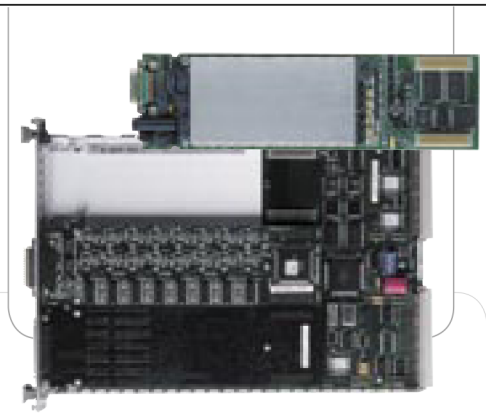
VM2710A



6.5 Digit Multimeter (VMIP™)

Features

- DCV, ACV, DCI, ACI, 2- and 4-wire Ohms
- Up to 2000 Readings/sec Over the Backplane!!!
- FIFO Memory for Continuous Measurements
- Two Balanced Differential Isolated Inputs
- Up to 256,000 Readings of On-board Memory
- Message or Register Data Access
- Min/Max, Limit Features, Math (y=mX+b)
- High Common Mode Rejection
- VXI*plug&play* Drivers

Overview

The VM2710A is a high-performance auto-ranging 6.5 digit multimeter that offers V dc, V ac, I dc, I ac, and 2- and 4-wire resistance measurements in a very small footprint. This DMM is designed for fast system throughput, with greater than 2000 readings/s across the backplane, unlike other 6.5 digit DMMs that only allow fast read rates into on-board memory. For applications that require multiple input monitoring, the VM2710A provides for on-board limit checking and the option of generating VXIbus triggers if the input exceeds these limits. This approach further speeds system throughput by freeing up the VXIbus controller and backplane from having to continuously monitor these limits.

Two differential isolated input channels are provided on the VM2710A to allow one channel to be connected directly to a scanning multiplexer, while the other can be brought directly out to a probe panel for manual test and debug of the unit under test, or precision measurements. This DMM belongs to the VMIP™ family of products which gives the user the added flexibility of combining it with other instruments, such as arbitrary waveform generators or counters, to create a multi-function C-size card. Because it is unnecessary to take up a complete VXIbus card slot for the DMM functionality, the VM2710A is the ideal choice for data acquisition and ATE.

Accuracy

Measurement aperture times may also be programmed, allowing the choice of resolution, accuracy, and noise rejection (i.e., rejection of 50 Hz or 60 Hz noise). Fast function/range changes allow for optimum measurement throughput. Short aperture times give high speed readings while longer aperture times give greater accuracy. Resolution from 6.5 to 4.5 digits is selectable as a function of integration time.

Flexible Triggering

The DMM has extensive triggering capabilities, including programmable delays to allow synchronization with external devices. It can be triggered under software or hardware control. The VM2710A can be programmed to initiate a measurement off of one of the eight TTL backplane triggers, and can also issue a trigger on a separate backplane trigger line upon completion of a measurement. This makes it ideal to use in a multiple-channel scanning system (e.g. in conjunction with SMIP*II*™ switching) where measurement speed is critical.

Programming

The VM2710A is programmed using message-based, word serial protocol. The commands are SCPI and IEEE-488.2 compatible. VXI*plug&play* drivers are also provided to further ease programming. For faster access, the VM2710A supports register data access.

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Calibration

The calibration constants are stored in non-volatile memory, and are password protected for security. These constants are determined when the instrument is calibrated and can be changed as necessary (such as during routine calibration cycles). These constants may also be examined at any time via a word serial query and altered via a word serial command. All calibration is done via software, including the ac range, eliminating the need for removing covers from the unit, allowing for automated calibration.

Specifications

DC Voltage

Accuracy: See table

Reading Rate: See table

Input Impedance: 1 GΩ (0.1 V - 10 V ranges)
10 MΩ (100, 300 V range)

CMMR: 140 dB @ dc

Input Bias Current: 50 pA maximum @ 25 °C
100 pA maximum over temp.

Input Protection: 300 V on all ranges

AC Voltage

Accuracy: See table

Reading Rate: See table

Input Impedance: 1 MΩ in parallel with <50 pF

Crest Factor: 5:1 maximum at full scale

AC CMR: 70 dB (100 Ω unbalance in low lead)

Max. Input Voltage: dc+ac = 300 V rms

Resistance

Accuracy: See table

Reading Rate: See table

Voltage Across: 240 mV nominal at F.S. in 20 Ω and 200 Ω

Range Unknown: 2.4 V nominal at F.S. in all other ranges

Open Circuit Voltage: +8 V max. in 20 Ω and 200 Ω range
+9 V max. in 2 kΩ to 20 MΩ range

Voltage Protection: 300 V dc or peak ac

Lead Wire Resistance: 10 Ω max. in 20 Ω and 200 Ω range
100 Ω max. in 2 kΩ to 20 MΩ range

Current

Accuracy: See table

Reading Rate: See table

Shunt Resistor: 0.1 Ω for 1 A, 10 Ω for 10 mA & 100 mA

Input Protection: Externally accessible 2 A, 250 V fuse

General

Warm-Up Time: 30 minutes

Front Panel Connectors: 15-Pin "D" Connector: Two input sets consisting of INPUT HI, INPUT LO, +I, -I, and GUARD, plus a single TRIGGER INPUT.

Data Access Types: Register or message-based word serial

Memory: 64,000 readings/256,000 readings optional

Reading Rates Table:

Aperture Times	100plc @50 Hz 2.0 s	100plc @60 Hz 1.67 s	10plc @50 Hz 200 ms	10plc @60 Hz 167 ms	1plc @50 Hz 20 ms	1plc @60 Hz 16.7 ms	0.1plc @50 Hz 2.0 ms	0.1plc @60 Hz 1.67 ms	0.03plc @60Hz/50Hz 50µs
Typical Reading Rates (rdgs/s)	0.4	0.5	4.0	5.0	45	50	450	500	2000
Resolution	6.5	6.5	6.5	6.5	5.5	5.5	5.5	5.5	4.5

Accuracy Table (see next page)

Specifications are for half hour warm-up at 6.5 digit
Accuracy (±% of reading + % of range)

(1) Relative to calibration standards.
(2) 20% over-range for V dc and V ac on all ranges, except 300 V.
No over-range for resistance. 18% over-range for current.
(3) Specifications are for 4-wire ohm function
(4) Specifications are for sinewave input >5% of range. Low frequency filter on.

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Function	Range(2)	Test Current Burden Voltage Frequency	24 hour(1) 23 °C ± 1 °C	90 Day 23 °C ± 5 °C	Temperature Coefficient/ °C 0 °C - 18 °C 28 °C - 55 °C
Voltage dc	100.0000 mV		0.001+0.002	0.005+0.003	0.0003+0.0005
	1.000000 V		0.001+0.001	0.004+0.003	0.0002+0.0001
	10.00000 V		0.001+0.001	0.005+0.003	0.0003+0.0001
	100.0000 V		0.001+0.001	0.005+0.003	0.0007+0.0001
	300.0000 V		0.001+0.001	0.005+0.003	0.0007+0.0001
Resistance (3)	20.000 Ω	1.2 mA	0.001+0.007	0.005+0.008	0.0007+0.0002
	200 Ω	1.2 mA			
	2.00000 kΩ	120 µA	0.001+0.007	0.005+0.008	0.0007+0.0002
	20.0000 kΩ	12 µA	0.001+0.001	0.005+0.002	0.0006+0.0001
	200 kΩ	1.2 µA	0.001+0.002	0.005+0.003	0.0006+0.0002
	2.00000 MΩ	120 µA	0.001+0.002	0.005+0.003	0.0006+0.0002
	20.0000 MΩ		0.001+0.002	0.010+0.003	0.0015+0.0004
		<0.100 V	0.010+0.002	0.020+0.003	0.0035+0.0004
Current dc	10.00000 mA	<1.0 V			
	100.0000 mA	<0.120 V	0.005+0.005	0.015+0.010	0.0020+0.0005
	1.000000 A		0.005+0.001	0.015+0.004	0.0010+0.0005
			0.030+0.005	0.050+0.010	0.0020+0.0005
True rms ac Current (4)	10.00000 mA	20 Hz-30 Hz			
		30 Hz-50 Hz			
		50 Hz-200 Hz	1.000+0.200	1.100+0.200	0.0200+0.0010
		200 Hz-10 kHz	0.500+0.200	0.600+0.200	0.0100+0.0010
			0.200+0.200	0.300+0.200	0.0060+0.0010
			0.050+0.200	0.150+0.200	0.0060+0.0010
	100.0000 mA	20 Hz-30 Hz			
		30 Hz-50 Hz			
		50 Hz-200 Hz	1.000+0.040	1.100+0.050	0.0200+0.0010
		200 Hz-10 kHz	0.500+0.040	0.600+0.050	0.0100+0.0010
			0.200+0.040	0.300+0.050	0.0060+0.0010
			0.020+0.040	0.150+0.050	0.0060+0.0010
	1.000000 A	20 Hz-30 Hz			
		30 Hz-50 Hz			
		50 Hz-200 Hz	1.000+0.200	1.100+0.200	0.0200+0.0010
		200 Hz-10 kHz	0.500+0.200	0.600+0.200	0.0100+0.0010
			0.200+0.200	0.300+0.200	0.0060+0.0010
			0.050+0.200	0.150+0.200	0.0060+0.0010
True rms ac Voltage (4)	100.0000 mV	20 Hz-30 Hz			
		30 Hz-50 Hz			
		50 Hz-200 Hz	1.00+0.15	1.10+0.15	0.020+0.001
		200 Hz-10 kHz	0.50+0.15	0.55+0.15	0.010+0.001
		10 kHz-50 kHz	0.20+0.15	0.23+0.15	0.005+0.001
		50 kHz-100 kHz	0.20+0.15	0.08+0.15	0.005+0.001
		100 kHz-300 kHz	0.80+0.15	0.23+0.15	0.005+0.001
			0.60+0.20	0.70+0.25	0.020+0.010
			3.00+0.50	4.00+0.60	0.200+0.020
	1.000000 V to 300.000 V(5)	20 Hz-30 Hz			
		30 Hz-50 Hz			
		50 Hz-200 Hz	1.00+0.02	1.10+0.03	0.020+0.001
		200 Hz-10 kHz	0.50+0.02	0.55+0.03	0.010+0.001
		10 kHz-50 kHz	0.20+0.02	0.23+0.03	0.005+0.001
		50 kHz-100 kHz	0.08+0.02	0.05+0.03	0.005+0.001
		100 kHz-300 kHz	0.20+0.04	0.10+0.05	0.005+0.001
			0.03+0.10	0.40+0.15	0.020+0.010
			3.00+0.50	4.00+0.60	0.200+0.020

Ordering Information

VM2710A	6.5 Digit DMM (must be configured with a VM9000 host module)
Option 8	256,000 readings

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