Specifications

miniLAB 1008

MEASUREMENT COMPUTING™

Document Revision 1, October, 2002

Specifications

Typical for 25°C unless otherwise specified.

Analog Input Section

Parameter	Conditions	Specification
A/D converter type		Successive Approximation type
Input range for linear operation	CHx to GND	±10V max
Maximum input range	CHx to GND	±40V max
Input current (Note 1)	Vin = +10V	70µA typ
	Vin = 0V	-12µA typ
	Vin = -10V	-94µA typ
Number of channels		8 single ended / 4 differential, software selectable
Input ranges, Single Ended Mode		±10V, G=2
Input ranges, Differential Mode		±20V, G=1 ±10V, G=2 ±5V, G=4 ±4V, G=5 ±2.5V, G=8 ±2.0V, G=10 ±1.25V, G=16 ±1.0V, G=20 Software selectable
Throughput	Software paced	50 S/s
	Continuous scan: 1,2 or 4 channels	1.2kS/s
	Burst scan: 1,2 or 4 channels to 4K FIFO	8kS/s
Resolution (Note 2)	Differential	12 bits, no missing codes
	Single ended	11 bits
Offset	G=1 to 20	±1*G bits
Accuracy	Vin = Full Scale	±1%
CAL Accuracy	CAL = 2.5V	±0.05% typ, ±0.25% max
CAL current	Source	5mA max
	Sink	20µA min, 200nA typ
Trigger latency	Burst	25µs min, 50µs max
Trigger pulse width	Burst	40µs min

Note 1: Input current is a function of applied voltage on the analog input channels. For a given input voltage, V_{in}, the input leakage is approximately equal to (8.181*Vin-12) µA

Note 2: The AD7870 converter only returns 11-bits (0-2047 codes) in single-ended mode.

Analog Output Section

Parameter	Conditions	Specification
D/A Converter type		PWM
Resolution		10-bits, 1 in 1024
Number of Channels		2 voltage output
Throughput		100 S/s each channel simultaneous
Maximum Voltage (Note 3)	**No Load**	**Vs**
	1mA Load	**0.99*Vs**
	5mA Load	**0.98*Vs**
Output Drive	**Each D/A OUT**	**30mA**

Note 3: Vs is the USB bus +5V power. The maximum analog output voltage is equal to Vs at no-load.

Digital Input / Output (Screw Terminal DIO3:0)

Parameter	Conditions	Specification
Digital Type 82C55		Discrete, 5V/TTL compatible
Number of I/O		4
Configuration		4 bits, independently programmable for input or output.
Input high voltage		3.0V min, 15.0V absolute max
Input low voltage		0.8V max
Output voltage (Note 4)	No Load	Vs - 0.4Vmin, Vs typ
	1mA Load	Vs - 1.5V
Input leakage current		±1.0µA
Output Short-Circuit Current (Note 4)	Output High	3.3mA
Power-up / reset state		Input mode (high impedance)

Note 4: The DIO[3:0] lines available at the screw terminals are protected with 1.5KOhm series resistors.

Digital Input / Output (DB37 DIO24)

Digital Type	82C55
Number of I/O	24 (Port A0 through Port C7)
Configuration	▪ 2 banks of 8 and 2 banks of 4 or ▪ 3 banks of 8 or ▪ 2 banks of 8 with handshake
Pull up/pull-down configuration	All pins pulled up to Vs via 47K resistors (default). Positions available for pull down to ground. Hardware selectable via zero ohm resistor.
Input high voltage	2.0V min, 5.5V absolute max
Input low voltage	0.8V max, –0.5V absolute min
Output high voltage (IOH = -2.5mA)	3.0V min

Counter Section

Counter type	Event counter
Number of Channels	1
Schmidt Trigger Hysteresis	20mV to 100mV
Input Leakage Current	±1µA
Input frequency	>1 MHz
High pulse width	30ns min
Low pulse width	30ns min
Input low voltage	0V min, 1.0V max
Input high voltage	4.0V min, 15.0V max

Power

Parameter	Conditions	Specification
Supply Current (Note 5)		20mA
+5V USB power available (Note 6)	Connected to Self-Powered Hub	4.5V min, 5.25V max
	Connected to Bus-Powered Hub	4.1V min, 5.25V max
Output Current (Note 7)	Connected to Self-Powered Hub	450mA min, 500mA max
	Connected to Bus-Powered Hub	50mA min, 100mA max

Note 5: This is the total current requirement for the miniLAB-1008 which includes up to 5mA for the status LED.

Note 6: Self-powered refers to USB hubs and hosts with a power supply. Bus-powered refers to USB hubs and hosts without their own power supply.

Note 7: This refers to the total amount of current that can be sourced from the USB +5V, analog outputs and digital outputs.

General

Parameter	Conditions	Specification
USB Controller Clock Error	25 °C	±30 ppm max
	0 to 70 °C	±50 ppm max
	-40 to 85 °C	±100 ppm max

Environmental

Operating Temperature Range	-40 to 85 °C
Storage Temperature Range	-40 to 85 °C
Humidity	0 to 90% non-condensing

Mechanical

Case Dimensions	157mm(L) x 102mm(W) x40mm(H) , including connectors
USB Cable Length	3 Meters max
User Connection Length	3 Meters max

Main Connector and Pin Out

Connector type	Screw Terminal

4 Channel Differential Mode

Pin	Signal Name	Pin	Signal Name
1	CH0 IN HI	16	DIO0
2	CH0 IN LO	17	DIO1
3	GND	18	GND
4	CH1 IN HI	19	DIO2
5	CH1 IN LO	20	DIO3
6	GND	21	GND
7	CH2 IN HI	22	D/A OUT 0
8	CH2 IN LO	23	D/A OUT 1
9	GND	24	GND
10	CH3 IN HI	25	CTR
11	CH3 IN LO	26	GND
12	GND	27	GND
13	PC +5V	28	PC +5V
14	PC +5V	29	PC +5V
15	CAL	30	TST

8 Channel Single-Ended Mode

Pin	Signal Name	Pin	Signal Name
1	CH0 IN	16	DIO0
2	CH1 IN	17	DIO1
3	GND	18	GND
4	CH2 IN	19	DIO2
5	CH3 IN	20	DIO3
6	GND	21	GND
7	CH4 IN	22	D/A OUT 0
8	CH5 IN	23	D/A OUT 1
9	GND	24	GND
10	CH6 IN	25	CTR
11	CH7 IN	26	GND
12	GND	27	GND
13	PC +5V	28	PC +5V
14	PC +5V	29	PC +5V
15	CAL	30	TST

DIO24 Connector and Pin Out

Connector type	37 D-Type, shielded
Compatible Cables	C37FF-x
	C37FFS-x
	C37FM-x
Compatible accessory products	SSR-RACK24 SSR-RACK08 CIO-ERB24 CIO-ERB08

Pin	Signal Name	Pin	Signal Name
1	n/c	20	USB +5V
2	n/c	21	GND
3	Port B7	22	Port C7
4	Port B6	23	Port C6
5	Port B5	24	Port C5
6	Port B4	25	Port C4
7	Port B3	26	Port C3
8	Port B2	27	Port C2
9	Port B1	28	Port C1
10	Port B0	29	Port C0
11	GND	30	Port A7
12	n/c	31	Port A6
13	GND	32	Port A5
14	n/c	33	Port A4
15	GND	34	Port A3
16	n/c	35	Port A2
17	GND	36	Port A1
18	n/c	37	Port A0
19	GND		

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