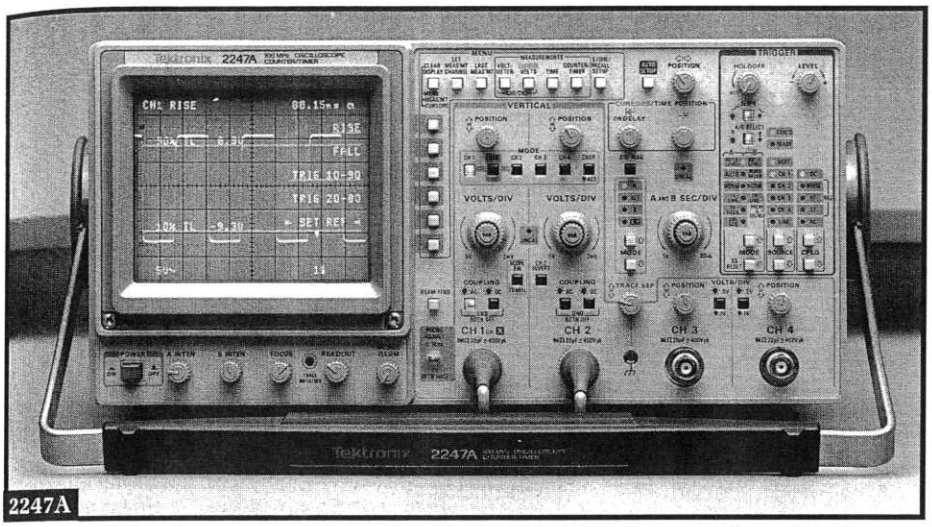
Dual Time Base Oscilloscopes

100 MHz

2245A
2247A
2252



2247A

2247A: Packed with time saving automation like front panel auto setup and store/recall. Automatic measurements are push-button simple using the integrated digital voltmeter and precision counter/timer.

2252, 2247A, 2245A
Dual Time Base Oscilloscopes

When productivity, performance, and low cost really count, nothing beats the 2245A, 2247A, and new 2252 line of portable oscilloscopes. These four-channel, dual time base oscilloscopes are top-of-their-class in automation and versatility, becoming the industry standard in 100 MHz real-time performance. Such capabilities as 2 ns/division time base, 2 mV/division vertical sensitivity, and advanced trigger modes assure you solutions for your design, testing, and service tasks.

AUTOMATIC FRONT PANEL SETUP

All these oscilloscopes offer single button setup. Just press the AutoSet key and vertical, horizontal, triggering and display controls are automatically adjusted to display a waveform. In seconds, a stable, triggered display of your waveform appears on-screen, ready to measure.

STORE/RECALL MEMORY

For even greater versatility in setup, the 2247A and 2252 offer store/recall of 20 front panel setups. Current front panel settings can be stored in non-volatile memory, then recalled when and where they are needed. Switching between setups is easy – just two buttons recall a complete setup, including selected measurements and operator prompts. For repetitive testing or service diagnostics, store/recall settings can even be used in sequence to step through a predetermined series of tasks.

ADVANCED REAL-TIME MEASUREMENTS

Each have cursors for making time, frequency and voltage measurements pushbutton simple. CRT readout gives you a numerical display of the waveform parameter you are measuring. There is no need for arithmetic or counting of graticule divisions.

The 2247A and 2252 further integrate advanced measurement capability with a built-in digital voltmeter and a precision counter/timer. These integrated tools provide a complement of automatic measurements at your fingertips.

Continued on next page.

2252, 2247A, 2245A

- Four Independent Channels
- Auto Setup of Instrument Front Panel
- Dual Time Base with Delayed Sweep
- Cursor Time/Voltage Measurements
- On-Screen Scale Factor Readouts

2247A

- Hands-Off Voltmeter Measurements
- SmartCursor™ Track Voltmeter Measurements
- Integrated Counter/Timer
- Phase Measurements
- Automatic Rise/Fall Time and Propagation Delay Time Measurements
- Store/Recall of 20 Front Panel Setups

2252

All the features of 2247A, plus:

- Push-Button Hardcopy Output
- Centronics Interface
- Fully GPIB Programmable

Smart Scopes with 100 MHz, Four Channels, and Advanced Features like Auto Setup, Tracking Cursors, Voltmeter, Integrated Counter/Timer, and Store/Recall of Front Panel Setups.

Automation made easy with full programmability, digitized waveform hardcopy, and push-button measurements.

TD

Call Direct – Product available within 24 hours, (through TekDirect only). Call 1-800-426-2200. Also available through an Authorized Tektronix Distributor (listed on page 540).

To order, contact your local sales office (listed on the inside back cover) or call the National Marketing Center at 1-800-426-2200, Ext. 99.

GPIB IEEE-488 The 2252 complies with IEEE Standard 488.2-1988, and with Tektronix Standard Codes and Formats.

2245A
2247A
2252

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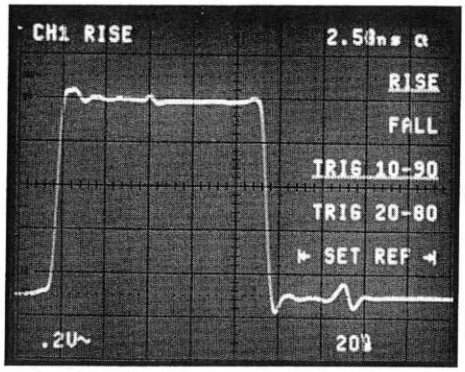
100 MHz

SELECTION GUIDE

Features	Bandwidth	Channels	Time Base	Auto Setup	Cursors	Store/ Recall	Digital Voltmeter	Counter/ Timer	Program-mability	Hardcopy Output
2245A	100 MHz	4	Dual	Yes	Yes	No	No	No	No	No
2247A	100 MHz	4	Dual	Yes	Yes	Yes	Yes	Yes	No	No
2252	100 MHz	4	Dual	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Make difficult measurements faster and more accurately. Rise time measurements are made automatically with the integrated 200 MHz counter/timer on the 2247A and 2252.

DIGITAL VOLTMETER BUILT-IN

The voltmeter measurement system simplifies measurements of + peak, – peak, peak-to-peak, DC and gated volts, all with convenient on-screen readout of values. Tektronix' unique SmartCursors™ make interpretation even easier. They automatically track changes in voltmeter measurements and visually indicate where ground and trigger levels are located. The built-in voltmeter along with Smart Cursors™ delivers instant answers.

INTEGRATED PRECISION TIMER/COUNTER

The 200 MHz counter/timer delivers crystal-controlled accuracy for your timing measurements. You can measure frequency, width, period, and totalized events directly from your input channels. Rise and fall time can be made automatically at predefined thresholds (10-90%, 20-80%) or user-set reference levels. Propagation delay measurements between channels are push-button simple. And all measurements can be made using gated time intervals simply by adjusting an intensified zone to any size and position on your waveform.

HARDCOPY DOCUMENTATION

With the introduction of the 2252, Tektronix combines the precision and versatility of analog real-time with the power of waveform digitizing. At the push of a button, repetitive waveforms are quickly digitized using a proprietary sequential sampling technique. With this innovation, an Epson-compatible printer replaces the traditional CRT camera for waveform documentation. Each channel is acquired using 500-point record length and up to 12-bit vertical resolution, then transferred via the Centronics interface to your printer. Active measurements and scale factors are also documented. An exclusive peak detection process further ensures anti-aliasing, and is capable of detecting repetitive events as narrow as 10 ns at any sweep speed.

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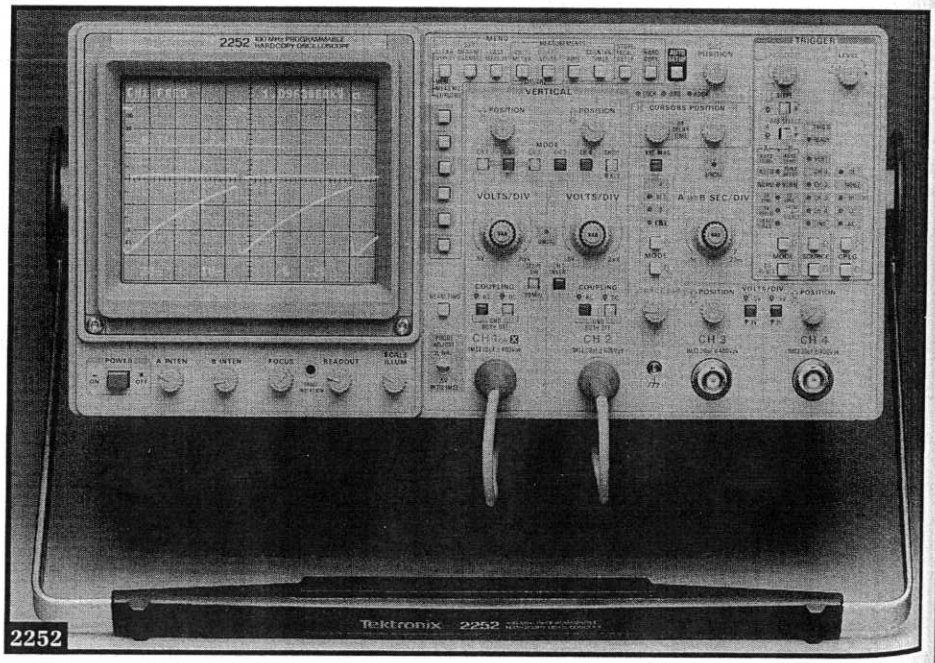

Dual Time Base Oscilloscopes

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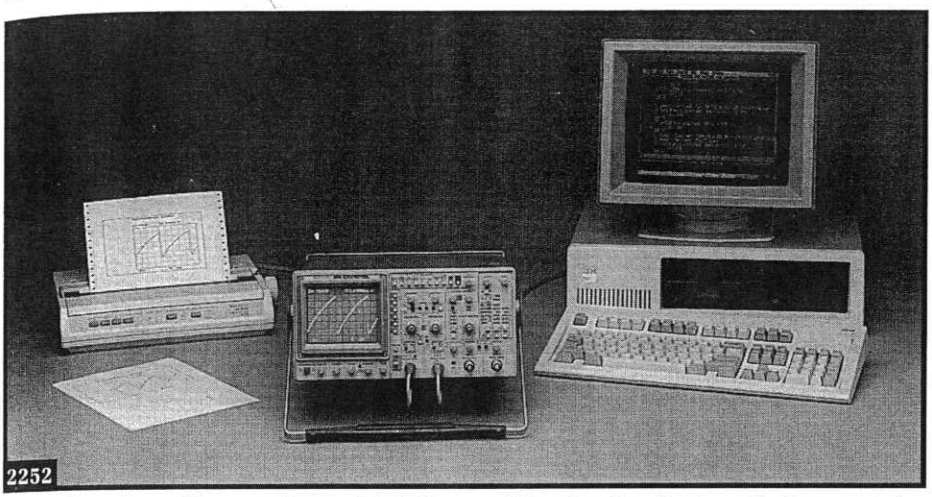
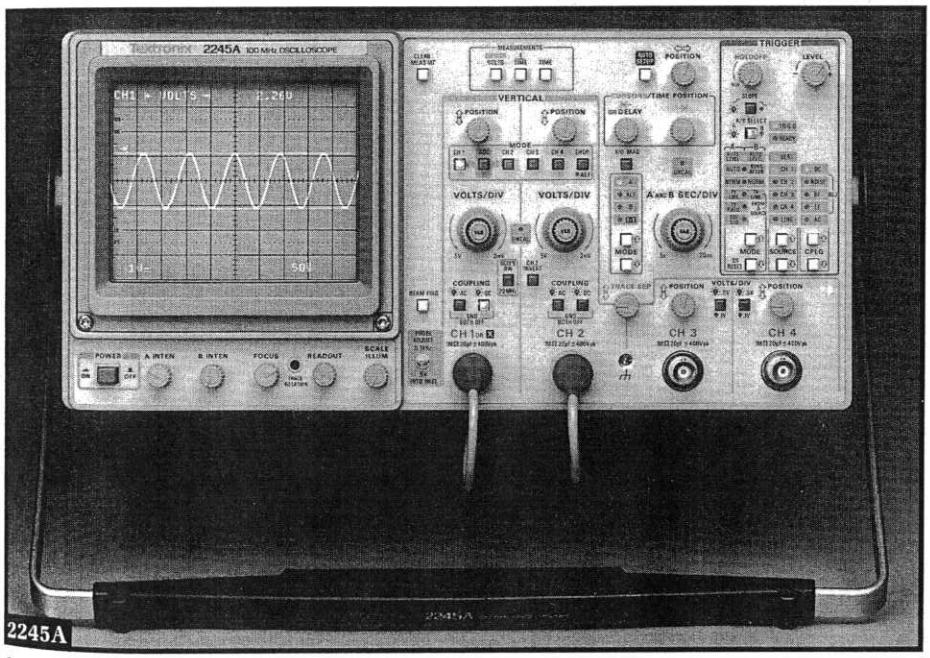


2252: The only oscilloscope that combines the versatility of analog display with the power of precision measurement tools, full programmability and push-button waveform hardcopy. Ideal for manufacturing test, depot repair, service documentation, and bench-top ATE.



2245A: Ideal for troubleshooting, general repair, and design where basic measurements are often needed. Time and voltage cursors make short work of signal time and amplitude analysis.

FULL GPIB PROGRAMMABILITY

The 2252 extends its power of automation to include full programmability of all front panel and menu controls. The standard GPIB (IEEE 488.2) interface allows access to all scope functions, including instrument setup, signal acquisition, and measurement control. Digitized waveforms can be acquired and transferred to a personal computer for analysis, documentation, and archiving. Measurements can be queried, and test routines easily created for go/no-go testing.

The 2252 is as easy to program as it is to use. In addition to specific command variables, the operator can learn an entire front-panel setting simply be querying the current instrument setup. The response can be stored in a file, then downloaded to the scope when needed at a later time. To support automated test development, a 2252 instrument driver is also available for Tektronix' popular EZ-Test PC software program. See the Test and Measurement Software section of this catalog for more information on this complete development and test routine software system.

UNMATCHED PERFORMANCE AND INNOVATION

The 2245A, 2247A, and 2252 are packed with performance capabilities and innovation to meet your automation needs. Whether you're looking for automation in the field, on the design bench, or an entire production line, these scopes can meet the challenge.

Continued on next page.

2245A
2247A
2252

Dual Time Base Oscilloscopes

100 MHz

Characteristics

Characteristics are common to the 2252, 2247A, and 2245A except where noted.

VERTICAL SYSTEM (4 CHANNELS)
Bandwidth (–3 dB) and Rise Time – 100 MHz and 3.5 ns (–10°C to + 35°C); 90 MHz and 3.9 ns (2 mV/div or + 35°C to + 55°C). Bandwidth limit: 20 MHz.

Deflection Factor and Accuracy – CH 1 & 2: 2 mV/div to 5 V/div; CH 3 & 4: 0.1 V/div and 0.5 V/div; all at ±2% (±3% outside +15°C to + 35°C). CH 1 & 2 variable at least 2.5:1.

Vertical Operating Modes – CH 1, 2, 3, 4, CH 2 IN-VERT, ADD, ALT, CHOP (625 kHz).

CMRR – At least 10:1 at 50 MHz.

Input R and C – 1 MΩ, 20 pF.

Max Input Voltage – 400 V (DC + peak AC) or 800 Vp-p.

Channel Isolation – 50:1 at 100 MHz.

HORIZONTAL SYSTEM
Sweep Speeds – A Time Base: 0.5 s/div to 20 ns/div; B Time Base: 5 ms/div to 20 ns/div (X10 MAG to 2 ns/div).

Accuracy – ±2%; Magnified ±3% (degrade by 1% outside +15°C to + 35°C).

Horizontal Operating Modes – A, ALT, B, X-Y.

Delay Jitter – 20,000:1.

Delay Accuracy – ±0.5% + 5% of one div + 25 ns.

TRIGGER SYSTEM
Trigger Sensitivity (A and B) – DC: 0.35 div to 25 MHz, 1.0 div at 150 MHz. Noise Reject: 1.4 div to 25 MHz, 2.2 div at 100 MHz. HF Reject: attenuates above 70 kHz. LF Reject: attenuates below 50 kHz. AC: Same as DC, attenuates below 25 Hz. TV Line, TV Field: 0.5 div of composite sync for stable display.

Trigger Operating Modes – A mode: AUTO LEVEL, AUTO, NORM, TV LINE, TV FIELD, SINGLE SEQ. B mode: RUNS AFTER DELAY, AUTO LEVEL, NORM, TV LINE (from A source).

Trigger Source (A and B) – VERT, CH 1, 2, 3, 4, LINE.

Variable Holdoff – At least 10:1.

X-Y OPERATION
Deflection Factors – Same as vertical system.

X-Y Operating Modes – X: CH 1; Y: CH 1, 2, 3, 4, and ADD.

Bandwidth – X-Axis: 3 MHz; Y-Axis: 100 MHz.

Phase Difference – ±3° from DC to 50 kHz.

CRT SYSTEM
Display – 8 cm x 10 cm, 16.5 kV nominal voltage.

Z-Axis – 3.8 V causes noticeable modulation. Usable to 10 MHz.

POWER REQUIREMENTS
Line Voltage Range – 90 VAC to 250 VAC.

Line Frequency – 48 Hz to 445 Hz.

Maximum Power Consumption – 100 W (155 VA).

ADVANCED FUNCTIONS
Cursors – Time, 1/Time: ±0.5% + 2% of one div; Delta Time, 1/Delta Time, Delta Phase (2247A/2252): ±0.5% +1% of one div; Volts: ±0.5% + 2% of one vertical div.

Voltmeter (2252 and 2247A) – DC Volts: ±(0.5% of reading + 2% of one vertical div + 250 μV); Plus or Minus Peak Volts: ±(2% of reading + 10% of one div + 1.0 mV) and Pk-Pk Volts (25 Hz to 25 MHz): ±(2% of reading + 15% of one div + 1.5 mV). Channels 1 and 2.

Counter/Timer (2252 and 2247A) – Time Base and Accuracy: 200 MHz and 10 ppm (0.001%). Frequency: 0.01 Hz to 100 MHz. Max resolution: 0.00000001 Hz. Max accuracy same as time base. Period: 100 s to 5 ns. Max resolution: 0.1 fs. Max accuracy same as time base. Width: 100 s to 5 ns. Max resolution: 1 ps. Max accuracy same as time base ±2 ns. Totalize: 100,000,000 counts. Delta Time: 0 to 5 s. Max resolution: 1 ps. Max accuracy same as time base ±100 ps. 1/Delta Time: 0.2 Hz to 10 GHz. Rise/Fall: 0 to 5 s. Max resolution: 1 ps. Max accuracy same as time base ±2 ns. Propagation Delay: 0 to 5 s. Max resolution: 1 ps. Max accuracy same as time base ±100 ps. External C/T Timebase Input: 10.1 kΩ AC coupled. Sensitivity: 1 Vp-p. Max input V: 35 VDC + peak AC. Frequencies: 1, 5, and 10 MHz.

Centronics Interface (2252) – Printers: Epson FX-Series (9 or 24 pin).

ANSI/IEEE-488.2 GPIB Interface (2252) – Function Subsets: SH1, AH1, T6, L4, SR1, RL1, DC1, DT, PPO, E1, and CO.

DIGITIZER SYSTEM (2252)
Type – Sequential (10 ns peak detection).

Resolution – Vertical: 12 Bits (250 levels/div) (25 pts/div for hardcopies). Horizontal: 9 Bits (50 pts/div).

Record length – 500 points per channel (four channels).

Useable Sweep Speeds – (A Horizontal Mode only) 0.5 s to 20 ns/div.

INSTRUMENT OPTIONS
Channel 2 And A-Gate Output (Opt. 15) – Channel 2 Output – Bandwidth: DC to 25 MHz; Deflection factor: 10 mV/div into 50 Ω, 20 mV/div into 1 MΩ; Dynamic Range: ±7 divisions; DC Offset: < 0.5 divisions. A-Gate Output Level – TTL compatible; Drive: 4 mA (high state), 20 mA (low state).

ENVIRONMENTAL SPECIFICATIONS
Instruments meet in part, the environmental requirements of MIL-T-28800D or C for Type III, Class 3, Style D or C equipment as described below.

Ambient Temp – Operating: –10°C to +55°C. Nonoperating: –51°C to +71°C.

Humidity – Percent: 95% 5 cycles, (120 hours). Reference: MIL-T-28800D, paragraph 4.5.5.1.2.2.

Altitude – Operating: to 4,500 m (15,000 ft.), maximum operating temp decreases 1°C per 300 m above 1500 m. Nonoperating: to 15,000 m (50,000 ft.).

EMC – Meets Class B requirements per VDE 0871-B for radiated and conducted emissions and FCC requirements.

Vibration – Operating: 15 minutes along each of the 3 major axis, 10 Hz to 55 Hz to 10 Hz in one minute cycles. Hold for 10 minutes at 55 Hz. Displ. (in p-p) 0.025.

Shock – Operating: 30 g, 1/2 sine, 11ms duration, 3 shocks per axis along each major axis. Total of 18 shocks.

OTHER CHARACTERISTICS
Safety – UL 1244 listed, CSA certification.

Warranty – 3 years.

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Height	164	6.4
Width (with handle)	362	14.2
Depth (with front cover)	445	17.5
Weight	**kg**	**lb.**
Net	8.7	17.9