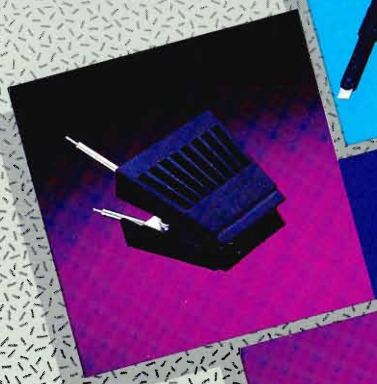
Oscilloscope Probes and Accessories

HEWLETT PACKARD

Technical Data May, 1988



This data sheet catalogs accessories for Hewlett-Packard oscilloscopes. Refer to the table of contents on the front cover for a pictoral listing of contents, or to the part number index on the rear cover. A second index listing is included at right in alphabetical order.

Probe Accessories

The HP 10400 family of oscilloscope passive mini-probes are compatible with many tip accessories that fit older "standard" probes. The section called "Oscilloscope Probe Accessory Tree" will be helpful when you need one or more of these older tips for special applications.

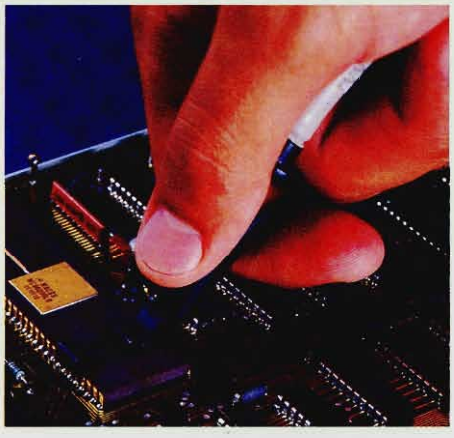
Selecting a Probe

If you need help in selecting a probe for a particular application, read the section "How To Select A Probe." This section explains the basics of probe circuitry and how various parameters affect oscilloscope measurements.

Accessories for HP Logic Analyzers

Another accessory reference you may wish to consult is the "Accessories for the HP 1650A/HP 1651A and HP 16500A Logic Analyzers" data sheet. This document may be obtained from your Hewlett Packard sales representative under part number 5954-2654.

Alphabetical Index



Selecting the right probe for your particular measurement involves many choices. This section will give you some ideas on how to go about making the best decision.

When an oscilloscope measurement is made, the circuit under test is disturbed since energy must be transferred from the circuit to the oscilloscope input. Effectively, this means that what is being measured is not just the circuit under test, but the combination of the probe, oscilloscope *and* the circuit under test. The idea then, is to select a probe that will affect the test circuit the least and still have the necessary characteristics to make the measurement of choice with accuracy.

Below is a list of probe parameters to be considered when selecting the proper probe for a given measurement:

- ☐ Attenuation
- ☐ Bandwidth (BW)
- ☐ Pulse response
- ☐ Input resistance (Rin)
- ☐ Input capacitance (Cin)
- ☐ Form factor
- ☐ Compensation range
- ☐ Maximum input voltage (Vmax)
- ☐ Cable length
- ☐ Serviceability

Probe Compensation Range

You will note that many probes have a specification that lists the oscilloscope input capacitance range over which they can be used. When choosing a probe, be sure that it can be compensated for the amount of input capacitance that your oscilloscope has.

Most oscilloscopes have 1 megohm input resistance. This input resistance is in parallel with shunt capacitance that results from the oscilloscope's input components. Probes that have attenuation factors (other than 1:1) designed for these high-impedance inputs must have "compensation" networks that adjust the probe's circuitry to give equal attenuation to all frequencies within their application bandwidth. Operating instructions provided with the probe explain how to adjust the compensation network to obtain best test signal fidelity.

Types of Probes

The most common oscilloscope probe is the "passive probe." It is called this because it has no "active" components and has only resistive, capacitive, and inductive circuit elements.

The most frequent trade-offs made in passive probes are between attenuation, circuit loading, and bandwidth. For instance, when the attenuation factor is increased, it is possible to reduce circuit loading and increase system bandwidth. For example, a divide by 10 (10:1) probe can have hundreds of MHz bandwidth while a 1:1 (no attenuation) probe is limited to tens of MHz bandwidth.

The 1:1 passive probe

The 1:1 probe is essentially a length of low capacitance coaxial cable with a BNC connector on one end and a probe tip on the other. This probe has no attenuation, is shielded, and yields the same input resistance that the scope has.

The 1:1 probe should be used when small signals are being examined and no attenuation can be tolerated. It has high input capacitance so it is normally used only in low-frequency applications where limited bandwidth will not cause measurement errors.

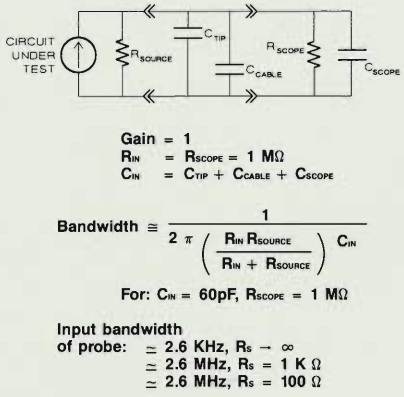


Figure 1. Equivalent circuit of a 1:1 probe

As you might interpret from figure 1, it is usually a poor choice to probe a high-frequency high-impedance source with a 1:1 probe since the probe's bandwidth is low for high-impedance sources.

The 1:1 50Ω Probe

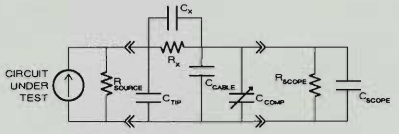
There are two types of 1:1 probes. Some are designed for high-impedance oscilloscope inputs, others are designed for 50Ω inputs. In general, they differ only in the cable that is used between the tip and scope connector. 50Ω 1:1 probes use 50Ω transmission line coaxial cable and are meant to be used with terminated 50Ω inputs. High impedance 1:1 probes use low-capacitance cable specially designed to give best pulse response with high impedance (usually 1 megohm) oscilloscope inputs.

When a 50Ω probe is used to probe source impedances close to 50Ω, there is little loading of the circuit under test. As the source impedance increases, the 50Ω probe will increasingly load the test circuit, causing errors in the voltage amplitude measured.

The 10:1 Passive Probe

10:1 probes are most frequently furnished with oscilloscopes when shipped from the factory. This probe adds attenuation circuitry to its tip and a compensation chassis at its other end. The compensation adjustment allows faithful waveform transfer when used with different oscilloscopes having different input capacitance specifications. The 10:1 probe's higher attenuation factor allows lower input capacitance and higher bandwidth than the 1:1 probe for the same signal source resistance.

The 10:1 attenuation factor also increases the oscilloscope's viewable maximum input voltage by a factor of 10. Many oscilloscopes have maximum input settings of 5 volts per division, so this probe allows viewing several hundred volts up to the maximum limit of the probe itself.



When correctly compensated

$$C_X R_X = R_{SCOPE}(C_{CABLE} + C_{COMP} + C_{SCOPE})$$

For a 10 MΩ probe to be used with a 1 MΩ input scope:

$$C_X = 1/9\,(C_{CABLE} + C_{COMP} + C_{SCOPE})$$

$$C_{IN} = + C_{TIP} + \frac{1}{\frac{1}{C_X} + \frac{1}{C_{CABLE} + C_{COMP} + C_{SCOPE}}} \cong C_X + C_{TIP}$$

TYPICAL:
Gain = 0.1
R_{IN} = 10 MΩ
C_{IN} = 7 - 20 pF Depending upon scope and cable length.

$$\text{Probe Bandwidth} \cong \frac{1}{2\pi\left(\frac{R_{IN}R_{SOURCE}}{R_{IN}+R_{SOURCE}}\right)C_{IN}}$$

Figure 2. Equivalent circuit for a 10:1 passive divider probe.

100:1 Passive Probes

The lower input capacitance of the 10:1 probe is further increased by the 100:1 passive probe. This probe should be used for fairly high level signals where the oscilloscope/probe combination has sufficient sensitivity to properly display the test signal.

Input capacitances of approximately 2 pF are not uncommon for this type of probe. For that reason, in applications where high frequencies are present and driving impedances are high, this probe will load the circuit under test less than the 10:1 probe. An example: probing the final stage of a z axis amplifier that drives the control grid (brightness) of a cathode ray tube.

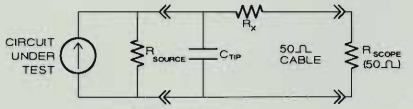
Resistive Divider Passive Probes

The highest bandwidth passive probe is the resistive divider probe. It uses a 50Ω transmission line for its cable and must be used with an oscilloscope that has a 50Ω input. High impedance inputs can be used if they are fitted with a 50Ω feed-thru termination like the HP 10100C.

The 50Ω transmission line eliminates effects of capacitance in the cable, however, probe input resistance is low (50Ω times the attenuation factor of the probe). Input capacitance is low and consists only of the stray capacitance at the probe tip. Typical input capacitance is approximately 1 pF.

Resistive divider probes have excellent system bandwidth and are useful in high frequency applications where impedances are typically low so that the low input resistance of the probe has minimum effect on the circuit under test.

Low input resistance does limit the maximum amplitude of signals that can be probed. Care must be taken not to overheat the probe's voltage division resistor or the resistor that terminates the 50Ω cable.



Gain = 1 to 0.01 (R_X = 1 to 4950 Ω)

For Gain = 0.1, R_X = 450 Ω
R_{IN} = 500 Ω
C_{IN} = C_{TIP} ≃ 1pF

For R_{SOURCE} = 50 Ω

$$\text{Bandwidth of the probe} \cong \frac{1}{2\pi\,(50)\,(1\text{pF})} = 3.2\ \text{GHz}$$

Figure 3. Equivalent circuit for a resistive divider passive probe.

Active Probes

One version of an active probe contains an amplifier in the probe tip to provide a high input R and low C. The output of this amplifier is connected to the oscilloscope through a 50Ω transmission line cable.

Since an amplifier is located in the tip, this type of probe is larger, more expensive and more easily damaged. It has high input impedance, high bandwidth and lacks the attenuation of resistive divider probes. For this reason, within its limitations, it is a good general purpose probe.

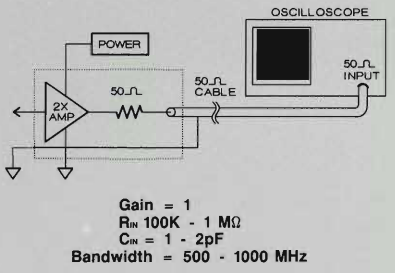


Figure 4. One version of an active probe.

Another variation of the active probe follows the principal of the resistive divider probe, but the tip series resistor value is made larger to increase the probe's input resistance. As with the resistive divider probe, the attenuated test signal is transmitted down a 50Ω cable but instead of being directly connected to the oscilloscope, it is amplified and compensated at the end of the cable in a probe pod assembly connected to the oscilloscope input. The pod makes up for the increased attenuation caused by the higher valued tip resistor and compensates response so that it is flat with frequency.

The HP 54100, HP 54110 oscilloscopes and the HP 54300A probe multiplexer use this type of active probe. An example is the HP 54001A probe which has a gain of 1, a bandwidth of 1 GHz, and an input R of 10 kΩ shunted by approximately 2 pF. Since there are no active components in the probe tip, the tip is much smaller than those of active probes described in the first case above.

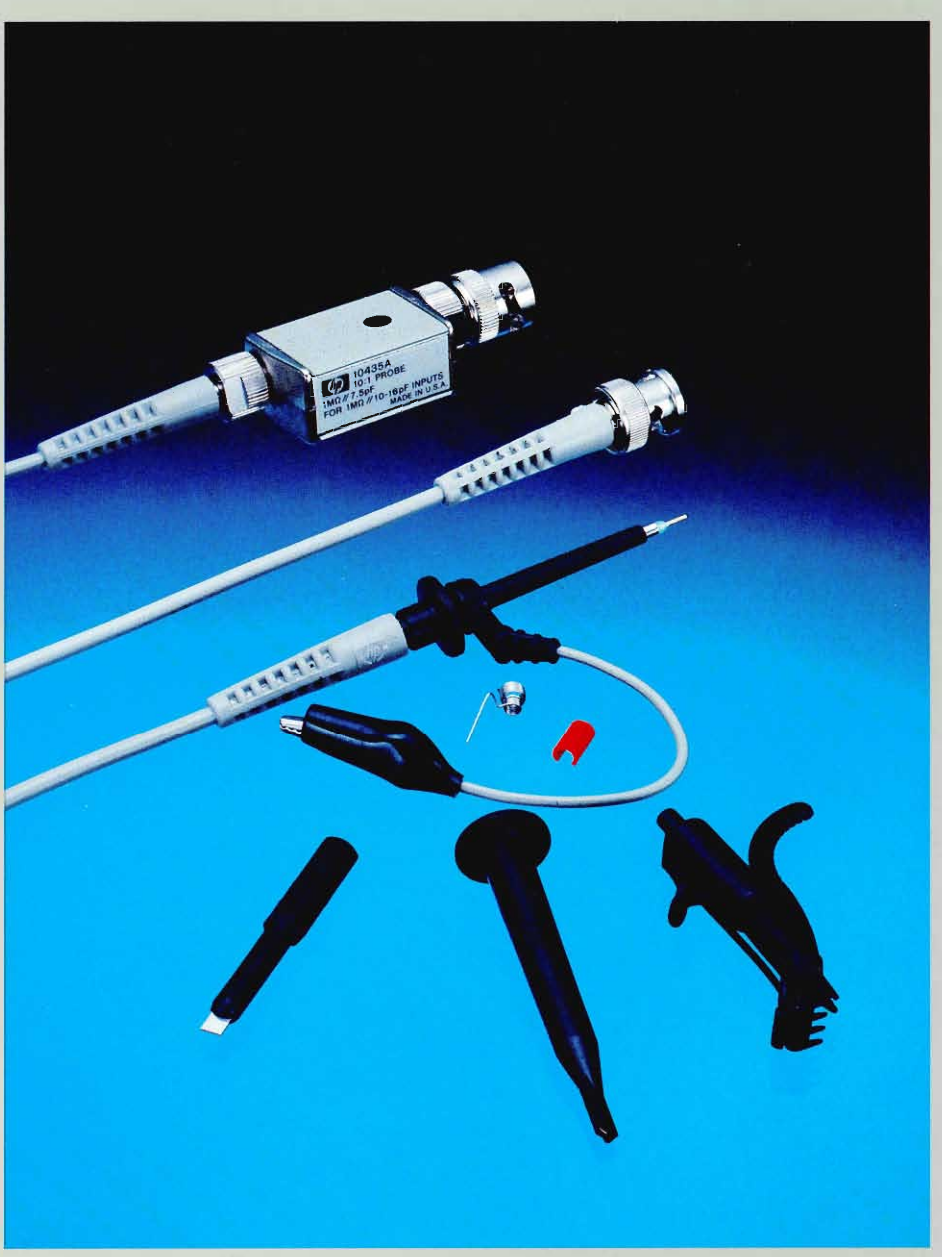
The HP 54001A, for mechanical reasons, is limited to use with the oscilloscopes and probe multiplexer mentioned above.

The HP 10400 Family of Mini-Probes

- ☐ Modular Construction
- ☐ Improved Electrical Performance
- ☐ New Accessories

The HP 10400A Miniature Probe Family offers modular construction, improved reliability and superior electrical performance over our previous mini-probes. Modular construction allows individual replacement of probe tips, cables, and chassis assemblies reducing probe replacement and repair costs.

Improved cable and strain relief design increase reliability. Electrical performance is also improved by superior grounding accessories and increased input resistance (10 MΩ) in many probes.



Oscilloscope/Miniature Probe Compatibility and Probe Characteristics

HP Oscilloscope/ Logic Analyzer	HP Probe Model No.	Approx Overall Length in Metres (ft)	Division Ratio	Input R	Approx Shunt Capacitance	Typical Oscilloscope Maximum Bandwidth	Compensates Oscilloscope Input	Max[1] dc Volts
Same as 10431A but without probe indent	**10430A**	1m (3.3)	10:1	1MΩ	6.5 pF	500 MHz	1MΩ 6-9 pF	450
54111D, 54112D	**10431A[2]**	1m (3.3)	10:1	1MΩ	6.5 pF	500 MHz	1MΩ 6-9 pF	450
1631A/D, 1715/22/25/26/27, 5185, 1805/09, 54200/201[3], 54501A	**10432A**	1m (3.3)	10:1	10MΩ	7.5 pF	300 MHz	1MΩ 10-16 pF	450
1631A/D, 16530/31, 5185, 54200/201[3] , 54501A	**10433A**	2m (6.6)	10:1	10MΩ	10 pF	300 MHz	1MΩ 10-16 pF	450
1740/41/42/43/44/45/46	**10434A**	1m (3.3)	10:1	10MΩ	8.5 pF	100 MHz	1MΩ 18-22 pF	450
1631A/D, 1715/22/25/26/27, 1805/09, 54200/201, 5185, 54003A, 54501A	**10435A**	1m (3.3)	10:1	1MΩ	7.5 pF	300 MHz	1MΩ 10-16 pF	450
1740/41/42/43/44/45/46	**10436A**	2m (6.6)	10:1	10MΩ	11 pF	100 MHz	1MΩ 18-22 pF	450
For oscilloscopes with 50Ω inputs	**10437A**	2m (6.6)	1:1	50Ω	—	—	—	—
All scopes with high Z inputs (may reduce bandwidth)	**10438A**	1m (3.3)	1:1	—	40 pF	—	—	450
	10439A	2m (6.6)	1:1	—	64 pF	—	—	450
1631A/D, 1715/22/25/26/27, 1805/09, 1950A, 54003A, 54111D[3,4], 54112D[3], 54200/201[3]	**10440A**	2m (6.6)	100:1	10MΩ	2.5 pF	300 MHz	1MΩ 6-14 pF	450

(1) Maximum input voltage may be limited by scope input maximum voltage.
(2) Has probe identification pin.
(3) For application with vertical inputs only. External trigger inputs require probes with 1 MΩ input R.
(4) System bandwidth is reduced.

HP 10400A Family Replacements For Older HP Probes

How to use this table.
The table below lists older HP probes that have been obsoleted together with their **CLOSEST HP 10400A family replacement (bold type).** *COMPARE SPECIFICATIONS TO CHECK THE NEW PROBE'S COMPATIBILITY WITH YOUR APPLICATION.*

HP Model No.	Division Ratio	Compensation Range	Max DC Volts	Input C	Input R	Usage BW*	Length	Style**
10001A	10:1	15-55 pF	600	10 pF	10 MΩ	30 MHz	1.5 m	S1
10436A	10:1	18-22 pF	450	11 pF	10 MΩ	100 MHz	2 m	MP
10003A	10:1	15-55 pF	600	10 pF	10 MΩ	45 MHz	1.2 m	S1
10434A	10:1	18-22 pF	450	8.5 pF	10 MΩ	100 MHz	1 m	MP
10004D	10:1	20-30 pF	500	10 pF	10 MΩ	100 MHz	1.1 m	S2
10434A	10:1	18-22 pF	450	8.5 pF	10 MΩ	100 MHz	1 m	MP
10005D	10:1	20-30 pF	500	17 pF	10 MΩ	100MHz	3 m	S2
10436A	10:1	18-22 pF	450	11 pF	10 MΩ	100 MHz	2 m	MP
10006D	10:1	20-30 pF	500	14 pF	10 MΩ	100 MHz	1.8 m	S2
10436A	10:1	18-22 pF	450	11 pF	10 MΩ	100 MHz	2 m	MP
10007B	1:1	—	500	40 pF	1 MΩ	system	1.1 m	S2
10438A	1:1	—	450	40 pF	1 MΩ	system	1 m	MP
10008B	1:1	—	500	60 pF	1 MΩ	system	1.8 m	S2
10439A	1:1	—	450	64 pF	1 MΩ	system	2 m	MP
10014A	10:1	9-13 pF	500	10 pF	10 MΩ	300 MHz	1.1 m	S2
10432A	10:1	10-16 pF	450	7.5 pF	10 MΩ	300 MHz	1 m	MP
10016B	10:1	9-13 pF	500	14 pF	10 MΩ	300 MHz	1.8 m	S2
10433A	10:1	10-16 pF	450	10 pF	10 MΩ	300 MHz	2 m	MP
10017A	10:1	9-14 pF	300	8 pF	1 MΩ	300 MHz	1 m	MPO
10435A	10:1	10-16 pF	450	7.5 pF	1 MΩ	300 MHz	1 m	MP
10018A	10:1	9-14 pF	300	10 pF	1 MΩ	300 MHz	2 m	MPO
10433A	10:1	10-16 pF	450	10 pF	10 MΩ	300 MHz	2 m	MP
10021A	1:1	—	300	36 pF	1 MΩ	system	1 m	MPO
10438A	1:1	—	450	40 pF	1 MΩ	system	1 m	MP
10022A	1:1	—	300	62 pF	1 MΩ	system	2 m	MPO
10439A	1:1	—	450	64 pF	1 MΩ	system	2 m	MP
10026A	1:1	—	scope(1)	—	50Ω	scope(1)	1 m	MPO
10437A	1:1	—	scope(1)	—	50Ω	scope(1)	2 m	MP
10027A	1:1	—	scope(1)	—	50Ω	scope(1)	2 m	MPO
10437A	1:1	—	scope(1)	—	50Ω	scope(1)	2 m	MP
10032A	100:1	9-14 pF	300	3 pF	3 MΩ	300 MHz	1.1 m	MPO
10440A	100:1	6-14 pF	450	2.5 pF	10 MΩ	300 MHz	2 m	MP
10033A	10:1	4-12 pF	200	8 pF	1 MΩ	500 MHz	1 m	MPO
10431A	10:1	6-9 pF	450	6.5 pF	1 MΩ	500 MHz	1 m	MP
10040A	10:1	20-30 pF	300	9 pF	1 MΩ	100 MHz	1 m	MPO
10434A	10:1	18-22 pF	450	8.5 pF	10 MΩ	100 MHz	1 m	MP
10041A	10:1	20-26 pF	300	12 pF	1 MΩ	100 MHz	2 m	MPO
10436A	10:1	18-22 pF	450	11 pF	10 MΩ	100 MHz	2 m	MP
10042A	10:1	20-24 pF	300	15 pF	1 MΩ	100 MHz	3 m	MPO
10436A	10:1	18-22 pF	450	11 pF	10 MΩ	100 MHz	2 m	MP

***Usage Bandwidth:** This column describes the maximum bandwidth of the oscilloscope with which this probe is typically used.

****Style:** This column describes the physical configuration of the probe described:

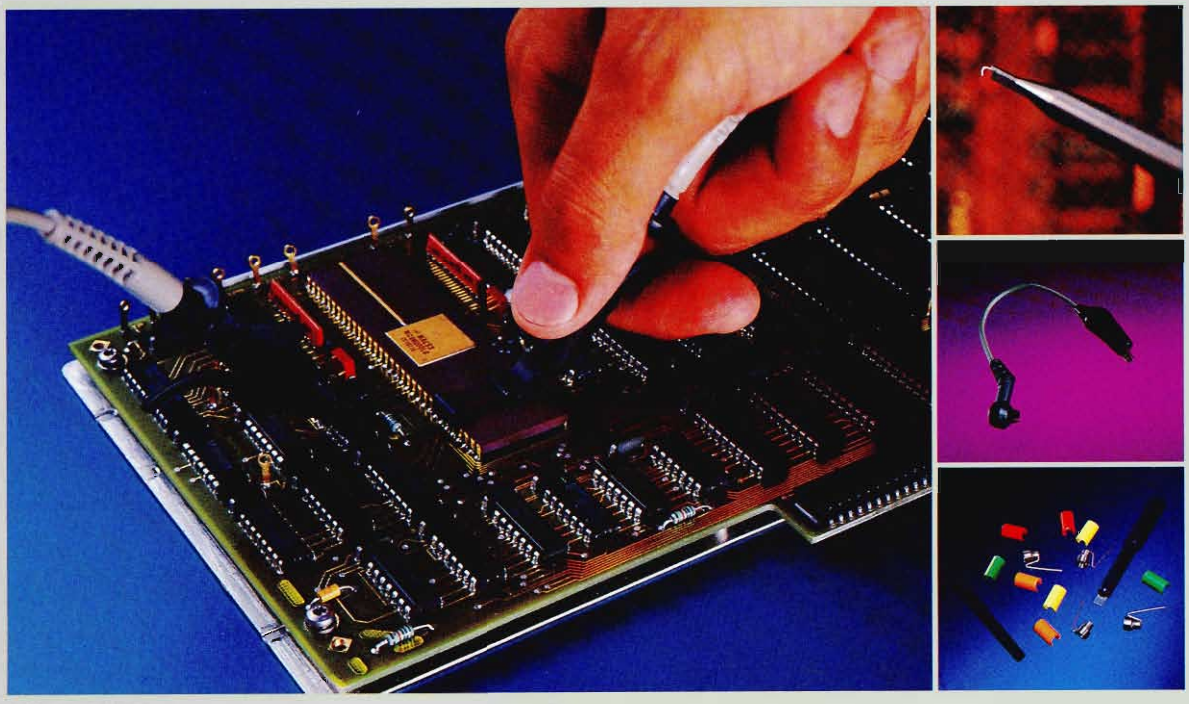
MP: Miniature probe, a member of the new HP 10400 family of mini-probes. These probes replace other styles in most cases. See photograph on opposite page.

MPO: Member of the older family of HP mini-probes. Tips of MP probes have the same diameter as MPO probes. Most MPO probes have been obsoleted and are replaced by new HP 10400A series probes (MP probes).

S1: Older standard probes. See Oscilloscope Probe Accessory Tree for adapters that allow use of standard probe accessories on new HP 10400 series probes.

S2: Older probes also referred to as standard. See Oscilloscope Probe Accessory tree.

Note (1): 50Ω Probes: See section on How To Select A Probe for details. In general, the maximum input voltage of a 50Ω probe is dictated by the maximum input voltage of the oscilloscope that it is used with in the 50Ω input mode. The system bandwidth when using a 50Ω probe with a 50Ω test source is generally the bandwidth of the oscilloscope used.



HP 10400A Supplied Accessories

The HP 10400A mini-probe family also features new accessories including a ground lead fitted with a ferrite bead for reduced ringing on pulse tops, and an IC grabber that allows easy connection of a single probe to many IC packages without fear of shorting adjacent pins. The new IC grabber fits DIPs with 0.01 inch spacing (standard) and up to 0.9 inch package width.

Each 10400A family probe is shipped with one general-purpose Grabber, one IC grabber, one Ground Lead, and one Accessory Package which contains: 4 grounding spanners (for close grounds at the probe tip), 1 probe barrel insulator, an adjustment screwdriver, and 8 colored cable markers.

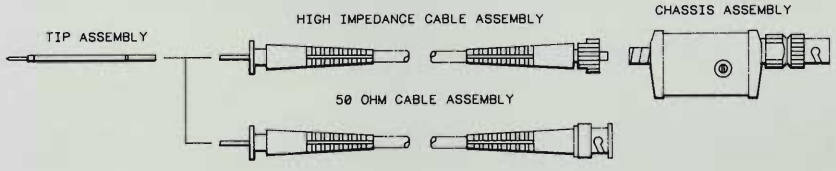
The accessories listed above may be purchased singly under the following numbers:.

5061-6160 General Purpose Grabber
5061-6161 IC Grabber
5061-6162 Ground lead
5061-6163 Accessory Packet

Replacement parts for HP 10400A Family Probes

Probe Model Number	Replacement Tip	Replacement Cable	Replacement Chassis
10430A	5061-6145	5061-6139	10430-60101
10431A	5061-6145	5061-6139	10431-60101
10432A	5061-6151	5061-6139	10432-60101
10433A	5061-6146	5061-6140	10433-60101
10434A	5061-6150	5061-6139	10434-60101
10435A	5061-6147	5061-6139	10435-60101
10436A	5061-6152	5061-6140	10436-60101
10437A	5061-6149	5061-6142	none
10438A	5061-6149	5061-6139	10438-60101
10439A	5061-6149	5061-6140	10439-60101
10440A	5061-6148	5061-6140	10440-60101

HP 10400-90901 HP 10400 Probe Family User Manual $5.00



Additional HP 10400 Family Accessories

HP 10024A *HP 10211A*

HP 10024A IC Test Clip

The HP 10024A IC Test Clip is useful when several IC pins must be probed. By removing the probe's insulating sleeve and inserting the mini-probe's tip into the IC Test Clip, you can monitor points on 14 and 16 pin DIP's without worrying about shorting adjacent pins.

The HP 10024A also includes 4 insulated circuit interface pins. These pins can be used to make low inductance connections between the IC's ground pin and the 10024A's probe ground contacts. By inserting the other end of the pin, IC pin connections can be brought out to the top of the IC clip for easy access.

HP 10024A IC Test Clip

HP 10024-69501 Interface Pin Kit for the HP 10024A: includes 12 interface pins.

HP 10211A DIP Clip

The HP 10211A DIP Clip is similar to the HP 10024A in operation but accesses 24 pin IC DIP's without the worry of shorting adjacent pins.

HP 12011A Dip Clip

HP 1250-1454 (two shown)

HP 1250-1454 BNC (m) to Mini-Probe Adapter

This device permits connection of 10400 family mini-probe tips to BNC connectors.

HP 1250-1454

HP 1250-1918 and HP 1250-1737

HP 1250-1737 PC board mini-probe socket

The HP 1250-1737 PC board mini-probe socket is ideal for circuit applications where it is desirable to make a reliable circuit connection between the mini-probe tip and a test circuit (Soldering the tip itself into place is not recommended.) The HP 1250-1737 is useful in production PC board applications as an oscilloscope test point. The probe plugs into its socket parallel to the PC board.

HP 1250-1737

HP 1250-1918 PC board vertical mini-probe socket.

The HP 1250-1918 is similar to the 1250-1737 (above) except that it is designed for attaching the probe vertically to the board rather than horizontally.

HP 1250-1918

HP 10020A

HP 10020A Resistive Divider Probe Kit

The HP 10020A Resistive Divider Kit is a signal probing system for measuring fast-transition-time signals in high-impedance systems. It is designed for use with 50Ω input oscilloscopes, but may be used with other than 50Ω systems if a 50Ω feedthrough termination, such as the Model 10100C, is used. The extremely low input RC of the 10020A provides high-fidelity probing of fast-transition signals.

Several accessories, supplied with the Model 10020A, provide greater probing versatility. The Model 10218A BNC Adapter allows the resistive divider to be connected to a BNC connector. The Model 10240B Blocking Capacitor provides ac-coupling at the divider output. A spanner tip provides a very short ground lead, which reduces ringing in high-frequency probing. A special probe handle fits over the short vinyl tip for convenient use.

Specifications

Probe Tip: pin (see accessories supplied for other tips)

Output Connector: BNC

Length (overall): Approx 1.2 m (4 ft.)

Weight: NET, 0.45 KG (1 lb.)

Accessories Supplied: Blocking Capacitor, HP 10240B; BNC Adapter Tip, HP 10218A; Adapter Tip 6-32, 5060-0449; Alligator Tip 6-32, 2 ea, 5061-1258; Probe Handle, 5040-5968; Cable Assy. 5.1 cm (6 in.) Ground 6-32, 10020-61602; Cable Assy 15.2 cm (6 in.), Ground 6-32, 10020-61603; Tip, Spanner Ground, 5060-0549; Cap, insulating (clear plastic) 2 ea, 10020-45401; Cap, insulating (grey plastic) 2 ea, 10004-45402; Sleeve, color coding, red 2 ea, 5040-0477

HP 10020A Resistive Divider Probe Kit

HP 10229A Slip-on Hook Tip (Recommended Accessory)

HP 10240B Blocking Capacitor

Model 10240B Blocking Capacitor is a probing accessory that provides ac coupling while maintaining a 50Ω system. This capacitor is designed for use with the model 10020A Resistive Divider Kit, but may be used with any probe that must be terminated in 50Ω.

(Note: Model 10240B is included in the model 10020A Resistive Divider Kit.)

Characteristics

Capacitance: 0.18 μF
Maximum Voltage: ±200Vdc.
Reflection: <12% when driven by a 150 ps rise time step in a 50Ω system.
Sag: Approximately 10% per μs (1% in 100 ns).
Connectors: BNC

HP 10240B

High Frequency Resistive Dividers (Supplied in the HP 10020A Resistive Divider Probe Kit.)

Part No.	Division Ratio	Input R ohms[1]	Division Accuracy	Max V rms[2]	Input C pF	Probe Rise Time ns[3]	Bandwidth MHz
10020-67701	1:1	50	—	6	—	<0.5	700
10020-67702	5:1	250	± 3%	9	<0.7	<0.5	700
10020-67703	10:1	500	± 3%	12	<0.7	<0.5	700
10020-67704	20:1	1000	± 3%	15	<0.7	<0.5	700
10020-67705	50:1	2500	± 3%	25	<0.7	<0.5	700
10020-67706	100:1	5000	± 3%	35	<0.7	<0.5	700

[1] When terminated in 50Ω
[2] Limited by power dissipation of the resistive element.
[3] Rise time with or without 10240B blocking capacitor

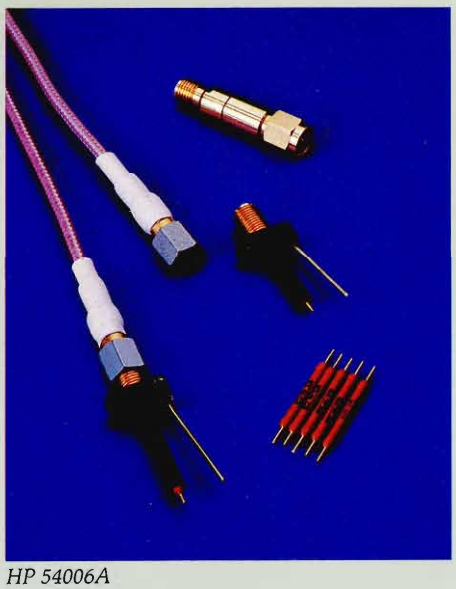
HP 10002A

HP 10002A 1000V 50:1 Voltage Divider Probe.

The HP 10002A voltage divider probe is a general purpose probe for use with instruments that have a bandwidth of less than 40 MHz with an input impedance of 1 MΩ shunted by approximately 15 to 55 pF. The probe is rated at 1000V peak.

Characteristics:
Input resistance: Approximately 9 MΩ. Shunt capacitance: Approximately 2.5 pF.
Length: 1.7 m (5.5 ft)

HP 10002A



HP 54006A

Probing Multi Gigahertz Systems

Probe multi-gigahertz systems with the HP 54006A, 10:1, 500Ω and 20:1, 1 kΩ resistive divider probes. These 6 GHz probes give access to circuit nodes that are not 50Ω or do not have 50Ω connectors allowing you to see signals at specific points such as the input to a gate. HP 54006A input capacitive loading is approximately 0.25 pF.

The HP 54006A probe system is useful with the HP 54120T oscilloscope as well as the HP 54100/54110A oscilloscopes fitted with HP 54002A input pods.

The HP 54006A 6 GHz Resistive Divider Probe Kit includes:
One 10:1, 500Ω probe body, six 450Ω resistors.

One 20:1, 1 kΩ probe body, six 950Ω resistors

One 36 inch, 50Ω coaxial cable, SMA (m-m)

One dc blocking cap, 10 GHz-26 GHz APC-3.5 (m-f)

HP 54006A
Extra resistors may be ordered separately:

Five 450Ω resistors.
HP 54006-68701

Five 950Ω resistors.
HP 54006-68702

HP1124A

HP 1124A 100 MHz Active Divider Probe

The HP 1124A Active Divider Probe provides high-voltage, general-purpose probing for instruments having 50Ω inputs without selectable high-impedance inputs. This 10 MΩ, 10 pF probe allows direct measurements of 100 volts, in the 100:1 division ratio mode, from dc to 100 MHz. In the 10:1 division ration mode, input voltage range is ± 10 volts. Power is supplied by instruments with probe power jacks or the 1122A probe power supply.

Specifications
(Measured with output connected to a 50Ω load.)

Bandwidth: (measured from a terminated 50Ω source)

DC-Coupled: dc to 100 MHz

AC-Coupled: 2 Hz to 100 MHz

Pulse Response (measured from a terminated 50Ω source)

Transition Time: <3.5 ns

Perturbations: 5% p-p. Measured with pulse transition time of >2.5 ns.

Attenuation Ratio: 10:1 ±5%; 100:1 ±5%

Dynamic Range
×10: ±10 V
×100: ±100 V

Input RC: 10 MΩ shunted by approx. 10 pF.

Maximum Safe Input
DC-Coupled
×10: ±300 V (dc + peak ac) ≤100 MHz
×100: ±500 V (dc + peak ac) ≤100 MHz

AC-Coupled
×10: ±300 V (dc + peak ac) ≤100 MHz
DC component must not exceed ±200 V

×100: ±500 V (dc + peak ac) ≤100 MHz
DC component must not exceed ±200 V

Accessories Supplied: One 20 cm (8 in.) ground lead with alligator clip (10004-61301), one retractable hook tip (10004-67604), and two probe tip insulating caps (10004-45402).

Power: −12.6 V and +15 V ±3% approx 30 mA from each supply. Use Model 1122A Probe Power Supply.

Weight: net 0.2 kg (5 oz); shipping 0.91 kg (2 lb)

Length: Approx 1.5 m (5 ft) overall

HP 1124A 100 MHz Active Divider Probe

HP 1122A

HP 1122A Power Supply

The HP 1122A Power Supply is a regulated power supply that provides power for operating the 1124A Active Probe. The power supply provides all power requirements for simultaneous operation of up to four active probes.

Specifications
Probe Driving Capability: Up to four 1124A active probes.

Power Output: −12.6 V and +15V ±3%

Power Input: 115V or 230V ±10%, 48 to 440 Hz, 40 W (with four probes)

Dimensions: 130 mm wide, 87 mm high, 305 mm long (5 1/8 in x 3 7/16 in x 12 in)

Weight: net 2.7 kg (6 lb); shipping 3.6 kg (8 lb)

Accessories Supplied: one 2.3 m (7.5 ft) power cord (8120-1378), four 0.9 m (36 in) extender cables (Model 10131B) The cables extend the probe power cable for added probing convenience.

HP 1122A Probe Power Supply

Replacement Price of HP 10131B Extender Cable

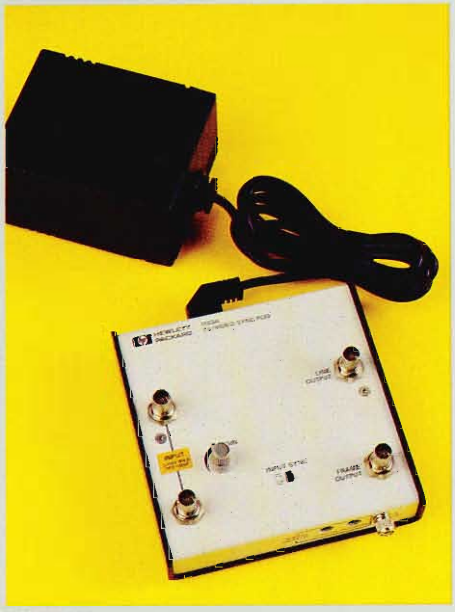
HP 1133A TV/Video Sync Pod

- ☐ **Clamped or Unclamped Video Output**
- ☐ **Trigger Output for Line and Frame**
- ☐ **For Most Standard Broadcast Composit Video Systems**
- ☐ **Compatible With Most Analog or Digitizing Oscilloscopes.**

The HP 1133A TV/Video Sync Pod provides users with TV sync triggering for most analog or digitizing oscilloscopes. It features clamped or unclamped video outputs that can be viewed on the oscilloscope's vertical channels and trigger outputs that can synchronize the oscilloscope to video frame and individual lines.

The pod is packaged in a case approximately 14x14x4.5 cm (5.5x5.5x1.75") and is powered by a separate a.c. power module. The pod features a loop-thru input (two female BNC) which can be driven from a 75Ω source, or for probing high impedance circuits, from a 1-10 MΩ probe. The loop-thru feature allows 75Ω signal to be looped through the TV/Video pod then connected to a video monitor or other device. Clamped or unclamped video outputs are designed to drive a high-impedance probe (1-10 MΩ) connected to the oscilloscope input.

The HP 1133A is compatible with broadcast standards M, N, C, B, G, H, I, D, K, K1, and L systems.



HP 1133A

Characteristics:
Video input: AC coupled with an RC of 1 MΩ shunted by approximately 10 pF.

Bandwidth: Approximately 10 MHz.

Maximum input voltage: 40 Volts (DC plus peak AC.)

Frame output is phase locked to the leading edge of the third field synchronizing pulse on field one, to the leading edge of the second pulse on field two. Frame output goes high on field one, and low on field two.

A switch is provided for positive or negative sync pulse polarity. A gain control is provided to adjust for signal amplitude at the BNC input. Gain from the input BNC to unclamped output is variable from approximately 2.5 to 50.

HP 1133A TV/Video Sync Pod

NOTE: THE 1133A MUST BE ORDERED WITH A POWER SUPPLY OPTION

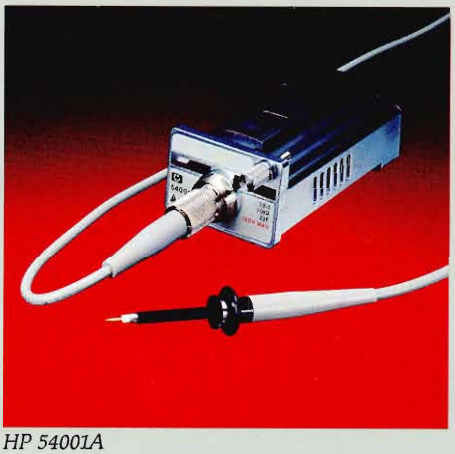
Opt. ABA Power supply for **U.S.A**, 120V nema 515P plug.

Opt. ABB Power supply for **Europe**, 220V CEE7-VII plug.

Opt. ABJ Power supply for **Japan**, 100V nema 515P plug.

Opt. ABU Power supply for **United Kingdom**, 240V BS1363 plug.

Input Pods for the HP 54100/54110 Oscilloscopes and the HP 54300A Probe Multiplexer.



HP 54001A

HP 54001A 1 GHz Miniature Active Probe Input Pod

Use the HP 54001A in applications such as high-speed logic measurements where high bandwidth is essential and capacitive probe loading dominates the probe's effect on the signal. A cable length of 1.5 metres provides access to hard to reach areas of a system rack or backplane. The probe's small tip diameter and size make it easy to get into crowded circuits. The combined system rise time with the HP 54100/54110 is less than 450 ps allowing measurements on sub-nanosecond logic.

Characteristics
Length: 1.5 m
Division Ratio 10:1 ±3%
Typical Circuit Loading
  Capacitive 2 pF
  Resistive 10 kΩ
System Response with HP 54100/54110 oscilloscopes:
  Rise time 400 ps
  Bandwidth 700 MHz
Usable Signal Range: ±20 V

For use with HP 54100/54110 oscilloscopes and the HP 54300A Probe multiplexer.
HP 54001A

HP 54002A

HP 54002A 50 Ohm BNC Input Pod

Use the HP 54002A with a terminated 50Ω system to preserve signal fidelity and to minimize measurement effects on the circuit under test. The HP 54002A can be used with the HP 10020A resistive divider probe kit. It may also be used with a variety of active oscilloscope probes that require 50Ω inputs.

Characteristics
System Response with the HP 54100/54110
  Risetime: 350 ps
  Bandwidth: 1 GHz

Maximum Input Voltage: 5 V rms.

For use with HP 54100/54110 oscilloscopes and with the HP 54300A Probe multiplexer.
HP 54002A

HP 54003A

HP 54003A 1 Megohm Probe Pod

Use the HP 54003A when resistive loading is critical, as in op-amp measurements. The supplied probe can be removed from the pod to provide a 1 MΩ, approximately 12 pF BNC input. This is useful when a coaxial connection is desired, in applications where bandwidth and capacitive load are not as critical as resistive loading (e.g., moderate bandwidth measurements in an ATE system).

The HP 54003A pod (with supplied probe removed) can also be used with the HP 10440A 100:1 probe for wide dynamic range measurements. (±200 Vdc. See probe operating instructions for voltage derating with frequency.)

Characteristics
Length: 1 m
Division Ratio 10:1
Typical Circuit Loading
  Capacitive: 7.5 pF
  Resistive: 1 MΩ
System Response with
The HP 54100/54110
  Risetime: 1.2 ns
  Bandwidth: 300 MHz
Usable signal range: ±20 V (with supplied probe)

For use with HP 54100/54110 oscilloscopes and with the HP 54300A Probe multiplexer.
HP 54003A

Adapters

Right Angle BNC(m) to BNC (f)
50Ω: **1250-0076**

75Ω: **1250-1286**

BNC(f) to BNC(f)
50Ω: **1250-0080**

Tee BNC(m) (f) (f)
1250-0781

BNC(m) to BNC(m)
50Ω: **1250-0216**

Standard N(f) to BNC(m)
50Ω: **1250-0077**

75Ω: **1250-1534**

Precision
50Ω: **1250-1477**

Standard N(m) to BNC(m)
50Ω: **1250-0082**

75Ω: **1250-1533**

Precision
50Ω: **1250-1473**

Standard N(m) to BNC(f)
50Ω: **1250-0780**

75Ω: **1250-1535**

Precision
50Ω: **1250-1476**

Standard N(f) to BNC(f)
75Ω: **1250-1536**

Precision
50Ω: **1250-1474**

Right Angle Standard N(m) to Standard N(f)
50Ω: **1250-0176**

Tee, Standard N(m) (f) (f)
1250-0559

Standard N(m) to Standard N(m)
50Ω: **1250-0778**

75Ω: **1250-1528**

Precision
50Ω: **1250-1475**

Tee, Standard N(f) (f) (f)
1250-0846

Standard N(f) to Standard N(f)
50Ω: **1250-0777**

75Ω: **1250-1529**

Precision
50Ω: **1250-1472**

BNC(f) to Dual Banana Plug(m)
1251-2277

Stacking Dual Banana Plug(m)
1251-2816

BNC(m) to single Banana Jack(f)
1250-1263

BNC(m) to Dual Banana Jack(f)
1250-1264

SMA(f) to SMA(f)
1250-1158

SMA(m) to SMA(m)
1250-1159

Terminations

HP 10100C
50Ω ±1% Feedthrough Termination BNC(m) to BNC(f)

HP 11094B
75Ω ±0.2% Feedthrough Termination BNC(m) to BNC(f)

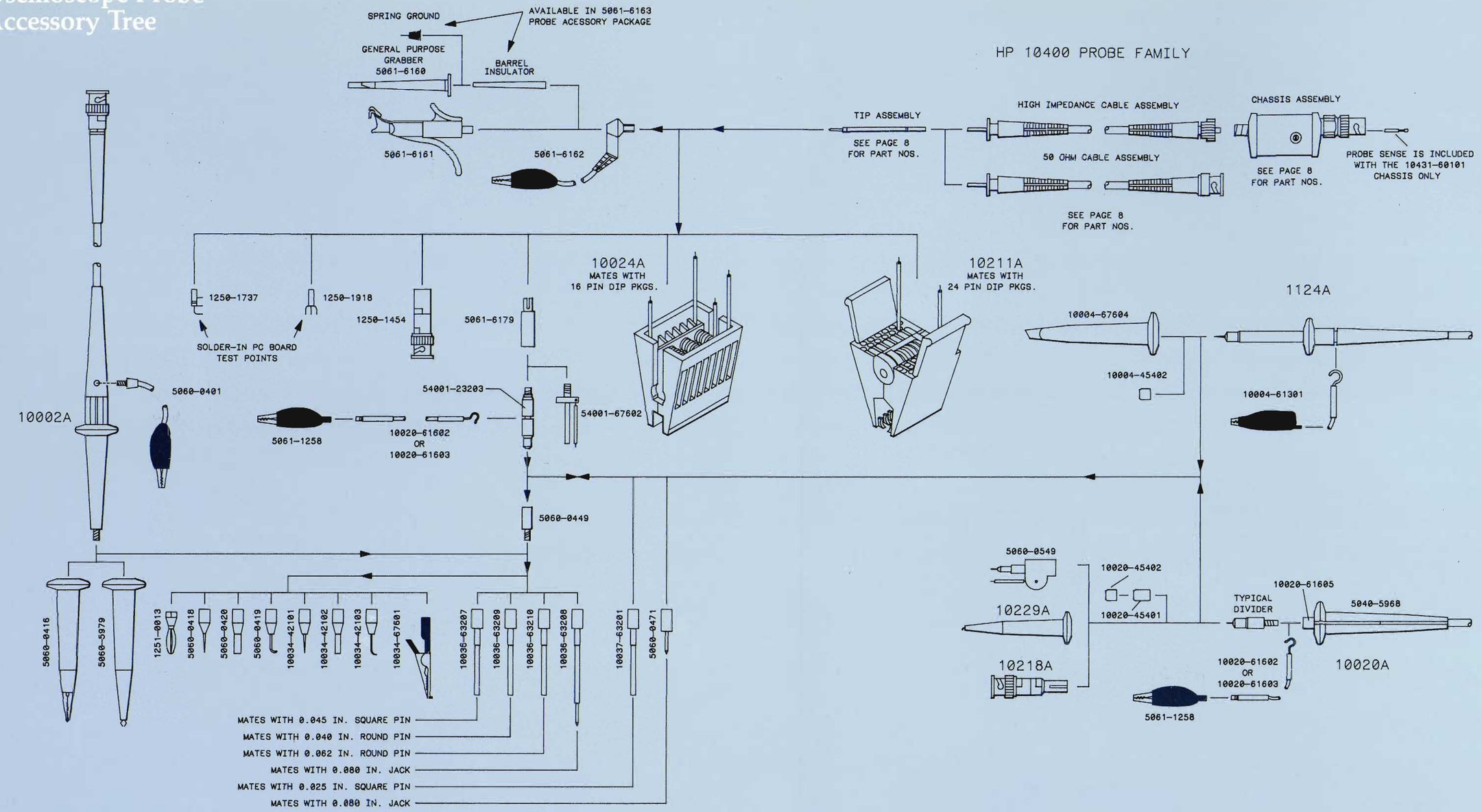
HP 908A
50Ω Termination Type N(m), dc-4GHz, SWR 1.05, power rating 1/2 W avg. 1 kW peak

(not shown)

50Ω Cables

Part No.	Description
HP 10502A	BNC(m) to BNC(m), 23 cm (9 in.)
HP 8120-1838	BNC(m) to BNC(m), 30 cm (12 in.)
HP 8120-1839	BNC(m) to BNC(m), 61 cm (24 in.)
HP 10503A	BNC(m) to BNC(m), 1.2 m (48 in.)
HP 11500A	Type N(m) to Type N(m), 1.8 m (72 in.)
HP 11500B	Type N(m) to Type N(m), 61 cm (24 in.)
HP 11501A	Type N(m) to Type N(f), 1.8 m (72 in.)

Oscilloscope Probe Accessory Tree



10002A 50:1 1000V voltage divider probe.

10004-45402 Probe tip insulator supplied with the 10020A Resistive Divider Kit and the 1124A Active Probe.

10004-61301 Ground lead assembly.

10004-67604 Hook tip adapter.

10020A Resistive divider probe kit.

10020-45401 Plastic probe tip insulator cap supplied with 10020A Resistive Divider Kit.

10004-45402 Probe tip insulator supplied with 10020A Resistive Divider Kit.

10020-61602 5.1 cm (2 in.) ground lead, supplied with model 10020A Resistive Divider Kit.

10020-61603 15.2 cm (6 in.) ground lead. Supplied with model 10020A Resistive Divider Kit.

10020-61605 Probe cable assembly supplied with 10020A Resistive Divider Kit.

10024A Integrated circuit clip. Allows probing 16 pin ICs with multiple 10400A family mini-probes.

10034-42101 Pin tip adapter for 10002A 50:1 probe, also mates with 5060-0449 adapter. See diagram.

10034-42102 Female tip, fits 0.6 mm, (0.025 in.) square pins. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10034-42103 Hook tip. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10034-67601 Alligator clip. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10036-63207 Flexible female adapter for 1.14 mm (0.045 in.) square pin. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10036-63208 Flexible male adapter for 2.03 mm (0.080 in.) jack. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10036-63209 Flexible female adapter for 1.02 mm (0.040 in.) diameter pin. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10036-63210 Flexible female adapter for 1.58 mm (0.062 in.) diameter pin. Mates with 10002A 50:1 probe or with 5060-0449 adapter. See diagram.

10037-63201 Flexible female adapter for 0.64 mm (0.025 in.) square pin. Fits 54001-23203 probe adapter. See diagram.

10211A Integrated circuit clip. Allows probing 24 pin ICs with multiple 10400A family mini-probes.

10218A Probe tip to BNC adapter.

10229A Hook tip adapter.

1124A Active Probe.

1250-1454 Mini-probe to BNC (male) adapter.

1250-1737 PC board mini-probe socket. 10400A series probes plug into this socket parallel to the PC board.

1250-1918 PC board mini-probe socket. 10400A series probes plug into this socket perpendicular to the PC board.

1251-0013 Banana tip adapter. Mates with 10002A 50:1 probe and 5060-0449 6-32 adapter. See diagram.

5060-0401 20 cm (8 in.) ground lead assembly with alligator clip. Supplied with model 10002A 50:1 probe.

5060-0416 Meshing jaw probe tip for 10002A 50:1 probe.

5060-0418 Pin tip adapter. Mates with 10002A 50:1 probe and 5060-0449 adapter. See diagram.

5060-0419 Hook tip adapter. Mates with 10002A 50:1 probe and 5060-0449 adapter. See diagram.

5060-0420 Spring tip adapter. Mates with 10002A 50:1 probe and 5060-0449 adapter. See diagram.

5060-0449 Adapter tip (slip on to no. 6-32 screw tip.) Supplied with 10020A. Allows use of 6-32 screw on tips. See diagram for other accessories.

5060-0471 Pin adapter with 0.203 cm (0.080 in.) diameter pin. Fits 54001-23203 probe adapter. See diagram.

5060-0549 Spanner tip adapter, supplied with 10020A Resistive Divider Kit.

5060-5979 Pincer-jaw tip for 10002A 50:1 probe.

5061-1258 Alligator clip, fits ground leads 10020-61602 and 10020-61603.

5061-6160 General-purpose hook tip grabber for HP 10400A family probes.

5061-6161 Integrated-Circuit grabber for HP 10400A family probes. Fits DIPs with 0.1 in. spacing between pins and up to 0.9 in. package width.

5061-6162 Alligator ground lead for HP 10400A family probes.

5061-6163 Accessory package for HP 10400A family probes. Includes: 4 grounding spanners, 2 probe barrel insulators, 1 adjustment tool, and 8 colored wire markers.

5061-6179 Threaded accessory adapter allows use of standard probe accessories when used with part number 54001-23203. See diagram.

54001-23203 Probe adapter. When used with part number 5061-6179, this adapter makes 10400A series probes compatible with standard probe accessories. See diagram for other accessories.

54001-67602 Spanner tip assembly. Insulates 10400A series probe tip barrels from test circuit and provides spanner for short ground path. Also fits 54001A and 54003A probe tips.

The HP 54300A probe multiplexer expands the input capability of the HP 54100 and HP 54110 digitizing oscilloscopes, or any 50Ω input instrument, simplifying delicate high-frequency connections.

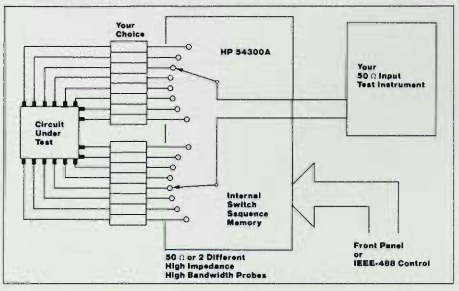
HP 54300A Probe Multiplexer

- ☐ Expand Input Capability of 50Ω Instrumentation
- ☐ Your Choice of 50Ω, 10 kΩ and 1 MΩ input pods
- ☐ Fully HP-IB Programmable, Plus Convenient Front-panel Control
- ☐ Internal Non-volatile Memory

The Multi-input Tool For 50Ω Instrumentation

The HP 54300A is a programmable, dual eight-to-one probe multiplexer designed to expand the input capability of instrumentation with 50Ω inputs. The unique strength of this multiplexer is its configurability. The user may select from three different input pods: Two high-frequency, high-impedence probes, or a 50Ω BNC input for terminated line applications.

The HP 54300A features full HP-IB programmability as well as simple front-panel control. It has internal non-volatile memory for storing lists of switching steps. Switch lists can be advanaced step-by-step from a front-panel button, over the HP-IB (IEEE-488) or for data logging applications, through a TTL pulse entered at the rear panel.



The HP 54300A's configurable inputs and HP-IB programmability make it a powerful addition to your bench or ATE system.

Automate Complex Measurements

The HP 54300A is ideal for delicate situations where high-frequency connections must be maintained and probes cannot be conveniently moved from one connection to another. Complex measurements can be automated by using the multiplexer's 16 inputs, switching one or two of them at a time into the test instrument, under computer control. In situations requiring more than 16 inputs, HP 54300A multiplexers may be cascaded in series to give a total of 128 inputs.

Your Choice of Inputs

The HP 54300A accepts all of the input pods designed for the HP 54100 and HP 54110 1 GHz digitizing oscilloscopes:

The HP 54001A 1 GHz active mini-probe pod.

The HP 54002A 50Ω BNC pod.

The HP 54003A 300 MHz 1 megohm probe pod.

See page 14 for details on these input pods.

Fully Programmable for Automated Testing

The HP 54300A command set is simple, but complete. Even information such as the type of input pod that is being used or the total number of switch closures that have occurred on a given switch pole may be obtained over the bus.

Specifications:
Insertion loss: <2dB at 1 GHz with the HP 54002A 50Ω pod.

Closed channel resistance: <0.5Ω (end of switch life.)

Outputs: Two front-panel BNC connectors with 50Ω output impedance. Each output BNC corresponds to a specific set of eight input pod recepticles.

One rear-panel BNC connector with jumper-selectable TTL level pulse output. Output goes true for approximately 10 ms when a sequence step switch closure has settled.

Inputs: Two sets of eight HP 5400XA pod receptacles on the front panel.

One rear-panel BNC connector which accepts positive TTL level input pulses. An input pulse advances multiplexer to the next step in an active switch sequence list. Pulse must be >5 microseconds long.

Non-volatile memory: Internal switching sequence memory for up to 100 sequences of up to 99 steps each to a maximum of 3761 steps in all lists combined.

Operating Characteristics:
Channel-channel delay: < 60 ps

Switching time: approximately 15 ms. Switching is break before make. Off channels are open circuit.

Power requirements: 100, 120, 220, and 240 Vac, +5% −10%, 48-66 Hz; 155 VA with highest power consumption pod configuration.

Weight:
Net: 65 kg (30 lbs)
Shipping: 84 kg (38 lbs)

Accessories supplied: One line cord, one operating/programming/service manual, 16 pod receptacle covers, 16 color-coded probe identifier markers.

HP 54300A Probe Multiplexer

Opt 908 Rackmount flange kit

HP 54001A 1 GHz miniature active probe pod.

HP 54002A 50Ω BNC input pod

HP 54003A 1 MΩ 10:1 probe pod

Convenient soft carrying case for the HP 54501 oscilloscope or the HP 1650/1651 logic analyzers.

HP 1540-1066 Soft Carrying Case

The HP 1540-1066 soft carrying case provides convenient protection for the HP 54501 oscilloscope. It is ideal when the oscilloscope must be transported in the trunk of a car. The carrying case features a shoulder strap and comfortable handle for easy portability.

This carrying case is not recommended as protective packaging for shipping or for airline checked baggage.

HP 1540-1066

Transit Cases for HP Oscilloscopes

When HP oscilloscopes must be shipped from one location to another, the transit cases listed below provide convenient, re-usable protection.

HP Part Number	Transit case fits HP model numbers
9211-2662	HP 54100
9211-2663	HP 54110,54111, 54112
9211-2650	HP 54200, 54201
9211-2645	HP 54501

Note: Instruments are not an exact fit. It may be necessary to trim the internal foam pad or add pad to obtain an exact fit. For further information on available transit cases see the HP Test and Measurement Catalog.

Testmobiles

The HP 1008A provides a sturdy, lightweight, stable platform for your oscilloscope or instrumentation system (see specifications). Large angled wheels with a wide track move quietly and smoothly over most surfaces. The top tray is table height and can be tilted to a convenient viewing angle between 30 degrees above and 30 degrees below the horizontal position with a total of seven detent positions in 10 degree increments. The caps on each side rail are designed to hold three probes to reduce the possibility of damaging probes not in use. A 01007-60017 power strip (U.S.) and an instrument tie-down strap are included with each HP 1008A.

HP 1008A Option 006 adds a storage cabinet with a shelf on top and a drawer below to the basic HP 1008A.

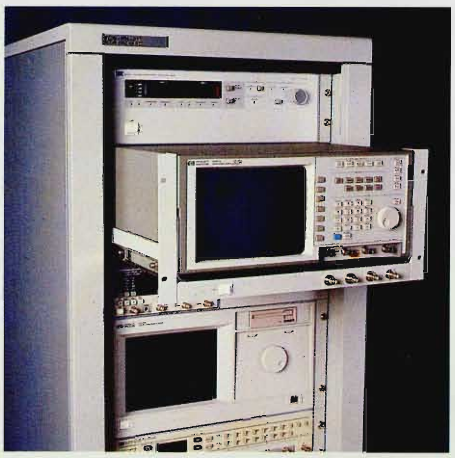
Specifications

Height: 930 mm (36½ in)
Overall width: 759 mm (29⅞ in)
Width of tray: 473 mm (18⅝ in)
Tilt tray angle: ±30 degrees
Weight
  net: 13 kg (28 lb)
  shipping: 22 kg (48 lb)
Max load on tray: 45 kg (100 lb)
Max load below tilt tray: (opt. 006)
  on shelf and in cabinet (each):
  18 kg (40 lb) in drawer: 11 kg (25 lb)

HP 1008A
Opt 006

Basic Testmobile, HP 1008A

HP 1008A opt 006: Storage cabinet with shelf on top and drawer in lower position; load limit 18 kg (40 lb) each on shelf and in cabinet, 11 kg (25 lb) in drawer.



The HP 54501A oscilloscope rack mounted with slides. Note that this rack mount kit (5061-6175) includes a power switch for the oscilloscope (the 54501A's power switch is on the rear panel) and 4 bulk head BNC connectors to feed signals from inside the rack to the outside. These connectors allow convenient hook up of signals within the rack to the oscilloscope's inputs.

HP Oscilloscope Rack Mount and Slide Kits

Below is a table listing rack mounting hardware for HP oscilloscopes. In using this table, see the notes listed below it.

Rack Mounting Hardware for HP 54XXX Oscilloscopes

Instrument	System II Size H x W x D	Rack Mount Flange Kit W/O Front Handles	Rack Mount Flange Kit With Front Handles	Support Rail Kit For All HP Racks (4)	Standard Slide Kit, Non-Tilt (4)	Standard Slide Kit, Tilting (4)	Slide End Brackets For Non HP Rack (1)	New Side Cover Req'd (1 ea.) For Slides	Remarks
54100A/D	177.0 x 425.5 x 497.8 (7 x F x 20)*	5061-9678	5061-9684	12679B	1494-0059	1494-0063	1494-0061 (1)	5060-9942	(3)
54110A/D	221.5 x 425.5 x 574.0 (8¾ x F x 23)*	5061-9679	5061-9685	12679B	1494-0059	1494-0063	1494-0061 (1)	5060-9948	(3)
54111D	221.5 x 425.5 x 574.0 (8¾ x F x 23)*	5061-9679	5061-9685	12679B	1494-0059	1494-0063	1494-0061 (1)	5060-9948	(3)
54112D	221.5 x 425.5 x 574.0 (8¾ x F x 23)*	5061-9679	5061-9685	12679B	1494-0059	1494-0063	1494-0061 (1)	N/A	(3)
54120A	221.5 x 425.5 x 574.0 (8¾ x F x 23)*	5061-9679	5061-9685	12679B	1494-0059	1494-0063	1494-0061 (1)	5060-9948	(3)
54121A	88.1 x 212.3 x 269.2 (3½ x H x 11)*	5061-9672 (5) —or— 5061-9696 (6)	N/A N/A	12679B (7) 12679B	N/A 1494-0015	N/A N/A	N/A 1494-0061	N/A N/A	(3) (3)(7)
54200A/D	177.0 x 425.5 x 345.4 (7 x F x 14)*	5061-9678	5061-9684	12679B	1494-0060	1494-0062	1494-0061 (1)	5060-9940	(3)
54201A/D	177.0 x 425.5 x 345.4 (7 x F x 14)*	5061-9678	5061-9684	12679B	1494-0060	1494-0062	1494-0061 (1)	5060-9940	(3)
54300A	132.6 x 425.5 x 497.8 (5¼ x F x 20)*	5061-9677	5061-9683	12679B	1494-0059	1494-0063	1494-0061 (1)	N/A	(3)
54501A	N/A	5061-6175 (2)	N/A	12679B	1494-0015	N/A	(1)(8)	N/A	(2)(3)

(1) G-E, Honeywell, etc.
(2) Rack kit comes with rails, as standard equipment.
(3) CAUTION: Some kits furnished with both inch & metric hardware.
(4) Instruments mounted without slides require support rails.
(5) Cantilever mounting with support rail along one side only.
(6) Recommended, support shelf.
(7) Use 5061-9722 filler panel if mounted alone.
(8) Use Accuride Part No. 4000-0182-CE.
(*) F = full rack width.
H = half rack width.

Part Number Index

For more information, call your local HP sales office listed in the telephone directory white pages. Ask for the Electronic Instruments Department. Or write to **Hewlett-Packard, U.S.A.:** P.O. Box 10301, Palo Alto, CA 94303-0890. **Europe/Middle East/Africa:** Central Mailing Department, P.O. Box 529, 1180 AM Amstelveen, The Netherlands. **Canada:** 6877 Goreway Drive, Mississauga, L4V1M8, Ontario. **Japan:** Yokogawa-Hewlett-Packard, Ltd., 3-29-21, Takaido-Higashi, Suginami-ku, Tokyo 168. Elsewhere in the world, write to: Hewlett-Packard Intercontinental, 3495 Deer Creek Road, Palo Alto, CA 94304.

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Printed USA.
5954-2678

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