

TEKTRONIX

TDS7704B

The Tektronix TDS7704B is a 7.0 GHz Digital Phosphor Oscilloscope from the TDS7000B series, offering outstanding signal fidelity, up to 20 GS/s real-time sample rate, and deep memory solutions for advanced design and analysis.

SPECIFICATIONS

General

Interfaces	GPIB, LAN (10/100Base-T), USB 1.1 (4 ports), RS-232, Centronics Parallel, Keyboard & Mouse (PS/2), VGA Out, Audio In/Out/Mic
Display	10.4-inch touch-sensitive color TFT-LCD, 1024 × 768 pixels (XGA)
Calibration Interval	1 year

Physical

Power Supply	100 to 240 V RMS (±10%), 47 to 63 Hz; or 115 V RMS (±10%), 360 to 440 Hz; < 600 W
Operating Temperature	+5 °C to +45 °C (excluding floppy drive) °C
Dimensions (W×H×D)	457 mm × 277 mm × 489 mm mm
Weight	19.1 kg kg

Vertical System

Input Channels	4
Analog Bandwidth	7.0 GHz
Calculated Rise Time (10% - 90%)	62 ps
Calculated Rise Time (20% - 80%)	43 ps
Input Coupling	DC, GND
Input Impedance	50 Ω $\pm$ 2.5%
Input Sensitivity Range	2 mV/div to 1 V/div
Vertical Resolution	8-bit (>11-bit with averaging)
DC Gain Accuracy	$\pm$ 2%
Maximum Input Voltage	5 V RMS, with peaks $\leq$ $\pm$ 30 V
Offset Range	$\pm$ 0.5 V (2 to 50 mV/div), $\pm$ 2.5 V (50.5 to 100 mV/div), $\pm$ 5 V (101 to 500 mV/div), $\pm$ 10 V (505 mV/div to 1 V/div)
Position Range	$\pm$ 5 divisions
Bandwidth Limits	250 MHz or 4 GHz (user-selectable)
Channel-to-Channel Isolation	$\geq$ 100:1 at $\leq$ 2.5 GHz, $\geq$ 80:1 at >2.5 GHz to 7 GHz
Probe Interface	TekConnect
Channel-to-Channel Deskew Range	$\pm$ 75 ns
Channel-to-Channel Deskew Resolution	1 ps

Horizontal System

Maximum Real-Time Sample Rate (1 Channel)	20 GS/s
Maximum Real-Time Sample Rate (2 Channels)	10 GS/s
Maximum Real-Time Sample Rate (3 or 4 Channels)	5 GS/s
Maximum Equivalent-Time Sample Rate	250 GS/s
Maximum Record Length	64 M (option-dependent), 2 M standard
Timebase Range	50 ps/div to 10 s/div
Timebase Delay Time Range	-16 ns to 250 s
Timebase Accuracy	$\pm$ 15 ppm
Trigger Jitter (RMS)	8 ps (typical)
Aperture Uncertainty	<0.06 ps RMS (typical)

Trigger System

Trigger Sources	Ch 1, Ch 2, Ch 3, Ch 4, Aux, Line
Trigger Modes	Auto, Normal, Single
Trigger Coupling	DC, AC, HF Rej, LF Rej, Noise Rej
Trigger Holdoff Range	250 ns to 12 s
Edge Triggering	Positive or negative slope on any channel or auxiliary input. Coupling includes DC, AC, noise reject, HF reject, and LF reject.
Glitch Triggering	Trigger on glitched pulses down to 225 ps
Width Triggering	Trigger on width of positive or negative pulses from 225 ps to 30 s
Runt Triggering	Trigger on a pulse that crosses one threshold but fails to cross a second before crossing the first again
Timeout Triggering	Trigger on an event which remains high, low, or either, for a specified time period (300 ps to 30 s)
Transition/Slew Rate Triggering	Trigger on pulse edge rates that are faster or slower than specified. Slope may be positive, negative, or either.
Setup/Hold Triggering	Trigger on violations of both setup time and hold time between clock and data on any two input channels
Pattern/State Triggering	Trigger when pattern goes false or true, or be qualified by clock edge. Pattern (AND, OR, NAND, NOR) specified for four input channels.
Window Triggering	Trigger on an event that enters or exits a window defined by two user-adjustable thresholds

Acquisition Modes

FastAcq Acquisition	DPX acquisition technology; >400,000 wfms/s waveform capture rate
Sample Mode	Acquires sample values only
Peak Detect Mode	Captures high-frequency and random glitches down to 400 ps
Envelope Mode	Min/max values acquired over one or more acquisitions
Average Mode	Waveform average selectable from 2 to 10,000
Waveform Database Mode	Accumulates a three-dimensional database of sample address, time, and amplitude

Waveform Measurements

Automatic Measurements	53 measurements including amplitude, frequency, rise/fall time, pulse width, duty cycle, overshoot, undershoot, area
Measurement Statistics	Mean, minimum, maximum, standard deviation, and population
Waveform Histograms	Vertical or horizontal, with statistical measurements

Waveform Processing and Math

Math Functions	Add, subtract, multiply, divide, integrate, differentiate, FFT
Advanced Math	Algebraic expressions, variables, and measurement scalars
Fast Fourier Transform (FFT)	Magnitude, phase
FFT Windows	Rectangular, Hamming, Hanning, Kaiser-Bessel, Blackman-Harris, Gaussian, Flattop, TekExponential

Computer & Storage System

Operating System	Windows 2000 Professional
Processor	Intel Pentium 4
Hard Disk Drive Capacity	≥ 40 GB
Removable Media Drive	3.5-inch 1.44 MB floppy drive, CD-RW drive

Input / Output Signals

Auxiliary Input	Front-panel BNC, trigger level range ± 8 V
Auxiliary Output	Rear-panel BNC, provides trigger out or recovery clock out (option-dependent)
External Reference Input	Rear-panel BNC, accepts 10 MHz reference signal
Internal Reference Output	Rear-panel BNC, 10 MHz

Power & Environmental

Power Source Voltage	100 to 240 V RMS ($\pm 10\%$)
Power Source Frequency	47 to 63 Hz (100 to 240 V), 360 to 440 Hz (115 V)
Power Consumption	< 600 W
Non-Operating Temperature	-22 °C to +60 °C
Operating Humidity	8% to 80% RH, non-condensing
Non-Operating Humidity	8% to 90% RH, non-condensing
Operating Altitude	Up to 3,000 m (10,000 ft.)
Non-Operating Altitude	Up to 12,190 m (40,000 ft.)

Physical Characteristics

Height	277 mm (10.9 in.)
Width	457 mm (18.0 in.)
Depth	489 mm (19.25 in.)
Net Weight	19.1 kg (42 lbs.)
Shipping Weight	37 kg (82 lbs.)

Acquisition System

Max Waveform Capture Rate	>400,000 wfm/s (FastAcq mode)
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Triggering

Edge Trigger Sensitivity (A Event)	DC to 3 GHz: 1 div, 3 GHz to 6 GHz: 2 div, 6 GHz to 7 GHz: 3 div
Edge Trigger Sensitivity (B Event)	0.5 div from DC to 50 MHz, increasing to 1.5 div at 3 GHz, 2.5 div at 6 GHz, 4.0 div at 7 GHz
Trigger Level Range	Any channel: ± 8 divisions from screen center; Auxiliary input: ± 5.0 V
Trigger Level Resolution	0.1 division (internal), 5 mV (Aux input)
Serial Pattern Triggering	Option ST (up to 1.25 Gb/s) / Option SST (up to 3.125 Gb/s) serial pattern triggering on NRZ data
Comm Triggering	Option SM; supports AMI, HDB3, BnZS, CMI, MLT3, NRZ

Connectivity

USB Ports	4 ports (1 front, 3 rear)
LAN Port	RJ-45, 10Base-T, 100Base-T, and 1000Base-T
GPIB Interface	IEEE-488.2
Video Output	DB-15 female connector, SVGA
Serial Port	DB-9 COM1 port
Parallel Port	DB-25, Centronics mode
Audio Ports	Microphone input, line input, and line output (3.5 mm jacks)
Front Panel Connectors	TekConnect probe inputs (4), Aux Trigger input, Calibrator output, Probe Compensation output, Ground terminal

Storage

CD-RW Drive	Rear-panel CD-R/W
Floppy Drive	Front-panel 3.5 in, 1.44 MB

Environmental

Cooling Clearance	76 mm (3 in) left and right sides
Operating Vibration	0.22 g RMS (5 Hz to 500 Hz)
Non-Operating Vibration	2.28 g RMS (5 Hz to 500 Hz)

Software & Features

Optional Software Applications	RT-Eye (Opt. RTE), Advanced Jitter Analysis (Opt. JA3), Serial Mask Testing (Opt. MTM), Ethernet Compliance (Opt. ET3)
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Compliance

Safety Certification	UL 3111-1, CSA 1010.1, EN 61010-1
Electromagnetic Compatibility	EN 61326-1, FCC Class A

TECHNOLOGY

Digital Phosphor Oscilloscope (DPO)

APPLICATIONS

High-speed digital design, compliance testing, spectral analysis, and advanced timing measurements

