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# HP 8719D, 8720D and 8722D Network Analyzers

## Configuration Guide

**HP 8719D, 50 MHz to 13.5 GHz**  
**HP 8720D, 50 MHz to 20 GHz**  
**HP 8722D, 50 MHz to 40 GHz**

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The HP 8720D family of microwave network analyzers integrates a microwave source, tuned-receiver, and S-parameter test set into a single, cost-effective instrument. To complete a microwave measurement system, select the desired network analyzer options, test port cables, and calibration kits. Also, additional measurement accessories may be selected.

### Standard Network Analyzers

**HP 8719D** vector network analyzer, 50 MHz to 13.5 GHz  
**HP 8720D** vector network analyzer, 50 MHz to 20 GHz  
**HP 8722D** vector network analyzer, 50 MHz to 40 GHz

Included with a standard network analyzer is an installation and quick start guide, a user's guide, a quick-reference guide, a programmer's guide and example programs disk, a bandpass filter test device (P/N 0955-0446), and a 1-year on-site service warranty that may be converted to a 3-year return-to-HP service warranty.

### Network Analyzers Preconfigured for Noncoaxial Applications

**HP 8719DX** includes the standard HP 8719D analyzer, the items listed above, plus Options 010, 012, 1D5, and 400

**HP 8720DX** includes the standard HP 8720D analyzer, the items listed above, plus Options 010, 012, 1D5, and 400

**HP 8722DX** includes the standard HP 8722D analyzer, the items listed above, plus Options 010, 012, 1D5, and 400

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## Network Analyzer Options

### Analyzer Options

- 1D5** high-stability frequency reference: replaces standard frequency reference with a higher stability unit.
- 007** mechanical transfer switch: replaces the solid-state transfer switch with a mechanical transfer switch. Increases test port power and dynamic range by 5 dB.
- 010** time-domain capability: allows time-domain measurements.
- 012** direct sampler access: configures the test set with direct access to A and B sampler receiver inputs. Operates as a standard instrument with the jumpers installed.
- 085** high-power S-parameter test set modification: deletes bias tees and adds a mechanical transfer switch and internal attenuators. Allows insertion of an amplifier before the transfer switch and insertion of isolators in the measurement configuration.
- 089** frequency offset mode: modifies the test set and firmware. Provides mixer measurement capability, allowing a receiver frequency offset from the source.
- 400** adds fourth sampler and TRL calibration firmware: replaces the transfer switch with a solid-state switch/splitter.

### Hardware Options

- 1CM** adds rack mount flange kit for use without handles
- 1CP** adds rack mount flange kit for use with handles<sup>1</sup>

### Information Options

- 0BW** adds service guide (08720-90292)
- 0B0** deletes all user and programming guides
- AV8** adds extra user and programming guides (08720-90288, 08720-90293)
- ABF** adds French quick reference guide (08720-90283)
- ABJ** adds Japanese quick reference guide (08720-90285)

### Service Options

- 0Q8** includes factory-delivered service training.
- W08** converts one year on-site repair warranty to three year return-to-HP repair warranty<sup>2</sup>
- W31** adds two years of on-site repair
- W32** adds three years of return-to-HP calibration
- W34** adds three years of return-to-HP standards-compliant calibration
- W51** adds five years of on-site repair
- W52** adds five years of return-to-HP calibration
- W54** adds five years of return-to-HP standards-compliant calibration

### Certification Options

- 1BN** mil standard 45662A calibration certification
- 1BP** mil standard 45662A calibration certification with test data

## Network Analyzer Option Compatibility

Option	Option 1D5	Option 007	Option 010	Option 012	Option 085	Option 089	Option 400
<b>1D5</b> High-Stability Frequency Reference	—	Yes	Yes	Yes	Yes	Yes	Yes
<b>007</b> Mechanical Transfer Switch	Yes	—	Yes	Yes	No <sup>2</sup>	Yes	No <sup>3</sup>
<b>010</b> Time Domain	Yes	Yes	—	Yes	Yes	Yes	Yes
<b>012</b> Direct Sampler Access	Yes	Yes	Yes	—	Yes	Yes	Yes
<b>085</b> High-Power Test	Yes	No <sup>4</sup>	Yes	Yes	—	Yes	No <sup>3,4</sup>
<b>089</b> Frequency Offset Mode	Yes	Yes	Yes	Yes	Yes	—	Yes
<b>400</b> Four-Sampler Test Set	Yes	No <sup>3</sup>	Yes	Yes	No <sup>3,4</sup>	Yes	—
<b>DX</b> Noncoaxial Configuration	Included	No <sup>3</sup>	Included	Included	No <sup>3,4</sup>	Yes	Included

<sup>1</sup> The HP 8719D/8720D/8722D is supplied with handles.

<sup>2</sup> Applies only at time of purchase.

<sup>3</sup> Option 400 uses solid-state switch splitter in place of transfer switch.

<sup>4</sup> Option 085 requires and includes a mechanical transfer switch.

## Measurement Accessories

Accessories are available in these connector types: 7 mm, K connector® (2.92 mm), type N, 3.5 mm (SMA-compatible), 2.4 mm coaxial, WR-90 (X Band), WR-62 (P Band), WR-42 (K Band), WR-28 (R Band)

For a complete list of Hewlett-Packard's coaxial and waveguide accessories, ask your Hewlett-Packard sales representative for the Coaxial and Waveguide Test Accessories Catalog (HP literature number 5091-4269E).

### Calibration Kits

#### Coaxial measurements

For coaxial measurements, Hewlett-Packard offers two types of calibration kits:

**Economy**, includes:

- open standards (male and female)
- short standards (male and female)
- fixed-termination standards (male and female)
- in-series adapters

**Standard**, includes the devices in the economy kit and adds:

- sliding loads
- connector gages

**Precision**, includes the devices in the economy kit and adds:

- 50 ohm airline for TRL calibration
- TRL adapters
- connector tools

#### Waveguide measurements

For waveguide measurements, Hewlett-Packard offers calibration kits that include:

- waveguide-to-coax adapters (X, P, K)
- precision waveguide section
- flush short circuit
- fixed terminations
- straight section

#### Electronic calibration

Hewlett-Packard also offers electronic calibration systems. This system requires a control unit and electronic calibration kit. The calibration kit includes:

- highband ECal module
- torque wrench
- optional adapters
- optional lowband ECal module

### Verification Kits

All Hewlett-Packard verification kits include:

- precision  $Z_0$  airline
- mismatched airline
- fixed attenuators
- traceable measured data and uncertainties

### Cables and Adapter Sets

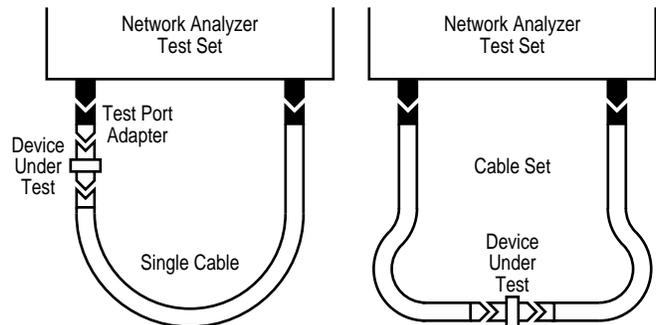
Hewlett-Packard offers cables in the following types:

- single cables in semi-rigid and flexible
- cable set in semi-rigid and flexible

There are also adapter sets available that protect the test port and convert the port to the desired connector interface. These kits contain:

- one male adapter
- one female adapter

To attain the best mechanical rigidity for device connection, use a single cable and the appropriate special adapter set. To attain the greatest flexibility for device connection, use a cable set.



## Measurement Accessories *(continued)*

### For Devices with 3.5 mm or SMA Connectors

#### Calibration Kits

- **HP 85052B** standard: 0.045 to 26.5 GHz. Includes:
  - 00902-60003 3.5 mm (m) fixed load
  - 00902-60004 3.5 mm (f) fixed load
  - 00911-60019 3.5 mm (m) sliding load
  - 00911-60020 3.5 mm (f) sliding load
  - 85052-60006 3.5 mm (m) short
  - 85052-60007 3.5 mm (f) short
  - 85052-60008 3.5 mm (m) open
  - 85052-60009 3.5 mm (f) open
  - 85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
  - 85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
  - 85052-60014 3.5 mm (m) to 3.5 mm (m) adapter
- **HP 85052B Option K11** PSC-3.5 slotless female center contact repair kit
- **HP 85052C<sup>5</sup>** precision TRL: 0.045 to 26.5 GHz. Includes:
  - 00902-60003 3.5 mm (m) fixed load
  - 00902-60004 3.5 mm (f) fixed load
  - 85052-60006 3.5 mm (m) short
  - 85052-60007 3.5 mm (f) short
  - 85052-60008 3.5 mm (m) open
  - 85052-60009 3.5 mm (f) open
  - 85052-60032 3.5 mm (f) to 3.5 mm (f) adapter
  - 85052-60033 3.5 mm (m) to 3.5 mm (m) adapter
  - 85052-60034 3.5 mm (f) to 3.5 mm (m) adapter
  - 85052-60035 3.5 mm short TRL line
  - 85052-60036 3.5 mm long TRL line
- **HP 85052D** economy: 0.045 to 26.5 GHz. Includes:
  - 00902-60003 3.5 mm (m) fixed load
  - 00902-60004 3.5 mm (f) fixed load
  - 00902-60006 3.5 mm (m) short
  - 00902-60007 3.5 mm (f) short
  - 00902-60008 3.5 mm (m) open
  - 00902-60009 3.5 mm (f) open
  - 85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
  - 85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
  - 85052-60014 3.5 mm (m) to 3.5 mm (m) adapter
- **HP 85033D** economy: DC to 6 GHz. Includes:
  - 85052-60003 3.5 mm (f) to APC-7 adapter
  - 85052-60004 3.5 mm (m) to APC-7 adapter
  - 85033-60009 3.5 mm (m) load
  - 85033-60010 3.5 mm (f) load
  - 85033-60011 3.5 mm (m) open
  - 85033-60012 3.5 mm (f) open
  - 85033-60013 3.5 mm (m) short
  - 85033-60014 3.5 mm (f) short

- **HP 85062A**<sup>6</sup> electronic: 1 to 26.5 GHz. Includes:
  - 85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
  - 85052-60014 3.5 mm (m) to 3.5 mm (m) adapter
  - 85052-60001 3.5 mm (m) to 3.5 mm (f) lowband Ecal module
  - 85052-60002 3.5 mm (m) to 3.5 mm (f) highband Ecal module
  - **Option 00M** substitutes:
    - 85052-60003 3.5 mm (m) to 3.5 mm (m) lowband Ecal module
    - 85052-60004 3.5 mm (m) to 3.5 mm (m) highband Ecal module
  - **Option 00F** substitutes:
    - 85052-60005 3.5 mm (f) to 3.5 mm (f) lowband Ecal module
    - 85052-60006 3.5 mm (f) to 3.5 mm (f) highband Ecal module
  - **Option 001** adds lowband electronic calibration (Ecal) module: 0.045 to 2 GHz
- **HP 85060C** electronic calibration (Ecal) control unit<sup>7</sup>

### Verification Kits

- **HP 85053B** 0.045 to 26.5 GHz
  - **Option 1BP** MIL-STD 45662A calibration certificate with test data

### Cables for either HP 8719D or 8720D

- **HP 85131C** single, semi-rigid: 3.5 mm to 3.5 mm, 81 cm, 32-inches
- **HP 85131D** set, semi-rigid: 3.5 mm to 3.5 mm, 53 cm each, 21-inches
- **HP 85131E** single, flexible: 3.5 mm to 3.5 mm, 81 cm, 32-inches
- **HP 85131F** set, flexible: 3.5 mm to 3.5 mm, 53 cm each, 21-inches

### Cables for the HP 8722D

- **HP 85134C** single, semi-rigid: 3.5 mm to 2.4 mm, 81 cm, 32 inches
- **HP 85134D** set, semi-rigid: 3.5 mm to 2.4 mm, 53 cm each, 21 inches
- **HP 85134E** single, flexible: 3.5 mm to 2.4 mm, 81 cm, 32 inches
- **HP 85134F** set, flexible: 3.5 mm to 2.4 mm, 53 cm each, 21 inches

### Adapter Sets

- **HP 85130D** HP 8719D/20D only: 3.5 mm<sup>8</sup> to 3.5 mm
- **HP 85130F** HP 8722D only: 2.4 mm<sup>8</sup> to 3.5 mm

<sup>5</sup> Kit includes open and short circuits, fixed broadband loads, precision short air-lines, TRL adapters and 3.5 mm connector tools.

<sup>6</sup> Requires an HP 85060C electronic calibration control unit.

<sup>7</sup> Requires HP 85060 series calibration modules of the appropriate connector type.

<sup>8</sup> Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

## Measurement Accessories *(continued)*

### For Devices with 7 mm Connectors

#### Calibration Kits

- **HP 85050B** standard: 0.045 to 18 GHz. Includes:
  - 00909-60008 7 mm coax termination
  - 85050-60006 7 mm fixed broadband load
  - 85050-80007 7 mm short
  - 85050-80010 7 mm open
  - 85050-80011 7 mm sliding load
- **HP 85050C**<sup>9</sup> precision TRL: 0.045 to 18 GHz. Includes:
  - 00909-60008 7 mm coax termination
  - 85050-60003 7 mm to 7 mm airline
  - 85050-60005 7 mm to 7 mm TRL adapter
  - 85050-60006 7 mm fixed broadband load
  - 85050-80007 pin collet assembly
  - 85050-80008 7 mm short
  - 85050-80009 7 mm short collet
  - 85050-80010 7 mm open
- **HP 85050D** economy: 0.045 to 18 GHz. Includes:
  - 85050-60006 7 mm fixed broadband load
  - 85050-80007 7 mm short
  - 85050-80010 7 mm open
- **HP 85031B** economy: 30 kHz to 6 GHz. Includes:
  - 00909-60008 7 mm coax termination
  - 85050-60001 7 mm open/short
- **HP 85060A**<sup>10</sup> electronic calibration (ECal) module: 1 to 18 GHz. Includes:
  - 85060-60002 7 mm highband Ecal module
    - **Option 001** adds:
      - 85060-60001 7 mm lowband Ecal module: 0.045 to 2 GHz
- **HP 85060C** electronic calibration (ECal) control unit<sup>11</sup>

#### Verification Kit

- **HP 85051B** HP 8719D/20D only: 0.045 to 18 GHz
  - **Option 1BP**MIL-STD 45662A calibration certificate with test data

#### Cables for either HP 8719D or 8720D

- **HP 85132C** single, semi-rigid: 7 mm to 3.5 mm, 81 cm, 32 inches
- **HP 85132D** set, semi-rigid: 7 mm to 3.5 mm, 53 cm each, 21 inches
- **HP 85132E** single, flexible: 7 mm to 3.5 mm, 81 cm, 32 inches
- **HP 85132F** set, flexible: 7 mm to 3.5 mm, 53 cm each, 21 inches

#### Cables for the HP 8722D

- **HP 85135C** single, semi-rigid: 7 mm to 2.4 mm, 81 cm, 32 inches
- **HP 85135D** set, semi-rigid: 7 mm to 2.4 mm, 53 cm each, 21 inches
- **HP 85135E** single, flexible: 7 mm to 2.4 mm, 81 cm, 32 inches
- **HP 85135F** set, flexible: 7 mm to 2.4 mm, 53 cm each, 21 inches

#### Adapter Sets

- **HP 85130B** HP 8719D/20D only: 3.5 mm<sup>12</sup> to 7 mm
- **HP 85130E** HP 8722D only: 2.4 mm<sup>12</sup> to 7 mm

<sup>9</sup> Kit includes open and short circuits, fixed loads, precision short airline, 7 mm connector tools and gages.

<sup>10</sup> Requires an HP 85060C electronic calibration control unit.

<sup>11</sup> Requires HP 85060 series calibration modules of the appropriate connector type.

<sup>12</sup> Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

## For Devices with Type-N Connectors

### Calibration Kits

- **HP 85054B** standard: 0.045 to 18 GHz. Includes:
  - 00909-60011 type-N (m) fixed lowband load
  - 00909-60012 type-N (f) fixed lowband load
  - 85054-60025 type-N (m) short
  - 85054-60026 type-N (f) short
  - 85054-60027 type-N (m) open
  - 85054-60028 type-N (f) open
  - 85054-60031 type-N (f) to 7 mm adapter
  - 85054-60032 type-N (m) to 7 mm adapter
  - 85054-60037 type-N (f) to type-N (f) adapter
  - 85054-60038 type-N (m) to type-N (m) adapter
- **HP 85054B Option K11** PSC-N slotless contact repair kit
- **HP 85054D** economy: 0.045 to 18 GHz. Includes:
  - 85054-60025 type-N (m) short
  - 85054-60026 type-N (f) short
  - 85054-60027 type-N (m) open
  - 85054-60028 type-N (f) open
  - 85054-60031 type-N (f) to 7 mm adapter
  - 85054-60032 type-N (m) to 7 mm adapter
  - 85054-60037 type-N (f) to type-N (f) adapter
  - 85054-60038 type-N (m) to type-N (m) adapter
  - 85054-60046 type-N (m) fixed load
  - 85054-60047 type-N (f) fixed load
- **HP 85036B** 75 ohm: DC to 3 GHz. Includes:
  - 00909-60019 type-N (m) fixed 75 ohm load
  - 00909-60020 type-N (f) fixed 75 ohm load
  - 85032-20001 type-N (f) open
  - 85032-20007 type-N (m) open
  - 85032-20011 type-N (f) 75 ohm short
  - 85032-20012 type-N (m) 75 ohm short
  - 85032-20013 type-N (m) to type-N (m) 75 ohm adapter
  - 85032-20014 type-N (f) to type-N (f) 75 ohm adapter
  - 85032-20015 type-N (m) to type-N (f) 75 ohm adapter
- **HP 85036E** 75 ohm: type-N. Includes:
  - 00909-60019 type-N (m) fixed 75 ohm load
  - 85036-60016 type-N (m) fixed 75 ohm open/short
- **HP 85064A**<sup>13</sup> electronic calibration (ECal) module: 1 to 18 GHz. Includes:
  - **Option 001** adds lowband ECal module: 0.045 to 2 GHz
  - **Option 00F** changes connectors to f-f
  - **Option 00M** changes connectors to m-m
- **HP 85060C** electronic calibration (ECal) control unit<sup>14</sup>

### Verification Kit

- **HP 85055A** HP 8719D/8720D only: 0.045 to 18 GHz
  - **Option 1BPMIL-STD 45662A** calibration certificate with test data

### Cables<sup>15</sup>

See 7 mm connector section

### Adapter Set

- **HP 85130C** HP 8719D/20D only: 3.5 mm<sup>12</sup> to type-N

<sup>13</sup> Requires an HP 85060C electronic calibration control unit.

<sup>14</sup> Requires HP 85060 series calibration modules of the appropriate connector type.

<sup>15</sup> Use the test port return cables recommended for devices with 7 mm connectors, and 7 mm to type-N adapters that are from the HP 85054B/D type-N calibration kit.

## Measurement Accessories *(continued)*

### For Devices with 2.4 mm Connectors

#### Calibration Kits

- **HP 85056A** standard: 0.045 to 50 GHz. Includes:
  - 00901-60003 2.4 mm (m) fixed broadband load
  - 00901-60004 2.4 mm (f) fixed broadband load
  - 00915-60003 2.4 mm (m) sliding load
  - 00915-60004 2.4 mm (f) sliding load
  - 85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
  - 85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
  - 85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
  - 85056-60020 2.4 mm (m) short
  - 85056-60021 2.4 mm (f) short
  - 85056-60022 2.4 mm (m) open
  - 85056-60023 2.4 mm (f) open
- **HP 85056D** economy: 0.045 to 50 GHz. Includes:
  - 00901-60003 2.4 mm (m) fixed broadband load
  - 00901-60004 2.4 mm (f) fixed broadband load
  - 85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
  - 85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
  - 85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
  - 85056-60020 2.4 mm (m) short
  - 85056-60021 2.4 mm (f) short
  - 85056-60022 2.4 mm (m) open
  - 85056-60023 2.4 mm (f) open

#### Verification Kit

- **HP 85057B** HP 8722D only: 0.045 to 50 GHz
  - **Option 1BPMIL-STD 45662A** calibration certificate with test data

#### Cables for the HP 8722D

- **HP 85133C** single, semi-rigid: 2.4 mm, 81 cm, 32 inches
- **HP 85133D** set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
- **HP 85133E** single, flexible: 2.4 mm, 81 cm, 32 inches
- **HP 85133F** set, flexible: 2.4 mm, 53 cm each, 21 inches

#### Adapter Set

- **HP 85130G** HP 8722D only: 2.4 mm<sup>16</sup> to 2.4 mm

## For Devices with K Connectors® (2.92 mm)

### Calibration Kit

- **HP 85056K**<sup>17</sup> economy, 2.92/2.4 mm: 0.045 to 40 GHz. Includes:
  - 00901-60003 2.4 mm (m) fixed broadband load
  - 00901-60004 2.4 mm (f) fixed broadband load
  - 00915-60003 2.4 mm (m) sliding load
  - 00915-60004 2.4 mm (f) sliding load
  - 11904-60001 2.4 mm (m) to 2.92 mm (m) adapter
  - 11904-60002 2.4 mm (f) to 2.92 mm (f) adapter
  - 11904-60003 2.4 mm (m) to 2.92 mm (f) adapter
  - 11904-60004 2.4 mm (f) to 2.92 mm (m) adapter
  - 85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
  - 85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
  - 85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
  - 85056-60020 2.4 mm (m) short
  - 85056-60021 2.4 mm (f) short
  - 85056-60022 2.4 mm (m) open
  - 85056-60023 2.4 mm (f) open
- **Option 001** adds 2.4 mm sliding loads and gages

### Cables<sup>18</sup>

- **HP 85133C** single, semi-rigid: 2.4 mm, 81 cm, 32 inches
- **HP 85133D** set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
- **HP 85133E** single, flexible: 2.4 mm, 81 cm, 32 inches
- **HP 85133F** set, flexible: 2.4 mm, 53 cm each, 21 inches

### Adapters

- **HP 11904A** 2.4 mm<sup>16</sup> to K (m)
- **HP 11904B** 2.4 mm<sup>16</sup> to K (f)
- **HP 11904C** 2.4 mm<sup>16</sup> to K (f)
- **HP 11904D** 2.4 mm<sup>16</sup> to K (m)
- **HP 11904S** 2.4 mm<sup>16</sup> to K adapter set

<sup>16</sup> Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

<sup>17</sup> This kit can be used to calibrate in the 2.4 mm interface, as well as measure in the 2.92 mm (K connector).

<sup>18</sup> 2.4 mm to K type adapters are required in addition to these cables.

## For Devices with Waveguide

### X-Band

- ❑ **HP X11644A** calibration kit (standard, WR-90, 8.2 to 12.4 GHz). Includes:
  - 00896-60008 X-band standard section
  - 00910-60003 X-band termination
  - 11644-20018 X-band short
  - 11644-20021 X-band shim (open)
  - X281C waveguide to 7 mm coax adapter
- ❑ **HP 8719D/20D, HP 85132F** cable set (set, flexible, 7 to 3.5 mm, 53 cm each, 21 inches)
- ❑ **HP 8722D, HP 85135F** cable set (set, flexible, 7 to 2.4 mm, 53 cm each, 21 inches)
- ❑ **HP X281C** adapter (included in calibration kit): WR-90 to 7 mm

### P Band

- ❑ **HP P11644A** calibration kit (standard, WR-62, 12.4 to 18 GHz). Includes:
  - 00896-60007 P-band standard section
  - 00910-60002 P-band termination
  - 11644-20017 P-band short
  - 11644-20020 P-band shim (open)
  - P281C waveguide to 7 mm coax adapter
- ❑ **HP 8719D/20D, HP 85132F** cable set (flexible, 7 to 3.5 mm, 53 cm each, 21 inches)
- ❑ **HP 8722D, HP 85135F** cable set (flexible, 7 to 2.4 mm, 53 cm each, 21 inches)
- ❑ **HP P281C** adapter (included in calibration kit): WR-62 to 7 mm

### K Band

- ❑ **HP K11644A** calibration kit (standard, WR-42, 18 to 26.5 GHz). Includes:
  - 00896-60006 K-band standard section
  - 00910-60001 K-band termination
  - 11644-20016 K-band short
  - 11644-20019 K-band shim (open)
  - K281C waveguide to 3.5 mm (f) coax adapter
- ❑ **HP 8719D/20D, HP 85131F** cable set (set, flexible, 3.5 to 3.5 mm, 53 cm each, 21 inches)
- ❑ **HP 8722D, HP 85134F** cable set (set, flexible, 3.5 to 2.4 mm, 53 cm each, 21 inches)
- ❑ **HP K281C** adapter (included in calibration kit): WR-42 to 3.5 mm (f)
  - ❑ **Option 012** WR-42 to 3.5 mm (m)

### R Band

- ❑ **HP R11644A** calibration kit (standard, WR-28, 26.5-40 GHz). Includes:
  - 00914-60028 R-band termination
  - 11644-20005 R-band short
  - 11644-20003 R-band shim (open)
  - 11644-60001 R-band 10 cm straight waveguide
  - 11644-60016 R-band 5 cm straight waveguide
- ❑ **HP 8722D, HP 85133F** cable set (set, flexible, 2.4 mm, 53 cm each, 21 inches)
- ❑ **HP R281A** adapter (2.4 mm (f) to WR-28 waveguide adapter)
- ❑ **HP R281B** adapter (2.4 mm (m) to WR-28 waveguide adapter)

## Test Configuration Accessories

### Power Meters<sup>19</sup>

- HP 437B** digital average
- HP 438A** dual channel

### Power Sensors

- HP 8481B** 10 MHz to 18 GHz, type-N (m), 25 watt
- HP 8482B** 100 kHz to 4.2 GHz, type-N (m), 25 watt
- HP 8485A** 50 MHz to 26.5 GHz, APC-3.5 mm (m), 100 mW
- HP 8481A** 10 MHz to 18 GHz, type-N (m), 100 mW
- HP 8482A** 100 kHz to 4.2 GHz, type-N (m), 100 mW
- HP 8483A** 100 kHz to 2 GHz, type-N (m), 75 ohm, 100 mW
- HP R8486A** 26 GHz to 40 GHz, waveguide flange UG-599/U, 100 mW
- HP 8487A** 50 MHz to 50 GHz, 2.4 mm (m), 100 mW

### Power Amplifiers<sup>20</sup>

- HP 83006A** 0.01 to 26.5 GHz, 20 dB gain, power out:  
+18 dBm to 10 GHz or +16 dBm to 20 GHz or +14 dBm to 26.5 GHz
- HP 83017A** 0.05 to 26.5 GHz, 25 dB gain, power out:  
+20 dBm to 20 GHz or +15 dBm to 26.5 GHz
- HP 83018A** 2 to 26.5 GHz, 27 dB gain to 20 GHz or 23 dB to  
26.5 GHz, power out: +24 dBm to 20GHz or +21 dBm to 26.5 GHz
- HP 83020A** 2 to 26.5 GHz, 30 dB gain to 20 GHz or 27 dB to  
26.5 GHz, power out: +30 dBm to 20 GHz or +26 dBm to 26.5 GHz
- HP 83050A** 2 to 50 GHz, 21 dB gain, power out:  
+20 dBm to 40 GHz or +17 dBm to 50 GHz
- HP 83051A** pre-amplifier, 0.045 to 50 GHz, 23 dB gain, power out:  
+12 dBm to 45 GHz or +10 dBm to 50 GHz

### Couplers

- HP 87300B** coaxial: 1 to 20 GHz, SMA (f), 10 dB coupling
- HP 87300C** coaxial: 1 to 26.5 GHz, 3.5 mm (f), 13 dB coupling
- HP 87301D** coaxial: 1 to 40 GHz, 2.4 mm (f) or optional  
2.92 mm (f), 13 dB coupling
- HP 87310B** coaxial: 1 to 18 GHz, SMA (f), 3 dB coupling
- HP 87310B** Option 020 coaxial: 1 to 26.5 GHz, SMA (f), 20 dB coupling
- HP 87301E** coaxial: 2 to 50 GHz, 2.4 mm (f), 10 dB coupling

### Test Fixtures

For TRL/LRM and TOSL calibration standards, microstrip adapters, and test fixtures, HP recommends ICM<sup>21</sup> Adjustable Test Fixture Mainframe Series-TF-3000, which is compatible with the ICM TRL-3000 Series Calibration Kits.

- HP 85041A** transistor test fixture: 45 MHz to 18 GHz<sup>22</sup>
- HP 11608A** transistor fixture: DC to 12.4 GHz

<sup>19</sup> A power meter with the appropriate HP 8480-series power sensor is required for use with the power meter calibration feature.

<sup>20</sup> RF connectors: 3.5 mm (f) on RF input and output; BNC (f) detector out 2.4 mm (f) on RF input and output for HP 85050A, 83051A.

<sup>21</sup> Inter-Continental Microwave, 1515 Wyatt Drive, Santa Clara, CA 95054-1524, Telephone: (408) 727-1596 Fax: (408) 727-0105

<sup>22</sup> Must use with HP 85014C active device measurement software. Includes inserts for 0.070 inch and 0.100 inch stripline packaged transistors. Also order appropriate 7 mm calibration kit and cables.

## Bias Supplies<sup>23</sup>

- ❑ **HP 6626A** precision DC power supply; 2 A, 50 V maximum
- ❑ **HP 6629A** quad-out precision HP-IB DC power supply
- ❑ **HP 14852A** bias interconnect cable
- ❑ **HP 4142B** modular DC source/monitor; 10 A, 200 V maximum

## Bias Networks<sup>24</sup>

- ❑ **HP 11590B** 100 MHz to 12.4 GHz, type-N, 0.5 A and 100 V maximum bias
  - ❑ **Option 001** 100 MHz to 18 GHz, 7 mm, 0.5 A and 100 V maximum bias
- ❑ **HP 11612A** 45 MHz to 26.5 GHz, 3.5 mm (f), 0.5 A and 40 V maximum bias
  - ❑ **Option 001** 2 A maximum bias
- ❑ **HP 11612B** 45 MHz to 50 GHz, 2.4 mm (f), 0.5 A maximum bias

## System Software

- ❑ **HP 85070B** high-temperature dielectric probe kit<sup>25</sup>
  - ❑ Option 300 HP BASIC; runs on BASIC 5.0 or higher, 3 1/2-inch disk
- ❑ **HP 85071B** materials measurement software<sup>26</sup> (MS-DOS<sup>®</sup>)
  - ❑ Option 300 HP BASIC; runs on BASIC 5.0 or higher, 3 1/2-inch disk
- ❑ **HP 85014C** active device measurement software<sup>27</sup>
- ❑ **HP 85190A** IC-CAP modeling suite<sup>28</sup>
- ❑ **Design Software**, HP microwave design system series (MDS) and HP series IV<sup>28</sup> connector repair kits

## Application Support

- ❑ **HP 50629A** system startup assistance; provides one-half day (4 hours) of on-site assistance for initial instrument/system startup. Includes travel charges through Zone 4.

<sup>23</sup> For internally biasing with the HP 8719D/8720D/8722D.

<sup>24</sup> For supplying DC bias externally from test sets. Internal bias networks have a current limit of 0.5 A.

<sup>25</sup> Includes the dielectric probe, software on 3.5 inch disk, cables, port/cable adapters, switch, short circuit, mounting bracket, adapters, 50-ohm termination, stand, vials, and stoppers. Measures complex permittivity of materials. Standard software version runs on PC or PC-compatible MS-DOS<sup>®</sup> 3.20 or higher and Microsoft Windows 3.0 or 3.1.

<sup>26</sup> Measures complex permeability and permittivity of materials in a transmission line environment.

<sup>27</sup> Controls biasing and data storage for FETs and BJTs. Requires BASIC 5.0 (or higher) and 2 Mbytes of RAM. (3 1/2-inch disk)

<sup>28</sup> Consult with an HP systems application engineer. The product you order will depend on the test environment.

<sup>29</sup> For a printer compatibility guide for network and spectrum analyzers, contact your HP representative.

<sup>30</sup> This printer will also accept plot files.

<sup>31</sup> LaserJet II and IV can also accept plot files.

<sup>32</sup> The analyzer can accept most PC-AT-compatible keyboards with a standard DIN connector. Keyboards with a mini-DIN connector are compatible with the HP C1405-60015 adapter.

<sup>33</sup> Rack is 123.7 cm (48.7 inches) high x 60 cm (23.6 inches) wide x 80 cm (31.5 inches) deep. Supplied with anti-static mat, support rails, rack mounting kits, power distribution, and two HP 10833A HP-IB cables.

<sup>34</sup> The HP 8719D/8720D/8722D is supplied with handles.

## Peripheral Accessories

### Printers<sup>29</sup>

- HP C2170A** DeskJet 520 (parallel, monochrome)
- HP C2184A** DeskJet 600 (parallel, monochrome; color-capable)
- HP C2164A** DeskJet 660C (parallel, color)
- HP C2145A** DeskJet 850C (parallel, color)
- HP C3540A** DeskJet 1600C (parallel, color)<sup>30</sup>
- HP C2655A** DeskJet Portable 340 (parallel, monochrome; color-capable)
- HP C3150A** LaserJet 5P (parallel, monochrome)<sup>31</sup>

### Interface Cables

- HP 10833A** HP-IB cable: 1.0 m (3.3 ft.)
- HP 10833B** HP-IB cable: 2.0 m (6.6 ft.)
- HP 10833D** HP-IB cable: 0.5 m (1.6 ft.)
- HP C2913A** RS-232C interface cable: 1.2 m (3.9 ft.)
- HP C2914A** serial interface cable: 1.2 m (3.9 ft.)
- HP 24542G** RS232C F/M cable: 3 m (9.9 ft.)
- HP 24542D** RS-232C interface cable: 3 m (9.9 ft.)

### Keyboard<sup>32</sup>

- HP C1405B** Option ABA keyboard, also order adapter HP C1405-60015

### Equipment Racks

- HP 85043D** system rack kit.<sup>33</sup> Also order the following:
  - HP 40104A** 7-inch filler panel
  - HP 5063-9223** rack mount flange kit, for use with handles; includes handles<sup>34</sup>
  - HP 5063-9236** rack mount kit, for use with handles; does not include handles. May be ordered as Option 1CP.
  - HP 5063-9216** rack mount kit, for use without handles. May be ordered as Option 1CM.
  - HP 5063-9229** front handle kit; includes handles only<sup>34</sup>
  - HP 1181A** system testmobile, 3 ft. tall (see HP literature number 5091-1233E)
  - HP 1540-1695** operating case
  - HP 9211-2657** transit case

### Computers

- Any computer configured with an HP-IB interface card and software drivers

### Monitors

- Any VGA-compatible monitor

## Upgrades

### Network Analyzer Upgrade Kits

- **HP 8719DU** plus the upgrade option designations below for the HP 8719D
- **HP 8720DU** plus the upgrade option designations below for the HP 8720D
- **HP 8722DU** plus the upgrade option designations below for the HP 8722D

### Upgrade Kit Options

- **007** adds mechanical S-parameter transfer switch. Includes installation by HP service engineer at service center.
- **010** adds time domain capability. Includes installation by HP service engineer at customer site or service center.
- **012** modifies S-parameter test set for direct sampler access. Front panel jumpers also allow standard instrument operation. Includes installation by HP service engineer at service center.
- **020** for HP 8719D only. Adds 20 GHz operation. Includes installation by HP service engineer at HP service center.
- **040** for HP 8719D and 8720D only. Adds 40 GHz operation. Includes installation at HP factory.
- **085** modifies S-parameter test set for high power measurement capability. Includes installation by HP service engineer at HP service center.
- **089** modifies S-parameter test set and firmware for frequency offset mixer test capability. Includes installation by HP service engineer at HP service center.
- **1D5** adds high stability time base. Includes installation by HP service engineer at service center.
- **400** adds fourth sampler and TRL calibration firmware. Includes installation by HP service engineer at HP service center.

## Literature and Documents

	<i>Part / Literature Number</i>
□ <b>Application Note 1217-1</b> , Basics of Measuring the Dielectric Properties of Materials	5091-3300E
□ <b>Product Note 8510-8A</b> , Applying TRL Cal to Non-coaxial Measurements	5091-3645E
□ <b>Product Note: 85150-1</b> , Using Instruments with MDS	5091-1702E
□ <b>Product Note 8720-1</b> , Amplifier Measurements with the HP 8720C	5091-1942E
□ <b>Product Note 8720-2</b> , In-Fixture Measurements with the HP 8720C	5091-1943E
□ <b>Product Note 8753-3</b> , Applications of the Test Sequence Function	08753-90133
□ <b>Product Note 8753-2A</b> , Mixer Measurements using the HP 8753 Network Analyzer	5952-2771
□ <b>HP 8719D/8720D/8722D Installation and Quick Start Guide</b>	08720-90291
□ <b>HP 8719D/8720D/8722D Network Analyzer User's Guide</b>	08720-90288
□ <b>HP 8719D/8720D/8722D Network Analyzer Quick Reference Guide</b>	08720-90289
□ <b>HP 8719D/8720D/8722D Network Analyzer Programmer's Guide</b>	08720-90293
□ <b>HP 8719D/8720D/8722D Network Analyzer Service Guide</b>	08720-90292



**For more information on Hewlett-Packard Test and Measurement products, applications or services please call your local Hewlett-Packard sales offices. A current listing is available via the World-wide Web through AccessHP at <http://www.hp.com>. If you do not have access to the Internet please contact one of the HP centers listed below and they will direct you to your nearest HP representative.**

**United States:**

Hewlett-Packard Company  
Test and Measurement Organization  
5301 Stevens Creek Blvd.  
Bldg. 51L-SC  
Santa Clara, CA 95052-8059  
1 800 452 4844

**Canada:**

Hewlett-Packard Canada Ltd.  
5150 Spectrum Way  
Mississauga, Ontario  
L4W 5G1  
(905) 206 4725

**Europe:**

Hewlett-Packard  
European Marketing Centre  
P.O. Box 999  
1180 AZ Amstelveen  
The Netherlands

**Japan:**

Yokogawa-Hewlett-Packard Ltd.  
Measurement Assistance Center  
9-1, Takakura-Cho, Hachioji-Shi,  
Tokyo 192, Japan  
(81) 426 48 3860

**Latin America:**

Hewlett-Packard  
Latin American Region Headquarters  
5200 Blue Lagoon Drive, 9th Floor  
Miami, Florida 33126, U.S.A.  
(305) 267 4245/4220

**Australia/New Zealand:**

Hewlett-Packard Australia Ltd.  
31-41 Joseph Street  
Blackburn, Victoria 3130, Australia  
131 347 Ext. 2902

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