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Digital Phosphor Oscilloscopes

TDS 3012 • TDS 3014 • TDS 3032 • TDS 3034 • TDS 3052 • TDS 3054



Features and Benefits

- 500 MHz, 300 MHz, and 100 MHz Bandwidths
- Sample Rates up to 5 GS/s
- 2 or 4 Channels
- Full VGA Color LCD on all Models
- Built-in Floppy Disk Drive For Easy Storage and Documentation
- 21 Automatic Measurements
- Centronics Port Standard on all Models for Quick, Convenient Hardcopies
- 9-bit Vertical Resolution
- Multi-Language User Interface
- QuickMenu User Interface Mode for Quick, Easy Operation
- Advanced Triggers, such as, Glitch, Width, and Logic
- Telecommunications Mask Testing (TMT)
- Fast Fourier Transform (FFT) for Frequency and Harmonic Analysis
- Extended Video Application Module
- Support for Active Probes, Differential Probes, and Current Probes that Provide Automatic Scaling and Units

Applications

- Telecommunications Manufacturing (Telecom Mask Test Application Module for Pass/Fail Compliance of ITU-T G.703 and ANSI T1.102 (Up to STS-1 Rates) Standards)
- Digital Design and Debug
- Video Design and Service (Video Application Modules Offer Line Count, HDTV and Custom Video Trigger, Video Display Graticules, SDI to Analog Video Conversion with Composite and Component Outputs, Video Picture Identification and Vectorscope)
- Industrial Electronic Design
- Power Supply Design
- Connected Instrumentation (10Base-T LAN, GPIB and VGA Modules with RS-232)
- Highly Mobile Environments (Optional Battery Pack for Convenient Use in the Field or Away from the Bench)

The TDS 3000 Series of Digital Phosphor Oscilloscopes

The TDS 3000 oscilloscopes are the lowest priced, most portable Digital Phosphor Oscilloscopes (DPOs). Now every design engineer and technician can take advantage of the tremendous benefits of DPOs. DPOs deliver a new level of insight that makes dealing with complex signals simple. DPOs display, store, and analyze, in real-time three dimensions of signal information: amplitude, time, and distribution of amplitude over time.

BENEFITS OF DPO

DPOs have an intensity graded color display that provides information about the frequency of occurrence of signal amplitudes and widths. This helps the user locate and characterize waveform anomalies that can be elusive on traditional Digital Storage Oscilloscopes. The fast update rate of DPOs also makes it easier to capture and display infrequent waveforms or waveform variations.

Tektronix®

QUICK TO LEARN AND QUICK TO USE

The TDS 3000 Series graphical user interface offers a new operating mode called QuickMenu. This quick access user interface makes the main oscilloscope controls accessible with a push of a single button. Included with every scope is an On-Line Tour disk that runs in the oscilloscope. This disk gives an overview of the product's operation and capabilities.

FLEXIBLE FEATURES FOR EVERY APPLICATION

The portable form factor allows the instrument to go wherever it is needed. The Communication and Application Modules enable the instrument to be configured for specific applications or upgraded without returning it to the manufacturer. The TekProbe® Level II interface provides power to a range of application specific accessories.

APPLICATION MODULES

With the application module concept, the TDS 3000 Series can be easily adapted to the needs of the user. These modules are easily installed by the user. At power on the scope indicates which modules are installed. Currently, there are five application modules available for the TDS 3000 Series – a telecommunications mask test module, an FFT module, an advanced trigger module, a 601 digital video module and an extended video module. In addition, there are three communication modules available – a 10Base-T LAN/RS-232 module, a GPIB/RS-232 module and a VGA/RS-232 module. Centronics port is standard.

Characteristics

TDS 3000 Series Electrical Characteristics

	TDS 3012	TDS 3032	TDS 3052	TDS 3014	TDS 3034	TDS 3054
Bandwidth	100 MHz	300 MHz	500 MHz	100 MHz	300 MHz	500 MHz
Channels	2	2	2	4	4	4
Sample Rate on Each Channel	1.25 GS/s	2.5 GS/s	5 GS/s	1.25 GS/s	2.5 GS/s	5 GS/s
Maximum Record Length	10K points on all models					
Vertical Resolution	9-bits on all models					
Vertical Sensitivity (/div)	1 mV-10 V on all models					
Vertical Accuracy	±2% on all models*					
Max Input Voltage (1 MΩ)	150V RMS CAT I on all models					
Position Range	± 5 div on all models					
BW Limit	20 MHz	20, 150 MHz	20, 150 MHz	20 MHz	20, 150 MHz	20, 150 MHz
Input Coupling	AC, DC, GND on all models					
Input Impedance Selections	1 MΩ in parallel with 13 pF, or 50 Ω					
Time Base:Range (/div)	4 ns – 10 s/div	2 ns – 10 s/div	1 ns – 10 s/div	4 ns – 10 s/div	2 ns – 10 s/div	1 ns – 10 s/div
Accuracy	200 ppm	200 ppm	200 ppm	200 ppm	200 ppm	200 ppm
Display Monitor	Color LCD					

** Derated at 0.07%/°C for temperatures above +28°C and below +18°C.*

ACQUISITION MODES

Peak Detect – High frequency and random glitch capture. Captures glitches as narrow as 1 ns.
Sample – Sample data only.
Envelope – Max/Min values acquired over one or more acquisitions.
Average – Waveform data from 2 to 572 (selectable) acquisitions is averaged.
Single Sequence – Use SINGLE SEQUENCE button to capture a single triggered acquisition sequence at a time.

TRIGGER SYSTEM

Main Trigger Modes – Auto (supports Roll Mode for 40 ms/div and slower), Normal.
B Trigger – Trigger after time or events.
Trigger After Time Range – 13.2 ns to 50 s.
Trigger After Events Range – 1 to 9,999,999 events.
External Trigger Input (available on TDS 30X2 only) **–** >1 MΩ in parallel with 17 pF; Max input voltage is 150 V RMS.

TRIGGER TYPES

Edge – Conventional level-driven trigger. Positive or negative slope on any channel. Coupling selections: DC, noise reject, HF reject, LF reject.
Video – Trigger on all lines or individual line, odd/even or all fields, or analog HDTV formats (1080i, 1080p, 720p, 480p). See optional TDS 3VID and TDS 3SDI application modules for extended video triggering and measurement features.
Logic (Standard on TDS 30X4, must purchase TDS 3TRG for TDS 30X2) **–**
PATTERN: Specifies AND, OR, NAND, NOR when true or false for a specific time.
STATE: Any logic state. Triggerable on rising or falling edge, of a clock.

Note: Logic triggers can only be used on combinations of 2 inputs.

Pulse (Standard on TDS 30X4, must purchase TDS 3TRG for TDS 30X2) **–**
WIDTH (or GLITCH): Trigger on pulse width less than, greater than, equal to, or not equal to a selectable time limit ranging from 39.6 ns to 50s.
RUNT: Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again.
SLEW RATE: Trigger on pulse edge rates that are either faster or slower than a set rate. Edges can be rising, falling, or either.

Comm (must purchase TDS 3TMT) **–** provides isolated pulse triggering required to perform DS1/DS3 telecommunications mask testing per ANSI T1.102 standard.

MEASUREMENT SYSTEM

Automatic Waveform Measurements –
Period, Frequency, +Width, –Width, Rise Time, Fall Time, +Duty Cycle, –Duty Cycle, +Overshoot, –Overshoot, High, Low, Max, Min, Pk-Pk, Amplitude, Mean, Cycle Mean, RMS, Cycle RMS, Burst Width.
Display any four measurements from any combination of waveforms.

Thresholds – Settable in percentage or voltage.

Gating – Measurements can be gated using the screen or vertical cursors.

Characteristics (Continued)

WAVEFORM PROCESSING

Deskew – Channel to channel deskew ±10 ns may be manually entered for better timing measurements and more accurate math waveforms.
Arithmetic Operators – Add, Subtract, Multiply, Divide.
Autoset – Single-button, automatic setup on selected input signal for vertical, horizontal, and trigger systems.

DISPLAY CHARACTERISTICS

Graticules – Full, grid, cross-hair, frame, NTSC, PAL, SECAM, vectorscope 100% and 75% color bars (with optional TDS 3VID and TDS 3SDI video application modules).
Format – YT, XY and Gated XYZ (XY with Z-axis blanking available on TDS 30X4 only).

I/O INTERFACE

Hardcopy Port (standard) – Centronics-type parallel.
TDS 3GM Communications Module –
GPIB (IEEE –488.2) Programmability: Full talk/listen modes; Control of all modes, settings, and measurements.
RS-232-C Interface Programmability: Full talk/listen modes; Control of all modes, settings, and measurements. Baud Rate up to 38,400. DB-9 male connector.
Programmer Manual: (071-0381-00).

TDS 3VM Communications Module –
VGA: Monitor output for direct display on large VGA-equipped monitors. DB-15 female connector, 31.6 kHz sync rate, EIA RS-343A compliant.
RS-232-C Interface Programmability: same as TDS 3GM.
Programmer Manual: same as TDS 3GM.

TDS 3EM Communications Module –
Ethernet Port: 10Base-T with RJ-45 connector. Provides local area network printing and programming interface.
RS-232-C Interface programmability: same as TDS 3GM.
Programmer Manual: same as TDS 3GM.

Note: Only one Communication Module may be installed at a time.
All Communication Modules include WaveStar™ Software for oscilloscopes 30-day, full-functioning product demo.

HARD COPY CAPABILITY

Graphics File Formats – Interleaf (.img), TIF, PCX (PC Paintbrush), BMP (Microsoft Windows), and Encapsulated Postscript (EPS).
Printer Formats – Bubblejet, DPU-3445, Thinkjet, Deskjet, Laserjet, Epson (9 and 24-pin).

ENVIRONMENTAL AND SAFETY

Temperature – +5 to +50°C (operating), –20 to +60°C (nonoperating).
Humidity – 20% to 80% RH below 32°C, derate to 30% RH at 45°C (operating), 5% to 90% RH below 41°C, derate to 30% RH at 60°C (nonoperating).
Altitude – to 3,000 m (operating), 15,000 m (nonoperating).
Electromagnetic Compatibility – Meets or exceeds EN55011 Class A Radiated and Conducted Emissions; EN50082-1; FCC 47 CFR, Part 15, Subpart B, Class A; Australian EMC Framework; Russian GOST EMC regulations.
Safety – UL3111-1, CSA1010.1, EN61010-1, IEC61010-1.

Physical Characteristics

Instrument

Dimensions	**mm**	**in.**
Width	375.0	14.8
Height	176.0	6.9
Depth	149.0	5.9
Weight	**kg**	**lb.**
Instrument only	3.2	7.0
w/battery	5.2	11.5

Ordering Information

TDS 3012, TDS 3014, TDS 3032, TDS 3034, TDS 3052, TDS 3054

STANDARD ACCESSORIES

Probes: 2 each P3010 10X passive probes (TDS 3012), 4 each P3010 10X passive probes (TDS 3014), 2 each P6139A 10X passive probes (TDS 3032, TDS 3052), 4 each P6139A 10X passive probes (TDS 3034, TDS 3054).

Documentation: Quick Reference Manual, User Manual, On-line Tour Disk, Front panel overlay for non-English languages.

Application Modules (TDS 3014, TDS 3034, TDS 3054 only): TDS 3FFT, TDS 3TRG.

Power Cord.

Accessory Tray.

Protective Front Cover: has holder for reference manual and/or 3.5 in. floppy disks.

NIST-Traceable Certificate of Calibration.

WARRANTY INFORMATION

Three year warranty covering all labor and parts, excluding probes.

INTERNATIONAL POWER PLUGS

Standard – US (161-0104-00).
Opt. A1 – Universal Euro 220 V, 50 Hz (161-0104-06).
Opt. A2 – United Kingdom 240 V, 50 Hz (161-0104-07).
Opt. A3 – Australia 240 V, 50 Hz (161-0104-05).
Opt. A5 – Switzerland 220 V, 50 Hz (161-0167-00).
Opt. A6 – Japan 3 to 2 wire adapter (013-0310-00).

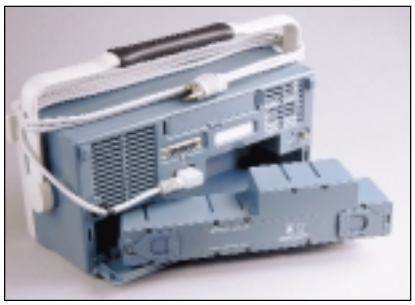
INTERNATIONAL USER MANUALS (TDS 3000 SERIES, TDS 3FFT, TDS 3TRG, TDS 3VID, TDS 3TMT)

Standard – English.
Opt. L1 – French.
Opt. L2 – Italian.
Opt. L3 – German.
Opt. L4 – Spanish.
Opt. L5 – Japanese.
Opt. L6 – Portuguese.
Opt. L7 – Simplified Chinese.
Opt. L8 – Traditional Chinese.
Opt. L9 – Korean.
Opt. LR – Russian. (TDS 3000 products only)

INSTRUMENT ACCESSORIES

TDS 3SDI – 601 Digital Video Module.

Converts ITU-R BT.601 format serial digital video to analog video. Automatically detects and displays 525/60 and 625/50 formats. Provides composite and component (RGB, YPbPr, or YC) outputs. Provides auto equalization for cable lengths up to 250 m and EDH and counting for incoming SDI signal. Adds video picture mode with on-screen line select and vectorscope mode with 100% and 75% color bars. Adds triggering and vectorscope graticules for analog HDTV. Includes full functionality of TDS 3VID Extended Video Applications module. Includes special output cable and four 75 Ω terminators. Ships with Quick Reference and User Manuals in 10 languages. (Russian not available.)



TDS 3BAT – Battery Pack being installed.



Application Module being installed.

Ordering Information (Continued)

TDS 3TMT – Telecom Mask Testing Application Module. Adds Pass/Fail mask testing for compliance to telecommunications standards:

- ITU-T G.703 (DS0, DS1, E1, Clk Interface, DS2, E2, E3, and DS3 rates)
- ANSI T1.102 (DS1, DS1A, DS1C, DS2, DS3, STS-1 rates)
- Customize (edit) masks using WaveStar™ software for oscilloscopes (Version 2.3) mask editing tool

TDS 3FFT – FFT Application Module (standard on TDS 30X4). Adds FFT measurement capabilities in dB or linear RMS scales. A selection of four FFT windows (Rectangular, Hamming, Hanning, and Blackman-Harris) are provided.

TDS 3TRG – Advanced Trigger Application Module (standard on TDS 30X4). Adds Logic and Pulse triggering described under Trigger Types (page 2).

TDS 3VID – Extended Video Application Module. Adds line count triggering, custom video scan and field rates, readout in mV or IRE units, and includes 75 Ω terminator.

TDS 3EM – 10Base-T Ethernet (LAN) and RS-232 interfaces.

TDS 3GM – GPIB and RS232 interfaces.

TDS 3VM – VGA port and RS232 interface.

TDS 3BAT – Battery pack for up to 2 hours continuous operation without line power. Note: the instrument must be grounded at all times.

TDS 3CHG – Fast charger for battery pack.

AC3000 – Soft case for carrying instrument.

HCTDS32 – Hard plastic case for carrying instrument.

RM3000 – Rackmount kit.

Service Manual (TDS 3000 Series) – English Only (071-0382-00).

TDS 3GM, TDS 3VM and TDS 3EM Programmers Manual – English Only (071-0381-00).

WSTRO – WaveStar™ Software for Oscilloscopes, Windows 95/98/NT 4.0 Application.

PROBES

ADA400A – 100X, 10X, 1X, 0.1X High gain differential amplifier.

P6243 – 1 GHz, ≤1pF input C 10X active probe.

P6246 – 400 MHz differential probe.

P5205 – 1.3 kV, 100 MHz high voltage differential probe.

P5210 – 5.6 kV, 50 MHz high voltage differential probe.

P5100 – 2.5 kV, 100X high voltage passive probe.

TCP202 – 15 A, DC + Peak AC 50 MHz AC/DC current probe.

For further information, contact Tektronix:

Worldwide Web: for the most up-to-date product information visit our web site at: www.tektronix.com/Measurement/scopes/

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ISO 9001

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