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, Network Analyzers etc from all the major suppliers such as Keysight, 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. We fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M 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, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

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 in at Oakley, Bedfordshire 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 40GHz 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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Tektronix

TDS 210,TDS 220,TDS 224 Digital Real-Time™ Oscilloscopes

Tektronix' Most Popular DSO

The TDS 200 Oscilloscopes have quickly become the benchmark for low-cost oscilloscopes. Offering an unbeatable combination of performance, reliability and versatility, the TDS 200 Series offers breakthrough digital and real-time advantages at low-cost analog oscilloscope prices. And with the introduction of the TDS 224, Tektronix now brings the digital performance of the TDS 200 to customers that need four full-featured channels.

Affordable Digital Performance

No other digital oscilloscope offers as much bandwidth and sample rate for the price. By sampling at 10 and 16 times their bandwidths on all channels, the TDS 200 Series oscilloscopes provide accurate real-time acquisition up to their full bandwidth.

Versatility and Flexibility

The portable form factor provides increased versatility, allowing the instrument to be easily moved or safely stored away when not in use.

Easy to Use

The user interface is similar to that of an analog oscilloscope, but with improvements that reduce learning time and increase efficiency

The Personal Oscilloscope

The TDS 200 Series oscilloscopes are designed for people who demand the ultimate in oscilloscope value. If an inexpensive yet high performance oscilloscope is needed for the bench, production line, or training lab, a TDS 200 Series Digital Real-Time Oscilloscope is the best choice.

FEATURES AND BENEFITS

60 MHz or 100 MHz with 1 GS/s Sample Rate on all Channels

Dual Timebase

Automatic Measurements

Multi-Language User Interface

Autoset

Waveform and Setup Memories

Extended Capabilities are Provided with Optional Modules, Software and Probing

APPLICATIONS

Design/Debug

Service and Repair

Manufacturing Test and Quality Control

Education/Training

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TDS 200 Series Characteristics

SIGNAL ACQUISITION SYSTEM

Bandwidth –
TDS 210: 60MHz.
TDS 220: 100MHz.
TDS 224: 100MHz.

Sample Rate –
1 GS/s on each channel.

Channels –
TDS 210 and TDS 220: 2 identical channels plus external trigger.
TDS 224: 4 identical channels.

Sensitivity (with calibrated fine adjustment) –
2 mV to 5V/div (bandwidth limited to 20 MHz at 2 mV/div and 5 mV/div, in all modes, and 20 MHz at 10 mV/div in Peak Detect mode).

Vertical Zoom –
Vertically expand or compress a live or stopped waveform.

CALIBRATED POSITION RANGE

Volts/Div Setting	Offset Range
2 mV to 200 mV/div	±2 V
>200 mV to 5 V/div	±50 V

DC Gain Accuracy – ± 3%. (± 4% at 2 mV/div and 5 mV/div)

Vertical Resolution –
8 bits (256 levels over 10.24 vertical divisions).

AUTOMATIC MEASUREMENTS

Period, Frequency, Cycle RMS, Mean, Peak to Peak.

ACQUISITION MODES

Sample, Average, Peak Detect – High frequency and random glitch capture; captures glitches as narrow as 10 ns using acquisition hardware at all time/div settings between 5 µs/div and 5 s/div.

TIME BASE SYSTEM (MAIN AND WINDOW)

Horizontal Zoom – Horizontally expand or compress a live or stopped waveform.

Time/Division Range – 5 ns to 5 s/div.

Record Length – 2500 sample points per channel.

Horizontal Accuracy – ± 0.01%.

NON-VOLATILE STORAGE

Waveform Display – Two 2500 point reference waveforms.

Waveform Storage – Two 2500 point reference waveforms (TDS 210, TDS 220), four 2500 point reference waveforms (TDS 224).

Setups – 5 front panel setups.

TRIGGERING SYSTEM (MAIN ONLY)

Trigger Type – Edge (Rising or Falling), Video, Set to 50%.

Video Trigger Type – Triggers on Fields or Lines from sync-negative composite video; triggers on broadcast standard NTSC, PAL, or SECAM video.

Trigger Modes – Auto, Normal, Single Sweep.

Trigger Source –
TDS 210 and TDS 220: CH1, CH2, Ext, Ext/5.
TDS 224: CH1, CH2, CH3, CH4

Trigger View – Displays trigger signal while trigger view button depressed.

CURSORS

Types – Voltage, Time.

Measurements – a T, 1/a T, a V.

WAVEFORM PROCESSING

Arithmetic Operators – Add, Subtract.

Sources – CH1±CH2, CH3±CH4.

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

DISPLAY SYSTEM

Robust, backlit LCD with adjustable multi-level contrast.

Interpolation – Sin(x)/x.

Modes – Vector, Dots, Dot Persistence.

Format – YT and XY.

HARDCOPY CAPABILITY

Printer/File Formats – Thinkjet, Deskjet, Laserjet, Epson (9 or 24 pin), BMP, PCX, IMG, EPS, DPU 411, DPU 412.

Hardcopy Layout – Landscape or Portrait.

TDS2CM COMMUNICATIONS EXTENSION MODULE

Centronics-type Parallel Port

RS-232 Programmability – Full talk/listen modes. Control of all modes, settings, and measurements. Baud Rate up to 19,200. 9-Pin, DTE.

GPIB Programmability – Full talk/listen modes. Control of all modes, settings, and measurements (IEEE Std 488-1987).

TDS2MM MEASUREMENT EXTENSION MODULE

FFT – Windows: Hanning, Flat Top, Rectangular.
Sample points: 2048.

Automatic Measurements – Rise/Fall Time, Positive/Negative Pulse Width.

Interface – Centronics, RS-232, GPIB.

ENVIRONMENTAL AND SAFETY

Temperature –
0° C to +50° C (operating).
-20° C to +60° C (non-operating).

Humidity –
Up to 90% RH at or below +40° C;
Up to 60% RH from 41° C to 50° C (operating and non-operating).

Altitude –
Up to 2000 m (operating).

Electromagnetic Emissions –
Meets Directive 89/336/EEC for Electromagnetic Compatibility;
FCC Code of Federal Regulations, 47 CFR, Part 15, Subpart B, Class A.

Safety – UL 3111, EN61010, CAN/CSA-C22.2 No. 1010.1-92.

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Width	304.8	12.0
Height	151.4	5.96
Depth	120.7	4.75

Weight	kg	lb.
oscilloscope only	1.5	3.25
w/accessories	1.7	3.75

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TDS 200 Series Ordering Information

TDS 200 Digital Real-Time™ Oscilloscopes

Standard Accessories

P6112 100MHz 10X Passive Probes (one per channel).

Warranty Information

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

International Power Plug Options

Standard – U.S. 115V, 60 Hz (161-0230-01).

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, 50Hz (161-0104-05).

Opt. A4 – North America 240 V, 60Hz (161-0104-08).

Opt. A5 – Switzerland 220 V, 50 Hz (161-0167-00).

Opt. AC – China 240 V, 50Hz (161-0306-00).

International User Manuals (TDS 200 Series Oscilloscopes)

Standard – English (071-0398-00).

Opt. L1 – French (071-0400-00).

Opt. L2 – Italian (071-0401-00).

Opt. L3 – German (071-0402-00).

Opt. L4 – Spanish (071-0399-00).

Opt. L5 – Japanese (071-0405-00).

Opt. L6 – Portuguese (071-0403-00).

Opt. L7 – Simplified Chinese (071-0406-00).

Opt. L8 – Traditional Chinese (071-0407-00).

Opt. L9 – Korean (071-0408-00).

Opt. LR – Russian (071-0404-00).

Translated front panel overlays included with their respective user manuals. (except Russian)

International User Manuals (TDS2xM Extension Modules)

Standard – English (071-0409-00).

Opt. L1 – French (071-0483-00).

Opt. L2 – Italian (071-0484-00).

Opt. L3 – German (071-0485-00).

Opt. L4 – Spanish (071-0482-00).

Opt. L5 – Japanese (071-0488-00).

Opt. L6 – Portuguese (071-0486-00).

Opt. L7 – Simplified Chinese (071-0489-00).

Opt. L8 – Traditional Chinese (071-0490-00).

Opt. L9 – Korean (071-0491-00).

Opt. LR – Russian (071-0487-00).

Instrument Accessories

TDS2CM – Communications Extension Module.

TDS2MM – Measurement Extension Module.

TR210 – Huntron Tracker®.

AD007 – LAN/WAN GPIB Converter.

AC220 – Soft Carrying Case.

RM200 – Rackmount Kit.

Service Manual (TDS 200 Series) – English only (071-0492-00).

TDS2CM and TDS2MM Programmer's Manual – English only (071-0493-00).

Software

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 (TDS 210, TDS 220).

WSTR31U – Upgrade from DocuWave® software to WSTR31 (TDS 210, TDS 220).

Probes

P6015A – 1000X High Voltage Probe.

P6021 – 60 MHz AC Current Probe.

P6022 – 120 MHz AC Current Probe.

A621 – 2000 A AC Current Probe/BNC.

A622 – 100 A AC/DC Current Probe/BNC.

P5100 – 100X High Voltage Passive Probe.

P5200 – High Voltage Differential Probe.

P6101B – 1X Passive Voltage Probe (15 MHz).

P6243S – Active FET Probing System (1 GHz).

P6408 – Word Recognizer/Trigger Probe.

P6561A – SMD Small Geometry Probe.

AM503S – AC/DC Current Probe System.

Accessory Cables

GPIB, 1 m (3.3 ft) – Order 012-0991-01.

GPIB, 2 m (6.6 ft) – Order 012-0991-00.

RS-232, 9-Pin female to 9-Pin female connectors, null modem, 76 in. (1.9 m), for AT style computers – Order 012-1379-00.

RS-232, 9-Pin female to 9-Pin male connectors, 15 ft. (4.6 m), for modems – Order 012-1241-00.

Centronics, 25-Pin male to 36-Pin Centronics, 2.4 m (8 ft), for parallel printer interfaces – Order 012-1214-00.

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