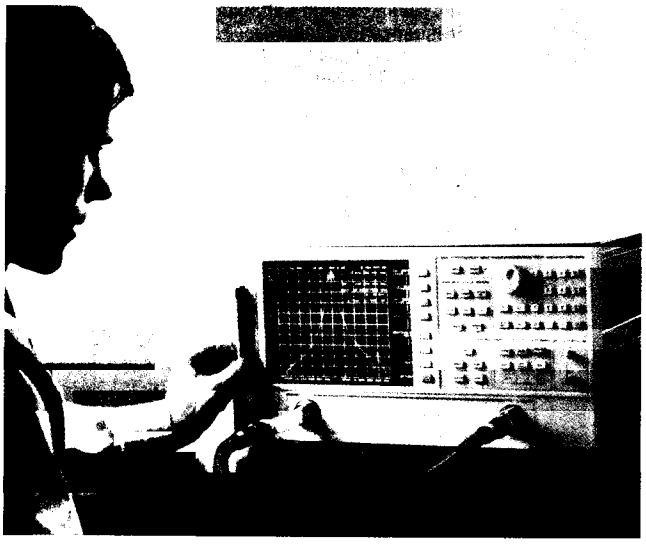
Microwave Network Analyzers, 50 MHz to 40 GHz

HP 8719D
HP 8720D
HP 8722D

- 50 MHz to 13.5, 20, or 40 GHz frequency coverage
- Fast-sweeping, built-in synthesized source
- Integrated solid-state switching S-parameter test set
- Vector receiver, error correction, time domain
- Direct save/recall from built-in 3.5-inch floppy disk drive
- Up to 105 dB dynamic range



HP 8720D provides flexibility, performance, and ease of use to solve your toughest device measurement problems.

HP 8720D Series Microwave Network Analyzers

The HP 8719D, 8720D and 8722D vector network analyzers (VNAs) offer built-in source, receiver, and S-parameter test set covering frequencies from 50 MHz to 13.5, 20 or 40 GHz. With their built-in 3.5-inch disk drive and serial/parallel ports, you'll benefit from improved data handling, in addition to higher accuracy, faster sweep speed, and built-in test sequencing automation. Compact, economical, and easy to use, the 8720D family provides accurate, fast tests of microwave filters, amplifiers, mixers, multiport devices and cables in coaxial and non-coaxial environments, such as waveguide, in-fixture and on-wafer. The HP 8720 family is an ideal choice for cost- and space-conscious engineers in research and development, manufacturing, incoming inspection, or quality assurance.

Affordable Analyzers with Outstanding Performance

Despite their affordable price, the HP 8720 series network analyzers offer remarkable performance. The integrated source is fully synthesized, even while sweeping, and provides stability and accuracy within 10 ppm (typical). Yet the sweep rate is extremely fast: measurement update times are typically about 1 ms per point. Frequency resolution is 1 Hz standard for accurate measurements of narrowband or long-delay devices.

The tuned receivers with variable bandwidth IF filters provide up to 105 dB of dynamic range. A built-in, solid-state switching test set measures both forward and reverse parameters with a single connection, and provides continuous updating of all four S-parameters as required for two-port error correction.

Two independent channels can simultaneously display two measurements, such as reflection and transmission responses. The receiver detects both magnitude and phase, and displays results in a variety of useful formats, including group delay, deviation from linear phase, complex impedance or admittance, and SWR on rectangular, polar or Smith charts.

Built-in vector accuracy enhancement provides excellent error-corrected accuracy in all common coaxial connectors. A user kit supports user-defined standards, and allows calibration in waveguide (including effects of dispersion).

Powerful Features for Active Devices

With +5 dBm at their test ports, the HP 8719D and 8720D have plenty of power for testing amplifiers. Option 007 provides 5 dB more output power by replacing the solid-state transfer switch with a mechanical switch (although Option 007 does not provide continuous updating of all four S-parameters). For sensitive small-signal devices, the built-in step attenuator can cut power back to –70 dBm. Absolute power levels can be set accurately anywhere in the system, using the power meter calibration feature. Power-sweep capability and power resolution of 0.01 dB make it easy to test the gain-compression characteristics of active components. A new sweep mode controls power during retrace for safe testing of AGC amplifiers.

In-Fixture and On-Wafer Device Characterization

Use TRL*/LRM* calibration to minimize fixture errors for measuring noncoaxial devices (such as microstrip). Combine the network analyzer with a wafer probing station in order to measure devices while still on the wafer. For even better accuracy, Option 400 adds a fourth sampler and TRL/LRM calibration. Electronic port extensions and gating are also available to enhance accuracy.

Time Domain and Fault Location

Time domain capability (Option 010) computes and displays the response versus time or distance (instead of frequency) of the device under test. Use time domain to locate and quantify individual faults or discontinuities in a network. Apply the gating feature to remove the effects of unwanted reflections (separated in time), then view the device under test's true response versus frequency.

Productivity Features

Limit-test capability makes pass/fail decisions quantitative and decisive, allowing faster tuning and more consistent testing.

Fast two-port tuning mode speeds up 12-term error correction by allowing the user to specify a number of forward sweeps to take before updating the reverse sweep.

To document results without a computer, the copy feature sends the entire display to a compatible plotter or printer using the HP-IB, serial, or parallel interface. A built-in buffer controls the peripheral while you continue with the next measurement.

Up to five markers per channel can be used to annotate trace features or search and track values with marker functions.

With save/recall capability, you can define and save test configurations, then recall identical conditions later, and align or test each device under test consistently. Use up to 31 internal nonvolatile memory registers, or save/recall directly to an internal 3.5-inch floppy disk drive.

Automate repeated tasks with test sequencing. Create test sequences with automatic keystroke recording, then repeat the measurements with a single keystroke. No programming expertise is needed. You can also use test sequencing to control external devices such as part handlers through the parallel port.

Adapter Removal Calibration

This feature, adopted from the 8510, provides greater accuracy for measuring non-insertable devices, such as devices with the same sex connectors on both ports or different connector types on ports 1 and 2. Adapter-removal calibration effectively removes the errors from the adapter that must be used during a non-insertable calibration to make a "thru" connection between the test ports. For customers with older versions of the HP 8719D, 8720D, or 8722D, this capability can be obtained with a firmware upgrade (p/n 08720-60168). Other key features included in the new firmware are S2P format data output files and a wider IF bandwidth. S2P format is convenient, easy-to-read, and compatible with CAD programs, including HP EEsofs Libra, Touchstone, and jOmega. A wider 3.7 kHz IF bandwidth has been added to provide 15 to 20 percent faster measurements than the previous 3 kHz bandwidth, with only minor increases in trace noise and noise floor.

Key Literature

HP 8719D, 8720D, 8722D Microwave Vector Network Analyzers
Brochure, p/n 5964-6419E
HP 8719D, 8720D, 8722D Network Analyzers
Technical Specifications, p/n 5964-9133E
HP 8719D, 8720D, 8722D Network Analyzers
Configuration Guide, p/n 5964-9130E

HP 8719D
HP 8720D
HP 8722D

Flexible Configuration for Applications

Option 007 replaces the standard solid-state transfer switch with a mechanical switch to provide 5 dB more power at the test port, and 5 dB more dynamic range. The mechanical transfer switch does not provide continuous updating of all 4 S-parameters for full two-port calibration.
Option 010 adds time-domain capability, which allow fault location and gating of fixture responses.
Option 012 provides direct sampler access, enabling the user to eliminate coupler loss and increase sensitivity by 16 dB. Option 012 allows filter rejection measurements to greater than –120 dB and allows insertion of attenuation between coupler and sampler. By using separate transmit and receive antennae, Option 012 can improve signal-to-noise in free-space measurements.
Option 085 is a high-power S-parameter test set modification allowing device test up to +43 dBm (20 watts) input and output. It deletes the bias tees, replaces the solid-state switch with a mechanical switch, and adds internal attenuators.
Option 089 offers a frequency offset mode for simple mixer conversion loss measurements without the need for a reference mixer.
Option 1D5 adds a high-stability frequency reference to improve measurement accuracy of narrowband or high Q devices.
Option 400 adds a fourth sampler to the receiver and improves TRL calibration accuracy for in-fixture and on-wafer applications.
DX models are pre-configured systems that are ideal for noncoaxial applications. They combine a standard network analyzer with Options 400, 010, 012, and 1D5 at a value price.

Accessories

Configure a complete measurement system with test port cables, calibration kits, verification kits, and adapters. Waveguide calibration kits are available in X, P (Ku), K, and R (Ka) bands, covering 8.2 to 40 GHz. The HP 8720 family of network analyzers uses the same precision calibration standards and rugged, flexible cables as the industry standard HP 8510.

Software Enhances Measurement Capability

Measure the dielectric properties of materials quickly and non-destructively with the HP 85070B dielectric probe kit (including software). For greater accuracy and flexibility, use the HP 85071B materials measurement software, for samples loaded into waveguide or coaxial fixtures, and for free space measurements.

Specifications Summary

Data applies at 23°± 3°C. See product literature for more complete specifications and for total measurement uncertainty after error correction.

	HP 8719D	HP 8720D	HP 8722D
Minimum Frequency	50 MHz	50 MHz	50 MHz
Maximum Frequency	13.5 GHz	20 GHz	40 GHz
Frequency Resolution	1 Hz	1 Hz	1 Hz
Frequency Accuracy	10 ppm	10 ppm	10 ppm
Max. Source Power (std)	+5 dBm	+5 dBm	–5 dBm, < 20 GHz –10 dBm, 20 to 40 GHz
With Option 007	+10 dBm	+10 dBm	0 dBm, < 20 GHz –5 dBm, 20 to 40 GHz
Min. Source Power (std)	–70 dBm	–70 dBm	–75 dBm
With Option 007	–65 dBm	–65 dBm	–70 dBm
Power Resolution	0.01 dB	0.01 dB	0.01 dB
Power Flatness	± 1.5 dB	± 1.5 dB	± 2 dB
Power Sweep Range	20 dB	20 dB	15 dB
System Dynamic Range (>2 GHz)	100 dB	100 dB	82 to 93 dB
With Option 007	105 dB	105 dB	86 to 98 dB
Test Port Connector	3.5 mm	3.5 mm	2.4 mm

Measurement Rate (typical, 201-point sweep): < 2 ms/point (1-port cal) to < 5 ms/point (full 2-port cal)
HP-IB Functions: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, C1, C10, E2
Size: 222 mm H x 425 mm W x 457 mm D (8.75 in x 16.750 in x 18.00 in)
Weight: Net, 25 kg (54 lb); shipping, 28 kg (61 lb)

Ordering Information

	Price
HP 8719D Network Analyzer, 50 MHz to 13.5 GHz	$49,470
HP 8720D Network Analyzer, 50 MHz to 20 GHz	$64,770
HP 8722D Network Analyzer, 50 MHz to 40 GHz	$81,090
The following options apply to all three network analyzers:	
Opt 007 Mechanical Transfer Switch	$0
Opt 010 Time Domain Capability	+$9,080
Opt 012 Direct Sampler Access	+$2,550
Opt 085 High-Power Test Set	+$10,200
Opt 089 Frequency Offset Mode	+$3,750
Opt 1D5 High-Stability Frequency Reference	+$1,020
Opt 400 Four-Sampler Test Set	+$6,120
Opt 1CM Rackmount Kit	+$46
Opt 1CP Rackmount and Handle Kit	+$46
Opt W08 Convert 1-yr. on-site to 3-yr. return to HP warranty	$0
The DX models are pre-configured systems for noncoaxial applications that include Options 400, 010, 012, and 1D5 at a value price.	
HP 8719DX Network Analyzer, 50 MHz to 13.5 GHz	$66,200
HP 8720DX Network Analyzer, 50 MHz to 20 GHz	$81,500
HP 8722DX Network Analyzer, 50 MHz to 40 GHz	$97,820
The following options apply to all three network analyzers:	
Opt 089 Frequency Offset Mode	+$3,750
Opt 1CM Rackmount Kit	+$46
Opt 1CP Rackmount and Handle Kit	+$46
Opt W08 Convert 1-yr. on-site to 3-yr. return to HP warranty	$0
HP 85070B High-Temperature Dielectric Probe Kit	$5,985
HP 85071B Materials Measurement Software	$4,995

Upgrades and Retrofit Kits

To add options to an HP 8720D family analyzer after initial purchase, order model number HP 8719DU, 8720DU, or 8722DU with the option(s) you want to retrofit. All "DU" upgrade/retrofit kits include installation at an HP service center.

HP 8719DU Upgrade Kits for HP 8719D	$0
HP 8720DU Upgrade Kits for HP 8720D	$0
HP 8722DU Upgrade Kits for HP 8722D	$0
The following options are available for all three models:	
Opt 007 Add Mechanical Transfer Switch	+$2,040
Opt 010 Add Time Domain Capability	+$9,080
Opt 012 Add Direct Sampler Access	+$2,550
Opt 085 Add High-Power Test Capability	+$10,200
Opt 089 Add Frequency Offset Mode	+$3,750
Opt 1D5 Add High-Stability Frequency Reference	+$1,020
Opt 400 Add Four-Sampler Test Set	+$6,120
The following upgrades are only available for the specified models:	
HP 8719DU Opt 020 Upgrades HP 8719D to HP 8720D	$15,300
HP 8719DU Opt 040 Upgrades HP 8719D to HP 8722D	$31,620
HP 8720DU Opt 040 Upgrades HP 8720D to HP 8722D	$16,320
The following kits offer upgrades for older HP 8720 family network analyzers. Installation is NOT included unless stated otherwise.(Do not order these for the HP 8720D family.)	
HP 86384A Solid-State Switch Retrofit Kit (HP 8719C)	$3,640
HP 86384B Solid-State Switch Retrofit Kit (HP 8720C)	$3,640
HP 86384C Solid-State Switch Retrofit Kit (HP 8722C)	$5,100
HP 86382B Upgrade HP 8719C to HP 8720C; incl. installation	$13,005
HP 86382C Upgrade HP 8720C to HP 8722C; incl. installation	$22,900
HP 86380A Add Time Domain; includes installation	$9,885
HP 86381A Add 1 Hz Frequency Resolution; incl. installation	$10,405
HP 08720-60024 High Forward Dynamic Range	$470
HP 08720-60168 Firmware Upgrade	$85
HP 1540-1695 Operating Case	$3300
HP 9211-2657 Transit Case	$650