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# Installation and Service Guide

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For Safety information, Warranties and Regulatory information,  
see the pages behind the index

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## HP 16500H Interface Module

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## In This Book

This book shows you how to install and service the HP 16500H Interface Module . This book contains the following chapters:

- Chapter 1 provides an overview of the HP 16500H.
- Chapter 2 shows you how to install the HP 16500H in the HP 16500B mainframe. This chapter also provides information on where to go next, depending on which environment you are using the HP 16500 system in.
- Chapter 3 contains the procedures for performance verification and replacing assemblies. This chapter tells you where to find information on troubleshooting the system, depending on which environment you are using the HP 16500B system in.

### See Also

The *HP 16500H LAN Interface Module Administrator's and Service Guide* for information on installing and setting up the HP 16500H in the LAN environment.

The *HP 16500B Logic Analysis System Setting UP the System Guide* for information on installing and setting up an HP 16501A Expansion Frame.

The *HP 16505A Prototype Analyzer Installation Guide* for information on installing and setting up an HP 16505A Prototype Analyzer.

The *Logic Analyzer Training Kit* if you are unfamiliar with the basic operation of the HP 16500B system.

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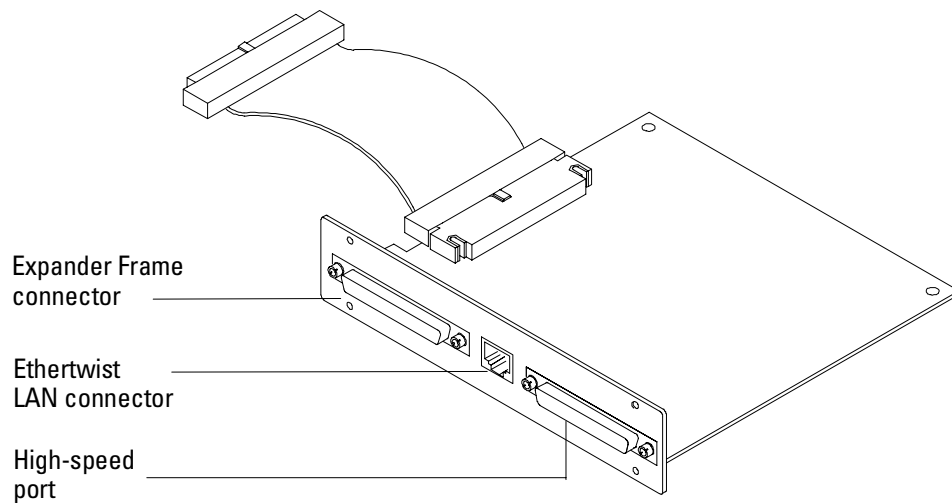
## Introducing the HP 16500H Interface Module

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# Introducing the HP 16500L LAN Interface Module

The HP 16500H LAN interface module provides three capabilities for your HP 16500 Logic Analysis System:

- connection to an Ethernet 10Base-T Local Area Network (LAN)
- connection to an HP 16501A Expansion Frame for the HP 16500B Logci Analysis System
- a high-speed port for connecting the HP 16500B to an HP 16505A Prototype Analyzer



**The HP 16500H interface module**

## Accessories Supplied

The HP 16500H is shipped with the following accessories:

- this *Installation and Service Guide*
- a *LAN Administrator's and Service Guide*
- a *LAN User's Guide*
- screws and one cable to install the HP 16500H into the HP 16500B mainframe
- TORX 10 and TORX 15 wrenches

If your HP 16500H was installed into the HP 16500B by HP, you will not receive these tools. If your HP 16500H was not installed by HP, you will receive these tools.

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## Requirements

HP 16500B Logic Analysis System mainframe, and one of the following:

- NFS or FTP capabilities on your TCP/IP Ethernet LAN, or
  - HP 16501A Expansion Frame, or
  - HP 16505A Prototype Analyzer
- 

## Physical Connections

- RJ-45 connector for direct connection to 10Base-T networks
- 68-pin D-connector for connection to an HP 16501A Expansion Frame
- High-speed port for connection to an HP 16505A Prototype Analyzer

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## LAN Support

For information about the LAN protocols and file types supported by the HP 16500H, refer to the *LAN Administrator's and Service Guide*



This chapter includes procedures to install the interface module into the HP 16500B Logic Analysis System mainframe and to verify the installation.

For detailed information on how to install the HP 16500B in one of the three applications supported by the interface module, refer to the documentation for the specific application. This chapter provides references to those other documents.

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## Installing the Interface Module

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## To Install the HP 16500H Hardware

If you need instructions for removing and replacing parts of the HP 16500B, refer to the *HP 16500B Logic Analysis System Service Guide*.

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### WARNING

**SHOCK HAZARD** Disconnect the power from the mainframe before performing the following procedures. After disconnecting the power, wait at least six minutes for the capacitors on the power supply board and the CRT driver board to discharge before servicing the instrument. Failure to do so could result in electrical shock. Hazardous voltages exist on the power supply, the CRT, and the CRT driver board of the HP 16500B mainframe. As long as the AC LED on the power supply has any illumination, a significant charge remains on the capacitors.

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### CAUTION

Use grounded wriststraps and mats when performing any service to this module or to the HP 16500B Logic Analysis System. Electrostatic discharge can damage electronic components.

For correct orientation of the cables, match the slots on the cable connectors and on the board connectors.

- 1 Remove power from the HP 16500B mainframe, then remove the measurement modules, the four rear feet, and the top and bottom covers of the mainframe.
- 2 Remove the sheetmetal plate on the rear of the mainframe covering the slot where the interface module will be installed.

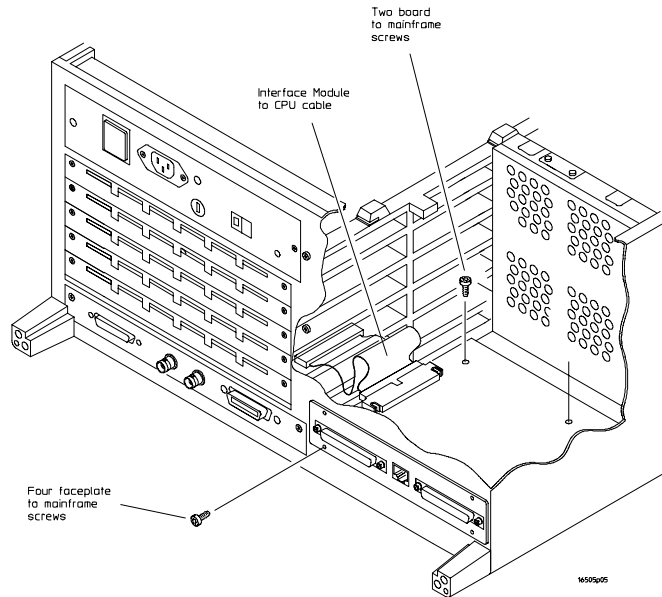
With the interface module installed, you will not use the plate. Save the plate to use in case the interface module is removed.

- 3 Slide the interface module into the mainframe through the slot in the rear panel.
- 4 Install the screws connecting the interface module to the mainframe.

Two screws through the top of the interface module connect it to the sheetmetal plate, and four screws through the rear plate of the interface module connect it to the rear panel of the mainframe.
- 5 Connect the 80-pin cable to the CPU board and to the interface module.

Before installing the cable, inspect the cable and the connectors for any signs of damage.

  - a Slide the 80-pin cable halfway through the rear slot of the card cage between the interface module and the CPU board.
  - b Connect the cable to the CPU board.
  - c Connect the cable to the interface module.
- 6 Replace the top and bottom covers, the optional modules, and the rear feet of the mainframe.



### Installing the Interface Module

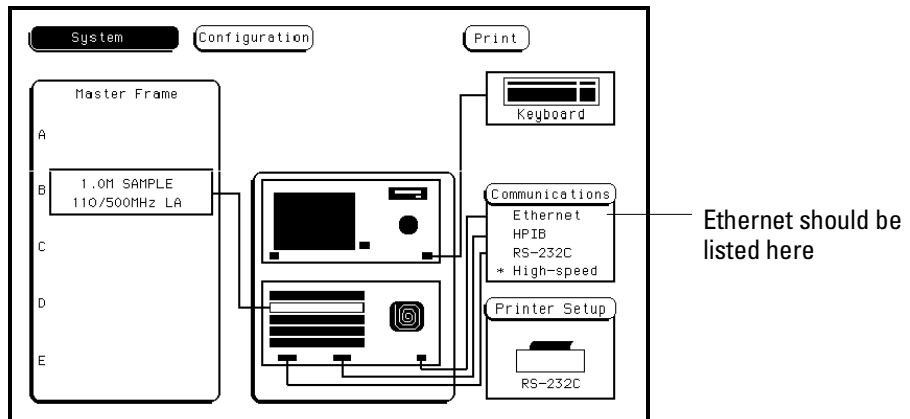
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## To Verify the Installation

- 1 Check that "Ethernet" is available in the Communications menu of the mainframe System Configuration menu.

When you power-up the mainframe, the Logic Analysis System performs the power-up self-tests. After the self-tests are finished, the screen displays the System Configuration menu. If the operating system finds an interface module installed, then Ethernet is available in the Communications menu.

- 2 If "Ethernet" is not available in the Communications menu, go to "Verifying the Interface Module Performance" in Chapter 3 of this manual.



### Verifying the Installation

## Ethernet LAN Interface

The LAN interface provides a network-based interface between the HP 16500B Logic Analysis System and personal computers and workstations over a 10Base-T Ethernet LAN. Detailed information on installing and troubleshooting in the LAN environment is covered in the *HP 16500H LAN Administrator's and Service Guide*. The following steps are an overview of the process with some troubleshooting hints.

- 1 Connect an EtherTwist 10Base-T LAN cable into the RJ-45 LAN port on the interface module.**

If your LAN uses ThinLAN connections, a Media Access Unit (MAU) is required.

- 2 Set up the configuration menus on the HP 16500B mainframe.**

You can configure the interface module to work with your network from the HP 16500B front-panel touchscreen. After the HP 16500B power-up tests are complete, the Ethernet configuration can be accessed in the Communications menu.

The interface module automatically obtains the subnet mask by sending a broadcast ICMP query over the network. The broadcast ICMP query is transmitted approximately 10 seconds after power is applied to the interface module and approximately 2 seconds after the IP address is changed. When the query is answered by another network device, the interface module stores the information in internal memory.

### **3 Verify connectivity with an echo request.**

In most network environments, an echo request is accomplished using the **ping** utility. For the exact syntax for the **ping** or other echo request utility, refer to your network documentation. A normal response to multiple echo requests is 9, 10, or possibly 11 packets transmitted for every 10 echo requests.

If there is no response to the echo request, first check the command line. If an IP address is used in the echo request command line, then the IP address typed in the command line should match the IP address stored in the HP 16500B Ethernet Configuration menu. If a hostname was used in the command line, then check the node names database to see that the IP address and the hostname for the HP 16500B were correctly entered.

After verifying the command line, check to make sure the hardware is connected and operating properly. To verify operation of the interface module, refer to "To verify the interface module performance" in Chapter 3.

An intermittent response to the echo request indicates a problem with the LAN itself. Use a LAN analyzer or LAN management software to monitor activity and determine where bottlenecks or other problems are occurring.

### **4 Mount the HP 16500B system with an NFS mount.**

An NFS mount of the 16500B system depends on the network environment the system is being mounted to. For UNIX, the **mount** command with the computer name and mount point are required. In MS-DOS, a virtual drive specifier and 16500B IP address are required. File Manager in MS-Windows is used to mount in an MS-Windows environment. In all cases, either the 16500B file server /control or /data directory must be specified depending on whether the 16500B system is being mounted for control or data.

The normal response to an NFS mount in most cases is the command line prompt reappears. If the system includes a utility to view the mount table (for example, in UNIX, the **mount** command alone displays /etc/mnttab), then the 16500B remote file server should appear in the table of mounted devices.

If error messages appear, then check the command line syntax. If the syntax is correct, then resolve the error message directly using your network documentation. Note that an error message appears if you try to mount too soon after power-up. You need to wait at least 15 seconds after the System Configuration menu is displayed on the HP 16500B display before attempting to mount.

## HP 16501A Expansion Frame Interface

The interface port for the HP 16501A Expansion Frame permits you to quickly and easily connect an expansion frame to the HP 16500B mainframe. With an expansion frame connected to the mainframe, a total of ten 16500-series measurement modules can be configured and utilized. Detailed service information for the HP 16500B mainframe and 16501A Expansion frame is covered in the *HP 16500B/16501A Service Manual*.

The expansion frame is recognized by the mainframe if the "Master Frame" text on the left side of the mainframe power-up screen appears as a blue user-select field. If the text does not appear as a blue field, the most likely cause is a defective interface module.

## HP 16505A Protoytype Analyzer

The high-speed interface port for an HP 16505A Protoytype Analyzer permits you to connect a Prototype Analyzer to the HP 16500B mainframe. Detailed installation information is covered in the *HP 16505A Prototype Analyzer Installation Guide*.



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## Servicing the Interface Module

## Verify the Interface Module Performance

Before starting the interface module performance verification, check all cables and connectors to ensure that all cables are properly connected.

The interface module performance verification (self-test) is divided into two sections. The first section tests the physical connection, for example, the cable and termination. The second section tests the internal functions of the LAN IC on the LAN interface module. When both sections of the self-test have been completed, a status reporting message appears in the Option Board Test menu. The status reporting message indicates whether the tests pass, if a failure occurs, and which section failed.

The first section, the physical connection, is tested depending on the LAN topology used. Because EtherTwist (10Base-T) is used, the interface module will listen for the heartbeat signal from the LAN. If a heartbeat is received, then the physical connection is considered good.

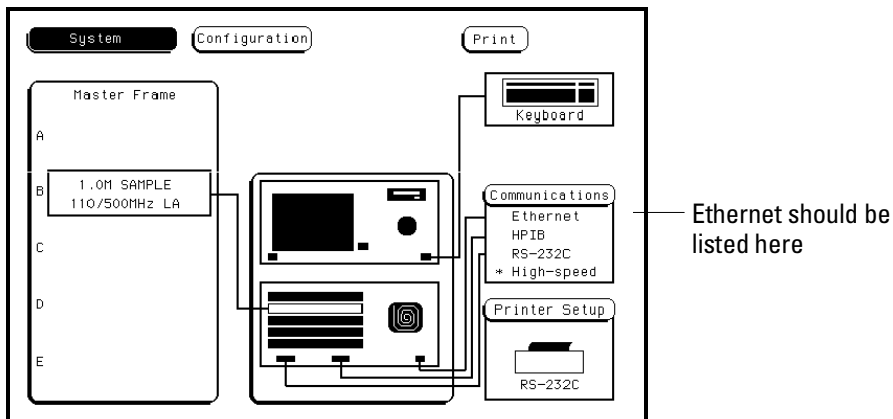
The second section is tested using internal loopback features of the LAN IC. Transmitted packets are looped back to the receive circuit of the LAN IC. When the looped back packets are received, they are processed like a packet received from a remote client or server. If the looped back packet is recognized and processed, then the LAN IC and the LAN function are considered good.

The Option Board Test also tests the system integrity of the High Speed Port on the interface module. If an HP 16501A Expansion Frame is connected, the Option Board Tests can also be used to test the expansion frame interface.

**Procedure**

This procedure verifies the performance of the interface module. To verify performance of the HP 16500B Logic Analysis System or the optional measurement modules, refer to the Service Guides for those products.

- 1 If the screen appears blank, the interface module or cable may be defective.
  - a Remove power from the HP 16500B, disconnect the power cable, then remove the top cover.
  - b Remove and inspect the interface module cable for signs of damage. If the cable appears defective, replace it.
  - c Ensure that the cable is connected according to the installation procedures and that all cables are properly seated. For installation procedures, refer to chapter 2, "Installing the Interface Module."
  - d Install the top cover of the HP 16500B mainframe, connect the power cable, and reapply power.
- 2 Touch the blue field in the upper-left corner of the HP 16500B screen. Select System from the pop-up menu .
- 3 Touch the blue field immediately to the right. In the pop-up menu, select Configuration.
- 4 Verify that "Ethernet" is available in the Communications menu on the HP 16500B System Configuration screen.



If the "Ethernet" selection appears in the Communications menu, then go to step 5.

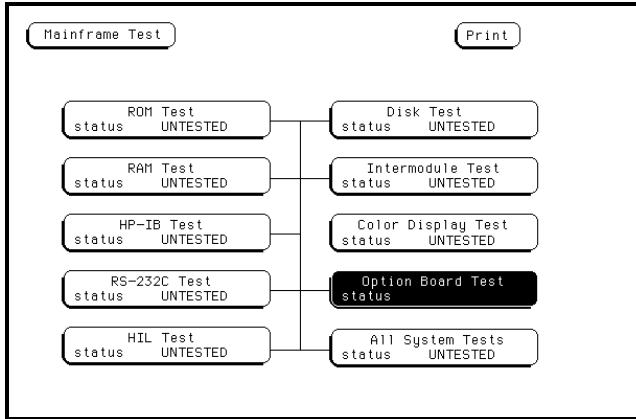
If "Ethernet" does not appear in the Communications menu, perform the following steps.

- a** Remove power from the HP 16500B, disconnect the power cable, then remove the top cover.
- b** Remove and inspect the interface module cable for signs of damage. If the cable appears defective, replace it.
- c** Ensure that the cable is connected according to the installation procedures and that all cables are properly seated. For installation procedures, refer to chapter 2, "Installing the Interface Module."
- d** Install the top cover of the HP 16500B mainframe, connect the power cable, and reapply power.

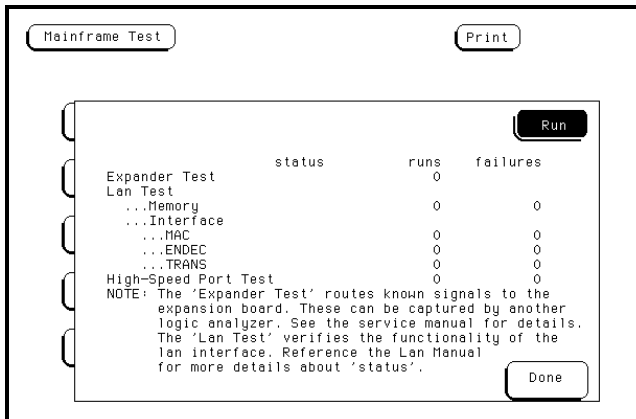
If Ethernet still does not appear, then suspect a defective CPU board. Refer to the *HP 16500B/16501A Service Guide* for information on testing and replacing the CPU board.

- 5** Touch Configuration, then touch Test. When the test menu appears, touch the blue field to load the performance verification test system.

- 6 Touch Test System, then select Mainframe Test in the pop-up menu. The screen will display the Mainframe Test menu.



- 7 Select Option Board Test, then select Run.



If an HP 16501A expansion frame is not connected, then expect a "No Expansion Card Present" message to appear when you run the Option Board Test. Refer to the *HP 16500B/16501A Service Guide* for more information about the expansion frame.

**8** Verify that the tests pass.

If all of the tests pass, then go to the step 9.

If any of the tests fail, then LAN hardware or the interface module is suspect.

- To verify the LAN hardware, perform the following checks:
  - Check that the LAN cable is properly seated at both the interface module and at the client/server/router ends.
  - Check that the LAN cable is good and that all signal lines in the cable have electrical integrity.
- To replace a defective interface module, refer to "Removing and replacing the interface module," later in this chapter.

**9** Exit the Test System.

- a** Touch the Module field, then touch Test System.
- b** Touch the Menu field, then touch Exit Test.
- c** Touch the field near the center of the screen to exit the test system and to load the operating system.

## Troubleshooting an HP 16501A Expansion Frame

For details on troubleshooting a system that is connected to an HP 16501A Expansion Frame, refer to the *HP16500B/16501A Logic Analysis System Service Manual*. If you suspect that the HP 16500H Interface Module is defective, use the procedures in this chapter to verify the interface module performance and, if necessary, replace the hardware.

The expansion frame is recognized by the mainframe if the "Master Frame" text on the left side of the mainframe power-up screen appears as a blue user-select field. If the text does not appear as a blue field, the most likely cause is a defective interface module.

## Troubleshooting in an Ethernet LAN Environment

For details on troubleshooting a system that is connected to an Ethernet LAN, refer to the *HP16500H LAN Administrator's and Service Guide*. If you suspect that the HP 16500H Interface Module is defective, use the procedures in this chapter to verify the interface module performance and, if necessary, replace the hardware.



## Troubleshooting in the HP 16505A Prototype Analyzer Environment

For details on troubleshooting a system that is connected to an HP 16505A Prototype Analyzer, refer to the *HP16505A Prototype Analyzer Service Guide*. If you suspect that the HP 16500H Interface Module is defective, use the procedures in this chapter to verify the interface module performance and, if necessary, replace the hardware.

## Removing and Replacing the HP 16500H Interface Module

- 1 If the HP 16500B Logic Analysis System is connected and mounted to a LAN, then unmount the HP 16500B file system.

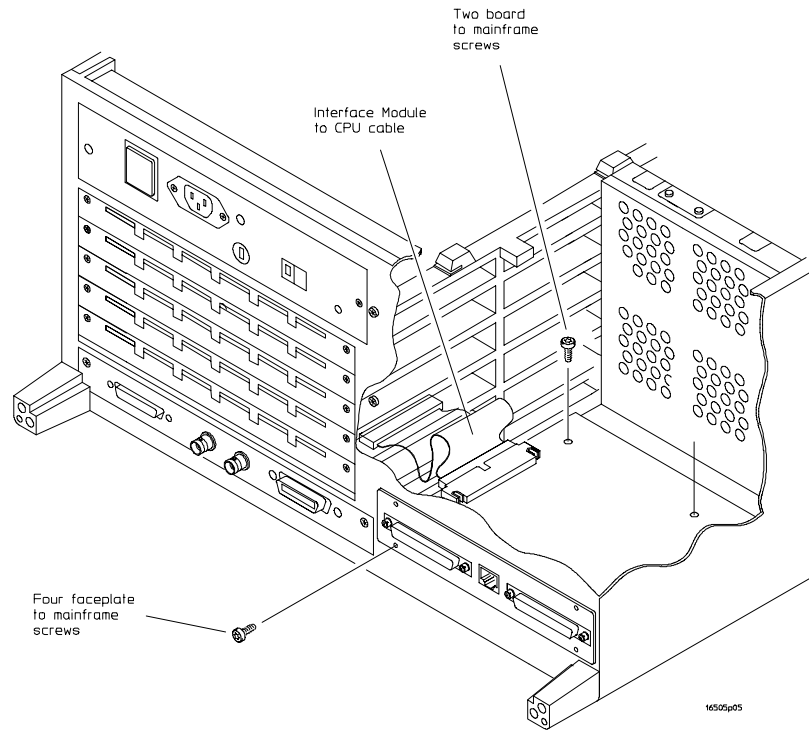
### **Unmounting from a LAN**

You must unmount the HP 16500B before power is removed from it. Then, you can mount the HP 16500B 15 seconds after the System Configuration menu is displayed when powering up the instrument. You can write a network script that executes an unmount and mount procedure.

- 2 If the HP 16500B Logic Analysis System is being used in the HP 16505A prototype analyzer environment:
  - a Save all work and close all windows.
  - b Open the Session Manager window, then select Power Down.
  - c Remove power from the HP 16505A Prototype Analyzer, then remove power from the HP 16500B mainframe.
  - d Disconnect the HP 16505A interface cable, HP 16501A interface cable, and LAN cable from the interface board.
- 3 Turn off the power switch located on the front panel of the HP 16500B mainframe and the standby switch located on the rear panel. Then, unplug the power cord from the mainframe.  
Refer to the HP 16500B Service Guide if you need instructions for removing and replacing parts of the HP 16500B.
- 3 Remove the two rear feet on the top and the top cover of the HP 16500B mainframe.
- 4 On the interface module, disconnect the cable from the CPU board.

**5 Remove the screws connecting the interface module to the mainframe.**

Two screws through the top of the interface module connect it to the sheetmetal plate, and four screws connect the rear plate of the interface module to the rear panel of the mainframe (see the figure below).



**Removing the Interface Module**

**6** Install the new interface module by reversing this procedure.

**7** Test the performance of the interface board.

Refer to "Verifying the interface module performance" in this chapter for the performance verification test procedure.

**8** Reconnect the HP 16505A or HP 16501A to the interface board, or reconnect the interface board to your network.

If you are reconnecting to a network, refer to the *LAN Administrator's and Service Guide*, or check with your system administrator for reconnecting instructions.

The Ether Address of the replacement interface module will be different than the other module. At powerup, the HP 16500B operating system reads the address of the interface module, then records the address in memory.

If your network configuration did not change, the addresses and information in the configuration menus will remain the same.

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## Returning Parts

Before shipping the module to Hewlett-Packard, contact your nearest Hewlett-Packard sales office for additional details.

**1 Write the following information on a tag and attach it to the part to be returned.**

- Name and address of owner
- Model number
- Description of service required or failure indications

**2 Remove accessories from the module.**

Only return accessories to Hewlett-Packard if they are associated with the failure symptoms.

**3 Package the module or assemblies.**

You can use either the original shipping containers, or order materials from an HP sales office.

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**CAUTION**

Package the interface module in electrostatic material. Failure to do so could cause electrostatic discharge, damaging the module.

**4 Seal the shipping container securely, and mark it FRAGILE.**

## Ordering Replaceable Parts

### **Parts listed**

To order a part on the list of replaceable parts, quote the Hewlett-Packard part number, indicate the quantity desired, and address the order to the nearest Hewlett-Packard Sales Office.

### **Parts not listed**

To order a part not on the list of replaceable parts, include the model number of the module, a description of the part (including its function), and the number of parts required. Address the order to your nearest Hewlett-Packard Sales Office.

### **Direct mail order system**

To order using the direct mail order system, contact your nearest Hewlett-Packard Sales Office.

Within the USA, Hewlett-Packard can supply parts through a direct mail order system. The advantages to the system are direct ordering and shipment from the HP Part Center in Mountain View, California. There is no maximum or minimum on any mail order. (There is a minimum amount for parts ordered through a local Hewlett-Packard Sales Office when the orders require billing and invoicing.) Transportation costs are prepaid (there is a small handling charge for each order) and there are no invoices.

In order for Hewlett-Packard to provide these advantages, a check or money order must accompany each order. Mail order forms and specific ordering information are available through your local Hewlett-Packard Sales Office. Addresses and telephone numbers are located in a separate document at the back of the HP 16500B Service Guide.

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## Replaceable Parts List

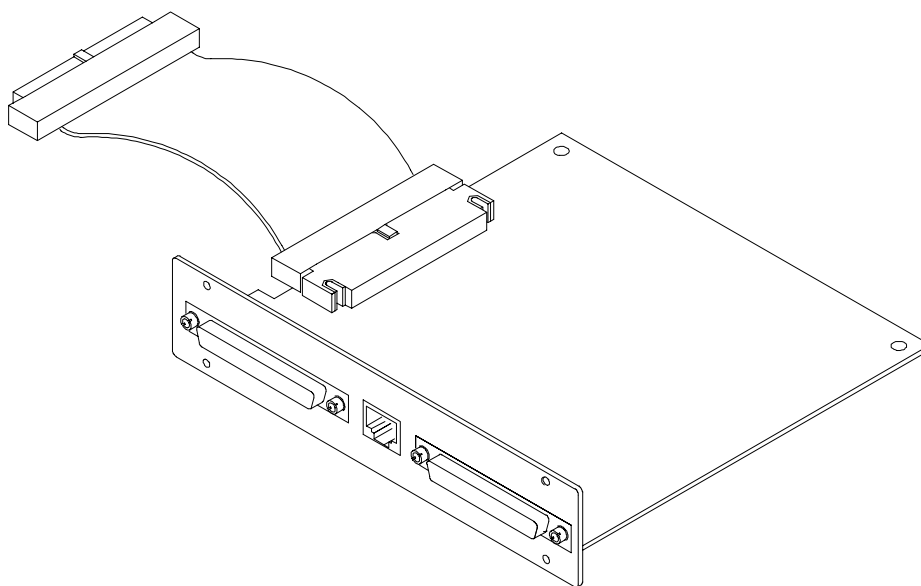
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### HP 16500H Interface Module Replacement Parts

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<b>Designator</b>	<b>HP Part Number</b>	<b>QTY</b>	<b>Description</b>
A3	16500-66514	1	Interface Board
H2	0515-0372	6	Machine Screw
W1	16500-61613	1	10/40 Cable*
W2	16500-61614	1	Mainframe CPU-Interface Board Cable

\* This cable is only used if the HP 16500H is installed in place of an HP 16500L interface module.



**HP 16500H Replaceable parts**





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#### Safety

This apparatus has been designed and tested in accordance with IEC Publication 348, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

#### Warning

- Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.
- Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders. To do so could cause a shock of fire hazard.

- Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- If you energize this instrument by an auto transformer (for voltage reduction), make sure the common terminal is connected to the earth terminal of the power source.
- Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.
- Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
- Do not install substitute parts or perform any unauthorized modification to the instrument.
- Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.
- Use caution when exposing or handling the CRT. Handling or replacing the CRT shall be done only by qualified maintenance personnel.

#### Safety Symbols



Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product.



Hazardous voltage symbol.



Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

#### WARNING

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

#### CAUTION

The Caution sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood or met.

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**Product Warranty**

This Hewlett-Packard product has a warranty against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by Hewlett-Packard.

For products returned to Hewlett-Packard for warranty service, the Buyer shall prepay shipping charges to Hewlett-Packard and Hewlett-Packard shall pay shipping charges to return the product to the Buyer. However, the 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 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 the 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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Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

**About this edition**

This is the first edition of the *HP 16500H Interface Module Installation and Service Guide*.

Publication number  
16500-97012

Printed in USA.

Edition dates are as follows:  
First edition, May 1995

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by you. The dates on the title page change only when a new edition is published.

A software or firmware code may be printed before the date. This code indicates the version level of the software or firmware of this product at the time the manual or update was issued. Many product updates do not require manual changes; and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual updates.

The following list of pages gives the date of the current edition and of any changed pages to that edition.

All pages original edition

# DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

**Manufacturer's Name:** Hewlett-Packard Company

**Manufacturer's Address:** Colorado Springs Division  
1900 Garden of the Gods Road  
Colorado Springs, CO 80907 U.S.A.

declares, that the product

**Product Name:** Prototype Analyzer

**Model Number(s):** HP 16505A/16500H

**Product Option(s):** All

conforms to the following Product Specifications:

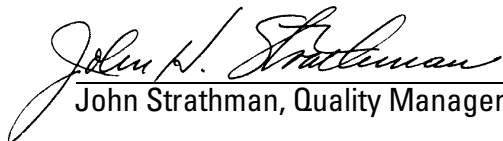
**Safety:** IEC 348:1978 / HD 401 S1:1981  
UL 1244  
CSA-C22.2 No. 231 (Series M-89)

**EMC:** CISPR 11:1990 / EN 55011:1991      Group 1 Class A  
IEC 801-2:1991 / EN 50082-1:1992      4 kV CD, 8 kV AD  
IEC 801-3:1984 / EN 50082-1:1992      3 V/m, {1kHz 80% AM, 27-1000 MHz}  
IEC 801-4:1988 / EN 50082-1:1992      0.5 kV Sig. Lines, 1 kV Power Lines

## Supplementary Information:

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

Colorado Springs, 9/15/94

  
John Strathman, Quality Manager

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ / Standards Europe, Herrenberger Strasse 130, D-71034 Böblingen Germany (FAX: +49-7031-14-3143)