Warning: Maximum Signal Ratings for MIO/AI E Series Boards

Note: *National Instruments is not liable for any damages resulting from signal connections that exceed these ratings. Refer to your warranty for specific information on warranty coverage.*

Connections that exceed any of the maximum ratings of input signals on the data acquisition (DAQ) boards listed in the table below can damage your computer and your board.

Note: *These are the absolute maximum ratings of the input signals, not the working ratings. Refer to your user manual for the recommended operating conditions of your board.*

Use the following specifications as definitive values. Signal ratings change depending on whether the DAQ board is powered on or off.

Signal Name	AT-MIO-16E-1 AT-MIO-16E-2 AT-MIO-64E-3 AT-MIO-16XE-10 AT-AI-16XE-10		AT-MIO-16E-10 AT-MIO-16DE-10		AT-MIO-16XE-50 PCI-MIO-16XE-50 DAQPad-MIO-16XE-50 SB-MIO-16E-4	
	On	**Off**	**On**	**Off**	**On**	**Off**
ACH$<x>$	±25 V	±15 V	±35 V	±25 V	±25 V	±15 V
AISENSE	±25 V	±15 V	±35 V	±25 V	±25 V	±15 V
EXTREF	±25 V [1]	±15 V [1]	±35 V	±25 V	±25 V [2]	±15 V [2]
PFI0	5.5 to -0.5 V [3]	±35 V [4]	5.5 to -0.5 V [3]	±0.5 V [5]	5.5 to -0.5 V [3]	±0.5 V [5]
PFI$<1..9>$	5.5 to -0.5 V [3]	±0.5 V [5]	5.5 to -0.5 V [3]	±0.5 V [5]	5.5 to -0.5 V [3]	±0.5 V [5]
DIO$<x>$	5.5 to -0.5 V [3]	±0.5 V [5]	5.5 to -0.5 V [3]	±0.5 V [5]	5.5 to -0.5 V [3]	±0.5 V [5]
PA, PB, PC$<x>$	N/A		5.5 to -0.5 V [3, 6]	±0.5 V [5, 6]	N/A	
DACxOUT			Output only			
EXTSTROBE*			Output only			
SCANCLK			Output only			
GPCTR0_OUT			Output only			
FREQ_OUT			Output only			
VCC			Output only			

[1] N/A for AT-MIO-16XE-10 and AT-AI-16XE-10.

[2] N/A for AT-MIO-16XE-50, PCI-MIO-16XE-50, and DAQPad-MIO-16XE-50.

[3] When configured as a digital input.

[4] When PFI0 is configured as an analog trigger or the DAQ board is powered off, the input protection level is ±35 V.

[5] The E Series boards guarantee a powered off input protection level of ±0.5 V. This level can be exceeded if the source of the input signal has a current limited output, such as any member of the LS, HC, or HCT logic families.

[6] N/A for AT-MIO-16E-10.

Test Your Connections

The easiest way to check the proper limits of your I/O signals is to measure them with a voltmeter. Be sure to check your signal levels *before* connecting them to the I/O connector of the DAQ board. Connect the voltmeter's negative lead (usually black) to a ground terminal on your computer chassis. This can be a grounding lug at the back of the computer, or any part of the base metal computer chassis. Then measure each signal input using the voltmeter's positive terminal (usually red). In the case of a differential signal, measure each signal in the differential pair individually. Measure both the DC and AC voltage of each signal.

If any signal should fall outside of the specified limits for *any* of the input signals, *do not* connect it to the DAQ board. Before proceeding, add signal-conditioning circuitry to the signal in question to either attenuate or clip the voltage signal.

If dynamic (for example, AC) signals are connected to the inputs, you must anticipate or calculate the maximum voltage that the signal may attain. Again, if you suspect it will exceed the maximum signal rating allowed for the selected signal, you should add protection or signal-conditioning circuitry to prevent damage to your DAQ board and computer.