

## About this Manual

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## Support for Your Product

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## HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. In other documentation, to reduce potential confusion, the only change to product numbers and names has been in the company name prefix: where a product number/name was HP XXXX the current name/number is now Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

# **Installation and Quick Start Guide**

## **HP 8753E Network Analyzer**



**HP Part No. 08753-90369**

**Printed in USA**

**Print Date: January 1998**

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## **Notice**

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## **Certification**

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## **Regulatory Information**

The regulatory information is in the *HP 8753E Network Analyzer User's Guide*.

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## **Warranty**

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of three years from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Hewlett-Packard. Buyer shall prepay shipping charges to Hewlett-Packard and Hewlett-Packard shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Hewlett-Packard from another country.

Hewlett-Packard warrants that its software and firmware designated by Hewlett-Packard for use with an instrument will execute its programming instructions when properly installed on that instrument. Hewlett-Packard does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error-free.

### **LIMITATION OF WARRANTY**

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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### **EXCLUSIVE REMEDIES**

**THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HEWLETT-PACKARD SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.**

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## Assistance

*Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products. For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. See the end of this guide for the "Hewlett-Packard Sales and Service Offices" table.*

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## Safety Notes

The following safety notes are used throughout this manual. Familiarize yourself with each of the notes and its meaning before operating this instrument.

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<b>WARNING</b>	<b>Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.</b>
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<b>CAUTION</b>	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, would result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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## General Safety Considerations

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<b>WARNING</b>	<b>For continued protection against fire hazard replace line fuse only with same type and rating (3A/250V). The use of other fuses or material is prohibited.</b>
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<b>WARNING</b>	<b>This is a Safety Class I 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 the instrument, is likely to make the instrument dangerous. Intentional interruption is prohibited.</b>
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<b>CAUTION</b>	<b>Ventilation Requirements:</b> When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument 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.
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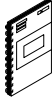
## How to Use This Guide

### This guide uses the following conventions:

Front-Panel Key	This represents a key physically located on the instrument.
Softkey	This represents a “softkey,” a key whose label is determined by the instrument’s firmware.
Screen Text	This represents text displayed on the instrument’s screen.

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# HP 8753E Network Analyzer Documentation Map



The **Installation and Quick Start Guide** familiarizes you with the HP 8753E network analyzer's front and rear panels, electrical and environmental operating requirements, as well as procedures for installing, configuring, and verifying the operation of the analyzer.



The **User's Guide** show how to make measurements, explains commonly-used features, and tells you how to get the most performance from your analyzer.



The **Quick Reference Guide** provides a summary of selected user features.



The **HP-IB Programming Examples Guide** provides a tutorial introduction using BASIC programming examples to demonstrate the remote operation of the network analyzer.



The **HP BASIC Programming Examples Guide** provides a tutorial introduction using BASIC programming examples to demonstrate the remote operation of the network analyzer.



The **System Verification and Test Guide** provides the system verification and performance test and the Performance Test Record for your HP 8753E network analyzer.

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# **1 Installing Your Analyzer**

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## **Installing Your Analyzer**

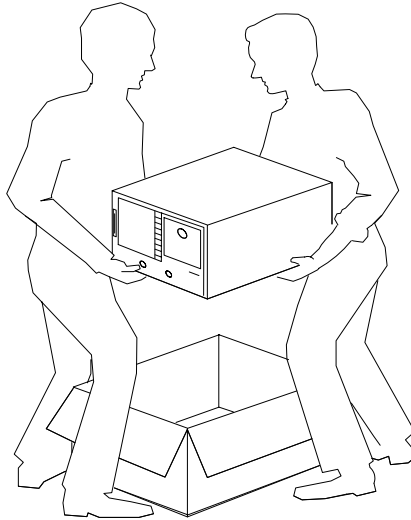
This chapter shows you how to install your analyzer and confirm the correct operation, by following the steps below:

1. Verify the shipment.
2. Familiarize yourself with the HP 8753E front and rear panels.
3. Meet electrical and environmental requirements.
4. Configure the analyzer.
5. Verify the analyzer operation.
6. Backup the EEPROM disk.

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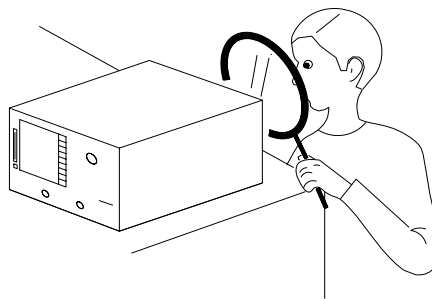
## STEP 1. Verify the Shipment

1. Unpack the contents of all the shipping containers. **WARNING:** The HP 8753E weighs approximately 46 pounds (21 kilograms). Use correct lifting techniques.



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2. Carefully inspect the analyzer to ensure that it was not damaged during shipment.



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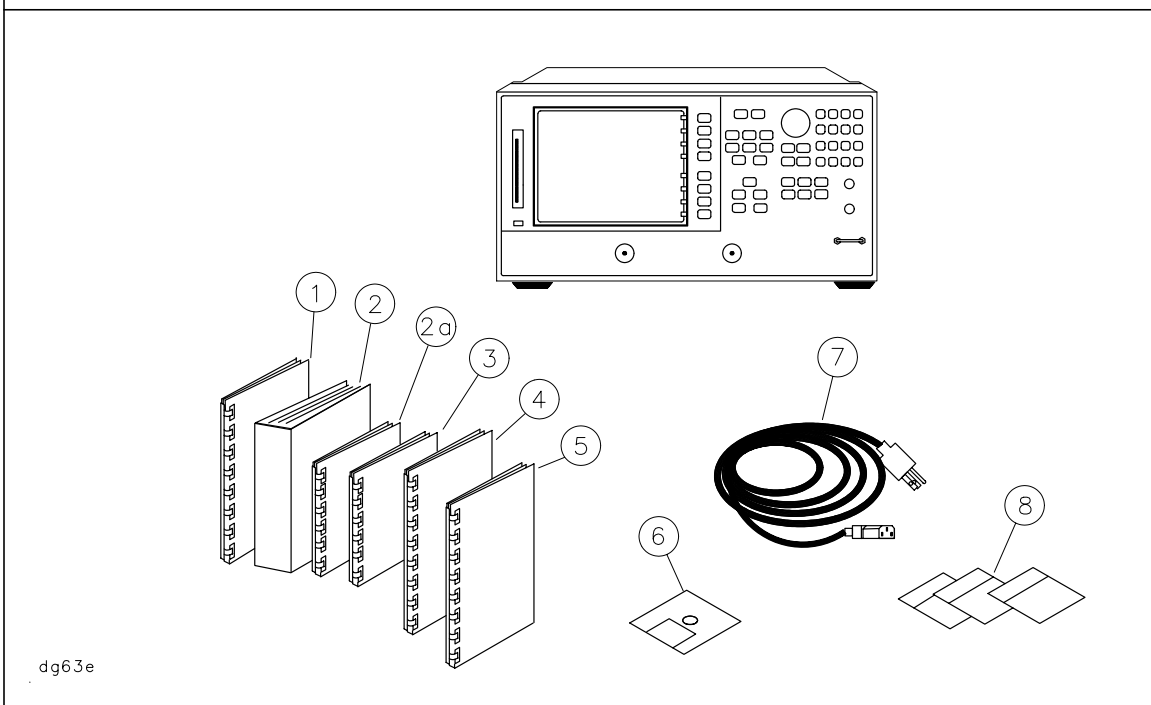
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### NOTE

If your analyzer was damaged during shipment, contact your nearest Hewlett-Packard office or sales representative. A list of HP Sales and Service offices is provided at the end of this guide.

**The PORT 1 and PORT 2 connectors move. This is NOT a defect.**

**3. Verify that all the accessories have been included with the analyzer.**

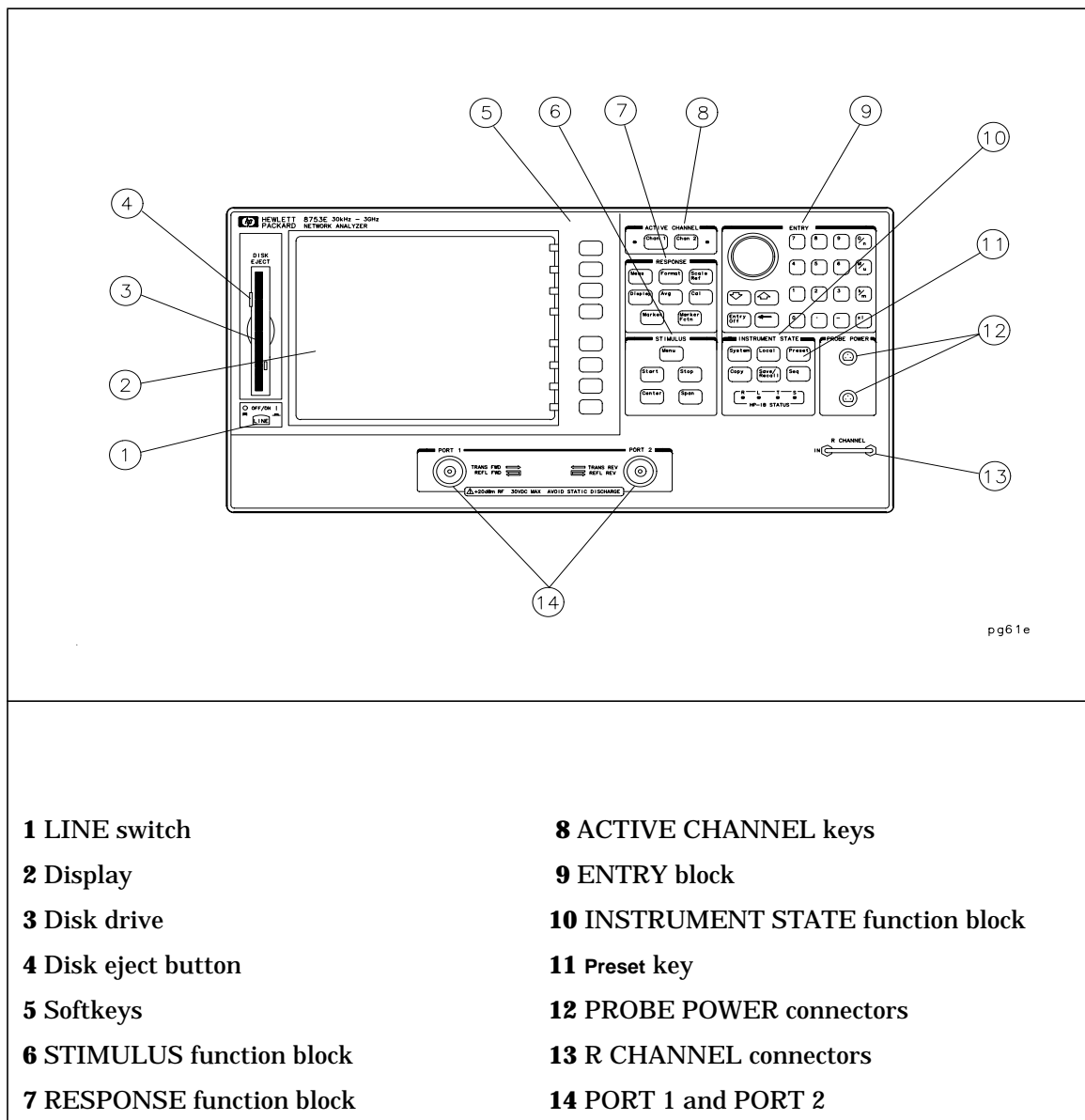


Received	Part Number	Item Number	Description
	08753-90369	1	Installation and Quick Start Guide
	08753-90367	2	User's Guide
	08753-90368	2a	Quick Reference Guide
	08753-90366	3	HP-IB Programming and Command Reference Guide
	08753-90413	4	HP BASIC Programming Examples Guide
	08753-90394	5	System Verification and Test Guide
	08753-10013	6	EEPROM Backup Disk
	unique to country	7	AC power cable
	5062-9216	8	Rack Flange Kit (Option 1CM only)
	5062-9236	8	Rack Flange Kit with Handles (Option 1CP only)
	5062-9229	8	Front Handle Kit (standard)

## STEP 2. Familiarize Yourself with the HP 8753E Front and Rear Panels

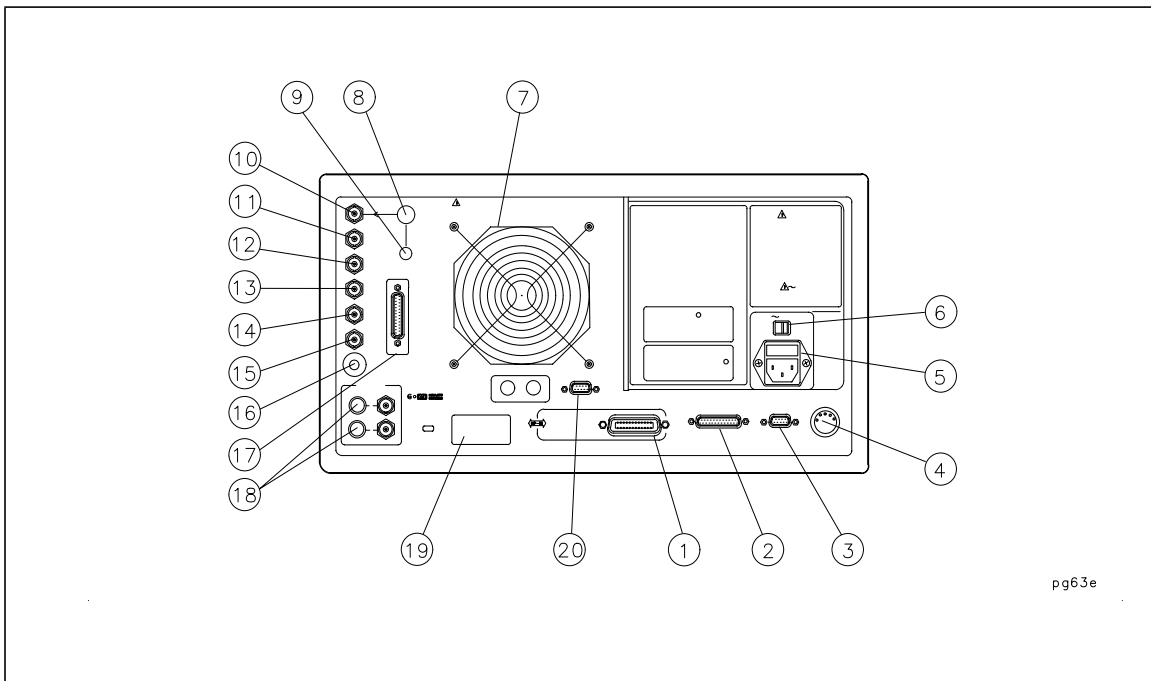
### HP 8753E Front Panel

**CAUTION** Do not mistake the line switch for the disk eject button. See the figure below. If the line switch is mistakenly pushed, the instrument will be turned off, losing all settings and data that have not been saved.





## HP 8753E Rear Panel

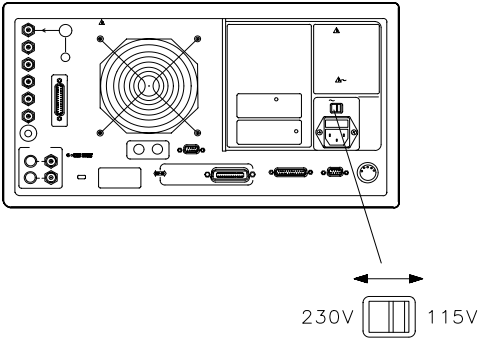
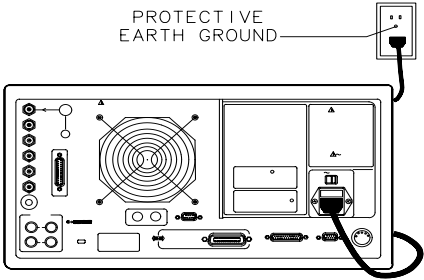


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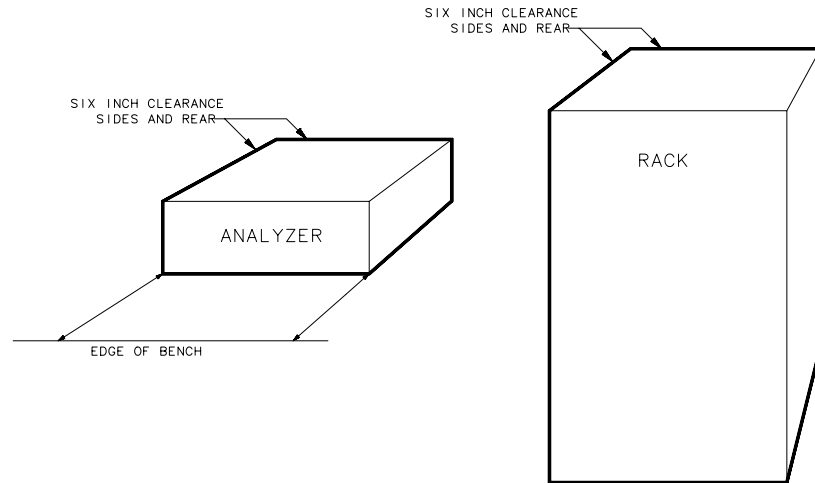
- |  |                                      |
|--|--------------------------------------|
| <b>1</b> HP-IB connector                     | <b>11</b> AUXILIARY INPUT connector  |
| <b>2</b> PARALLEL interface                  | <b>12</b> EXTERNAL AM connector      |
| <b>3</b> RS-232 interface                    | <b>13</b> EXTERNAL TRIGGER connector |
| <b>4</b> KEYBOARD input (mini-DIN)           | <b>14</b> TEST SEQUENCE              |
| <b>5</b> Power cord receptacle, with fuse    | <b>15</b> LIMIT TEST                 |
| <b>6</b> Line voltage selector switch        | <b>16</b> MEASURE RESTART            |
| <b>7</b> Fan                                 | <b>17</b> TEST SET INTERCONNECT      |
| <b>8</b> 10 MHZ PRECISION REFERENCE OUTPUT*  | <b>18</b> BIAS INPUTS AND FUSES      |
| <b>9</b> 10 MHZ REFERENCE ADJUST*            | <b>19</b> Serial number plate        |
| <b>10</b> EXTERNAL REFERENCE INPUT connector | <b>20</b> EXTERNAL MONITOR: VGA      |

\* Option 1D5.

## STEP 3. Meet Electrical and Environmental Requirements

<p><b>1.</b> Set the line-voltage selector to the position that corresponds to the AC power source.</p>	<p><b>2.</b> Ensure the available AC power source meets the following requirements:</p>
 <p>dg64e</p>	<ul style="list-style-type: none"> <li>■ 90–132 VAC</li> <li>■ 47–66 Hz / 400 Hz (single phase)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>■ 198–265 VAC</li> <li>■ 47–66 Hz (single phase)</li> </ul> <p>The analyzer power consumption is 350 VA max.</p>
<p><b>3.</b> Ensure the operating environment meets the following requirements:</p>	<p><b>4.</b> Verify that the power cable is not damaged, and that the power-source outlet provides a protective earth contact.</p>
<ul style="list-style-type: none"> <li>■ 0 to 55 C</li> <li>■ &lt; 95% relative humidity at 40 C (non-condensing)</li> <li>■ &lt; 15,000 feet ( <sup>a</sup> 4,500 meters) altitude</li> </ul> <p>Some HP 8753E performance parameters are specified for 25 °C ±5 °C. Refer to the <i>HP 8753E Network Analyzer User's Guide</i> for information on the environmental compatibility of warranted performance.</p>	 <p>dg65e</p> <p><b>WARNING:</b> Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal, can result in personal injury, or may damage the analyzer.</p>

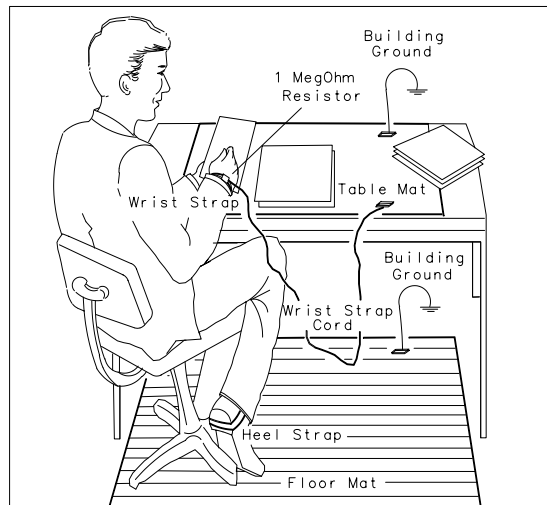
**5. Ensure there are at least six inches of clearance between the sides and back of either the stand-alone analyzer or the system cabinet.**



qq68d

**CAUTION:** The environmental temperature must be 4°C less than the maximum operating temperature of the analyzer for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is >800 watts, then you must provide forced convection.

**6. Set up a static-safe workstation. Electrostatic discharge (ESD) can damage or destroy electronic components.**



qq653d

- static-control table mat and earth ground wire: HP P/N 9300-0797
- wrist-strap cord: HP P/N 9300-0980
- wrist-strap: HP P/N 9300-1367
- heel-straps: HP P/N 9300-1308
- floor mat: not available through Hewlett-Packard

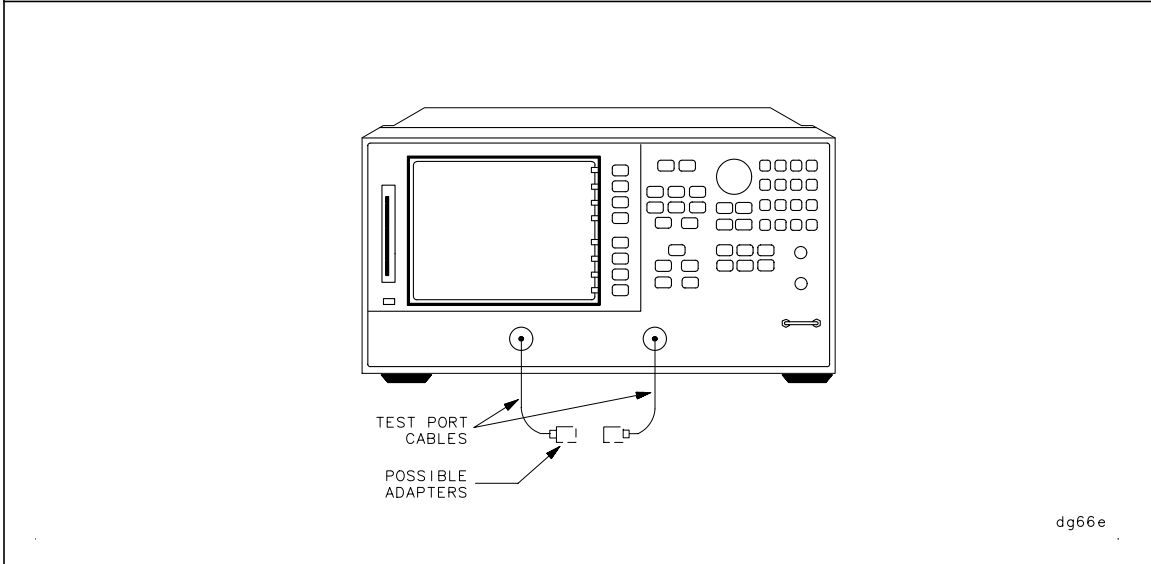
## **STEP 4. Configure the Analyzer**

This step shows you how to set up your particular analyzer configuration.

- standard configuration
- Option 1D5 configuration – high stability frequency reference
- printer or plotter configuration
- rack-mount configuration

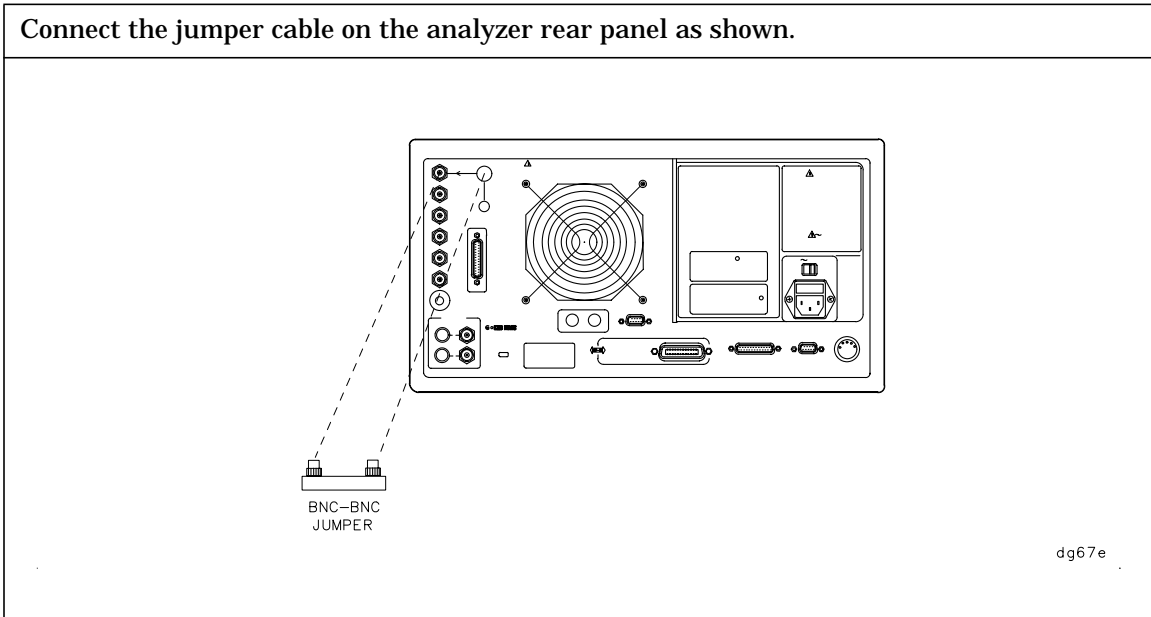
## To Configure the Standard Analyzer

Connect 7-mm cables and optional adapters if you are using other connector types.



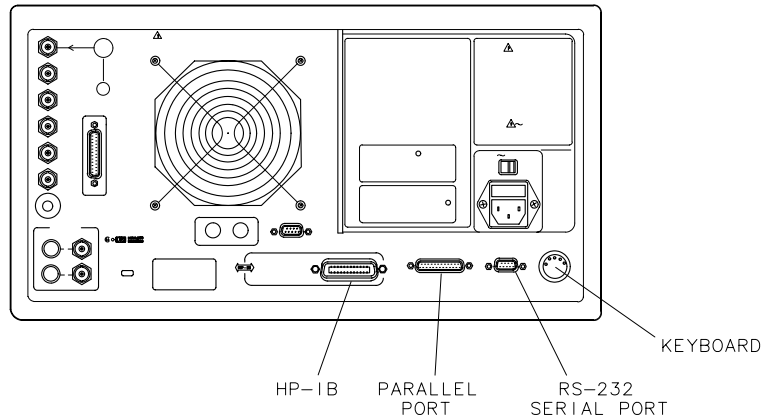
## To Configure the Analyzer that has a High Stability Frequency Reference (Option 1D5)

Connect the jumper cable on the analyzer rear panel as shown.



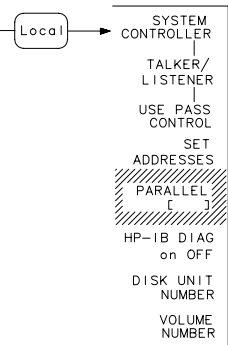
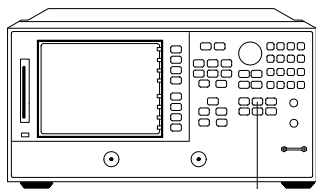
## To Configure the Analyzer with Printers or Plotters

1. Connect your printer or plotter to the corresponding interface.



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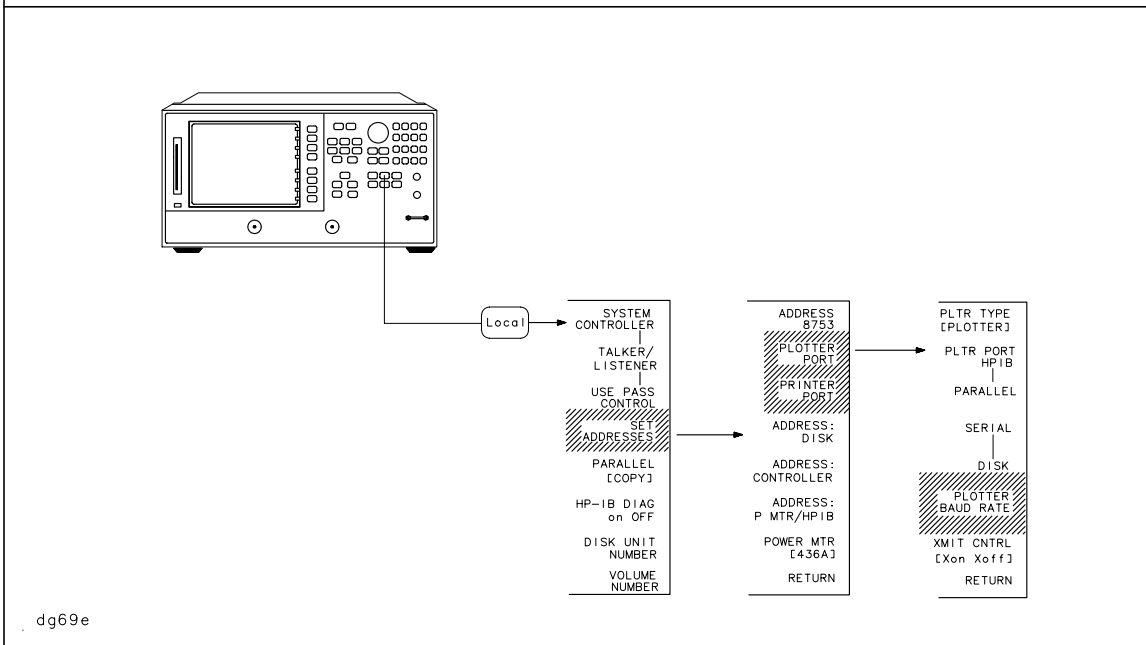
2. If you are using the parallel interface, press **Local** and **PARALLEL** until your choice of [GPIO] or [COPY] appears.



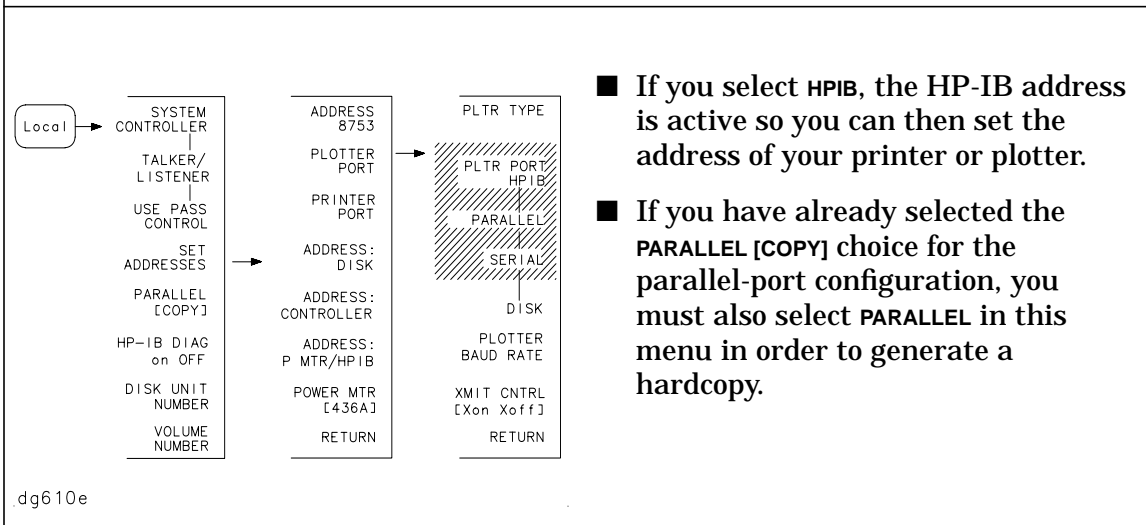
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- If you choose [COPY], the parallel port is dedicated for normal copy device use (printers or plotters).
- If you choose [GPIO], the parallel port is dedicated for general purpose I/O. The HP 8753E controls the data input or output, through the sequencing capability of the analyzer.

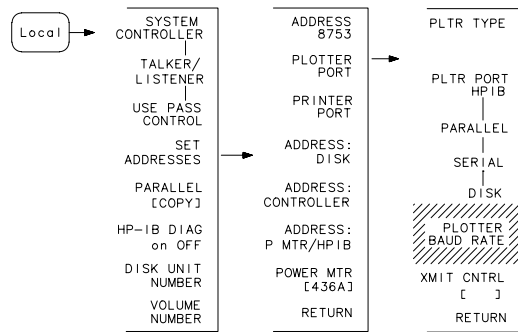
**3. Press SET ADDRESSES and then choose either PRINTER PORT or PLOTTER PORT, depending on your hardcopy device. Or, if you are plotting your files to disk, press SET ADDRESSES, PLOTTER PORT, DISK. Enter the HP-IB address of the peripheral, followed by [x1].**



**4. Press HP-IB and the key that corresponds to your printer or plotter interface: PARALLEL (parallel port) or SERIAL (serial port). NOTE: The plotter menu is shown as an example. It will only appear if you select PLOTTER PORT. Similar interface choices will appear if you select PRINTER PORT.**



**5.** If you will be using the serial port, adjust the analyzer's baud rate until it is equal to the baud rate set on the peripheral by pressing **PLOTTER BAUD RATE** or **PRINTER BAUD RATE** and the **↑** and **↓** front panel keys. **NOTE:** The plotter menu is shown as an example. It will only appear if you select **PLOTTER PORT**.

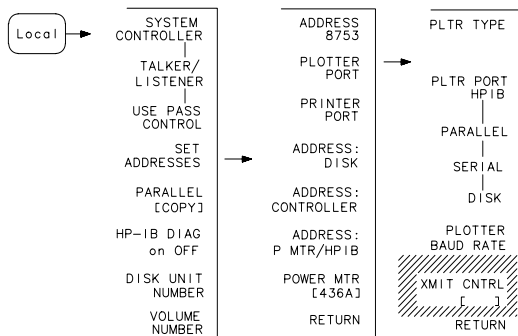


You can set the analyzer to the following rates:

- 1200
- 2400
- 4800
- 9600
- 19200

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**6.** Also, if you will be using the serial port, you must set the transmission control **XMIT CNTRL** (handshaking protocol) to either **Xon/Xoff** or **DTR/DSR** (equal to the transmission control set on the peripheral). **NOTE:** Transmission control for plotters is set programmatically. The plotter menu is shown as an example. It will only appear if you select **PLOTTER PORT**.

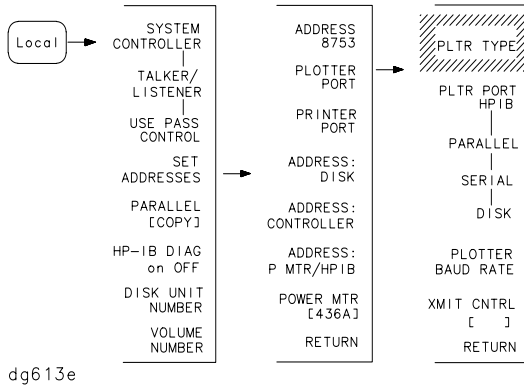


- **Xon/Xoff** sets transmission on/transmission off (software handshake).
- **DTR/DSR** sets data terminal ready/data set ready (hardware handshake).

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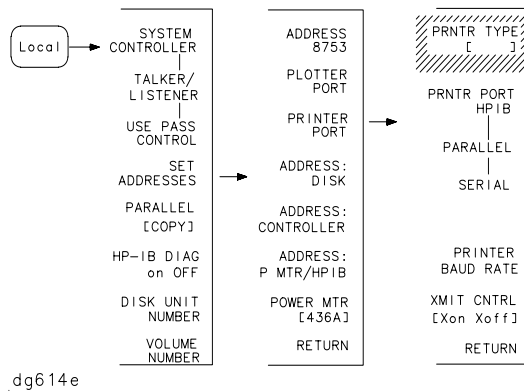


**7. If you will be using a plotter, select PLTR TYPE and keep pressing the key until the choice you want appears.**



- Choose **PLOTTER** for a pen plotter such as the HP 7440A, 7470A, 7475A, or 7550B.
- Choose **HPGL PRT** for a PCL5 compatible printer, which supports HP-GL/2, such as the:
  - LaserJet III
  - LaserJet 4
  - DeskJet 1200C

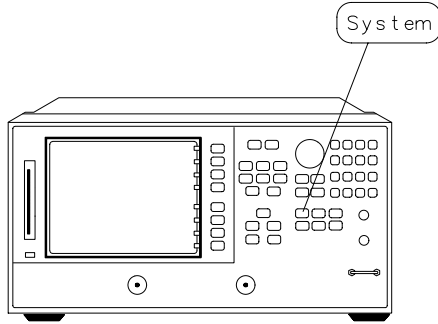
**8. If you will be using a printer, press PRNTR TYPE until your printer choice appears.**



- Choose your printer type from these HP printers:
  - THINKJET
  - DESKJET (except for HP DeskJet 540)
  - LASERJET
  - PAINTJET
  - DJ 540 (converts 100 dpi raster information to 300 dpi raster format)
- Choose **EPSON-P2** for Epson-compatible printers (ESC/P2 printer control language).

**9. Press System, SET CLOCK to begin setting and activating the time stamp feature so the analyzer places the time and date on your hardcopies and disk directories.**

**10. Press each of the following softkeys to set the date and time.**



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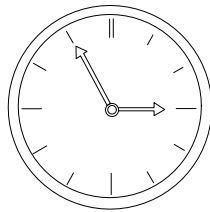
- TIME STAMP  
ON off
- ROUND  
SECONDS
- SET MINUTES — *Select Next Closest Minute*
- SET HOUR — *Select a Number for 24 Hour Clock (0-24)*
- SET DAY — *Select a Number for Calendar Date (1-31)*
- SET MONTH — *Select a Number for Calendar Month (1-12)*
- SET YEAR — *Select a Four Digit Number for Year*
- RETURN

dg616e

**11. Press ROUND SECONDS when the time is exactly as you have set it.**

**12. Press TIME STAMP so that ON is displayed on the softkey label. Then press RETURN.**

01NOV1997 14:55:00



- TIME STAMP  
ON off
- ROUND SECONDS — *Press to Synchronize Time*
- SET MINUTES
- SET HOUR
- SET DAY
- SET MONTH
- SET YEAR
- RETURN

dg631e

- TIME STAMP  
ON off — *Press to Activate Time Stamp*
- ROUND SECONDS
- SET MINUTES
- SET HOUR
- SET DAY
- SET MONTH
- SET YEAR
- RETURN — *Press when Finished*

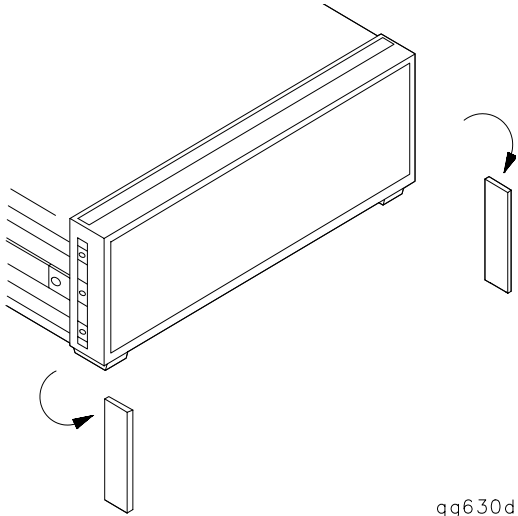
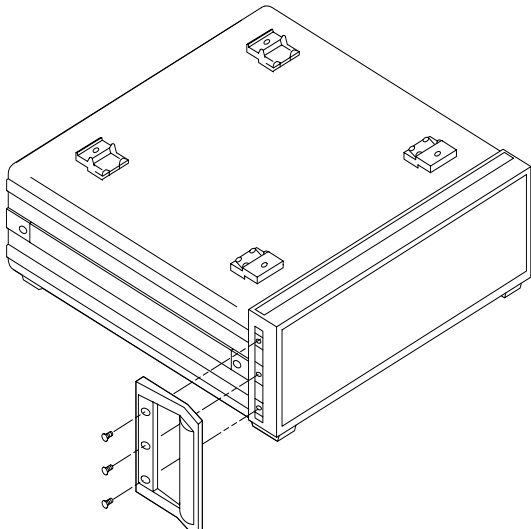
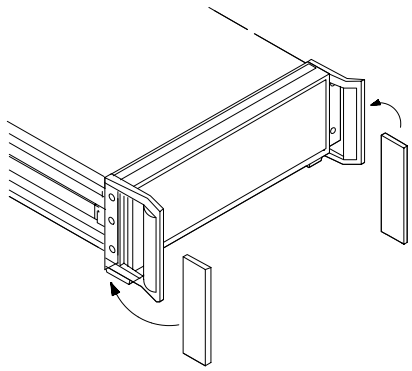
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## **To Configure the Analyzer for Rack Mount Use**

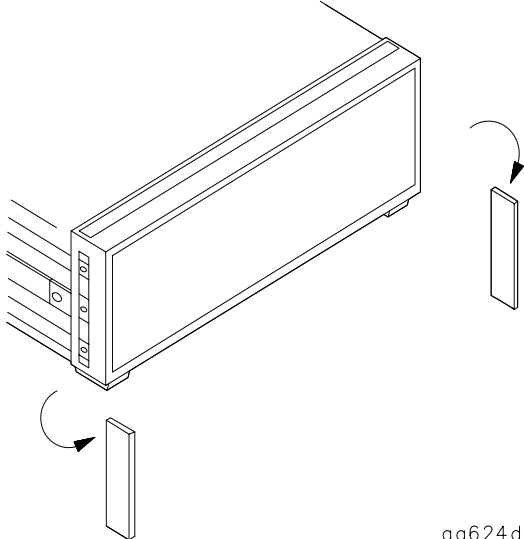
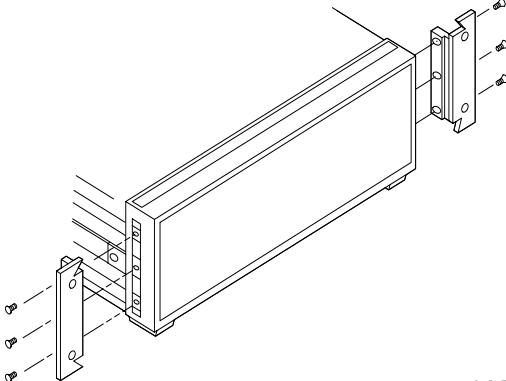
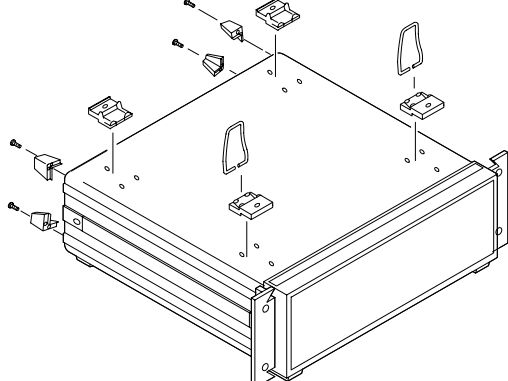
There are three kits available for the analyzer:

- instrument front handles kit (standard HP part number 5062-9229)
- cabinet flange kit without front handles (Option 1CM HP part number 5062-9216)
- cabinet flange kit with front handles (Option 1CP HP part number 5062-9236)

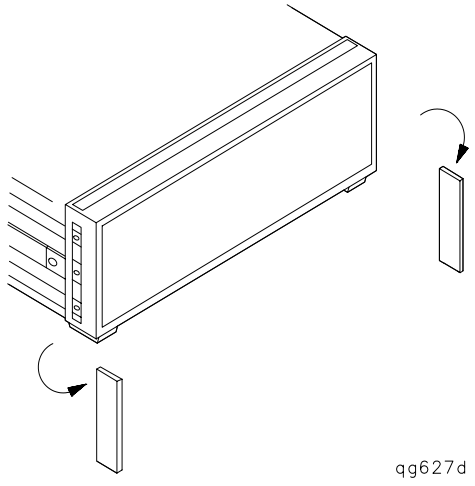
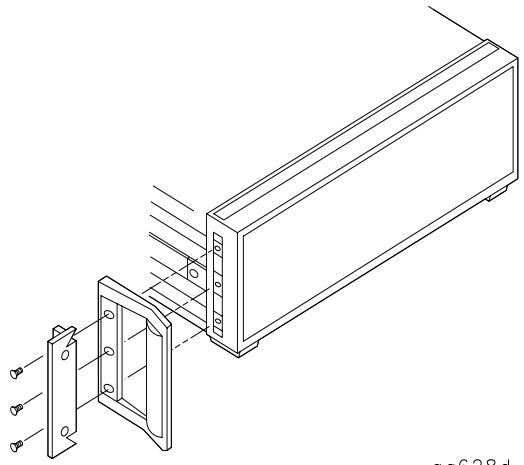
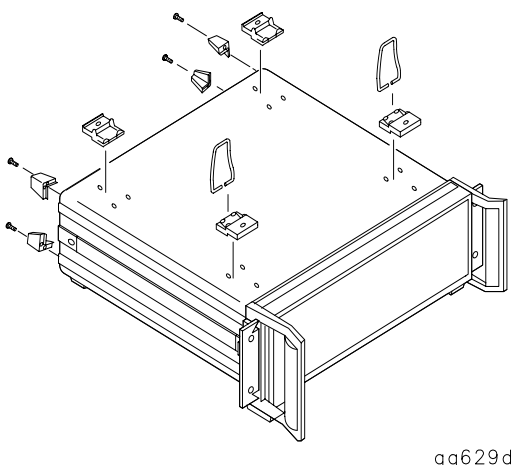
## To Attach Front Handles to the Analyzer (Standard)

<p>1. Ensure that the front handles kit is complete. <b>NOTE:</b> If any items are damaged or missing from the kit, contact the nearest HP sales and service office to order a replacement kit. Items within the kit (handles, flanges, screws, etc.) are not individually available.</p>	<p>2. Remove the side trim strips.</p>
<ul style="list-style-type: none"><li>■ (2) front handles</li><li>■ (6) screws</li><li>■ (2) trim strips</li></ul>	 <p>Diagram illustrating the removal of the side trim strips. The analyzer front panel is shown with two trim strips being removed from the sides. The trim strips are labeled with the part number qq630d.</p>
<p>3. Attach the handles to the sides of the front panel, using three screws for each handle.</p>	<p>4. Place the new trim strip over the screws on the handles.</p>
 <p>Diagram illustrating the attachment of the front handles to the analyzer front panel. The handles are shown being attached to the sides of the front panel using screws. The diagram is labeled with the part number qq631d.</p>	 <p>Diagram illustrating the placement of the new trim strips over the screws on the handles. The trim strips are shown being placed over the screws on the handles. The diagram is labeled with the part number qq632c.</p> <p><b>WARNING:</b> If an instrument handle is damaged, you should replace it immediately. Damaged handles can break while you are moving or lifting the instrument and cause personal injury or damage to the instrument.</p>

### To Attach Cabinet Flanges to the Analyzer (Option 1CM)

<p><b>1. Ensure that the cabinet flange kit is complete.</b></p>	<p><b>2. Remove side trim strips.</b></p>
<ul style="list-style-type: none"><li>■ (2) cabinet mount flanges</li><li>■ (6) screws</li></ul>	 <p>qq624d</p>
<p><b>3. Attach the cabinet flanges to the sides of the front panel using three screws for each flange.</b></p>	<p><b>4. Remove the feet and the tilt stands before cabinet mounting the instrument.</b></p>
 <p>qq625d</p>	 <p>qq626d</p>

## To Attach Cabinet Flanges and Front Handles to the Analyzer (Option 1CP)

<p><b>1.</b> Ensure that the cabinet flange kit with handles is complete.</p>	<p><b>2.</b> Remove the side trim strips.</p>
<ul style="list-style-type: none"><li>■ (2) cabinet mount flanges</li><li>■ (2) front handles</li><li>■ (8) screws</li></ul>	 <p>Diagram illustrating the removal of side trim strips from the analyzer front panel. Two trim strips are shown being removed from the left and right sides of the panel. The part number qq627d is indicated.</p>
<p><b>3.</b> Attach the cabinet mount flanges and the handles to the sides of the front panel, using four screws per side. (Attach the flanges to the outside of the handles.)</p>	<p><b>4.</b> Remove the feet and the tilt stands before cabinet mounting the instrument.</p>
 <p>Diagram illustrating the attachment of cabinet mount flanges and front handles to the analyzer front panel. The flanges are being attached to the outside of the handles. The part number qq628d is indicated.</p> <p><b>WARNING:</b> If an instrument handle is damaged, you should replace it immediately.</p>	 <p>Diagram illustrating the removal of feet and tilt stands from the analyzer front panel. The feet and tilt stands are shown being removed from the bottom of the panel. The part number qq629d is indicated.</p>

## STEP 5. Verify the Analyzer Operation

This step shows you how to check your analyzer for correct operation.

- installed options
- self-test
- operator's check
- transmission mode
- reflection mode

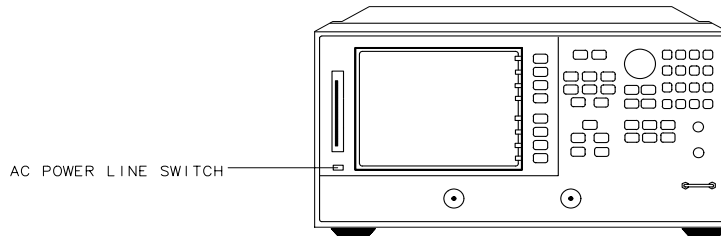
---

<b>NOTE</b>	The HP 8753E has a three-year warranty for repair at a Hewlett-Packard facility. If the HP 8753E should fail any of the following tests, call your local HP sales and service office. If repair is necessary, send the analyzer to the nearest HP service center with a description of any failed test and any error message. Ship the analyzer, using the original or comparable anti-static packaging materials. A table listing of Hewlett-Packard sales and service offices is provided at the end of this guide.
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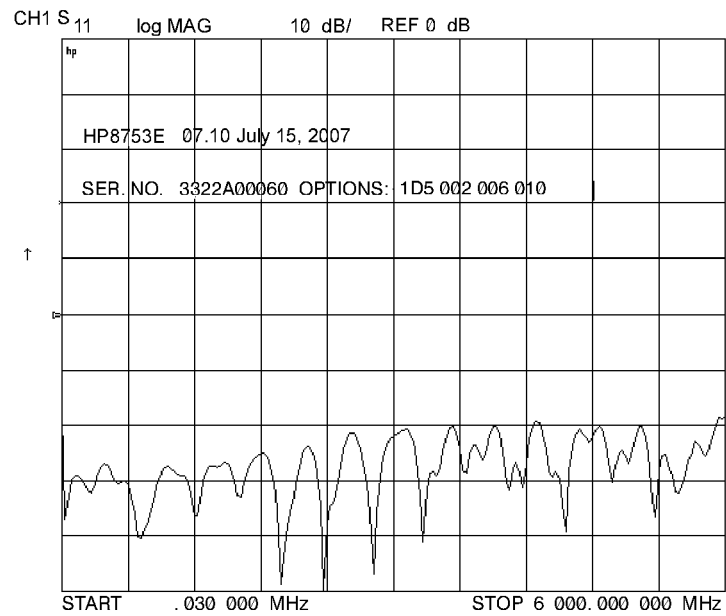
## To View the Installed Options

1. Switch on the AC power supplied to the analyzer, or cycle the AC power using the LINE switch, or press **System**, **SERVICE MENU**, **FIRMWARE REVISION**.



dg617e

2. Locate the serial number and configuration options. Compare them to the shipment documents.

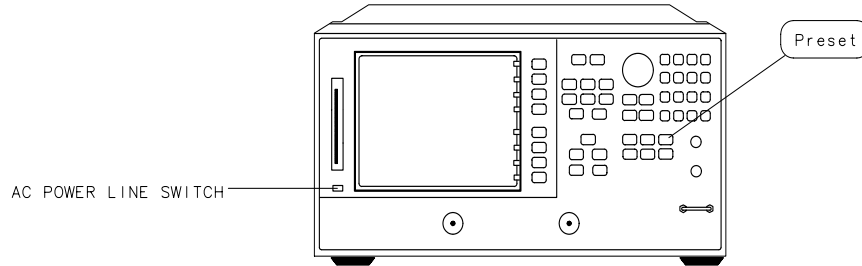


dg632e



## To Initiate the Analyzer Self-Test

1. Switch on the AC power supplied to the analyzer, and press **Preset**.



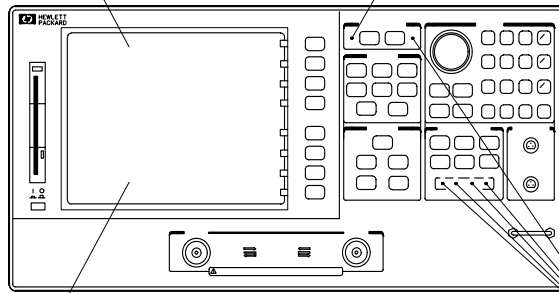
dg618e

2. Watch for the following indications that the analyzer is operating correctly:

MESSAGES APPEAR IN SEQUENCE:

INITIALIZING INSTRUMENT, PLEASE WAIT  
SELF TEST PASSED

ILLUMINATES DURING AND AFTER PRESET



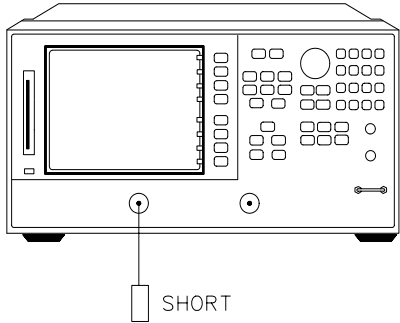
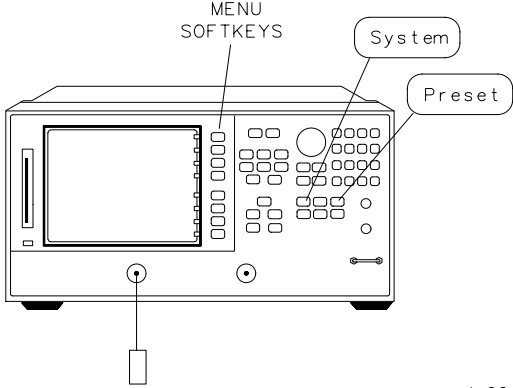
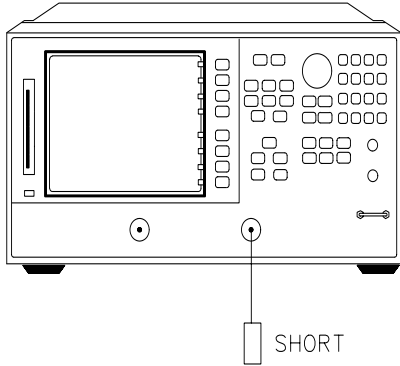
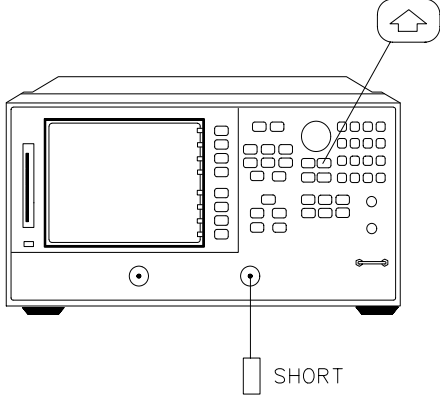
PARAMETERS APPEAR AFTER PRESET:

- CH1,  $S_{11}$ , log MAG, 10dB, REF 0dB
- START 30kHz, STOP 3GHz (or 6GHz FOR OPTION 006)

ILLUMINATES  $\approx$  4 SECONDS DURING PRESET

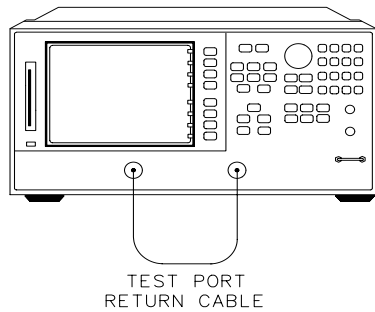
dg619e

## To Run the Operator's Check

<p><b>1. Connect the equipment as shown.</b></p>	<p><b>2. Press Preset, System, SERVICE MENU, TESTS, EXTERNAL TESTS, EXECUTE TEST.</b></p>
 <p>dg620e</p>	 <p>dg621e</p>
<p><b>3. Follow the prompts shown on the analyzer display and then press CONTINUE.</b></p>	<p><b>4. Press <math>\uparrow</math>, EXECUTE TEST, follow the prompts shown on the analyzer display, and then press CONTINUE.</b></p>
 <p>dg622e</p>	 <p>dg623e</p>

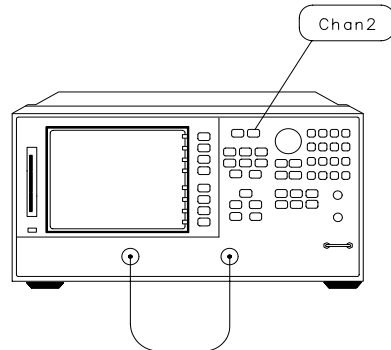
## To Test the Transmission Mode

**1.** Connect the equipment as shown and press **Preset**. **NOTE:** The test port return cable should have low-loss characteristics to avoid a degradation in frequency response at higher frequencies.



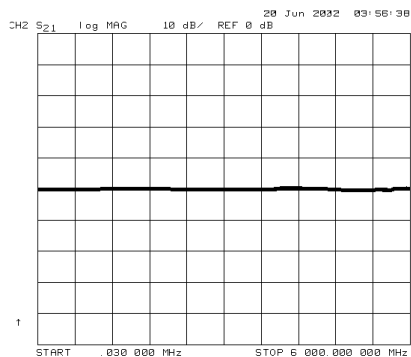
dg624e

**2.** To check the forward transmission mode for channel 2, press **Chan2**, **Meas**, **Trans:FWD S21(B/R)**.

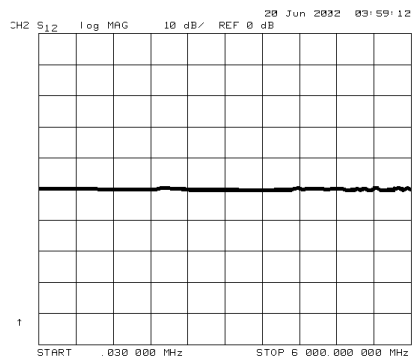


dg625e

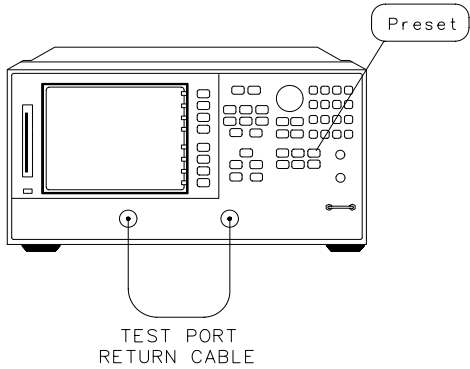
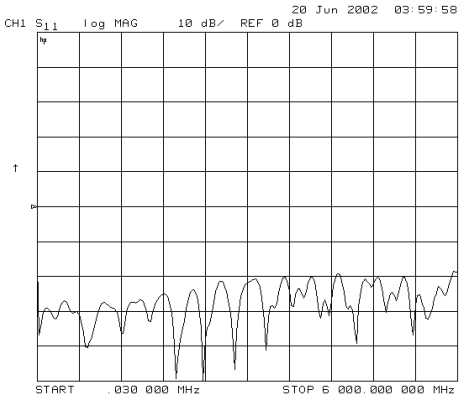
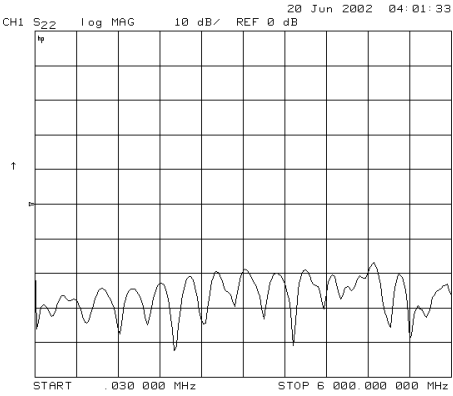
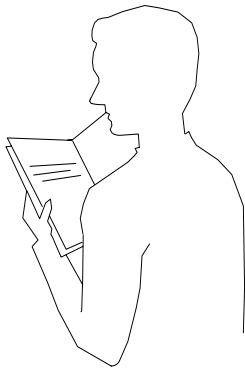
**3.** Look at the measurement trace displayed on the analyzer. It should be similar to the trace below. **NOTE:** The analyzer display shown below and to the right is an HP 8753E Option 006 display (30 kHz to 6 GHz span).



**4.** To check the reverse transmission mode for channel 2, press **Meas**, **Trans: REV S12 (A/R)**. The measurement trace should be similar to the trace below.



## To Test the Reflection Mode

<p><b>1. Connect the equipment as shown and press Preset.</b></p>	<p><b>2. Look at the measurement trace displayed on the analyzer. It should be similar to the trace below.</b></p>
 <p>TEST PORT RETURN CABLE</p> <p>dg626e</p>	 <p>CH1 S<sub>11</sub> log MAG 10 dB REF 0 dB</p> <p>20 Jun 2002 03:59:58</p> <p>START 0.030 000 MHz STOP 6.000 000 MHz</p>
<p><b>3. To check the reverse reflection mode for channel 1, press Meas, Refl: REV S22 (B/R). The measurement trace should be similar to the trace shown below.</b></p>	<p><b>4. If you are ready to start making measurements, continue with the next chapter "Quick Start: Learning How to Make Measurements".</b></p>
 <p>CH1 S<sub>22</sub> log MAG 10 dB REF 0 dB</p> <p>20 Jun 2002 04:01:33</p> <p>START 0.030 000 MHz STOP 6.000 000 MHz</p>	 <p>qg646d</p>

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## STEP 6. Back Up the EEPROM Disk

### Description

Correction constants are stored in EEPROM on the A9 controller assembly. The advantage of having an EEPROM backup disk is its capacity to store all the correction-constant data to a new or repaired A9 assembly without having to rerun the correction-constant procedures. The HP 8753E network analyzer is shipped from the factory with an EEPROM backup disk which is unique to each instrument. It is prudent to make a copy of the EEPROM backup disk so that it can be used in case of failure or damage to the original backup disk.

### Equipment

3.5-inch disk.....HP 92192A (box of 10)

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<b>CAUTION</b>	Do not mistake the line switch for the disk eject button. If the line switch is mistakenly pushed, the instrument will be turned off, losing all settings and data that have not been saved.
----------------	--

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### EEPROM Backup Disk Procedure

1. Insert a 3.5-inch disk into the HP 8753E disk drive.
2. Press **Preset** so that the preset state is stored.
3. If the disk is not formatted, press **Save/Recall**, **FILE UTILITIES**, **FORMAT DISK**.
  - To format a LIF disk, select **FORMAT:LIF** (The supplied EEPROM backup disk is LIF. The analyzer does not support LIF-HFS format.)
  - To format a DOS disk, select **FORMAT:DOS**Press **FORMAT INT DISK** and answer **YES** at the query.
4. Press **System**, **SERVICE MENU**, **SERVICE MODES**, **MORE**, **STORE EEPR ON**. Then press **Save/Recall**, **SELECT DISK**, **INTERNAL DISK**, **RETURN**, **SAVE STATE** to store the correction-constants data onto floppy disk.

---

<b>NOTE</b>	A default file "FILE0" is created. The file name appears in the upper left-hand corner of the display. The file type "ISTATE(E)" describes the file as an instrument-state with EEPROM backup.
-------------	--

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5. Press **FILE UTILITIES**, **RENAME FILE**, **ERASE TITLE**. Use the **RPG** and the **SELECT LETTER** softkey to rename the file "FILE0" to "N12345" where 12345 represents the last 5 digits of the instrument's serial number. (The first character in the file name must be a letter.) When finished, press **DONE**.

6. Label the disk with the serial number of the instrument, the date, and the words "EEPROM Backup Disk".

---

<b>NOTE</b>	Whenever the HP 8753E network analyzer is returned to Hewlett-Packard for servicing and/or calibration, the EEPROM backup disk should be returned with the analyzer. This will significantly reduce the instrument repair time.
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7. The EEPROM backup disk procedure is now complete.



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## **2 Quick Start: Learning How to Make Measurements**

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## **Quick Start: Learning How to Make Measurements**

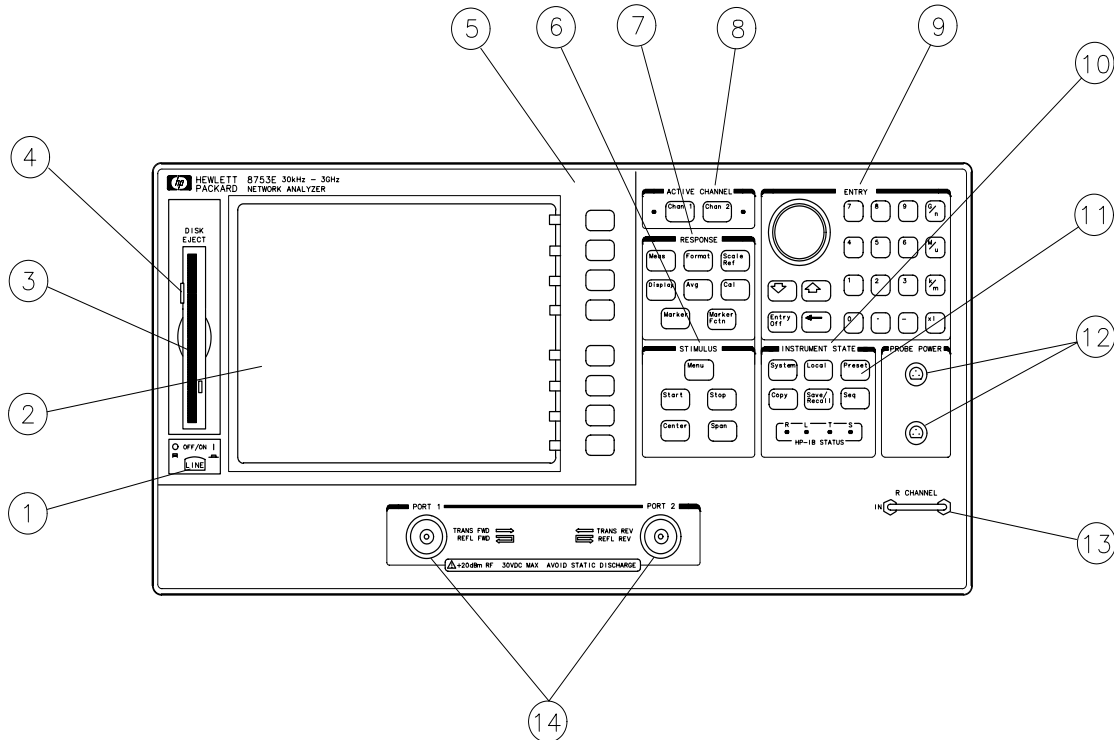
The information and procedures in this chapter teach you how to make measurements and what to do if you encounter a problem with your analyzer. The following sections are included:

- Front Panel
- Measurement Procedure
- Learning to Make Transmission Measurements
- Learning to Make Reflection Measurements
- If You Encounter a Problem

## The HP 8753E - Front Panel

**CAUTION** Do not mistake the line switch for the disk eject button. See the figure below. If the line switch is mistakenly pushed, the instrument will be turned off, losing all settings and data that have not been saved.

**Figure 2-1 The HP 8753E Network Analyzer Front Panel**



pg61e

- 1. LINE switch.** This switch controls ac power to the analyzer. 1 is on, 0 is off.
- 2. Display.** This shows the measurement data traces, measurement annotation, and softkey labels.
- 3. Disk drive.** This 3.5-inch drive allows you to store and recall instrument states and measurement results for later analysis.
- 4. Disk eject button.** This button ejects the disk from the disk drive.
- 5. Softkeys.** These keys provide access to menus that are shown on the display.
- 6. STIMULUS function block.** The keys in this block allow you to control the analyzer source's frequency, power, and other stimulus functions.
- 7. RESPONSE function block.** The keys in this block allow you to control the measurement and display functions of the active display channel.

**8. ACTIVE CHANNEL keys.** The analyzer has two independent display channels. These keys allow you to select the active channel. Then any function you enter applies to this active channel.

**9. The ENTRY block.** This block includes the knob, the step  $\uparrow \downarrow$  keys, and the number pad. These allow you to enter numerical data and control the markers.

You can use the numeric keypad to select digits, decimal points, and a minus sign for numerical entries. You must also select a units terminator to complete value inputs.

**10. INSTRUMENT STATE function block.** These keys allow you to control channel-independent system functions such as the following:

- copying, save/recall, and HP-IB controller mode
- limit testing
- external source mode
- tuned receiver mode
- frequency offset mode
- test sequence function
- harmonic measurements (Option 002)
- time domain transform (Option 010)

HP-IB STATUS indicators are also included in this block.

**11. Preset key.** This key returns the instrument to either a known factory preset state, or a user preset state that can be defined. Refer to the "Preset State and Memory Allocation" chapter in the *HP 8753E Network Analyzer User's Guide* for a complete listing of the instrument preset condition.

**12. PROBE POWER connectors.** These connectors (fused inside the instrument) supply power to an active probe for in-circuit measurements of ac circuits.

**13. R CHANNEL connectors.** These connectors allow you to apply an input signal to the analyzer's R channel, for frequency offset mode.

**14. PORT 1 and PORT 2.** These ports output a signal from the source and receive input signals from a device under test. PORT 1 allows you to measure  $S_{12}$  and  $S_{11}$ . PORT 2 allows you to measure  $S_{21}$  and  $S_{22}$ .

---

## Measurement Procedure

This is a general measurement procedure that is used throughout the guide to illustrate the use of the HP 8753E.

### Step 1. Choose measurement parameters with your test device connected

- Press the **Preset** key to return the analyzer to a known state.
- Connect your test device to the analyzer.

---

<b>CAUTION</b>	Damage may result to the device under test if it is sensitive to analyzer's default output power level. To avoid damaging a sensitive DUT, be sure to set the analyzer's output power to an appropriate level before connecting the DUT to the analyzer.
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- Choose the settings that are appropriate for the intended measurement.
  - measurement type
  - frequencies
  - number of points
  - power
  - measurement trace format
- Make adjustments to the parameters while you viewing the device response.

### Step 2. Make an error-correction (measurement calibration)

Press the **cal** key to begin to make an error-correction using a known set of standards (a calibration kit). An error-correction establishes a magnitude and phase reference for the test setup and then reduces systematic measurement errors.

### Step 3. Measure the device

- Reconnect the device under test.
- Use the markers to identify various device response values.

### Step 4. Output measurement results

- Store the measurement file to a disk.
- Generate a hardcopy with a printer or plotter.

---

## Learning to Make Transmission Measurements

This example procedure shows you how to measure the transmission response of a bandpass filter. The measurement parameters listed are unique to this particular test device.

For further measurement examples, refer to the "Optimizing Measurement Results" chapter in the *HP 8753E Network Analyzer User's Guide*.

### Step 1. Choose the measurement parameters with your test device connected

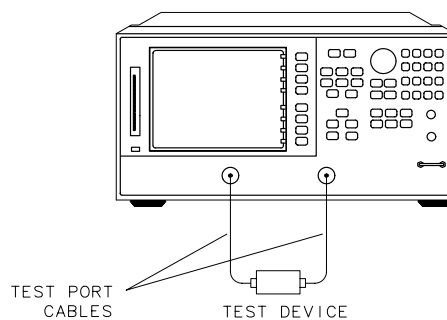
1. Press the **Preset** key to return the analyzer to a known state.
2. Connect your test device to the analyzer as shown in [Figure 2-2](#).

---

<b>CAUTION</b>	Damage may result to the device under test if it is sensitive to analyzer's default output power level. To avoid damaging a sensitive DUT, be sure to set the analyzer's output power to an appropriate level before connecting the DUT to the analyzer.
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**Figure 2-2** Device Connections for a Transmission Measurement



dg627e

3. Choose the following measurement settings:

**Meas, Trans: FWD S21 (B/R)**

**Center, 125, M/μ (Change to match the center frequency of your device.)**

**Span, 125, M/μ (Change to match the bandwidth of your device.)**

**Menu, POWER, 5, x1, RETURN**

**Scale Ref, AUTO SCALE**

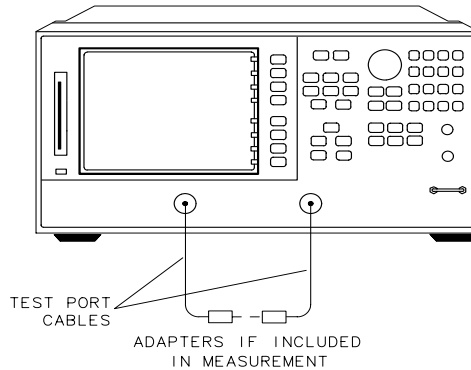
4. Look at the device response to determine if these are the parameters that you want for your device measurement. For example, if the trace is noisy you may want to increase the test port output power (which increases the analyzer input power), reduce the IF bandwidth, or add averaging. Or, to better see an area of interest, you may want to change the test frequencies.

## Step 2. Make an error-correction (measurement calibration)

1. Connect a "thru" between the measurement cables, as shown in [Figure 2-3](#). Include all the adapters that you will use in your device measurement.

If noise reduction techniques are needed for the measurement, the instrument's settings (reduced IF BW, and /or averaging) should be done prior to any error-correction.

**Figure 2-3** Connections for a "Thru" Calibration Standard



dg628e

2. Press the following keys to make a transmission response calibration:

Cal, CALIBRATE MENU, RESPONSE, THRU

3. To save the error-correction (measurement calibration), press:

Save/Recall, SELECT DISK

4. Next, choose from the following options:

- Choose INTERNAL MEMORY if you want to save the calibration results and instrument state to the analyzer's memory.
- Choose INTERNAL DISK if you want to save the calibration results and instrument state to the disk that is in the analyzer's internal disk drive.
- Choose EXTERNAL DISK if you want to save the calibration results and instrument state to the disk that is in an (optional) external disk drive that is configured to the analyzer.

5. Press RETURN, SAVE STATE to save the error-correction (measurement calibration).

---

**NOTE** Example procedures for all types of error-corrections (measurement calibrations) are located in the "Optimizing Measurement Results" chapter in the *HP 8753E Network Analyzer User's Guide*. For information on the analyzer operation during an error-correction (measurement calibration), refer to the "Application and Operation Concepts" chapter in the user's guide.

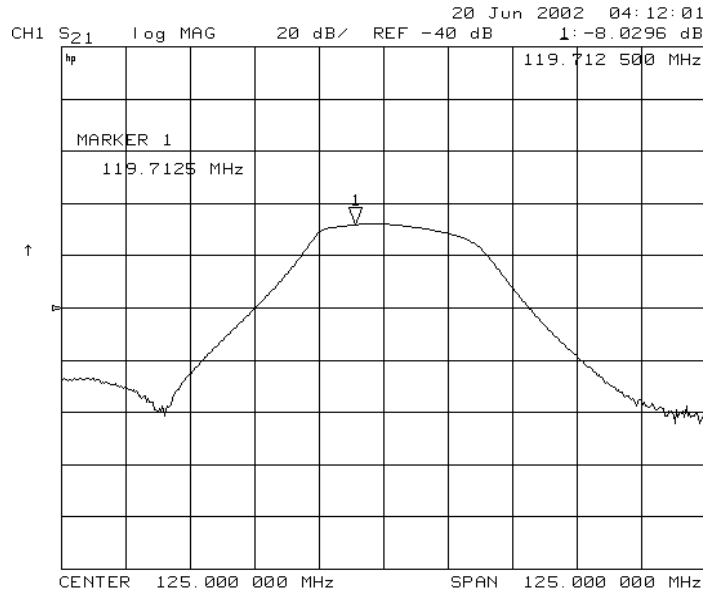
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### Step 3. Measure the device

1. Connect your test device as in Figure 2-2. Use adapters where appropriate.
2. Press **Scale Ref**, **AUTO SCALE** to reposition the measurement trace for the best view.
3. Press **Marker** and turn the front panel knob to place the marker at a frequency of interest. Read the device's insertion loss to 0.001 dB resolution as shown in Figure 2-4.

The analyzer shows the frequency of the marker location in the active entry area (upper-left corner of display). The analyzer also shows the amplitude and frequency of the marker location in the top-right corner of the display.

**Figure 2-4 Example Measurement of Insertion Loss**



## Step 4. Output measurement results

In this example procedure you are shown how to output (store) measurement results to a disk.

For more information on creating a hardcopy of the measurement results, refer to the "Printing, Plotting, and Saving Measurement Results" chapter in the *HP 8753E Network Analyzer User's Guide*.

---

<b>CAUTION</b>	Do not mistake the line switch for the disk eject button. If the line switch is mistakenly pushed, the instrument will be turned off, losing all settings and data that have not been saved.
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1. Insert a DOS- or LIF-formatted disk into the analyzer disk drive. The analyzer does not support LIF-HFS (hierarchy file system).
2. To output the measurement results to a disk, press:

Save/Recall, **SELECT DISK**

- Choose **INTERNAL MEMORY** if you want to save the measurement results to the analyzer's internal memory.
  - Choose **INTERNAL DISK** if you want to save the measurement results to the analyzer's internal disk drive.
  - Choose **EXTERNAL DISK** if you want to save the measurement results to an (optional) external disk drive that is configured to the analyzer.
3. Press **RETURN, DEFINE DISK-SAVE**
    - Choose **DATA ARRAY ON** if you want to store the error-corrected data on disk with the instrument state.
    - Choose **RAW ARRAY ON** if you want to store the raw data (ratioed and averaged, but no error-correction) on disk with the instrument state.
    - Choose **FORMAT ARRAY ON** if you want to store the formatted data on disk with the instrument state.
    - Choose **GRAPHICS ON** if you want to store user graphics on disk with the instrument state.
    - Choose **DATA ONLY ON** if you want to only store the measurement data of the device under test. The analyzer will not store the instrument state and error-correction (measurement calibration). Therefore, the saved data cannot be retrieved into the analyzer.

---

<b>NOTE</b>	Selecting <b>DATA ONLY ON</b> will override all of the other save options. Because this type of data is only intended for computer manipulation, the file contents of a <b>DATA ONLY ON</b> save cannot be recalled and displayed on the analyzer.
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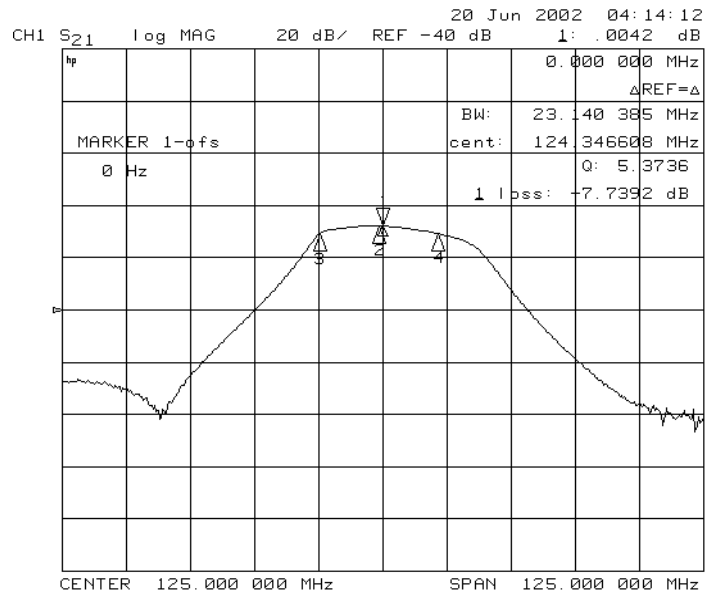
- Choose **SAVE USING BINARY** if you want to store data in a binary format.
  - Choose **SAVE USING ASCII** if you want to store data in an ASCII format, to later read on a computer.
4. Press **RETURN, SAVE STATE** and the analyzer saves the file with a default title.



## Measuring Other Aspects of Insertion Loss with Marker Functions

Using the analyzer marker functions, you can derive several important filter parameters from the measurement trace that is shown on the analyzer display.

**Figure 2-5 Example Measurement of 3 dB Bandwidth**



### Measuring 3 dB Bandwidth.

The analyzer can calculate your test device bandwidth between two equal power levels. In this example procedure, the analyzer calculates the  $-3$  dB bandwidth relative to the center frequency of the filter.

1. Press **Marker** and turn the front panel knob to move the marker to the center frequency position of the filter passband.

You can also position the marker by entering a frequency location: for example, press 125, M/μ.

2. Press **MKR ZERO** to zero the delta marker magnitude and frequency (this sets the delta marker reference). The  $-3$  dB points will be relative to this marker.

The softkey label changes to **MKR ZERO Δ REF=Δ** to show you that the delta reference point is the small Δ symbol.

3. Press **Marker Fctn**, **MKR SEARCH** to enter the marker search mode.
4. Press **WIDTHS ON**.

The analyzer calculates the  $-3$  dB bandwidth, the center frequency and the Q (Quality Factor) of the test device and lists the results in the upper-right corner of the display. Markers 3 and 4 indicate the location of the  $-3$  dB points, as shown in [Figure 2-5](#).

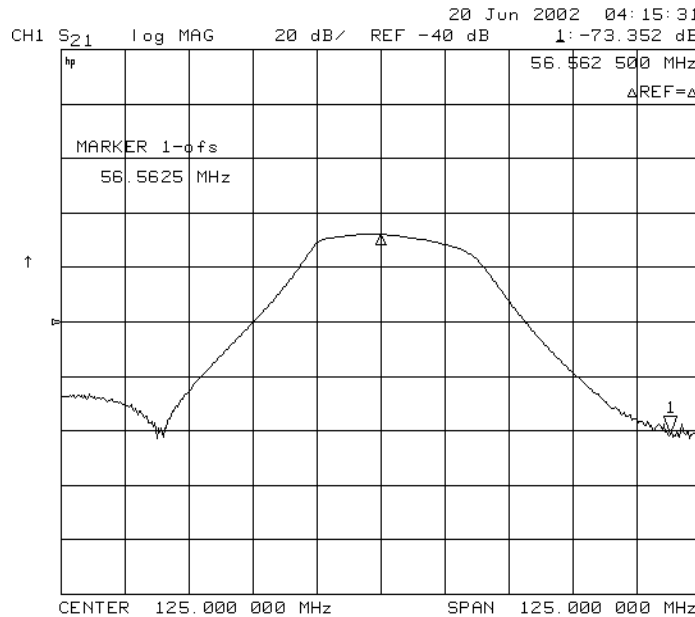
5. Press WIDTH VALUE and enter  $-$ , 6, x1.

The analyzer now calculates the bandwidth between  $-6$  dB power levels.

6. Press Marker, all OFF when you are finished with this measurement.

### Measuring Out-of-Band Rejection.

**Figure 2-6 Example Measurement of Out-of-Band Rejection**



1. Press MARKER 1. The marker appears where you placed it during the bandwidth measurement.
2. Press MKR ZERO, Marker Fctn, MKR SEARCH, SEARCH: MIN.

The marker automatically searches for the minimum point on the trace. The frequency and amplitude of this point, relative to the delta symbol in the center of the filter passband, appear in the upper-right corner of the display. This value is the difference between the maximum power in the passband and the power in the rejection band, that is, one of the peaks in the rejection band.

---

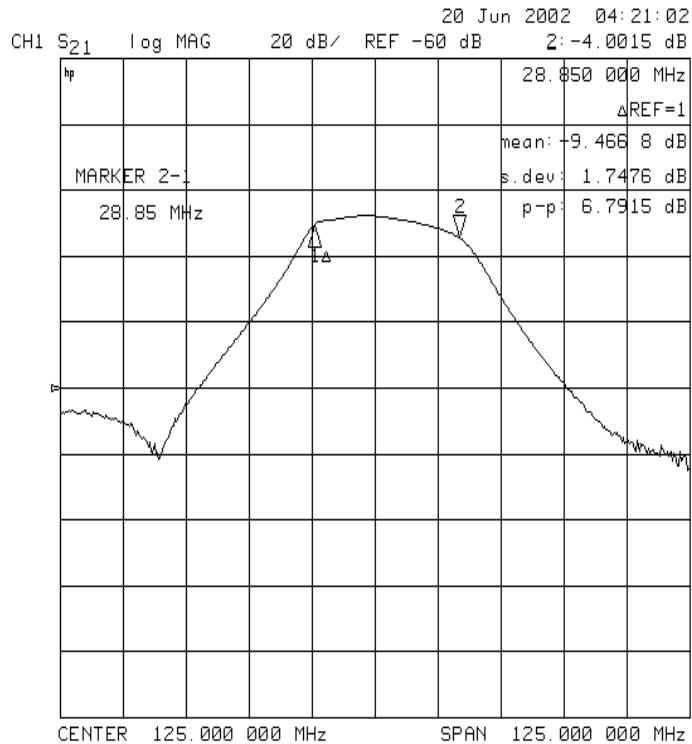
**NOTE** You can use the marker search mode to search the trace for the maximum point or for any target value. The target value can be an absolute level (for example,  $-3$  dBm) or a level relative to the location of the small delta symbol (for example:  $-3$  dB from the center of the passband).

---

3. If your measurement needs some noise reduction, you could reduce the IF bandwidth or add averaging.
  - To reduce the IF bandwidth, press Avg, IF BW, ↓.
  - To add averaging, press Avg, AVERAGING ON.

## Measuring Passband Flatness or Ripple.

**Figure 2-7 Example Measurement of Passband Flatness or Ripple**



Passband flatness (or ripple) is the variation in insertion loss over a specified portion of the passband.

Continue with the following steps to measure passband flatness or ripple.

1. Press **Save/Recall**, **RECALL STATE** to recall the error-corrected transmission measurement that has no markers engaged.
2. Press **Marker** and turn the front panel knob to move marker 1 to the left edge of the passband.
3. Press **ΔMODE MENU**, **Δ REF=1** to change the marker 1 position to the delta reference point.
4. Press **MARKER 2** and turn the front panel knob to move marker 2 to the right edge of the passband.
5. Press **Marker Fctn**, **MKR MODE MENU**, **STATS ON**.

The analyzer calculates the mean, standard deviation, and peak-to-peak variation between the  $\Delta$  reference marker and the active marker, and lists the results in the upper-right corner of the display. The passband ripple is automatically shown as the peak-to-peak variation between the markers.

---

## Learning to Make Reflection Measurements

This example procedure shows you how to measure the reflection response of a bandpass filter. The measurement parameter values listed are unique to this particular test device.

For further measurement examples, refer to the "Making Measurements" chapter in the *HP 8753E Network Analyzer User's Guide*.

---

<b>NOTE</b>	Reflection measurements monitor only one port of a test device. When a test device has more than one port, you must ensure that the unused port(s) are terminated in their characteristic impedance (for example, 50Ω or 75Ω). If you do not terminate unused ports, reflections from these ports will cause measurement errors.  You can connect an unused device port to the unused analyzer test port, to act as a termination. For example: when you are measuring $S_{11}$ or $S_{22}$ , you can connect an unused device port to the analyzer's PORT 2 or PORT 1, respectively.
-------------	---

---

The signal reflected from the device under test is measured as a ratio of the reflected energy versus the incident energy. It can be expressed as reflection coefficient, return loss, or standing-wave-ratio (SWR). These measurements are mathematically defined as follows:

<b>reflection coefficient (<math>\Gamma</math>)</b>	= reflected voltage / incident voltage = $S_{11}$ or $S_{22}$ (magnitude and phase)
<b>magnitude of reflection coefficient (<math>\rho</math>)</b>	= $ \Gamma $
<b>return loss (dB)</b>	= $-20 \log(\rho)$ , where $(\rho) =  \Gamma $
<b>standing-wave-ratio (SWR)</b>	= $V_{\text{maximum}} / V_{\text{minimum}}$ = $(1 + \rho) / (1 - \rho)$

## Step 1. Choose measurement parameters with your test device connected

---

**NOTE** For purposes of explanation, a 125 MHz bandpass filter was used as the test device throughout this section.

---

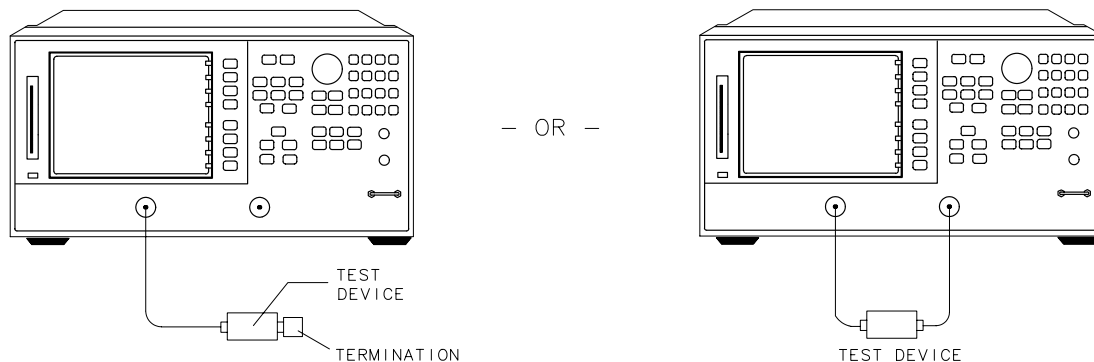
1. Press the **Preset** key to return the analyzer to a known state.
2. Connect your test device as shown in [Figure 2-8](#).

---

**CAUTION** Damage may result to the device under test if it is sensitive to analyzer's default output power level. To avoid damaging a sensitive DUT, be sure to set the analyzer's output power to an appropriate level before connecting the DUT to the analyzer.

---

**Figure 2-8 Connections for Reflection Measurements**



dg629e

3. Choose the following measurement parameters:

**Meas, Refl:FWD S11 (A/R)**  
**Center, 125, M/μ**  
**Span, 100, M/μ**  
**Menu, POWER, 5, x1, RETURN**  
**Scale Ref, AUTO SCALE**

---

**NOTE** If you press **Start** and **Stop**, the analyzer will show the frequencies at the beginning and end of the frequency span that you have set up around the center frequency. This is also another method you could use to set the analyzer's measurement frequencies.

---

4. Look at the device response to determine if these are the measurement parameters that you want. For example, if the trace is noisy you may want to increase the input power, reduce the IF bandwidth, or add averaging. Or, to better see an area of interest, you may want to change the test frequencies.

## Step 2. Make an error-correction (measurement calibration)

Follow these instructions to make an  $S_{11}$  1-port error correction:

1. Select a calibration kit that is appropriate to your device under test. Press **Cal**, **CAL KIT**, **SELECT CAL KIT**. Choose the calibration kit that is appropriate to your test device by pressing the appropriate softkey. For example, if your test device uses type-N 50 $\Omega$  connectors, press **N 50 $\Omega$** . If your test device uses 7-mm connectors, press **7mm**, and so on.
2. Press **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**.
3. Follow the prompts shown on the analyzer display to connect and measure an open, short, and load on **PORT 1**.

Any choice of male/female in the calibration process should always be made for the sex that represents the test port. For example, if the test port had a male, type-N connector, you would connect the female, type-N calibration device. But when you follow the prompts on the analyzer to measure a short calibration standard, you would select **SHORT (M)**, or the sex that represents the test port.

---

**CAUTION** To ensure an accurate error correction, you must connect the calibration standards to the adapters or cables that you will include in the actual device measurement.

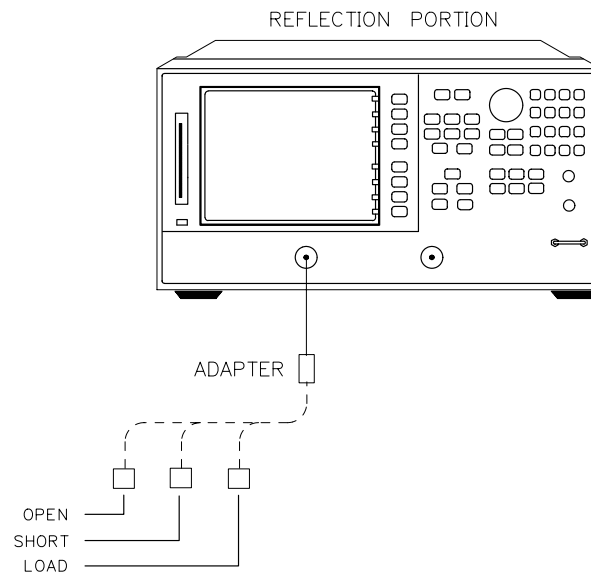
---

---

**NOTE** If a mistake is made, standards can be measured more than once before pressing **DONE 1-PORT CAL**.

---

**Figure 2-9** Connections for an  $S_{11}$  1-Port Error-Correction (Measurement Calibration)



dg630e

4. Press **DONE 1-PORT CAL** after measuring the three standards.
5. Press **Save/Recall**.

6. Press **SAVE STATE** to complete the process.

### Step 3. Measure the device

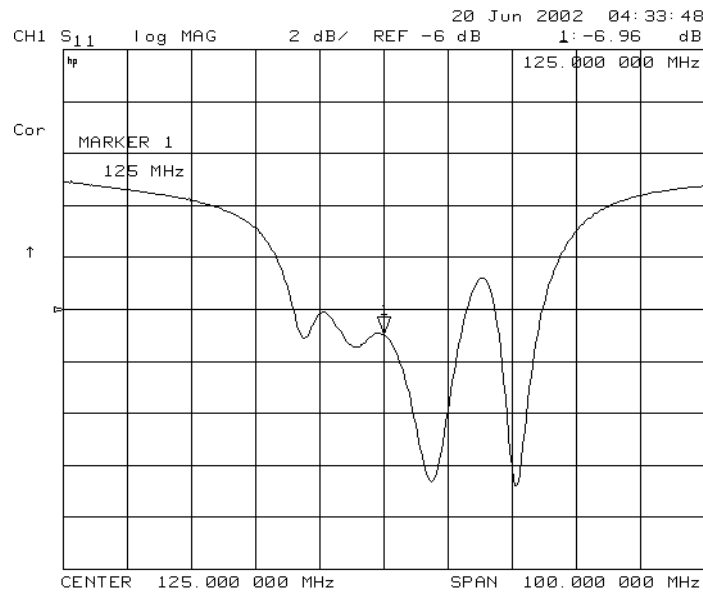
#### Measuring Return Loss.

1. Connect your device to PORT 1.
2. Terminate any unused port on your device. You can do this by either connecting a load to the device's unused port, or by connecting the device's unused port to PORT 2 on the HP 8753E.
3. Press **Scale Ref**, **AUTO SCALE** to reposition the trace.
4. Press **Marker** to read the return loss from the analyzer display as shown in [Figure 2-10](#).

The device response indicates that the filter and the analyzer impedances are well matched within the frequency range of the filter passband. That is, the reflected signal is smaller within the filter passband than outside the passband.

In terms of return loss, the value within the passband is larger than outside the passband. A large value for return loss corresponds to a small reflected signal just as a large value for insertion loss corresponds to a small transmitted signal.

**Figure 2-10 Example Return Loss Measurement Trace**



## Step 4. Output measurement results

This step in the procedure shows you how to output the measurement results to a printer.

For in-depth information on creating a hardcopy of the measurement results, refer to the "Printing, Plotting, and Saving Measurement Results" chapter in the *HP 8753E Network Analyzer User's Guide*.

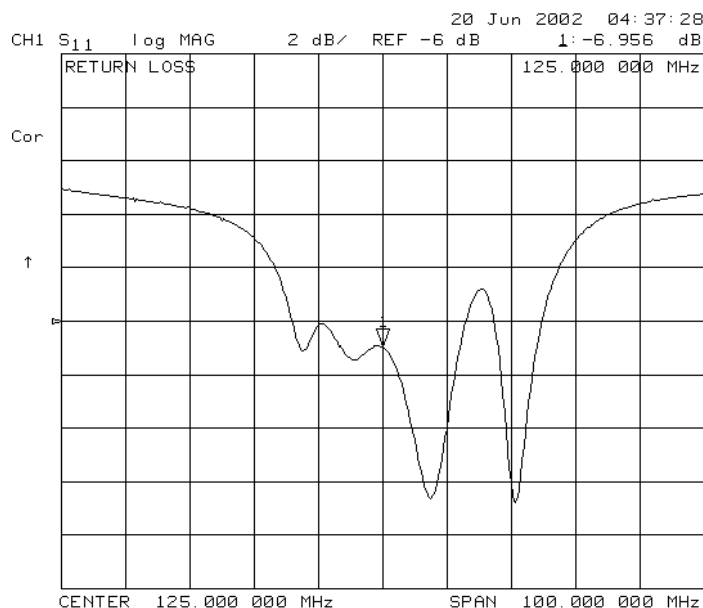
1. Connect a printer to the analyzer as described in the "Installing Your Analyzer" chapter.
2. Press **Display**, **MORE**, **TITLE** and then create a title for the measurement, as shown in [Figure 2-11](#):
  - Use an optional DIN keyboard to type the title, or
  - Use the front panel knob and the softkey menu to select each letter of the title.
3. Press **DONE** when you finish creating the measurement title. The title appears on the upper-left corner of the analyzer display.
4. Press **Local**, **SYSTEM CONTROLLER** to set up the analyzer as the controller. If you are using an HP-IB printer, ensure that there is not another controller on the bus. (Note that this step is not required when using parallel or serial printers.)
5. Press **Copy**, **PRINT MONOCHROME** to create a black and white hardcopy.

---

**NOTE** If you encounter a problem when printing a hardcopy, refer to "To Configure an Analyzer with Printers or Plotters" in the "Installing your Analyzer" chapter.

---

**Figure 2-11 Example Measurement Title**





## Measuring Other Reflection Characteristics

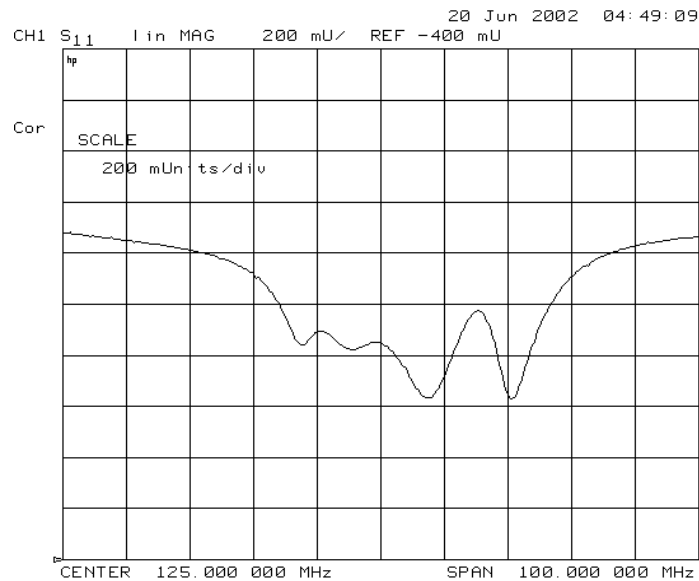
You can derive several important filter parameters from the measurement shown on the analyzer display. The following set of procedures is a continuation of the previous reflection measurement procedure.

### Measuring Reflection Coefficient.

1. Press **Save/Recall**, **RECALL STATE** to recall the calibrated reflection measurement that you saved earlier in this procedure.
2. Press **Format**, **LIN MAG**, **Scale Ref**, **AUTO SCALE** so the analyzer shows the same data in terms of reflection coefficient, as shown in [Figure 2-12](#).

The units "mU" displayed on the analyzer are "milli-units," where "units" or "U" is used to indicate that the parameter is unitless (as opposed to log or linear). For example, 200 mUnits = 0.2.

**Figure 2-12** Example Reflection Coefficient Measurement Trace

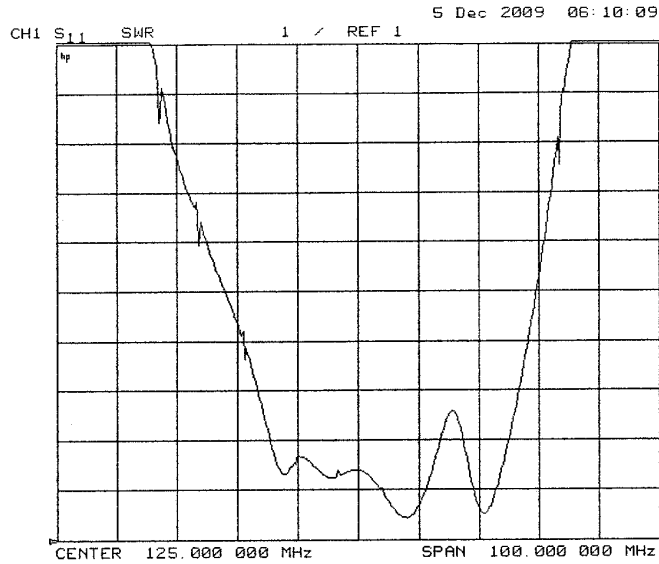


### Measuring Standing Wave Ratio (SWR).

Press **Format**, **SWR** so the analyzer shows the same data in terms of standing-wave-ratio (SWR), as shown in [Figure 2-13](#).

Now the analyzer shows the measurement data in the unitless measure of SWR where  $SWR = 1$  (perfect match) at the bottom of the display.

**Figure 2-13** Example Standing-Wave-Ratio Measurement Trace



### Measuring $S_{11}$ and $S_{22}$ in a Polar Format.

$S_{11}$  is a measurement parameter used to measure the reflection coefficient of your test device input, where  $S_{22}$  is a measurement parameter used to measure the reflection coefficient of the your test device output. In both instances, you must terminate all the unused ports.

1. Press **Format, POLAR**.
2. Press **Scale Ref, AUTO SCALE** to reposition the trace, as shown in [Figure 2-14](#).

The analyzer shows the results of an  $S_{11}$  measurement with each point on the polar trace corresponding to a particular value of both magnitude and phase. The center of the circle represents a coefficient ( $\Gamma$ ) of 0, (that is, a perfect match or no reflected signal). The outermost circumference of the scale shown in [Figure 2-14](#) represents  $\rho = 2.00$ , or 200% reflection. The phase angle is read directly from this display. The 3 o'clock position corresponds to zero phase angle, (that is, the reflected signal is at the same phase as the incident signal). Phase differences of  $90^\circ$ ,  $180^\circ$ , and  $-90^\circ$  correspond to the 12 o'clock, 9 o'clock, and 6 o'clock positions on the polar display, respectively.

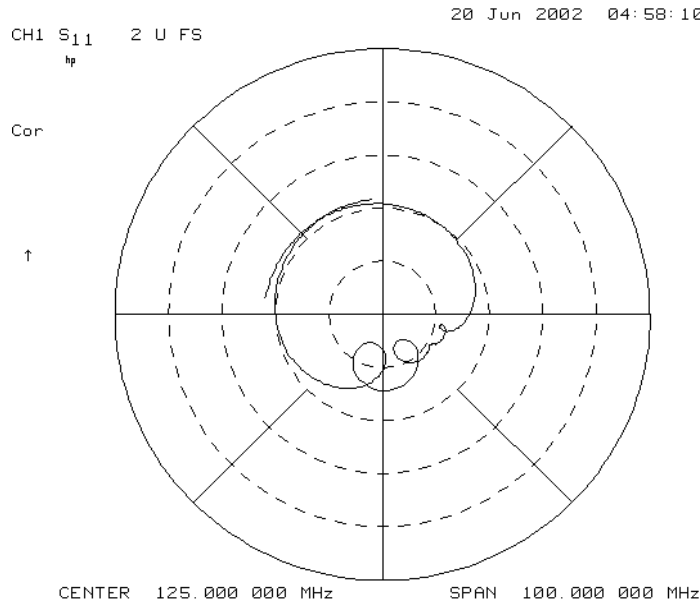
3. Press **Marker Fctn, MKR MODE MENU, POLAR MKR MENU**.
4. Turn the front panel knob to position the marker at any desired point on the trace, then read the frequency, linear magnitude and phase in the upper right hand corner of the display.
  - Choose **LIN MKR** if you want the analyzer to show the linear magnitude and the phase of the marker.
  - Choose **LOG MKR** if you want the analyzer to show the logarithmic magnitude and the phase of the active marker. This is useful as a fast method of obtaining a reading of the log-magnitude value without changing to log-magnitude format.
  - Choose **Re/Im MKR** if you want the analyzer to show the values of the marker as a real and imaginary pair.

---

<b>NOTE</b>	You can also enter the frequency of interest, from either the optional attached keyboard or the numeric keypad, and read the magnitude and phase at that point.
-------------	---

---

**Figure 2-14 Example S<sub>11</sub> Measurement Trace in Polar Format**



### Measuring Impedance.

The amount of power reflected from a device is directly related to the impedance of the device and the measuring system. Each value of the reflection coefficient ( $\Gamma$ ) uniquely defines a device impedance;  $\Gamma = 0$  only occurs when the device and analyzer impedance are exactly the same. The reflection coefficient for a short circuit is:  $\Gamma = 1 \angle 180^\circ$ . Every other value for  $\Gamma$  also corresponds uniquely to a complex device impedance, according to the equation:

$$Z_L = [(1 + \Gamma) / (1 - \Gamma)] \times Z_0$$

where  $Z_L$  is your test device impedance and  $Z_0$  is the measuring system's characteristic impedance (50 $\Omega$  or 75 $\Omega$ ).

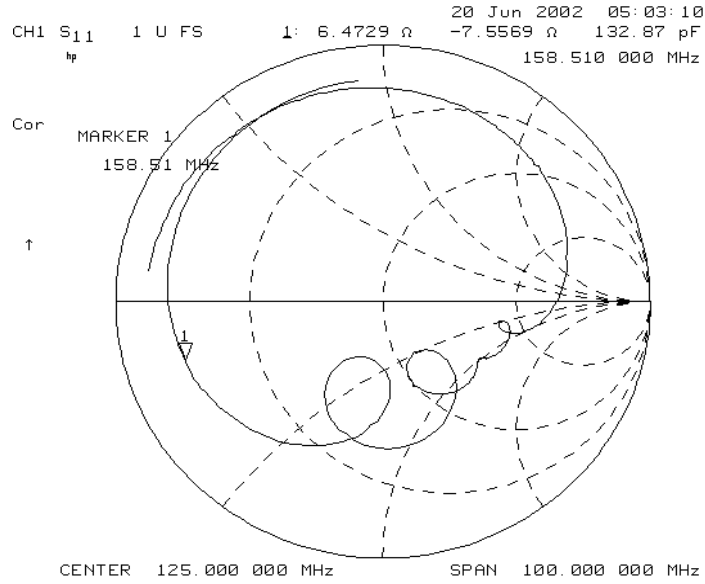
1. Press **Format**, **SMITH CHART**, **Scale Ref**, **AUTOSCALE**.
2. Press **Marker Fctn**, **MKR MODE MENU**, **SMITH MKR MENU** and turn the front panel knob to read the resistive and reactive components of the complex impedance at any point along the trace, as shown in [Figure 2-15](#). This is the default Smith chart marker.

The marker annotation tells that the complex impedance is capacitive in the bottom half of the Smith chart display and is inductive in the top half of the display.

- Choose **LIN MKR** if you want the analyzer to show the linear magnitude and the phase of the reflection coefficient at the marker.
- Choose **LOG MKR** if you want the analyzer to show the logarithmic magnitude and the phase of the reflection coefficient at the active marker. This is useful as a fast method of obtaining a reading of the log magnitude value without changing to log magnitude format.
- Choose **Re/Im MKR** if you want the analyzer to show the values of the reflection coefficient at the marker as a real and imaginary pair.

- Choose **R+X MKR** to show the real and imaginary parts of the device impedance at the marker. Also shown is the equivalent series inductance or capacitance (the series resistance and reactance, in ohms).

**Figure 2-15 Example Impedance Measurement Trace**

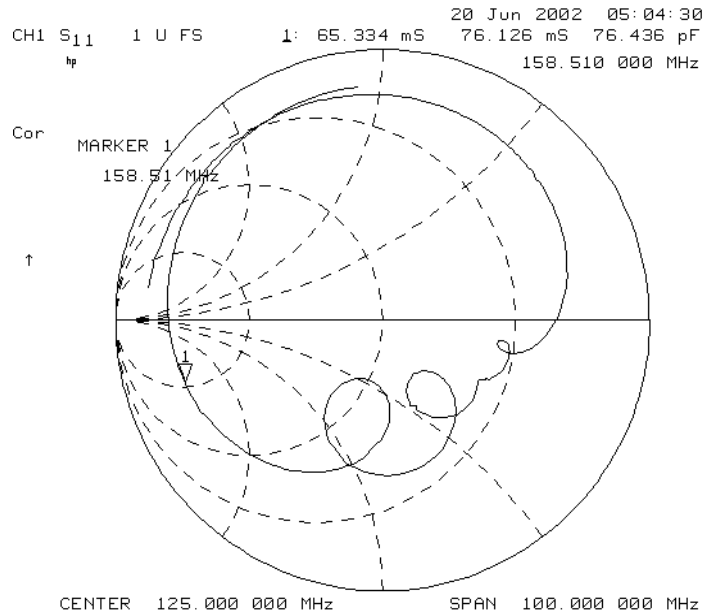


### Measuring Admittance.

To change the display to an inverse Smith chart graticule and the marker information to read admittance, press **G+jB MKR**.

As shown in [Figure 2-16](#), the marker reads admittance data in the form  $G+jB$ , where  $G$  is conductance and  $B$  is susceptance, both measured in units of Siemens (equivalent to mhos: the inverse of ohms). Also shown is the equivalent parallel capacitance or inductance.

**Figure 2-16 Example Admittance Measurement Trace**



---

## If You Encounter a Problem

If you have difficulty when installing or using the HP 8753E, check the following list of commonly encountered problems and troubleshooting procedures. If the problem that you encounter is not in the following list, refer to additional sections entitled "If You Have a Problem" in the *HP 8753E Network Analyzer User's Guide*.

### Power-up Problems

#### If the HP 8753E display does not light:

- Check that the power cord is fully seated in both the main power receptacle and the analyzer power module.
- Check that the AC line voltage selector switch is in the appropriate position (230 V/115 V) for your available power supply.
- Check that the analyzer AC line fuse is not open.

---

**WARNING**                    **For continued protection against fire hazard, replace the fuse with the same type and rating.**

---

Refer to [Figure 2-17](#) to remove the fuse from the power module. You can use a continuity light or an ohmmeter to check the fuse. An ohmmeter should read very close to zero ohms if the fuse is good. The 3 A, 250 V fuse is HP part number 2110-0780.

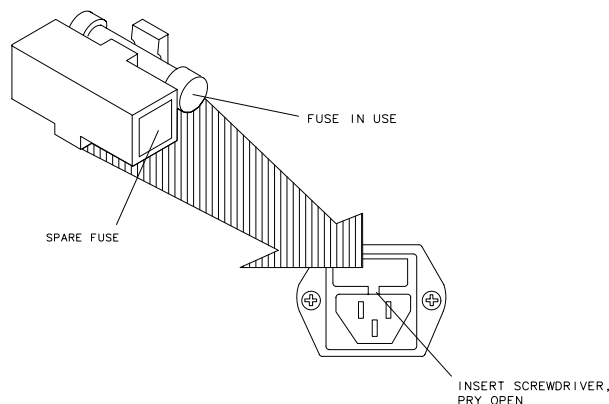
- Contact the nearest Hewlett-Packard office for service, if necessary. A list of Hewlett-Packard sales and service offices is provided at the end of this guide.

---

**WARNING**                    **The power cord is connected to internal capacitors that may remain live for 10 seconds after you disconnect the cord from the power supply.**

---

**Figure 2-17**                    **Line Fuse Removal and Replacement**



q9652d

### **If the display lights, but the ventilation fan does not start:**

- ❑ Check that the fan is not obstructed. To check the fan, follow these steps:
  1. Switch the LINE power to the off position.
  2. Check that the fan blades are not jammed.
- ❑ Contact the nearest Hewlett-Packard office for service, if necessary. A list of Hewlett-Packard sales and service offices is provided at the end of this guide.

## **Data Entry Problems**

### **If the data entry controls (keypad, knob, ↑, ↓, (←, ⇒ keys) do not respond:**

- ❑ Check that the ENTRY OFF function is not enabled.

The ENTRY OFF function is enabled after you press the **Entry Off** key. To return to normal entry mode, press any function key that has a numeric parameter associated with it, for example, **Start**.
- ❑ Check that none of the keys are stuck.
- ❑ Check that the selected function key accepts data.

For example, **Scale Ref** accepts data, but **System** does not.
- ❑ Check that the analyzer's "R" HP-IB STATUS light is not illuminated.

If the analyzer's "R" HP-IB STATUS light is illuminated, a test sequence may be running, or a connected computer controller may be sending commands or instructions to, or receiving data from, the analyzer. Press **Local** if you want to return to LOCAL control.

### **If the parameter you are trying to enter is not accepted by the analyzer:**

- ❑ Ensure that you are not attempting to set the parameter greater than or less than its limit. Refer to the *HP 8753E Network Analyzer User's Guide* for the parameter limits.

## **No RF Output**

### **If there is no RF signal at either PORT 1 or PORT 2 connector:**

- ❑ Check that the signal at the test ports is switched on.
  - Press **Menu**, **POWER**, **SOURCE PWR** until **ON** appears on the **SOURCE PWR** softkey label.
- ❑ If you are applying external modulation (AM) to the analyzer, check the external modulating signal or external gate/trigger signals for problems.



---

**CAUTION**     If the error message:

CAUTION: OVERLOAD ON INPUT X, POWER REDUCED

appears on the HP 8753E display, too much source power is being applied at the input. In such a case, the input power will need to be reduced before the source power will remain on.

---

- ❑ If phase-lock error messages appear on the analyzer display, check that the front panel jumper is secure on the R CHANNEL connectors. If the jumper is secure and the error messages still appear, contact your nearest Hewlett-Packard office for service. A list of Hewlett-Packard Sales and Service offices is provided at the end of this guide.

**Table 2-1 Hewlett-Packard Sales and Service Offices**

<b>UNITED STATES</b>		
<p><b>Instrument Support Center</b> Hewlett-Packard Company (800) 403-0801</p>		
<b>EUROPEAN FIELD OPERATIONS</b>		
<p><b>Headquarters</b> Hewlett-Packard S.A. 150, Route du Nant-d'Avril 1217 Meyrin 2/ Geneva Switzerland (41 22) 780.8111</p>	<p><b>France</b> Hewlett-Packard France 1 Avenue Du Canada Zone D'Activite De Courtaboeuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60</p>	<p><b>Germany</b> Hewlett-Packard GmbH Hewlett-Packard Strasse 61352 Bad Homburg v.d.H Germany (49 6172) 16-0</p>
<p><b>Great Britain</b> Hewlett-Packard Ltd. Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG41 5DZ England (44 734) 696622</p>		
<b>INTERCON FIELD OPERATIONS</b>		
<p><b>Headquarters</b> Hewlett-Packard Company 3495 Deer Creek Rd. Palo Alto, CA 94304-1316 USA (415) 857-5027</p>	<p><b>Australia</b> Hewlett-Packard Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 (61 3) 895-2895</p>	<p><b>Canada</b> Hewlett-Packard (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232</p>
<p><b>Japan</b> Hewlett-Packard Japan, Ltd. 9-1 Takakura-Cho, Hachioji Tokyo 192, Japan (81 426) 60-2111</p>	<p><b>Singapore</b> Hewlett-Packard Singapore (Pte.) Ltd. 150 Beach Road #29-00 Gateway West Singapore 0718 (65) 291-9088</p>	<p><b>Taiwan</b> Hewlett-Packard Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Taipei, Taiwan (886 2) 712-0404</p>
<p><b>China</b> China Hewlett-Packard Co. 38 Bei San Huan X1 Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888</p>		



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