HP 8751A DESCRIPTION

The HP 8751A is a 5 Hz to 500 MHz vector network analyzer for reflection and transmission parameters. It integrates a high resolution synthesized RF source, and a dual channel and three-input receiver to measure and display magnitude, phase, and group delay responses of active and passive RF networks. Option 001 provides a high stability frequency reference. For information on other options, refer to "OPTIONS AVAILABLE" later in this section.

Two independent display channels and a large screen color CRT display the measured results of one or both channels, in rectangular or polar/Smith chart formats. The display function has capability to display three trace simultaneously.

Digital signal processing and microprocessor control combine to provide easy operation and measurement improvement. Measurement functions are selected with front panel keys and softkey menus. Displayed measurement results can be printed or plotted directly with a compatible peripheral without the use of an external computer. A built-in micro flexible disk drive stores and recalls instrument states and trace data (measurement data). Built-in service diagnostics are available to simplify troubleshooting procedures.

Trace math, data averaging, trace smoothing, electrical delay, and accuracy enhancement provide performance improvement and flexibility. Accuracy enhancement methods range from normalizing data to complete one or two port vector error correction. Vector error correction reduces the effects of system directivity, frequency response, source and load match, and crosstalk.

In combination with its compatible test sets and accessories, the analyzer has the ability to make complete reflection and transmission measurements in both 50 and 75 Ω impedance environments.

Additional Features

In addition to the above capabilities, this analyzer has several features:

Advanced List Sweep Mode

The analyzer can measure specifically at user defined frequencies, power levels, IF bandwidths, and number of points as defined in List Segment. The list sweep mode can make the display resolution even, even though the frequency points are not evenly distributed, as well as making the frequency base display even.

Automatic Sweep Time

The analyzer can automatically shorten sweep time as much as possible for the given IF bandwidth, number of points, averaging mode, frequency range, and sweep type.

Automatic Interpolated Error Correction

This allows the operator to perform any type of calibration, and then display any subset of that frequency range or use a different number of points. If the operator changes the stimulus parameter, the analyzer turns the interpolated error correction on, and new error coefficients are interpolated from the coefficients of the original calibration. Interpolated error correction provides a great improvement over uncorrected measurements, but is not specified. Refer to *Chapter 7*.

Conjugate Matching

This calculates the optimum parameters of devices in assumed two element L-C impedance matching networks at a DUT end to obtain optimum power transfer at a specific frequency. Several types of the assumed matching circuit will be selected automatically from among the eight provided candidates depending on the DUT's characteristics.

The operator can simulate the circuit after modifying the parameters to suit to commercially available values.

Four Trace Simultaneous Measurement

The analyzer can measure and display two traces for one channel, which allows four traces simultaneous display using the dual channel display capability. In addition, stimulus values (frequency, power) can range independently for each channel.

HP Instrument BASIC (Option 002)

This allows analyzer programmability without any external controller. HP Instrument BASIC is a subset of HP BASIC and allows all of the analyzer's measurement capabilities and any other HP-IB compatible instrument to be programmed. (Refer to *Using HP Instrument BASIC with the HP 8751A*.)

I/O port

This allows the creation of a production line measurement system when used with an automatic handler. Refer to Appendix C for more information.

Waveform Analysis Commands

The waveform analysis function provides filter and resonator specific measurement commands. These commands can be used to analyze filter ripple, obtain filter parameters (for example 3 dB bandwidth), or to search for a resonator's series-resonant mode frequency and its parallel-resonant mode (antiresonant) frequency. Executing a command derives parameters from measurement results and returns the derived parameters by HP-IB. An external controller or HP Instrument BASIC (Option 002) is required to use this command set. These commands cannot be executed from the front panel.

System Description

An HP 8751A system consists of the analyzer with one of the following test sets/accessories:

- HP 87511A,B S-parameter test set
- HP 87512A,B transmission/reflection test kit
- HP 11850C,D or 11667A power splitter

In addition to one of the above, a system requires a compatible Hewlett-Packard calibration kit and the necessary cables. The compatible test sets, power splitters, calibration kits, and cables are described under "TEST SETS REQUIRED" and "MEASUREMENT ACCESSORIES AVAILABLE" later in this section.

The system may also include other compatible peripherals such as a printer or plotter. The printer and plotter are described under "SYSTEM ACCESSORIES AVAILABLE" .

Options Available

The system can be automated with the addition of an HP 9000 series 200 or 300 computer, this allows all of the measurement capabilities to be programmed over the Hewlett-Packard Interface Bus (HP-IB).

HEWLETT-PACKARD INTERFACE BUS (HP-IB)

The analyzer is factory-equipped with a remote programming interface using the Hewlett-Packard Interface Bus (HP-IB). HP-IB is Hewlett-Packard's hardware, software, documentation, and support for IEEE-488.1, IEEE-488.2, IEC-625, and JIS-C1901 worldwide standards for interfacing instruments. This provides a remote operator with the same control of the instrument available to the local operator, except for control of the power line switch and some internal tests. Remote control is maintained by a controlling computer that sends commands or instructions to and receives data from the analyzer using HP-IB. Several output modes are available for output data. A complete general description of HP-IB is available in *Condensed description of the Hewlett-Packard Interface Bus* (HP part number 59401-90030), and in *the Tutorial Description of the Hewlett-Packard Interface Bus* (HP literature number 5952-0156).

The analyzer itself can use HP-IB to output measurement results directly to a compatible printer or plotter without the use of an external computer.

OPTIONS AVAILABLE

Option 001, High Stability Frequency Reference

This option, a 10 MHz crystal in temperature stabilized oven, improves the source signal frequency accuracy and stability.

Option 002, HP Instrument BASIC

See the previous section for information.

Option 008, Add Japanese Manual Set

Option 009, Delete Manual Set

Option 907, Front Handle Kit

Option 908, Rack Mount Kit

This option is a rack mount kit containing a pair of flanges and the necessary hardware to mount the instrument, with handles detached, in an equipment rack with 482.6 mm (19 inches) horizontal spacing.

Option 909, Rack Mount Flange and Handle Kit

This option is a rack mount kit containing a pair of flanges and the necessary hardware to mount the instrument with handles attached in an equipment rack with 482.6 mm (19 inches) horizontal spacing.)

Option 910, Extra Manual Set

This option is an extra manual set containing the same manual set which is furnished with the analyzer.

Option 915, Add Service Manual (HP Part Number: 08751-90031)

TEST SETS REQUIRED

HP 87511A,B S-Parameter Test Sets

These contain the hardware required to make simultaneous transmission and reflection measurement in both the forward and reverse directions for system impedances of 50 or 75 Ω. An RF switch in the set is controlled by the analyzer so that reverse measurement can be made without changing the connections to the device under test.

HP 87512A,B Transmission/Reflection Test Kits

These contain the hardware required to make simultaneous transmission and reflection measurement in one direction only for system impedances of 50 or 75 Ω.

Other Test Sets Available

HP 85046A,B S-parameter Test Sets

These measure the response of devices from 300 kHz to 500 MHz with the HP 8751A. These contain two internal DC bias tees for biasing of active devices.

HP 85044A,B Transmission/Reflection Test Sets

These measure the response of devices from 300 kHz to 500 MHz with the HP 8751A. These include a 0 to 70 dB step attenuator manually controllable in 10 steps, and the circuitry necessary to allow biasing of active devices through the test set.

MEASUREMENT ACCESSORIES AVAILABLE

Power Splitters

HP 11850C,D Three-Way Power Splitters

These are four-port, three-way power splitters. One output is used as the reference for the network analyzer in making ratio measurements and the other two output arms are test channels. The HP 11850C has a frequency range of DC to 3 GHz and an impedance of 50 Ω the HP 11850D has a frequency range of DC to 2 GHz and an impedance of 75 Ω. Three HP 11852B 50 to 75 Ω minimum loss pads are supplied with the HP 11850D power splitter, to provide a low SWR impedance match between the power splitter and the 50 Ω ports of the network analyzer.

HP 11667A Power Splitter

This is a two-way power splitter with one output arm used for reference and one for test. It has a frequency range of DC to 18 GHz and an impedance of 50 Ω.

Active Probes

HP 41800A Active Probe

This is a high input impedance probe for in-circuit measurement which covers the same frequency range as the HP 8751A.

HP 41802A 1 MΩ Input Adapter

This adapter allows use of a high impedance probe. It has a frequency range of 5 Hz to 100 MHz.

Calibration Kits

The following calibration kits contain precision standards (and required adapters) of the indicated connector type. The standards (known devices) facilitate measurement calibration, also called vector error correction. Refer to the data sheet and ordering guide for additional information. Part numbers for the standards are in their respective manuals.

- HP 85031B 7 mm Calibration Kit
- HP 85032B 50 Ω Type-N Calibration Kit
- HP 85036B 75 Ω Type-N Calibration Kit

Test Port Return Cables

The following RF cables are used to return the transmitted signal to the test set in measurement of two-port devices. These cables provide shielding for high dynamic range measurements.

HP 11857D 7 mm Test Port Return cable Set

These are a pair of test port return cables for use with the HP 87511A or HP 85046A S-parameter test sets. The cables can be used in measurements of devices with connectors other than 7 mm by using the appropriate precision adapters.

HP 11857B 75 Ω Type-N Test Port Return Cable Set

These are a pair of test port return cables for use with the HP 87511B or HP 85046B S-parameter test sets.

HP 11851B 50 Ω Type-N RF Cable Set

This kit contains the three phase-matched 50 Ω type-N cables necessary to connect the HP 87512A,B or HP 85044A,B transmission/reflection test kit or a power splitter to the analyzer, as well as an RF cable to return the transmitted signal of a two-port device to the network analyzer. For use with the HP 87512B or HP 85044B test kit, the HP 11852B 50 Ω to 75 Ω minimum loss pad supplied with the test kit must be used for impedance matching with the RF return cable.

Adapter Kits

HP 11852B 50 Ω to 75 Ω Minimum Loss Pad

This device converts impedance from 50 Ω to 75 Ω or from 75 Ω to 50 Ω. It is used to provide a low SWR impedance match between a 75 Ω device under test and the HP 8751A network analyzer or a 50 Ω measurement accessory. An HP 11852B pad is included with the HP 87512B and HP 85044B 75 Ω transmission/reflection test kit. Three HP 11852B pads are included with the HP 11850D 75 Ω power splitter.

These adapter kits contain the connection hardware required for making measurements on devices of the indicated connector type.

- HP 11853A 50 Ω Type-N Adapter Kit
- HP 11854A 50 Ω BNC Adapter Kit
- HP 11855A 75 Ω Type-N Adapter Kit
- HP 11856A 75 Ω BNC Adapter Kit

SYSTEM ACCESSORIES AVAILABLE

System Rack

The HP 85043B system rack is a 124 cm (49 inch) high metal cabinet designed to rack mount the analyzer in a system configuration. The rack is equipped with a large built-in work surface, a drawer for calibration kits and other hardware, a bookshelf for system manuals, and a locking rear door for secured access. Lightweight steel instrument support rails support the instrument along their entire depth. Heavy-duty casters make the cabinet easily movable even with the instruments in place. Screw-down lock feet permit leveling and semi-permanent installation: the cabinet is extremely stable when the lock feet are down. Power is supplied to the cabinet through a heavy-duty grounded primary power cable, and to the individual instruments through special power cables included with the cabinet.

Plotters and Printers

The HP 8751A is capable of plotting displayed measurement results directly to a compatible peripheral without the use of an external computer. The Compatible plotters are:

- HP 7440A Option 002 ColorPro Eight-Pen Color Graphics Plotter, plots on ISO A4 or 8 1/2 × 11 inch charts.
- HP 7475A Option 002 Six-Pen Graphics Plotter, plots on ISO A4/A3 or 8 1/2 × 11 inch or 11 × 17 inch charts.
- HP 7550B Option 002 High-Speed Eight-Pen Graphics Plotter, plots on ISO A4/A3 or 8 1/2 × 11 inch or 11 × 17 inch charts.

The compatible printers for both printing and plotting are:

- HP 3630A Paintjet Option 002 color printer
- HP 2225A (HP-IB compatible) ThinkJet printer
- HP 2227B QuietJet Option 002 printer

HP-IB Cables

An HP-IB cable is required for interfacing the analyzer with a plotter, printer, computer, or other external instrument. The cables available are HP 10833A (1 m), HP 10833B (2 m), and HP 10833D (0.5 m).

Computer

An external controller is not required for measurement calibration. However, the system can be automated with the addition of HP Instrument BASIC (Option 002) or the HP 9000 200,300 series computer.

Disks and Disk Accessories

Hewlett-Packard disks are listed below.

Table 1-1. Disks and Disk Accessories

HP Parts Number	Description
92192A	Box of 10 3.5 inch, 720K byte microfloppy disks
92192N	Box of 100 3.5 inch, 720K byte microfloppy disks
92192X	Box of 10 3.5 inch, 1.44M byte microfloppy disks
92191R	Rosewood roll-top disk holder. Holds 50 disks.
92191Q	Acrylic lift-top disk holder. Holds 25 disks.
92191T	Bookshelf-style folding plastic disk holder. Holds 10 disks.
92191H	Disk Library binder. Holds 20 disks initially.

External Monitors

The analyzer can drive both its internal CRT and an external monitor simultaneously. One recommended color monitor is the HP 35741A,B. A monochrome monitor, such as the HP 35731A,B, may also be used if the analyzer is operated in the monochrome mode.

RECOMMENDED TEST EQUIPMENT

Equipment required to test, adjust, and the system is listed in the beginning of the *Maintenance Manual* and the *Service Manual*. Other equipment may be substituted if it meets or exceeds the listed critical specifications.

2

Instrument Specifications

These specifications are the performance standards or limits against which the instrument is tested. When shipped from the factory, the HP 8751A meets the specifications listed in this section. The specification test procedures are covered in *HP 8751A Maintenance Manual.*

Supplement characteristics are intended to provide information that is useful in applying the instrument by giving non-warranted performance parameters. These are denoted as "Typical", "Typ." or "Nominal".

SOURCE

Frequency Characteristics

Range ..... 5 Hz to 500 MHz
Accuracy
  at 23 ± 5°C ..... ±(20 ppm + 1 mHz)
  at 0 to 55°C (with Opt. 001, 20 minutes after power on) ..... ±(1.0 ppm + 1 mHz)
Stability (at 23 ± 5°C)
  Typical ..... $\pm 5 \times 10^{-6}$/day
  Typical with Opt. 001, 48 hours after power on ..... $\pm 2.5 \times 10^{-9}$/8 hours
Resolution ..... 1 mHz

Output Power Characteristics

Range ..... −50 to +15 dBm
Resolution ..... 0.1 dB
Level Accuracy (at 23 ±5°C, 0 dBm output level, 50 MHz) ..... ± 0.5 dB
Flatness (at 23 ±5°C, 0 dBm output level relative to 50 MHz)
  5 Hz ≤ Freq. ≤ 1 MHz ..... ± 2.0 dB
  1 MHz < Freq. ≤ 300 MHz ..... ± 1.5 dB
  300 MHz < Freq. ≤ 500 MHz ..... ± 2.0 dB
Linearity (at 23 ±5°C, relative to 0 dBm output level at 50 MHz)
  Output Level ≥ −35 dBm ..... ± 0.5 dB
  Output Level < −35 dBm ..... ±1.5 dB
Impedance
  Nominal ..... 50 Ω
  Return Loss (at 0 dBm, typical) ..... > 15 dB

Spectral Purity Characteristics

Harmonics (at +10 dBm output level) ..... < −30 dBc
Non-harmonic Spurious Signals (at 0 dBm output level) ..... < −45 dBc
Phase Noise (at 20 kHz offset from 0 dBm fundamental) ..... < −75 dBc/Hz

Sweep Characteristics

Frequency Sweep

Same as the Frequency Characteristics.

Power Sweep

Maximum Span ..... 25 dB to 35 dB

Note The sweep start power is determined by the sweep stop power.

Stop Power Range	Start Power
+5 dBm to +15 dBm	≥ −20 dBm
−5 dBm to +5 dBm	≥ −30 dBm
−15 dBm to −5 dBm	≥ −40 dBm
−50 dBm to −15 dBm	≥ −50 dBm

Resolution ..... 0.1 dB
Linearity (at 23 ±5°C, Reference: Stop Power)
Start Power ≥ −45 dBm

	Span ≤ +20 dB	Span > +20 dB
CW Freq. ≤ 300 MHz	±(0.3 dB/10 dB + 0.2 dB)	±(0.3 dB/10 dB + 1.0 dB)
CW Freq. > 300 MHz	±(1.0 dB/10 dB + 0.2 dB)	±(1.0 dB/10 dB + 1.0 dB)

Start Power < −45 dBm

	Span ≤ +20 dB	Span < +20 dB
CW Freq. ≤ 300 MHz	±(0.3 dB/10 dB + 1.2 dB)	±(0.3 dB/10 dB + 2.0 dB)
CW Freq. > 300 MHz	±(1.0 dB/10 dB + 1.2 dB)	±(1.0 dB/10 dB + 2.0 dB)

Others

Reverse Power Protection ..... None (Neither AC nor DC)
Output Connector ..... Type N female, 50 Ω, Single ended

RECEIVER

Input Characteristics

Frequency Range ..... 5 Hz to 500 MHz

Impedance

Nominal ..... 50 Ω

Return Loss

	ATT = 0 dB	ATT = 20 dB
5 Hz ≤ Freq. ≤ 100 MHz	> 20 dB	> 25 dB
100 MHz < Freq. ≤ 300 MHz	> 15 dB	> 25 dB
300 MHz < Freq. ≤ 500 MHz	> 10 dB	> 20 dB

Maximum Input Level

	ATT = 0 dB	ATT = 20 dB
5 Hz ≤ Freq. ≤ 4 kHz	−26 dBm	−6 dBm
4 kHz < Freq. ≤ 10 kHz	−21 dBm	−1 dBm
10 kHz < Freq. ≤ 500 MHz	−20 dBm	0 dBm

Damage Level

DC ..... ±3 V (Typ.)

At ATT = 0 dB ..... +15 dBm (Typ.)

At ATT = 20 dB ..... +20 dBm (Typ.)

Noise Level (at 23 ±5°C)

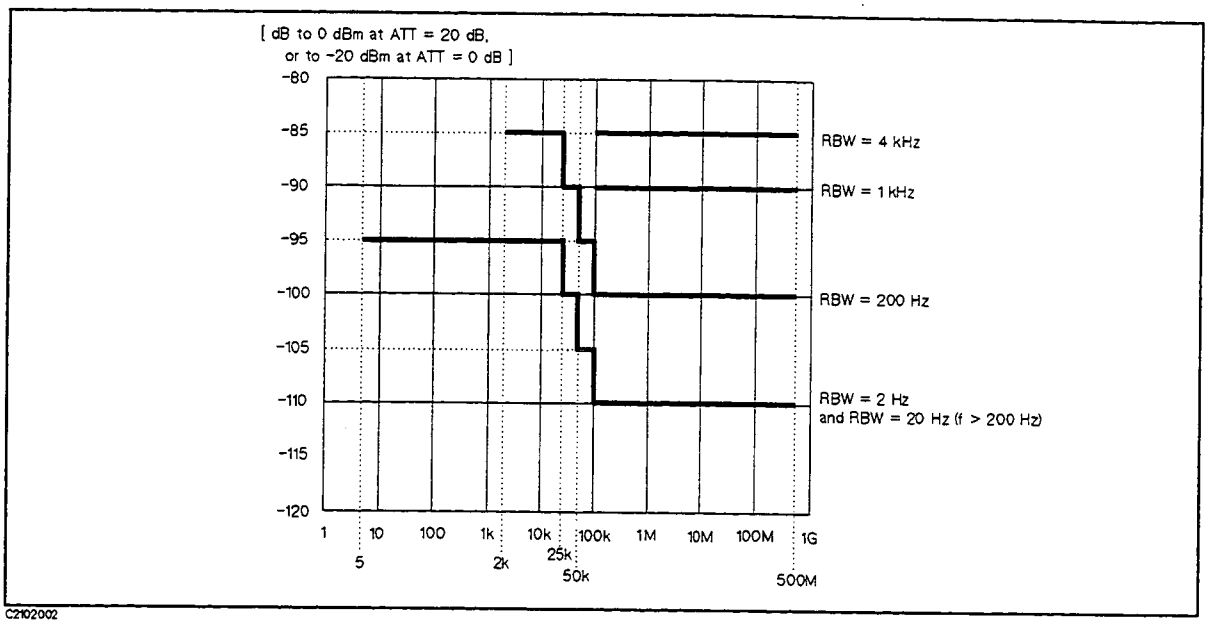


Figure 2-1. Average Noise Level on Magnitude Measurement

IF Bandwidth (IF BW) .....2 Hz, 20 Hz, 200 Hz, 1 kHz, and 4 kHz (Norminal)
Input Crosstalk (at the same ATT setting for both input ports)
Freq. < 10 kHz ..... < −95 dB
Freq. ≥ 10 kHz ..... < −100 dB
Source Crosstalk (at +15 dBm output level, ATT = 0 dB)
Freq. < 10 kHz ..... < −100 dB (Typ.)
Freq. ≥ 10 kHz ..... < −135 dB (Typ.)
Input Connector ..... Type N female, 50 Ω, single ended, 3 inputs (R, A, and B)

Magnitude Characteristics

Absolute Characteristics

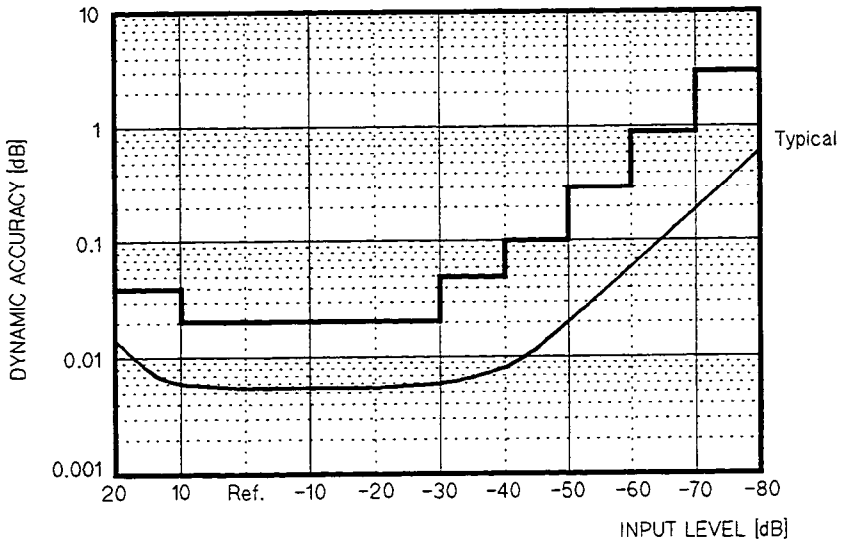
Display Range (Ref. value can be set to) ..... ±500 dBm
Display Resolution (/div can be set to) .....0.001 dB/div to 500 dB/div
Marker Resolution ..... 0.001 dB or 5 digits
Absolute Amplitude Accuracy (at 23 ±5°C, −30 dBm for ATT = 0 dB, or −10 dBm for ATT = 20 dB)
Freq. ≤ 300 MHz ..... ±1.0 dB
300 MHz < Freq. ≤ 500 MHz ..... ±1.5 dB
Residual responses (excluding line related and CRT scan related component)
At ATT = 20 dB .....−100 dB to input level 0 dBm
At ATT = 0 dB .....−100 dB to input level −20 dBm

Ratio Characteristics

Display Range (Ref. value can be set to) ..... ±500 dB
Display Resolution (/div can be set to) ..... 0.001 dB/div to 500 dB/div
Marker Resolution ..... 0.001 dB or 5 digits
Ratio Accuracy (at 23 ± 5°C, the same ATT setting for both input ports −10 dB relative to Input Range)
Freq. ≤ 100 MHz ..... ±0.5 dB
100 MHz < Freq. ≤ 300 MHz ..... ±1.0 dB
300 MHz < Freq. ≤ 500 MHz ..... ±1.5 dB

Note Frequency response can be corrected by the calibration.

Dynamic Accuracy (At constant temperature within 23±5°C, 20 Hz bandwidth, Freq. ≥ 500 Hz)



Input Level : A/R and B/R - Rch. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)
A/B - Bch. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)
Assumption : Ref. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)

Averaging Factor:	Input Level A/R, B/R, A/R [dB]	Averaging Factor
	20 to -20	1
	-20 to -40	4
	-40 to -50	8
	-50 to -60	32
	-60 to -70	128
	-70 to -80	256

C2102007

Figure 2-2. Dynamic Accuracy (Amplitude)

Receiver

Trace Noise (at 1 kHz bandwidth, −10 dB full-scale, Freq. ≥ 100 kHz) .....< 10 mdB rms
Stability .....0.02 dB/°C (Typ.)

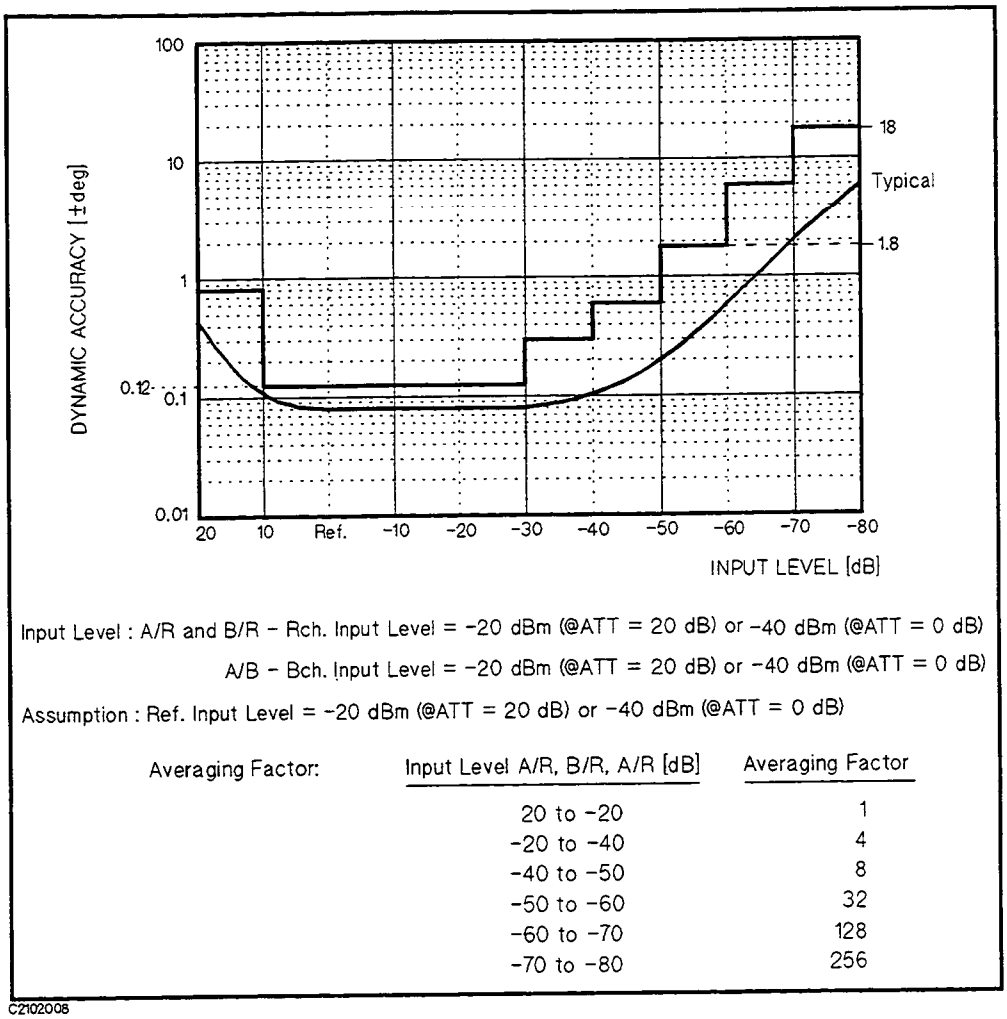
Phase Characteristics

Measurement Mode ..... Normal/Expanded
Measurement Range
Normal mode .....±100 kdeg (no radian unit available)
Expanded mode .....±5 Mdeg
Display Resolution ..... 10^{-4} deg/div to 10 kdeg/div
Marker Resolution
Normal mode .....0.01 deg. or 5 digits
Expanded mode .....5 digits
Frequency Response (at 23 ± 5°C, deviation from linear phase, input level −10 dBm (ATT = 20 dB) or −30 dBm (ATT = 0 dB), ATTs are the same setting)
Freq. ≤ 100 MHz .....±2.5 degree
100 MHz < Freq. ≤ 300 MHz .....±5.0 degree
300 MHz < Freq. ≤ 500 MHz .....±10.0 degree

Note

This specification is only for the deviation from linear phase. Frequency response can be corrected by calibration.

Dynamic Accuracy (At constant temperature within 23±5°C, 20 Hz bandwidth, Freq. ≥ 500 Hz)



Input Level : A/R and B/R – Rch. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)

A/B – Bch. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)

Assumption : Ref. Input Level = −20 dBm (@ATT = 20 dB) or −40 dBm (@ATT = 0 dB)

Averaging Factor:

Input Level A/R, B/R, A/R [dB]	Averaging Factor
20 to −20	1
−20 to −40	4
−40 to −50	8
−50 to −60	32
−60 to −70	128
−70 to −80	256

C2102008

Figure 2-3. Dynamic Accuracy (Phase)

Trace Noise (at Freq. ≥ 100 kHz, 1 kHz bandwidth, input level −10 dBm (ATT = 20 dB) or −30 dBm (ATT = 0 dB) ..... 50 mdeg rms
Stability ..... 0.05 deg/°C (Typ.)

Delay Characteristics

Aperture Frequency ..... $\frac{200}{N-1}$% to 100% of span, where N is Number of Points
Display Range (Ref. value can be set to) ..... ±10 psec to ±0.5 sec
Display Resolution (/div can be set to) ..... 10 fsec/div to 10 sec/div
Accuracy (at = 23 ±5°C)

In general, the following formula can be used to determine the accuracy, in seconds, of a specific group delay measurement:

$$\frac{PhaseAccuracy[deg]}{360[deg] \times Aperture[Hz]}$$

Depending on the aperture, input level, and device length, the phase accuracy used in either incremental phase accuracy or worst case phase accuracy.

DC Voltage Measurement Characteristics for INPUT B

Range ..... ± 2 Vdc
Accuracy ..... ± (0.5 % + 5 mV)
Damage Level ..... ± 3 Vdc (Typ.)

GENERAL CHARACTERISTICS

Operating Conditions
When disk drive is in operation
Temperature ..... 10 to 50 °C
Humidity (at wet bulb ≤ 29°C, without condensation) ..... 15% ≤ RH ≤ 80%
When disk drive is not in operation
Temperature ..... 0 to 55 °C
Humidity (at wet bulb ≤ 29°C, without condensation) ..... 15% ≤ RH ≤ 95%
Altitude ..... 0 to 4,500 meters (15,000 feet)
Warm Up Time ..... 30 minutes
Non-operating Conditions
Temperature ..... −40 to 60 °C
Humidity (at wet bulb ≤ 29°C, without condensation) ..... 15 % ≤ 95 %
Altitude ..... 0 to 15,240 meters (50,000 feet)
Safety ..... Based on IEC-348, UL 1244 certified by CSA 556B
EMI ..... Based on FTZ 526/527
Probe Power ..... +15 V (300 mA), −12.6 V (160 mA), GND
Line Power

Voltage Selector	Line Voltage	Line Frequency	MAX. VA
115 V	90 to 132 V	47 to 66 Hz	350
230 V	198 to 264 V	47 to 66 Hz	350

Weight ..... 28 kg (Typ.)
Cabinet Dimensions ..... 425(W) × 235(H) × 553(D) mm (Typ.)

REAR PANEL SPECIFICATIONS

I/O Buses

HP-IB Interface

ANSI/IEEE 488.2 compatible. There is no address switch.

S-Parameter Test Set Interface

Figure 2-4 shows pin assignments of the S-parameter test set interface.

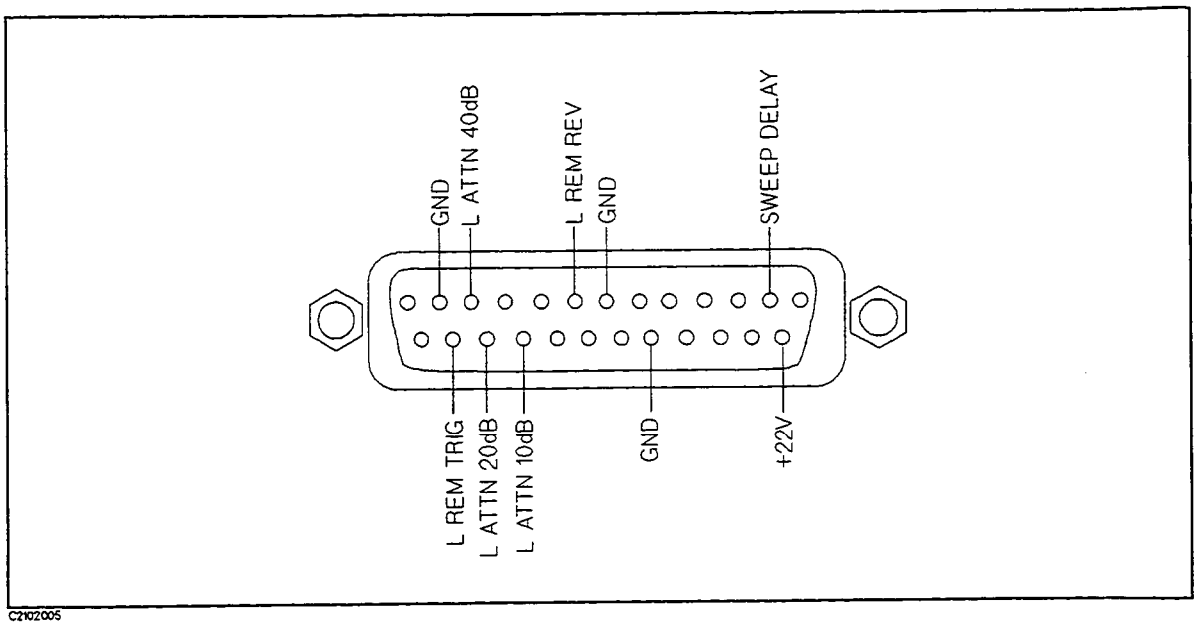


Figure 2-4. S-Parameter Test Set Interface Pin Assignments

The HP part number for the connection cable is 08503-60051.

I/O Port

See Appendix C in the *Reference Manual*.

BNC Connectors

"EXT REF INPUT 10/N MHz" Connector

This inputs a frequency reference to phase lock the analyzer to an external frequency standard.

Applicable input signal is:

Frequency ..... $\frac{10}{N}$ MHz ±10 ppm, (N=1,2,5,10)
Amplitude ..... 0 ±5 dBm
Nominal Impedance 50Ω

"REF OVEN (OPTION 001)" Connector

This outputs a frequency standard if Option 001 is installed. Output signal specifications follow:

Frequency ..... 10 MHz ±1.0 ppm
Amplitude ..... 0 ±5 dBm
Nominal Impedance 50Ω

"INT REF OUTPUT" Connector

This outputs a frequency reference to an external instrument to phase lock it to the analyzer.

Output signal specifications follow:

Frequency ..... 10 MHz ±20 ppm
Amplitude ..... 0 ±5 dBm
Nominal Impedance 50Ω

"EXT TRIGGER" Connector

This triggers a measurement sweep.

Trigger signal specifications follow (refer to Figure 2-5):

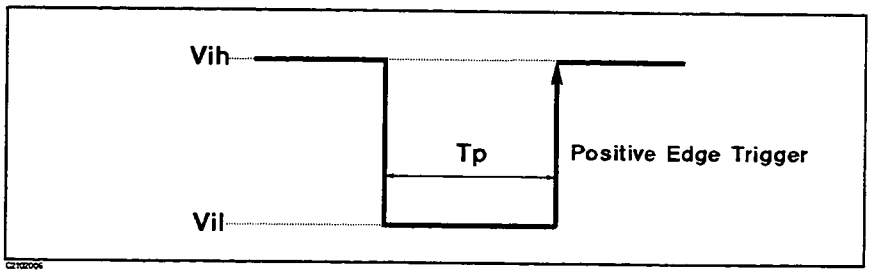


Figure 2-5. Trigger Signal

Vih ..... +2 V to +5 V
Vil ..... 0 V to +0.5 V
Sink current (Is) ..... Is ≤ 0.4 mA
Pulse width (Tp) ..... Tp ≥ 20 μsec
Trigger Polarity ..... Positive edge trigger

"EXT PROG RUN/CONT" Connector

This externally triggers RUN/CONT of the Instrument BASIC program. The signal specifications are the same with the "EXT TRIGGER" connector.

"EXT MONITOR" Connectors

These drive an external monitors. The signal specifications follow:

Output level ..... 0 to 0.714 V
H-sync. signal ..... mixed in "G" signal

FURNISHED ACCESSORIES

Accessory	HP part number
Operation Manual	08751-90000
HP-IB Programing Manual	08751-90003
Using HP Instrument BASIC with the HP 8751A	08751-90004
Maintenance Manual	08751-90030
Floppy Disk	9164-0299
Power Cable[1]	

Accessory	HP part number
BNC Adapter[2]	1250-1859
Keyboard Template[3]	08751-87111
ASCII Keyboard[3]	HP 46021A
ITF Keyboard Cable[3]	46020-60001
HP Instrument BASIC Manual Set[3]	E2083-90000

1 power cable depends on where the instrument is used, see figure on the next page

2 Only option 001.

3 Only option 002.