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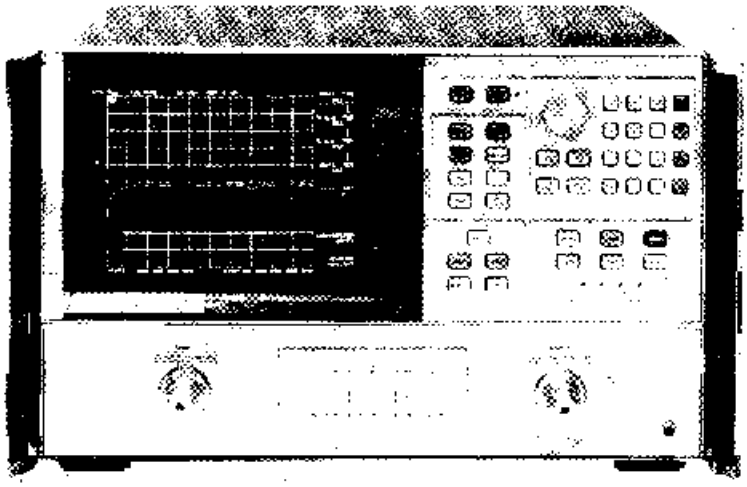
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NETWORK ANALYZERS

Microwave Network Analyzer, 130 MHz to 20 GHz

Models 8720A, 85162A

- 130 MHz to 20 GHz frequency range
- Integrated swept synthesized source
- Integrated switching s-parameter test set
- Direct save/recall to an external disc drive
- >85 dB dynamic range
- Built-in vector accuracy enhancement



HP 8720A

HP-IB SYSTEMS

Description

The HP 8720A provides simple and complete vector network measurements in a compact and fully integrated microwave network analyzer. Characterize your microwave components and networks accurately, yet economically with the HP 8720A microwave network analyzer. Integration of the 130 MHz to 20 GHz swept synthesized source, test set, and receiver results in a compact, low cost network analyzer which is ideal for incoming inspection, production, and final test measurements.

With two independent display channels available, you can simultaneously measure the reflection and transmissions characteristics of the device under test. The easy-to-use softkey selection of measurement functions allows you to quickly measure the magnitude, phase, or group delay characteristics of your device under test. Directly measure the electrical length of a single device or phase match multiple devices. Data can be displayed in log magnitude, linear magnitude, SWR, phase, group delay, polar, real, or Smith Chart formats.

The HP 8720A's integrated synthesized source provides 100 kHz frequency resolution standard or, with the addition of option 001, it will provide 1 Hz frequency resolution for testing narrowband, frequency selective or electrically long devices. The integrated synthesized source also provides a measurement port power level of −10 to −65 dBm which is settable in 5 dB steps.

Time Domain Analysis

The HP 8720A with option 010 has the capability of displaying the time domain response of a network, obtained by computing the Inverse Fourier Transform of the frequency domain response. The time domain response displays the reflection coefficient versus time, yielding the magnitude and location of each individual discontinuity of the network. It can also display the transmission coefficient versus time, yielding simulated transient response analysis of the network.

Features Designed for Manufacturing

The HP 8720A's productivity features allow increased throughput on your production floor. The arbitrary frequency list mode allows selection of only those frequencies you wish to test, resulting in reduced test time. In this mode, you can define up to 30 CW frequencies or swept frequency segments, calibrate once, and then measure all of the segments or "zoom-in" on just one segment and still remain calibrated. The HP 8720A's limit test capability allows your technicians to make pass/fail decisions easily and systematically. Based on the specifications for the device under test, define up to 22 test limits on each channel so your technicians can align and objectively verify the device's response. Utilize the HP 8720A's save/recall capability to reduce set up time and enable all your technicians to repeatedly use the same test configuration. This feature allows your engineer or skilled specialist to define the test configuration once, store it to an external CS80 compatible disc drive, and then have it recalled by each member of your production test line without the use of an external computer. This feature provides confidence that each technician is aligning and evaluating your devices under the same conditions. For a permanent record of your measurement results, the HP 8720A's copy feature allows the entire CRT display to be directly output to a compatible HP-GL plotter or printer.

All of the functions of the HP 8720A are completely programmable from an external computer through the Hewlett-Packard Interface Bus. For fully automated, guided measurements, use the HP 85162A Measurement Automation Software. To completely and efficiently characterize crystals, SAWs, and other resonant devices, use the HP 85165A Resonator Measurement Software.

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NETWORK ANALYZERS
Microwave Network Analyzer, 130 MHz to 20 GHz
Models 8720A, 85162A (cont'd)

HP 8720A System Performance

Dynamic Range (for transmission measurements)[1]

	Frequency Range			
	0.13 to 0.5 GHz	0.5 to 2 GHz	2 to 8 GHz	8 to 20 GHz
Dynamic Range	70 dB	80 dB	85 dB	85 dB

Measurement Port Characteristics[2]

The following specifications show the residual system uncertainties (including switch repeatability) after accuracy enhancement using a full 2-port measurement calibration (including isolation) with an IF bandwidth of 10 Hz, and the specified calibration kit. Environmental temperature is 23±3°C.

Calibration Kit: HP 85052B (3.5 mm, male and female lowband and sliding loads)

	Frequency Range			
	0.13 to 0.5 GHz	0.5 to 2 GHz	2 to 8 GHz	8 to 20 GHz
Directivity	40 dB	40 dB	40 dB	40 dB
Source Match	30 dB	30 dB	30 dB	30 dB
Load Match	35 dB	35 dB	30 dB	30 dB
Reflection Tracking	±0.10 dB	±0.10 dB	±0.10 dB	±0.20 dB
Transmission Tracking	±0.10 dB	±0.10 dB	±0.12 dB	±0.15 dB

Calibration Kit: HP 85052D (3.5 mm, male and female broadband precision fixed load)

	Frequency Range			
	0.13 to 0.5 GHz	0.5 to 2 GHz	2 to 8 GHz	8 to 20 GHz
Directivity	40 dB	40 dB	36 dB	36 dB
Source Match	30 dB	30 dB	30 dB	30 dB
Load Match	35 dB	35 dB	30 dB	30 dB
Reflection Tracking	±0.10 dB	±0.10 dB	±0.10 dB	±0.20 dB
Transmission Tracking	±0.10 dB	±0.10 dB	±0.12 dB	±0.15 dB

System Accessories

	3.5 mm	7 mm[3]	Type N[3]
Test port cables			
Semi-flexible	HP 85131C/D	HP 85132C/D	HP 85132C/D[4]
Super-flexible[5]	HP 85131E/F	HP 85132E/F	HP 85132E/F[4]
Adapter sets	HP 85130D	HP 85130B	HP 85130C
Calibration kits			
Standard (sliding loads)	HP 85052B	HP 85050B	HP 85054B
Economy (fixed loads)	HP 85052D	HP 85050D	
Verification kits	HP 85051B	HP 85053B	HP 85055A

[1]Limited by maximum output power and system noise floor. Specified for an IF bandwidth of 10 Hz, using a full 2-port measurement calibration (including an isolation calibration performed with an averaging factor of 16).
[2]Crosstalk, after an isolation calibration, is below the system noise floor and can be ignored.
[3]HP 85130B/C Special Adapter Sets required if devices with 7 mm or Type N connectors are to be connected directly to the HP 8720A's test ports.
[4]Use the cables recommended for 7 mm devices. Precision 7 mm to Type N adapters are included in the HP 85054B Type N calibration kit.
[5]Semi-flexible cable are warranted for 90 days. Super-flexible cables carry a standard one-year warranty.

General Characteristics

Source Frequency Characteristics
Range: 130 MHz to 20.0 GHz
Resolution: 100 kHz (1 Hz with Option 001)
Stability: typically ±7.5 ppm @ 0° to 55°C
typically ±3 ppm/year
Accuracy: 10 ppm @ 25°±3°C

Output characteristics (at test ports, 25°±3°C)
Power range: −10 to −65 dBm in 5 dB steps
Power level: −10 dBm ± 3 dB
Harmonics: <−15 dBc @ −10 dBm (typical)

Test ports
Connector type: 3.5 mm (male)
Impedance: 50 ohms nominal
Switch type: Mechanical
Switch lifetime: >3 million cycles (typical)
Maximum input level: +20 dBm
DC bias: 500 mA, 40 VDC maximum

Rear Panel Connectors
External reference frequency input:
Frequency: 1, 2, 5, and 10 MHz; ≤±200 Hz at 10 MHz
Level: −10 dBm to +20 dBm, typical
Impedance: 50 ohms
External trigger: Triggers start of sweep on a negative TTL transition or contact closure to ground.
External AM auxiliary input: 0 to 10 volts (1 dB/volt) into a 10 kohm resistor, 5 kHz max.
Auxiliary voltage input: −10 to +10 V
IO interconnect:
Type: DB-25
Output: Standard LS TTL output (active high logic) on pin 17 indicative of PASS/FAIL status during limit testing. Output voltage remains at +5 Vdc (nominal) until a FAIL condition occurs. Remains at 0 Vdc until a PASS condition occurs.

HP 85162A Measurement Automation Software
The HP 85162A Measurement Automation software is designed specifically to operate on an HP 9000 series 200 or 300 computer with BASIC 3.0 or higher. The software complements the HP 8720A microwave network analyzer, providing calibration, measurement, and data output capabilities with a minimum of operator interaction.

Ordering Information	Price
HP 8720A Microwave Network Analyzer	$55,000
Option 001 1 Hz frequency resolution	9,500
Option 010 Time Domain Capability	9,000
Option 802 add HP 9122C Dual Disc Drive, HP 10833A cable	1,495
Option 830 add HP 85052D Cal Kit, HP 85131E cable	5,800
Option 913 Rack Mount Kit	40
HP 85162A Measurement Automation Software	
Requires BASIC 3.0 or above and 2 Mbytes of RAM	1,500
Must select media option (no charge):	
Option 630 for 3.5 in. disc media	N/C
Option 655 for 5.25 in. disc media	N/C

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