AI-EXP48

Specifications

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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 µs 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
Signal to noise and distortion	*72 dB typical for ±10 V range, 1 kHz fundamental*
Total harmonic distortion	*-80 dB typical for ±10 V range, 1 kHz fundamental*
Bias current	*40 pA typical (0 °C to 35 °C)*
Crosstalk	*-75 dB DC to 60 Hz; -65 dB @ 10 kHz, typical*
Input impedance	*10 MΩ single-ended, 20 MΩ differential*
Over-voltage protection	*±30 V*

Accuracy

Table 2. Analog input accuracy specifications

Voltage range (note 1)	**Accuracy ±(% of reading + % range) 23°C ±10 °C, 1 year**	**Temperature coefficient ±(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 (±°C)**	**Noise typical (±°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° 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)

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)	
	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	**Analog In**
	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)	**Analog in**
	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)	**Analog In**
	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)	

Measurement Computing Corporation
10 Commerce Way
Suite 1008
Norton, Massachusetts 02766
(508) 946-5100
Fax: (508) 946-9500
E-mail: info@mccdaq.com
www.mccdaq.com