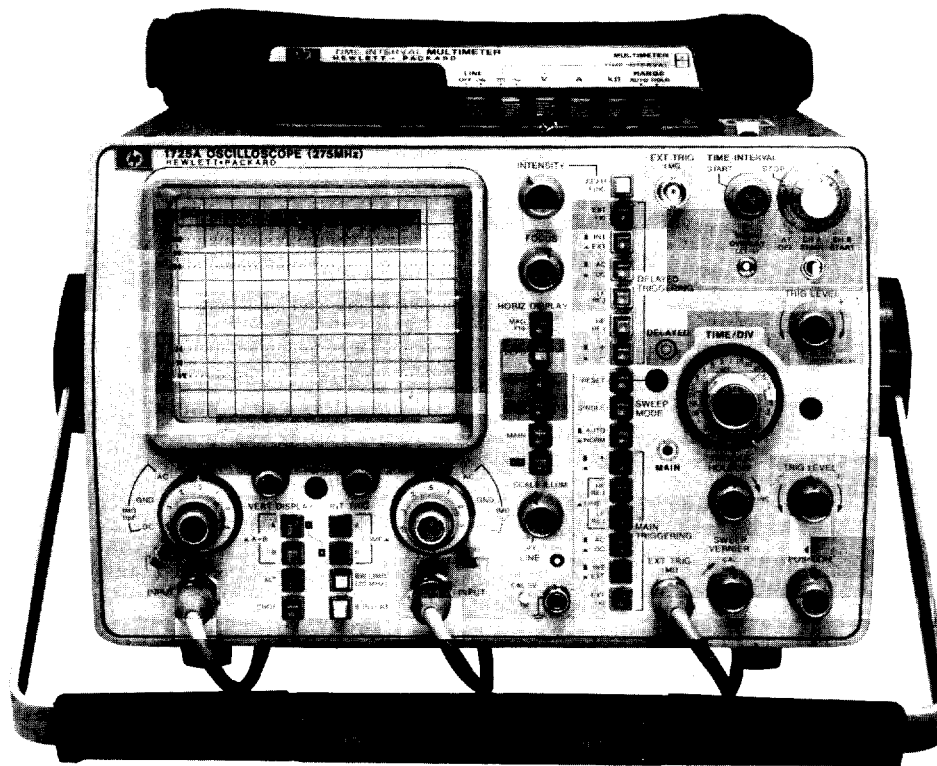


OSCILLOSCOPES

200/275 MHz Delta Time, 275 MHz Storage

Models 1715A, 1722B, 1725A, & 1727A

- 200 MHz (1715A) and 275 MHz (1725A) bandwidths
- Two marker delta time measurements
- Optional DMM
- Selectable input impedance



1725A Opt 034

Hewlett-Packard's Models 1725A, 275 MHz, and 1715A, 200 MHz oscilloscopes offer delta time measurements with an optional DMM for direct delta time readout and current, voltage, or resistance measurements. The large 8 × 10 cm CRT provides easy viewing of dual trace signals on which timing measurements can be made conveniently and accurately using the Hewlett-Packard developed delta time technique. For easier percentage measurements, reference lines of 0% and 100% amplitude are 5 divisions apart and markings for 10%, 90%, 20%, and 80% are also provided for easier transition time measurements. Vertical deflection factors of 10 mV/div to 5 V/div over the full bandwidth (5 mV/div to 150 MHz in the 1715A) and a selectable 50 ohm or 1 megohm input offer the high performance required for both laboratory and field applications.

Delta Time Measurements

These oscilloscopes offer two methods for making timing measurements. One is the familiar single marker delayed sweep, using the calibrated delay control to accurately measure time relationships; the second is a system of dual intensified markers which significantly improves accuracy while conveniently reducing the time necessary to make a measurement. The latter, better known as the Delta Time measurement method, incorporates a system of two intensified markers which are two delayed sweeps displayed alternately.

The Delta Time measurement technique is to select the Main Intensified mode and position the first marker at t_1 with the Time Interval Start control and position the second marker at t_2 with the Time Interval Stop control. The difference between the two selected points is then read directly on the optional DMM or on the calibrated delay time control, or is available as a rear panel scaled voltage output compatible with most DVM's. Units of seconds, milliseconds, or microseconds are read on the Main Time/Div control.

For increased precision, Delayed Sweep mode is selected where the two intensified portions are displayed alternately. Maximum accuracy is achieved by superimposing the start and stop points using the

Time Interval Stop control. Even without an external voltmeter and using only the Time Interval Stop control, this optical nulling technique reduces the chance of error in time interval measurements.

The Delta Time technique makes timing measurements such as transition times, propagation delay, clock phasing, and other high speed digital timing measurements faster and with more repeatability than with standard delayed sweep oscilloscopes. Time interval measurements can be made between two events on channel A, two events on channel B, or between two events on alternate channels.

Optional Digital Multimeter

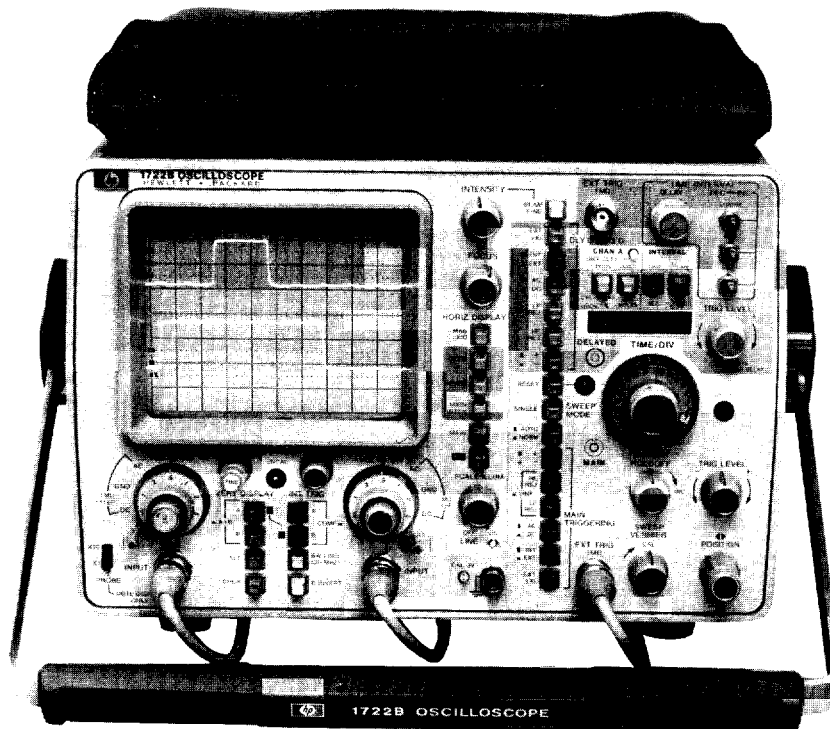
Adding an optional multimeter to the 1715A or 1725A improves the accuracy and convenience of delta time measurements as well as improving basic measurement capabilities. A switch on the instrument allows selection of direct delta time measurements or DMM operation. The DMM mode provides the five most common measurements: ac and dc voltage, ac and dc current, and resistance. This versatile DMM includes autopolarity, autozeroing, and autoranging to make direct convenient measurement. Using a Model 10023A Temperature Probe with the DMM, fast, accurate temperature measurements are easy to make. The pencil-like tip accesses small components and the temperature is displayed directly in degrees Celsius on the DMM.

Optional TV Sync

A TV sync option (005) is available for the 1715A and 1725A. This option provides external main and external delayed triggers to the instrument. A sync separator derives these triggers from the composite video which allows the analysis of fields, test signals, timing relationships, lines, or segments of lines. This added TV sync capability in a high frequency oscilloscope offers the ability to view either video signals or the fast transitions and timing relationships of high speed logic in today's video systems. For more information, ask your local HP Field Engineer for the 1715A/1725A TV Sync Data Sheet.



- 275 MHz bandwidth
- Microprocessor calculated delta time measurements
- Direct LED readout with 20 ps resolution
- Selectable input impedance



1722B

1722B Description

Model 1722B is a 275 MHz bandwidth, 1 ns/div sweep speed, dual channel oscilloscope with a built-in microprocessor and five function LED display for precise real time measurements. In addition to the conventional volts versus time CRT display, the microprocessor gives you direct readout of delta time, frequency, dc voltage, instantaneous waveform voltage, and percent amplitude. The 1722B's outstanding repeatability and 20 ps resolution make it ideal for clock phasing measurements in large computer timing applications.

Delta Time Measurements

Delta time measurement, developed by Hewlett-Packard, is used in the Time Interval mode for making accurate time interval measurements including transition time, pulse duration (width), period, and propagation delay. Time interval measurements can be made between two events on Channel A, two events on Channel B, or between an event beginning on Channel A and ending on Channel B.

The delta time measurement technique is to select Main Intensified mode and set the first intensified marker to t_1 . The second intensified marker is positioned by using the DEC → INC controls (coarse, medium, or fine) which causes the microprocessor to develop the voltage to position the second marker. While developing the voltage ($t_2 - t_1$) to separate the two markers, the microprocessor drives and updates the 3 1/2 digit LED display. Time interval measurements are automatically scaled for the proper sweep speed and displayed in units of seconds (exponent 0), milliseconds (exponent -3); microseconds (exponent -6); or nanoseconds (exponent -9).

Additional precision is obtained by switching to the Delayed Sweep mode where the two intensified markers are expanded and displayed alternately. Maximum accuracy is quickly obtained by overlapping the two expanded sweeps using the DEC → INC controls. Superimposing the start and stop points of the measured time interval provides a more accurate digital readout by nulling any amplifier or CRT nonlinearities. Separate portions of a sweep can be magnified and examined simultaneously, enabling you to view two events separated in time while maintaining their relative time relationship.

The microprocessor not only keeps track of the distance between the two markers but automatically expands the measurement resolution by a factor of 10 whenever the two markers are within 1 div of each other. The microprocessor also interrogates the function switches to help prevent inaccurate measurements.

1/Time (Frequency) Measurements

The 1722B gives an automatic 3 or 4 digit display of the reciprocal of time, eliminating the need for calculations when setting up clock frequencies and measuring the frequency or repetition rate of a waveform.

DC Voltage Measurements

The Input (dc volts) mode provides a direct digital display of the average value of a waveform at the input to channel A. The built-in DVM measurement is made using a successive approximation algorithm controlled by the microprocessor. This allows you to establish a reference level with respect to any voltage and enables differential dc measurements.

Instantaneous Voltage Measurements

In the Position mode you can measure the voltage at any point on a waveform in channel A without needing to count divisions from a base line and multiply by the attenuator setting. The measurement mode is useful for measuring peak voltages, crossover, and threshold points in logic circuits, or for any time you need to know a precise voltage at a particular point on a waveform.

Percentage Measurements

Percentage measurements are made in the Position mode with the channel A vernier out of the Cal position to establish 5 div separation between the 0% and 100% points. By positioning the desired 0% point on a convenient graticule line, zeroing the LED display, and then positioning the waveform to the 100% point, percent amplitude of any point on the waveform with respect to the 100% point is measured by positioning that point at the reference graticule and reading the LED display. Relative amplitude measurements such as pulse overshoot, ringing, preshoot, and percent amplitude modulation on an rf carrier are easily measured using this measurement mode.

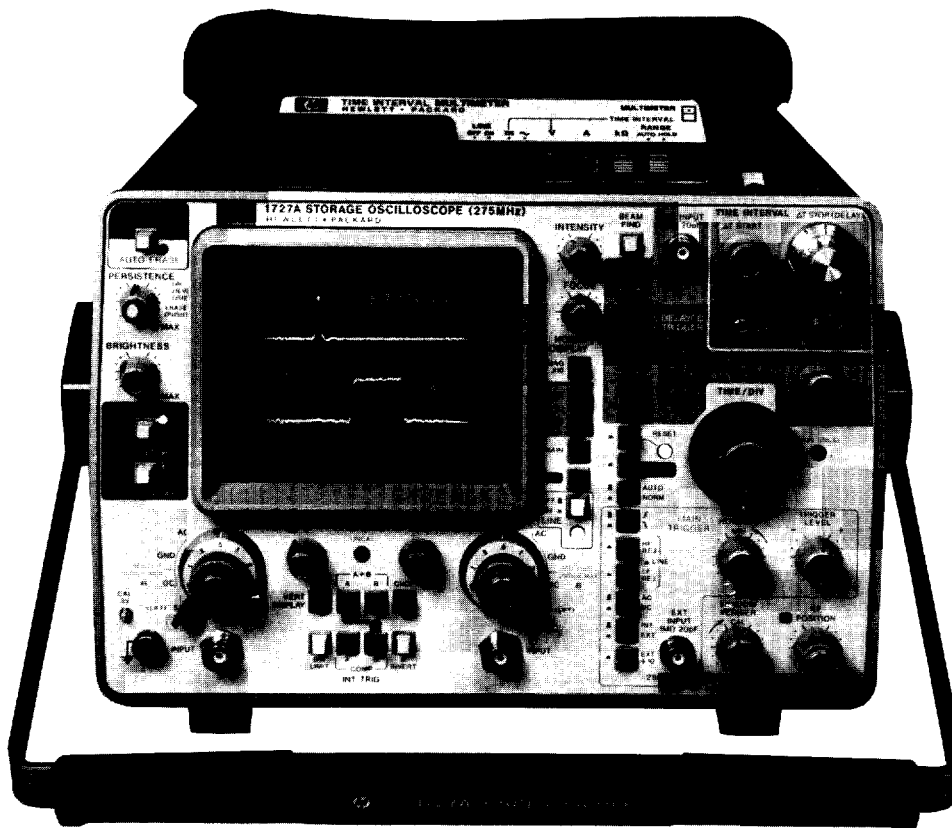


OSCILLOSCOPES

275 MHz Variable Persistence/Storage

Models 1715A, 1725A, 1722B, 1727A

- 2000 cm/ μ s Variable Persistence and Stored Writing Speed
- Minimum Blind Time, Auto Intensity Circuit
- 275 MHz bandwidth, 10 mV/div with 1 M Ω or 50 Ω input
- Delta Time and Optional DMM



1727A Opt 034

1727A Description

Hewlett-Packard's 275 MHz, Model 1727A Variable Persistence/Storage Oscilloscope offers 2000 cm/ μ s writing speed in both the variable persistence and single shot storage modes. The fast writing speed and large display area make the 1727A ideal for viewing and analyzing narrow pulses in the physical sciences as well as glitches and noise pulses in digital environments. Signals with rise times as fast as 1.27 ns (4 div) can be captured and displayed in the single-shot mode.

Conveniently grouped variable persistence storage controls, front panel color coding, LED indicators, and automatic operating modes make the 1727A one of the easiest to use, high-speed storage oscilloscopes available today. Additional features which provide exceptional versatility and ease of use include dual marker delta time measurements; an auto-intensity circuit to simplify the setup of a sharp, non-blooming trace; and selectable input impedance (1 M Ω /50 Ω) for both general purpose probing and high fidelity, high frequency signal capture with the built-in 50 ohm impedance matching.

Expansion Storage

The expansion storage CRT (refer to 1744A for illustration) has a miniature storage mesh, about the size of a postage stamp, and an electronic lens system to present well defined, sharp traces at the high writing speed of 2000 cm/ μ s in a variety of operating modes. The fast CRT writing speed is obtained over the full display quality area. Other convenience features include an automatic focus circuit that maintains a crisp display with changes in intensity, and an auto intensity circuit that minimizes blooming and reduces operator concern about CRT damage.

Variable Persistence Is General Purpose

The ability to write at 2000 cm/ μ s in the variable persistence mode makes the 1727A a general purpose instrument. Using the

variable persistence mode, the effective writing speed can be increased by integrating repetitive signals. With the 1727A, only two or three repetitions of a signal in a 10 second time period are needed to view any signal compatible with the vertical and horizontal specifications. For example, a 275 MHz sine wave with an amplitude of 8 divisions at a sweep speed of 1 ns/div has a maximum spot velocity of 5028 cm/ μ s and only requires about three repetitions for viewing.

The following table is a quick reference guide for determining the single-shot signals that can be captured by a 1727A.

Amp p-p	Sine Wave MHz	Observed Pulse Tr	Sweep Speed ns/div	Req Writing Speed cm/ μ s
4 div		1.27 ns	1	1952
4 div		1.27 ns	10	1816
3 div	275		1	2000
3 div	275		10	1867
4 div	200		1	1948
4 div	200		10	1811

Delta Time Measurements

In the variable persistence mode, the 1727A can make delta time measurements using the two marker delta time system. This delta time system simplifies time interval measurements while improving both accuracy and resolution. In the delta time mode, Start and Stop markers are alternately displayed on the main intensified sweep. The time interval between these markers can be displayed on the optional DMM or is available as a scaled voltage output, on the rear panel, that is compatible with most DVMs. Time interval measurements may also be made without a DVM using the helical for determining the measurement.



1715A, 1722B, 1725A, 1727A Specifications

Vertical Display Modes

Channel A; channel B; A and B displayed alternately on successive sweeps (ALT); A and B displayed by switching between channels at ≈ 1 MHz rate with blanking during switching (CHOP); A plus B (algebraic addition); X-Y (A vs. B).

Vertical Amplifiers (2)

Bandwidth: (3 dB down from 6 div reference signal).

DC-coupled: (1722B, 1725A, 1727A) dc to 275 MHz, (1715A) dc to 200 MHz 10 mV/div to 5 V/div (to 150 MHz at 5 mV/div, 1715A), in both 50 Ω and high Z input modes.

AC-coupled: lower limit ≈ 10 Hz.

Bandwidth limit: limits upper bandwidth to ≈ 20 MHz.

Rise time: (1722B, 1725A, 1727A) < 1.3 ns; (1715A) < 1.75 ns 10 mV/div to 5 V/div, < 2.3 ns at 5 mV/div.

Deflection factor: ranges, 10 mV/div to 5 V/div (9 calibrated positions) in 1, 2, 5 sequence, $\pm 2\%$ attenuator accuracy; 5 mV/div to 5 V/div (10 calibrated positions) in 1715A; Vernier, extends max deflection factor to ≥ 12.5 V/div.

Polarity: channel B may be inverted.

Input coupling: selectable, ac or dc, 50 Ω (dc) or ground.

Input RC (selectable): ac and dc, 1 M Ω $\pm 2\%$ shunted by ≈ 11 pF; 50 Ω , 50 Ω $\pm 2\%$; SWR (1722B, 1725A, 1727A) ≤ 1.3 on 10, 20, and 50 mV ranges, < 1.15 on all other ranges; SWR (1715A) ≤ 1.3 on 5, 10, 20, and 50 mV ranges and < 1.15 on all other ranges.

Max input: 1M Ω , ± 250 V (dc + pk ac) at ≤ 1 kHz; 50 Ω , 5 V rms.

A+B operation: amplifier, bandwidth and deflection factors are unchanged; channel B may be inverted for A-B operation; Differential (A-B) Common Mode, CMR is ≥ 40 dB from dc to 5 MHz decreasing to 26 dB at 50 MHz. Common mode signal amplitude equivalent to 12 div with one vernier adjusted for optimum rejection.

Channel A Input-dc Volts (1722B)

X1 range: 95 mV to 47 V fs vertical deflection (10 mV/div to 5 V/div).

X10 range: 0.95 V to 470 V full scale vertical deflection (100 mV/div to 50 V/div with X10 probe).

Accuracy: $\pm 0.5\%$ reading $\pm 0.5\%$ full scale ($f_s = 10$ cm), $+20^\circ\text{C}$ to $+30^\circ\text{C}$; Stability, temperature coefficient, $< \pm 0.02\%/^\circ\text{C}$.

Input impedance: X1 range, 1 M Ω shunted by ≈ 11 pF; X10 range (with X10 probe) 10 M Ω shunted by ≈ 10 pF.

Sample rate: $\approx 2/s$, response time ≤ 1 s.

Channel A Position - Volts (1722B)

(Channel A vernier in CAL detent.)

Measurement: dc substitution method using channel A position control to determine voltage of any point on displayed waveform using any graticule line as reference.

Bandwidth: dc to 275 MHz (≤ 3 dB down from 6 div ref signal).

Dynamic range: ± 6 cm from ground referenced to center screen.

Accuracy: $\pm 1\%$ reading $\pm 0.5\%$ of full scale (10X the volts/div range) measured at dc.

Channel A Position - % (1722B)

(Channel A vernier out of CAL detent.)

Measurement: dc substitution method using channel A position control to determine percent of any waveform point with respect to user defined 0 and 100% points. Accuracy $\pm 1\%$.

Range: 0 to $\pm 140\%$ (set with vernier so that 100% equals 5 div).

Vertical Output (Rear Panel)

Amplitude: one div of vertical deflection produces ≈ 100 mV output, dc to 50 MHz in 1722B, 1725A, 1727A, dc to 25 MHz in 1715A.

Cascaded deflection factor: 1 mV/div with both vert channels set to 10 mV/div. Bandwidth, dc to 5 MHz (with bandwidth limit). Source resistance $\approx 100\Omega$; selection, trig source set to A selects channel A output, to B selects channel B output.

Horizontal Display Modes

Main, main intensified (1715A, 1722B, 1725A), delayed, mixed, X-Y, and mag X10. The 1727A main intensified mode is automatically selected whenever the delayed time base is turned on.

Main Time Base

Sweep

Ranges: 10 ns/div to 0.5 s/div (24 ranges) 1, 2, 5 sequence.

Accuracy

Main Sweep Time/Div	Accuracy (0°C to +55°C)	
	X1	X10
10 ns to 50 ns	$\pm 3\%$	$\pm 5\%$
100 ns to 20 ms	$\pm 2\%$	$\pm 3\%$
50 ms to 0.5s	$\pm 3\%$	$\pm 3\%$

Vernier: extends slowest sweep to at least 1.25 s/div.

Magnifier: extends fastest sweep to 1 ns/div.

Sweep Mode

Normal: sweep is triggered by internal or external signal.

Automatic: baseline displayed in absence of input signal. Triggering is same as normal above ≈ 40 Hz.

Single: in Normal, sweep occurs once with same triggering as Normal, reset arms sweep and lights indicators; in Auto, sweep occurs once each time Reset is pressed (1727A). Erase pushbutton arms sweep, lights indicator, and performs the Reset function immediately following the erase cycle.

Triggering

Source: channel A, B, Comp, or line frequency.

Internal: dc to 100 MHz on signals causing ≥ 0.5 div vertical deflection, increasing to 1 div of vert deflection at 300 MHz (200 MHz, 1715A) in all display modes. Line freq. triggering selectable.

External: dc to 100 MHz on signals ≥ 50 mV p-p increasing to 100 mV p-p at 300 MHz (200 MHz, 1715A). Max input, ± 250 V (dc + peak ac) at ≤ 1 kHz. Input RC ≈ 1 M Ω shunted by ≈ 15 pF.

Trigger Level and Slope

Internal: at any point on the vertical waveform displayed.

External: $+1.0$ V to -1.0 V ($+10$ V to -10 V in $\div 10$ mode).

Coupling: AC, DC, LF REJ, or HF REJ.

Trigger holdoff: variable, to > 1 sweep from 10 ns/div to 50 ms/div.

Main Intensified

Delayed sweep: intensifies that part of main time base to be expanded to full screen in delayed mode.

Delta time mode: intensifies two parts of main time base that are expanded in delayed mode.

Delayed Time Base

Sweep

Ranges: 10 ns/div to 20 ms/div (20 ranges) in 1, 2, 5 sequence.

Accuracy: same as main time base.

Triggering

Internal: same as main time base, no Line Frequency triggering.

Starts after delay: sweep starts at end of delay period.

Trigger: with delayed trigger level control out of detent (starts after delay) delayed sweep is triggerable at end of delay period.

Delay time range: 0.5 to 10X Main Time/Div settings of 20 ns to 0.5 s (min delay 50 ns).

External triggering, external input RC, max external input, trigger level and slope, and coupling are same as main time base.

Differential time accuracy (1715A, 1725A, 1727A)

Main Time Base Setting	Accuracy (+15°C to +35°C)
50 ns/div to 20 ms/div	$\pm (0.5\%$ of reading $+0.1\%$ of full scale)
20 ns/div	$\pm (1\%$ of reading $+0.2\%$ of full scale)
50 ms/div to 0.5 s/div	$\pm 3\%$

Delay jitter: $< 0.005\%$ of max delay in each step.

Stability (0°C to +55°C): short term 0.005%. Temperature, $\pm 0.03\%/^\circ\text{C}$ deviation from calibration temperature range.



OSCILLOSCOPES

Models 1715, 1722B, 1725A & 1727A (cont.)

Time Interval (Δ Time Mode—1715A, 1725A, 1727A)

Function: measures time interval between two events on channel A (A display), on channel B (B display), or starting from an event on either A or B and ending with an event on either A or B (alt display).

Time interval output voltage: from 50 V to 100 mV full-scale.

Accuracy: Time Interval Accuracy plus DVM accuracy.

Main Time Base Setting	Accuracy (+20°C to +30°C)
100 ns/div to 20 ms/div	$\pm 0.5\%$ of reading $\pm 0.05\%$ of fs
50 ns/div*	$\pm 0.5\%$ of reading $\pm 0.1\%$ of fs
20 ns/div*	$\pm 0.5\%$ of reading $\pm 0.2\%$ of fs
50 ms/div to 0.5 s/div	$\pm 3\%$

Time Interval Measurements (1722B)

Time interval delay: continuously variable from 10 ns to 5 s.

Delay jitter: refer to Time Interval Measurements, Stability.

Time Interval Measurement (Time)

Function: measures time interval between two events on channel A (A display), on channel B (B display), or between two events starting from an event on A and one ending on channel B (alt display).

Time Interval Accuracy

Main Time Base Setting	Accuracy (+20°C to +30°C)
100 ns/div to 20 ms/div	$\pm 0.5\%$ of measurement $\pm 0.02\%$ of full scale (for measurements < 1 cm). For measurements > 1 cm, $\pm 0.5\%$ of measurement $\pm 0.05\%$ of full scale.
50 ns/div*	$\pm 0.5\%$ of measurement $\pm 0.06\%$ of full scale.
20 ns/div*	$\pm 0.5\%$ of measurement $\pm 0.15\%$ of full scale.
50 ms/div to 0.5 s/div.	$\pm 3\%$

*Starting after 60 ns of sweep.

Resolution: intervals < 1 cm, > 0.01% of full scale; intervals > 1 cm, 0.1% of full scale; max display resolution, 20 ps.

Stability (0° to +55°C): short term, < 0.01%. Temperature, $\pm 0.03\%/^{\circ}\text{C}$ deviation from calibration temperature range.

Reciprocal of Time Interval Measurement (1/time)

Accuracy, resolution, stability: see time interval measurements.

Mixed Time Base

Dual time base in which the main time base drives the first portion of sweep and the delayed time base completes the sweep.

X-Y Operation

Bandwidth:

Y-axis (channel A), same as channel A;

X-axis (channel B), dc to > 1 MHz.

Deflection factor: 10 mV/div to 5 V/div, 9 cal positions (5 mV/div to 5 V/div, 10 cal positions, 1715A) in 1, 2, 5 sequence.

Phase difference: < 3°, dc to 1 MHz (3 MHz, 1722B).

Cathode-ray Tube and Controls (1715A, 1722B, 1725A)

Type: post accelerator, ≈ 20.5 kV, aluminized P31 phosphor.

Graticule: 8 x 10 div internal graticule, 0.2 subdiv markings on major horiz and vert axes, 1 div = 1 cm. Internal floodgun illum.

Beam finder: returns trace to CRT screen.

Intensity modulation (Z-axis): +8 V, ≥ 50 ns width pulse blanks trace of any intensity, usable to 20 MHz for normal intensities. Input R, 1 k Ω $\pm 10\%$. Max input, ± 10 V (dc + peak ac).

Auto-focus: maintains beam focus with variations of intensity.

Intensity limit: limits beam current to simplify operation. Circuit response time ensures full writing speed.

Cathode-ray Tube and Controls (1727A)

Type: post accelerator, ≈ 9.5 kV, aluminized P31 phosphor.

Graticule: 8 x 10 div internal graticule, 0.2 subdivision markings on major horiz and vert axes, 1 div = 0.72 cm.

Beam finder: returns trace to CRT screen.

Intensity modulation (Z-axis): +4V, ≥ 50 ns width pulse blanks trace of any intensity, usable to 20 MHz for normal intensities. Input R, 1 k Ω $\pm 10\%$. Max input, ± 20 V (dc + peak ac).

Operating modes: write, store, display, auto-store, and auto-erase.

Writing speed, variable persistence and storage: ≥ 2000 cm/ μs (2775 div/ μs) over center 6 x 8 div (with viewing hood).

Storage time (at 22°C): display mode, at least 10 s; store mode, at least 30 s; wait time, at least 60 s.

Persistence: variable, ≥ 100 ms.

Erase time: ≈ 300 ms.

Intensity limit: limits beam current to simplify operation. Circuit response time ensures full writing speed.

Auto-focus: maintains beam focus with variations of intensity.

General

Rear panel controls: astigmatism and trace align (both X and Y).

Rear panel outputs: main and delayed gates, -0.7 V to +1.3 V capable of supplying ≈ 3 mA; and vertical output.

Calibrator: type, 1 kHz $\pm 15\%$ ($\pm 10\%$, 1722B) square wave; 3 V p-p $\pm 1\%$, < 0.1 μs transition time.

Power: 100, 120, 220, and 240 Vac, -10% + 5%; 48 to 440 Hz; 110 VA max.

Weight

1715A, 1725A: net, 12.9 kg (28.5 lb); shipping, 17.9 kg (39.5 lb).

1722B: net 13.6 kg (30 lb); shipping, 19.5 kg (43 lb).

1727A: net, 15.9 kg (35 lb); shipping, 20 kg (44 lb).

Operating environment: temp, 0°C to +55°C; humidity, to 95% rel humidity at +40°C; altitude, to 4600 m (15,000 ft); vibration, in three planes for 15 min. each with 0.254 mm excursion, 10 to 55 Hz.

Size: (1715A, 1725A, 1722B) 197 H x 335 W x 570 mm D (7.75" x 13.8" x 22.4") with handle; (1715A, 1725A) 502 mm D (18.88 in. without handle; (1722B) 510 mm (20.06 in.) without handle; (1727A) 197 H x 335 W x 652 mm D (7.75" x 13.8" x 25.69") with handle; 595 mm (23.38 in.) without handle.

Accessories furnished: one blue light filter; one panel cover; two 10017A 10:1 divider probes with 1722B, 1725A, 1727A; two 10018A 10:1 divider probes with 1715A; one 2.3 m (7.5 ft) power cord; one vinyl storage pouch; one Operating and Service Manual. The 1727A includes one Model 10173A RFI filter and contrast screen, and one Model 10140A viewing hood.

Options and Accessories

001: U.S. fixed line cord add \$15

003: probe power supply with two rear panel jacks for use with HP 1120A or 1124A active probes. add \$60

034 (except 1722B): built-in DMM (60 Hz) add \$430

035 (except 1722B): built-in DMM (50 Hz) add \$430

091 (except 1715A): two 2 m (6.6 ft) 10018A, 10:1 probes substituted for two 10017A miniature probes N/C

091 (1715A): two 1 m (3.3 ft) 10017A, 10:1 probes substituted for two 10018A miniature probes N/C

092: two 1.8 m (6 ft) 10016B, 10:1 probes substituted for two miniature probes N/C

112: includes 1112A Inverter Power Supply. add \$1525

910 (except 1727A): additional set of manuals add \$30

910 (1727A): additional set of manuals add \$30

Time interval multimeter kit: (HP P/N 01715-69501 for 1715A or 1725A, HP P/N 01727-69501 for 1727A) adapts a standard Model 1715A, 1725A, or 1727A to an Opt 034/035, built-in, LED readout, delta time oscilloscope. Included are a multimeter, an oscilloscope cover, a vinyl storage pouch, and mounting hardware. \$450

Ordering Information

1715A 200 MHz Oscilloscope \$4000

1722B 275 MHz Oscilloscope with Microprocessor \$5960

1725A 275 MHz Oscilloscope \$4450

1727A 275 MHz Storage Oscilloscope \$8775