

KEYSIGHT TECHNOLOGIES (AGILENT HP)

MSO7104B

The Keysight Technologies (Agilent) MSO7104B is a 1 GHz, 4-analog-channel plus 16-digital-channel Mixed Signal Oscilloscope in the InfiniiVision 7000B Series. Featuring a large 12.1" XGA display and deep MegaZoom III memory, this instrument delivers high-speed hardware-accelerated acquisition up to 100,000 waveforms per second, ensuring excellent signal visibility and troubleshooting capabilities.

SPECIFICATIONS

General

Interfaces	3 x USB 2.0 Host (1 front, 2 rear), 1 x USB 2.0 Device, LAN (10/100Base-T, LXI Class C), VGA video output, Auxiliary Output, External Trigger Input
Display	12.1-inch diagonal color TFT LCD with XGA (1024 x 768) resolution and 256 intensity levels
Calibration Interval	2 years
Real-Time Clock	Yes, built-in
Supported Languages (Built-in Help)	11 languages (English, Simplified Chinese, Traditional Chinese, French, German, Italian, Japanese, Korean, Portuguese, Russian, Spanish)

Physical

Power Supply	100 - 120 V (50/60/400 Hz) / 100 - 240 V (50/60 Hz) auto-ranging, 120 W maximum power consumption
Operating Temperature	0 °C to +55 °C °C
Dimensions (W×H×D)	454 mm x 298 mm x 172 mm mm
Weight	5.9 kg kg

Key Performance Specifications

Analog Bandwidth (-3 dB)	1 GHz
Calculated Rise Time (10% to 90%)	350 ps
Number of Analog Channels	4
Number of Digital Channels (MSO)	16
Maximum Analog Sample Rate	4 GSa/s (half-channel interleaved), 2 GSa/s (each channel)
Maximum Digital Sample Rate	2 GSa/s
Standard Memory Depth	8 Mpts MegaZoom III (half-channel interleaved), 4 Mpts (each channel)
Maximum Waveform Update Rate	Up to 100,000 waveforms/sec

Vertical System - Analog Channels

Vertical Resolution	8 bits
Input Sensitivity Range	2 mV/div to 5 V/div (1 M Ω), 2 mV/div to 1 V/div (50 Ω)
Maximum Input Voltage	CAT I 300 Vrms, 400 Vpk (1 M Ω); 5 Vrms (50 Ω)
Input Coupling	AC, DC
Input Impedance	1 M Ω $\pm$ 1% 14 pF, or 50 Ω $\pm$ 1.5%
Hardware Bandwidth Limits	20 MHz selectable
DC Vertical Gain Accuracy	$\pm$ 2.0% of full scale
Channel-to-Channel Isolation	$\geq$ 40 dB from DC to 1 GHz
Offset Range (50 Ω)	2 mV/div to 200 mV/div: $\pm$ 2 V; 201 mV/div to 1 V/div: $\pm$ 5 V
Offset Range (1 M Ω)	2 mV/div to 200 mV/div: $\pm$ 5 V; 201 mV/div to 5 V/div: $\pm$ 100 V
Dynamic Range	$\pm$ 8 div from center-screen
Probing Interface	AutoProbe

Vertical System - Digital Channels

Input Channels (Digital)	16 digital channels (D0 to D15)
Threshold Selections	TTL, CMOS, ECL, User-Defined
User-Defined Threshold Range	$\pm$ 8.0 V in 10 mV steps
Threshold Accuracy	$\pm$ (100 mV + 3% of threshold setting)
Maximum Input Voltage (Digital)	$\pm$ 40 V peak
Input Impedance (Digital)	100 k Ω $\pm$ 2% $\sim$ 8 pF
Minimum Detectable Pulse Width	2 ns
Channel-to-Channel Skew (Digital to Digital)	2 ns typical
Channel-to-Channel Skew (Analog to Digital)	2.5 ns typical
Digital Channel Minimum Input Voltage Swing	500 mV p-p
Digital Channel Maximum Toggle Rate	250 MHz

Horizontal System (Timebase)

Timebase Range	200 ps/div to 50 s/div
Timebase Accuracy	$\pm$ 25 ppm (0.0025%)
Channel-to-Channel Deskew Range	$\pm$ 100 ns
Horizontal Modes	Main, Zoom, Roll, XY

Acquisition System

Acquisition Modes	Normal, Peak Detect, Averaging, High Resolution, Segmented Memory
Peak Detect Glitch Capture Minimum	250 ps (at 4 GSa/s)
Averaging Factor Selections	2 to 65,536 (in powers of 2)
Segmented Memory Maximum Segments	Up to 2,000 segments

Trigger System

Trigger Sources	Analog channels, Digital channels, Line, External
Trigger Modes	Auto, Normal, Single
Trigger Coupling	AC, DC, LF Reject, HF Reject, Noise Reject
Trigger Holdoff Range	60 ns to 10 s
Trigger Sensitivity	0.6 div or 5 mV (DC to 100 MHz), 1.0 div or 10 mV (100 MHz to max bandwidth)
Trigger Level Range (Analog)	±6 div from center of screen
Standard Trigger Types	Edge, Pulse Width, Pattern, TV/Video, Duration, Sequence
Trigger Jitter	15 ps rms

Waveform Measurements and Math

Automatic Voltage Measurements	Peak-to-peak, Max, Min, Amplitude, Top, Base, Overshoot, Preshoot, Average, RMS
Automatic Time Measurements	Period, Frequency, Rise Time, Fall Time, +Width, -Width, Duty Cycle, Delay, Phase
Waveform Math Operators	Addition, Subtraction, Multiplication, FFT
FFT Window Functions	Hanning, Flat Top, Rectangular, Blackman-Harris

Connectivity and Interfaces

USB Host Ports (Front & Rear)	3 x USB 2.0 host (1 front, 2 rear)
USB Device Port	1 x USB 2.0 device (rear)
LAN Port (LXI Compliant)	10/100Base-T, RJ-45, LXI Class C
External Trigger Input	Rear panel, BNC
Auxiliary Output (Trigger Out / Calibration)	Rear panel BNC (Trigger out or Calibration)
VGA Video Output	15-pin D-sub, rear panel

Power and Environmental Specifications

Non-Operating Temperature Range	-40 °C to +70 °C
Operating Humidity Range	Up to 95% RH at +40 °C (non-condensing)
Operating Altitude	Up to 4,000 m (13,000 ft)
Electromagnetic Compatibility (EMC)	IEC 61326-1, EN 61326-1
Safety Standards	UL61010-1, CAN/CSA-C22.2 No. 61010-1, EN61010-1

Physical Characteristics

Shipping Weight	9.3 kg (20.5 lbs)
Kensington Lock Slot	Rear panel

Accessories

Standard Passive Probes	Four N2890A 10:1 500 MHz passive probes
Standard Logic Probe Cable	54620-68701 16-channel logic probe and accessory kit

Environmental

Acoustic Noise	35 dBA at front panel
Vibration and Shock	Meets MIL-PRF-28800F Class 3 random vibration
Pollution Degree	Pollution Degree 2
Overvoltage Category	CAT II 300 V

Power

Maximum Power Consumption	120 W
AC Input Power Voltage Range	100 to 120 V AC (50/60/400 Hz), 100 to 240 V AC (50/60 Hz)

Outputs

Calibration Output	~1.2 V p-p into 1 MΩ, ~1.2 kHz square wave
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Interfaces

Optional GPIB Interface	Supported via N2727A GPIB module
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Display

Display Size	12.1 inches (307 mm) diagonal
Display Resolution	1024 x 768 pixels (XGA)
Display Intensity Levels	256 levels

Triggering

External Trigger Input Impedance	Not applicable (external trigger is only available on 2-channel models)
External Trigger Maximum Input Voltage	Not applicable (external trigger is only available on 2-channel models)
External Trigger Level Range	Not applicable (external trigger is only available on 2-channel models)
Optional Serial Triggering and Decode	I²C, SPI, UART/RS-232, CAN, LIN, FlexRay, I²S, MIL-STD-1553

Digital Channels

Digital Channel Threshold Resolution	10 mV
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Connectivity

Web Viewer Control	Supported via standard web browser
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TECHNOLOGY

Mixed Signal Oscilloscope (MSO)

APPLICATIONS

Design, debugging, and testing of mixed-signal, digital, and analog circuits.

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