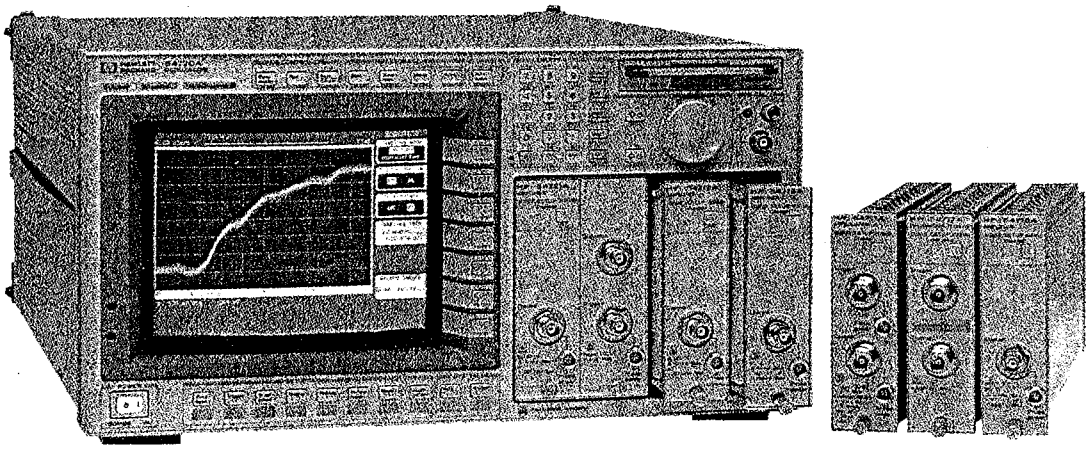
OSCILLOSCOPES

Digitizing Oscilloscopes

HP 54710A, 54720A

- 4-GSa/s sampling rate on two channels
- 50-ps time-interval accuracy, real-time (RT) mode
- 1.5-GHz bandwidth, equivalent-time (ET) mode
- Modular design
- 3½-in MS-DOS®-compatible disk drive
- Flash ROM firmware memory



NEW

DESIGNED FOR HP-IB SYSTEMS

A unique technology called sample-and-filter is responsible for the unprecedented performance of the HP 54720A.

HP 54720A and HP 54710A 4-GSa/s Modular Oscilloscopes

When You Have Only One Chance, You Need the Most Accurate Real-Time Oscilloscope

When an electronic or electrical event occurs only once, you need to capture and analyze the parametric nature of the event accurately the first time. The high sample rate, the industry-leading accuracy, and the powerful features of the HP 54720A and HP 54710A give you the clearest picture of the event possible.

The HP 54700 Series: Key Contributions

- Four channels with 2-GSa/s ADCs and 16-K memory channel (HP 54720A)
- Two channels with 4-GSa/s ADCs and 32-K memory channel (HP 54720A)
- Two channels with 2-GSa/s ADCs and 16-K memory channel (HP 54710A)
- One channel with 4-GSa/s ADCs and 32-K memory channel (HP 54710A)
- 8 bits vertical resolution (RT)
- 9 to 12 bits vertical resolution with averaging
- 1% vertical gain accuracy
- ±30-ps time interval measurement accuracy (ET)
- 500-ps glitch capture
- Advanced logic triggering
- User-selectable sample rate and memory depth
- High, 177 waveforms/s max capture and display update rate

A Scope You Configure Today . . . Enhance Tomorrow

Because of the modularity, you choose the combination of preamplification, gain vernier, attenuation, trigger pickoff, external trigger, input coupling, and impedance that provides you with optimum accuracy. The powerful hardware can be enhanced by upgrading the scope's firmware via a 3½-inch disk drive and flash ROM. Seven blank menu keys are reserved to easily accommodate new and innovative features that you receive free with Option +UA8, the software update service. There is even one key that will provide application-specific measurements.

MS-DOS® is a U.S. registered trademark of Microsoft Corporation.

A Scope That Was Designed for You

Understand Your High-Speed Digital System Problems

In digital logic designs, analog problems—such as glitches, ground bounce, timing violations, reflections, ringing, and crosstalk—are becoming more difficult to solve as computer architecture complexity and MIPS increase.

Capture all narrow glitches with a 500-ps glitch trigger. Then accurately analyze whether the glitch has the capability of violating a logic threshold. Measure glitch amplitude and pulse width more accurately than ever before with a 4-GSa/s sample rate and a 1.1-GHz bandwidth.

Utilize the HP 54720A's four channels, deep memory, and pre-trigger acquisition to locate the cause of a glitch. Trigger the HP 54720A with a logic analyzer for added diagnostic capability.

Improve the reliability of your fastest CMOS designs by making precise amplitude and duration measurements on worst-case ground bounce caused by intermittent simultaneous switching.

The 50-ps single-shot time interval accuracy will help you trouble-shoot clock skew problems.

Faithfully Reproduce and Nonintrusively Load Your DUT's Signal

Probes must faithfully reproduce the signal under test and not load the device that generates the signal. With 2.5-GHz bandwidth and 0.6-pF input capacitance, the HP 54701A measures signals more accurately and introduces less loading than any other active probe.

Capture and Analyze Your High-Energy Physics Phenomena

At 4 GSa/s, the higher frequency harmonics of the phenomena you are investigating can now be accurately measured. With nonvolatile memory backup and fast re-trigger time, feel secure that you will capture, record, and transfer your data with ample integrity.

Investigate Fast Rise Time ESD Pulses with Confidence

Characterize ESD waveforms with greater confidence because the 4-GSa/s sample rate provides greater insight about higher frequency components in the pulse.

Discover Unseen Characteristics of Your Laser's Impulse Response

With 4 GSa/s, 32 K memory depth, and fast throughput, you can capture and analyze a larger number of slow-rep rate laser pulses more accurately than ever before possible.

HP 54710A and HP 54720A System Specifications

SPECIFICATION	HP 54700 Series with HP 54711A	HP 54700 Series with HP 54712A	HP 54700 Series with HP 54713A	HP 54700 Series with HP 54721A
Time Base				
Time base scale (full screen is 10 div)	100 ps/div to 1 s/div			
Time base position range Pre-trigger Post-trigger	0 to −1 s, or one full-scale screen width (whichever is larger) 0 to 1 s, or one full-scale screen width (whichever is larger)			
Time Interval Measurement Accuracy[1] Real time Equivalent time (16 averages)	< ±0.2 sample interval ±0.007% of Δ Time-marker reading < ±30 ps ±0.007% of Δ Time-marker reading			
Time interval measurement resolution	1 ps			
Maximum sampling rate Real time Equivalent time	2 GSa/s 500 MSa/s	2 GSa/s 500 MSa/s	2 GSa/s 500 MSa/s	4 GSa/s 500 MSa/s
Maximum waveform record length/ plug-in	16,384 points	16,384 points	16,384 points	32,768 points
Channel				
Number of channels	1	1	1	1
Number of slots	1	1	1	2
Bandwidth (−3dB)[1]	dc to > 1.5 GHz	dc to > 1.1 GHz	dc to > 500 MHz	dc to > 1.1 GHz
Bandwidth to HP 54701A probe tip (−3dB)[1]:	dc to > 1.3 GHz	dc to > 1 GHz	dc to > 500 MHz	dc to > 1 GHz
Channel scale Minimum Maximum	20 mV/div 1 V/div	10 mV/div 1 V/div	7 mV/div 5 V/div	10 mV/div 1 V/div
Vertical resolution (full scale is 8 divisions)	8 bits, up to 12 bits with averaging			
dc gain accuracy (best accuracy calibration)	< ±1% of full screen at full resolution channel scale			
Offset accuracy (best accuracy calibration)	< ±0.5% of offset setting ±1% of full screen at full resolution channel scale	< ±0.5% of offset setting ±1% of full screen at full resolution channel scale	< ±0.5% of offset setting ±2% of full screen at full resolution channel scale	< ± 0.5% of offset setting ±1% of full screen at full resolution channel scale
dc voltage measurement accuracy (single marker)[1]	± gain accuracy ± offset accuracy			
RMS noise	< 300 μV	< 350 μV	< 350 μV	< 350 μV
Input resistance[1]	50 Ω ±1.5%	50 Ω ±1.5%	50Ω ±1% 1 MΩ (@ ~7 pF) ±1%	50 Ω ±1.5%
Input coupling	dc	dc, ac (34 KHz)	dc, ac (90 or 450 Hz)	dc, ac (34 KHz)
Probe power	Yes	Yes	Yes	Yes

SPECIFICATION	HP 54700 Series with HP 54711A	HP 54700 Series with HP 54712A	HP 54700 Series with HP 54713A	HP 54700 Series with HP 54721A	
Trigger					
Type	External trigger	Internal	Internal	Internal	External trigger
Modes	Edge (all plug-ins). Glitch, pattern, state, delay by time, delay by events (all plug-ins except HP 54711A).				
Trigger sensitivity[1] High sensitivity	dc to 100 MHz: 40 mVpp increasing linearly to 200 mVpp @ 2.5 GHz	0.3 div @ 1 GHz, 0.1 div @ 100 MHz	0.3 div @ 500 MHz, 0.1 div @ 100 MHz	0.3 div @ 1 GHz, 0.1 div @ 100 MHz	20 mVpp @ 1 GHz, 6 mVpp @ 100 MHz
Normal sensitivity	dc to 100 MHz: 40 mVpp increasing linearly to 200 mVpp @ 2.0 GHz	1.5 div @ 1 GHz, 0.5 div @100 MHz	1 div @ 500 MHz, 0.5 div @ 100 MHz	1.5 div @ 1 GHz, 0.5 div @ 100 MHz	90 mVpp @ 1 GHz, 30 mVpp @ 100 MHz
Noise reject	N/A	3.0 div @ 1 GHz, 1 div @ 100 MHz	3.0 div @ 500 MHz, 1 div @ 100 MHz	3.0 div @ 1 GHz, 1 div @ 100 MHz	150 mVpp @ 1 GHz, 60 mVpp @ 100 MHz
Minimum pulse width at normal sensitivity[1]	<200 ps @ 200 mVpp	< = 500 ps @> = 1 div	< = 500 ps @ > = 1 div	< = 500 ps @ > = 1 div	< = 500 ps @ > = 60 mVpp
RMS jitter	< 6 ps ± 0.01% of delay setting				
External probe power	Yes	See channel	See channel	See channel	Yes

[1] Only the characteristics designated with a superscript 1 [n] are specified performance.

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 665.