

TEKTRONIX

DSA70404

The Tektronix DSA70404 is a high-performance Digital Serial Analyzer (oscilloscope) designed to address the challenges of high-speed serial design verification, characterization, and debugging. Part of the DSA70000 series, it combines a 4 GHz analog bandwidth with a real-time sample rate of 25 GS/s across all four channels simultaneously. It features Pinpoint® triggering, dedicated serial pattern triggering up to 3.125 Gb/s, and a large 12.1-inch touch display, running on an open Windows platform to enable advanced signal integrity analysis and compliance testing.

SPECIFICATIONS

General

Interfaces	USB 2.0 (Host/Device), LAN (10/100/1000 Base-T), GPIB, RS-232, DVI-I, VGA, Auxiliary Input/Output, Reference Clock Input/Output
Display	12.1-inch liquid crystal active-matrix color TFT touch screen, 1024 × 768 pixels (XGA)
Operating System	Microsoft Windows XP Professional
LXI Compliance	LXI Class C V1.3

Physical

Power Supply	100 to 240 V AC ±10% (47 to 63 Hz), 115 V AC ±10% (360 to 440 Hz), power consumption <980 VA
Operating Temperature	5 to 45 °C
Dimensions (W×H×D)	451 × 298 × 490 mm
Weight	20.6 kg
Required Cooling Clearance (Left/Right Sides)	3 in (76 mm)
Required Cooling Clearance (Rear)	3 in (76 mm)

Vertical System (Analog Channels)

Number of Analog Channels	4
Analog Bandwidth (-3 dB)	4 GHz
Calculated Rise Time (10% to 90%)	98 ps (typical)
Calculated Rise Time (20% to 80%)	70 ps (typical)
Input Impedance and Coupling	50 Ω $\pm$ 1.5%, DC coupling (GND setting available)
Input Sensitivity Range	10 mV/div to 1 V/div
Vertical Resolution (ADC)	8-bit (up to 11-bit with averaging or Hi-Res mode)
Maximum Input Voltage (50 Ohm)	1.5 Vrms for <100 mV/div, 5.5 Vrms for $\geq$ 100 mV/div
DC Gain Accuracy	$\pm$ 2% of full scale
Offset Range	$\pm$ 3.4 V (10 mV/div to 99.5 mV/div), $\pm$ 6 V (100 mV/div to 1 V/div)
Channel-to-Channel Isolation	$\geq$ 120:1 at $\leq$ 100 MHz, $\geq$ 80:1 at 100 MHz to 2.5 GHz, $\geq$ 50:1 at 2.5 to 10 GHz
Hardware Bandwidth Limit Filters	None (DSP-based filters only)

Horizontal System (Timebase)

Maximum Real-Time Sampling Rate	25 GS/s (on all 4 channels)
Maximum Record Length (Points per Channel)	25 MS (standard), up to 250 MS (option dependent)
Timebase Range	20 ps/div to 1000 s/div
Timebase Delay Range	-5.0 ks to 1.0 ks
Channel-to-Channel Deskew Range	$\pm$ 75 ns
Timebase Accuracy	$\pm$ 1.5 ppm initial accuracy

Trigger System

Trigger Modes	Auto, Normal, Single
Trigger Coupling	DC, AC, Low Frequency Reject, High Frequency Reject, Noise Reject
Trigger Holdoff Range	250 ns to 12 s
Trigger Jitter	1 ps RMS (typical), <100 fs RMS (with Enhanced Triggering)
Edge Triggering	Positive, negative, or dual slope on any channel or front panel auxiliary input
Pulse Width Triggering	Trigger on width of positive or negative pulses from 80 ps to 150 s
Runt Triggering	Trigger on a pulse that crosses one threshold but fails to cross a second threshold
Timeout Triggering	Trigger on an event which remains high, low, or either, for a specified time (300 ps to 1 s)
Window Triggering	Trigger on an event that enters or exits a window defined by two thresholds
Setup and Hold Triggering	Trigger on setup time and hold time violations between clock and data
Logic and Pattern Triggering	Trigger when logic pattern goes false or stays true for a specified time
Transition / Slew Rate Triggering	Trigger on pulse edge rates faster or slower than a specified rate
Serial Pattern Triggering	Standard up to 3.125 Gb/s (includes 8b/10b standard protocol and NRZ testing)
Auxiliary Input Max Input Voltage	5 V RMS
Edge Trigger Sensitivity (A Trigger, DC Coupled)	0.5 div from DC to 50 MHz, 1.0 div at 4 GHz
Standard Serial Pattern Triggering Speed	Up to 3.125 Gb/s
Optional Serial Pattern Triggering Speed	Up to 6.25 Gb/s (with Opt. ST6G)

Acquisition System

Acquisition Modes	Sample, Peak Detect, Envelope, Average, Waveform Database
Waveform Capture Rate (Max)	>300,000 wfms/s (on all 4 channels)

Display and User Interface

Waveform Display Formats	Vectors, Dots, Color Grading, Variable Persistence, Infinite Persistence
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Input/Output Ports and Connectivity

USB Host Ports	5 ports (1 front, 4 rear, USB 2.0 compliance)
Auxiliary Input (External Trigger)	Front panel BNC connector, 50 Ω impedance, max input 5 Vrms
Auxiliary Output (Trigger Out)	Front panel BNC, provides a trigger signal when oscilloscope triggers
Probing Interface Standard	TekConnect Interface

Environmental and Safety Compliance

Storage Temperature Range	-20 °C to +60 °C
Operating Humidity Range	8% to 80% RH (non-condensing, max wet bulb temperature 29 °C)
Operating Altitude	Up to 3,000 m (9,843 ft.)
EMC Compliance	EN 61326 Class A, FCC 47 CFR Part 15
Safety Certifications	UL 61010-1, CSA 61010-1, EN 61010-1, IEC 61010-1

Frequency Reference

Internal Reference Frequency	10 MHz
Internal Reference Initial Accuracy	±1.5 ppm
Internal Reference Aging Rate	±1 ppm/year
External Reference Input Impedance	50 Ohm
External Reference Input Frequency	10 MHz ± 10 kHz
Internal Reference Output Frequency	10 MHz
Internal Reference Output Level	≥1.5 Vp-p into 50 Ω

Storage

Standard Storage Drive	Removable hard disk drive, >= 80 GB
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Horizontal System

Jitter Noise Floor (Typical)	420 fs RMS
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Triggering

Hardware Clock Recovery Frequency Range	1.5 MBaud to 3.125 GBaud (up to 6.25 GBaud with Option STU)
Trigger Delay Range by Events	1 to 2,000,000,000 events
Trigger Delay Range by Time	3.2 ns to 250 s
Trigger Level Range (Channels 1 to 4)	±12 divisions from center of screen
Auxiliary Input Trigger Level Range	±8 V

Interfaces

LAN Port Speed	10/100/1000 Mbps
GPIB Interface	IEEE-488.2 compatible
External Display Outputs	DVI-I and VGA
Audio Ports	Line In, Line Out, Microphone In

Analysis & Measurements

Waveform Math Functions	Arithmetic, algebraic, filtering, spectral (FFT), user-defined equations
Automatic Measurement Types	Amplitude, Timing, Histogram, Communication (Eye-pattern)

TECHNOLOGY

Digital Phosphor Oscilloscope (DPO) / Digital Serial Analyzer (DSA)

APPLICATIONS

High-speed serial design, compliance testing, signal integrity analysis, jitter and timing measurements

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