AIGND   27   61   ACH12     ACH13   26   60   ACH5     ACH6   25   59   AIGND     ACH5   23   57   ACH7     DACOUT   22   56   AIGND     DACOUT   22   56   AIGND     DACOUT   21   55   AOGND     DAC1OUT   21   55   AOGND     DAC10UT   21   55   AOGND     DAC10UT   21   55   AOGND     DAC10UT   21   55   AOGND     DAC10UT   21   55   AOGND     DIO4   19   53   DGND     DGND   18   52   DIO0     DIO1   17   51   DIO5     DIO6   16   50   DGND     DGND   13   47   DIO3     DGND   13   47   DIO3     DGND   12   46   SCANCLK <td></td> <td></td> <td></td> <td>-</td>				-
ACH4   28   62   AISENSE     AIGND   27   61   ACH12     ACH3   26   60   ACH5     ACH6   25   59   AIGND     AIGND   24   58   ACH14     ACH5   23   57   ACH7     DACOUT   22   56   AIGND     DACIOUT   21   55   AOGND     DAC1OUT   21   55   AOGND     DAC10UT   21   53   DGND     DIO4   19   53   DGND     DIO5   DIO6   16   50     DGND   13   47   DIO3     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROB				
AIGND   27   61   ACH12     ACH13   26   60   ACH5     ACH6   25   59   AIGND     AIGND   24   58   ACH14     ACH5   23   57   ACH7     DAC00UT   22   56   AIGND     DAC10UT   21   55   AOGND     DAC10UT   21   55   AOGND     EXTREF   20   54   AOGND     DIO4   19   53   DGND     DGND   18   52   DIO0     DIO1   17   51   DIO5     DIO6   16   50   DGND     DGND   15   49   DIO2     +5 V   14   48   DIO7     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI0/TRIG1   11   45   EXTSTROBE*     PFI1/TRIG2   10   44   DGND     DGND   9   43   PFI2/C		-		-
ACH13   26   60   ACH5     ACH6   25   59   AIGND     AIGND   24   58   ACH14     ACH15   23   57   ACH7     DAC00UT   22   56   AIGND     DAC10UT   21   55   AOGND     DIO4   19   53   DGND     DIO4   19   53   DGND     DIO1   17   51   DIO2     DIO6   16   50   DGND     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI1/TRIG2   10   44   <	_	-		
ACH6     25     59     AIGND       AIGND     24     58     ACH14       ACH15     23     57     ACH7       DAC00UT     22     56     AIGND       DAC10UT     21     55     AOGND       DGND     18     52     DIO0       DIO1     17     51     DIO5       DGND     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1			-	-
AIGND     24     58     ACH14       ACH15     23     57     ACH7       DAC00UT     22     56     AIGND       DAC10UT     21     55     AOGND       DGND     18     52     DIO0       DIO1     17     51     DIO5       DGND     16     50     DGND       JCA     48     DIO7     DIO3       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG2		-		
ACH15   23   57   ACH7     DAC0OUT   22   56   AIGND     DAC1OUT   21   55   AOGND     EXTREF   20   54   AOGND     DIO4   19   53   DGND     DIO4   19   53   DGND     DGND   18   52   DIO0     DIO1   17   51   DIO5     DIO6   16   50   DGND     DGND   15   49   DIO2     +5 V   14   48   DIO7     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI1/TRIG2   10   44   DGND     DGND   9   43   PFI2/CONVERT*     +5 V   8   42   PFI3/GPCTR1_SOURCE     DGND   7   41   PFI4/GPCTR1_GATE     PFI6/WFTRIG   5   39   DGND     DGND   4   38   PFI7/STARTSCAN     PFI9/GPCTR0_GATE   3 </td <td></td> <td>-</td> <td></td> <td></td>		-		
DACOOUT     22     56     AIGND       DAC1OUT     21     55     AOGND       EXTREF     20     54     AOGND       DIO4     19     53     DGND       DGND     18     52     DIO0       DIO4     19     53     DGND       DGND     18     52     DIO0       DIO1     17     51     DIO5       DIO6     16     50     DGND       DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI1/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI6/WFTRIG     5     39     DGND				
DAC1OUT   21   55   AOGND     EXTREF   20   54   AOGND     DIO4   19   53   DGND     DGND   18   52   DIO0     DIO1   17   51   DIO5     DIO6   16   50   DGND     DGND   15   49   DIO2     +5 V   14   48   DIO7     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI0/TRIG2   10   44   DGND     DGND   9   43   PFI2/CONVERT*     +5 V   8   42   PFI3/GPCTR1_SOURCE     DGND   7   41   PFI4/GPCTR1_GATE     PFI5/UPDATE*   6   40   GPCTR1_OUT     PFI6/WFTRIG   5   39   DGND     DGND   4   38   PFI7/STARTSCAN     PFI9/GPCTR0_GATE   3   37   PFI8/GPCTR0_SOURCE     GPCTR0_OUT   2   36   DGND   GND <td></td> <td>-</td> <td>-</td> <td>-</td>		-	-	-
EXTREF     20     54     AOGND       DIO4     19     53     DGND       DGND     18     52     DIO0       DIO1     17     51     DIO5       DIO6     16     50     DGND       DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI0/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI5/UPDATE*     6     40     GPCTR1_OUT       PFI6/WFTRIG     5     39     DGND       DGND     4     38     PFI7/STARTSCAN       PFI9/GPCTR0_GATE     3     37     PFI8/GPCTR0_SOURCE       GPCTR0_OUT     2     36				
DIO4   19   53   DGND     DGND   18   52   DIO0     DIO1   17   51   DIO5     DIO6   16   50   DGND     DGND   15   49   DIO2     +5 V   14   48   DIO7     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI0/TRIG2   10   44   DGND     DGND   9   43   PFI2/CONVERT*     +5 V   8   42   PFI3/GPCTR1_SOURCE     DGND   7   41   PFI4/GPCTR1_GATE     PFI5/UPDATE*   6   40   GPCTR1_OUT     PFI6/WFTRIG   5   39   DGND     DGND   4   38   PFI7/STARTSCAN     PFI9/GPCTR0_GATE   3   37   PFI8/GPCTR0_SOURCE     GPCTR0_OUT   2   36   DGND				
DGND     18     52     DIO0       DIO1     17     51     DIO5       DIO6     16     50     DGND       DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI1/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI5/UPDATE*     6     40     GPCTR1_OUT       PFI6/WFTRIG     5     39     DGND       DGND     4     38     PFI7/STARTSCAN       PFI9/GPCTR0_GATE     3     37     PFI8/GPCTR0_SOURCE       GPCTR0_OUT     2     36     DGND		-	-	
DIO1     17     51     DIO5       DIO6     16     50     DGND       DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI1/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI5/UPDATE*     6     40     GPCTR1_OUT       PFI6/WFTRIG     5     39     DGND       DGND     4     38     PFI7/STARTSCAN       PFI9/GPCTR0_GATE     3     37     PFI8/GPCTR0_SOURCE       GPCTR0_OUT     2     36     DGND		-		
DIO6     16     50     DGND       DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI1/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI5/UPDATE*     6     40     GPCTR1_OUT       PFI6/WFTRIG     5     39     DGND       DGND     4     38     PFI7/STARTSCAN       PFI9/GPCTR0_GATE     3     37     PFI8/GPCTR0_SOURCE       GPCTR0_OUT     2     36     DGND		-	-	
DGND     15     49     DIO2       +5 V     14     48     DIO7       DGND     13     47     DIO3       DGND     12     46     SCANCLK       PFI0/TRIG1     11     45     EXTSTROBE*       PFI1/TRIG2     10     44     DGND       DGND     9     43     PFI2/CONVERT*       +5 V     8     42     PFI3/GPCTR1_SOURCE       DGND     7     41     PFI4/GPCTR1_GATE       PFI5/UPDATE*     6     40     GPCTR1_OUT       PFI6/WFTRIG     5     39     DGND       DGND     4     38     PFI7/STARTSCAN       PFI9/GPCTR0_GATE     3     37     PFI8/GPCTR0_SOURCE       GPCTR0_OUT     2     36     DGND	-			
+5 V   14   48   DIO7     DGND   13   47   DIO3     DGND   12   46   SCANCLK     PFI0/TRIG1   11   45   EXTSTROBE*     PFI1/TRIG2   10   44   DGND     DGND   9   43   PFI2/CONVERT*     +5 V   8   42   PFI3/GPCTR1_SOURCE     DGND   7   41   PFI4/GPCTR1_GATE     PFI5/UPDATE*   6   40   GPCTR1_OUT     PFI6/WFTRIG   5   39   DGND     DGND   4   38   PFI7/STARTSCAN     PFI9/GPCTR0_GATE   3   37   PFI8/GPCTR0_SOURCE     GPCTR0_OUT   2   36   DGND		-		
DGND1347DIO3DGND1246SCANCLKPFI0/TRIG11145EXTSTROBE*PFI1/TRIG21044DGNDDGND943PFI2/CONVERT*+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND			-	
DGND1246SCANCLKPFI0/TRIG11145EXTSTROBE*PFI1/TRIG21044DGNDDGND943PFI2/CONVERT*+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND			-	-
PFI0/TRIG11145EXTSTROBE*PFI1/TRIG21044DGNDDGND943PFI2/CONVERT*+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND		-		
PFI1/TRIG21044DGNDDGND943PFI2/CONVERT*+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND			-	
DGND943PFI2/CONVERT*+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND			-	
+5 V842PFI3/GPCTR1_SOURCEDGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND		-		
DGND741PFI4/GPCTR1_GATEPFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND		-	-	
PFI5/UPDATE*640GPCTR1_OUTPFI6/WFTRIG539DGNDDGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND	DGND	7	41	
PFI6/WFTRIG 5 39 DGND DGND 4 38 PFI7/STARTSCAN PFI9/GPCTR0_GATE 3 37 PFI8/GPCTR0_SOURCE GPCTR0_OUT 2 36 DGND		6		—
DGND438PFI7/STARTSCANPFI9/GPCTR0_GATE337PFI8/GPCTR0_SOURCEGPCTR0_OUT236DGND		-	-	—
PFI9/GPCTR0_GATE 3 37 PFI8/GPCTR0_SOURCE GPCTR0_OUT 2 36 DGND		-		
GPCTR0_OUT 2 36 DGND		3		
	—	-	-	—
FREQ_OUT   1   35   DGND	FREQ_OUT	1	35	

Figure 3 shows the pin assignments of the DAQPad cable adapter.

Figure 3. DAQPad Cable Adapter Pin Assignments



Connections that exceed any of the maximum ratings of input or output signals on the DAQPad-MIO-16XE-50 can damage the DAQPad-MIO-16XE-50 and the computer. The DAQPad-MIO-16XE-50 User Manual lists the maximum input ratings for each signal. National Instruments is NOT liable for any damages resulting from incorrect signal connections.

## Installation

Warning:

To install the DAQPad cable adapter, remove the DAQPad-TB-52 (a detachable terminal block with screw terminals) from the DAQPad-MIO-16XE-50. Slide the cable adapter into the DAQPad-MIO-16XE-50 and screw it in place using the two thumbscrews.

**Note:** The LED on the DAQPad cable adapter lights only when the adapter is firmly connected to the DAQPad-MIO-16XE-50.

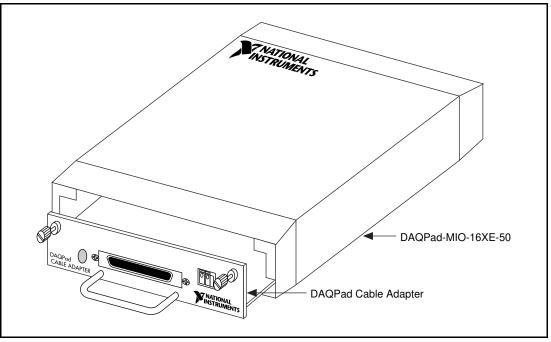


Figure 4. DAQPad-MIO-16XE-50

Refer to your *DAQPad-MIO-16XE-50 User Manual* for instructions on connecting your parallel port connectors and power supply to the DAQPad-MIO-16XE-50.