

2232 100 MHz, 100 MS/s DIGITAL PLUS ANALOG OSCILLOSCOPE

Waveform Confidence and Versatility Unmatched at the Price.

- 100 MHz Analog Bandwidth; 100 MHz Digital Storage Bandwidth
- Dual Time Base
- 100 MS/s Per Channel Sampling Rate
- 10 ns Glitch Capture, Any Sweep Speed
- Selectable 1K or 4K Record Length
- 8-bit Vertical Resolution
- Time and Voltage Waveform Cursors
- Trigger-Level Readout
- Point-Selectable Pre/Post Triggering
- Extended Battery-Backed Waveform Storage (26K)
- Expand/Reposition Any Stored Waveform
- GPIB or RS-232-C Communications Options

PREMIUM VERSATILITY

The new 2232 delivers high-end performance at the lowest price in its class. As the new flagship of Tek's 2200 series, the 100 MHz 2232 has advanced capabilities not found in comparable scopes. On the digital storage side, it offers 100 MS/s sampling simultaneously on two channels, 10 ns glitch capture, 4K record length and extended memory. At the push of a button, the 2232 operates as a conventional analog scope with the ease of use and familiarity you expect from Tektronix scopes. And, the 2232 offers all this for a price that makes it the best value in its class.

HIGH SPEED GLITCH CAPTURE

With innovative sampling technologies, the 2232 is capable of catching signal variations that are easy to miss with other scopes. In Peak Detect sampling mode the 2232 is always sampling at 100 MS/s. Because it can capture and display random events as narrow as 10 ns at any sweep speed, the 2232 helps you quickly isolate problems that you might otherwise overlook.

EXCELLENT WAVEFORM RESOLUTION

The 2232 acquires either 1K or 4K records with 8-bit vertical resolution, displaying the necessary detail for precise analysis. You can capture four screens of data in a single acquisition with the 2232, and store them in a 4K record. Or, you can compress all points on-screen, look at any 1K portion, or expand to view 100 points in

library of known-good waveforms can be recalled at any time for performance verification. Or unknown signals can be captured and recalled for later analysis.

TIME-SAVING FEATURES

Bezel buttons, measurement cursors and on-screen readouts reduce analysis time and measurement error. Conveniently located bezel buttons let you save reference waveforms and select advanced menu functions. These functions include setting acquisition modes, average weighting and sweep limits, point-selectable trigger position, stored waveform formatting and position, and stored waveform recall.

Measurement cursors further simplify scope operation by automatically calculating and displaying time and voltage differentials. The cursors are tied to a selected waveform and can be positioned anywhere in a record for detailed timing analysis. Scale factors automatically track the selected waveform.

SOLID TRIGGERING PERFORMANCE

A full range of triggering capabilities has been built into the 2232 to assure trigger stability. These include features like variable hold-off for triggering on complex waveforms, high frequency and low frequency reject conditioning for noisy environments, and peak-to-peak auto trigger for virtually hands-free trigger level control. A new feature, trigger level readout, allows the user to set a voltage value for the trigger point and read it directly on screen. This capability is especially useful for setting up a single-shot acquisition.

INTEGRATED SOFTWARE PACKAGES

Optional GPIB or RS-232-C interfaces let you tie the 2232 directly to your printer, plotter, or PC for automated data collection and analysis. In addition, a number of software packages designed specifically for the 2232 are available from Tek. For example, Tek's new RS-232-C TeleServicing software is the first commercial package that combines data communication, data management and waveform graphics for remote service applications. See the Test and Measurement Software section of this catalog for more information on this and other software solutions.

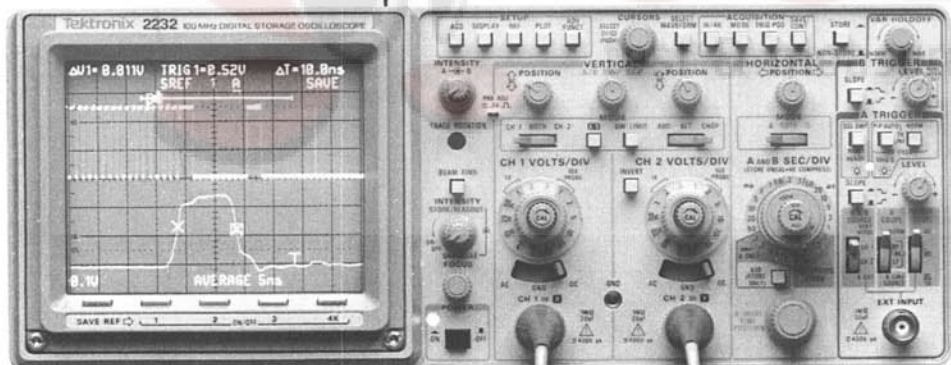
WIDE RANGE OF APPLICATIONS

The versatility of the 2232 feature set makes it ideal for a wide range of applications. For example, its ruggedness and portability are a perfect match for the field service technician. Its 10 MHz single shot bandwidth, glitch capture and signal analysis capabilities are invaluable for circuit design and troubleshooting. TV triggering and a complete dual time base allow for easy video and image waveform analysis. Waveform averaging and trigger conditioning make it ideal for power supply troubleshooting.

CHARACTERISTICS

DIGITAL STORAGE SYSTEM

Sample Rate – 100 MS/s per channel. Effective sample rates up to 2 GS/s in repetitive storage mode (0.5 μ s/div and faster in single-channel mode, 0.2 μ s/div and faster dual-channel).



The 2232's peak detect mode captures glitches as narrow as 10 ns. Using the second time base and expansion feature, it's then easy to characterize the glitch.



*The 2232 oscilloscope complies with IEEE Standard 488.1-1988, RS-232C and Tektronix Standard Codes and Formats

precise detail. For quick update speed, just select 1K acquisition record length from the start. And for even greater resolution, use the 2232's complete dual time base to quickly zoom in on any portion of a waveform and acquire a full record of information – at up to 500 ps sample resolution.

EXTENDED STORAGE CAPABILITY

Once stored, any waveform can be expanded, compressed, and repositioned vertically and horizontally for more precise analysis or comparison with other waveforms.

The 2232 also comes with 26K of extended, battery-backed memory, which lets you store as many as 26 waveform sets for up to three years. Thus, a reference

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2232

NEW

Resolution – Vertical: 8 bits (25 levels per division), 10 bits useful in average mode. Horizontal: 10 bits (100 points per division), 9 bits per channel in dual channel mode.

Record Length – 4K or 1K selectable. 2K or 512 per channel in dual channel mode.

Pre/Post Trigger – 1/8, 1/2, or 7/8 trigger position selectable, point-selectable via menu.

Acquisition Modes – Peak Detect (10 ns glitch capture at all available sweep speeds); Accumulated Peak Detect; Average (weight-selectable from 1/1 to 1/256 in a binary sequence); and Sample.

Save Reference Memory – One 4K or three 1K acquisitions, and 26K of extended memory (store up to 26 waveform sets). Battery-backed memory stores waveforms for up to 3 years.

VERTICAL SYSTEM (2 Identical Channels)

Bandwidth (-3 dB) and Rise Time – 100 MHz and 3.5 ns (0°C to +35°C); 80 MHz and 4.4 ns (2 mV/div or +35°C to +50°C).

Deflection Factor and Accuracy – 2 mV/div to 5 V/div $\pm 2\%$ (+15°C to +35°C); $\pm 3\%$ (0°C to +50°C).

Vertical Operating Modes – CH 1, CH 2, CH 2 INVERT, ADD, ALT, CHOP (500 kHz), and XY.

CMRR – At least 10:1 at 50 MHz.

Input R and C – 1 M Ω , 20 pF.

Max Input Voltage – 400 V (dc + peak ac), 800 V p-p.

Channel Isolation – 100:1 at 50 MHz.

HORIZONTAL SYSTEM

Sweep Speeds – A sweep: 0.5 s/div to 0.05 μ s/div, extended to 5 ns/div with X10 magnification. 5 s/div to 0.05 μ s/div in store mode (5ns/div with X10 MAG). B sweep: 50 ms/div to 0.05 μ s/div.

Accuracy – Nonstore Mode: X1: $\pm 2\%$; X10: $\pm 3\%$ (+15°C to +35°C). X1: $\pm 3\%$; X10: $\pm 4\%$ (0°C to +50°C). Store Mode: $\pm 0.1\%$ over full 10.24 divisions.

Horizontal Operating Modes – Nonstore Mode: A, ALT (A intensified by B and B), B. Store Mode: A, A intensified by B, B, 4K COMPRESS.

Delay Jitter – 5000:1

Delay Time Accuracy – $\pm 1\%$ (+15°C to +35°C); $\pm 2\%$ (0°C to +50°C).

TRIGGER SYSTEM

Trigger Sensitivity (A and B) – Internal: 0.35 div at 10 MHz, 1.5 div at 100 MHz. External: 40 mV at 10 MHz, 150 mV at 100 MHz (A trigger only).

Trigger Operating Modes – A-Mode: Peak-Peak AUTO (also for TV LINE), NORM, TV FIELD, SGL SWP. B-Mode: Runs After Delay, Triggered After Delay.

Trigger Source – A Trigger: VERT MODE, CH 1, CH2, LINE, EXT. B Trigger: VERT MODE, CH 1, CH 2.

Trigger Coupling – With Internal Source: AC with P-P AUTO, TV LINE, or TV FIELD mode; DC with NORM or SGL SWP mode. With External Source: AC, DC, or DC/

10. With Either Source: HF REJECT (attenuates above 40 kHz), LF REJECT (attenuates below 40 kHz).

Variable Holdoff – At least 10:1.

X-Y OPERATION

Deflection Factors – Same as vertical system.

Bandwidth – X-Axis: 2.5 MHz in nonstore mode, up to 100 MHz in store mode. Y-Axis: same as vertical system.

Phase Difference – $\pm 3^\circ$ from dc to 150 kHz.

ADVANCED FUNCTIONS

Cursor Function and Accuracy – Δ Volts: $\pm 3\%$ of reading. Δ Time: ± 1 display interval (5 s/div to 1 μ s/div); ± 2 display intervals + 500 ps] (0.5 μ s/div to 0.05 μ s/div).

X-Y Plotter Output – Plots all displayed waveforms, crt readout, and graticule (selectable).

External Clock Input – dc to 1 kHz (slow mode), dc to 100 kHz (fast mode).

CRT SYSTEM

Display – 8 cm x 10 cm, 14 kV nominal voltage.

Controls – A INTENSITY, B INTENSITY, TRACE ROTATION, BEAM FIND, FOCUS, STORAGE/READOUT INTENSITY, GRATICULE ILLUMINATION.

Z-Axis – 5 V causes noticeable modulation. Usable to 20 MHz.

POWER REQUIREMENTS

Line Voltage Range – 90 Vac to 250 Vac.

Line Frequency – 48 Hz to 440 Hz.

Max. Power Consumption – 85 W (150 VA).

ENVIRONMENTAL CHARACTERISTICS

(See page 142)

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Width	360	14.2" with handle
Height	137	5.4"
Depth	440	17.3" w/o front cover
Weight	kg.	lbs.
Net	8.2	18

Safety – UL 1244 listed, CSA certification.

Warranty – 3 years

INSTRUMENT OPTIONS

ANSI/IEEE-488 GPIB Interface (Option 10) – Function Subsets Implemented: SH1, AH1, T5, L3, SR1, RL2, PPO, DC1, DT0, CO, E2. Plotter Devices: HP-GL, Epson FX-Series, HP ThinkJet. Data Transfer Rate: approx. 1 kByte/s.

EIA Std RS-232-C Interface (Option 12) – Baud Rate: 50 to 2400 for interactive use, up to 4800 for driving plotters. Plotter Devices: HP-GL, Epson FX-Series, HP ThinkJet. Connectors: DCE (female), DTE (male).

QuickStart Training Package (Option 2F) – Includes QuickStart training manual and multiple signal source board with battery.

ORDERING INFORMATION

2232 100 MHz Dual Time Base, Digital + Analog Oscilloscope **\$5,495**
Includes:
Two 10X Voltage Probes (P6109 Opt. 01), Operator's Manual (070-7066-00), User's Ref. Guide (070-7068-00), Front Panel Cover (200-2520-00), Accessory Pouch (016-0677-02), 3 Year Warranty, Power Cord.

INSTRUMENT OPTIONS

Opt. 10 – GPIB Interface **+\$300**
Opt. 12 – RS-232-C Interface (w/cable) **+\$300**
Opt. 2F – Operator's QuickStart Training Package **+\$199**
(See page 361 in education section for information on Quick Start Packages)

ACCESSORY OPTIONS

Opt. 1C – C-5C Opt. 02 Camera **+\$500**
Opt. 1K – K212 Instrument Cart **+\$380**
Opt. 1P – HC100 Plotter w/GPIB cable (requires Opt. 10) **+\$990**
Opt. 3P – HC100 Plotter w/RS-232-C Cable (req. Opt. 12) **+\$895**
Opt. 1T – Transit Carrying Case **+\$280**
Opt. 17 – P6408 Logic Probe **+\$350**
Opt. 33 – Travel Line Package **+\$295**

INTERNATIONAL POWER PLUG OPTIONS

Opt. A1- A5 – Available **NC**
See page 142 for descriptions.

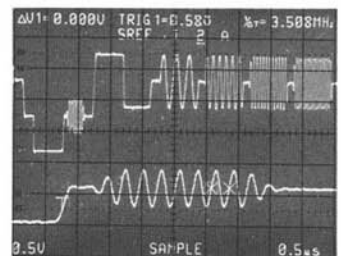
WARRANTY-PLUS SERVICE PLANS

Opt. M2 – +2 yrs service **+\$295**
Opt. M3 – +2 yrs srv. & 9 calcs **+\$800**
Opt. M4 – +5 calibrations **+\$615**
Opt. M5 – +2 yrs srv. & 9 calcs **+\$1,400**
Opt. M7 – +2 calibrations **+\$265**
Opt. M8 – +4 calibrations **+\$530**

RECOMMENDED ACCESSORIES/ FIELD KITS

Service Manual – (070-7067-00) **\$25**
2232 F10 – GPIB Field Upgrade Kit **\$350**
2232 F12 – RS-232-C Field Upgrade Kit **\$350**
GPIB Cable, 2m – (012-0991-00) **\$160**
Rackmount Kit – (016-1003-00) **\$155**
(See page 142 for more accessories.)

Product available within 24 hours through Tek Direct. Call 1-800-426-2200.



The 2232's 100MS/s sampling rate and excellent resolution make it the appropriate choice for a wide range of applications, including video/TV design, troubleshooting and service.