

Operating Manual

8757D Scalar Network Analyzer

SERIAL NUMBERS

This manual applies to all HP/Agilent 8757D scalar network analyzers. Each instrument is individually serialized. The last five numbers are the sequential suffix, unique to each instrument.



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Glossary

General Information

This chapter provides information on the following topics:

- general safety considerations
- serial numbers
- analyzer description
- power calibrator option
- available options
- specifications
- operating characteristics
- manufacturer's radio interference declaration
- manufacturer's sound emission declaration
- manufacturer's ISO declaration
- ordering accessories and supplies

General Safety Considerations

Warning No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electric shock, do not remove covers.

Warning To prevent electrical shock, disconnect the Agilent Technologies 8757D from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

Warning If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

Caution Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage.

Safety Symbols

General

This product was designed and manufactured in accordance with international safety standards. Before you operate this analyzer, review the product and related documentation. Become familiar with safety markings and instructions.



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents).



Indicates hazardous voltages.



Indicates earth (ground) terminal.



The CE mark is the registered trademark of the European Community.



The CSA mark is a registered trademark of the Canadian Standards Association.

ISM1-A

This is a symbol of an Industrial Scientific and Medical Group 1, Class A product (CISPR 11, Clause4).



The “ON” symbol is used to mark the position of the analyzer’s line power switch.



The “STANDBY” symbol is used to mark the position of the analyzer’s power switch.

1-2 General Information



The AC symbol is used to indicate the required nature of the line module input power.

The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.

Warning **The WARNING sign denotes a hazard. It calls attention to a procedure, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

Caution A **Caution** note denotes a hazard. It calls attention to a procedure, that, if not correctly performed or adhered to, could result in damage to or destruction of the product. Do not proceed beyond a **Caution** note until the indicated conditions are fully understood and met.

Safety Earth Ground

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power, cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Before Applying Power

Verify that the product is configured to match the available main power source. Refer to the input power configuration instructions provided in this manual.

If this product is to be used with an autotransformer make sure the common terminal is connected to the neutral (grounded) side of the main supply.

Servicing

Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel. Capacitors inside this product may still be charged even when disconnected from their power source.

To avoid a fire hazard, replacement fuses must have the required current rating and be of the type specified in this manual.

Preface

This manual applies directly to all HP/Agilent 8757D network analyzers. See the serial number plate (Figure 1-1) attached to the analyzer back panel. The first four digits followed by a letter are the serial number prefix. The last five digits are the sequential suffix, which are unique to each instrument.

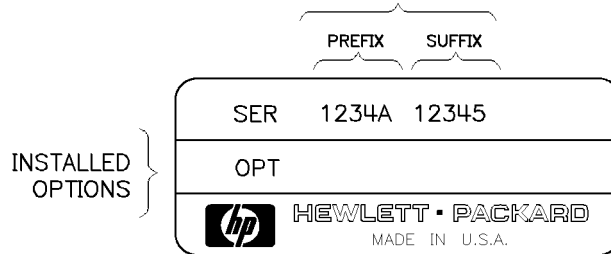
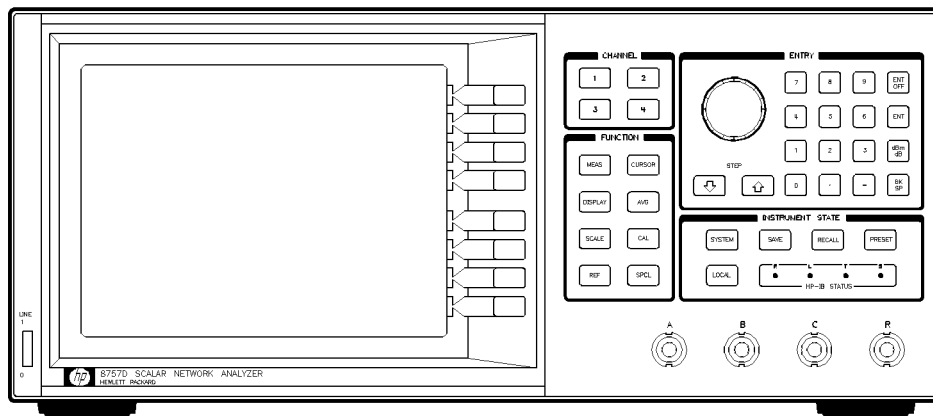
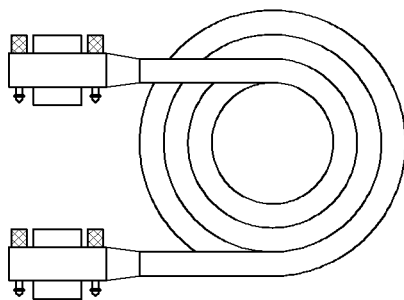


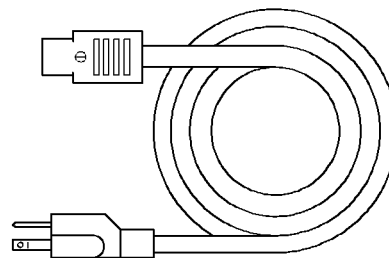
Figure 1-1. Typical Serial Number Label



HP 8757D OPTION 001 SCALAR NETWORK ANALYZER



HP-IB CABLE



POWER CABLE *

* Power cable/plug supplied depends on country of destination.

Figure 1-2. HP 8757D Scalar Network Analyzer and Accessories Supplied

The HP 8757D Analyzer

The HP 8757D (Figure 1-2) is a microprocessor-based receiver capable of making scalar (magnitude only) reflection and transmission measurements. The external detectors used determine the frequency range. The raster display provides high resolution for viewing measurements.

Note The original HP 8757D incorporated a cathode ray tube (CRT) based display. The current design incorporates a liquid crystal display (LCD) based display. In this manual, references to either CRT or LCD apply to both display designs unless noted otherwise.

CRT/LCD Attributes

The CRT/LCD displays attributes (such as the grid, measurement traces for each channel, and labels) in factory-defined colors. You can adjust the hue, saturation and intensity of each of these attributes.

Displays

The analyzer can simultaneously drive both the internal display and one external monitor (color or monochrome, if compatible with the analyzer's scan rate and video levels).

Peripherals

You can use the analyzer to control external printers, plotters, and sources through the system interface. A printer and plotter buffer speeds measurements by returning control to the analyzer while data prints.

Calibration Data and Instrument States

You can store and recall instrument states and calibration data to and from external disks.

Measurement Channels

Four independent but identical measurement channels allow simultaneous measurements and viewing of measurement parameters. The detector inputs (A, B, C, and R) accept AC or DC detected signals from detectors or bridges.

Local and Remote Operation

You can operate the analyzer either locally, using the front panel controls and menu selections, or remotely over the HP-IB. You can also generate on-screen graphics (see "Remote Operation").

Options Available

- Option 001 adds a fourth detector input (C).
- Option 002 adds the power calibrator.
- Option 001 and 002 adds *both* the fourth detector input and the power calibrator. (See the front panel options table on the following page and the descriptions below it for more detailed information on these options.)

HP 8757 FRONT PANEL OPTIONS

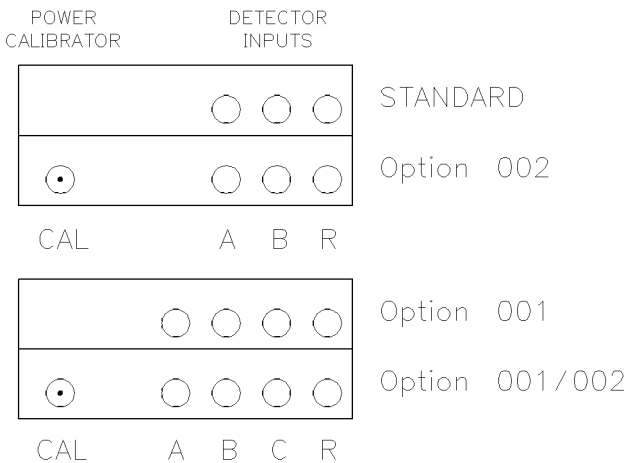


Figure 1-3.

Option 001, Fourth Detector Input

This option supplies four front-panel detector inputs (A, B, C, and R).

Option 002, Internal Power Calibrator

This option supplies three front panel detector inputs (A,B,and R) and adds an internal power calibrator. The power can be precisely controlled in 1 dB increments from +20 to -50 dBm.

Option 908, Rack Mount Without Handles

This option supplies a rack mount kit containing a pair of flanges and the necessary hardware to mount the analyzer (with handles *detached*) in an equipment rack that has 482.6 mm (19 in) horizontal spacing. See chapter 2 for installation instructions.

Option 913, Rack Mount With Handles

This option supplies a rack mount kit containing a pair of flanges and the necessary hardware to mount the analyzer (with handles *attached*) in an equipment rack that has 482.6 mm (19 in) horizontal spacing. See chapter 2 for installation instructions.

Option W30, Extended Service

This option (identified on the serial number tag) adds two additional years of return-to-HP hardware support following the first year of warranty. You can order this option only at time-of-purchase.

Option W32, Three-Year Calibration

This option (identified on the serial number tag) provides a three-year return-to-HP calibration service. You can order this option only at time-of-purchase.

Option 1BN, MIL-STD 45662A Calibration

This option provides an instrument calibration and a certificate of calibration in full compliance with MIL-STD 45662A.

Option 1BP, MIL-STD 45662A Calibration with Data

This option provides an instrument calibration, a certificate of calibration, and test data in full compliance with MIL-STD 45662A.

Specifications, General Requirements, and Operating Characteristics

Specifications

Specifications (listed in Table 1-1) are the performance standards or limits against which the instrument is tested. Specifications apply from +20°C to +30°C (unless otherwise noted), and only after the instrument's temperature stabilizes after one hour of continuous operation. Unless otherwise noted, corrected limits are given when specifications are subject to optimization with error-correction routines.

General Requirements

General requirements (listed in Table 1-2) define specifications required of the source for proper analyzer operation.

Operating Characteristics

Operating characteristics (listed in Table 1-3) are non-warranted parameters. They are not specifications, but are typical performance parameters that most units meet from +20°C to +30°C.

Table 1-1. HP 8757D Specifications¹ (1 of 2)

Function: Four independent display channels process signals from the HP 85025, 85026, 11664, or 85037 detectors and the HP 85020 or 85027 bridges. The analyzer displays the data logarithmically, in single input or ratio mode, with respect to frequency, on the internal CRT/LCD. Three detector inputs (A, B, and R) accept AC or DC detected signals from detectors or bridges.

Option 001 has four detector inputs (A, B, C, and R).

Modulator Drive: The analyzer modulator drive output provides the circuitry to drive the HP 8340 and 8341 synthesized sweepers and the HP 11665B modulator. You can turn modulator drive on and off via either the front panel or HP-IB. In the OFF state, the modulator drive signal turns the HP 11665B fully on for minimum insertion loss. The 8360 and 8370 synthesized sweepers have the capability of modulating signals, so an external modulator such as the 11665B is not necessary when using the 8360/8370 series.

Marker Accuracy: The marker frequency accuracy is 0.1 PPM of the marker frequency plus the source marker frequency accuracy.

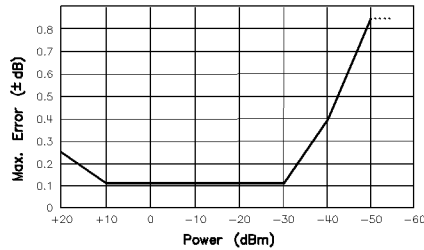
Frequency: 27.778 kHz \pm 12 Hz
Symmetry: 50% \pm 1%

Dynamic Range, Dynamic Accuracy, Absolute Power Accuracy: These system specifications are dependent on the detector used. The following examples show both the HP 85037A/B and the HP 11664A/E detectors. (For HP 85025 and HP 85026 specifications, refer to their manuals.)

Dynamic Range²

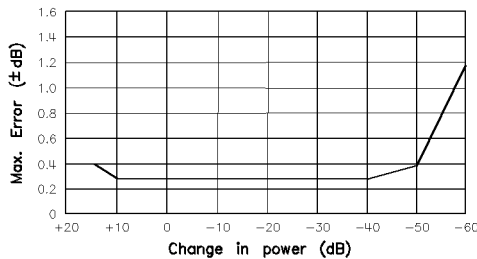
HP 85037A/B
 AC Mode: +20 to -55 dBm
 DC Mode: +20 to -50 dBm

HP 11664A/E
 AC Mode: +16 to -60 dBm



Dynamic Accuracy - AC/DC MODE
 Absolute Accuracy - DC MODE
 (D.C. MODE to -50dBm only)

HP 85037A/B



Note: For ≤ 20 dB change of power within +10 to -40dBm the specifications for the HP8757D with the HP11664A/E is $\pm (0.1\text{dB} + 0.01\text{dB/dBm})$.

HP 11664A/E

¹All specification apply at 25° \pm 5°C, unless otherwise noted.

²Using an HP 85037A/B Detector.

HP 8757D Specifications¹ (2 of 2)

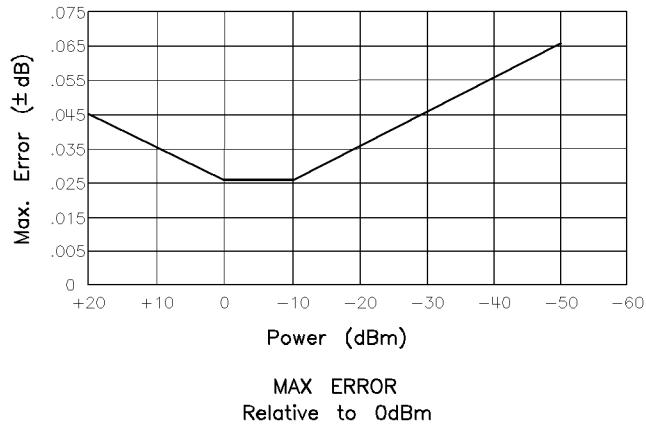
Power Calibrator (Option 002)

The internal power calibrator option (Option 002) provides a 50 MHz reference standard for characterizing the absolute power accuracy and dynamic power accuracy of HP 85037 Series precision detectors.

Frequency: 50 MHz \pm 0.1 MHz

Output Power (DC mode):

Range: +20 to -50 dBm
Accuracy at 0 dBm: \pm 0.05 dB



SWR: \leq 1.05 typical

Modes of Operation:

DC Mode (unmodulated)

AC Mode:

Modulation Frequency: 27.778 \pm 0.012 kHz

On/Off Ratio: \geq 40 dB typical

Symmetry: 50 \pm 1% typical

Connector: Type-N(f)

Accessories Included:

Adapter: Type-N(m) to 3.5 mm(f)

¹All specification apply at 25° \pm 5°C, unless otherwise noted.

Table 1-2. HP 8757D General Requirements

General requirements define specifications required of the source for proper analyzer operation.

Sweep Time: Minimum sweep time and maximum number of displayed CRT/LCD traces depend on the horizontal resolution (number of points):

Number of Points	Minimum Sweep Time (ms) ¹			
	1 Input	2 Inputs	3 Inputs	4 Inputs
101	40	40	40	40
201	40	40	52	68
401	40	72	104	136
801	80	144	208	272
1601	160	288	NA	NA

Modulation (for use with HP 85025, 85026, 11664, 85037 detectors and HP 85020 or 85027 bridges in AC mode):

Square-wave amplitude modulation.
 Frequency: 27.778 kHz ±20 Hz.
 ≥30 dB on/off ratio.
 45% to 55% symmetry.

Sweep Voltage (Sweep In): Horizontal sweep voltage (0 to 10 V) or a pulse signal (0 to 10 V) from an HP 83750 Series source provided to the analyzer's SWEEP IN 0—10V rear-panel input. You can use other sweep voltages by using the analyzer's non-standard sweep mode.

Marker and Marker Blanking (Poz Z Blank): Blanking and marker signals provided to the analyzer's POS Z BLANK rear-panel input. HP 8350, HP 8340 and 8341, and HP 8360 Series sources provide five available markers, but the HP 83750 Series source provides ten available markers.

Voltage Levels (Typical)	
Blanked	+5 V
Unblanked	0 V
Marker	-4 V
Active Marker	-8 V

¹Log magnitude format.

Table 1-3. Operating Characteristics¹ (1 of 4)

Display			
Display Modes: All analyzer channels can display any detector input, or any ratio combination of detector inputs. The CRT/LCD can display data in one of the following modes.			
Log Magnitude:			
dBm:	Single channel power measurement.		
dB:	Relative power measurement (ratio or relative to trace memory).		
SWR:	Relative measurements.		
AUX:	The rear-panel BNC input ADC IN can be measured and displayed in volts (−10 to +10V). Typical maximum error is 60 mV.		
Display Mode	Scale Resolution	Display Range	Vertical Resolution
dBm	0.1 to 20 dB/div	−80 to −130 dBm ²	0.003 dB ³
dB (ratio)	0.1 to 20 dB/div	−150 to +150 dBm ⁴	0.006 dB ³
Normalized Ratio	0.1 to 20 dB/div	−180 to +180 dB	0.01 dB
SWR	0.02 to 10 units/div	1.0 to 37.0	0.01 at 1 0.1 at 10 0.27 at 30
AUX	0.025 to 5V/div	−10 to +10V	0.001 V
Color Settings: Up to 8 operator-selected colors for CRT/LCD attributes (such as the grid, measurement traces, and labels).			

¹The values in this table are *not* specifications, but typical, non-warranted performance parameters.

²Maximum 90 dB range per trace.

³0.01 dB for display cursor.

⁴Maximum 180 dB range per trace.

Table 1-3. Operating Characteristics¹ (2 of 4)

Display(cont'd)	
Horizontal Resolution:	
Number of Traces	Number of Points
1	101, 201, 401, 801, 1601
2	101, 201, 401, 801
3, 4	101, 201, 401
Averaging: 2, 4, 8, 16, 32, 64, 128, or 256 successive traces.	
Smoothing: Provides a linear moving average of adjacent data points. The smoothing aperture defines the trace width (number of data points) averaged, and ranges from 0.1% to 20% of the trace width.	
Normalization: Traces are stored and normalized with the highest resolution, independent of display scale/division or offset.	
Calibration data is interpolated when you decrease the frequency span with adaptive normalization engaged.	
Limit Lines: Any limit combination of flat or sloped lines, or single points (up to 12 segments) can be displayed on channels 1 and 2. You can store limit lines in save/recall registers 1 through 4.	
Graticules:	
8 vertical x 10 horizontal divisions.	
1 division \approx 11 mm.	

¹The values in this table are *not* specifications, but typical, non-warranted performance parameters.

Table 1-3. Operating Characteristics¹ (3 of 4)

LCD/CRT and Graphics											
<p>CRT Scan Rate: Raster scan with 60 Hz vertical refresh rate, and 25.5 kHz horizontal scan rate. CRT Graphics Resolution: 1024 horizontal x 400 vertical pixels.</p> <p>LCD Scan Rate: Raster scan with 59.83 Hz vertical refresh rate and 31.41 kHz horizontal scan rate. LCD Graphics Resolution: 640 horizontal x 480 vertical pixels.</p>											
Rear Panel Connectors											
<p>ADC IN: An auxiliary voltage input (−10 to +10V) that can be displayed (in volts) on any channel.</p> <p>Control 1 and 2: Provide digital output signals (TTL open-collector) to drive peripheral equipment in an HP-IB controlled system.</p> <p>DAC Out: Used in troubleshooting.</p> <p>Modulator Drive: Provides the drive for HP 8340/8341 synthesized sweepers and the HP 11665B modulator. You can turn modulator drive on/off at the front panel or by HP-IB.</p> <p>Pos Z Blank Input:</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;">Voltage Levels</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 2em;">Blanked:</td> <td style="text-align: center;">+5 V</td> </tr> <tr> <td style="padding-left: 2em;">Unblanked:</td> <td style="text-align: center;">0 V</td> </tr> <tr> <td style="padding-left: 2em;">Marker:</td> <td style="text-align: center;">−4 V</td> </tr> <tr> <td style="padding-left: 2em;">Active Marker:</td> <td style="text-align: center;">−8 V</td> </tr> </tbody> </table> <p>Stop Sweep: Used with HP 8350 sweep oscillators and HP 8340, 8341, or 8360 synthesized sweepers (when controlled by the HP 8757 system interface) to stop the sweep at band crossings and at the end of sweep.</p> <p>Sweep In: Accepts the horizontal sweep voltage (usually provided by the source).</p> <p>CRT Video Output: Three BNC connectors used to drive external monitors with the following characteristics:</p> <ul style="list-style-type: none"> 75Ω input impedance. R, G, B, with sync on green. 60 Hz vertical refresh rate. 25.5 kHz horizontal scan rate. 1 Vp-p (0.7 V = white; 0 V = black; −0.3 V = sync). <p>LCD Video Output: VGA compatible.</p>			Voltage Levels	Blanked:	+5 V	Unblanked:	0 V	Marker:	−4 V	Active Marker:	−8 V
	Voltage Levels										
Blanked:	+5 V										
Unblanked:	0 V										
Marker:	−4 V										
Active Marker:	−8 V										
Internal Save/Recall Registers											
<p>General Capability: Separate front panel states may be saved in registers 1 through 9. If an appropriate source is connected to the 8757D system interface, the front panel state of the source is included in the saved state.</p> <p>Memory Trace and Limit Lines: For channels 1 and 2, the states saved in registers 1 through 4 also include the appropriate trace and limit line data. (Registers 5 through 9 only store front panel states.)</p>											

¹The values in this table are *not* specifications, but typical, non-warranted performance parameters.

Table 1-3. Operating Characteristics¹ (4 of 4)

HP-IB			
Interface: HP-IB operates according to IEEE 488-1978 and IEC-625 interface standards. Note that the HP-IB interface does not support the IEEE 488.2 standard.			
Interface Function Codes: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, E1.			
Transfer Formats: You may transfer data either as ASCII characters, or as 16-bit integers (most significant byte first). You may take readings at a single point, or transfer an entire trace at once.			
Transfer Speed (includes command to initiate output):			
	Format	# Points	ms (typical)
	ASCII	401	500
	ASCII	1	10
	Binary	401	30
	Binary	1	7
Programmable Functions: Except for power on/off, all front panel functions are programmable. The analyzer is compatible with all appropriate HP 8757A/C/E programming codes.			
Interrupts: The following conditions generate HP-IB service interrupts (SRQs):			
	Front panel key pressed		Illegal command
	Instrument self-test error		Limit test fails
	Operation (sweep or plot) completes		
System Interface			
The 8757 system interface is a dedicated HP-IB port used exclusively by the analyzer to control and extract information from a swept source, digital plotter, printer, or other device.			
General			
Temperature Range:	Operating:	0° to +55°C (+32° to 131°F)	
	Storage:	-40° to +70°C (-40° to +158°F)	
Humidity: Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C (unless specified otherwise).			
Altitude: 3000 meters			
Power Requirements: 48 to 66 Hz, 100/120/220/240 V ±10%, typically 155 VA.			
Dimensions: 178 x 425 x 445 mm (7.0 x 16.75 x 17.5 in).			
Weight:	Net:	17 kg (38 lb)	
	Shipping:	25 kg (55 lb)	

¹ The values in this table are *not* specifications, but typical, non-warranted performance parameters.

Caution

This product is designed for use in INSTALLATION CATEGORY II AND POLLUTION DEGREE 2, per IEC 61010-1 and 664 respectively.

Manufacturer's Declarations

RADIO FREQUENCY INTERFERENCE

Note

This is to certify that this product meets the radio frequency interference requirements of Directive FTZ 1046/1984. The German Bundespost has been notified that this equipment was put into circulation and has been granted the right to check the product type for compliance with these requirements.

Note: If test and measurement equipment is operated with unshielded cables and/or used for measurements on open set-ups, the user must ensure that under these operating conditions, the radio frequency interference limits are met at the border of his premises.

Model HP/Agilent 8757D

Note

Hiermit wird bescheinigt, dass dieses Gerat/System in Ubereinstimmung mit den Bestimmungen von Postverfugung 1046/84 funkentstort ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerates/Systems angezeigt und die Berechtigung zur Uberprufung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Zustzinformation fur Mess-und Testgerate:

Werden Mess- und Testgerate mit ungeschirmten Kabeln und/oder in offenen Messaufbauten verwendet, so ist vom Betreiber sicherzustellen, dass die Funk-Entstorb Bestimmungen unter Betriebsbedingungen an seiner Grundstücksgrenze eingehalten werden.

SOUND EMISSION

Note

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) <70 dB.

- Sound Pressure L_p <70 dB (A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779 (Type Test).

Model HP/Agilent 8757D

Note

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlarminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel L_p <70 dB(A).
 - Am Arbeitsplatz.
 - Normaler Betrieb.
 - Nach DIN 45635 T. 19 (Typprüfung).
-

DECLARATION OF CONFORMITY

According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014

Manufacturer's Name: Agilent Technologies, Inc.

Manufacturer's Address: 1400 Fountaingrove Parkway
Santa Rosa, CA 95403-1799
USA

Declares that the product

Product Name: Network Analyzer

Model Number: 8757D

Product Options: This declaration covers all options of the above product.

Conforms to the following product specifications:

EMC: IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998

<u>Standard</u>	<u>Limit</u>
CISPR 11:1990 / EN 55011-1991	Group 1, Class A
IEC 61000-4-2:1995+A1998 / EN 61000-4-2:1995	4 kV CD, 8 kV AD
IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80 - 1000 MHz
IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5 kV sig., 1 kV power
IEC 61000-4-5:1995 / EN 61000-4-5:1996	0.5 kV L-L, 1 kV L-G
IEC 61000-4-6:1996 / EN 61000-4-6:1998	3 V, 0.15 - 80 MHz
IEC 61000-4-11:1994 / EN 61000-4-11:1998	1 cycle, 100%

Safety: IEC 61010-1:1990 + A1:1992 + A2:1995 / EN 61010-1:1993 +A2:1995
CAN/CSA-C22.2 No. 1010.1-92

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE-marking accordingly.



Santa Rosa, CA, USA 12 Oct. 2000

Greg Pfeiffer/Quality Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Accessories and Supplies

See Figure 2-2, “Example of a Static-Safe Workstation,” and Table 1-4 for a list available parts. To order a listed item, provide the part number and the quantity required; send the order to the nearest Agilent Technologies sales and service office, listed at the back of this chapter.

Table 1-4. Replaceable Parts for the HP/Agilent 8757D

Description	HP/Agilent Part Number
Documentation	
Manual Set (includes 08757-90109 and 08757-90110)	08757-90107
Operating Manual (includes programming guides)	08757-90109
Programming Guides:	
HP 9000 Series 200/300	08757-90116
HP Vectra Microsoft Quick Basic 4.5	08757-90117
HP Vectra Microsoft C 2.5	08757-90118
Quick Reference Guide	08757-90130
Service Manual	08757-90110
Connector Care	08510-90064
Other	
Touch-up Paint (cobblestone gray)	6010-1140
Adapter ¹ (type-N male to 3.5 mm female)	08485-60005
HP-IB Cable	10833A
Fuses	
2.5 A 250 V NTD FE UL	2110-0083
1.5 A 250 V NTD FE UL	2110-0043
Rack Mount Handles	
Front Handles (standard)	5062-3990
Rack Mounting without Handles (Option 908)	5062-3978
Rack Mounting with Handles (Option 913)	5062-4072
ESD Supplies	
Conductive Table Mat with 15 ft Ground Wire	9300-0797
Wrist Strap to Table Mat Grounding Cord	9300-0980
Grounding Wrist Strap	9300-1367
ESD Heal Strap (reusable 6 to 12 months)	9300-1126
Cleaning Supplies	
Compressed Air (235 ml)	8500-6659
Cleaning Swabs (100)	9301-1243
Isopropyl Alcohol (8 oz)	8500-0559
Isopropyl Alcohol (30 ml)	8500-5344

¹ Part of Option 002.

Table 1-5. Agilent Technologies Sales and Service Offices

UNITED STATES		
<p>Instrument Support Center Agilent Technologies (800) 403-0801</p>		
EUROPEAN FIELD OPERATIONS		
<p>Headquarters Agilent Technologies S.A. 150, Route du Nant-d'Avril 1217 Meyrin 2/Geneva Switzerland (41 22) 780.8111</p>	<p>France Agilent Technologies France 1 Avenue Du Canada Zone D'Activite De Courtaboeuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60</p>	<p>Germany Agilent Technologies GmbH Agilent Technologies Strasse 61352 Bad Homburg v.d.H Germany (49 6172) 16-0</p>
<p>Great Britain Agilent Technologies Ltd. Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG41 5DZ England (44 118) 9696622</p>		
INTERCON FIELD OPERATIONS		
<p>Headquarters Agilent Technologies Company 3495 Deer Creek Road Palo Alto, California, USA 94304-1316 (415) 857-5027</p>	<p>Australia Agilent Technologies Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 (61 3) 895-2895</p>	<p>Canada Agilent Technologies (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232</p>
<p>China China Agilent Technologies 38 Bei San Huan X1 Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888</p>	<p>Japan Agilent Technologies Japan, Ltd. 9-1 Takakura-Cho, Hachioji Tokyo 192, Japan (81 426) 60-2111</p>	<p>Singapore Agilent Technologies Singapore (Pte.) Ltd. 150 Beach Road #29-00 Gateway West Singapore 0718 (65) 291-9088</p>
<p>Taiwan Agilent Technologies Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Taipei, Taiwan (886 2) 712-0404</p>		

Installation

This chapter provides information on the following topics:

- initial inspection
- instrument serial numbers
- environmental requirements
- electrostatic discharge hazards and precautions
- line voltage selector switch
- fuse inspection
- power cable inspection

Introduction

This section provides installation instructions for your HP/Agilent 8757D scalar network analyzer. This section also includes information about initial inspection, damage claims, preparation for using the analyzer, packaging, storage and shipment.

Initial Inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, keep it until you have verified that the contents are complete and you have tested the analyzer mechanically and electrically.

If the shipment is incomplete or if the analyzer does not pass the operator's check (see chapter 3) notify the nearest Agilent office. If the shipping container is damaged or the cushioning material shows signs of stress, notify the carrier. Keep the shipping materials for the carrier's inspection. The Agilent office will arrange for repair or replacement without waiting for a claim settlement.

If the shipping container and cushioning material are in good condition, retain them for possible future use. You may wish to ship the analyzer to another location or to return it to Agilent Technologies for service. Instructions for repackaging and shipping the instrument are located at the end of this chapter.

Shipment Contents

A complete shipment consists of one box (see chapter 1 for part numbers).

- The box will contain one each of the following:
 - HP/Agilent 8757D scalar network analyzer
 - HP-IB cable
 - power cable
 - type-N to 3.5 mm adapter (Option 002 only)
 - front handles
 - operating manual
 - service manual

Serial Numbers

Agilent Technologies makes frequent improvements to its products to enhance their performance, usability, or reliability, and to control costs. Agilent service personnel have access to records of design changes to each type of equipment, based on the equipment's serial number. If you contact Agilent about your analyzer, have the complete serial number available to make sure that you receive the most complete and accurate information possible.

A serial number label is attached to the rear panel of the analyzer. A typical serial number label is shown in Figure 2-1. The first four digits followed by a letter comprise the serial number prefix; the last five digits are the sequential suffix, unique to each instrument.

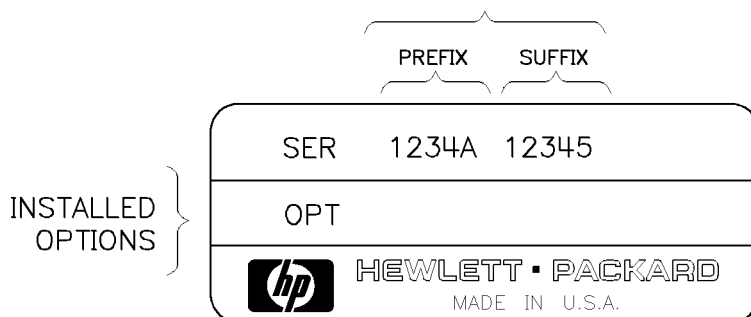


Figure 2-1. Typical Serial Number Label

Operating Environment

Caution **VENTILATION REQUIREMENTS:** When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

To meet the specifications listed in chapter 1, you must operate this instrument within the following limits:

Temperature 0 to +55°C (+32 to 131°F)

Altitude ≤ 4572 metres (15,000 feet)

Humidity 5 to 95% at +25 to +40° C (+77 to 104°F)

Protect the analyzer from temperature extremes which can cause internal condensation.

Cooling Leave 10 cm (4 in) of room at the rear of the cabinet and 7.6 cm (3 in) at the sides of the cabinet. In bench stacking, the plastic feet provide adequate clearance for the top and bottom surfaces. In rack mounting, filler strips provide the clearance.

The rear-mounted fan moves air into the instrument and out through the sides. Clean the fan regularly.

Electrostatic Discharge

Because electrostatic discharge (ESD) can damage or destroy electronic components, perform all work on assemblies consisting of electronic components at a static-safe work station.

Static-Safe Accessories

See chapter 1 “General Information” for static-safe accessories available from Agilent Technologies.

Figure 2-2 is an example of a static-safe work station using two types of ESD protection that can be used either together or separately:

1. A conductive table mat and wrist-strap combination.
2. A conductive floor mat and heel-strap combination.

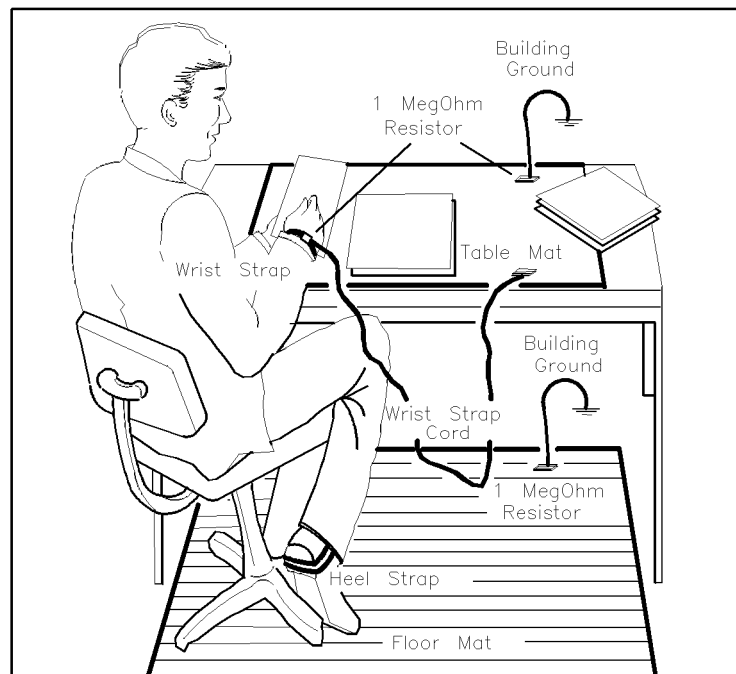


Figure 2-2. Example of a Static-Safe Work Station

Reducing Damage Caused by ESD

The following can help reduce ESD damage that occurs during testing and servicing operations:

- Before you connect a coaxial cable to an analyzer connector for the first time each day, momentarily ground the cable center and outer conductors.
- Ground yourself with a resistor-isolated wrist strap before touching the center pin of *any* connector, and before removing *any* assembly from the instrument.
- To prevent a buildup of static charge, ensure that all instruments are properly earth-grounded.

Power Requirements

Table 2-1. HP/Agilent 8757D Power Requirements

Characteristic	Requirement
Input Voltage	100, 120, 220, or 240 V ($\pm 10\%$)
Frequency	48 to 66 Hz
Power	155 VA (max)

Cautions

Before switching on this instrument, make sure

- the line voltage selector switch is set to the voltage of the mains supply
 - the correct fuse is installed
 - the supply voltage is in the specified range
-

Checking the Line Voltage and Fuse

Both the voltage selection card and the fuse are located in the AC power module on the rear panel of the analyzer (see Figure 2-3). For continued protection against fire hazard, replace line fuse only with the same type and ratings. The use of other fuses or materials is prohibited. To select the line voltage and fuse (see chapter 1 for fuse part numbers):

1. Measure the AC line voltage.
2. Using the values in Table 2-2, follow the instructions in Figure 2-3.

Table 2-2. Line Voltage and Fuse Selection

Measured AC Line Voltage (V)	Voltage Selection Card Position	Fuse (A)
90 to 110	100	2.5
108 to 132	120	2.5
198 to 242	220	1.5
216 to 264	240	1.5

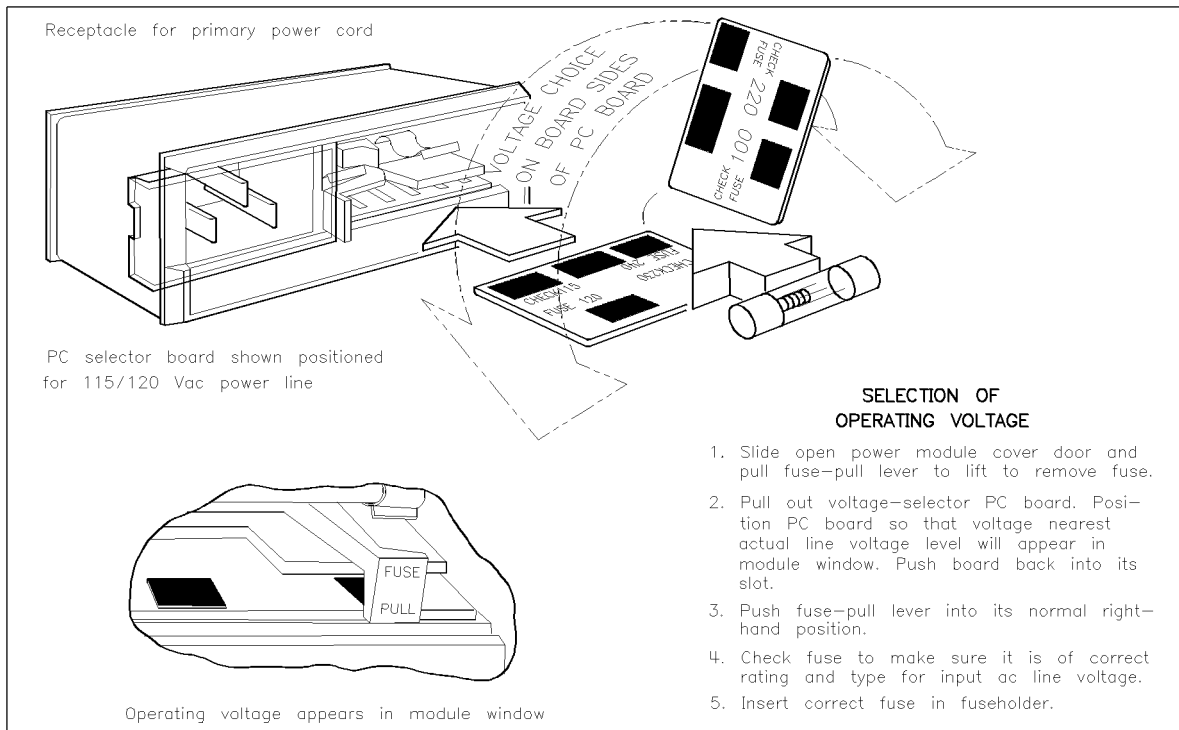


Figure 2-3. Setting the Voltage Selector Switch and Checking the Fuse

Checking the Power Cable

The analyzer is shipped with a three-wire power cable (appropriate for its original destination), in accordance with international safety standards. When connected to an appropriate power line outlet, this cable grounds the analyzer chassis.

Warning

This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited. (IEC 348 clauses 17.3.3 c) & 17.3.4)

Install the instrument so that the ON/OFF switch is readily identifiable and is easily reached by the operator. The ON/OFF switch or the detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

Equipment Required But Not Supplied

To make measurements with a standard analyzer, you must have a swept RF or microwave source and from one to three detectors or directional bridges (four with an Option 001).

AC Detection

AC detection measurements require square wave modulation capability at 27.778 kHz.

Firmware Compatibility

Table 2-3 lists the sweeper firmware revisions required for complete compatibility with the HP/Agilent 8757D.

Table 2-3. Firmware Revisions

HP/Agilent Sweeper	Firmware Revision
8350B	≥ 6
83522A	≥ 3
83525A/B	≥ 3
83540A/B	≥ 3
83545A	≥ 3
83550A	≥ 6
83570A	≥ 3
83572A/B	≥ 6
83590A	≥ 6
83592A/B/C	≥ 6
83594A	≥ 6
83595A	≥ 6
83595C	All
83596A	All
83596B	All
83597A	All
83597B	All
83598A	All
83599A	All

Rack Mounting

Caution Use only the specified screws to install the rack mount kit. Longer screws can damage internal components located behind the screw mounting holes.

Rack Mounting without Front Handles (Option 908)

Option 908 instruments are shipped with a rack mount kit. The kit supplies the hardware and installation instructions to prepare the instrument to mount on an equipment rack with 482.6 mm (19 in) support spacing. To order additional rack mount kits, see Table 1-4.

1. Refer to Figure 2-4. Contact your nearest sales and service office. See Table 1-5 for a list of Agilent Offices.
2. Remove each front handle trim ①:
 - a. Insert the tip of a screwdriver between the back edge of trim and the front handle.
 - b. Pull forward.
3. Remove four screws ④ and one front handle assembly ③ per side.
4. Attach one rack mount flange ② with four panhead screws ④ per side.
5. Remove the feet and tilt stands ⑤.
6. Save the flat head screws and front handle assemblies for reuse.

Rack Mounting with Front Handles (Option 913)

Option 913 instruments are shipped with a rack mount kit. The kit supplies the hardware and installation instructions to prepare a standard instrument (with handles) to mount on an equipment rack with 482.6 mm (19 in) support spacing. To order additional rack mount kits, see Table 1-4. Contact your nearest sales and service office. See Table 1-5 for a list of Agilent Offices.

1. Refer to Figure 2-4.
2. Remove each front handle trim ①:
 - a. Insert the tip of a screwdriver between the back edge of trim and the front handle.
 - b. Pull forward.
3. Remove four screws ④ and one front handle assembly ③ per side.
4. Attach one rack mount flange ② and one front handle assembly ③ with four panhead screws ④ per side.
5. Remove the feet and tilt stands ⑤.
6. Save the flat head screws and front handle assemblies for reuse.

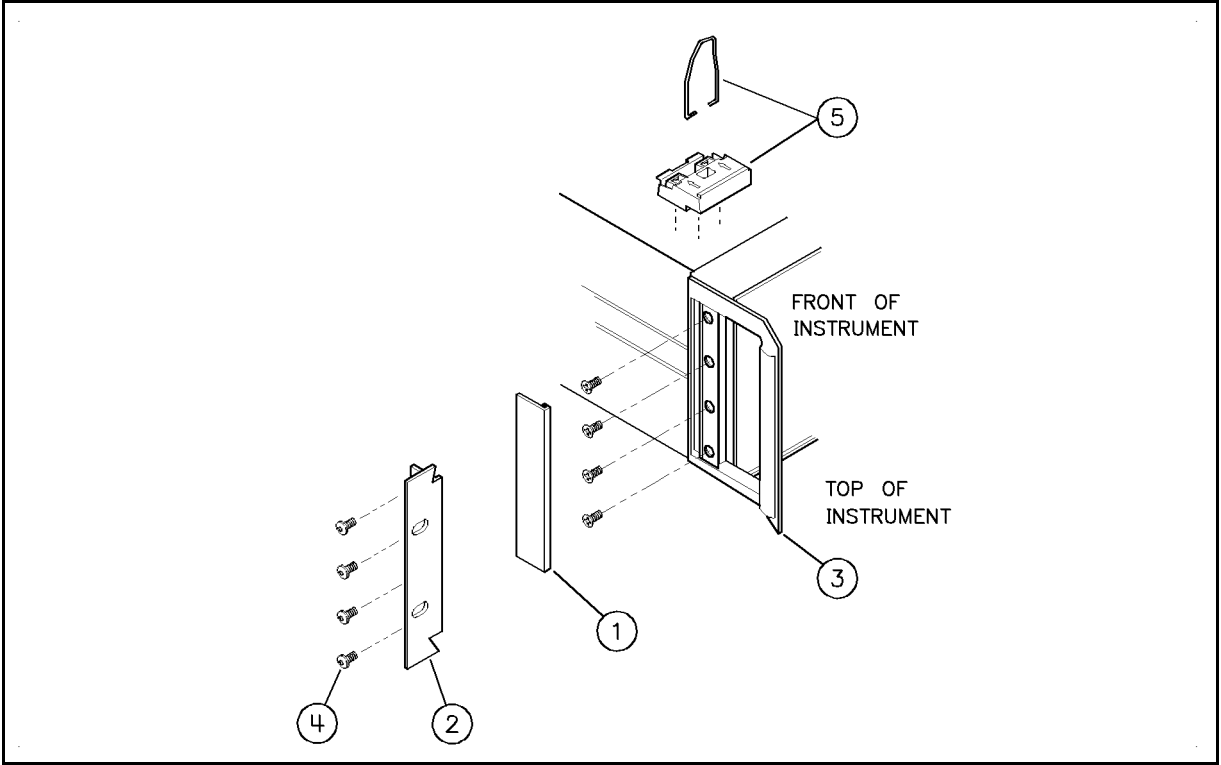


Figure 2-4. Rack Mounting the Analyzer

Connecting the Analyzer to a Source

Figure 2-5, Figure 2-6, Figure 2-7, and Figure 2-8 show the interconnections between the analyzer and three commonly used sources.

External Modulation

Unlike the HP/Agilent 8350, 8360, and 83750 Series sources, HP/Agilent 8340 and 8341 Series synthesizers do not provide an internal 27.778 kHz modulated signal (used in AC measurements). Use the analyzer's 27.778 kHz modulation signal to externally modulate the source, connected as described in Table 2-4.

Table 2-4. External Modulation Connections

HP/Agilent Source	Serial Prefix	Connection/Function (W/O System Interface Connected)	Connection/Function (With System Interface Connected)
8340A	< 2302A	Pulse Input/Pulse	Input/Pulse
	\geq 2320A	AM Input/Shift Pulse	AM Input ¹
8341A	all	AM Input/Shift Pulse	AM Input ¹
8340B	all	Pulse Input/Pulse	Input/Pulse ¹
8341B	all	Pulse Input/Pulse	Pulse Input/Pulse ¹

¹ The correct function is programmed automatically.

Other Configurations

If you operate the analyzer without connecting the HP/Agilent 8757 system interface, make the connections to the analyzer's POZ BLANK and SWEEP IN 0-10V only. Also use this configuration with the HP/Agilent 8620 Series sweep oscillator and with non-HP/Agilent sources. For modulation, connect the MODULATOR DRIVE to the source PULSE input, or use an external modulator (such as an HP/Agilent 11665B).

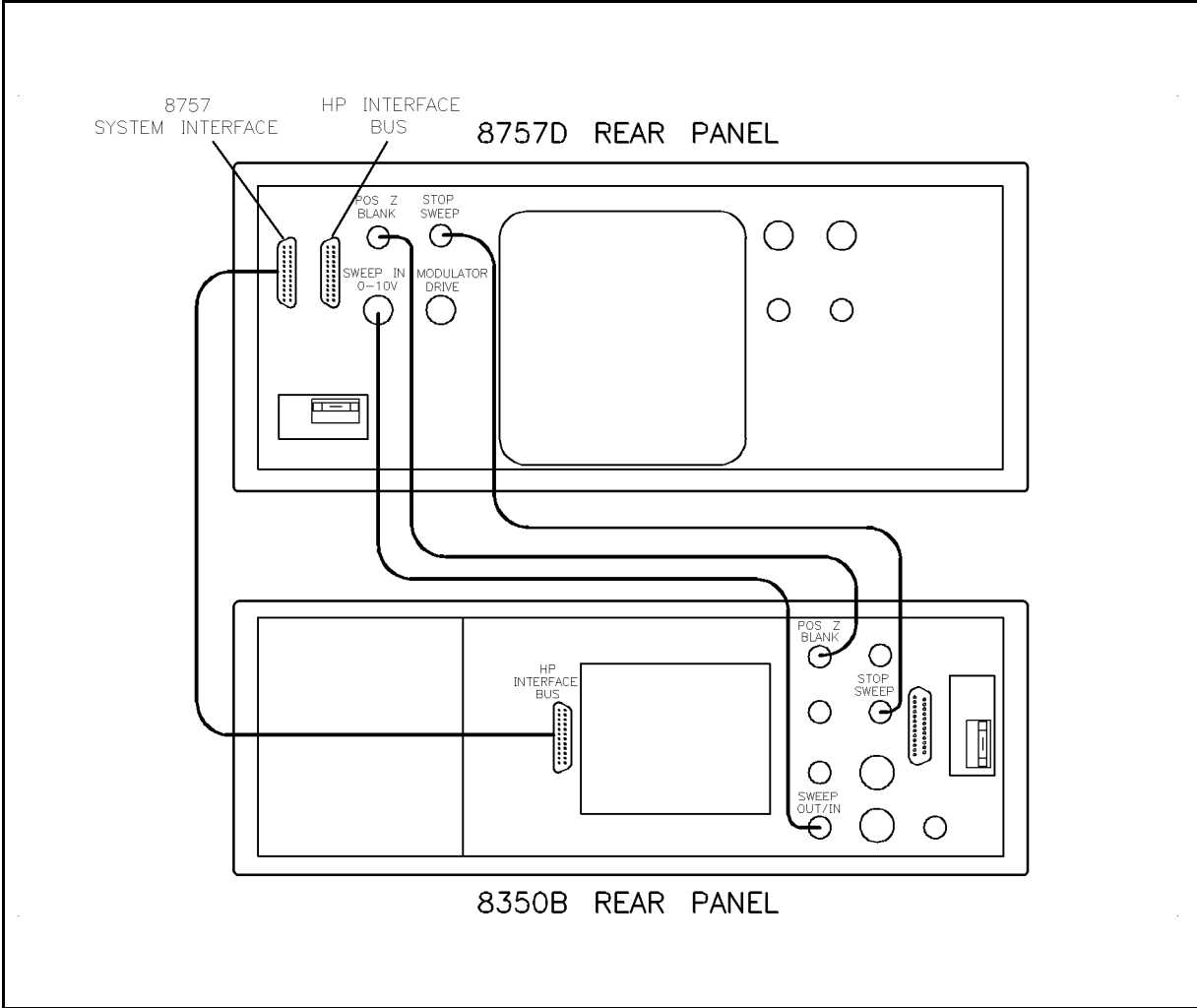


Figure 2-5. Analyzer to HP/Agilent 8350 Sweep Oscillator Interconnections

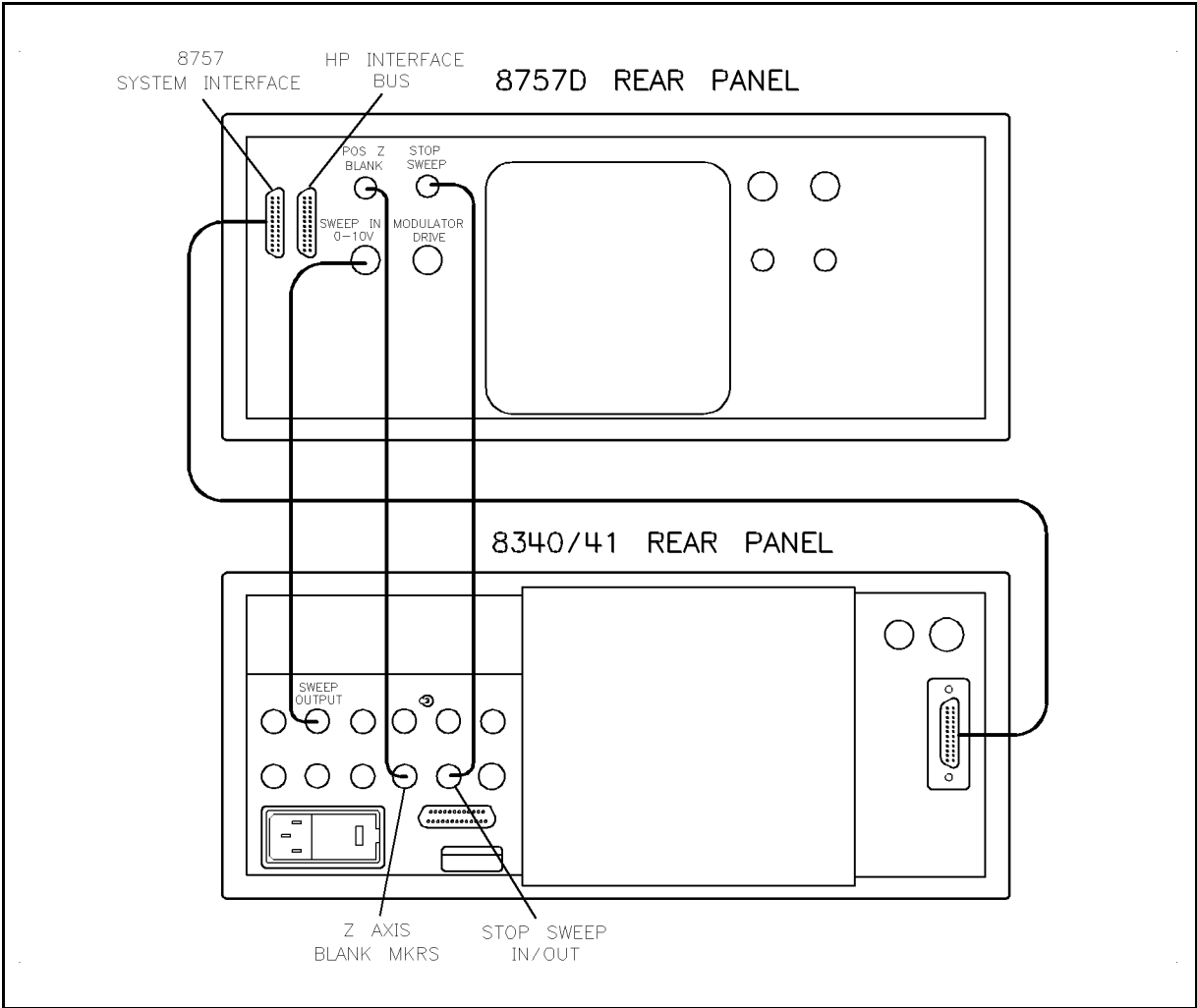


Figure 2-6. Analyzer to HP/Agilent 8340 and 8341 Series Synthesizer Interconnections

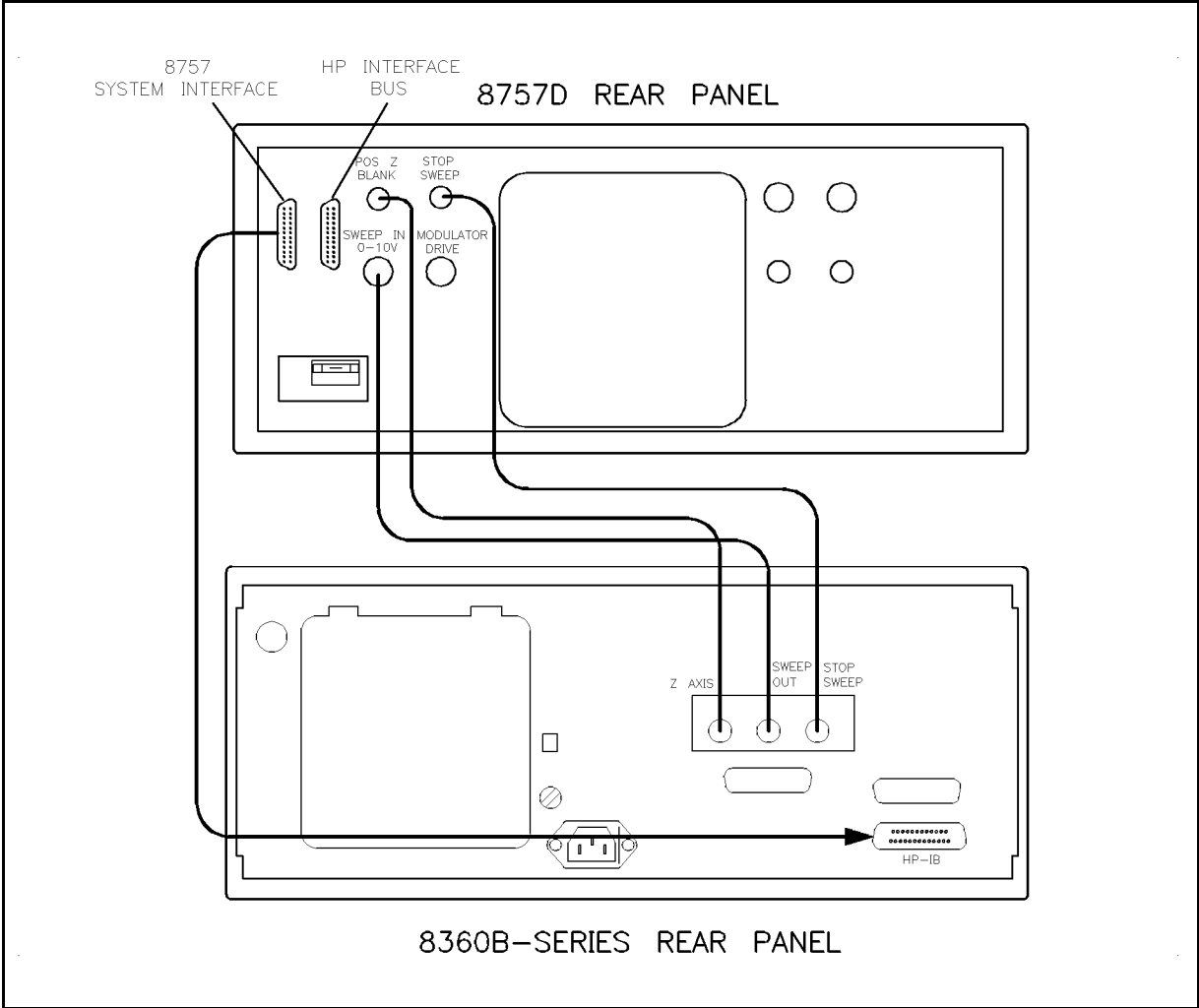


Figure 2-7. Analyzer to HP/Agilent 8360 Series Synthesizer Interconnections

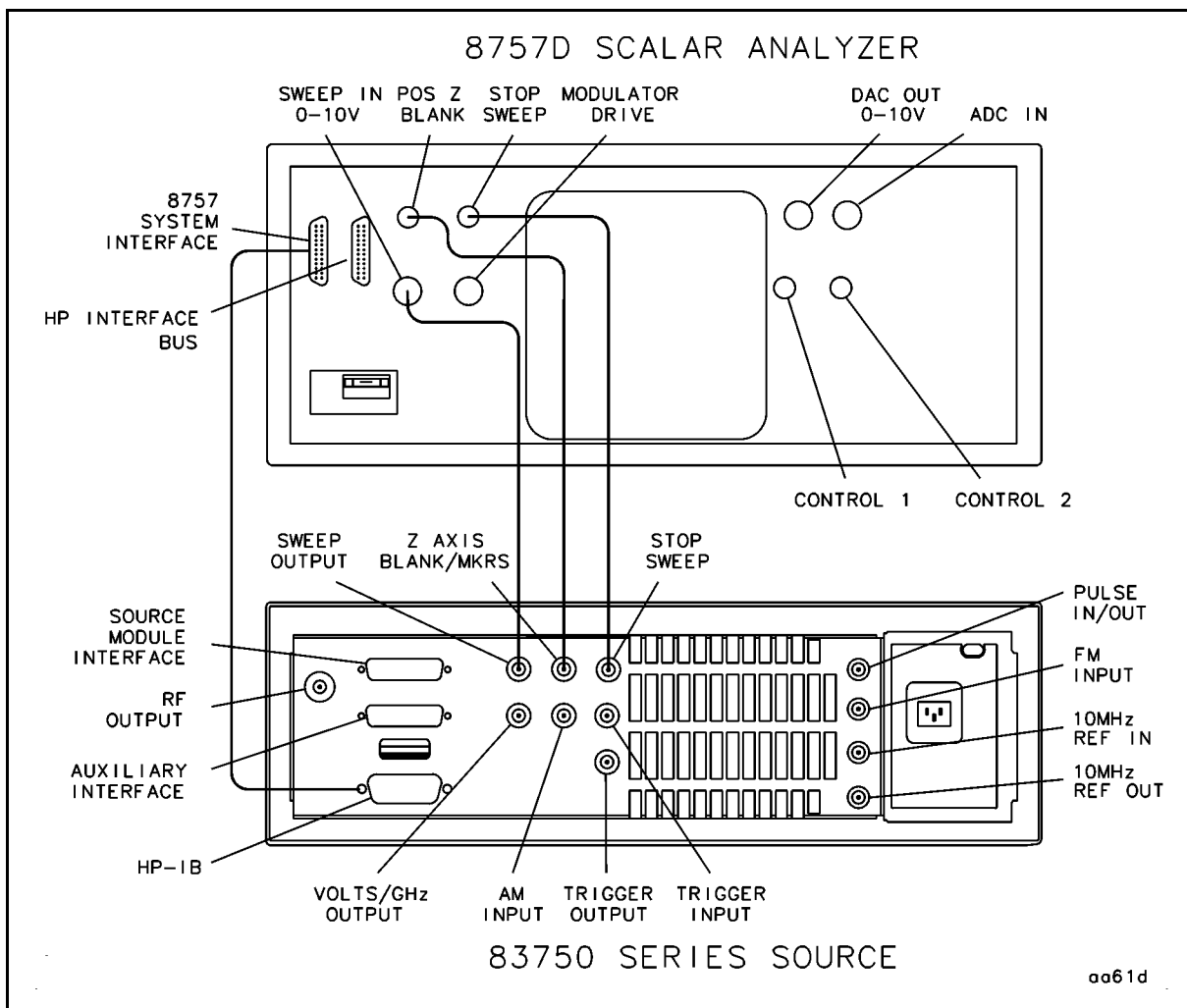
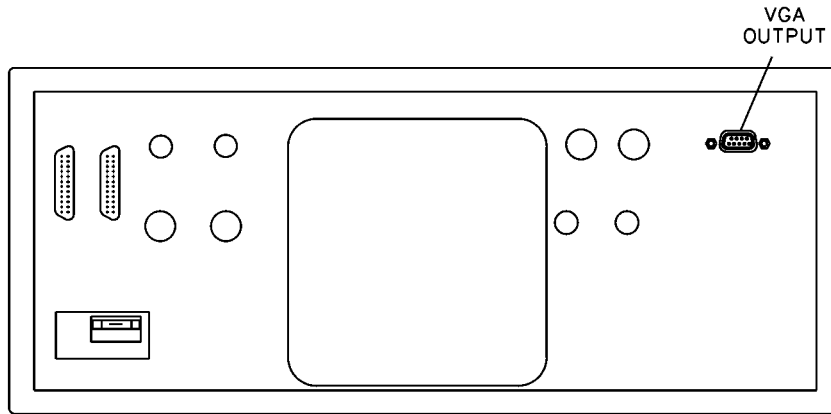
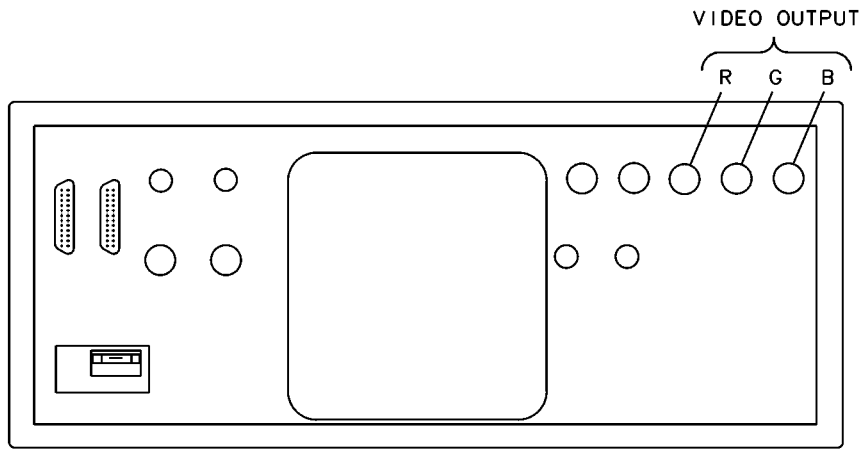


Figure 2-8. Analyzer to HP/Agilent 83750 Series Synthesizer Interconnections

8757D LCD DISPLAY CONNECTION



8757D CRT DISPLAY CONNECTION



oo62d

Figure 2-9. Rear Panel Display Connectors

Connecting the Analyzer to an External Monitor

CRT

Use the three rear panel outputs (RGB) to drive an external monitor (see chapter 1 for specific video output characteristics). Connect the three BNC analyzer outputs (RGB) to the corresponding monitor inputs.

If you use a monochrome monitor, operate the analyzer in monochrome mode and connect only the green (G) output to the monitor.

LCD

The analyzer can drive both its internal display and an external monitor simultaneously. Connect the VGA output to the corresponding monitor input.

External Monitor Requirements:

VGA Compatible

- 640 (horizontal) x 480 (vertical) resolution
- 59.83 Hz vertical refresh rate
- 16.716 mS vertical time
- 31.41 kHz horizontal refresh rate
- 31.840 μ S horizontal time
- 75 ohm video input impedance
- video analog amplitude 0.7 Vp-p
- negative true TTL logic for vertical and horizontal synchronization

Setting the HP-IB Address

In remote mode, a controller communicates through the HP-IB, identifying each instrument on the bus by its HP-IB address. Because of this, each instrument on an HP-IB *must* have a unique address (0 through 29 are available).

Factory Setting

The factory sets the analyzer to address 16. The central processing unit (CPU) reads this address from the firmware when the instrument is first turned on and stores it in memory. The address changes only when the value in memory changes, either through a front panel entry, or when you change the firmware. With a firmware change, the address again defaults to 16.

Checking the Address

To display the current HP-IB address on the CRT:

1. Press **LOCAL**.
2. Select **8757**.

Changing the Address

To change the HP-IB address:

1. Press **LOCAL**.
2. Select **8757**.

The CRT displays the current address.

3. Using the front panel keypad, enter the new address.
4. Press **ENT** to terminate the entry.

The CRT displays the new address. Turning the line switch off or presetting the instrument does not affect this address.

Recording the Address

Figure 2-10 shows an HP-IB label (see chapter 1 for ordering information), available for recording instrument HP-IB addresses.

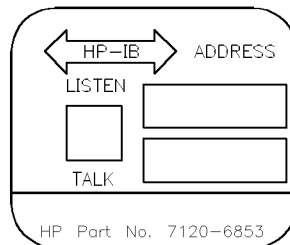


Figure 2-10. HP-IB Address Label

HP-IB Connectors and Cables

A tutorial description of HP-IB is available from Agilent Technologies (see chapter 1 for ordering information). See also “Remote Operation,” which describes the analyzer’s HP-IB capabilities. Figure 2-11 illustrates an HP-IB connector pin configuration and signals.

Connectors

The analyzer has two rear panel HP-IB connectors:

1. The 8757 System Interface (J1).

This remote programming interface lets you connect the analyzer to the HP-IB connector of compatible instruments and use the analyzer (in either local or remote operation) to control a plotter, printer, or source. This dedicated HP-IB port is used exclusively by the analyzer; do not connect a controller to this connector.

2. The HP Interface Bus (J2).

This remote programming interface lets you connect the analyzer to a controller via HP-IB with or without additional instruments. You can then remotely operate the analyzer with the same control (except for power, line switch, and internal tests) as with local operation. The controller maintains remote control by sending commands to and receiving data from the analyzer over the HP-IB.

Cables

Connect instruments on the HP-IB or on the system interface using HP-IB cables. The cables are available in lengths from 0.5m (1.6 ft) to 4m (13.2 ft). See chapter 1 “General Information” for ordering information.

You may connect up to fifteen instruments in parallel on the HP-IB or the system interface, but if the system cable is too long or if the accumulated cable length between instruments is too long, the system cannot maintain the proper data and control lines voltage levels and timing relationships (see Table 2-5).

Table 2-5. HP-IB Cabling Restrictions

Number of Instruments in the System ¹	Maximum Cable Length (m/ft)
2	4/12
> 2	2/6 ²
na	20/65 ³

¹ Including the analyzer.

² To each instrument.

³ Between all units.

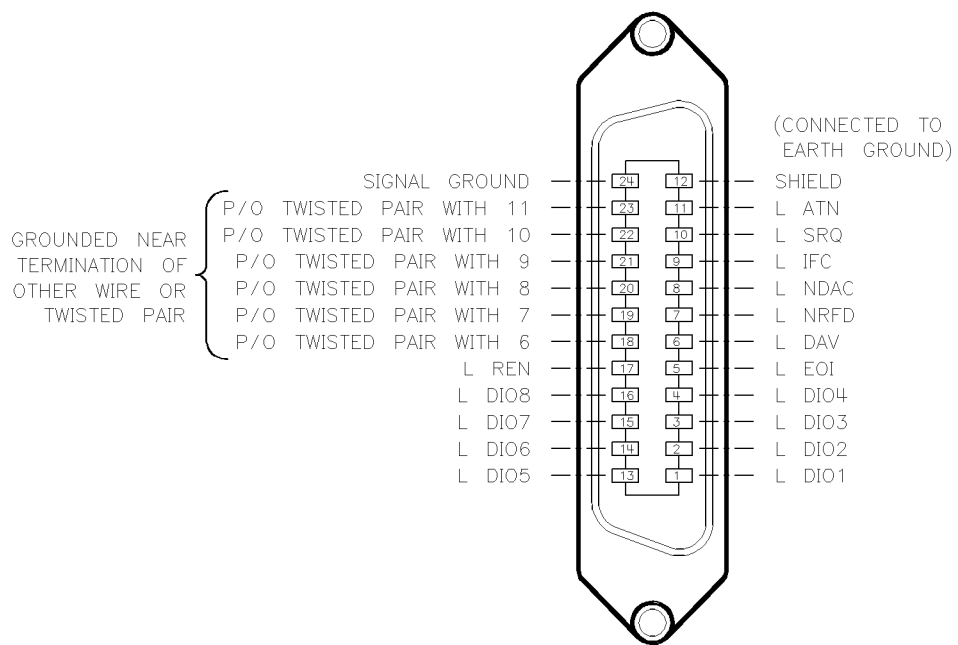


Figure 2-11. HP-IB Connectors: Signals and Pin Configuration

Storing and Shipping

Environment

Store or ship the instrument in environments within the following limits:

Temperature	-40 to + 70°C (-40 to + 167°F)
Altitude	≤ 15,240 metres (50,000 feet)
Humidity	90% at +65° C (+149°F)

Protect the instrument from temperature extremes, which can cause internal condensation.

Packing the Instrument

Hardware

- If the analyzer has handles, but no rack mounting hardware, go to “Packaging.”
- If the instrument has neither rack mount flanges, nor handles, attach the handles, and go to “Packaging.”
- If the instrument has handles *and* rack mount flanges, remove the flanges, reattach the handles, and go to “Packaging.”
- If the instrument has rack mount flanges, but no handles, remove the flanges, attach the handles, and go to “Packaging.”

Packaging

Containers and materials identical to those used in factory packaging are available through Agilent Technologies offices (see chapter 1 for ordering information). If you choose to package the instrument with commercially available materials, follow these instructions.

1. Wrap the instrument in heavy paper.
2. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.
3. Use enough shock-absorbing material (3 to 4 inch layer) around all sides of the instrument to provide a firm cushion and prevent movement inside the container. Protect the control panel with cardboard. Seal the shipping container securely.
4. Mark the shipping container “FRAGILE”.

Returning an Instrument for Service

If your analyzer requires service, contact the Agilent office nearest you for information on where to send it. See Table 1-5. Include a service tag (located at the end of this chapter), on which you provide the following information:

1. Your company name and address (do not give a post office box).
2. A technical contact person within your company, and the person’s complete phone number including country code and area code.
3. The complete model and serial number of the instrument.
4. Indicate the type of service required (calibration or repair).
5. A detailed description of the problem and how the instrument was being used when the problem occurred (such as calibration or measurement).

When making inquiries, either by correspondence or by telephone, please refer to the instrument by model number and full serial number.

Operation

Note The original HP/Agilent 8757D incorporated a cathode ray tube (CRT) based display. The current design incorporates a liquid crystal display (LCD) based display. In this manual, references to either CRT or LCD apply to both display designs unless noted otherwise.

The front panel LINE switch disconnects the mains circuits from the mains supply after the EMC filters and before other parts of the instrument.

HP/Agilent 8757D Firmware Compatibility

Caution Only firmware revisions 5.1 through 6.2 can be used in HP/Agilent 8757D models with a CRT-based display (revision 6.2 is recommended). Instrument models with an LCD-base display must use firmware revision 7.0 or greater—they are not interchangeable.

Check the rear panel of the instrument to determine the type of display. Instruments with the LCD-based display are equipped with a VGA connector on the rear panel so that an external monitor may be connected. CRT-based instruments are equipped with three BNC connectors (RGB) for this purpose. (See Figure 2-9 in Chapter 2, “Installation.”)

This operating section provides information that is divided into the following topics and sections:

Local Operation (see white tab)

- *User's Guide*, which contains:
 - typical measurement setups
 - example transmission and reflection measurements
- *Operating Reference*, which contains:
 - front and rear panel operating features
 - front panel key functions
 - softkey functions
 - operator's check

Remote Operation (see white tab)

For reference only. The three introductory programming guides may refer to obsolete hardware and software.

This section contains:

- information on converting HP/Agilent 8757A software
- quick reference guide
- introductory programming guides with example programs and programming codes

In Case of Difficulty (see white tab)

This section contains information on what to do if you encounter a problem with the analyzer. It provides suggestions for minor problems that do not involve defects in the internal circuitry. (The service manual, chapter 8, provides in-depth troubleshooting information.)