

TEKTRONIX

TDS2022

The Tektronix TDS2022 is a 200 MHz, 2-channel digital storage oscilloscope featuring a color TFT LCD, up to 2.0 GS/s real-time sample rate on all channels, and optional communication modules for PC connectivity and data storage.

SPECIFICATIONS

General

Interfaces	Expansion slot for optional modules (TDS2CMA: RS-232/Centronics, TDS2MEM: RS-232/Centronics/CompactFlash, TDSPACK: RS-232/Centronics/GPIB)
Display	5.7 in (145 mm) Color Active Matrix TFT LCD, 320 × 240 pixels

Physical

Power Supply	100 to 240 VAC (±10%), 47 to 440 Hz (at 115 V), 47 to 63 Hz (at 230 V), <30 W power consumption
Operating Temperature	0 to +50 °C °C
Dimensions (W×H×D)	323.6 mm × 151.4 mm × 124.5 mm mm
Weight	2.0 kg kg

Vertical System

Analog Bandwidth (-3 dB)	200 MHz
Calculated Rise Time (10% to 90%)	1.8 ns
Number of Input Channels	2
Input Impedance	1 MΩ ±2% in parallel with 20 pF ±3 pF
Input Coupling	AC, DC, GND
Input Sensitivity Range	2 mV/div to 5 V/div in a 1-2-5 sequence
Vertical Resolution (ADC)	8 bits
DC Gain Accuracy	±3% for 10 mV/div to 5 V/div, ±4% for 2 mV/div to 5 mV/div
Maximum Input Voltage	300 V RMS CAT II (derated at 20 dB/decade above 100 kHz to 13 V peak AC at 3 MHz and above)
Channel-to-Channel Isolation	>= 100:1 at 200 MHz
Hardware Bandwidth Limits	20 MHz
Lower Bandwidth Limit (AC Coupled)	<10 Hz at BNC
Common Mode Rejection Ratio (CMRR)	100:1 at 60 Hz, 10:1 at 50 MHz
Vertical Expansion Range	Allows vertical expansion or compression of active or stopped waveforms
Vertical Position Range	±2 V (2 mV/div to 200 mV/div), ±50 V (>200 mV/div to 5 V/div)

Horizontal System

Maximum Real-Time Sampling Rate	2.0 GS/s on all channels simultaneously
Equivalent-Time Sampling Rate (ETS)	Not supported (Real-time sampling only)
Maximum Record Length (Points per Channel)	2.5k points
Time Base Range	2 ns/div to 50 s/div
Time Base Accuracy	50 ppm
Dual Time Base	Yes (allows viewing main and window sweep simultaneously)
Horizontal Expansion Range	Allows horizontal expansion or compression of active or stopped waveforms
XY Mode Bandwidth	20 MHz
XY Mode Phase Difference	$\pm 3^\circ$ at 50 kHz
Real-time Sample Rate Range	50 S/s to 2.0 GS/s

Trigger System

Trigger Sources	CH1, CH2, Ext, Ext/5, AC Line
Trigger Modes	Auto, Normal, Single Sequence
Trigger Coupling	AC, DC, Noise Reject, HF Reject, LF Reject
Trigger Holdoff Range	500 ns to 10 s
Edge Triggering	Rising or falling slope (selectable)
Pulse Width Triggering	Trigger on pulse width <, >, or = selectable time limit; 33 ns to 10 s
Video Triggering	Trigger on NTSC, PAL, or SECAM; field 1, field 2, or line selectable
External Trigger Input Impedance	1 M Ω $\pm 2\%$ in parallel with 20 pF ± 3 pF
External Trigger Maximum Input Voltage	300 V RMS CAT II
Trigger Sensitivity (Edge, DC Coupled)	Internal: 0.3 div (DC to 10 MHz), 1 div (10 MHz to 200 MHz); External: 100 mV (DC to 10 MHz), 350 mV (10 MHz to 200 MHz)
Trigger Level Range	Internal: ± 8 divisions from screen center; External: ± 1.6 V; External/5: ± 8 V
Trigger Level Accuracy (typical)	Internal: ± 0.2 div; External: $\pm (6\% \text{ of setting} + 40 \text{ mV})$; External/5: $\pm (6\% \text{ of setting} + 200 \text{ mV})$
Pulse Width Range	33 ns to 10 s
Pulse Width Resolution	16.5 ns or 51 ppm, whichever is larger
Pulse Width Trigger Conditions	<, >, = (equal), $\neq$ (not equal)
Supported Video Standards	NTSC, PAL, SECAM

Acquisition System

Acquisition Modes	Sample, Peak Detect, Average
Peak Detect Mode Min Pulse Width	12 ns (typical)
Averaging Factor Range	4, 16, 64, 128

Waveform Measurements and Analysis

Automatic Voltage Measurements	Max, Min, Peak-to-Peak, Mean, Cycle RMS
Automatic Time Measurements	Period, Frequency, +Width, -Width, Rise Time, Fall Time
Total Automatic Measurements	11 measurements selectable
Basic Math Functions	Addition (+), Subtraction (-)
Fast Fourier Transform (FFT) Window Types	Hanning, Flat Top, Rectangular
FFT Vertical Scale Options	Linear RMS, dBV RMS
Internal Non-Volatile Storage	4 setups and 2 reference waveforms
Cursor Measurements	Amplitude (voltage/current) and Time (ΔT , $1/\Delta T$)

Display and User Interface

Waveform Display Formats	YT (voltage vs. time) and XY (channel 1 vs. channel 2)
Graticule Options	Grid, Reticule, None
Display Graticule Size	8 × 10 divisions
Multi-language User Interface	Yes (10 languages supported)
Context-sensitive Help	Yes
Probe Check Wizard	Yes (automatically verifies probe attenuation)
Autoset Menu	Yes, automatically configures vertical, horizontal, and trigger

Connectivity and Ports

Expansion Slot	Rear-panel slot supports optional TDS2CMA or TDS2MEM modules
Optional TDS2CMA Ports	RS-232, Centronics Printer Port, GPIB (IEEE-488)
Optional TDS2MEM Ports	CompactFlash Card Slot (supports CompactFlash up to 2 GB), RS-232, Centronics Printer Port
Probe Calibration Output	5.0 V into $\geq 1\text{ M}\Omega$ load at 1 kHz

Environmental Specifications

Storage Temperature Range	-40 to +71 °C
Operating Humidity Range	Up to 90% RH at or below +30 °C; up to 60% RH up to +50 °C
Operating Altitude	Up to 3,000 m
Non-Operating Altitude	Up to 15,000 m
Cooling Method	Convection cooling (fanless design)

Physical Characteristics

Form Factor	Benchtop portable
Included Probes	Two P2200 200 MHz 10x/1x passive probes

Compliance and Standards

Electromagnetic Compatibility (EMC)	EU EMC Directive, EN61326 Class A, FCC Part 15 Subpart B
Calibration Interval	1 year

Performance

DC Measurement Accuracy (Average Mode)	$\pm(3\% \times \text{reading} + 0.05 \text{ div})$ for average ≥ 16
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Environmental

Operating Vibration	0.31 g RMS from 5 Hz to 500 Hz, 10 minutes on each axis
Non-operating Vibration	2.46 g RMS from 5 Hz to 500 Hz, 10 minutes on each axis
Non-operating Shock	50 g, 11 ms, half-sine
Pollution Degree	2

Storage

Reference Waveform Storage	2 internal reference waveforms
Setup Storage	10 internal front-panel setups

Safety & Compliance

Overvoltage Category	CAT II 300 V
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Power Supply

Power Consumption	< 30 W
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Triggering

Trigger Frequency Counter	6-digit resolution
Trigger Frequency Counter Range	10 Hz to 200 MHz

Signal Outputs

Probe Compensator Output Frequency	1 kHz
Probe Compensator Output Voltage	5.0 V into $\geq 1 \text{ M}\Omega$ load

TECHNOLOGY

Digital Storage Oscilloscope (DSO)

APPLICATIONS

Electronic Design, Troubleshooting, Education, Production Test

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