

# ZMI 4104 Measurement Board

P/N	DESCRIPTION	PERFORMANCE	
8020-0103-12	4 axes, VME 6U board with APD	Position Resolution <sup>(1)</sup>	$\lambda/4096$ (0.15 nm)
8020-0103-13	4 axes, VME 6U board with APD and CEC	Position Range <sup>(1)</sup>	$\pm 10.6$ m
<b>GENERAL</b>		Position Format	37 bit - 2's complement
Maximum Number of Boards in a System	16 (64 axes); there may also be limits due to VME or P2 population	Time Stamp Resolution	25 nanoseconds
Reference Inputs	ST fiber optic or HSSDC2 electrical	Maximum Velocity <sup>(1)</sup>	2.55 m/s
Reference Outputs (2 per board)	HSSDC2 electrical	Maximum Acceleration	100 g (0.1 g max. during reset)
Measure Inputs (1 per axis)	ST fiber optic	Data Age (P2 output)	1 $\mu$ s typical (4104) 2 $\mu$ s typical (4104C)
Signal Strength Test Points (1 per axis)	RJ-11 connector also on-board MMCX connector	Data Age Uncertainty, Uncompensated	$\pm 6$ ns (axes on any one board) $\pm 30$ ns (15 boards, any axis to axis)
Status Indicators (LEDs)	Green – meas present (1 per axis), ref present Amber – meas error (1 per axis), ref error, Config. User LED	Data Age Uncertainty, Factory Compensated	$\pm 0.2$ ns (axes on any one board) $\pm 1.0$ ns (any axes including maximum of 3 calibrated reference jumpers)
Measurement Axis Input Optical Power	A dynamic range of 10:1 is supported within a static range of 70 nW to 7 $\mu$ W (at 15°C) or 8.5 $\mu$ W (at 25°C)	Accuracy <sup>(1) (2)</sup>	$\sigma \leq 1.0$ LSB at 0 m/sec $\sigma \leq 1.2$ LSB at $\pm 1.27$ m/sec $\sigma \leq 1.4$ LSB at $\pm 2.55$ m/sec
<b>POWER REQUIREMENTS</b>		Noise <sup>(2)</sup>	$\pm 3$ LSB (3 $\sigma$ )
4104	5 VDC +0.25V/-0.125V @ 7A (max)	Temperature Coefficient	< 1 LSB per °C
<b>COOLING REQUIREMENTS</b>		<b>CYCLIC ERROR COMPENSATION (CEC)</b>	
30° C	300 linear fpm	CEC Initialization Time	4.1 ms
40° C	400 linear fpm	CEC Initialization Velocity	$\geq 2$ mm/s
50° C	600 linear fpm	CEC Update Rate	2.4 kHz
<b>COMPLIANCE</b>		CEC Reduction	10x reduction of 20 MHz Leakage (CE 0) and -1 Doppler (CE N)
VME	VMEbus specification ANSI/VITA 1-1994 Type: VME64X Addressing: A24 Data Transfer: D16 or D32 P1 and P2 connectors: 160-pin DIN	<b>ENVIRONMENTAL</b>	
Other	UL94V0, CE Mark (Emissions EN 55011A, Immunity EN 50082-1, Low Voltage Directive EN 61010-1, Safety EN 60950-1 tested inside CE Mark compliant chassis)	Operating Temperature	15 to 50°C
		Operating Humidity	0 to 90%, noncondensing
		Operating Pressure	Standard 1 atmosphere (700-800 mmHg), non-vacuum applications

(1) Based on double pass interferometer.

(2) 70 nW with 90% modulation into onboard APD receiver, at optimum APD gain, and filter settings of  $K_p = -6$ ,  $K_v = -15$ .