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TDS460A 400 MHz, four channel, personal lab scope.

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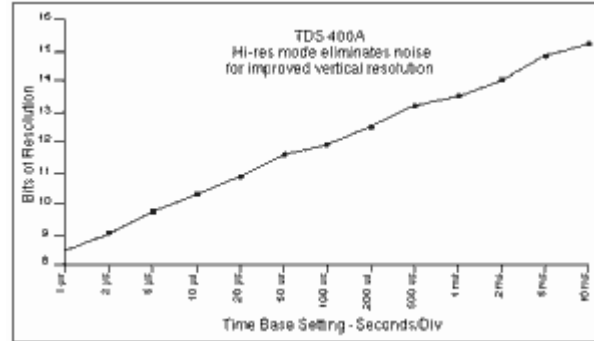
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TDS400 Series

CHARACTERISTICS



TDS400A Theoretically achievable resolution with TDS400A Hi-res mode.

Signal Acquisition System

Bandwidth - 200 MHz (TDS420A), 400 MHz (TDS430A, TDS460A).

Channels - 4 (2 on TDS430A).

Sample Rate - 100 MS/s on all channels.

Sensitivity - 1 mV to 10 V/div (with calibrated fine adjust).

Position Range - ± 5 Divisions.

Offset Range - ± 1 V from 1 mV/div to 99.5 mV/div; ± 10 V from 100 mV/div to 995 mV/div; ± 100 V from 1 V/div to 10 V/div.

DC Gain Accuracy - ± 1.5%.

Vertical Resolution - 8-Bit (256 levels over 10.24 vertical divisions).

Analog Bandwidth Selections - 20 MHz, 100 MHz and full.

Input Coupling - AC, DC or GND.

Input Impedance Selections - 1 MΩ in parallel with 15 pF or 50 Ω (AC and DC coupling).

Maximum Input Voltage - 300 V CAT II ± 400 V_p. Derate at 20 dB/decade above 1 MHz. 1 megaohm or GND coupled.

Channel Isolation - > 100:1 at 100 MHz for any two channels.

AC Coupled Low Frequency Limit - ≤ 10 Hz when AC 1 MΩ coupled. ≤ 200 kHz when AC 50 Ω coupled.

Acquisition Modes

Peak Detect - High frequency and random glitch capture. Captures glitches of 10 ns using acquisition hardware at all real-time sampling rates.

Sample - Sample data only.

Envelope - Max/min values acquired over one or more acquisitions, selectable from 2 to 2000, infinite.

Average - Waveform averages selectable from 2 to 10,000.

Hi-res - Vertical resolution improvement and noise reduction on low-frequency signals, e.g. 12-Bit at 10 ms/div and slower. Enhanced vertical resolution (>12-Bit) for noise reduction, on low frequency signals. Make precise low-level signal measurements (up to 5 μ V) with differential amplifier (ADA400A).

Time Base System

Time Bases - Main, Delayed.

Time/Division Range - 1 ns to 20 s/div.

Time Base Accuracy - 0.015% over any interval \geq 1 ms.

Record Length (Real Time and Equivalent Time) - Sample points per channel: 500 to 120,000 points (with Opt. XL).

Pre-trigger Position - Selectable from 0 to 100% of record.

Triggering System

Triggers - Main, Delayed.

Main Trigger Modes - Auto, Normal, Single Sequence.

Delayed Trigger - Delayed by time or events.

Time Delay Range - 0 ns to 20 s.

Events Delay Range - 2 to 10,000,000 events.

External Rear Input - > 1.5 k Ω ; max input voltage is \pm 6 V (DC + AC peak).

Video Trigger Types - NTSC, PAL, SECAM and custom; TV field, field 2 or both, any line within a field. Line rates - 10 kHz to 64 kHz, interlaced, noninterlaced, composite.

Video Trigger Sensitivity - 0.6 divisions of composite SYNC will achieve a stable display.

Display

Waveform Style - Dots or vectors. Infinite and variable persistence from 250 ms to 10 s.

Gray Scaling - With variable persistence selected, waveform points gradually decay through 16 levels of intensity, providing "z-axis" information about rapidly changing waveforms.

Update Rate - 200 ea. 500 point wfms/s with infinite persistence mode selected.

Graticules - Full, grid, cross hair, frame.

Format - YT and XY.

VGA Out - Drives VGA display monitors.

Zoom

The zoom feature allows waveforms to be expanded, compressed and positioned 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 of 1000 divisions or 100 screens.

Measurement System

Automatic waveform measurements	
Period	Frequency
High	Low
+ Width	- Width
Maximum	Minimum
Rise	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	-

Continuous update of up to four measurements on any combination of waveforms.

Thresholds - Settable in percentage or voltage.

Gated - Any region of the record 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.

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

Waveform Processing

Waveform Functions - Interpolate-selectable $\sin(x)/x$ or linear, Average, Envelope.

Advanced Waveform Functions - FFT, Integration, Differentiation (Opt. XL).

Arithmetic Operators - Add, Subtract, Multiply, Invert.

Autosetup - Single button, automatic setup on selected input signal for vertical, horizontal and trigger systems.

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

Computer Interface

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

Hardcopy/Desktop Publishing

Printer - HP ThinkJet, Epson, PostScript, Interleaf, DeskJet, LaserJet, TIFF, PCX, BMP (Microsoft Windows).

Plotter - HPGL.

Interface - GPIB standard.

Hardcopy Interface - Centronics Type and RS-232 (Opt. XL).

Storage

Waveforms - 120,000 waveform points of nonvolatile storage (with Opt. XL).

Floppy Drive - 3.5 in. 1.44 MB or 720 KB MS DOS compatible (store waveforms, screen data, and setups)*¹.

Setups - 10 front-panel setups.

CRT

Type - 7 in. diagonal, magnetic deflection. Horizontal raster-scan. P31 green phosphor.

Resolution - 640 horizontal by 480 vertical displayed pixels.

Power Requirements

Line Voltage Range - 90 to 250 V_{RMS}.

Line Frequency - 48 to 440 Hz.

Power Consumption - 240 W max.

Environmental and Safety

Temperature - Operating: 0 °C to +50 °C. Nonoperating: -40 °C to +75 °C.

Humidity - Operating and nonoperating: Up to 95% relative humidity at or below +40 °C; to 75% relative humidity from +41 °C to +50 °C.

Altitude - Operating: 15,000 ft., nonoperating: 40,000 ft.

Electromagnetic Compatibility - 89/336/EEC.

Safety - UL3111-1, CSA1010.1, EN61010-1, IEC61010-1.

Physical Characteristics

Dimensions	mm	in.
Height	165	6.4
w/acc. pouch	191	7.5
Width	362	14.25
Depth w/front cover installed	490	19.28
Depth w/handle extended	569	22.4
Weight	kg	lbs.
Net approximately	10.2	22.5
Shipping approximately	14.5	32

* ¹ Waveforms can be stored to file in MathCAD and Spreadsheet (Excel®, Lotus 1-2-3®) formats for analysis.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



Product(s) are manufactured in ISO registered facilities.



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3GW-10375-4B, 13-NOV-2006



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