HEWLETT PACKARD

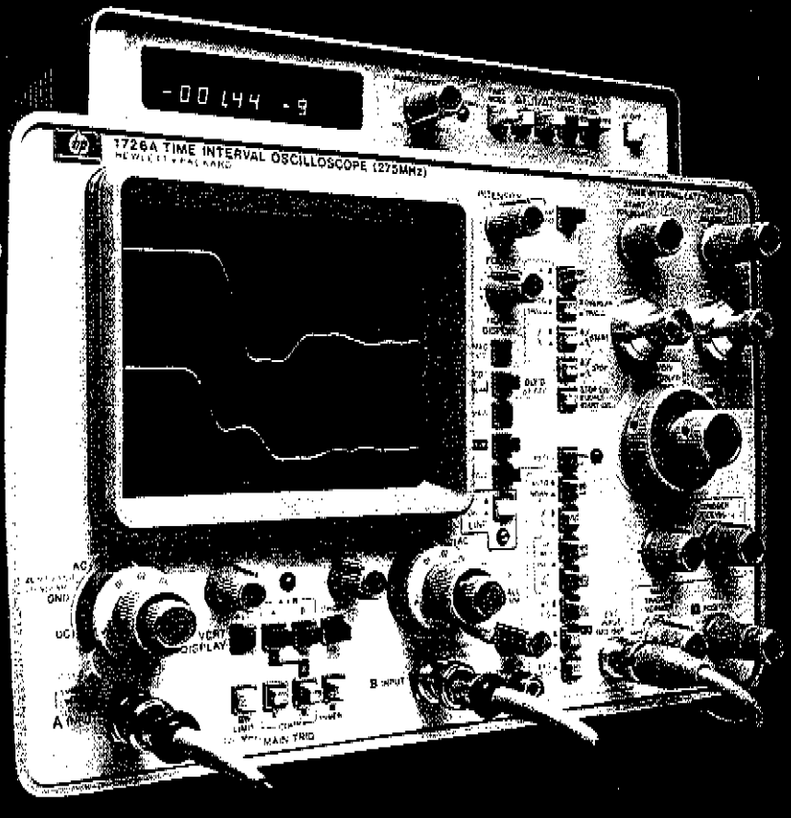
TIME INTERVAL OSCILLOSCOPE

275 MHz

Model 1726A

TECHNICAL DATA 1 FEB 83

TIME INTERVAL



OSCILLOSCOPE

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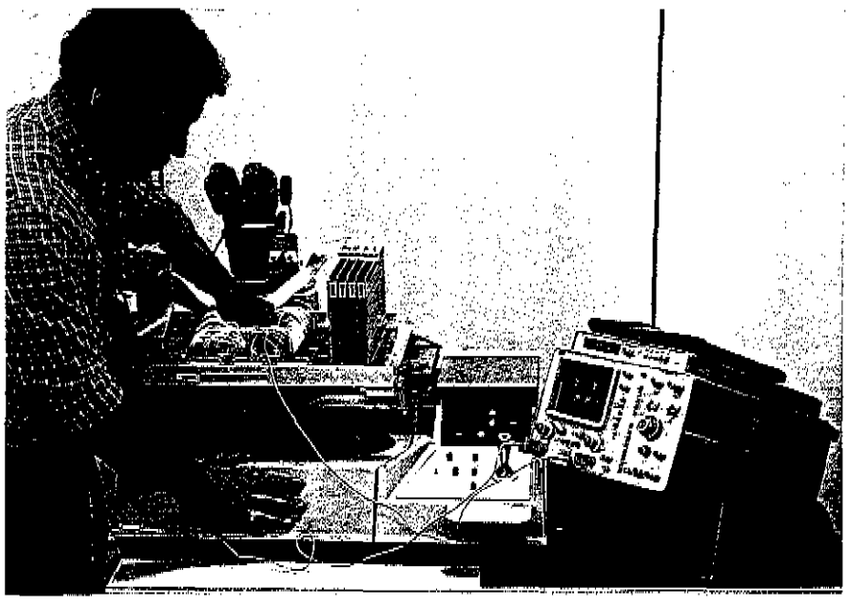
HP'S NEW TIME INTERVAL MEASUREMENT SOLUTION

The HP 1726A Time Interval Oscilloscope is a new time interval measuring instrument. Time interval counter and oscilloscope technologies have been synergistically combined in the 1726A to offer performance, convenience, and value unmatched by alternative instrumentation. The contributions of the Time Interval Oscilloscope benefit users with frequently encountered timing applications and/or precise timing measurement requirements.

The requirement for stringent timing measurements has resulted from advances in IC design, device characterization of custom integrated circuits (e.g., bipolar and MOS processes), ECL circuits, and faster clock speeds in computers and other electronic systems. For example, characterizing a process, verifying system operation, or troubleshooting a new design all require highly accurate and repeatable measurements. The feature set of the 1726A provides advanced performance with simple setup and the front panel conveniences expected from Hewlett-Packard products.

"THE COMPLETE TIME INTERVAL SOLUTION"

Completing the time interval solution is the HP 10326A Time Interval Standard, a dual channel signal source. The 10326A's waveform period accuracy (+/-5 picoseconds) and specified dual-channel timing relationships provide convenient signals with which to evaluate system performance and subsystem design. The 10326A is exceptionally easy to maintain, and its calibration procedure is completely traceable to the United States National Bureau of Standards and to the calibration facilities of other International Standards Organization members.



FAST, CONFIDENT MEASUREMENTS

Combining a CRT with a marker system makes the measured interval easy to identify. Matched wideband pre-amplifiers allow pulse parameters such as overshoot and ringing to be examined, and the overlap mode permits precise measurements to be made from specific points on any displayed waveform. This measurement system eliminates uncertainty concerning the exact interval being measured, and it obsoletes the technique of externally gating a time interval counter with an oscilloscope.

PRECISE MEASUREMENTS (+/-50 PICOSECONDS)

Time interval averaging, which is automatically controlled through the Main Time/Div switch, allows the 1726A to make precise measurements on virtually any repetitive signal that can be displayed on an oscilloscope. A crystal-referenced time base combines with sophisticated triggering circuits to form the most accurate measurement system available today—up to 10 picosecond resolution and 50 picosecond accuracy.

REPEATABILITY AND CONVENIENCE

Complex time interval measurements are highly repeatable and easy to make with the 1726A's triggered mode of operation. The triggered mode minimizes setup time, simplifies measurement procedures, and it allows highly repeatable measurements to be obtained independent of the operator's skill level. The fast mode, which reduces the number of averages taken by a factor of ten, minimizes measurement time in all operating modes. In production and record-keeping applications, a standard HP-IB interface outputs time interval information.

TWO INSTRUMENTS IN ONE

The feature set of the 1726A Time Interval Oscilloscope provides the performance of two complete instruments. Not only is the 1726A the most advanced time interval measurement solution, but with its time interval module turned off, the 1726A offers all the capabilities of a general purpose, 275 MHz oscilloscope.

A HYBRID TECHNOLOGY

The time interval measurement technology of the 1726A combines the crystal-referenced time base of a time interval counter with the stable triggering circuits of high performance oscilloscopes. This combination increases measurement capability and improves resolution and accuracy over traditional oscilloscope time interval measurements that are all restricted by the stability and linearity of analog sweep ramps (**Figure 1**).

The 1726A's hybrid technology, when compared to time interval counter technology (**Figure 2**), also offers several contributions to timing measurements on repetitive signals (**Figure 3**). All measurements are referenced to the main trigger event, the CRT provides visual feedback, and the overlap mode eliminates errors associated with blind triggered measurements.

FIRST-PULSE MEASUREMENTS

Eliminating an oscilloscope's horizontal sweep ramp as a reference for timing measurements allows the 1726A to precisely measure time intervals relative to the trigger event that synchronizes its waveform display. This means that the 1726A can make first-pulse measurements, a class of measurements that are absolutely necessary to solve many timing problems in today's fast circuits.

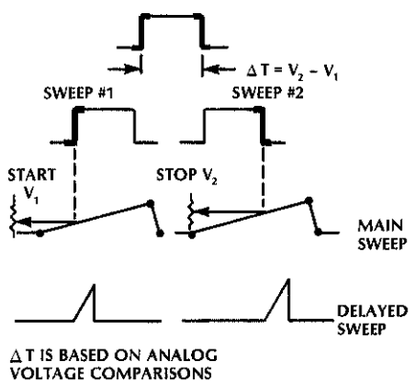


Figure 1—*Time interval measurements with traditional oscilloscopes are based upon analog voltage comparisons.*

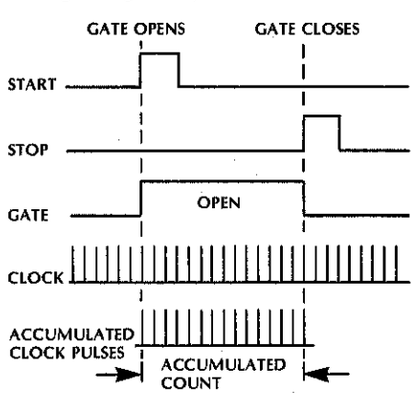


Figure 2—*Time interval counters make ΔT measurements by counting gated clock pulses. Time interval accuracy is often limited by the trigger circuitry.*

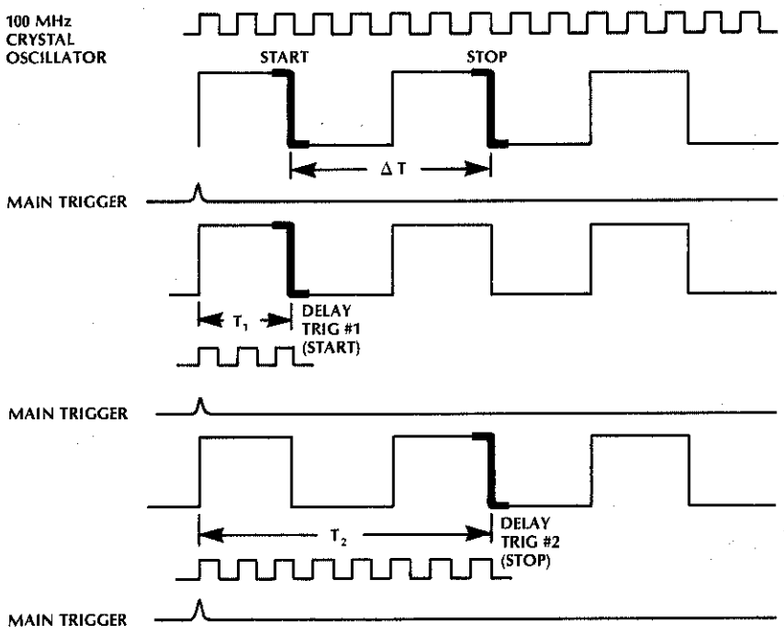


Figure 3—*The 1726A Time Interval Oscilloscope uses a synergistic combination of time interval counter and oscilloscope technologies. The result is a significant contribution in both measurement accuracy and user operating convenience.*

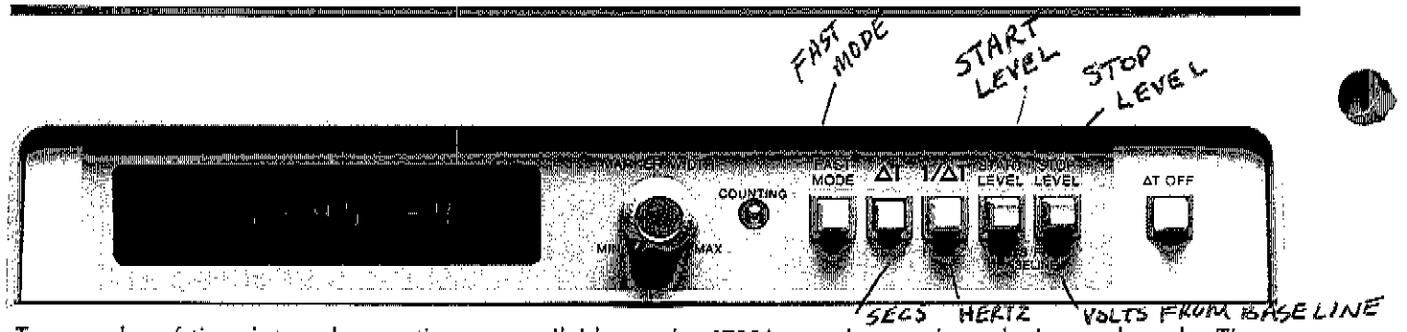
SWEEP VERNIER

In addition to first-pulse measurements, the crystal-referenced time base permits accurate timing measurements to be made with the 1726A's horizontal sweep vernier out of calibration. This extends the useful measurement range of every time base setting by a factor of three. This is important because accuracy is partially determined by the Main Time/Div setting. For example, time intervals as long as 1.2 μs can be measured with +/– 10 ps resolution.

GENERAL PURPOSE OSCILLOSCOPE CAPABILITY

The 1726A also functions as a complete general purpose oscilloscope. Selectable 1 MΩ and 50Ω inputs offer convenience in terminations. Vertical deflection factors of 10 mV/div to 5 V/div over the full 275 MHz bandwidth provide the high performance required for laboratory, production, and service applications. Sweep speeds from 10 ns/div to 0.5 s/div combine with a ×10 magnifier to offer a horizontal display window resolution of up to 1 ns/div. As a general purpose oscilloscope, the 1726A provides both a main and a delayed time base. The trigger source for each of these time bases can be individually selected to be either channel A or channel B. The main time base trigger source can also be obtained from an independent third channel (i.e., external trigger input).

TIME INTERVAL MEASUREMENTS



Two modes of time interval operation are available on the 1726A, overlap mode and triggered mode. Time interval averaging, automatically controlled via the Main Time/Div switch, is used to make accurate measurements in both operating modes. This measurement technique combines sophisticated triggering circuits with a crystal-referenced time base providing timing measurements on virtually any signal that can be displayed on an oscilloscope. A large LED readout on the time interval module displays answers and other relevant timing information.

OVERLAP MODE

The overlap mode is designed for applications that require absolute accuracy. In this mode, the CRT is used as a visual comparator for making timing measurements. This powerful technique is possible because of the known relationships between the delayed display and the stopping point for the counting process utilized in a time interval measurement.

Three steps are required to make a measurement. First, select ΔT and position the start/stop intensifed markers on the desired edges (**Figure 4**). Next, switch to ΔT Overlap (i.e., delayed display). Increase screen resolution with Mag ×10, and overlap or align the start/stop waveforms precisely (**Figure 6**). The answer is automatically displayed on the LED or output via the HP-IB interface (**Figure 7**).

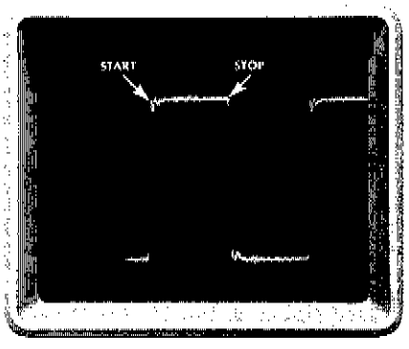


Figure 4—*A pulse width measurement using the overlap mode. This signal is generated by ECL 100k logic with voltage swings from –0.8 V to –1.6 V.*

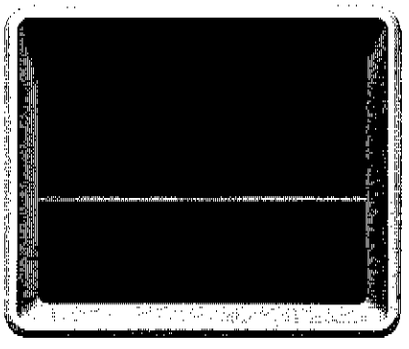


Figure 5—*The –1.3 V threshold is used as the known voltage.*

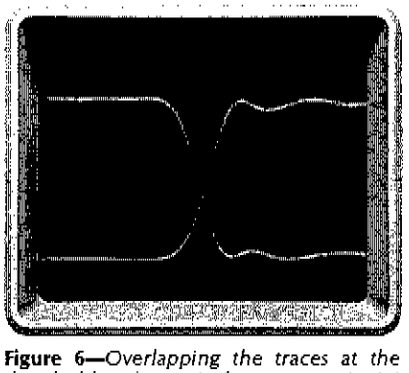


Figure 6—*Overlapping the traces at the threshold voltage (reference graticule) completes the measurement.*

MATCH PROBE AND CABLE PROPAGATION DELAYS

In many two-channel applications, small (+/– 200 ps) differences in probe or cable propagation delays can significantly affect short time interval measurements. A front panel adjustment, Signal Overlap A=B, is designed to compensate for small (+/– 0.5 ns) differential delays between probes or cables.

FAST MODE

This front panel button reduces the number of averages required for a measurement by a factor of ten. It is primarily a convenience for quickly updating the time interval display. However, in low repetition rate applications, this mode is extremely useful. Reducing the number of averages affects the displayed resolution and/or the uncertainty in the least significant digit.

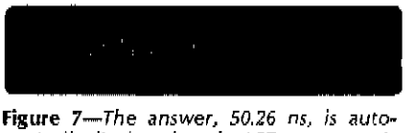


Figure 7—*The answer, 50.26 ns, is automatically displayed on the LED or output via the HP-IB interface.*

TRIGGERED MODE

The triggered mode of the 1726A provides simplicity and repeatability. With this mode, multiple timing measurements can be made quickly and confidently, virtually free of operator error. After triggered mode has been selected, only two steps are required to perform a measurement. First, adjust the start/stop trigger levels using the LED display as a trigger voltage readout (**Figure 8**), and then position the intensified markers on the desired edges with the Start/Stop and slope controls and press ΔT (**Figure 9**). Measurements are made from the trigger point of the start intensified marker to the trigger point of the stop intensified marker.

Measurements can be repeated days apart, and answers for a given signal and start/stop trigger level are repeatable to within +/- 30 ps. Repeatability is an operating characteristic based on characterization data (see specifications). Absolute accuracy can be verified with the overlap mode because several variables affect the accuracy of the triggered mode.

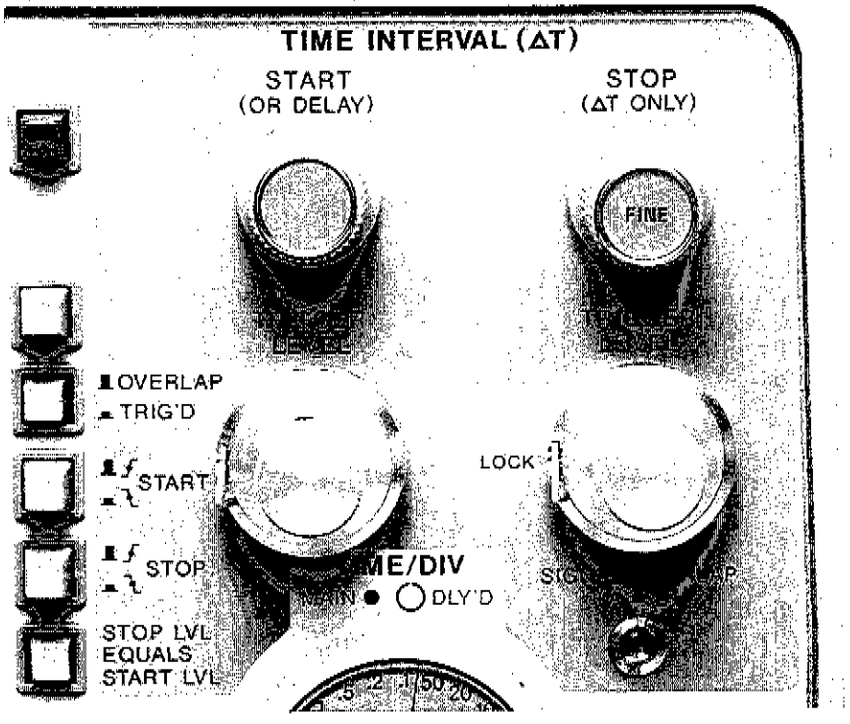


Figure 8—*The start trigger voltage is set to 1.9 V. The stop trigger level is set equal to start level.*

Figure 9—*The answer (0.4074 μs) is read from the LED display or output via the HP-IB interface.*

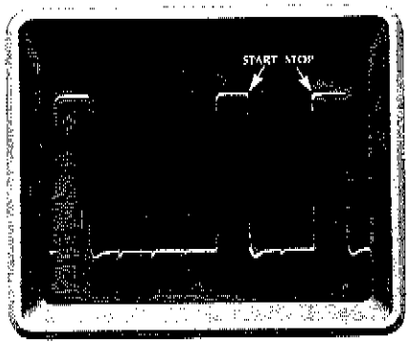
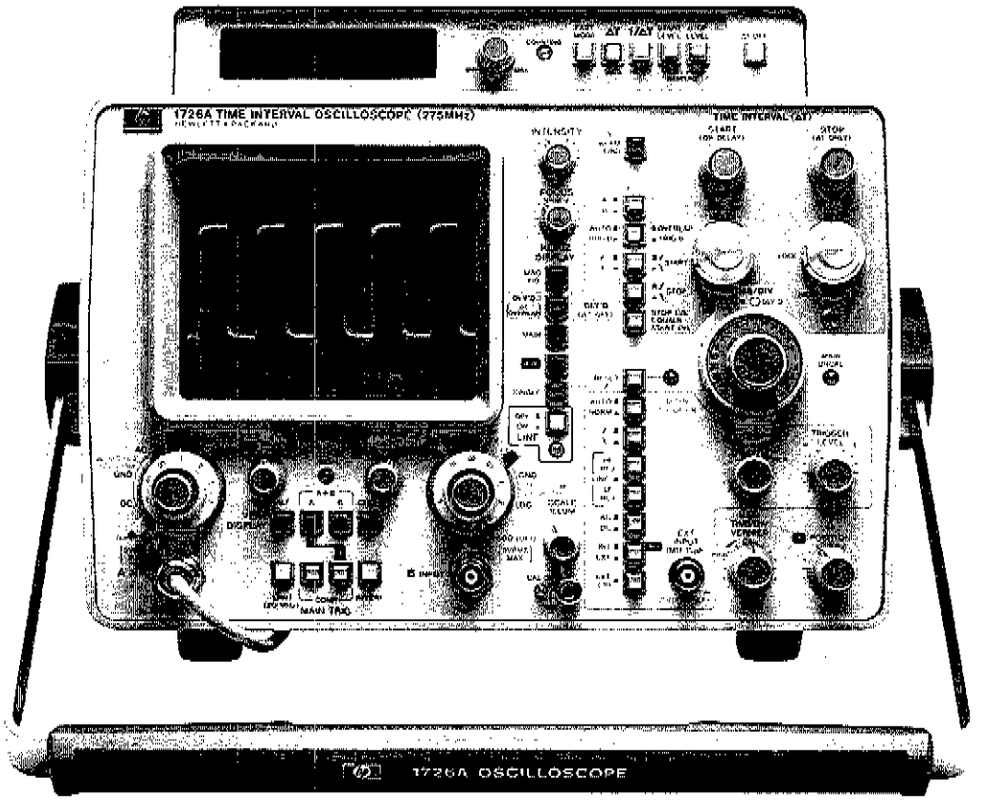


Figure 10—*This TTL signal has a nominal voltage swing of 0.4 V to 3.4 V with a threshold of 1.9 V.*

DATA OUTPUT CAPABILITY

A standard HP-IB interface on the 1726A can output data for production and record-keeping applications. Time interval measurements are easily output over HP-IB; and in the triggered mode, the Start/Stop trigger levels can also be obtained.

SPECIFICATIONS*



VERTICAL DISPLAY MODES
Channel A; Channel B; Channels A and B displayed alternately on successive sweeps (ALT); Channels A and B displayed by switching between channels at approximately 1 MHz rate with blanking during switching (CHOP); A+B (algebraic addition); A−B (with Channel B inverted); X Y (A vs B).

VERTICAL AMPLIFIERS
Bandwidth: 3 dB down from a 6 div reference signal.

DC-Coupled: dc to 275 MHz in both 50Ω and high input impedance modes.

AC-Coupled: lower limit is ≈10 Hz.

Bandwidth Limit: limits upper bandwidth to approximately 20 MHz.

Rise Time: <1.27 ns, measured from 10% to 90% points of a 5 div input step.

Deflection Factor

Ranges: 10 mV/div to 5 V/div (9 calibrated positions) in 1, 2, 5 sequence; ±2% attenuator accuracy.

Vernier: continuously variable between all ranges; extends maximum deflection factor to at least 12.5 V/div. Front panel indicator lights when vernier is not in CAL position.

Polarity: Channel B may be inverted with front panel pushbutton.

Signal Delay: input signals are delayed sufficiently to view leading edge of input pulse without advanced trigger.

Input Coupling

AC/DC: 1 MΩ ±2% shunted by approximately 11 pF.

50Ω: 50Ω ±2%; SWR ≤1.3 on 10 mV, 20 mV, and 50 mV ranges, ≤1.15 on all other ranges.

GND: disconnects input connector and grounds amplifier input.

Maximum Input

AC/DC: ±250 V (dc + peak ac) at 1 kHz or less.

50Ω: 5 V rms.

A+B/A−B Operation: amplifier bandwidth and deflection factors unchanged. Differential (A−B) common mode: CMR is at least 40 dB from dc to 5 MHz decreasing to 26 dB at 50 MHz. Common mode signal amplitude equivalent to 12 cm with one vernier adjusted for optimum rejection.

VERTICAL OUTPUT (REAR PANEL)
Amplitude: one division of vertical deflection produces ≈100 mV output, dc to 50 MHz.

Cascaded Deflection Factor: 1 mV/div with both vertical channels set to 10 mV/div.

Cascaded Bandwidth: dc to 5 MHz with bandwidth limit engaged.

Source Resistance: approximately 50Ω.

Source Selection: trigger source selects which channel is output. If external trigger is selected, Vertical Output is disabled.

TRIGGER SOURCE
Selectable from Channel A, Channel B, or Composite. Composite eliminates timing relationships by triggering the channel A display from channel A and the channel B display from channel B.

HORIZONTAL DISPLAY MODES
Main, Dly'd (ΔT Overlap), Single, X Y, and Mag ×10.

MAIN TIME BASE
Sweep: ranges, 10 ns/div to 0.5 s/div (24 ranges) 1, 2, 5 sequence.

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

Vernier: continuously variable between all ranges; extends slowest sweep to at least 1.25 s/div. Vernier uncalibrated indicator lights when vernier is not in CAL position.

Magnifier: expands all sweeps by a factor of ten; extends fastest sweep to 1 ns/div.

Sweep Mode

Normal: sweep is triggered by internal or external signal.

Automatic: baseline is displayed in absence of input signal. Triggering is the same as Normal with trigger source above approximately 40 Hz.

Single: Sweep occurs once with the same triggering as Normal, reset pushbutton arms sweep and lights indicator.

TRIGGERING
Internal: dc to 100 MHz on signals causing 0.5 division or more vertical deflection, increasing to 1.5 divisions of vertical deflection at 275 MHz in all display modes. Triggering on power line frequency is also selectable.

External: dc to 100 MHz on signals of 50 mV p-p or more increasing to 150 mV p-p at 275 MHz. Maximum Input: ±250 V (dc + peak ac) at 1 kHz or less.

External Input RC: approximately 1 MΩ shunted by approximately 15 pF.

Trigger Level and Slope

Internal: at any point on the vertical waveform displayed.

External: continuously variable from +1.0 V to −1.0 V on either slope of the trigger signal, +10 V to −10 V in ÷10 mode.

Coupling: ac, dc, LF Reject, or HF Reject

ac: attenuates signals below 10 Hz.

LF Reject: attenuates signals below approximately 7 kHz.

HF Reject: attenuates signals above approximately 7 kHz.

Trigger Holdoff: time between sweeps continuously variable, exceeding one full sweep from 10 ns/div to 50 ms/div.

*Specifications describe the instrument's warranted performance. Operating characteristics are intended to provide information useful in applying the instrument by giving TYPICAL or NOMINAL, but non-warranted performance parameters.

DELAYED TIME BASE

Sweep

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

Accuracy (0° C to 55° C): same as main time base.

Magnifier (0° C to 55° C): same as main time base.

Triggering (with ΔT off)

Auto: delayed sweep automatically starts at end of delay period.

Trig: delayed sweep is triggerable at end of delay period. Vary Start (or Delay) control to adjust the arming point of the delayed sweep trigger.

Delayed Trigger Source: Channel A or Channel B can be selected as a trigger source.

Delayed Jitter: <0.005% (1 part in 20,000) of maximum delay in each step.

TIME INTERVAL (ΔT)

Function: measures the time interval between start and stop events on one or two channels, in all operating modes except X Y.

Overlap Mode: the CRT is used as a visual comparator to measure time intervals between start and stop events. Time interval measurements are valid when start/stop delayed sweeps are overlapped or aligned on a vertical graticule (in ΔT overlap with mag ×10 if required). Known relationships between the delayed display and the stopping point for the counting process (see Figure 3) required for a time interval measurement enable the use of this technique.

ΔT Overlap: only the intensified portions (Start/Stop) of main sweep are displayed. With ΔT off, the intensified single delayed sweep is displayed.

Marker Width: In Main display, this control varies the width of the intensified start/stop markers. In ΔT overlap display, the width (i.e., time window) of the displayed intensified region varies. With ΔT off, this control is non-functional.

Start (or Delay)/Stop (ΔT Only): controls position of the start/stop intensified markers. Markers move continuously in overlap mode, and they jump discretely (from trigger event to trigger event) in triggered mode. With ΔT off, Start is the delay control for the single intensified marker.

Dly'd (ΔT Overlap): displays delayed sweep (i.e., the intensified portions of main sweep).

ΔT: activates time interval readout between start and stop events.

1/ΔT: displays reciprocal of ΔT measurement.

Fast Mode: used in conjunction with ΔT or 1/ΔT; reduces number of averages by a factor of 10. Increases uncertainty of least significant digit displayed.

Counting LED: indicates a measurement in progress.

Main Time/Div Setting: automatically determines the number of averages required for a measurement.

Triggered Mode: measures time interval between start trigger point and stop trigger point. Start/Stop trigger level controls adjust the desired trigger point when the corresponding button on the Time Interval Module is engaged.

Start/Stop Trigger Level: indicates through the LED readout the desired trigger point for start/stop events. These controls set the reference for the trigger point in the trigger chip. Actual trigger point will vary with slope, slew rate, and trigger voltage selected (see discussion in the 1726A Product Note).

Stop Lvl Equals Start Lvl: automatically sets stop trigger level equal to start trigger level.

Start/Stop Slope Selection: indicates positive or negative slope for start/stop trigger point.

ΔT ACCURACY

Overlap Mode: there are three components of accuracy in this mode: 1) CRT screen resolution; 2) resolution of the time interval averaging process; and 3) uncertainty in the counting process. Table A summarizes accuracy in all operating conditions (Channel A, Channel B, ALT, CHOP, A+B, A−B).

TABLE A

Main Time/Div	Dly'd Time/Div	Accuracy†
20 ns	10 ns	±100 ps
50 ns	10 ns, 20 ns	±50 ps
.1 μs,.2 μs,.5 μs	10 ns, 20 ns	±200 ps
.1 μs,.2 μs,.5 μs	50 ns	±300 ps
.2 μs,.5 μs	.1 μs	±400 ps
.5 μs	.2 μs	±600 ps
1.0 μs,2.0 μs	all	±2 ns
5.0 μs, 10 μs, 20 μs	all	±10 ns
50 μs,.1 ms,.2 ms	all	±100 ns
.5 ms,1.0 ms,2.0 ms	all	±1 μs
5.0 ms, 10 ms,20 ms	all	±10 μs
50 ms,.1 s,.2 s,.5 s	all	±100 μs

† Add ±50 ps if measurement is made relative to the first pulse. Accuracy is not specified if measurements are made relative to the last 0.5 divisions of main sweep.

Triggered Mode: for accuracy greater than ±0.5 ns, all measurements should be verified with the Overlap mode. Absolute accuracy on measurements made without Overlap mode verification can be determined by adding ±300 ps to the accuracy specifications in Table A. A number of variables affect the accuracy of this mode (see 1726A Product Note 5953-3920 for details).

Accuracy is composed of 1) "arm/walk" errors, which can be minimized by viewing triggered measurements in Dly'd (ΔT Overlap) display (see Product Note for details). 2) trigger level vs. trigger point errors (see Product Note for details). This error is minimized when time interval measurements are made at the same Start/Stop voltage on similar sloped edges. 3) counting process errors; 4) time interval averaging resolution; and 5) crystal time base accuracy of 0.001% of measurement.

OPERATING CHARACTERISTICS*

Repeatability: triggered mode measurements (i.e., at specific trigger voltages on similiar waveforms) are repeatable to within ±30 ps independent of operator.

X Y OPERATION

Bandwidth

Y-Axis (Channel A): same as Channel A

X-Axis (Channel B): dc to >1 MHz

Phase Difference: <3°, dc to 1 MHz

CATHODE-RAY TUBE AND CONTROLS

Type: post accelerator, approximately 20.5 kV accelerating potential, aluminized phosphor.

Graticule: 8 × 10 div internal graticule, 0.2 subdivision markings on major horizontal and vertical axes; 1 div = 1 cm. Internal flood gun graticule illumination.

Beam Finder: returns trace to CRT screen regardless of setting of horizontal, vertical, or intensity controls.

Intensity Modulation: TTL compatible. Pulse of >(−2) V and >75 ns width blanks trace of any intensity. Pulse of <(−2) V and >75 ns width intensifies trace of normal intensity. Maximum input ±10 V (dc + peak ac). Input R: 10 kΩ ±10%.

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

Intensity Limit: automatically limits beam current to decrease possibility of CRT damage.

Rear Panel Controls: astigmatism and trace align.

GENERAL

Rear Panel Outputs: main and delayed gates 0 to >3.0 V capable of supplying approximately 3 mA vertical output.

Calibrator: ≈1 kHz square wave; 3 V p-p ±1% <0.2 μs rise time; used for compensation of 10:1 passive divider probes.

Power: 100, 120, 220, 240 V ac, −10% +5%, 48 to 440 Hz; 160 VA max.

Weight: net 15.6 kg (34.3 lb); shipping 20.6 kg (45.4 lb).

Operating Environment: temperature, 0° C to +55° C (+32° F to 130° F), humidity to 95% relative humidity (non-condensing) at +40° C (+104° F); altitude to 4600 m (15000 ft); vibration, vibrated in three planes for 15 min each with 0.381 mm (0.015 in) excursion, 10 to 55 Hz.

Dimensions: See outline drawing.

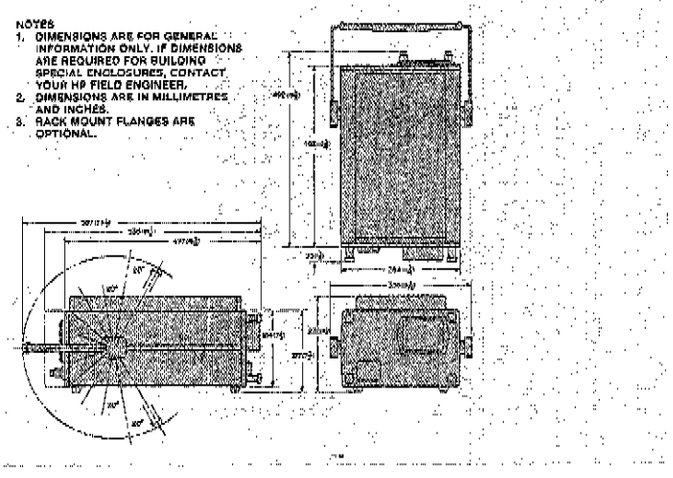
Accessories Furnished: One neutral density contrast filter/CRT shield; one front panel cover; one vinyl accessory storage pouch; one 2.3 m (7.5 ft) power cord; one Operating and Service Manual; two HP 10017A 10:1 divider probes ≈ 1 m (3.3 ft) long; and one attenuator resistor kit.

OPTIONS - 1726A

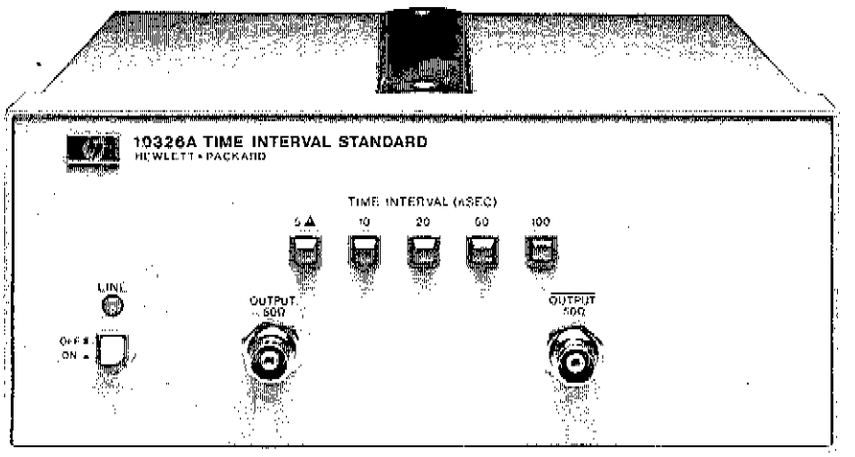
001: Fixed Power Cord ..... +$ 15.
002: Delete HP-IB Interface ..... −$ 150.
003: Probe Power ..... +$ 70.
090: Delete Probes ..... −$ 150.
091: Change Probes to (2) 10018A ..... N/C
092: Change Probes to (2) 10016B ..... N/C
093: Change Probes to (2) 10030A ..... N/C
910: Extra Manual ..... $ 45.

ORDERING INFORMATION:

1726A Time Interval Oscilloscope .... $7675.



ACCESSORIES



10326A TIME INTERVAL STANDARD

The 10326A is a signal source that provides a dual-channel time interval reference. The two channels, OUTPUT and $\overline{\text{OUTPUT}}$, offer a selectable square wave output with waveform periods of 5, 10, 20, 50, or 100 nanoseconds. These output signals can be delivered to probe tips or BNC connectors with the 10326A's accessory kit.

The waveform period accuracy of any selected square wave output is ±5 picoseconds. This accuracy results from the high frequency stability of the temperature compensated crystal oscillator and spectral purity achieved through the built-in Tchebychev filter network. To learn more, refer to the 10326A data sheet, #5953-3911. ..... $2275.
Option 001 (Delete Accessory kit): ..... –$125.

	Waveform Period Accuracy	Pulse Duty Cycle Accuracy	Two Channel Timing Accuracy	
ns	A	B	C	D
5	5 ns ±5 ps	—	0 ±250 ps	0 ±250 ps
10	10 ns ±5 ps	5 ns ±500 ps	0 ±250 ps	0 ±250 ps
20	20 ns ±5 ps	10 ns ±500 ps	0 ±250 ps	0 ±250 ps
50	50 ns ±5 ps	25 ns ±1.5 ns	0 ±250 ps	0 ±250 ps
100	50 ns ±5 ps	50 ns ±1.5 ns	0 ±250 ps	0 ±250 ps

Figure 11—*Edge-To-Edge Timing*

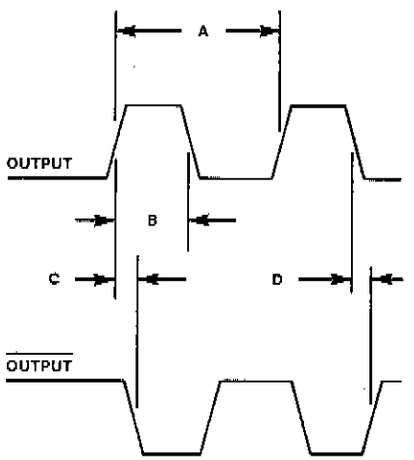


Figure 12—*10326A Waveforms*

Timing relationships between OUTPUT and $\overline{\text{OUTPUT}}$ of the 10326A are fully specified in Figure 11 above. A procedure outlined in the manual characterizes the timing relationships between OUTPUT and $\overline{\text{OUTPUT}}$ on an individual 10326A to much more precise values than those specified in Figure 11. Timing relationships established through characterization are accurate to within the limits listed in Figure 13.

10020A RESISTIVE DIVIDER PROBES

The 10020A Resistive Divider Kit is a signal probing accessory designed for use with 50Ω systems. Six divider tips are supplied [1:1 (50Ω), 5:1 (250Ω), 10:1 (500Ω), 20:1 (1000Ω), 50:1 (2500Ω), 100:1 (5000Ω)] all with input C < 0.7 pF .... $310.

10030A 10:1 RESISTIVE DIVIDER MINI-PROBE

This probe provides exceptional high frequency performance in the convenient mini probe package. Input R = 500Ω, Input C < 2 pF ..... $92.

ACTIVE PROBE FOR FAST SIGNAL APPLICATIONS

Model 1120A — 100 kΩ, < 3 pF; 1 MΩ, < 1 pF with 10:1 and 100:1 divider tips approximately 1.2 m (4 ft) ..... $1060.

MINIATURE PROBE ACCESSORIES

For complete information see the HP Instrument Catalog or the Oscilloscope Probes, Probe Accessories, and Adapters Data Sheet (#5953-3845).
IC Test Clip 10024A — simplifies probing on 16 pin DIPs ..... $20.
IC Test Clip 10211A — simplifies probing on a wide range of DIPs ..... $75.
BNC Adapter Tip (HP P/N 1250-1454) — permits signal monitoring at BNC connectors with miniature probes ... $21.

TESTMOBILES

Models 1006A and 1007A Testmobiles offer efficient mobility for all HP 1700-series oscilloscopes. Contact your HP field engineer for the available configurations or a copy of the Testmobiles Data Sheet (#5953-3839).

	Time Measurement		
	Pulse Duty Cycle	Two Channel Timing	
10326A Time Interval	B	C	D
5 ns	—	±30 ps	±30 ps
10 ns	±50 ps	±30 ps	±30 ps
20 ns	±50 ps	±30 ps	±30 ps
50 ns	±80 ps	±30 ps	±30 ps
100 ns	±80 ps	±50 ps	±50 ps

Figure 13—*10326A Characterization Expectations.*

For more information, call your local HP Sales Office or nearest Regional Office: Eastern (301) 258-2000; Midwestern (312) 255-9800; Southern (404) 955-1500; Western (213) 877-1282; Canadian (416) 678-9430. Ask the operator for Instrument Sales. Or, Write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 94304. In Europe: Hewlett-Packard S.A., 7, rue du Bois-du-Lan, P.O. Box CH-1217 Meyrin 2, Geneva, Switzerland. In Japan: Yokogawa-Hewlett-Packard Ltd., 29-21, Takaido-Higashi 3-chome, Suginami-ku, Tokyo, 168.

Prices apply only to domestic U.S. customers.
Data subject to change.