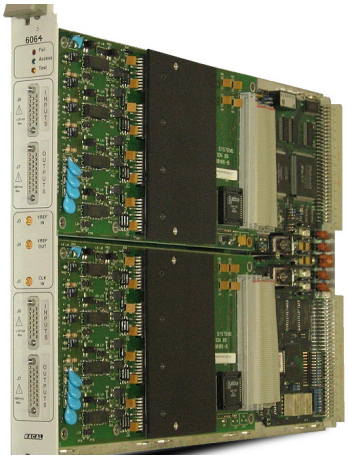

Racal Instruments™ 6084A-104-DMM

1 GHz Digitizer and 7.5 Digit Digital Multimeter

The Racal Instruments™ 6084A-104-DMM Digitizer/DMM increases test system performance and density by packaging a 7.5 digit Digital Multimeter (DMM) together with a 10-bit, 1 GHz Digitizer into a single VXI slot. Designed to exceed the requirements for Joint Services Military ATE systems, the 6084A-104-DMM is ideal for solving obsolescence, reducing footprint, and enhancing the performance of new or pre-existing ATE systems. The instrument may be configured as a Digitizer/DMM or as a single instrument (Digitizer or DMM).

Key Features

- **Replaces the Wavetek 1362 DMM, Analogic DBS series and Agilent VXI digitizers**
- **Digitizer with 4 inputs, 10-bits, 1 GHz, up to 4 GS/s and ranges up to 500 V**
- **DMM with 7.5 Digits for DC volts, current and Ω with AC volts up to 1 MHz**
- **IVI-COM drivers and soft front panels provided**
- **More dynamic range (by 20 dB for dmm and 12 dB for digitizer) for better legacy range mapping**

Product Information

High-Precision 7.5 Digit DMM

The 6084A-104-DMM high-precision DMM with 7.5 digit resolution is designed to meet the Joint Services requirements for Military ATE systems. The high-precision and high-accuracy ensures that the DMM will meet the requirements for legacy ATE systems and future TPS development.

Measurements include DC and AC volts, DC and AC current, two and four wire resistance measurements, frequency and period.

High-Performance Digitizer

The 6084A-104-DMM features a high-performance 10-bit 4 GS/s digitizer designed to meet the Joint Services requirements for Military ATE systems. The high-performance capability ensures that the digitizer will meet the requirements for legacy ATE systems and future TPS development.

The digitizer features four channels (two active at one time). The high-speed digitizer features a bandwidth of 1 GHz in 50 Ω mode.

More Dynamic Range

The 6084A-104-DMM digitizer and DMM feature more dynamic range than was available in older-generation test equipment. The 6084A-104-DMM DMM features ±20 million counts compared to ±1 to 2 million typical that is found in older designs for an additional 20 dB of headroom.

The 6084A-104-DMM digitizer features 10-bits of resolution, which is 12 dB more than what is found in older, 8-bit designs. This allows flexibility when mapping a physical DMM or digitizer range to a legacy range that was different.

Legacy Range Matching

The 6084A-104-DMM DMM range values and functionality are identical to those of the obsolete Wavetek 1362 DMM for the DCV, ACV (DC and AC coupled), and resistance functions.

Although the DMM can handle the measurement in a mapped range without losing any resolution versus legacy models, its ranges are mapped to those of the legacy Wavetek 1362 for strict range compliance. The resistance mode current sources and AC voltage frequency range also match those of the Wavetek 1362.

ASTRONICS TEST SYSTEMS

949.859.8999; 800.722.2528; atssales@astronics.com; www.astronicstestsystems.com

Specifications

Note: The Astronics Test Systems policy is one of continuous development and improvement. Consequently, the equipment may vary in detail from the description and specifications in this publication.

Input Characteristics

Bandwidth (-3 dB)
- 50 Ω: DC to 1 GHz (typ) ≤5 V
- 50 Ω: DC to 300 MHz (typ) ≤20 V
- 1 MΩ: DC to 300 MHz (typ) ≤50 V
- 1 MΩ: DC to 1 MHz (typ. ≤500 V

Maximum Input Voltage
- ±10 V/7 V_{rms} with 50 Ω
- ±300 V DC with 1 MΩ

Full Scale (FS)
- 50 Ω and 1 MΩ: 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V, 20 V
- 1 MΩ only: 10 V, 20 V, 50V, 500V

Offset
- 50 Ω:
  ±2 V for ≤500 mV FS
  ±5 V for ≥1 V FS
- 1 MΩ:
  ±2 V for ≤500 mV FS
  ±20 V for ≤5 V FS
  ±200 V for ≤50 V FS
  ±200 V for ≤500 V FS

Bandwidth Limit Filters
- 50 Ω:
  700 MHz, 200 MHz 2-pole Bessel filter
- 50 Ω and 1 MΩ:
  20 MHz single-pole filter

Connectors
- SMB, gold-plated

Impedance (DC)
- 50 Ω ±1.0%
- 1 MΩ ±2.0%

Coupling
- DC, AC

Digital Conversion

Sample Rate
- 100 S/s to 4 GS/s in 1, 2, 2.5, 5 sequence

Resolution
- 10 bits (1:1024)

Acquisition Memories
- 256 k points/channel

External Clock/Ref Threshold
- Variable between -3 V and +3 V

External Reference Frequency
- 10 MHz ±10%

Input Amplitude
- >500 mV_{pk-pk} into 50 Ω

Maximum Input Voltage
- ±5 V DC

External Clock Frequency
- From 100 MHz to 2 GHz

Time Base

Clock Accuracy
- Better than ±2 ppm

Acquisition Modes
- Single Shot
- Sequence: 1 to 1800 segments std
- 900,000 with optional 256 M points
- 1800 with optional 512 M points
- Dead Time: <1.1 µs

Sampling Jitter
- <1 ps RMS (for 10 µs record length)

Control I/O (A & B)

Input
- Trigger enable

Signals
- TTL & CMOS compatible (2.4 V)

Output
- 10 MHz reference clock
- Acquisition skipping to next segment
- Acquisition active
- Trigger ready

Triggering Characteristics

Internal Trigger Input
- Bandwidth DC to 1 GHz (-3 dB)
- Threshold adjust range: FS of channel
- Sensitivity: DC to 1 GHz >15% FS

External Trigger Input
- External Trigger Bandwidth:
  50 Ω: DC to 1 GHz (typ) ≤5 V
  50 Ω: DC to 300 MHz (typ) ≤20 V
  1 MΩ: DC to 300 MHz (typ)
- Full Scale Range (50 Ω): 0.5, 1, 2, 5, 20 V
- Full Scale Range (1 MΩ): 20 V
- Threshold Adjust Range = ±FS/2
- Maximum Input Voltage: ±5 V DC
- Sensitivity: DC to 1 GHz >15%
- Threshold Adjust Range = ± FS/2
- VXI ECL 0/1: Positive or Negative Edge, Selectable for trig source

Coupling
- DC, AC LF reject (50 Hz), JF reject (50 kHz)

Pre-Trigger
- Adjustable to 100% of horizontal full scale

Post-Trigger
- Adjustable up to 68 x 10^9 points

Modes
- Edge, positive and negative
- HF: divide by 4
- Spike Stretcher
- Window In/Out

Trigger Output

Coupling
- DC

Output Level
- -0.9 to 0 V Positive or Negative Edge

Output Impedance
- 50 Ω
- VXI ECL 0/1 Positive or Negative Edge

AC Cal Output

Output Level
- -0.9 to 0 V Positive or Negative Edge

Output Impedance
- 50 Ω

Output Waveform
- 500 Hz Square Wave

System Performance

DC Accuracy, Signal Inputs
- ±(2% x FSR = 0.4% x Offset)

SNR (typ)
- >40 dB Full Bandwidth
- >45 dB with BWL @ 700 MHz
- >50 dB with BWL @ 20 MHz

Effective Bits (typ)
- 8.0: DC to 10 MHz, @ 100 MS/s with 20 MHz BWL
- 7.0: 20 to 500 MHz, @ 1 GS/s with 700 MHz BWL
- 6.0: 0.5 to 1 GHz, @ 2 GS/s with full BW

SFDR (typ)
- >52 dB @ 10.7 MHz
- >40 dB @ 1 GHz

Integral Nonlinearity
- ±2.5 LSB (typical)

THD
- >-50 dB @ 10.7 MHz
- >40 dB @ 1 GHz

Specifications
continued

6084A measurement accuracy[1] ± (% of reading + % of range)

Function	Range	Frequency, burden voltage, test current	24 hour 23° C ±1° C	90 days 23° C ±5° C	1 year 23° C ±5° C	Temperature Coefficient 23° C ±>5° C
DC Volts[2]	200.00000 mV	10 nV resolution	0.003+0.0004	0.004+0.0006	0.005+0.0008	0.0005+0.00008
	2.0000000 V	100 nV	0.002+0.0001	0.0025+0.0002	0.003+0.0002	0.0003+0.00002
	20.000000 V	1 µV	0.004+0.0005	0.005+0.0005	0.006+0.0006	0.0006+0.00006
	200.00000 V	10 µV	0.003+0.0001	0.004+0.0001	0.005+0.0002	0.0005+0.00002
	330.00000 V	10 µV	0.005+0.0002	0.01+0.0002	0.015+0.0002	0.0015+0.00002
True RMS AC Voltage[4, 5]	200.00000 mV	10 to 40 Hz			1.69+0.33	0.169+0.033
	to	40 to 1 kHz			0.24+0.33	0.024+0.033
	20.000000 V	1 kHz to 10 kHz			0.66+0.29	0.066+0.029
		10 to 50 kHz			0.27+0.02	0.027+0.002
		50 to 100 kHz			0.75+0.29	0.075+0.029
		100 to 300 kHz			5.39+0.50	0.539+0.05
		300 to 500 kHz			5.61+0.83	0.561+0.083
		500 kHz to 1 MHz			7.78+1.68	0.778+0.168
	200.00000 V	10 to 40 Hz			1.69+0.21	0.169+0.021
	to	40 to 1 kHz			0.09+0.06	0.009+0.006
	330.00000 V	1 kHz to 10 kHz			0.66+0.03	0.066+0.003
		10 to 50 kHz			1.01+0.02	0.101+0.002
		50 to 100 kHz			1.87+0.12	0.187+0.012
Resistance[3]	20.000000 Ω[1]	10 mA test current	0.0038+0.0058	0.005+0.0067	0.006+0.0083	0.0006+0.00083
	200.00000 Ω	1 mA	0.0037+0.0019	0.004+0.0021	0.005+0.0025	0.0005+0.00025
	2.0000000 kΩ	1 mA	0.0023+0.0012	0.0025+0.0013	0.003+0.0014	0.0003+0.00014
	20.000000 kΩ	100 µA	0.0025+0.0013	0.005+0.0014	0.006+0.0015	0.0006+0.00015
	200.00000 kΩ	10 µA	0.0055+0.0013	0.004+0.0017	0.005+0.0021	0.0005+0.00021
	2.0000000 MΩ	4 µA	0.018+0.0017	0.0025+0.0021	0.003+0.0029	0.0003+0.00029
	20.0000 MΩ	400 nA	0.12+0.0017	0.005+0.0021	0.006+0.0025	0.0006+0.00025
DC Current	2.40000 mA	<25 mV	0.05+0.013	0.06+0.017	0.07+0.023	0.007+0.0023
	24.0000 mA	<250 mV	0.05+0.001	0.065+0.002	0.08+0.002	0.008+0.0002
	240.000 mA	<55 mV	0.05+0.021	0.055+0.025	0.065+0.033	0.0065+0.0033
	2.40000 A	<520 mV	0.3+0.025	0.4+0.029	0.45+0.038	0.045+0.0038
True RMS AC Current	2.400000 mA	10 to 20 Hz	1.8+0.17	2.7+0.17	3.2+0.17	0.32+0.017
	(>60 µA)	20 to 47 Hz	0.9+0.17	0.9+0.17	0.4+0.17	0.04+0.017
		47 Hz to 1 kHz	0.04+0.063	0.08+0.13	0.15+0.17	0.015+0.017
		1 to 10 kHz	0.12+0.17	0.14+0.17	0.27+0.17	0.027+0.017
	24.00000 mA	10 to 20 Hz	1.8+0.13	2.6+0.13	2.8+0.13	0.28+0.013
	(>300 µA)	20 to 47 Hz	0.6+0.13	0.9+0.13	1.0+0.13	0.1+0.013
		47 Hz to 1 kHz	0.07+0.083	0.15+0.083	0.16+0.13	0.016+0.013
		1 to 10 kHz	0.21+0.17	0.3+0.17	0.4+.17	0.04+.017

Specifications
continued

6084A measurement accuracy[1] ± (% of reading + % of range)

Function	Range	Frequency, burden voltage, test current	24 hour 23° C ±1° C	90 days 23° C ±5° C	1 year 23° C ±5° C	Temperature Coefficient 23° C ±>5° C
True RMS AC Current	240.0000 mA	10 to 20 Hz	1.8+0.17	2.7+0.17	2.8+0.17	0.28+0.017
	(>3 mA)	20 to 47 Hz	0.6+0.17	0.9+0.17	1.0+0.17	0.1+0.017
		47 Hz to 1 kHz	0.1+0.042	0.17+0.075	0.2+0.092	0.02+0.0092
		1 to 10 kHz	0.3+0.13	0.35+0.15	0.4+0.17	0.04+0.017
	2.400000 A	10 to 20 Hz	1.8+0.19	2.5+0.19	2.7+0.21	0.27+0.021
	(>30 mA)	20 to 47 Hz	0.66+0.19	0.8+0.19	0.9+0.25	0.09+0.025
		47 Hz to 1 kHz	0.3+0.16	0.33+0.16	0.35+0.17	0.035+0.017
		1 to 10 kHz	0.4+0.19	0.45+0.19	0.5+0.21	0.05+0.021

Notes:

1 To obtain the specified accuracies, allow 30 minutes of warm-up.
2 Accuracies are with aperture set to ≥0.5 s, and within one hour from self-calibration.
3 Accuracies are with aperture set to ≥0.96 s, and within one hour from self-calibration (relative control).
4 Between 5 mV and 10 mV, add 100 µV of additional error.
5 Signal is limited to $8x10^6$ Volt-Hz product. For example, the largest frequency input at 250 V is 32 kHz.
6 For a crest factor ≥3, add an additional ±0.1% error. For a crest factor ≥5, add an additional ±2.5% error.

DC Voltage Measurement

Input Protection
- 330 VDC/330 VAC on all ranges

Input Resistance
- 200 mV Range: >10 GΩ
- 2.0 V Range: >10 GΩ
- 20 V Range: 10 MΩ
- 200 V Range: 10 MΩ
- 330 V Range: 10 MΩ

DC Noise Rejection
- For 50, 60, or 400 Hz, and apertures of 0.160 s or higher:
  - Normal Mode Rejection >95 dB
  - Common Mode Rejection (with 1 kΩ lead imbalance), >120 dB

DC Current Measurement

Input Protection
- 3 ADC, Fast Blow fuse

AC Voltage Measurement

Coupling
- AC or DC (selectable)

Input Impedance
- All ranges: 1 MΩ || 300 pF

Crest Factor
- 4 at Full Scale, increasing to 7 at Lowest Specified Voltage

Frequency Range
- AC Coupled: 10 Hz to 1 MHz
- DC Coupled: DC to 1 MHz

Typical Settling Time
- <0.5 sec to within 0.1% of final value

Noise Rejection (for 1 kΩ imbalance in LO lead)
- AC CMRR: 60 dB

AC Current Measurement

Input Protection
- 3 A, Fast Blow fuse

Crest Factor
- 4 at Full Scale, increasing to 10 at Lowest Specified Current

Resistance Measurement

Test Voltage (max)
- 20 and 200 mΩ Ranges: 200 mV
- 2 kΩ, 20 kΩ and 200 kΩ Ranges: 2 V
- Other Ranges: 8 V

DMM Triggering Characteristics

External Trigger Input
- Level: TTL Compatible, negative slope
- Minimum Pulse Width: 1 µs
- Trigger Count: 1 to 50 k
- Trigger Delay: 0 to 3600 s
- Sample Count: 1 to 50 k

Measurement Complete Output
- Level: TTL Compatible, negative slope
- Duration: Aperture time dependent

VXI Trigger Line
- Level: TTL Compatible, negative slope
- Duration: Aperture time dependent
- Function: Trig In or Meas Complete Out

Interface
(Single slot, VXIbus 1.4 Compliant)

Backplane Signal Support
- TTLTrg0-7: DMM Trigger In, DMM Sync Out

Peak Current & Power Consumption
- Max Power: 56 W

	I_{PM} (A)
+12 V	200 mA
+5 V	8.2 A
-12 V	300 mA

Front Panel I/O

Main Digitizer Inputs (4)
- Impedance: 50 Ω ±1% or 1 MΩ ±2%
- Coupling: DC, AC

Digitizer Trigger
- Input: SMB, gold-plated, 50 Ω ±1%
- Output: SMB, gold-plated, 50 Ω ±1%

Digitizer Control I/O (2)
- MMCX, gold-plated

Digitizer AC Cal Output
- SMB, 500 Hz, 50 Ω

Specifications
continued

DMM Trigger Input
- Connector: DE-9M
- Level: TTL

DMM Sync Output
- Connector: DE-9M
- Level: TTL

DMM Voltage/Ω
- Connectors: Mini Banana (Hi/Lo)
- Impedance: 10 MΩ or >10 GΩ

DMM Current/Sense
- Connectors: Mini Banana
- Protection: 3 A fuse

Software

Software Compliance
- DMM: IVI-DMM Class Compliant Driver
- Digitizer: IVI Custom Specific Instrument Driver

Drivers
- IVI-COM

Environmental

Temperature
- Operating: 0° C to 40° C
- Storage: -40° C to 71° C

Relative Humidity
- 5% to 80% RH non-condensing ≤37° C

Altitude
- Operating: 10,000 ft.
- Non-Operating: 15,000 ft

Shock
- 30 g peak, half sine, 11 ms pulse

Vibration
- Random: 5 to 500 Hz

Emissions/Immunity (Digitizer)
- EN61326-1 (Industrial Environment)
- EN61326-1 Class A (Radiated emissions)

Safety
- DMM: IEC1010-1, Cat. II
- Digitizer: EN61010-1

Mechanical

Weight
- 4 lbs

Cooling
- 4.6 l/s @ 1.4 mm H_2O

CE The CE Mark indicates that the product has completed and passed rigorous testing in the area of RF Emissions and Immunity to Electromagnetic Disturbances, and complies with European electrical safety standards.

Ordering Information

VX407C-S-2270A : Racal Instruments™ 6084A-104-DMM
Quad Input 1 GHz Digitizer & 7.5 Digit DMM for the VXIbus