

Specifications

AI-EXP48



**MEASUREMENT
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Specifications

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Analog input

Table 1. Analog input specifications

Number of channels	48 single-ended/24 differential inputs
Voltage measurement speed	1 μ s per channel
Input ranges, software or sequencer programmable	Bipolar: ± 10 V, ± 5 V, ± 2 V, ± 1 V, ± 0.5 V, ± 0.2 V, ± 0.1 V, universal thermocouple
<i>Signal to noise and distortion</i>	<i>72 dB typical for ± 10 V range, 1 kHz fundamental</i>
<i>Total harmonic distortion</i>	<i>-80 dB typical for ± 10 V range, 1 kHz fundamental</i>
<i>Bias current</i>	<i>40 pA typical (0 °C to 35 °C)</i>
<i>Crosstalk</i>	<i>-75 dB DC to 60 Hz; -65 dB @ 10 kHz, typical</i>
<i>Input impedance</i>	<i>10 MΩ single-ended, 20 MΩ differential</i>
<i>Over-voltage protection</i>	<i>± 30 V</i>

Accuracy

Table 2. Analog input accuracy specifications

Voltage range (note 1)	Accuracy \pm (% of reading + % range) 23°C \pm 10 °C, 1 year	Temperature coefficient \pm (ppm of reading + ppm range)/°C	Noise (cts RMS) (note 2)
-10 V to 10 V	0.031% + 0.008%	14 + 8	2.0
-5 V to 5 V	0.031% + 0.009%	14 + 9	3.0
-2 V to 2 V	0.031% + 0.010%	14 + 10	2.0
-1 V to 1 V	0.031% + 0.02%	14 + 12	3.5
-500 mV to 500 mV	0.031% + 0.04%	14 + 18	5.5
-200 mV to 200 mV	0.036% + 0.05%	14 + 12	8.0
-100 mV to 100 mV	0.042% + 0.10%	14 + 18	14.0

Note 1: Specifications assume differential input single-channel scan, 1 MHz scan rate, unfiltered, CMV=0.0 V, 30 minute warm-up, exclusive of noise, -FS to +FS.

Note 2: Noise reflects 10,000 samples at 1 MHz, typical, differential short

Thermocouples

Table 3. TC types and accuracy (Note 3)

TC type	Temperature range (°C)	Accuracy (\pm °C)	Noise typical (\pm °C)
J	-200 to + 760	1.7	0.2
K	-200 to + 1200	1.8	0.2
T	-200 to + 400	1.8	0.2
E	-270 to + 650	1.7	0.2
R	-50 to + 1768	4.8	1.5
S	-50 to + 1768	4.7	1.5
N	-270 to + 1300	2.7	0.3
B	+300 to + 1400	3.0	1.0

Note 3: Assumes 16384 oversampling applied, CMV = 0.0V, 60 minute warm-up, still environment, and 25 °C ambient temperature; excludes thermocouple error; $TC_{in} = 0^{\circ}C$ for all types except B (1000 °C)

Power consumption

Table 4. Power consumption specifications

Power consumption (per board)	400 mW maximum (supplied by parent product, such as USB-1616HS series)
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Environmental

Table 5. Environmental specifications

Operating temperature range	-30 °C to +70 °C
Storage temperature range	-40 °C to +80 °C
Relative humidity	0 to 95% non-condensing

Mechanical

Table 6. Mechanical specifications

Vibration	MIL STD 810E, category 1 and 10
Dimensions	269 mm (W) x 92 mm (D) x 45 mm (H) (10.6" x 3.6" x 1.6")
Weight	400 g (0.88 lbs)

User connectors

Table 7. Screw terminal connector specifications

Connector type	Six banks of removable screw-terminal blocks
Wire gauge range	14 AWG to 30 AWG

Table 8. Expansion connector specifications

Communications connector	25-pin DSUB, male
Compatible cable	CA-96A (also mates directly with USB-1616HS series products)

Table 9. Single-ended mode pin out

Terminal block	Device label	(Signal description)	Device label	(Signal description)	Terminal block
Analog In	A▼	(Analog common)	63L	(CH 63)	Analog In
	16H	(CH 16)	55H	(CH 55)	
	24L	(CH 24)	A▼	(Analog common)	
	A▼	(Analog common)	62L	(CH 62)	
	17H	(CH 17)	54H	(CH 54)	
	25L	(CH 25)	A▼	Analog common	
	A▼	(Analog common)	61L	(CH 61)	
	18H	(CH 18)	53H	(CH 53)	
	26L	(CH 26)	A▼	(Analog common)	
	A▼	(Analog common)	60L	(CH 60)	
	19H	(CH 19)	52H	(CH 52)	
27L	(CH 27)	A▼	(Analog common)	Analog in	
A▼	(Analog common)	59L	(CH 59)		
20H	(CH 20)	51H	(CH 51)		
28L	(CH 28)	A▼	(Analog common)		
A▼	(Analog common)	58L	(CH 58)		
21H	(CH 21)	50H	(CH 50)		
29L	(CH 29)	A▼	(Analog common)		
A▼	(Analog common)	57L	(CH 57)		
22H	(CH 22)	49H	(CH 49)		
30L	(CH 30)	A▼	(Analog common)		
A▼	(Analog common)	56L	(CH 56)		
23H	(CH 23)	48H	(CH 48)		
31L	(CH 31)	A▼	(Analog common)	Analog In	
A▼	(Analog common)	47L	(CH 47)		
32H	(CH 32)	39H	(CH 39)		
40L	(CH 40)	A▼	(Analog common)		
A▼	(Analog common)	46L	(CH 46)		
33H	(CH 33)	38H	(CH 38)		
41L	(CH 41)	A▼	(Analog common)		
A▼	(Analog common)	45L	(CH 45)		
34H	(CH 34)	37H	(CH 37)		
42L	(CH 42)	A▼	(Analog common)		
A▼	(Analog common)	44L	(CH 44)		
35H	(CH 35)	36H	(CH 36)		
43L	(CH 43)	A▼	(Analog common)		

Table 10. Differential mode pin out

Terminal block	Device label	(Signal description)	Device label	(Signal description)	Terminal block
Analog In	A▼	(Analog common)	63L	(CH 31 LO)	Analog In
	16H	(CH 8 HI)	55H	(CH 31 HI)	
	24L	(CH 8 LO)	A▼	(Analog common)	
	A▼	(Analog common)	62L	(CH 30 LO)	
	17H	(CH 9 HI)	54H	(CH 30 HI)	
	25L	(CH 9 LO)	A▼	Analog common	
	A▼	(Analog common)	61L	(CH 29 LO)	
	18H	(CH 10 HI)	53H	(CH 29 HI)	
	26L	(CH 10 LO)	A▼	(Analog common)	
	A▼	(Analog common)	60L	(CH 28 LO)	
	19H	(CH 11 HI)	52H	(CH 28 HI)	
27L	(CH 11 LO)	A▼	(Analog common)		
Analog In	A▼	(Analog common)	59L	(CH 27 LO)	Analog in
	20H	(CH 12 HI)	51H	(CH 27 HI)	
	28L	(CH 12 LO)	A▼	(Analog common)	
	A▼	(Analog common)	58L	(CH 26 LO)	
	21H	(CH 13 HI)	50H	(CH 26 HI)	
	29L	(CH 13 LO)	A▼	(Analog common)	
	A▼	(Analog common)	57L	(CH 25 LO)	
	22H	(CH 14 HI)	49H	(CH 25 HI)	
	30L	(CH 14 LO)	A▼	(Analog common)	
	A▼	(Analog common)	56L	(CH 24 LO)	
	23H	(CH 15 HI)	48H	(CH 24 HI)	
31L	(CH 15 LO)	A▼	(Analog common)		
Analog In	A▼	(Analog common)	47L	(CH 23 LO)	Analog In
	32H	(CH 16 HI)	39H	(CH 23 HI)	
	40L	(CH 16 LO)	A▼	(Analog common)	
	A▼	(Analog common)	46L	(CH 22 LO)	
	33H	(CH 17 HI)	38H	(CH 22 HI)	
	41L	(CH 17 LO)	A▼	(Analog common)	
	A▼	(Analog common)	45L	(CH 21 LO)	
	34H	(CH 18 HI)	37H	(CH 21 HI)	
	42L	(CH 18 LO)	A▼	(Analog common)	
	A▼	(Analog common)	44L	(CH 20 LO)	
	35H	(CH 19 HI)	36H	(CH 20 HI)	
43L	(CH 19 LO)	A▼	(Analog common)		

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