

Digitizing Oscilloscope

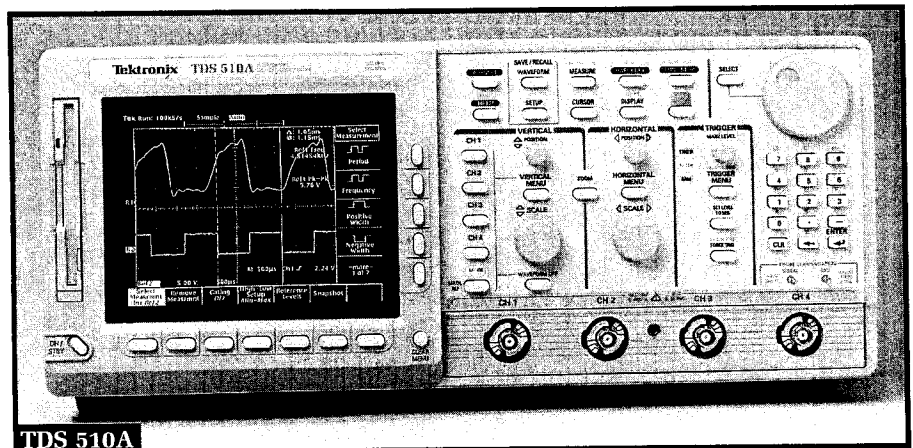
TDS 510A



Features

TDS 510A

- 500 MHz Bandwidth
- Sample Rates to 500 MS/s
- 4 Channels
- Width, 2 ns Glitch, Runt, State, and Pattern Triggering
- 1 mV to 10 V/div Sensitivity
- Infinite and Variable Persistence
- 8-Bit Vertical Resolution Up to 12-Bit in Hi-Res Mode
- 1% Vertical Accuracy
- FFT, Integration, Differentiation (option 2F)
- 25 Automatic Measurements
- GPIB Programmable
- 3.5 in. Floppy Disk Drive
- CE Marking



TDS 510A

TDS 510A Digital Oscilloscope

The TDS 510A Digital Oscilloscope is a full featured, cost effective, versatile oscilloscope which meets the measurement requirements for general purpose research and design. Its industry-preferred graphical user interface makes it easy to learn and efficient to use. The TDS 510A advanced trigger capability allows the user to trigger and view signals in a wide variety of simple as well as complex design and analysis settings. With four channels, 50 K-points per channel record length, and powerful waveform acquisition modes, the TDS 510A can satisfy most complex design, debug, and analysis requirements.

A full complement of graphical and digital output formats provides report generation and documentation of measurement results. These output formats are compatible with popular word-processor applications. Output interfaces include an integral floppy disk drive, GPIB, RS232C, and Centronics.

The most complete selection of active and passive probes facilitates measuring virtually any voltage or current waveform. Probe types include active and passive voltage probes, differential voltage probes for high and low voltages, and current probes. When used with the TDS 510A, these probes automatically provide correct scaling and engineering-unit readout for voltage, current, and power waveforms. You can tailor the TDS 510A to your specific measurement environment by using the appropriate probes and accessories. This powerful combination makes the TDS 510A the ideal instrument choice for low power, medical electronics, bio-physical, automotive, and general-purpose electronic design and development.

Characteristics

VERTICAL SYSTEM

Bandwidth – 500 MHz.*1

Channels – Four.

Waveform Capture Rate – 150 waveforms/s.

Max Sample Rate –

1 and 2 Channels: 500 MS/s.

4 Channels: 250 Ms/s.

Sensitivity – 1 mV to 10 V/div.

Position Range – ± 5 divisions.

Offset –

1 to 99.5 mV/div: ± 1 V.

100 to 995 mV/div: ± 10 V.

1 to 10 V/div: ± 100 V.

DC Gain Accuracy – $\pm 1\%$.

Vertical Resolution – 8-Bits.

Analog Bandwidth Selections – 20 MHz,

100 MHz, and Full.

Input Coupling – AC, DC, or GND.

Input Impedance Selections –

1 M Ω in parallel with 10 pF, or 50 Ω

(AC and DC coupling).

Maximum Input Voltage – 300 V CAT II;

± 400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 M Ω or GND coupled.

Channel Isolation – $>100:1$ at

100 MHz; $>30:1$ at BW for any two channels with equal V/div settings.

*1 500 MHz typical at probe tip with P6139A probe.

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1933, inside the U.S. call: 1-800-426-2200.



See Tektronix on the World Wide Web:
<http://www.tek.com>



Tektronix measurement products are manufactured in ISO registered facilities.

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AC Coupled LF Limit –

AC 1 M Ω coupled: ≤ 10 Hz.
AC 50 Ω coupled: ≤ 200 kHz.

TIME BASE SYSTEM

Time Bases – Main, Delayed.

Time/Div Range – 500 ps to 10 s/div.

Time Base Accuracy – ± 25 ppm over any interval ≥ 1 ms.

Record Length – 50 K points.

Pre-Trigger Position – 0 to 100% of record.

ACQUISITION SYSTEM

Acquisition Modes – Sample, Single Sequence, Average, Envelope, Hi-Res, Peak Detect.

TRIGGER SYSTEM

Trigger Types – Edge (Main and Delayed), Pulse (Width, Glitch, and Runt), Logic (Pattern and State), Video – Opt. 05 (NTSC, PAL, HDTV, FlexFormat™).

Main Trigger Modes – Auto, Normal, Single.

Delay Trigger Modes – Delay by time, events, or events and time.

STORAGE

Waveforms – Four full 50 K point records.

AUTOMATIC MEASUREMENTS

Period	Frequency
High	Low
+Width	-Width
Maximum Rise	Minimum Fall
Peak to Peak	Amplitude
+Duty Cycle	-Duty Cycle
+Overshoot	-Overshoot
Propagation Delay	Burst Width
Mean	Cycle Mean
RMS	Cycle RMS
Area	Cycle Area
Phase	

Setups – 10 front-panel setups.

DISPLAY SYSTEM

Monitor – 7 in., 640 x 480, monochrome.

Waveform Style – Dots or vectors, infinite and variable persistence.

Display Formats – YT, XY Zoom, Fit to Screen.

Advanced Waveform Functions – FFT, Differentiation, Integration (Option 2F), Limit Testing.

Cursor Measurements – Absolute, Delta; volts, time, frequency. NTSC IRE units and line number with video trigger (Option 05).

Waveform Functions – Interpolation (sin(x)/x or linear), Average, Envelope, Autosetup.

OUTPUTS

VGA Out – Monochrome.

RS-232 and Centronics – Opt. 13.

Hardcopy Formats – Epson, Thinkjet, Deskjet, Laserjet, PostScript, TIFF, PCX, BMP, DPU411/412, HPGL, Interleaf.

Power – 90 to 250 V RMS, 45 to 440 Hz, 300 W maximum.

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Height	193	7.6
Width	445	17.5
Depth	432	17
Weight	kg	lbs.
Net	14.1	31

SAFETY CERTIFICATION

UL and CSA-certified.

ORDERING INFORMATION

For price information: Outside the U.S. contact your local Tektronix representative, inside the U.S. see the price list in the back of this catalog.

TDS 510A

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Includes: P6139A probes (4 each), User Manual (070-9701-00), Reference Card (020-9758-00), Technical Reference (070-9706-00), Programmer's Disk*2 (063-2619-00), Front Cover (200-3696-00), U.S. Power Cord (161-0203-01).

*2 Programmer's Disk works as a Microsoft Help file under Windows. The disk allows for printing sections or the complete manual.

OPTIONS

Opt. 1K – Add K420 Cart.

Opt. 1R – Rackmount.

Opt. 2F – Extended Waveform Math (FFT, Integration, Differentiation).

Opt. 05 – Video Trigger.

Opt. 13 – RS-232 and Centronics Interfaces.

Opt. B2 – Hardcopy Programmer's Manual.

Opt. L1 – French User Manual.

Opt. L3 – German User Manual.

Opt. L5 – Japanese User Manual.

MEASUREMENT SERVICE OPTIONS

Opt. C3 – Three years of Calibration Services.

Opt. C5 – Five years of Calibration Services.

Opt. D3 – Test Data (requires Opt. C3).

Opt. D5 – Test Data (requires Opt. C5).

Opt. R5 – Repair warranty extended to cover five years.

RECOMMENDED ACCESSORIES – See page 354.

ADA400A – Differential Preamplifier.

AM503S – DC/AC Current Measurement System.

AFTDS – Electrical communication differential signal adapter.

AMT75 – 1 GHz electrical communication 75 Ω adapter.

P5100 – 2.5 kV High-voltage probe.

P5205 – 1.3 kV High-voltage 100 MHz differential probe.

P5210 – 5.6 kV High-voltage differential probe.

P6139A – 500 MHz passive 10X voltage probe.

P6205 – 750 MHz active voltage probe.

P6243 – 1 GHz active voltage probe.

P6245 – 1.5 GHz active voltage probe.

P6217 – 4 GHz active voltage probe.

P6158 – 3 GHz low capacitance voltage probe.

P6246 – 400 MHz differential probe.

P6247 – 1 GHz differential probe.

P6563A – SMD passive voltage probes.

TCP202 – DC to 50 MHz current probe.

Rackmount Kit – 016-1236-00.

Programmer's Manual – 070-9702-00.

SOFTWARE SUPPORT

WSTR0 – WaveStar™ software for oscilloscopes. Windows 95/NT application for waveform capture, analysis, documentation and control from your PC.

WSTR0U – Upgrade from WSTR31 to WSTR0.

WSTR31 – WaveStar software for Windows 3.1.

WSTR31U – Upgrade from DocuWave® software to WSTR31.

LVIEW95 – LabVIEW® for Windows 95.

LWCVI95 – LabWindows/CVI for Windows 95.

WARRANTY Three years. Covers all labor and parts, including CRT. One-year warranty on probes.

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ISO 9001 Tektronix measurement products are manufactured in ISO registered facilities.

Digital Storage Oscilloscopes

TDS Series

TDS SERIES SELECTION GUIDE: SEE PAGE 65 FOR FOOTNOTE EXPLANATIONS

		TDS 510A	TDS 640A	TDS 620B	TDS 644B	TDS 680B	TDS 684B	
SIGNAL ACQUISITION SYSTEM	Bandwidth	500 MHz	500 MHz	500 MHz	500 MHz	1 GHz	1 GHz	
	Channels	4	4	2+2	4	2+2	4	
	Sample Rate: 1 ch.	500 MS/s	2 GS/s	2.5 GS/s	2.5 GS/s	5 GS/s	5 GS/s	
	Sample Rate: 2 ch.	500 MS/s	2 GS/s	2.5 GS/s	2.5 GS/s	5 GS/s	5 GS/s	
	Sample Rate: 3, 4 ch.	250 MS/s	2 GS/s	—	2.5 GS/s	—	5 GS/s	
	Record Length: Std	50K pts	2K pts.	15K pts.	15K pts.	15K pts.	15K pts.	
	Record Length: Opt	—	—	—	—	—	—	
	Vert. Resolution: Normal	8-Bits	8-Bits	8-Bits	8-Bits	8-Bits	8-Bits	
	Vert. Resolution: w/ Averaging	11-Bits	11-Bits	11-Bits	11-Bits	11-Bits	—	
	Vert. Resolution: w/ HiRes	>= 13-Bits	—	—	—	—	—	
	Vert. Sensitivity (/div) *	1 mV-10 V	1 mV-10 V	1 mV-10 V	1 mV-10 V	1 mV-10 V	1 mV-10 V	
	Vertical Accuracy	± 1%	± 1.5%	± 1.5%	± 1.5%	± 1.5%	± 1.5%	
	Max Input Voltage (1 MΩ)	±400 V*12	±400 V*12	±400 V*12	±400 V*12	±400 V*12	±400 V*12	
	Linear Dynamic Range	± 5 div	± 5 div	± 5 div	± 5 div	± 5 div	± 5 div	
	BW Limit	20, 100 MHz	20, 250 MHz	20, 250 MHz	20, 250 MHz	20,250 MHz	20,250 MHz	
	Time Base:	Range	500 ps – 10 s	500 ps –	200 ps –	200 ps –	200 ps –	200 ps –
		Accuracy	25 ppm	5 s	10 s	10 s	10 s	10 s
	Peak Detection		2 ns	100 ppm	100 ppm	100 ppm	100 ppm	100 ppm
FastFrame™ *4		—	—	1ns	1ns	1ns	1ns	
Roll Mode*5		—	—	—	—	—	—	
Channel Deskew		—	—	±25 ns	±25 ns	±25 ns	±25 ns	
Trigger Conditioning		HF, LF, Noise Reject	HF, LF, Noise Reject	HF, LF, Noise Reject	HF, LF, Noise Reject	HF, LF, Noise Reject	HF, LF, Noise Reject	
		—	—	—	—	—	—	
TRIGGERING	Types: Edge	Std	Std	Std	Std	Std	Std	
	Types: Pattern/State	4 inputs	4 inputs	4 inputs	4 inputs	4 inputs	4 inputs	
	Types: Setup & Hold	—	—	Std	Std	Std	Std	
	Types: Pulse Width	Std	Std	Std	Std	Std	Std	
	Types: Glitch	1 ns	2 ns	2 ns	2 ns	2 ns	2 ns	
	Types: Runt Pulse	Std	Std	Std	Std	Std	Std	
	Types: Slew Rate	—	—	Std	Std	Std	Std	
	Types: Time Out	—	—	Std	Std	Std	Std	
	Types: Comm	—	—	—	—	—	—	
	Types: External	Std	Std	Std	Std	Std	Std	
Types: Video*6	Opt	Opt	Opt	Opt	Opt	Opt		
Modes: Delay by Time/Event	Std.	Std.	Std	Std.	Std.	Std.		
SIGNAL PROCESSING	Auto. Measurements	25	25	25	25	25	25	
	Math	+,-,x,inv	+,-,x,÷,inv	+,-,x,÷,inv	+,-,x,÷,inv	+,-,x,÷,inv	+,-,x,÷,inv	
	Envelope	Std	Std	Std	Std	Std	Std	
	Average	Std	Std	Std	Std	Std	Std	
	Interpolation *7	Std	Std	Std	Std	Std	Std	
	FFT, Int., Diff.	Opt	Std	Std	Std	Std	Std	
	Limit Test	Std	Std	Std	Std	Std	Std	
	Display Monitor	Mono	Mono	Mono	Color	Mono	Color	
	Inf. Persist.Vectors, Dots, YT, XY	Std	Std	Std	Std	Std	Std	
	Data Ports: VGA Out	Std	Std	Std	Std	Std	Std	
GENERAL	GPIB	Std	Std	Std	Std	Std	Std	
	RS232	Opt *9	Std *9	Std *9	Std *9	Std *9	Std *9	
	Centronics	Opt	Std	Std	Std	Std	Std	
	Hardcopy/Export Formats *10	Std	Std	Std	Std	Std	Std	
	Disk Drive (3.5 inch)	Std	Std	Std	Std	Std	Std	
	On-line Help	Std	Std	Std	Std	Std	Std	
	Standard Probes		4 ea.	2 ea	2 ea	4 ea	None	None
			P6139A	P6139A	P6139A	P6243	—	—
		500 MHz, 10X Passive	500 MHz, 10X Passive	500 MHz, 10X Passive	1 GHz, 10X FET	—	—	