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Tektronix

Digital Phosphor Oscilloscopes TDS 500D and TDS 700D Series



The TDS 500D/TDS 700D Family of Digital Phosphor Oscilloscopes

The TDS 500D/700D oscilloscopes are the first in the TDS family of Digital Phosphor Oscilloscopes (DPOs) designed to keep pace with current and evolving needs in advanced electronic design and debug. DPOs deliver a new level of insight that makes dealing with complex signals elementary – a new level of insight that must be seen to be believed.

DPOs capture, store, display, and analyze, in real-time, three dimensions of signal information: amplitude, time, and distribution of amplitude over time. The benefit of this new third dimension of information is an interpretation of the signal dynamics, including instantaneous changes and the frequency of occurrence displayed in the form of quantitative intensity information.

EASY TO LEARN AND EASY TO USE

Extensive user interface design has made the TDS family of products truly intuitive to operate. Each family member shares a familiar front panel layout with dedicated vertical, horizontal, and trigger controls. A graphical user interface with over 200 icons helps facilitate understanding and use of the advanced features. A color monitor helps rapidly distinguish between multiple waveforms and measurements. On-line help provides a convenient built-in reference manual.

FEATURES

2 GHz, 1 GHz, and 500 MHz Bandwidths

Sample Rates to 4 GS/s

DPO Display Density of up to 100M points/sec

2 or 4 Channels

1% Vertical Accuracy

8-Bit Vertical Resolution, over 11-Bits with Averaging, and Over 13-Bits with Hi-res

1 ns Peak Detect

1 mV to 10 V/div Sensitivity

Up to 1 GHz Differential Measurements

Channel Deskew

Record Lengths to 8M Points

Floppy Disk Storage

Iomega Zip™ Drive Compatible

Advanced Triggering

29 Automatic Measurements and Measurement Statistics

FFT and Advanced Math

Histograms on DPO and Normal Waveform Acquisitions

Histogram Statistics

Limit Test

FastFrame™ Time Stamp

Communication Signal Analysis Including Mask Testing and SONET/SDH and Fibre Channel Optical Reference Receivers

Full GPIB Programmability

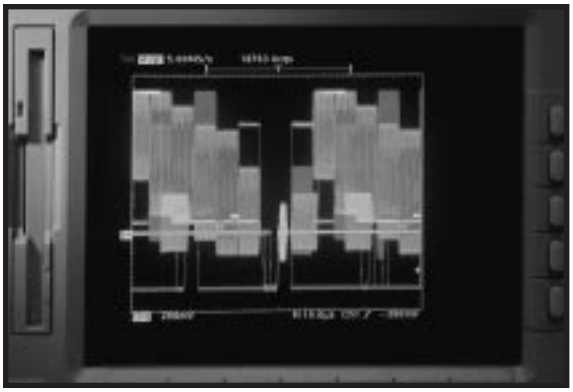
3 Year Warranty

CE Marking

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A traditional DSO is unable to display the details and dynamic changes of this composite video waveform.



The same composite video signal, captured with a Digital Phosphor Oscilloscope, shows all the details of this complex waveform, in real-time.

HIGH FIDELITY SIGNAL ACQUISITION

The high waveform capture rate of the TDS 500D/700D DPO series, together with its high bandwidth and sample rate, delivers instantaneous signal feedback to show the true signals that other scopes may be missing. The DPO acquisition acquires up to 1000 times more data than typical DSOs, allowing the capture of complex signals, reducing debugging times from hours to seconds.

Channels can be transparently combined to achieve higher sample rates and longer record lengths. The record length can be optionally increased to 8M points, providing a high-resolution representation of the signal over a long period of time.

All of the TDS products provide wide dynamic range, flat response, fast overdrive recovery, calibrated DC offset, 1 mV/div sensitivity (10 mV/div maximum sensitivity on TDS 794D), 1 ns peak detect, and internal calibration.

POWERFUL AND FLEXIBLE TRIGGERING

In addition to basic triggering such as edge and pulse-width, these Digtial Phosphor Oscilloscopes have several trigger modes tailored for specific design and debug applications. Logic and pulse triggers, including setup/hold, glitch, slew rate, and timeout triggers, capture hard-to-catch digital design problems. The optional video trigger provides line and field selection for NTSC, PAL, and HDTV standards. The optional communications trigger capability addresses needs to acquire a wide variety of AMI, CMI, NRZ, and Ethernet communication signals.

ADVANCED PERFORMANCE FEATURES

Digital Phosphor Oscilloscopes provide three dimensions of signal information including amplitude, time, and the distribution of amplitude over time; in the form of quantitative intensity information. The resulting information-rich display enables the user's eye to integrate the subtle patterns and variations of actual signal behavior.

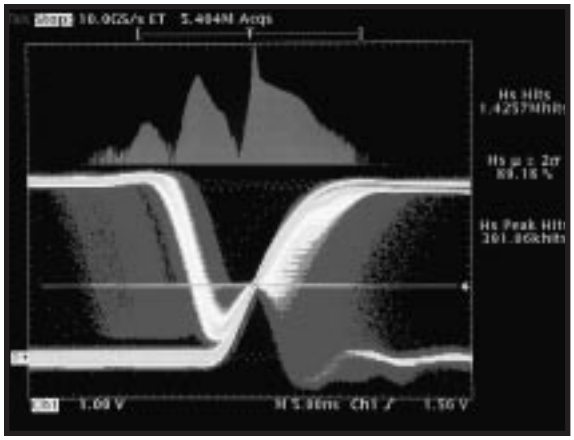
Color –Grading displays historical information that has been acquired over time. This is especially powerful when used in DPO operation, where the colors show relatively how often random events occur.

Automatic Measurements eliminate the need for manually measuring the waveform against the graticule or with cursors. Measurement gating, (gating not available for DPO operation) allows the user to select a specific part of the live waveform for measurement. Measurement statistics (min, max, mean, and standard deviation), give additional information about the variations in the measurements over time (for example, worst case excursions), increasing the confidence in the quality of the measurements.

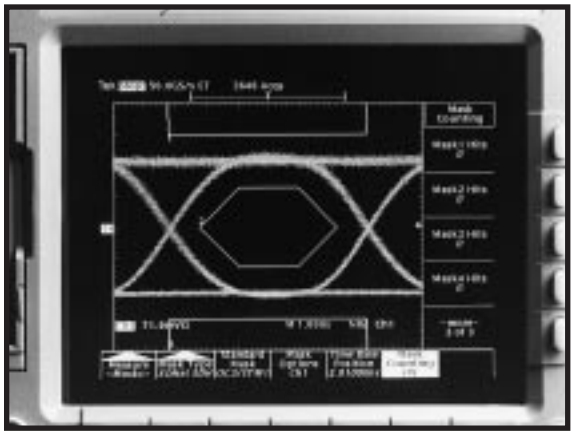
Waveform Histograms allow the examination of the statistical nature of the signal. Horizontal histograms, which are useful for evaluating signal jitter, sample the waveform within a specified region, sort the values into time bins, and plot the accumulated bin values versus time. Vertical histograms, which are useful for evaluating signal noise, sample the waveform within a specified region, sort the values into amplitude bins, and plot the accumulated bin values versus amplitude.

For histograms of DPO acquisitions (both live and stored), the specified region can be repositioned and will update to reflect the underlying 3 dimensional data base (32 bits in shallow mode, 64 bits in deep mode).

Communication Mask Testing (available as an option) allows mask compliance testing of a wide variety of communication signals to industry standards. Specialized measurement accessories, unique trigger modes, built-in optical reference receiver filters, mask autoset, and mask violation counting make these measurements easily and repeatably.



The horizontal histogram of the selected region of the waveform shows the character of a metastable flip-flop output.



A SONET/SDH (OC-3/STM-1) signal is compared with the standard mask, showing a compliant waveform.

COMPLEMENTARY MEASUREMENT ACCESSORIES

Tektronix provides a wide range of measurement accessories optimized for the TDS family. These accessories are designed to operate via the TEKPROBE® interface, which provides power and automatic scaling, to complete the DPO measurement solutions.

Active Probes such as the P6217 and P6245 active probes were designed specifically for the DPO products. For example, the P6217 is capable of achieving the full 2 GHz bandwidth on a TDS 794D, while providing low loading.

The P6339A Buffered Passive Probe is designed to provide high impedance 500 MHz general purpose probing capabilities for the TDS 794D.

Optical-to-Electrical Converters (P6701B, P6703B) allow convenient analysis of optical transmission signals with the oscilloscope to standard wavelengths for SONET/SDH and Fibre Channel.

High-bandwidth Differential Probes (P6246, P6247) enable high bandwidth (up to 1 GHz) differential measurements while maintaining high common-mode rejection.

Current Probes such as the TCP202 and **High-Voltage Differential Probes** such as the P5205 and P5210 allow safe, high-power measurements. Direct Probe Readouts use information from the probes to display measurements in units of Amps, Volts, and Watts.

SOPHISTICATED DOCUMENTATION

Save screen displays in a number of standard desktop publishing formats to the internal 3.5 in. DOS-compatible floppy disk drive. Transfer the disk to a PC for import into word processing applications. Make hardcopies directly to monochrome or color printers and plotters connected to the computer network (LAN), GPIB, RS-232, or Centronics ports, or acquire waveforms, screen displays, and scope settings using Tektronix WaveStar™ software running on a PC interfaced to the GPIB port.

TDS 500D/700D Series Timebase System

	TDS 794D	TDS 784D/TDS 580D	TDS 754D / TDS 724D / TDS 540D/TDS 520D
Time Bases	Main, delayed	Main, delayed	Main, delayed
Time Base Range	200 ps to 10 s/div	200 ps to 10 s/div	500 ps to 10 s/div
Time Base Accuracy	±25 ppm (over any interval ≥1 ms)	±25 ppm (over any interval ≥1 ms)	±25 ppm (over any interval ≥1 ms)
Pre-trigger Position	0% to 100% of any record	0% to 100% of any record	0% to 100% of any record
Delay Between Channels	≤50 ps (any 2 channels with equal V/div and coupling)		

TDS 500D/700D Series Electrical Characteristics

	TDS 794D	TDS 784D	TDS 754D	TDS 724D	TDS 580D	TDS 540D	TDS 520D
Bandwidth	2 GHz*5	1 GHz*1	500 MHz*2	500 MHz*2	1 GHz*4	500 MHz*2	500 MHz*2
# Channels	4	4	4	2 + 2 aux.	4	4	2 + 2 aux.
# Samplers	4	4	4	2	4	4	2
Max Real-time Sample Rate							
1 channel	4 GS/s	4 GS/s	2 GS/s	2 GS/s	4 GS/s	2 GS/s	2 GS/s
2 channels	2 GS/s	2 GS/s	2 GS/s	1 GS/s	2 GS/s	2 GS/s	1 GS/s
3-4 channels	1 GS/s	1 GS/s	1 GS/s	NA	1 GS/s	1 GS/s	NA
Equivalent-time Sample Rate	250 GS/s max.	250 GS/s max.	100 GS/s max.	100 GS/s max.	250 GS/s max.	100 GS/s max.	100 GS/s max.
Maximum Record Length							
1 channel	50 K (opt. 1M: 500 K, opt. 2M: 8 M)	50 K (opt. 1M: 500 K, opt. 2M: 8 M)	50 K (opt. 1M: 500 K, opt. 2M: 8 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 500 K, opt. 2M: 8 M)	50 K (opt. 1M: 500 K, opt. 2M: 8 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)
2 channels	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 130 K, opt. 2M: 2 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 250 K, opt. 2M: 4 M)	50 K (opt. 1M: 130 K, opt. 2M: 2 M)
3-4 channels	50 K (opt. 1M: 130 K, opt. 2M: 2 M)	50 K (opt. 1M: 130 K, opt. 2M: 2 M)	50 K (opt. 1M: 130K, opt. 2M: 2 M)	NA – –	50 K (opt. 1M: 130 K, opt. 2M: 2 M)	50 K (opt. 1M: 130 K, opt. 2M: 2 M)	NA – –
Max Sample Rate Window*3	2 ms	2 ms	4 ms	2 ms	2 ms	4 ms	2 ms
Display	NuColor™ Display	NuColor™ Display	NuColor™ Display	NuColor™ Display	monochrome	monochrome	monochrome

**1 In 50 Ω mode: 5 mV/div: 750 MHz, 2 mV/div: 600 MHz, 1 mV/div: 500 MHz. Make phrasing same as Reduce the upper bandwidth frequencies by 5 MHz for each degree C above 30 °C.*

**2 In 50 Ω mode: 1 mV/div: 450 MHz. Reduce the upper bandwidth frequencies by 2.5 MHz for each degree C above 30 °C.*

**3 Single-channel operating at full sample rate and maximum record length (Opt. 2M).*

**4 ≥ 10 mV/div in 50 Ω mode.*

**5 reduce for upper bandwidth frequency by 10 MHz °C above 30°C.*

Characteristics

ACQUISITION MODES

DPO – Captures and displays complex waveforms, random events, and subtle patterns in actual signal behavior. By acquiring up to 100M points/sec TDS 794D, TDS 784D, TDS 754D, TDS 580D, TDS 540D (50M points/sec; TDS 724D and TDS 520D) DPOs are able to provide 3 dimensions of signal information, in real-time; amplitude, time, and the distribution of amplitude over time. The DPX™ Waveform Imaging Processor automatically selects record lengths between 500 and 500,000 points and sample rate up to 1 GS/s, based on horizontal time base setting, to optimize displayed sample density.

Peak Detect – High frequency and random glitch capture. Captures glitches of 1 ns using acquisition hardware at all real-time sampling rates.

Sample – Sample data only.

Envelope – Max/min values acquired over one or more acquisitions.

Average – Waveform data from 2 to 10,000 (selectable) is averaged.

Hi –res – Vertical resolution improvement and noise reduction on low-frequency signal (e.g., 12-Bits typical).

FastFrame™ Time Stamp – Acquisition memory size segmentable with trigger rate up to 80,000 per second from 50 to 5,000 points per frame (independent of the number of channels).

Single Sequence – Use RUN/STOP button to capture a single triggered acquisition at a time, which may be automatically saved to NVRAM with AutoSave.

TRIGGER SYSTEM

Triggers – Main and delayed.

Main Trigger Modes – Auto, Normal, Single.

Delayed Trigger – Delayed by time, events, or events and time.

Time Delay Range – 16 ns to 250 s.

Events Delay Range – 1 to 9,999,999 events.

External Rear Input – ≥1.5 kΩ ; Max input voltage is ±20 V (DC + peak AC).

TRIGGER TYPES

EDGE (Main and Delayed) –
Conventional level-driven trigger. Positive or negative slope on any channel or rear panel auxiliary input. Coupling selections: DC, AC, noise reject, HF reject, LF reject.

LOGIC (Main) –
PATTERN: Specifies a logical combination (AND, OR, NAND, NOR) of the four input channels (high, low, don't care). Trigger when pattern stays true or false for a specified time.
STATE: Any logical pattern of channels 1, 2, and 3 (AUX1 on 2-CH products) plus a clock edge on channel 4 (AUX2 on 2-CH products). Triggerable on rising or falling clock edge.
SETUP/HOLD: Trigger on violations of both setup time and hold time between clock and data which are on two input channels.

TDS 500D/700D Series Vertical System

	TDS 794D	TDS 784D	TDS 754D	TDS 724D	TDS 580D	TDS 540D	TDS 520D
Sensitivity	10 mV/div to 1 V/div (50 Ω mode)	1 mV/div to 10 V/div (1 meg ohm mode), 1 mV/div to 1 V/div (50 Ω mode) (TDS 784D, TDS 754D, TDS 724D, TDS 580D, TDS 540D, TDS 520D only)					
DC Gain Accuracy	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)	±1.0% (±0.7% typical)
Effective Bits (typical)	4.5 (2 GHz @ 4 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	5.5 (1 GHz @ 4 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	6.8 (500 MHz @ 2 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	6.5 (490 MHz @ 1 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	5.5 (1 GHz @ 4 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	6.8 (500 MHz @ 2 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)	6.5 (490 MHz @ 1 GS/s) 9.7 with Hi-res (1 MHz @ 10 MS/s)
Vertical Resolution	8-Bits (256 levels on 10.24 divisions), >11-Bits with averaging, >13-Bits typical with Hi-res (TDS 794D, TDS 784D, TDS 580D), >12-Bits typical with Hi-res (TDS 754D, TDS 724D, TDS 540D, TDS 520D)						
Position Range	±5 divisions	±5 divisions	±5 divisions	±5 divisions	±5 divisions	±5 divisions	±5 divisions
Offset Range	+/–1 V from 1 mV to 100 mV/div, +/–10 V from 101 mV to 1 V/div, +/–100 V from 1.01 V to 10 V/div (TDS 784D, TDS 754D, TDS 724D, TDS 580D, TDS 540D, TDS 520D) +/–0.5 V from 10 mV to 50 mV/div, +/–0.25 V from 50.5 mV to 99.5 mV/div, +/–5 V from 100 mV to 500 mV/div, +/–2.5 V from 505 mV to 1 V/div (TDS 794D)						
Analog Bandwidth Selections	Full only	20 MHz, 250 MHz, full	20 MHz, 250 MHz, full	20 MHz, 250 MHz, full	20 MHz, 250 MHz, full	20 MHz, 250 MHz, full	20 MHz, 250 MHz, full
Input Coupling	DC, GND	AC, DC, GND	AC, DC, GND	AC, DC, GND	AC, DC, GND	AC, DC, GND	AC, DC, GND
Input Impedance Selections	1 MΩ in parallel with 10 pF, or 50 Ω (AC and DC coupling) (TDS 784D, TDS 754D, TDS 724D, TDS 580D, TDS 540D, TDS 520D) 50 Ω only (DC coupling only) (TDS 794D only)						
AC-coupled Low Frequency Limit	N/A	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.	≤10 Hz when AC 1 MΩ coupled. ≤200 kHz when AC 50 Ω coupled.
Channel Isolation	>100:1 at 100 MHz and >30:1 at the rated bandwidth						
Max. Input Voltage	5 V_{RMS}, with peaks ≤± 20 Volts	300 V CAT II ±400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.	300 V CAT II ±400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.	300 V CAT II ±400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.	±400 V (DC + peak AC). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.	300 V CAT II ±400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.	300 V CAT II ±400 V (peak). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.

Characteristics

PULSE (Main) –
GLITCH: Trigger on or reject glitches of positive, negative, or either polarity. Minimum glitch width is 1.0 ns with 200 ps resolution.
RUNT: Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again.
WIDTH: Trigger on width of positive or negative pulse either within or out of selectable time limits (1 ns to 1 s).
SLEW RATE: Trigger on pulse edge rates that are either faster or slower than a set rate. Edges can be rising, falling, or either.
TIMEOUT: Trigger on an event which remains high, low, or either, for a specified time period, selectable from 1 ns to 1 s, with 200 ps resolution.

COMM (Optional) –
AMI: Trigger on standard communications signals (including DS1, DS1A, DS1C, DS2, DS3, E1, E2, E3, STS-1, or a custom bit rate). Select between “isolated ones” (positive or negative) and eye diagrams.
CMI: Trigger on standard communications signals (including STS-3, STM1E, DS4NA, E4, or a custom bit rate). Select between positive or negative one pulses, zero pulses, and eye diagrams.
NRZ: Trigger on standard communications signals (including OC1/STM0, OC3/STM1, OC12/STM4, E5, FC133, FC266, FC531, FC1063, FDDI HALT, 143 Mb/s serial digital composite video, 270 Mb/s serial digital component video, or a custom bit rate). Select between an eye diagram, rising or falling edges, or any of eight 3-Bit serial patterns.

Characteristics Cont.

VIDEO (Optional) –
Trigger on a particular line of individual, odd/even, or all fields. Trigger on a specific pixel of a line by using the video trigger with delay by events.
525/NTSC: Choose monochrome or color (studio-quality NTSC) sync formats.625/PAL: Choose monochrome or color (studio-quality PAL) sync formats.HDTV: Choose from 1125/60, 1050/60, 1250/50, and 787.5/60 HDTV formats.

MEASUREMENT SYSTEM

Automatic Waveform Measurements – Period, frequency, + width, – width, rise time, fall time, + duty cycle, – duty cycle, delay, phase, burst width, high, low, max. min, peak to peak, amplitude, + overshoot, – overshoot, mean, cycle mean, RMS, cycle RMS, area, cycle area, extinction ratio (ratio, dB, %), and mean optical power. Continuous update of up to four measurements on any combination of waveforms.

Measurement Statistics – Display minimum and maximum or mean and standard deviation on any displayed single-waveform measurements.

Thresholds – Settable in percentage or voltage.

Gating – Any region of the waveform may be isolated for measurement using vertical bars.

Snapshot – Performs all measurements on any one waveform showing results from one instant in time.

Cursor Measurements – Absolute, Delta: Volts, Time, Frequency, and NTSC IRE and line number (with video trigger option).

Cursor Types – Horizontal bars (volts), vertical bars (time); operated independently or in tracking mode.

WAVEFORM PROCESSING

Waveform Functions – Sin(x)/x or linear interpolation, Average, Envelope.

Advanced Waveform Functions (optional on TDS 500D) – FFT, Integration, Differentiation.

Arithmetic Operators – Add, Subtract, Multiply, Divide, Invert.

Autoset – Single-button, automatic setup on selected input signal for vertical, horizontal, and trigger systems. Also automatically normalizes signals to standard masks when used with the mask testing option.

Waveform Limit Testing – Compares incoming or math waveform to a reference waveform's upper and lower limits.

Waveform Histograms – Both vertical and horizontal histograms, with periodically updated measurements, allow statistical distributions to be analyzed over any region of the signal. For histograms on DPO acquisitions, both live and stored, the specified region can be repositioned and will update to reflect the underlying 3 dimensional data base, in both YT and XY modes (32 bits in shallow mode, 64 bits in deep mode).

Mask Testing (Optional) – In addition to the standard communication masks in the instrument, the masks can be edited on the screen. Together with automatic waveform scaling, the mask tests give rapid verification of a digital bit stream's conformance to pulse templates and eye pattern masks. For optical conformance testing, the internal Fibre Channel and SONET/SDH optical reference receiver filters provide convenient test setup which is compliant to industry standards.

ZOOM CHARACTERISTICS

The zoom feature allows waveforms to be expanded or compressed in both vertical and horizontal axes. Allows precise comparison and study of fine waveform detail without affecting ongoing acquisitions. When used with Hi-res or Average acquisition modes, Zoom provides an effective vertical dynamic range or 1000 divisions or 100 screens. Zoom features not available on DPO operations.

Dual Window Zoom – Dual graticules simultaneously show selected and zoomed waveforms. Up to two zoom boxes show areas on the selected trace that are being magnified, and the two magnified areas can be overlapped for quick comparison. Color of zoomed trace matches selected trace.

DISPLAY CHARACTERISTICS

Waveform Style – Dots, vectors, variable persistence from 32 ms to 10 s, infinite persistence, and intensified samples.

Color (TDS 794D, TDS 784D, TDS 754D, TDS 724D) – Standard palettes and user-definable color for waveforms, text, graticules, and cursors. Measurement text and cursor colors matched to waveform. Waveform collision areas highlighted with different color. Statistical waveform distribution shown with color grading through variable persistence.

Color Grading (TDS 794D, TDS 784D, TDS 754D, TDS 724D) – With variable persistence selected, historical timing information is represented by temperature or spectral color scheme (or gray scale on TDS 580D, TDS 540D, TDS 520D) providing "z-axis" information about rapidly-changing waveforms.

Graticules – Full, grid, cross-hair, frame, and NTSC and PAL (with video trigger option).

Format –
YT and XY (and XYZ in DPO operation).

Type – 7 in. diagonal, NuColor™ liquid crystal full color shutter display, 256 color levels (TDS 700D); 7 in. diagonal, magnetic deflection, horizontal raster-scan monitor with P4 white phosphor (TDS 500D).

Resolution – 640 horizontal by 480 vertical displayed pixels (VGA).

COMPUTER INTERFACE

GPIB (IEEE-488.2) Programmability – Full talk/listen modes. Control of all modes, settings, and measurements.

Characteristics Cont.

HARDCOPY

Printer – HP Thinkjet, Deskjet, Laserjet, Epson, Interleaf, PostScript, TIFF, PCX, BMP, DPU411/412, RLE.

Plotter – HPGL.

Data – MathCad, spreadsheet formats.

Interface – GPIB standard.

Hardcopy Interface (optional on TDS 500D) – Centronics and RS-232 (talk only).

STORAGE

Non-volatile Waveform Storage – 4 full 50 K records (Opt. 1M or 2M: 4 full 130 K records, 2 full 250 K records, or 1 compressed 500 K record) (TDS 794D, TDS 784D, TDS 754D, TDS 580D, TDS 540D); 2 full 50 K records (Opt. 1M or 2M: 2 full 130 K records or 1 full 250 K record) (TDS 724D, TDS 520D).

Non-volatile Storage for Setups – 10 front panel setups.

Floppy Disk Drive – Store reference waveforms, setups, and image files on 3.5 in. 1.44 MB or 720 K DOS-format floppy disk.

Iomega Zip™ Drive Compatible – Compatible for waveform and front panel setup file transfer to Iomega Zip™ Drive.

POWER REQUIREMENTS

Line Voltage Range – 100 to 240 V RMS.

Line Frequency – 45 to 440 Hz.

Power Consumption – 350 W max.

ENVIRONMENTAL AND SAFETY

Temperature –
Operating: +4°C to +50°C (floppy not used), +10°C to +50°C (floppy in use). Non-operating: –22°C to +60°C.

Humidity –
Operating: To 80% RH at ≤32 °C. Derates to 30% RH at +45 °C. Non-operating: To 90% RH at ≤40 °C. Derates to 30% RH at +60 °C.

Altitude –
Operating: 15,000 ft. (hard disk not used), 10,000 ft. (hard disk in use). Non-operating: 40,000 ft.

Electromagnetic Compatibility – Meets or exceeds EN55011 Class A Radiated and Conducted Emissions; EN 50081-1; EN60555-2 Power Harmonics; FCC 47 CFR, Part 15. Subpart B, Class A; Australian EMC Framework; EN 50082-1

Safety – UL 3111-1, CSA-22.2 No. 1010.1

Physical Characteristics

Dimensions	mm	in.
Height with feet	193	7.6
Height without feet	178	7
Width with handle	445	17.5
Depth with front cover installed	434	17.1

Weight	kg	lbs.
Net approximately	14.1	31
Shipping Weight approximately	25.4	56

Ordering Information Cont.

TDS 794D Digital Phosphor Oscilloscope.

TDS 784D Digital Phosphor Oscilloscope.

TDS 754D Digital Phosphor Oscilloscope.

TDS 724D Digital Phosphor Oscilloscope.

TDS 580D Digital Phosphor Oscilloscope.

TDS 540D Digital Phosphor Oscilloscope.

TDS 520D Digital Phosphor Oscilloscope.

INCLUDED ACCESSORIES

Probes – 4 each P6139A passive probes (TDS 754D, TDS 540D), 2 each P6139A (TDS 724D, TDS 520D).

Documentation – Quick Reference in 9 languages (020-2235-00), User Manual (071-0130-00), Technical Reference (071-0135-00), Programmer's Manual (063-3006-00) in MS-Help format on floppy disk, and NIST, MIL-STD-45662A and ISO9000 calibration certificate.

Accessories – Front Cover (200-3696-01), US power cord (161-0230-01), and accessory pouch (016-1268-00; TDS 794D, TDS 784D, TDS 754D, TDS 724D).

INSTRUMENT OPTIONS

Opt. 05 – Add video trigger (NTSC, PAL, HDTV, FlexFormat™). (Not available on the TDS 794D)

Opt. 1M – Add 130 K/channel memory length (500 K max on TDS 794D, TDS 784D, TDS 754D, TDS 580D, TDS 540D) 250 K max (TDS 724D, TDS 520D).

Opt. 2M – Add 2M/channel memory length (8 M max on TDS 794D, TDS 784D, TDS 754D, TDS 580D, TDS 540D; 4 M max on TDS 724D, TDS 520D). Includes internal hard disk drive.

Opt. 13 (TDS 580D, TDS 540D, TDS 520D only) – Add RS-232C and Centronics hardcopy interfaces.

Opt. 2F (TDS 580D, TDS 540D, TDS 520D only) – Extended waveform math: FFT, integration, and differentiation.

COMMUNICATION SIGNAL ANALYZER OPTIONS

Opt. 2C – Communication Signal Analyzer; includes comm triggers and communication mask testing.

Opt. 3C – Short-wavelength (Fibre Channel FC133, FC266, FC513, FC1063) Optical Reference Receiver; includes P6701B and system calibration (Not Available on the TDS 794D).

Opt. 4C – Long-wavelength (SONET/SDH OC1/STM0, OC3/STM1, OC12/STM4) Optical Reference Receiver; includes P6703B and system calibration (Not Available on the TDS 794D).

INSTRUMENT PROBE OPTIONS*[1]

Opt. 31 (TDS 794D only) – Add 1 each P6339A buffered passive probe.

Opt. 32 (TDS 794D only) – Add 1 each P6217 active probe.

Opt. 33 (TDS 794D, TDS 784D, TDS 580D only) – Add 1 each P6158 low capacitance probe.

Ordering Information

Opt. 34 – Add 1 each P6247 differential probe.

Opt. 35 (TDS 754D, TDS 724D, TDS 540D, TDS 520D only) – Add 1 each P6243 active probe.

Opt. 36 (TDS 784D, TDS 754D, TDS 724D, TDS 580D, TDS 540D, TDS 520D only) – Add 1 each P6139A passive probe. (4 standard on TDS 754D, TDS 540D, 2 standard on TDS 724D, TDS 520D).

Opt. 37 (TDS 784D and TDS 580D only) – Add 1 each P6245 active probe.

Opt. 2D (TDS 724D, TDS 520D only) – Delete 2 each standard probes.

Opt. 4D (TDS 754D, TDS 540D only) – Delete 4 each standard probes.

*1 A maximum of six (6) of each probe option may be ordered with the TDS 500D or TDS 700D Oscilloscope at the time of initial purchase. The probe option price represents a 30% savings from catalog price, when ordered separately.

INSTRUMENT APPLICATIONS MEASUREMENT SOFTWARE

TDSRTE1 – Applications specific real-time environment software. (Required for TDS 500D/700D to compatible with all application measurement packages.)

TDSPRT1 – Printing Utility.

TDSDDM1 – Disk drive measurement package.

TDSPWR1 – Power measurement package.

OPTIONAL POWER CORDS

Opt. A1 – European power cord (220 V, 50 Hz).

Opt. A2 – UK power cord (240 V, 50 Hz).

Opt. A3 – Australian power cord (240 V, 50 Hz).

Opt. A4 – North American power cord (240 V, 60 Hz).

Opt. A5 – Swiss power cord (220 V, 50 Hz).

OPTIONAL ACCESSORIES

Opt. 1K – Add K420 scope cart.

Opt. 1R – Rackmount kit.

Opt. L1 – Substitute French user manual for English user manual.

Opt. L3 – Substitute German user manual for English user manual.

Opt. L5 – Substitute Japanese user manual for English user manual.

Opt. L9 – Substitute Korean user manual for English user manual.

RECOMMENDED PROBES

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 – 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.

P6339A – 500 MHz buffered passive voltage probe (TDS 794D only).

P6246 – 400 MHz differential probe.

P6247 – 1 GHz differential probe.

P6563A – SMD passive voltage probes.

P6701B – Short-wavelength (500-950 nm) optical-to-electrical converter.

P6703B – Long-wavelength (1100-1700 nm) optical-to-electrical converter.

P6723 – Optical logic probe (1310/1550 nm).

TCP202 – DC to 50 MHz current probe.

RECOMMENDED ACCESSORIES

Service Manual – TDS 500D/600B/700D. Order (071-0136-00).

GPIB – LAN Adapter – Order AD007.

Transit Case – Order 016-01135-00.

Scope Cart – Order K420.

SOFTWARE

S3FT400 – WaveWriter™ AWG and waveform creation software.

WSTR0 – WaveStar™ waveform capture and documentation software.

MEASUREMENT SERVICE OPTIONS

Opt. C3 – Three years of Calibration Services.

Opt. C5 – Five years of Calibration Services.

Opt. D1 – Cal Data Report.

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

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

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

For further information, contact Tektronix:

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