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Installation and Quick Start Guide

HP 8509A/B Lightwave Polarization Analyzer



HP Part No. 08509-90015
Printed in USA October 1994

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"ISM1-A" This is a symbol of an Industrial Scientific and Medical Group 1 Class A product.

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General Safety Considerations

Warning

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.

Warning

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

Caution

Before switching on this instrument, make sure that the line voltage selector switch is set to the voltage of the power supply and the correct fuse is installed.

How to Use This Guide

This guide uses the following conventions:

Button	This represents a button or key that may be selected in the HP 8509 user interface on the Vectra Display.
`Menu Item`	This indicates a menu item in the HP 8509 user interface main menu or pull-down menus.

Documentation Description

This manual provides information on installing your lightwave polarization analyzer and how to perform an operation verification to ensure that no damage was incurred during shipment, and that your analyzer is operating properly.

The operation verification is a fully automated pass or fail indicator. Users should familiarize themselves with MS Windows operation and conventions before using this product.

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1

Introduction

For the quickest installation of your HP 8509 system, use the *HP 8509A/B Installation Quick Reference Card* that came attached to the top cover of your lightwave polarization analyzer.

Chapter 1, Introduction

Figure 1-1 shows a typical HP 8509B system. Figure 1-2 shows the basic measurement screen of the HP 8509 user interface.

Chapter 2, Installation

Provides detailed installation instructions.

Chapter 3, Operation Verification

Perform the operation verification after installing your system to verify that your instrument is working properly.

Chapter 4, If Things Go Wrong

If you encounter obstacles or difficulties, check this section for possible solutions.

Note

The HP 8509 user interface is an MS Windows application. You should familiarize yourself with Windows conventions and operation before using this product. Refer to the Microsoft Windows *User's Guide* for information on using MS Windows.

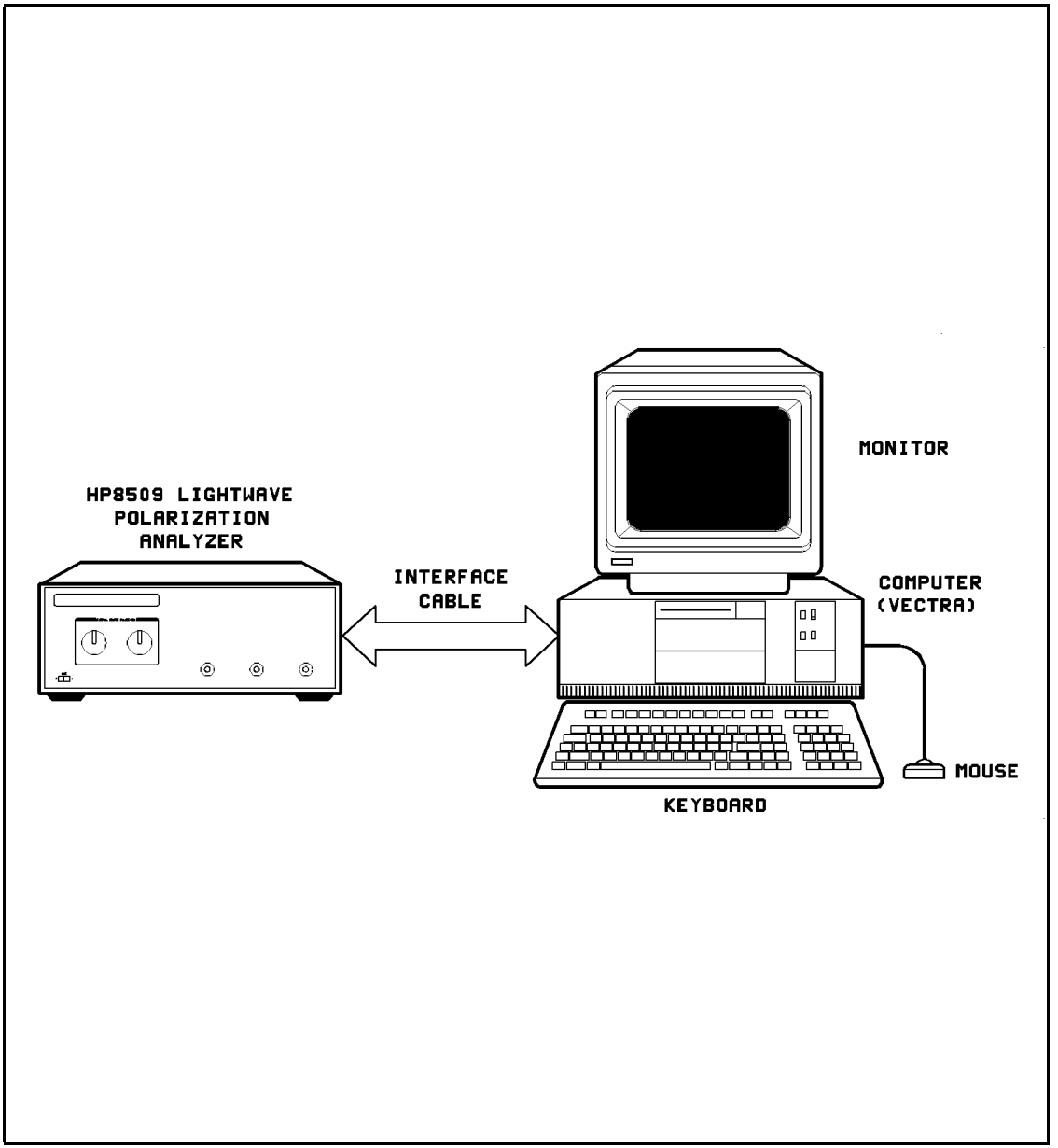
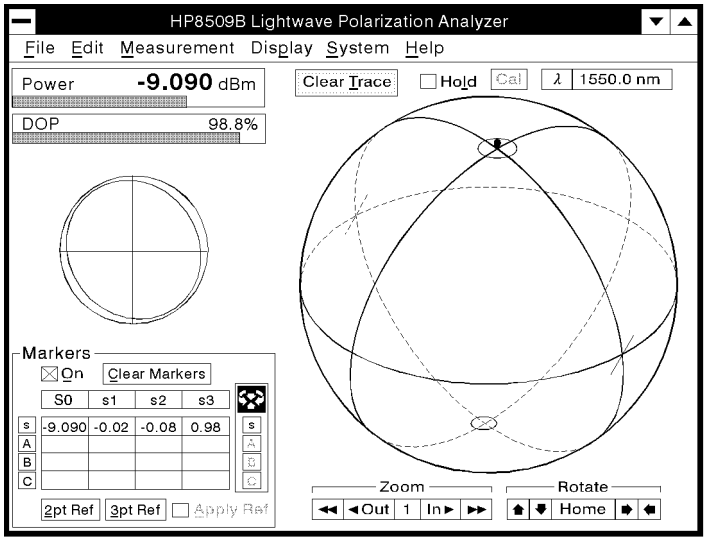


Figure 1-1. HP 8509B System



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Figure 1-2. The HP 8509 User Interface Basic Measurement Screen

2

Installation

The lightwave polarization analyzer system is preconfigured at the factory and installation requires minimal time to complete.

Tools needed

No special tools are required for the basic installation of the HP 8509 system. A small flat-blade screwdriver may be used to secure the monitor and analyzer interconnect cables.

Installation overview

The installation consists of unpacking the pieces of the system, correctly connecting them, and then turning them on.

After installation is complete, operation verification is performed to verify that the system is operating properly.

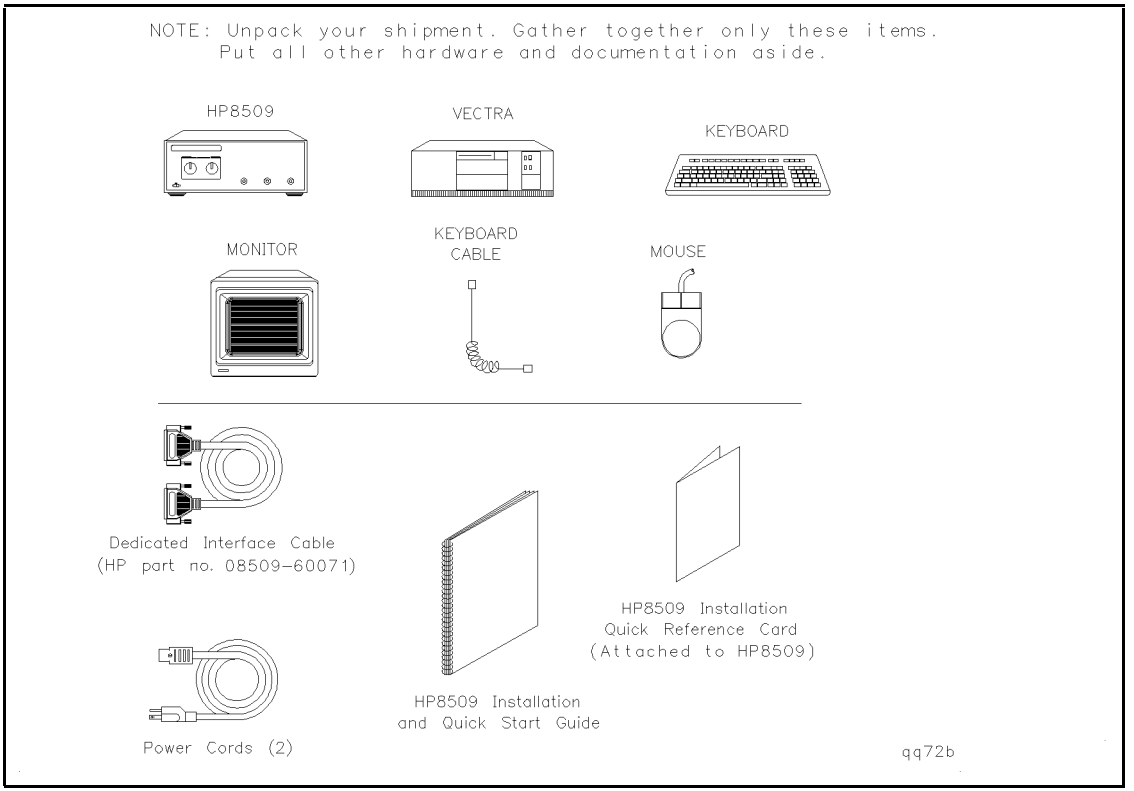


Figure 2-1. Items Needed for Installation

Unpack and Inspect the System

1. Unpack the lightwave polarization analyzer system from its shipping containers. Inspect it thoroughly to ensure that it was not damaged during shipment. If any container or piece of the system is damaged or incomplete, save the packing materials and notify both the carrier and Hewlett-Packard.
2. Refer to Figure 2-1. Gather the items shown, and put all other hardware, documentation, and software aside for now.

Note

The lightwave polarization analyzer in Figure 2-1 is an HP 8509B. The HP 8509A differs in appearance. Its front panel contains only a line power switch and an OPTICAL INPUT connector.

Power Requirements

The power requirements include line frequency in the range of 47 to 66 Hz, and 200 VA maximum. Other power requirements for the lightwave polarization analyzer are listed in Table 2-1.

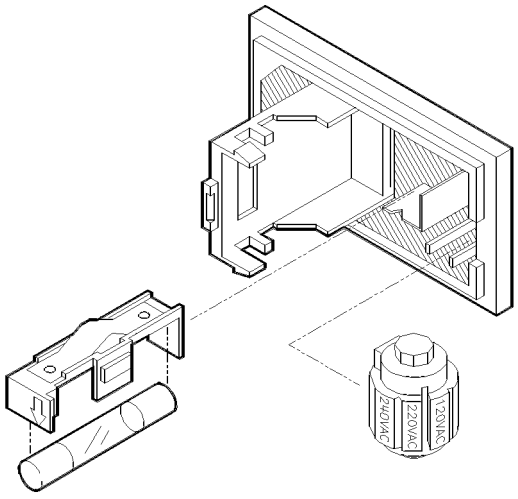
Table 2-1. Fuses

Available ac Voltage	Voltage Range	Fuse Type
100 V	90 to 110 V rms	2.00 A F (HP p.n. 2110-0002)
120 V	108 to 132 V rms	2.00 A F (HP p.n. 2110-0002)
220 V	198 to 242 V rms	1.00 A F (HP p.n. 2110-0001)
240 V	216 to 250 V rms	1.00 A F (HP p.n. 2110-0001)

On the lightwave polarization analyzer, set the line-voltage selector to the voltage corresponding to the power source used. The line voltage selector is located on the rear panel of the polarization analyzer.

Note

If you need to change the switch setting or the fuse, refer to Figure 2-2 and use a small flat-blade screwdriver to pry open the line module cover door.



CAUTION:

Do not attempt to rotate the voltage selector cam while it is installed in the line module or non–repairable damage will result. The cam must be completely removed from the line module, rotated to the proper position, and reinstalled. Refer to the instruction below.

REPLACEMENT OF FUSE

1. Pry open line module cover door.
2. Pull out fuse carrier.
3. Insert fuse of proper rating.
4. Place carrier back into line module.

SELECTION OF OPERATING VOLTAGE

1. Pry open line module cover door.
2. REMOVE CAM FROM THE LINE MODULE.
3. Rotate the cam to the desired voltage. (When the line module cover is closed, the selected voltage will be visible through a small window).
4. Insert the cam back into the line module.
5. Close the line module cover door.

Figure 2-2. Voltage Selector

Stack and Connect the System

1. Set the lightwave polarization analyzer on your work surface. Place the personal computer next to the lighwave polarization analyzer, place the monitor on top of the personal computer. Place the keyboard in front of the computer and place the mouse to the side of the system. Refer to Figure 1-1 for an example of how to stack your system.

Note

Do NOT stack the computer or monitor on top of the lightwave polarization analyzer.

2. Connect the system as shown in Figure 2-3.
   a. Connect the lightwave polarization analyzer to the personal computer using the dedicated interface cable.
   b. Connect the monitor, keyboard, and mouse to the personal computer. Refer to Figure 2-3 for locations of ports.
   c. Tighten connections with a small flat-blade screwdriver.

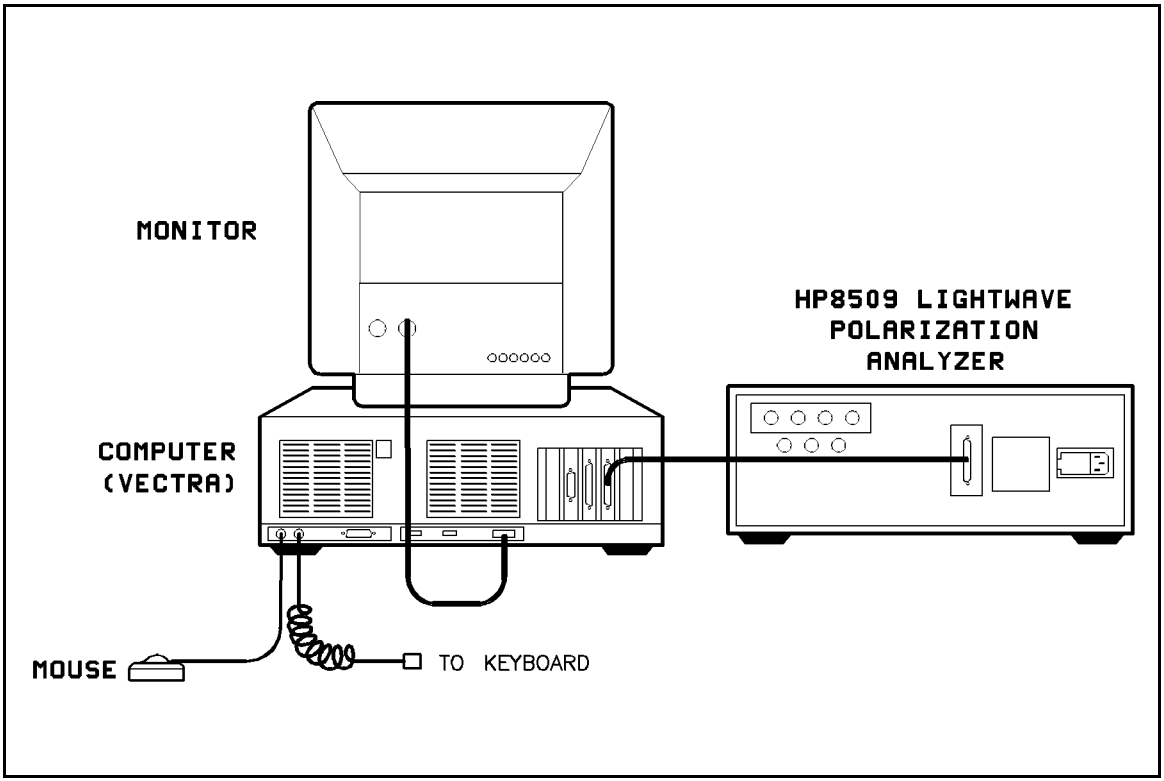


Figure 2-3. System Connections

Power Up the System

1. Connect the three power cords (one each from the computer, the monitor and the analyzer) to the line voltage.
2. Press the front-panel power switches on the analyzer, computer,and monitor.
3. After the computer is turned on, Microsoft Windows and the HP 8509 software are automatically loaded. After about 45 seconds the Basic Measurement Screen should appear on the computer display.

   It should look similar to Figure 1-2.

HP 8509B

You will hear a series of clicks as the internal mechanical polarizer is initialized; then the zeroing routine is performed. You will notice a green zeroing message in the power display while this procedure is being executed.

HP 8509A

When the software has initialized, it automatically runs the zeroing routine.

When you are instructed to block external laser, cover the OPTICAL INPUT port. Use a connector cap, your finger, or a piece of dark paper. Do not allow anything to touch the fiber end.

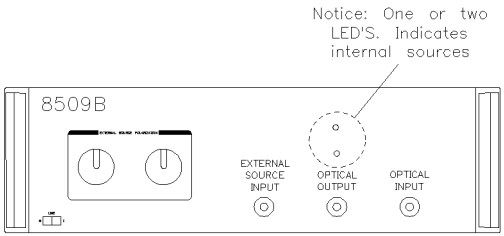
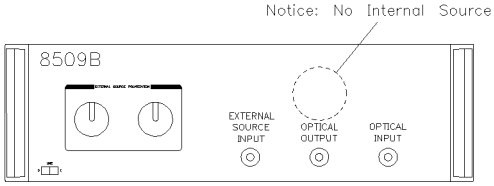
When you are instructed to clear the external laser, uncover the OPTICAL INPUT port and proceed.

4. Perform the operation verification now to ensure the lightwave polarization analyzer is working properly.

3

Operation Verification

The correct operation verification depends on your instrument and options. Use the table below to determine the correct operation verification to use for your particular instrument.

Model	Front Panel	Go To
HP 8509A		Page 3-2
HP 8509B with internal source		Page 3-8
HP 8509B/ (Option 210, 220) without internal source		Page 3-12

Operation Verification for HP 8509A

Perform the operation verification when you first receive and install your lightwave polarization analyzer, and thereafter on a regular basis. It verifies that your analyzer is working properly.

Required Equipment

The following items are needed to perform the operation verification:

- Optical source of known wavelength (between 1200 and 1600 nm) with known degree of polarization. (HP recommends that a highly polarized source be used. This can be achieved by routing the light from your source through a bulk or fiber optic polarizer.)
- A bulk or fiber optic polarizer.
- High-quality single mode patchcord. Refer to Table 3-1 for recommended part number.

Table 3-1. Recommended Patchcords

Connector Type	Connector Option Number	Patchcord HP Part Number
HMS-10HP	011	08703-80003
FC/PC	012	1005-0136
DIN 47256	013	1005-0144
ST	014	1005-0135
Biconic	015	1005-0134

Preliminary Steps

1. Turn on the lightwave polarization analyzer and allow it to warm up for at least one hour.
2. Zero the analyzer by selecting `System` and then `Zero`. When you are instructed to block external laser, cover the OPTICAL INPUT port. Use a connector cap, your finger, or a piece of dark paper. Do not allow anything to touch the fiber end.
3. Proceed by selecting (OK), and then when instructed to clear external laser, uncover the OPTICAL INPUT port and select (OK).

Note

After the zeroing routine is finished, the power display will read `Underrange`. This just means that the receiver is not yet detecting any optical power. Once you have connected a source to the OPTICAL INPUT, as in Figure 3-1, the underrange message will be replaced with a power measurement.

4. Clean all optical connectors and adapters using isopropyl alcohol and Q-tips. Refer to the *Connector Care* chapter in your *User's/Reference Guide*.
5. Connect the equipment as shown in Figure 3-1.

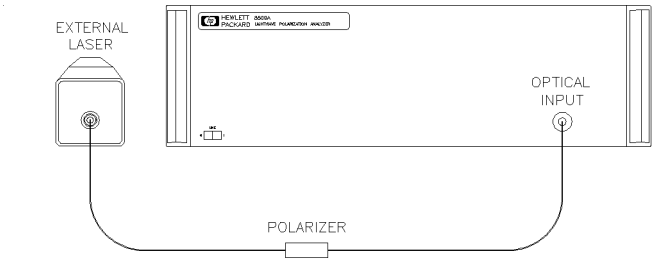
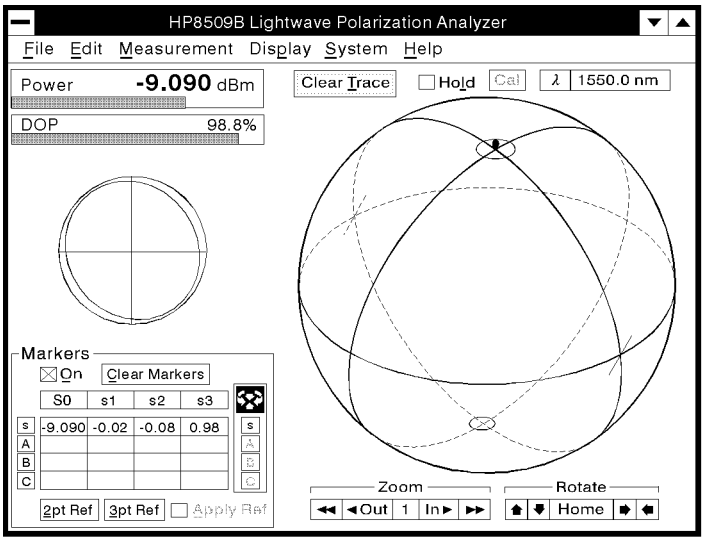


Figure 3-1. HP 8509A Equipment Setup

Adjust the Laser Fiber For Maximum Power

1. Adjust the laser fiber in front of the polarizer (see Figure 3-1) by grasping the middle of the fiber and slowly moving it to several positions to obtain maximum power into the receiver. Observe the power display (see Figure 3-2) while moving the fiber to monitor power.
2. When maximum power is achieved, stabilize the fiber by taping it to the work surface or by using some other reliable method.

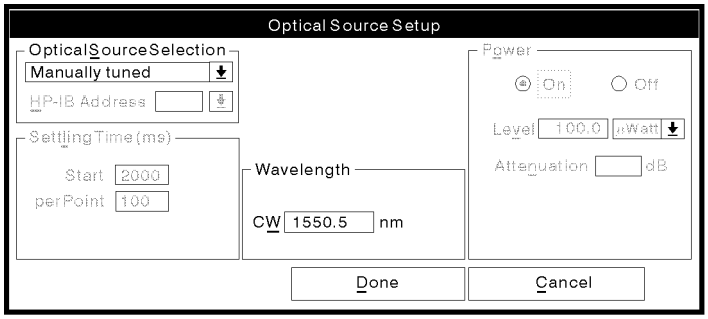


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Figure 3-2. HP 8509 Basic Measurement Screen

Setup Your Source

1. Select (λ). The optical source setup window will appear on the display. (See Figure 3-3).



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Figure 3-3. Optical Source Setup Window

2. Input the wavelength (to 1 nm accuracy) of your optical source using the keyboard.

Note

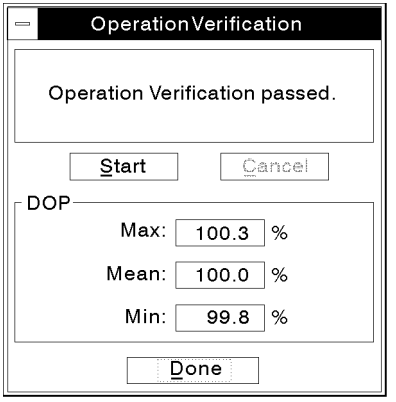
If you are using a Hewlett-Packard source such as the HP 8168A, select the `Optical Source Selection` dropdown menu and select `HP 8168A/HP-IB` with your mouse pointer.

3. Select (Done) with your mouse pointer.

Operation Verification

The operation verification procedure is a fully automatic pass/fail indicator of your systems performance.

1. Make sure that the optical cable connecting the polarizer to the lightwave polarization analyzer's OPTICAL INPUT is stable. This can be accomplished by taping the cable to the work surface if necessary.
2. Select `System` from the main window display, then select `Operation Verification`.



qq71b_c

Figure 3-4. Operation Verification Window

3. Select (Start). When the verification procedure is finished, the message `Operation Verification passed` will be displayed in the message window, and the Max, Min, and Mean DOP values will be displayed.

4. The operation verification is now complete. You may select (Done) to clear the window and begin your measurement.

Operation Verification for HP 8509B (With Internal Optical Source)

The operation verification is designed to be performed when you first receive and install your lightwave polarization analyzer and thereafter on a regular basis. If performed successfully, it will give you a high degree of confidence that your analyzer is working properly.

Note

The actual wavelength of your internal source is probably different from the nominal values of 1310 nm and 1550 nm used in this procedure. The optical source setup window and the wavelength display in the basic measurement screen will reflect the actual measured value of your internal source to the nearest nm.

Required Equipment

The following items are needed to perform the operation verification:

- High-quality single mode patchcord. Refer to Table 3-2 for the recommended part number.

Table 3-2. Recommended Patchcords

Connector Type	Connector Option Number	Patchcord HP Part Number
HMS-10HP	011	08703-80003
FC/PC	012	1005-0136
DIN 47256	013	1005-0144
ST	014	1005-0135
Biconic	015	1005-0134

Preliminary Steps

1. Turn on the lightwave polarization analyzer and allow it to warm up for at least one hour.
2. Clean all optical connectors and adapters using isopropyl alcohol and cotton swabs. Refer to the *Connector Care* chapter in the *User's/Reference Guide*.
3. Connect the equipment as shown in Figure 3-5.
4. Zero the analyzer by selecting `System` from the main window display, and then `Zero`.

Note

You will notice a green `zero` message will appear in the power display while the analyzer is zeroing. The `zero` message disappears when the zeroing routine is finished.

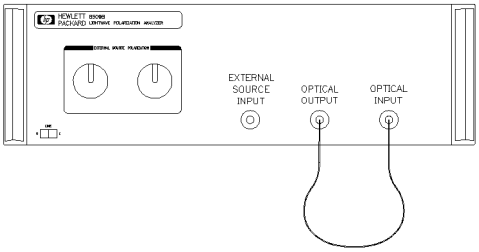
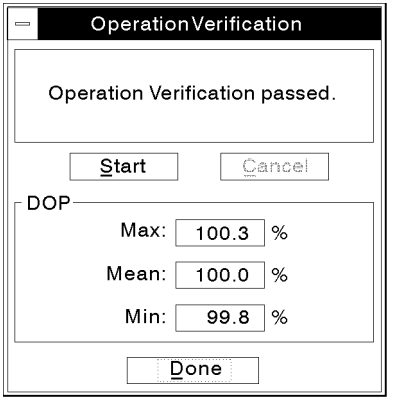


Figure 3-5. Equipment Setup

Operation Verification

The operation verification procedure is a fully automatic pass/fail indicator of your system's performance.

1. Make sure that the optical cable connecting the polarizer to the lightwave polarization analyzer's OPTICAL INPUT is stable. This can be accomplished by taping the cable to the work surface if necessary.
2. Select `System` from the main window display, then select `Operation Verification`.



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Figure 3-6. Operation Verification Window

3. Select (Start). When the verification procedure is finished, the message `Operation Verification passed` will be displayed in the message window, and the Max, Min, and Mean DOP values and polarizer angles (not shown in figure) will be displayed.

4. The operation verification is now complete. You may select (Done) to clear the window and begin your measurement.

Note

If your instrument has more than one source, perform this procedure on each source.

Operation Verification for HP 8509B (Without Internal Source)

The operation verification is designed to be performed when you first receive and install your HP 8509B/Option 210, 220 lightwave polarization analyzer and thereafter on a regular basis. If performed successfully, it will give you a high degree of confidence that your analyzer is working properly.

Required Equipment

The following items are needed to perform the operation verification:

- Optical source of known wavelength in one of the two following ranges.
  - between 1280 and 1340 nm
  - between 1470 and 1580 nm.
- High-quality single mode patchcords. Refer to Table 3-3 for recommended part number.

Table 3-3. Recommended Patchcords

Connector Type	Connector Option Number	Patchcord HP Part Number
HMS-10HP	011	08703-80003
FC/PC	012	1005-0136
DIN 47256	013	1005-0144
ST	014	1005-0135
Biconic	015	1005-0134

Preliminary Steps

1. Turn on the lightwave polarization analyzer and allow it to warm up for at least one hour.
2. Clean all optical connectors and adapters using isopropyl alcohol and Q-tips. Refer to the "Connector Care" chapter in the *User's/Reference Guide*.
3. Ensure that the optical cable connecting the external source to the lightwave polarization analyzer's OPTICAL INPUT is stable. This can be accomplished by taping the cable to the work surface if necessary.
4. Connect the equipment as shown below.
5. Zero the analyzer by selecting `System` and then `Zero`. You will notice the green `zero` message will appear in the Power display while the analyzer is zeroing.

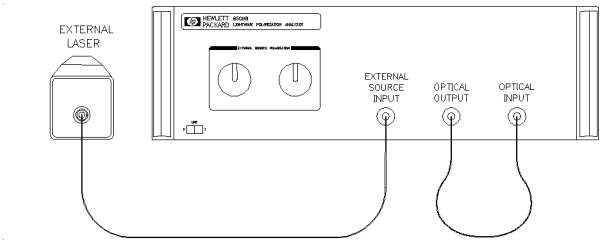
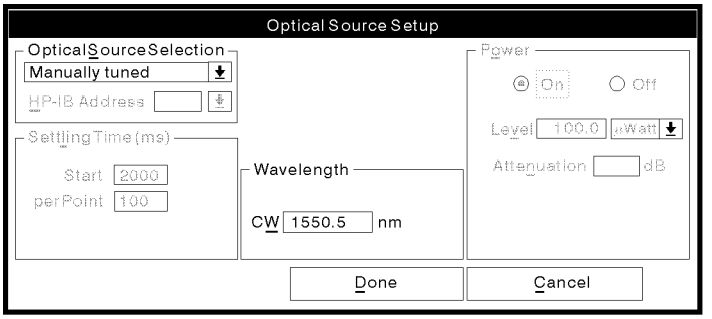


Figure 3-7. Equipment Setup

Setup Your Source

1. Select (λ). The optical source setup window will appear on the display. (See Figure 3-8).



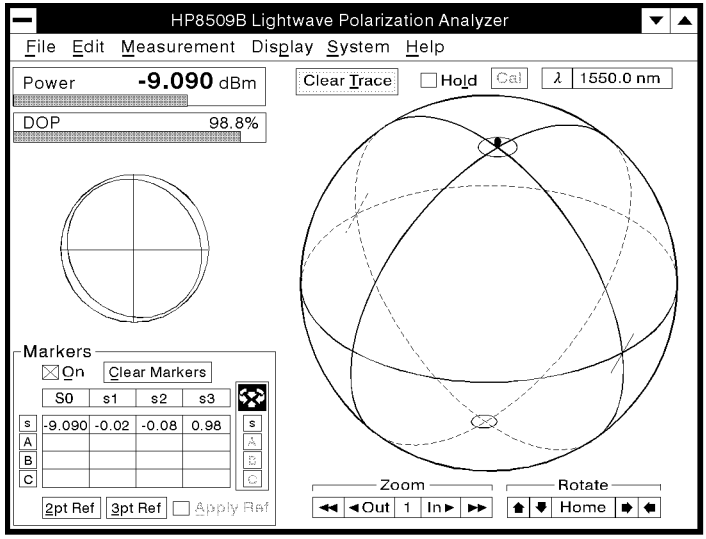
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Figure 3-8. Optical Source Setup Window

2. Select your source type from the `Optical Source Selection` menu.
3. Input the wavelength of your optical source (to an accuracy of ±1 nm) using the keyboard.
4. Select (Done). The optical source setup window will disappear.

Adjust For Maximum Power

1. Adjust the two large External Source Polarization knobs to obtain maximum power into the receiver. Observe the power display while turning the knobs to monitor power.



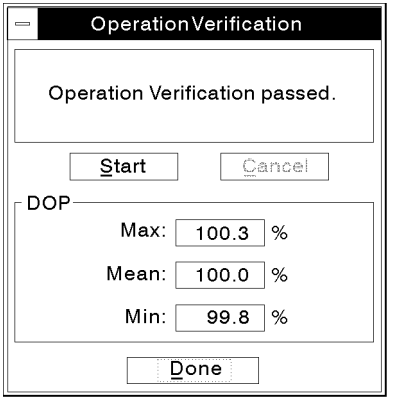
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Figure 3-9. HP 8509 Basic Measurement Screen

Operation Verification

The operation verification procedure is a fully automatic pass/fail indicator of your system's performance.

1. Make sure that the optical cable connecting the polarizer to the lightwave polarization analyzer's OPTICAL INPUT is stable. This can be accomplished by taping the cable to the work surface if necessary.
2. Select `System` from the main window display, then select `Operation Verification`.



qq71b_c

Figure 3-10. Operation Verification Window

3. Select (Start). When the verification procedure is finished, the message `Operation Verification passed` will be displayed in the message window, and the Max, Min, and Mean DOP values and polarizer angles (not shown in figure) will be displayed.

4. The operation verification is now complete. You may select (Done) to clear the window and begin your measurement.

4

If Things Go Wrong

This chapter will help correct problems that may be encountered while performing the installation and operation verification. The problem or symptom is listed at the top of each page. Most problems have a brief description or explanation to provide additional information regarding the problem. Following is a checklist of items that could cause the problems. Using the checklist of possible solutions will help to correct the problem.

Problems requiring additional resources

Problems that are internal to the lightwave polarization analyzer will require additional technical information. Contact a Hewlett-Packard sales or service office if you cannot solve your problem with the information in this chapter. Sales and service office locations are listed on the last page of this chapter. Instructions for returning your instrument to Hewlett-Packard are provided at the end of this chapter.

The system appears to be dead

When the computer, monitor and lightwave polarization analyzer are initially turned on, the following observations can be made:

1. The computer's fan and disk drive will make a certain amount of noise when the computer is turned on.
2. The monitor has an indicator light on the power button that should light up when the monitor is turned on.
3. If the lightwave polarization analyzer has at least one internal source, an LED will be lit on the front panel.

If these things do not occur, check the following conditions:

- Check that the computer, monitor and analyzer are all connected to the ac power source.
- Check the line voltage selector switch on the rear of the HP 8509 to ensure that it is set to the correct voltage for the power source. See Figure 2-2 in Chapter 2 for instructions on setting the switch.
- Check the line fuse on the lightwave polarization analyzer to ensure that it is not damaged. The fuse is located inside the power-cord receptacle housing on the rear panel of the analyzer. See Table 2-1 in Chapter 2 for replacement part numbers. See Figure 2-2 in Chapter 2 for exact location of fuse.

If the computer does not respond

The mouse and keyboard cable connectors look the same and therefore may accidentally be interchanged on the back of the computer. If this happens, the computer will not respond to the mouse or the keyboard, and you may hear lots of beeping when trying to use one or the other.

If you have any of these problems check the following:

- Make sure that the mouse and keyboard are plugged into the correct sockets on the back of the computer. There are icons on the computer rear panel and on the mouse and keyboard connectors to help you determine the correct socket. (See Figure 2-3 for exact location of mouse and keyboard ports.)
- Make sure that the mouse and keyboard cables are plugged in all the way and that a good connection is being made.

If you get the "EEprom not formatted or Box on?" error message

When you start up the software, the program expects the lightwave polarization analyzer to be turned on *and* connected to the computer via the dedicated interface cable. This error message occurs when it appears to the computer that the lightwave polarization analyzer is not connected or turned on.

If you see the error message, check the following conditions:

- Ensure that the lightwave polarization analyzer voltage selector switch is properly set, that it is connected to the ac power source, and that line switch has been turned on. (See Figure 2-2 for instructions on setting the voltage selector switch.)
- Ensure that the dedicated interface cable is properly connected to both the lightwave polarization analyzer and the computer. Be sure to finger tighten the screws on the connectors.

If operation verification fails

DOP measurement is out of specification

If you are able to detect power after connecting an optical source to the lightwave polarization analyzer's OPTICAL INPUT (Look at the power display in the upper left corner of the measurement screen), but the DOP measurement is out of specification, there is a good chance that dirty or improperly seated connectors are at fault.

If you are detecting power but your measurements are out of specification, check the following:

1. Ensure the connectors are clean. Use isopropyl alcohol and cotton swabs to clean optical connectors. For detailed instructions, and cleaning supply part numbers, refer to the "Connector Care" chapter in the *HP 8509A/B User's/Reference Guide*.
2. Ensure that the optical connections are properly seated and finger tightened.
3. If the operation verification still fails, perform and apply a calibration for the particular source and wavelength you are using to make the measurements. Refer to "Calibration" in the "The System Menu" section of the *HP 8509 User's/Reference Guide*.
4. If the operation verification still fails, contact Hewlett-Packard. Refer to the last page in this section for locations of Hewlett-Packard Sales and Service offices.

Power display reads `underrange`

If, after connecting power to the OPTICAL INPUT the power display reads **underrange**, the problem may be more severe.

Check the following:

- If you are using an external source, ensure that the source is turned on.
- If you have a lightwave polarization analyzer with one internal source, be sure that the front panel indicator LED is on. If it isn't, try turning the source on via the optical source setup window. (Select (λ) to open the optical source setup window.) If it still does not come on, you should return your lightwave polarization analyzer for repair.
- If you have a lightwave polarization analyzer with two internal sources, try switching to another internal source via the optical source setup window. (Select (λ) to open the optical source setup window.) If you are still not detecting power, or if you determine that one of your sources is dead, you should return your lightwave polarization analyzer for repair.

To return for service

The original shipping containers and materials, or the equivalent, must be used when repackaging the components of the HP 8509 lightwave polarization analyzer system. Packaging materials identical to the original factory packaging can be purchased through any Hewlett-Packard office.

Caution

Instrument damage can result from using packaging materials other than the original shipping materials or equivalent. Never use styrene pellets as packaging materials. They do not adequately cushion the instrument or prevent it from shifting in the carton.

Use the following procedure to prepare the instrument for shipment:

1. Gather the following information:
   a. Type of service required.
   b. Description of the problem; state if the problem is constant or intermittent.
   c. Name and phone number of technical contact person.
   d. Return address.
   e. Full serial number of returned instrument.
   f. List of any accessories returned with the instrument.

2. Pack the instrument in the original shipping materials (or the equivalent).
3. Seal the carton with strong nylon adhesive tape.
4. Mark the carton "FRAGILE, HANDLE WITH CARE."
5. Retain copies of all shipping papers.
6. Ship to the nearest Hewlett-Packard Sales or Service office.

Table 4-1. Hewlett-Packard Sales and Service Offices

US FIELD OPERATIONS		
Headquarters Hewlett-Packard Company 19320 Pruneridge Avenue Cupertino, CA 95014, USA (800) 752-0900	**California, Northern** Hewlett-Packard Co. 301 E. Evelyn Mountain View, CA 94041 (415) 694-2000	**California, Southern** Hewlett-Packard Co. 1421 South Manhattan Ave. Fullerton, CA 92631 (714) 999-6700
Colorado Hewlett-Packard Co. 24 Inverness Place, East Englewood, CO 80112 (303) 649-5000	**Georgia** Hewlett-Packard Co. 2000 South Park Place Atlanta, GA 30339 (404) 955-1500	**Illinois** Hewlett-Packard Co. 5201 Tollview Drive Rolling Meadows, IL 60008 (708) 255-9800
New Jersey Hewlett-Packard Co. 150 Green Pond Road Rockaway, NJ 07866 (201)627-6400	**Texas** Hewlett-Packard Co. 930 E. Campbell Rd. Richardson, TX 75081 (214) 231-6101	

Table 4-1. Hewlett-Packard Sales and Service Offices (continued)

EUROPEAN FIELD OPERATIONS

Headquarters
Hewlett-Packard S.A.
150, Route du Nant-d'Avril
1217 Meyrin 2/Geneva
Switzerland
(41 22) 780.8111

France
Hewlett-Packard France
1 Avenue Du Canada
Zone D'Activite De Courtaboeuf
F-91947 Les Ulis Cedex
France
(33 1) 69 82 60 60

Germany
Hewlett-Packard GmbH
Hewlett-Packard Strasse
6380 Bad Homburg v.d.H
Germany
(49 6172) 16-0

Great Britain
Hewlett-Packard Ltd
Eskdale Road, Winnersh Triangle
Wokingham, Berkshire RF11 5DZ
England
(44 734) 696622

INTERCON FIELD OPERATIONS

Headquarters
Hewlett-Packard Company
3495 Deer Creek Rd.
Palo Alto, California 94304-1316
(415) 857-5027

Australia
Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
(61 3) 895-2895

Canada
Hewlett- Packard (Canada) Ltd.
17500 South Service Road
Trans- Canada Highway
Kirkland, Quebec H9J 2X8
Canada
(514) 697-4232

China
China Hewlett-Packard Co.
38 Bei San Huan X1 Road
Shuang Yu Shu
Hai Dian District
Beijing, China
(86 1) 256-6888

Japan
Yokogawa-Hewlett-Packard Ltd.
1-27-15 Yabe, Sagamihara
Kanagawa 229, Japan
(81 427) 59-1311

Singapore
Hewlett-Packard Singapore (Pte.) Ltd
1150 Depot Road
Singapore 0410
(65) 273-7388

Taiwan
Hewlett-Packard Taiwan
8th Floor, H-P Building
337 Fu Hsing North Road
Taipei, Taiwan
(886 2) 712-0404

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