# Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 2 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, covering the cost of warranty returns BOTH ways (plus supplying a loan unit, if available) and supplying a free business tool with every order.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based near Heathrow Airport in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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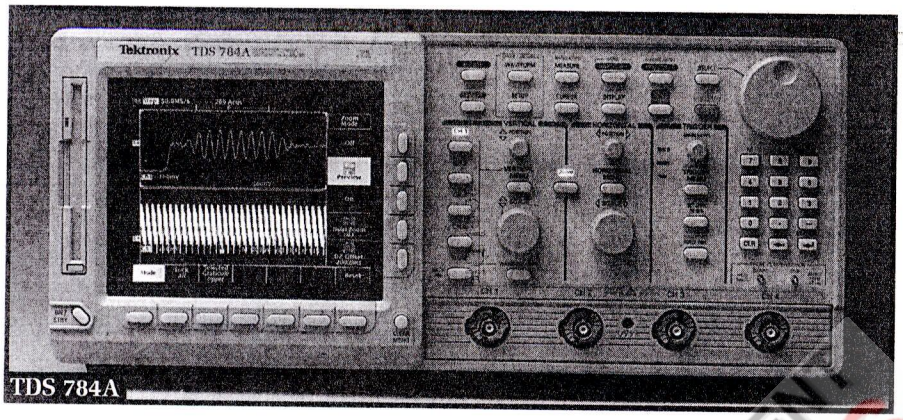
# Digitizing Oscilloscopes

## TDS 784A
## TDS 744A




*Featuring the waveform capture rate of the fastest analog oscilloscopes in a state-of-the-art DSO for advanced digital design, analog design, and R&D applications.*

**TDS 784A/TDS 744A**

- 1 GHz and 500 MHz Bandwidth
- Sample Rates to 4 GS/s
- 4 Input Channels
- InstaVu™ Acquisition Mode
- Pulse Width, 1 ns Glitch, Runt, Pattern and State, Setup & Hold Violation, and Slew Rate Triggering
- HDTV Video Triggering
- 1 mV/div to 10 V/div Sensitivity
- Infinite and Variable Persistence Displays
- Record Lengths to 500,000 Points
- 8-bit Vertical Resolution and up to 13-bit Resolution with Hi-Res Acquisition Mode
- Vertical Accuracy to 1%
- FFT, Integration and Differentiation
- 25 Automatic Measurements
- High Resolution Color Monitor
- 3.5 in. DOS Format Floppy Drive
- VGA-Output to External Monitor
- Waveform Pass/Fail Testing
- 1 ns Peak Detect
- FastFrame™ Acquisition Mode
- 3 Year Warranty

## Characteristics

### SIGNAL ACQUISITION SYSTEM

| | TDS 744A | TDS 784A |
|---|---|---|
| Channels | 4 | 4 |
| Samplers | 4 | 4 |
| Bandwidth | 500 MHz | 1 GHz |
| Maximum Sample Rate | | |
| 1 Channel | 2 GS/s | 4 GS/s |
| 2 Channels | 1 GS/s | 2 GS/s |
| 3, 4 Channels | 500 MS/s | 1 GS/s |

### MAXIMUM RECORD LENGTH

| TDS 784A/744A | Standard | Optional |
|---|---|---|
| 1 Channel | 50,000 pts | 500,000 pts |
| 2 Channels | 50,000 pts | 250,000 pts |
| 3, 4 Channels | 50,000 pts | 130,000 pts |

**TIME BASE SYSTEM**

**Time Bases –** Main, Delayed.

**Time/Division Range –**
TDS744A: 500 ps to 10 s/div.
TDS784A: 200 ps to 10 s/div.

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

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

**Delay Between Channels –** ≤50 ps between any two channels with equal V/div and coupling.

**VERTICAL SYSTEM**

**DC Gain Accuracy –** ±1.0%.

**Vertical Resolution –** 8-bits (256 levels over 10.24 vertical divisions), >13-bits with Hi-Res, 11-bits with averaging.

**Analog Bandwidth Selections –** 20 MHz, 100 MHz, and full.

**Input Coupling –** AC, DC or GND.

**Input Impedance Selections –** 1 MΩ in parallel with 10 pF, or 50 Ω (AC and DC coupling).

**APPLICATIONS**

- **Digital Design and Debug**
- **Analog Design and Debug**
- **Research and Development**

Product(s) available through your local Tektronix representative (listed in the back of this catalog).

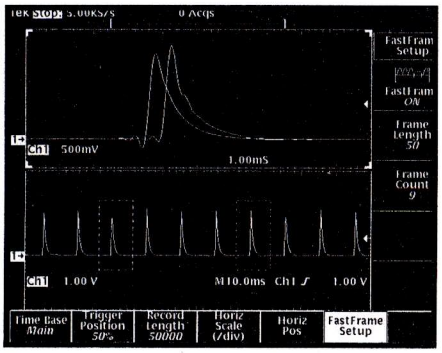
GPIB IEEE-488 The TDS Series complies with IEEE Standard 488.2-1987, and with Tektronix Standard Codes and Formats.

ISO 9001 ACCREDITED BY THE DUTCH COUNCIL FOR CERTIFICATION

Tektronix Measurement products are manufactured in ISO registered facilities.

# TDS 784A
# TDS 744A

# Digitizing Oscilloscopes




*Dual window zoom is effective for managing the 500 K acquisition memory. FastFrame™ allows you to capture multiple events in a single record.*

**Maximum Input Voltage –** ±400 V (DC + peak AC). Derate at 20 dB/decade above 1 MHz. 1 MΩ or GND coupled.

**Channel Isolation –** >100:1 at 100 MHz and >30:1 at bandwidth for any two channels having equal V/div settings.

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

**Effective Bits –**
TDS 784A: 6.0-bits (1 GHz at 4 GS/s), 9.3-bits with Hi-Res (1 MHz at 25 MS/s).
TDS 744A: 6.6-bits (500 MHz at 2 GS/s); 9.3-bits with Hi-Res (1 MHz at 25 MS/s).

**Step Response Setting –** ≤0.5% error within 20 ns of a ≤2 V step.

**Sensitivity –** 1 mV to 10 V/div.

**Position Range –** ±5 Divisions.

**Offset –** ±1 V from 1 to 100 mV/div. ±10 V from 101 mV to 1 V/div. ±100 V from 1.01 to 10 V/div.

## ACQUISITION MODES

1 ns Peak Detect, Sample, Single Sequence, Envelope, Average, Hi-Res, FastFrame™, InstaVu™ acquisition.

## TRIGGERING SYSTEM

**Triggers –** Edge (main and developed), Pulse (Width, 1 ns Glitch, Runt and Slew Rate), Logic (Pattern, State, and Setup & Hold Time Violation), HDTV Video (optional).

**Main Trigger Modes –** Auto, Normal, Single.

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

## DISPLAY

**Monitor –** 7 in. NuColor™ liquid crystal full-color shutter, 256 levels.

**Waveform Style –** Dots, vectors, variable persistence with color grading, infinite persistence, and intensified real samples.

**Format –** YT, XY, Zoom, Fit-to-Screen, Zoom, Dual Window Zoom.

**Waveform Capture Rate –**
InstaVu™ acquisition: >400,000 wfm/sec.
Infinite persistence (500 pts): 150 wfm/sec.

## MEASUREMENT SYSTEM

**Automatic Measurements –** 25 (on entire record or in gated region).

**Measurement Accuracy –** TDS 744A: <80 ps typical @ 2 GS/s single shot, TDS 784A: <38 ps typical @ 4 GS/s single shot.

**Cursors Measurements –** Absolute, Delta; volts, time, frequency. NTSC IRE units and line number with video trigger option.

## WAVEFORM PROCESSING

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

**Advanced Waveform Functions –** FFT, Integration, Differentiation, Waveform (math or acquired) Limit Testing.

**Arithmetic Operations–** Add, Subtract, Multiply, Divide, Invert.

# Digitizing Oscilloscopes

**TDS 784A**
**TDS 744A**

**HARDCOPY/DESKTOP PUBLISHING**
**Hardcopy Ports –** GPIB, RS-232, Centronics.

**Hardcopy Formats –** Epson, ThinkJet, DeskJet, LaserJet, PostScript, TIFF, PCX, BMP, DPU 411/412, RLE, HPGL, Interleaf.

**Floppy Drive –** 3.5 in. 1.44 MB or 730 kB DOS compatible.

**DATA FORMATS**
MathCad and spreadsheet.

**COMPUTER INTERFACE**
**GPIB (IEEE 488.2) –** Full Programmability.

**AUXILIARY INPUTS/OUTPUTS**
Video output (15-Pin VGA, full color); External Trigger input; Main and Delay Trigger outputs;
CH 3 Signal output.

**STORAGE**
**Waveform Storage –** NVRAM: Four 50 K pt. waveforms. Two full 130 K pt., one full 250 K pt., or one compressed 500 K pt. waveform with Option 1M. 1.44 MB Floppy Disk: 1,436 50 K pt. to 119,008 500 pt. waveforms.

**AutoSave –** Automatic storage of single sequence waveforms to NVRAM.

**Setup Storage –** 10 front panel setups.

**POWER REQUIREMENTS**
**Line Voltage Range –** 90 to 250 V RMS.

**Line Frequency –** 45 to 440 Hz.

**Power Consumption –** 300 W.

**PROBES**
**Passive P6139A (Standard with TDS 744A) –** 10 X, 8 pF, 500 MHz.

## Accessories

**P6139A**
*Passive Probing*
- 500 MHz
- 10X, 8 pF/1 MΩ
- 1.3 m

**P6205**
*Active Probing*
- 750 MHz
- 10X, 1 pF/1 MΩ
- 1.35 m

**NEW P6245**
*Active Probing*
- 1 GHz
- 10X, 1 pF/1 MΩ
- 1.5 m



## ORDERING INFORMATION

**TDS 784A**
Four-channel Color 1 GHz Digitizing Oscilloscope

**TDS 744A**
Four-channel Color 500 MHz Digitizing Oscilloscope

**TDS 700A includes:** Four each P6139A Passive Probes (TDS 744A only); Quick Reference Guide (070-8999-01); User Manual (070-8991-01); Programmer's Manual (070-8709-06); Technical Reference Manual (070-8990-02); Front Cover (200-3696-01); Accessory Pouch (016-1268-00); U.S. Power Cord (161-0230-01).

**Opt. 05 –** Video Trigger, NTSC, PAL, HDTV, FlexFormat™

**Opt. 1K –** K420 Scope Cart

**Opt. 1M –** 500 K Memory Length
TDS 784A
TDS 744A

**Opt. 1R –** Rackmount

**Opt. 2P –** Tektronix Phaser™ 200e Thermal Wax Transfer Color Printer

**Opt. 23 –** (TDS 744A only) Additional Two each P6205 Active Probes

**Opt. 24 –** (TDS 784A only) Four each P6139A 10 X Passive Probes

**Opt. 26 –** (TDS 784A only) Four each P6245 Active Probes

**Opt. 95 –** NIST, MIL-STD 45332A, and ISO 9000 Calibration Certification

**Opt. 96 –** Calibration Data

**RECOMMENDED ACCESSORIES**
See page 338 for complete selection information.

**INTERNATIONAL POWER PLUG OPTIONS**
**Opt. A1 – A5**
See General Customer Information Section for additional description.

**SERVICE ASSURANCE OPTIONS**
**Opt. R2 –** Adds two years of post-warranty Repair Protection

**Opt. C5 –** Adds five years of Calibration Services

**PRODUCT UPGRADES**
**HDTV Video Trigger –** TDS7F05

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