

HP 16500A/HP 16501A Logic Analysis System

Setting Up The System



 **HEWLETT
PACKARD**

Read This First

Setting Up the HP 16500A/16501A Logic Analysis System



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Introduction

Welcome to the Hewlett-Packard Logic Analysis Systems. The HP 16500A/16501A has been designed to be the easiest system to use, ever. Its modular mainframe allows you to configure the HP 16500A/16501A with just the modules you want.

This manual explains how to prepare the HP 16500A/16501A Logic Analysis System for operation. It instructs the user on inspection and preparation procedures, provides step-by-step instructions for setting up the instruments, and provides additional information about cleaning, storing, and shipping the system.

After you have read this manual and unpacked, inspected, and begun operating the instrument, your next step depends on your own needs. If you are a first-time user, you should read the two "Feeling Comfortable" books included with the HP 16500A/16501A. If you are familiar with logic analyzers and digitizing oscilloscopes, you may want to read the Getting Started Guide for each module or go directly to the *HP 16500A/16501A Reference Manual* and similar module reference manuals, depending on your knowledge, background, and comfort level.

Getting Ready to Operate

This chapter provides you with information to prepare your HP 16500A/16501A for operation. It explains how to inspect the HP 16500A/16501A and lists the manuals, disks, and standard accessories included with the instrument. This chapter also describes the recommended operating environment, including ventilation and power requirements. Finally, you learn how to prepare the HP 16500A/16501A for operation by removing the shipping disks, selecting the proper line voltage, checking the fuse, and providing power.

Initial Inspection

Inspect the shipping container for damage. If the shipping container or packaging material is damaged, you should keep them until the contents of the shipment have been checked. This should include a complete mechanical and electrical check of the instrument and a complete inventory of the items that were shipped with the instrument.

If shipping damage has occurred or if the instrument does not operate properly, refer to the *HP 16500A/16501A Service Manual*.

Manuals and Disks

The complete set of manuals and disks included with the HP 16500A/16501A is listed below. If any are missing, contact your nearest Hewlett-Packard office.

Included with the mainframe are:

- the book *Feeling Comfortable With Logic Analyzers*.
- the book *Feeling Comfortable With Digitizing Oscilloscopes*.
- this manual, *Setting Up The HP 16500A/16501A*.
- the *HP 16500A/16501A Reference Manual*.
- the *HP 16500A/16501A Programming Reference Manual*.
- the *HP 16500A/16501A Service Manual*.

- Composite System Software consisting of one or two disks:
Factory Configured Software for the HP 16500A Logic Analysis System (Disk 1).
Factory Configured Software for the HP 16500A Logic Analysis System (Disk 2) only when needed.
- and two blank disks.

Included with each module are:

- the *Getting Started Guide*.
- the reference manual.
- the programming manual.
- the service manual.
- Disk/Information pouch containing the module software.

Standard Accessories

One power cable is included as a standard accessory with the mainframe.

The standard accessories included with each module vary from module to module. To find a list of the accessories included with your modules, refer to the getting started guide or reference manual for each of your modules.

If any of the standard accessories are missing, contact the nearest Hewlett-Packard sales office.

Operating Environment

The complete operating environment specifications are listed in the *HP 16500A/16501A Reference Manual*. You should note the non-condensing humidity limitation. Condensation within the instrument can cause poor operation or malfunction.

The HP 16500A/16501A will operate to all specifications, within the following temperature and humidity range:

Hardware:

Temperature: 0 to 55 degrees C (32 to 131 degrees F)

Humidity: Up to 95% relative humidity at 40 degrees C (104 degrees F) (non-condensing)

Disk Drive and Media:

Temperature: 10 to 40 degrees C (50 to 104 degrees F)

Humidity: 8% to 80% relative humidity

Avoid high temperature/humidity combinations and protect the instrument against internal condensation.

Ventilation Requirements

You must provide an unrestricted airflow for the fan and ventilation openings in the rear and side panels of the HP 16500A /16501A. However, you may stack the HP 16500A and the HP 16501A under or over other instruments as long as the surfaces of the other instruments aren't needed for their ventilation. For more information on the ventilation requirements refer to Appendix A of the *HP 16500A/16501A Reference Manual*.

Power Requirements

The HP 16500A and the HP 16501A require a power source of either 115 or 230 VAC, -22% to +10%, single phase, 48 to 66 Hz. The HP 16500A requires 475 watts maximum. The HP 16501A requires 420 watts maximum.

The Yellow Shipping Disks

Remove the yellow shipping disks from both the front and rear disk drives by unlocking the shipping disk and pressing the button on the individual disk drives until the yellow shipping disk pops out. These disks help protect the disk drives during shipping and should be saved for later transportation of the HP 16500A.

Caution 

Failure to remove the yellow shipping disks from either disk drive before turning on the instrument may result in damage to the disk drives.

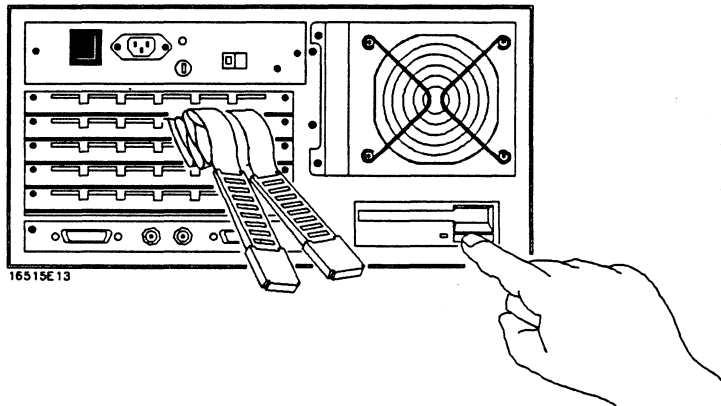


Figure 1-1 Removing the yellow shipping disk from the rear disk drive

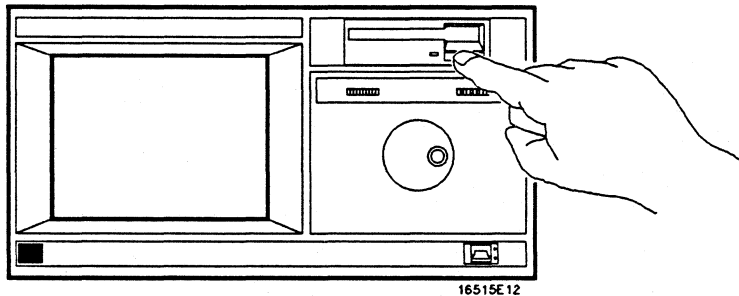


Figure 1-2 Removing the yellow shipping disk from the front disk drive

Selecting the Proper Line Voltage

Select the proper line voltage with the LINE SELECT switch on the rear panels of both the HP 16500A and the HP 16501A. Printed on the switch is the line voltage required for that position. If you want to change the selection, push the switch to the opposite side and the other line voltage selection will then show on the switch.

Caution 

Either the HP 16500A or the HP 16501A can be damaged if the LINE VOLTAGE SELECT switch is not properly set to match the input voltage.

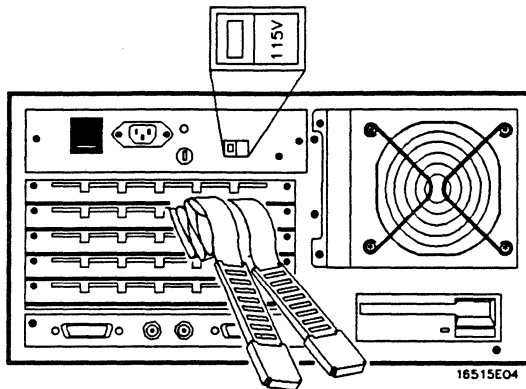


Figure 1-3. Selecting the proper line voltage

Checking for the Correct Fuse

To check the fuse on the rear panel, push in gently and turn the top of the fuse holder counter-clockwise about one quarter of a turn until the top pops out. Remove the fuse and check the value that is marked on it. The correct value for each line selection is printed on the top of the power supply (under the top cover) and in the *HP 16500A/16501A Service Manual*.

To install the fuse, put the top of the fuse holder on the fuse and gently push the fuse into the holder on the rear panel. Turn it clockwise until it seats itself and then push in gently and turn it about one quarter of a turn.



To avoid a potential shock hazard, always make sure the instrument is turned off and unplugged before checking the fuse.

For continued protection against fire hazard, replace fuses with only the same type and rating specified in the *HP 16500A/16501A Service Manual*.

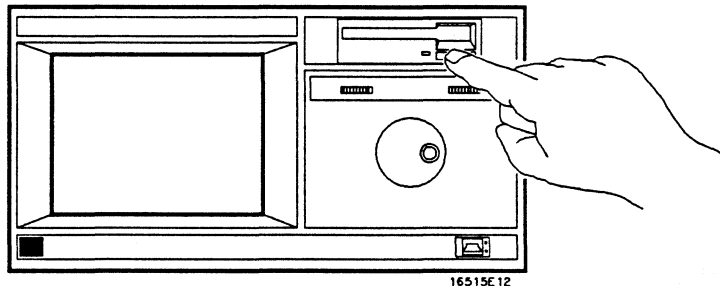


Figure 1-4 Checking the Fuse

Getting Power to the Instrument



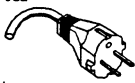

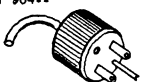
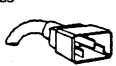

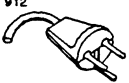

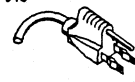
Both the HP 16500A and the HP 16501A are provided with three-wire power cables.

When you connect the cable to the appropriate power receptacle, a ground is provided for the instrument cabinet. The type of power cable you receive with the instrument depends on your particular country. The chart on the next page lists the power cables and plug configurations available.

Warning 

To avoid a potential shock hazard, you must connect the instrument to a properly grounded three-wire receptacle.

Table 1-1. Available Power Cables And Options

PLUG TYPE	CABLE PART NO.	PLUG DESCRIPTION	LENGTH IN/CM	COLOR	COUNTRY
OPT 900  250V	8120-1351 8120-1703	Straight *BS1363A 90°	90/228 90/228	Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Zimbabwe, Singapore
OPT 901  250V	8120-1369 8120-0696	Straight *NZSS198/ASC 90°	79/200 87/221	Gray Mint Gray	Australia New Zealand
OPT 902  250V	8120-1689 8120-1692 8120-2857	Straight *CEE7-Y11 90° Straight (Shielded)	79/200 79/200 79/200	Mint Gray Mint Gray Coco Brown	East and West Europe, Saudi Arabia, So. Africa, India (Unpolarized in many nations)
OPT 903**  125V	8120-1378 8120-1521 8120-1992	Straight *NEMA5-15P 90° Straight (Medical) UL544	90/228 90/228 96/244	Jade Gray Jade Gray Black	United States, Canada, Mexico, Philippines, Taiwan
OPT 904**  250V	8120-0698	Straight *NEMA6-15P	90/228	Black	United States, Canada
OPT 905  250V	8120-1396 8120-1625	CEE22-V1 (System Cabinet Use) 250V	30/76 96/244	Jade Gray	For interconnecting system components and peripherals. United States and Canada only
OPT 906  250V	8120-2104 8120-2296	Straight *SEV1011 1959-24507 Type 12 90°	79/200 79/200	Mint Gray Mint Gray	Switzerland
OPT 912  220V	8120-2956 8120-2957	Straight *DHCK107 90°	79/200 79/200	Mint Gray Mint Gray	Denmark
OPT 917  250V	8120-4211 8120-4600	Straight SABS164 90°	79/200 79/200	Jade Gray	Republic of South Africa India
OPT 918  100V	8120-4753 8120-4754	Straight Mitt 90°	90/230 90/230	Dark Gray	Japan

Rev. 11/03/88

ART00018

*Part number shown for plug is industry identifier for plug only. Number shown for cable is HP part number for complete cable including plug.

**These cords are included in the CSA certification approval of the equipment.

E=Earth Ground

L=Line

N=Neutral

Turning On the HP 16500A/16501A

Once you have prepared the HP 16500A/16501A for operation, as discussed in Chapter 1, you are ready to turn on the instrument. In this chapter you will learn how to install the operating system disk, connect any optional accessories you have, and turn on the instrument. This chapter also describes the steps the HP 16500A/16501A completes during power-up. Finally, you will learn how to adjust the brightness, background, and tilt stand and how to use each of the four available user interfaces.

Installing the Operating System Disk

The HP 16500A/16501A operating system disk contains a set of programs that controls the operation of the instrument. The operating systems are on 3.5 inch disks that you can install into either the front or rear disk drive. Typically, Disk 1 is installed in the rear disk drive and Disk 2 (if supplied) is installed in the front disk drive. To install the operating system disk follow these steps:

1. Hold the disk labeled “Factory Configured Software for HP 16500A Logic Analysis System (Disk 1)” so that the label is on top and the metal auto-shutter is away from you.
2. Push the disk gently, but firmly, into the rear disk drive until it clicks into place.



If the Factory Configured Software for HP 16500A Logic Analysis System is on two disks, install one disk in each disk drive.

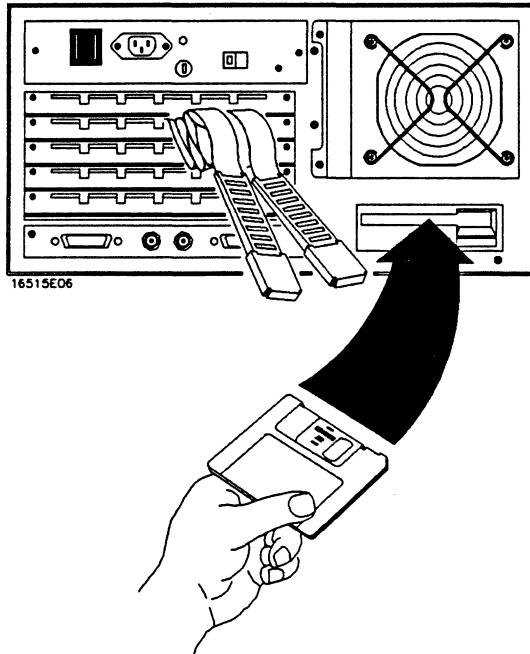


Figure 2-1. Installing the Operating System Disk

Connecting the Optional Mouse

The cord on the HP Mouse (HP 46060A) is marked with two dots. On the lower right corner of the front panel of the HP 16500A mainframe there is a port marked with two dots. This is the port into which you will insert the HP Mouse connector. To insert the connector, follow these steps:

1. Hold the connector so that the two spring clips are facing down and the contacts are facing up.
2. Gently push the connector into the port on the front panel until it clicks into place.

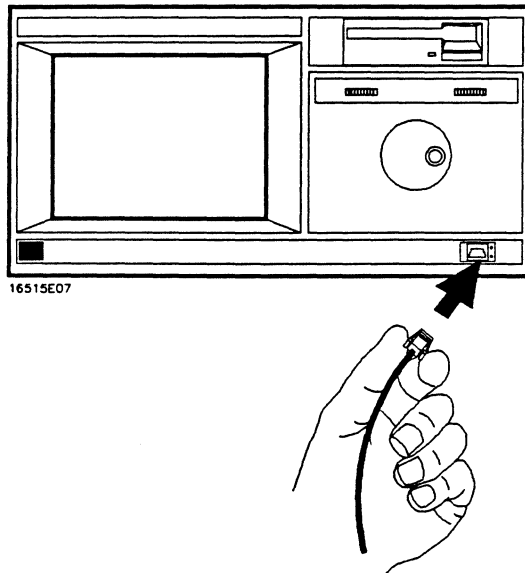


Figure 2-2. Connecting the Optional Mouse

The mouse may also be plugged into the optional keyboard interface (HP E2427A Keyboard Kit). To connect the mouse to the keyboard, insert the connector end of the mouse (marked with two dots) into the port marked with two dots located on the back of the keyboard.

When the mouse is connected directly to the HP 16500A mainframe, the System Configuration menu will show a mouse icon connected to the instrument (see Fig. 2-3).

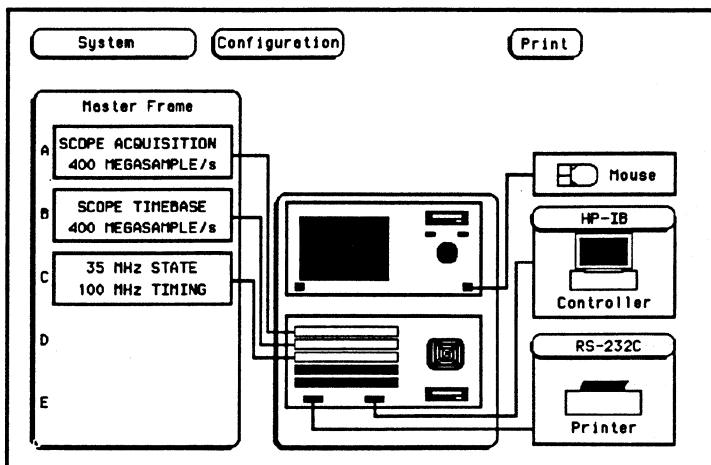


Figure 2-3. System Configuration with the Mouse Only

When the mouse is connected to the keyboard, the **System Configuration** menu will display a picture of the mouse connected to the keyboard, which is in turn connected to the HP 16500A mainframe (see Fig. 2-4).

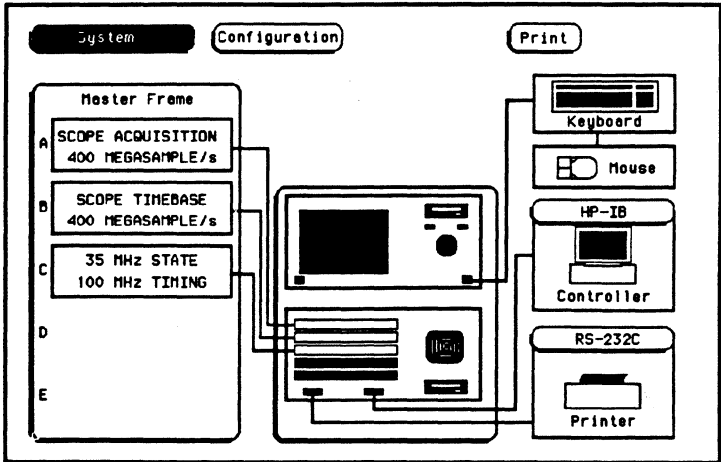
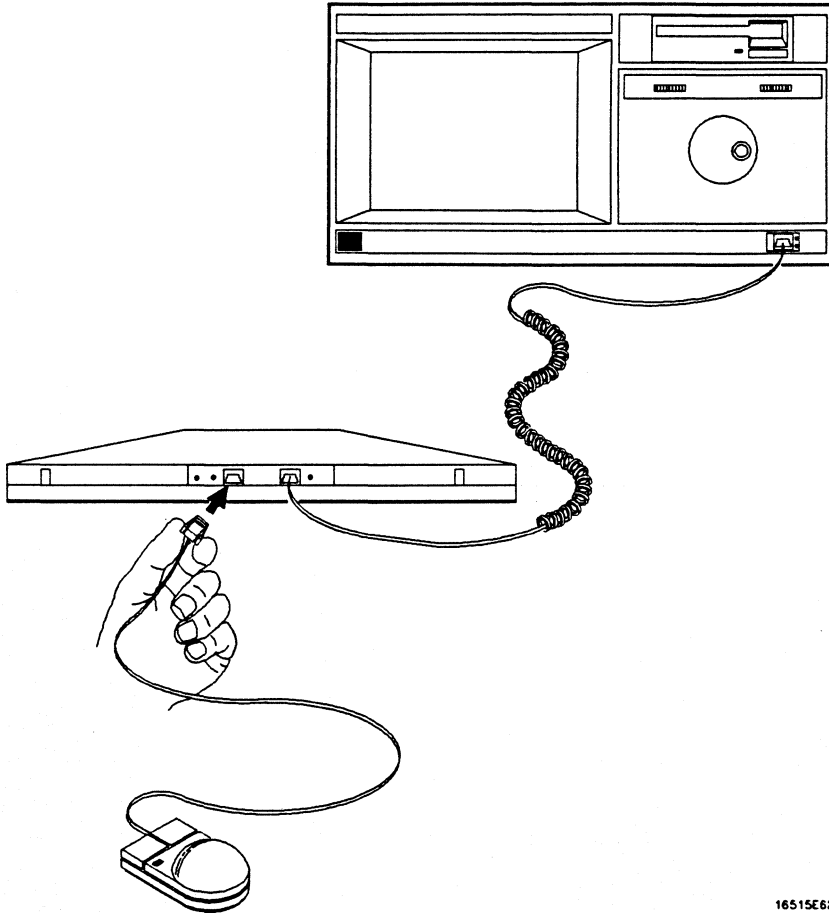


Figure 2-4. System Configuration with the Mouse

To disconnect the mouse, press the two spring clips on the connector together and gently pull the connector out of the port.

Connecting the Optional Keyboard

The cord attached to the back of the keyboard (HP E2427A Keyboard Kit) is marked with one dot where it is attached to the keyboard and two dots on the connector end. On the lower right corner of the front panel of the HP 16500A mainframe there is a port marked with two dots. This is the port into which you will insert the keyboard connector.



16515E62

Figure 2-5. Connecting the Optional Keyboard

To insert the connector, follow these steps:

1. Hold the connector so that the two spring clips are facing down and the contacts are facing up.
2. Gently push the connector into the port on the front panel until it clicks into place.

When the keyboard is connected to the HP 16500A, the **System Configuration** menu will display the connection as a picture showing the keyboard connected to the mainframe.

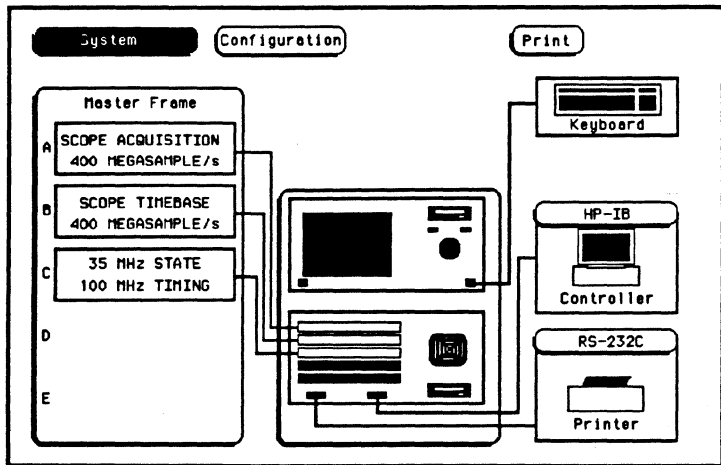


Figure 2-6. System Configuration with the Keyboard

To disconnect the keyboard, press the two spring clips on the connector together and gently pull the connector out of the port.

Connecting the Optional HP 16501A Expansion Frame

The optional HP 16501A Expansion Frame has four components:

- the **expansion frame** consisting of the five-slot card cage, power supply, and fans.
- an **expansion frame interface board**, which occupies a fixed, non-removable slot beneath the five-slot card cage in the HP 16501A. It contains a port designed to receive a 68-pin “D” connector.
- a **mainframe interface board**, which, if not already installed in the HP 16500A mainframe, you may insert into any one of the five card slots marked A-E. It also contains a port designed to receive a 68-pin “D” connector.
- a flat, bi-directional cable 2 meters long with a 68-pin “D” connector at each end. This cable is long enough to allow the units to be stacked vertically or placed side-by-side. The cable is externally shielded to reduce RFI emissions.

To connect the HP 16501A to the HP 16500A, follow these steps:

1. Insert one of the 68-pin cable connectors into the port located on the right side of the **mainframe interface board**.

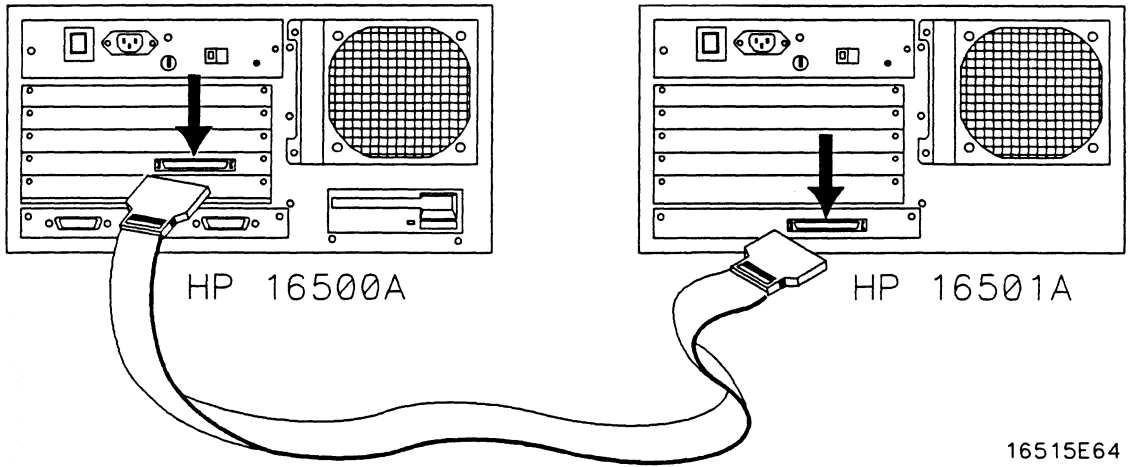


In order to ensure correct insertion, the 68-pin “D” connectors are asymmetric in shape. They only fit into their respective ports when oriented to match the shape of the ports.

2. Insert the other 68-pin connector into the port on the **expansion frame interface board**.
-



Make sure the connector is properly seated into the port by pulling the connector without pressing the release tabs. If the connector is properly seated it will remain connected to the port.



16515E64

Figure 2-7. Connecting the HP 16501A Expansion Frame

If, at power-up, the HP 16500A CPU board finds a **mainframe interface board** in any one of its five card slots, it checks the **expansion frame interface board** to determine whether an HP16501A Expansion Frame is present. If so, the CPU establishes a “link” between the rear panels of the two frames, which then are displayed by the **System Configuration** menu as a nine-slot system located on the HP 16500A rear panel.

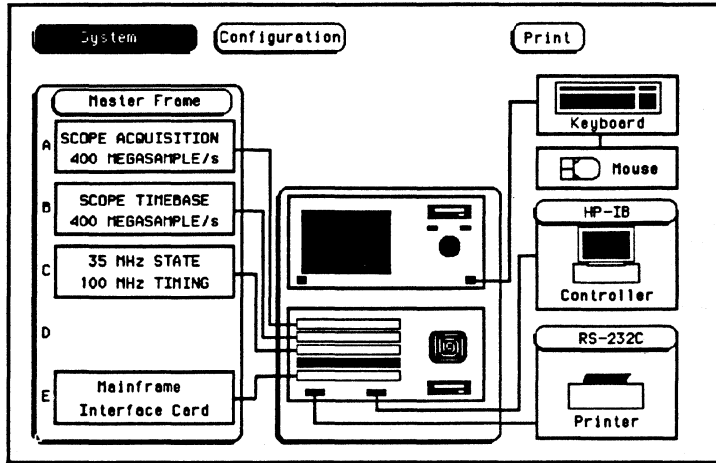


Figure 2-8. System Configuration with the HP 16501A

The Line Switch and Power Standby Switch

The HP 16500A has a master line switch on the rear panel and a power standby switch on the lower-left corner of the front panel. The HP 16501A also has a master line switch on the rear panel.

To turn on the instrument, press the top of the line switch (marked “ON”) on the rear panel. Then press the right side of the power standby switch (marked “ON”) on the front panel.

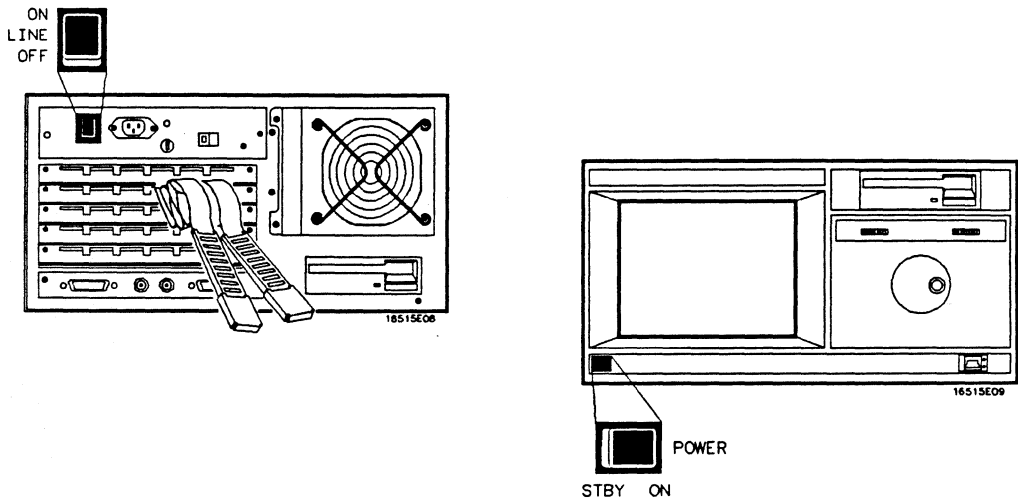


Figure 2-9. The Line and Power Standby Switches

Note 

If an HP 16501A is attached to the HP 16500A, and its rear-panel line switch is on, turning on the HP 16500A also turns on the HP 16501A.

Power-Up Self-Test

When you turn on the HP 16500A/16501A, it will initiate a set of self-tests to check the basic condition of the instrument and the operating system disk. Refer to Appendix D of the *HP 16500A/16501A Reference Manual* for an overview of these tests.

Loading the Operating System

After a brief self-test routine, the operating system is loaded into the instrument. At this time the operating system is transferred from the disk to the instrument's internal memory. Each time the instrument is powered up, the operating system will be reloaded automatically as long as the operating system disk remains in the disk drive.

Loading the operating system and running the power-up self-tests may take up to 90 seconds, depending on the number of option modules installed in the mainframe and the expansion mainframe. If there is a problem, an error message will appear on screen.



When you first power-up the HP 16500A/16501A, the operating system may take up to 90 seconds to fully load.



To prevent damage to your operating system disk, **DO NOT** remove the disk from the disk drive while it is running. Remove it only after the indicator light has gone out.

The System Configuration Menu

After the self-tests are completed and the operating system is loaded, the **System Configuration** menu will appear on screen. This menu lists the modules with which the HP 16500A /16501A is configured, and it is from this menu that you will start operating the instrument.

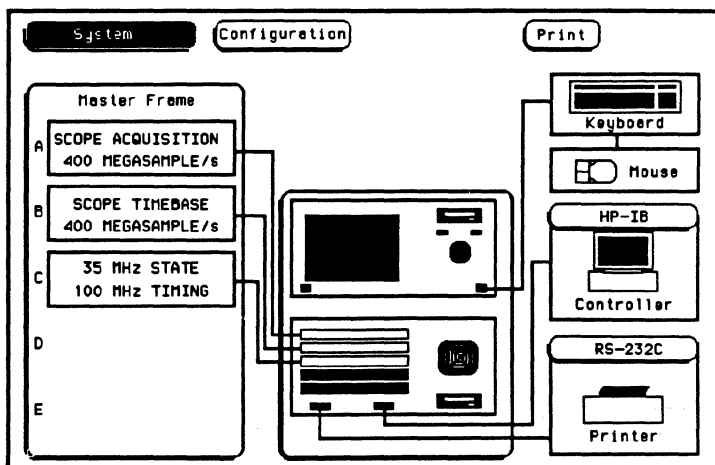


Figure 2-10. System Configuration menu (HP 16500A only)

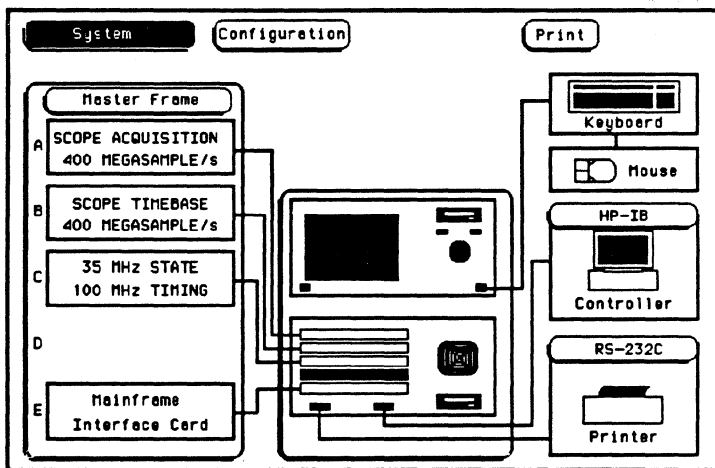


Figure 2-9. System Configuration (HP 16500A/HP 16501A)

Brightness and Background Controls

Once you have turned the instrument on, you may want to readjust the brightness and background levels to a more comfortable level. You can do this by turning the Brightness control and Background control on the front panel.



The screen may appear black or very dim if the Brightness or Background controls are improperly adjusted.

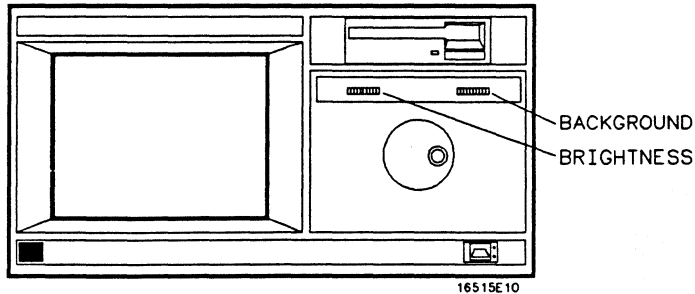


Figure 2-11. Brightness and Background Controls

The Tilt Stand

To use the tilt stand, raise the front panel of the instrument and pull the two metal feet on the front corners of the bottom cover towards you until they lock into place. This raises the front panel and gives you a better line-of-sight view of the menus and controls.



Make sure the rear feet have adequate support before raising the front panel.

User Interfaces

The HP 16500A has four user interface devices: the knob on the front panel, the touchscreen, the optional mouse, and the optional keyboard.

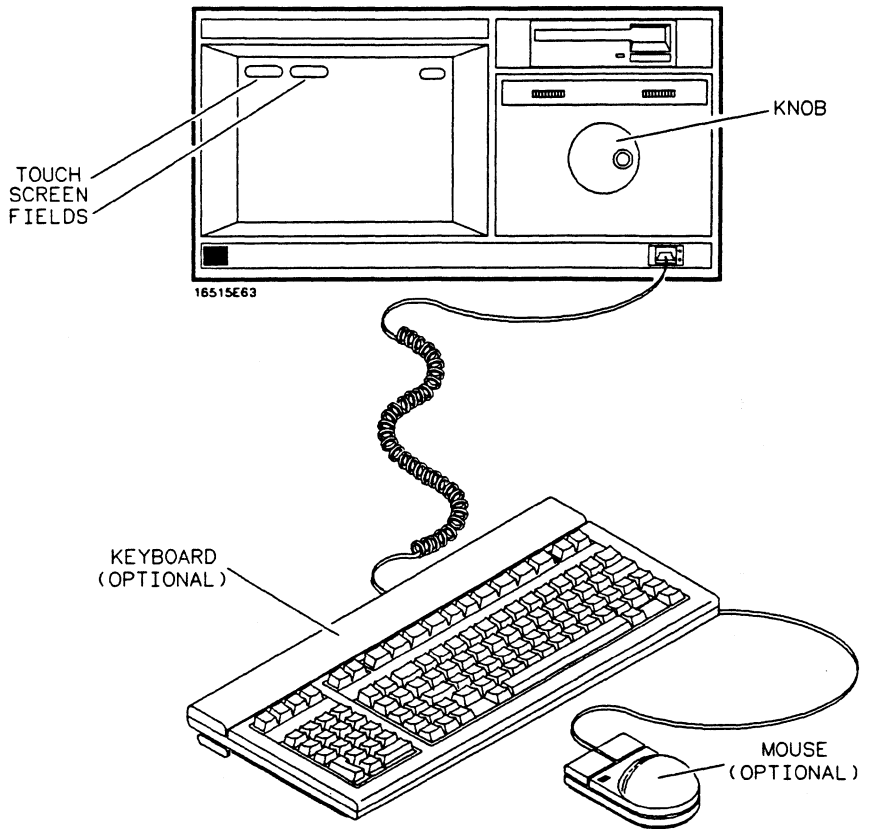


Figure 2-12. User Interfaces

The knob on the front panel is used to move the cursor on certain menus, increment or decrement numeric fields, and to roll the display.

The **touchscreen fields** can be selected by touch, by the optional **mouse**, or by the optional **keyboard**. To activate a **touchscreen field** by touch, touch or press the field (the dark blue box) on the display with your finger until the field changes color. Then remove your finger from the screen to activate your selection.

To activate a field with the optional **mouse**, position the cursor (+) of the **mouse** over the desired field and press the button on the upper-left corner of the **mouse**.

To activate a field using the optional **keyboard**, position the keyboard cursor (the location highlighted in inverse video) on the desired field and press either the Return key or the Select key.

Additional Information

This chapter contains additional information about maintaining the HP 16500A/16501A. You learn how to clean the instrument and how to store, ship, and tag it for service or repair. This chapter also provides direction for where you should turn to next to learn how to use the HP 16500A/16501A.

Cleaning Requirements

When cleaning the HP 16500A or the HP 16501A, use mild soap and water only. A harsh soap or solvent may damage the water-base paint finish.

Clean the CRT display and surrounding area regularly. Do not place tape or other foreign material on the screen that may interfere with the operation of the touchscreen.

Vacuum the ventilation slots on the sides of the instrument and the fan on the rear panel whenever there is a visible amount of dust on them.

The Storage and Shipment Environment

The instrument may be stored or shipped in environments within these limits:

Temperature: -40 to 70 degrees C (-40 to 158 degrees F)

Humidity: Up to 90% relative humidity at 65 degrees C (149 degrees F)

Altitude: Up to 15,300 m (50,000 ft)

The instrument should also be protected from temperature extremes, which cause condensation within the instrument. Condensation within the instrument may cause the instrument to malfunction when it is operating.

Tagging the Instrument for Service

If the instrument is to be shipped to a Hewlett-Packard sales office for service or repair, attach a tag with the owner's name and address, the model number, the complete serial number, and a description of the service required. In any correspondence, refer to the instrument by model number and serial number.

Repacking the Instrument

Remember, before you repack an HP 16500A, you must insert a yellow shipping disk into both the front and rear disk drives. These disks help protect the disk drives against possible damage during shipping.

If the original packing material is not available or is unserviceable, material identical to factory packaging is available through Hewlett-Packard sales offices. Always mark the container **FRAGILE** to ensure careful handling.

If you use other packaging, follow these instructions:

1. Wrap the instrument in a heavy paper or plastic.
2. Use a strong shipping container. A double-wall carton made of 350-lb test material is adequate.
3. Protect the control panel with a piece of cardboard.
4. Put a layer of shock-absorbing material, 70-to-100 mm (3-to-4 in.) thick, around the instrument to cushion the instrument and prevent any movement inside the container.
5. Seal the shipping container securely.
6. Mark the container **FRAGILE** to ensure careful handling.

What's Next

After you have unpacked, inspected, and begun operating the instrument, your next step depends on your own needs. If you are a first-time user and wanted to get the instrument running before reading the two "Feeling Comfortable" books, you should read them now. If you are familiar with logic analyzers and digitizing oscilloscopes, you may want to read the *Getting Started Guide* for each module or go directly to the *HP 16500A/16501A Reference Manual* and similar module reference manuals, depending on your knowledge, background, and comfort level.

The *Getting Started Guide* for each module introduces you to the user interfaces and teaches you front panel operation and setups for basic measurements through step-by-step procedures.

The reference manuals present the functions and features in a more detailed format with less task-oriented exercises. The functions and features are shown in an encyclopedic fashion. They are broken down into their major sections, with a conceptual example of their different applications. The general layout allows you to find your information quickly and easily, without unnecessary delay.