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For more information about this transition, please visit our website at: http://www.agilent.com, or contact your local sales representative. It has been our pleasure to work with you for the past 60 years as part of Hewlett-Packard. We look forward to continuing to serve you as Agilent Technologies for years to come.

# Installation Instructions

# for

# HP E2495A

# Pattern Generator Upgrade Kit

### HP 1660-Series Logic Analyzers

This kit upgrades either the HP 1660E, HP 1661E, HP 1662E, or the HP 1663E logic analyzer to an analyzer that contains a Pattern generator.

The following table lists how the kit upgrades your analyzer.

| The E2495A Kit | upgrades this analyzer | to this analyzer. |
|---|---|---|
| | HP 1660E | HP 1660EP |
| | HP 1661E | HP 1661EP |
| | HP 1662E | HP 1662EP |
| | HP 1663E | HP 1663EP |

**Note** *Your logic analyzer and this upgrade kit must be shipped together to a Hewlett-Packard service center*. The service center will install the upgrade and verify performance of the upgraded logic analyzer.
Contact your Hewlett-Packard sales office for the location of the nearest HP service center.

## TOOLS REQUIRED:

- T10 TORX screwdriver
- T15 TORX screwdriver
- #1 pozidrive screwdriver
- 9/32-inch hex nut driver
- 3/16-inch hex nut driver
- 5/8-inch deep-well nut driver
- Utility knife
- ROM removal tool

September 1998 HP Part Number E2495-92001

## PARTS SUPPLIED

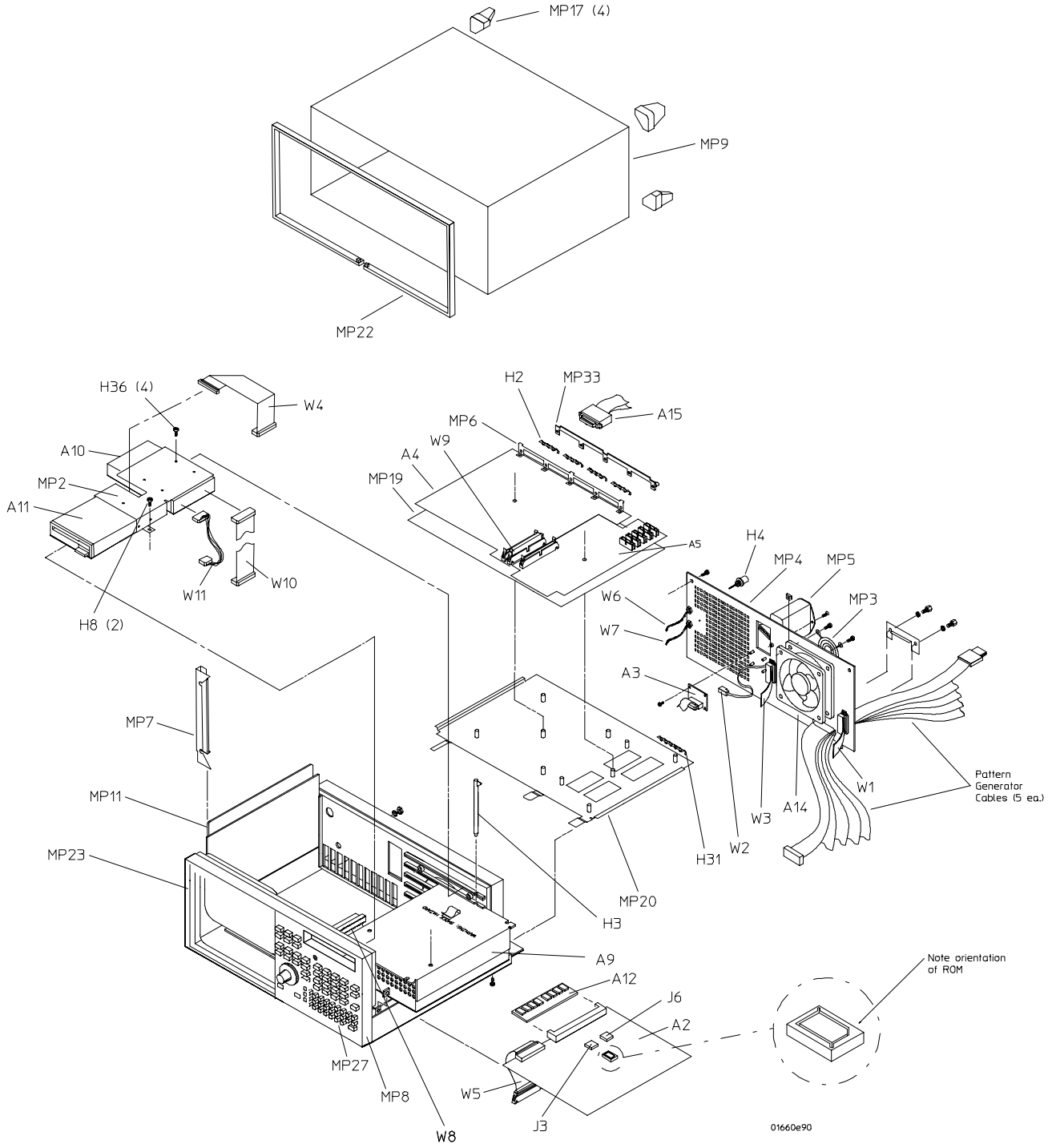
Most parts are not labeled. Refer to figure used in the instructions for easy identification.

| HP Part Number | Description | QTY. |
|---|---|---|
| 01660-66526 | Loaded Board for 1660EP | 1 |
| 01650-94309 | Label - Probe | 1 |
| 01660 - 61604 | Cable - 60 Conductor | 1 |
| 01660-68717 | SRS/166xE/ES SW Disk Pouch | 1 |
| 01660-99023 | User's Guide - English | 1 |
| 01660-99024 | Series Service Guide (Optional) - English | 1 |
| 0515-0430 | SCR - Machine | 9 |
| 16522-61601 | Cable - Output | 4 |
| 16522-61602 | Cable - Clock | 1 |
| E2495-68701 | Rear Panel Assy | 1 |
| E2495-92000 | Installation Instructions | 1 |
| 16500-41201 | Ribbon Cable ID Clip | 5 |

## INTRODUCTION

Refer to figure 1, HP 166xE/EP Logic Analyzer Exploded View, when performing this upgrade. Note that A5 is the pattern generator card.

**Figure 1 (Tear out and use as reference)**




**HP 166xE/EP Logic Analyzer Exploded View**

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## REMOVAL PROCEDURES

**WARNING** **Hazardous voltages exist on the power supply. To avoid electrical shock, disconnect the power from the instrument before performing the following procedures. After disconnecting the power, wait at least three minutes for the capacitors on the power supply board to discharge before servicing the instrument.**

**CAUTION** **Electrostatic discharge can damage electronic components. Use grounded wrist straps and mats when performing any service to the logic analyzer.**

**CAUTION** **Do not remove or replace any circuit assemblies in this instrument while power is applied. The assemblies contain components which may be damaged if the assembly is removed or replaced while the instrument is powered.**

### Remove the Probe Mounting Plate and the Probe Cables (See Figure 1)

1. Turn off the power and unplug the logic analyzer.
2. Using a #1 pozidrive screwdriver, loosen the screws and remove the probe mounting plate (MP33).
3. Remove the probe cables (A15) by pulling them out of their connectors on the rear panel.

### Remove the Cover Assembly (See Figure 1)

1. Using a T10 TORX screwdriver, remove the seven screws holding the trim strip (MP22) and the cover assembly (MP9) to the cabinet assembly (MP8). Remove MP22.
2. Using a T10 TORX screwdriver, remove the four screws to remove the four rear feet (MP17).
3. Using a T15 TORX screwdriver, remove the two screws and remove the handle assembly.
4. To remove the cover assembly (MP9) , set the instrument facing toward you. Prepare to remove the cover by using a T10 TORX to turn back three revolutions each the 4 screws fastening the equipment pouch to MP9. Slide the chassis toward the front, out of the cover. Set the instrument on a static-safe work area.

### Remove the Disk Drive (See Figures 1)

1. Disconnect the flexible disk drive cable (W4) from the rear of the flexible disk drive (A11). Disconnect the hard disk drive power cable (W11) and the hard disk drive data cable (W10).

2 . Remove the two screws holding the disk drive bracket (MP2, figure 1) to the power supply (A9).

3 . Slide the disk drive bracket assembly toward the rear of the instrument, then lift it up and out.

## Remove the Power Supply (See Figures 1 and 2)

1. Lift the two PCB locking pins (H3 (2 pins)) from the front and rear of the power supply.

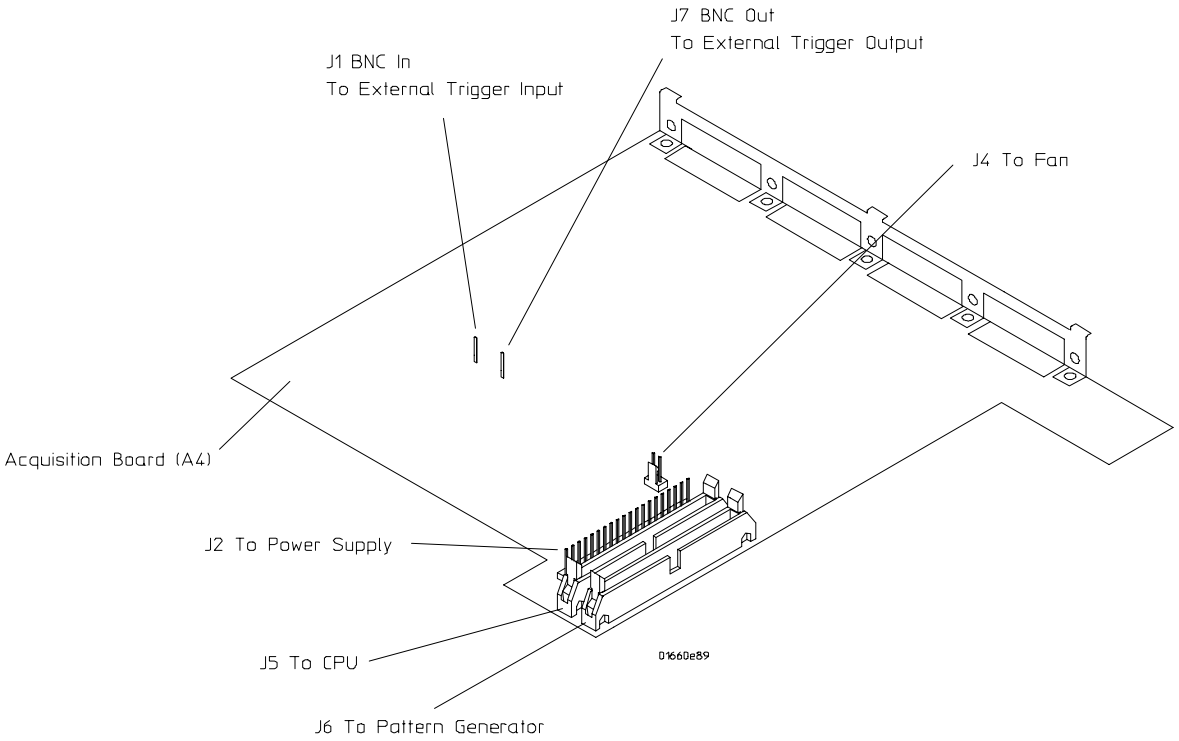
2. Slide the power supply out of the cabinet approximately 2.5 cm (1 in.).

3. Disconnect the J2 end of the power supply cable going from J2 (figure 2) on the acquisition board to the power supply assembly.

4. Disconnect the power supply end of the cable assembly going from the power supply to the line filter/cable assembly (MP5) located on the rear panel.

5. Slide the power supply the rest of the way out of the instrument.

**Figure 2**




**Acquisition Board Connector Location Diagram**

## Remove the CPU Board (See Figure 1)

1. Disconnect all cables from the CPU board (A2). The CPU board is directly under the power supply. Note cable positions for later reference.

2. Slide the CPU board out of the cabinet.

## Upgrade the ROM (See Figure 1)

1. Use a ROM removal tool to remove the ROM from the CPU board (A2)Disconnect all cables from the CPU board (A2).

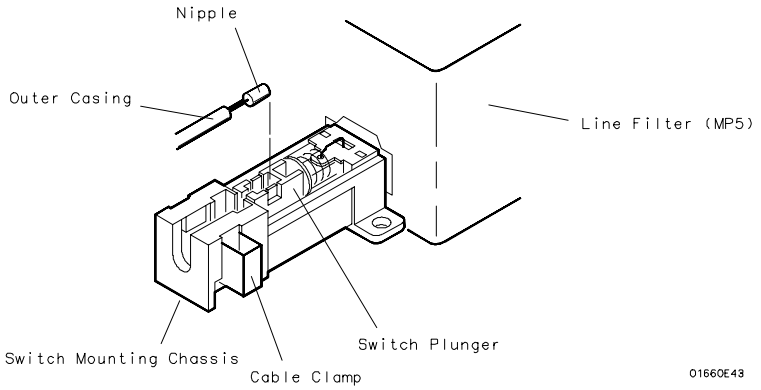
2. Place the new ROM (1660-80010) by aligning the ROM properly and pressing down.

## Disconnect Line Filter/Cable Assembly Cable (See Figures 1 and 3)

Disconnect the cable attached to the switch actuator (A7) on the line filter/cable assembly (MP5) using the following steps:

- Slide the cable clamp up and off the outer casing far enough to release the switch actuator assembly (figure 3).
- Without bending the wire, pry the nipple out of the switch plunger.
- Lift the cable up and out of the slot in the switch assembly.

**Figure 3**




**Line Filter/Cable Switch Assembly, Rotated 90°**

## Remove the Rear Panel Assembly (See Figures 1 and 2)

1. Disconnect both BNC trigger cables (W6 and W7) from the acquisition board (J1 and J7).
2. Disconnect the fan cable (W2) from the acquisition board (J4).
3. Using a T10 TORX screwdriver, remove the 6 screws from the rear panel assembly. Note how the cables are routed through the cabinet rear wall and where the cables are connected.
4. Remove the rear panel and set it aside.

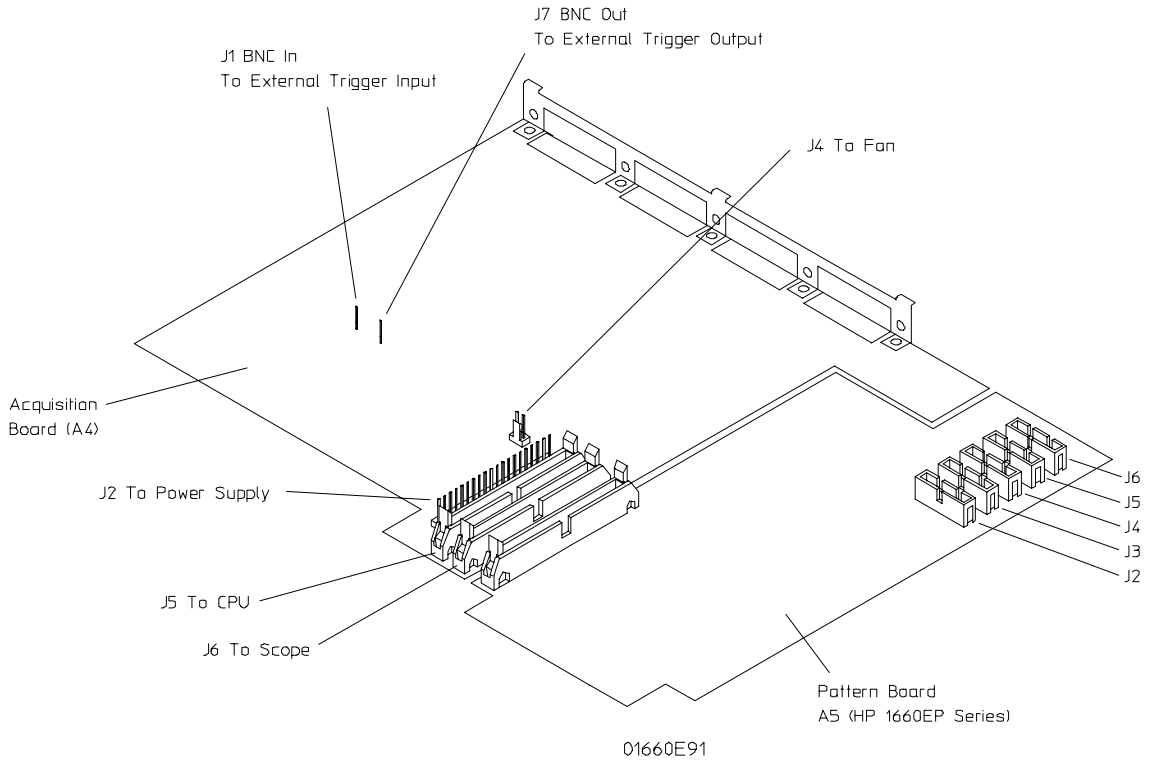
## Remove the Acquisition Board (See Figures 1 and 2)

1. At J5 on the acquisition board, disconnect the CPU-acquisition board cable (W5).
2. Slide the acquisition board and the attached mounting plate (MP20) out of the rear of the instrument; be careful not to break the locking tabs on J5 and J6.

## Mount the Pattern Generator Board (See Figures 1 and 4)

1. Place the supplied patter generator board assembly (01660-66526, A5 in figure 4) on the 4 studs on the circuit board mounting plate (MP20, figure 1) and slide the pattern generator board assembly forward to lock it to the mounting plate.

**Figure 4**




**Acquisition and Pattern Generator Board Connector Location Diagram**

## Attach the Pattern Generator Cables (See Figure 4)

1. Plug the clock pod (16522-61602) into J6 on the pattern generator board.

2. Plug the four output pods (16522-61601) into J5, J4, J3, and J2 on the pattern generator board.

## Apply the Cable Labels (See Figure 4)

1. Apply the clock label and the labels 1, 2, 3, and 4 to the cable clips (16500-41201).

2. Clip the cable clips to the end of the pattern generator cables in the following order:

   - Clip Clk onto J6
   - Clip 3 onto the cable connected to J5
   - Clip 1 onto the cable connected to J4
   - Clip 2 onto the cable connected to J3
   - Clip 4 onto the cable connected to J2

## REASSEMBLY PROCEDURE

### Install the Acquisition Board Assembly (See Figures 1 and 4)

1. Install the board assembly into the instrument by sliding it through the rear of the instrument. Tabs at the front of the mounting plate must align with slots at the front of the cabinet. The board assembly must also be flush with the rear of the cabinet.

2. Connect the 60-pin ribbon cable assembly (01660-61604) between the pattern generator 60-pin connector and the acquisition board J6 connector (figure 4).

### Replace and Position the Rear Panel Assembly

1. Place the new rear panel assembly (E2495-68701) at the rear of the logic analyzer.

2. Feed the free ends of the pattern generator cables through the cabinet rear wall. Ensure that all other cables are routed the same as before. They must not block the fan.

3. After completing the cable routing, insert the rear panel onto the rear of the instrument.

### Install the New Rear Panel Assembly (See Figures 1 and 4)

1. Using a T10 TORX screwdriver, attach the rear panel to the chassis using the 6 existing screws.

2. Ensure that the rear panel is properly seated on the rear of the chassis. Tabs at the rear of the acquisition board mounting plate should fit into the slots in the rear panel.

3. Plug the BNC cables (W6 and W7) into the acquisition board (J1 and J7, figure 4) using the reference designators shown on the acquisition board.

4. Plug the fan cable (W2) into the acquisition board (J4, figure 4).

## Reconnect the Power Switch (See Figure 3)

Insert the cable into the switch actuator assembly.

- Insert the nipple into the switch plunger.
- Depress the cable locking clamp to secure the outer casing.
- Test the power switch on the front panel to insure it catches.

## Check Cable Installations (See Figures 1 and 4)

1. Ensure that the BNC trigger cables (W6 and W7) are installed on acquisition board at J1 and J7 (figure 4).
2. Ensure that the power supply cable is installed on the acquisition board at J2 (figure 4).
3. Verify that the fan cable (W2) is installed on acquisition board at J4 (figure 4).
4. Verify that the cable is installed between acquisition board and pattern generator board (J6, figure 4).
5. Verify that the HP-IB, RS-232-C, and I/O board cables are routed through rear of cabinet.
6. Verify that the keypad cable is routed through front of cabinet.

## Install the CPU Board (See Figure 1)

1. Place the free ends of the RS-232-C and HP-IB cables in the bottom of the cabinet close to where the cables would connect to the CPU board.
2. Slide the CPU board (A2, figure 1) into the bottom slot of the cabinet.
3. Plug the existing CPU-acquisition board cable (W5) into the CPU board and into the acquisition board.
4. Plug both the HP-IB cable and the RS-232-C cable into the CPU board.
5. Plug the display cable into the CPU board (J6).
6. Plug the back light cable into the CPU board (J3).
7. Plug the keypad cable into the CPU board.
8. Plug the I/O cable into the CPU board.

## Install the Power Supply (See Figure 1)

1. Slide the power supply most of the way into the cabinet.
2. Connect the line filter cable to the power supply.
3. Connect the power supply cable (W8) to the acquisition board (J2).
4. Slide the power supply the rest of the way into the cabinet.
5. Secure the power supply in the cabinet using the two existing locking pins (H3 (2 pins)). Install the locking pins, one on the front and one on the rear of the power supply. The locking pins should go through the power supply and the CPU board.

## Install the Disk Drive Assembly (See Figure 1)

1. Position the disk drive/bracket assembly so that the front of the flexible disk drive can be inserted in the corresponding hole in the front of the cabinet. Insert the flexible disk drive into the hole.

2. Insert the rear of the disk drive/bracket assembly so that the rear of the bracket can be inserted in the top slot in the rear of the cabinet. Position the bracket assembly so that the two screw holes in the bracket ears align with the screw holes in the top of the power supply.

3. Using a T10 TORX screwdriver, use 2 existing screws to secure the disk drive/bracket assembly to the top of the power supply. Ensure that the bracket is seated into a slot in back.

4. Connect the hard disk drive data cable (W10) to the CPU board.

5. Connect the hard drive power cable (W11) to the CPU board.

6. Connect the flexible disk drive cable (W4) to the CPU board.

7. Plug the flexible disk drive cable into the rear of the flexible disk drive. Plug the hard disk drive data cable and hard disk drive power cable into the rear of the hard disk drive. Flat cables should be folded and inserted into the ribbon cable holder to prevent interference when sliding on outer cover.

## Install Cover (See Figure 1)

1. Slide the cabinet into the cover. Using a T10 TORX, re-tighten the 4 screws fastening the equipment pouch.

2. Using a T10 TORX screwdriver, attach the 4 existing rear feet to the rear panel of the logic analyzer.

3. Using a T15 TORX screwdriver, install the handle assembly to the monitor side of the logic analyzer.

4 . Connect the probe cables to the rear panel of the instrument. Using a #1 pozidrive screwdriver, install the probe mounting plate and the pattern generator cable mounting plate to the rear panel of the instrument.

## Record the Model and Serial Number (See Figure 5)

1. Read the original instrument serial number from the original rear panel.

2. Record the model number and serial number using indelible ink on the blank serial label on the new rear panel.

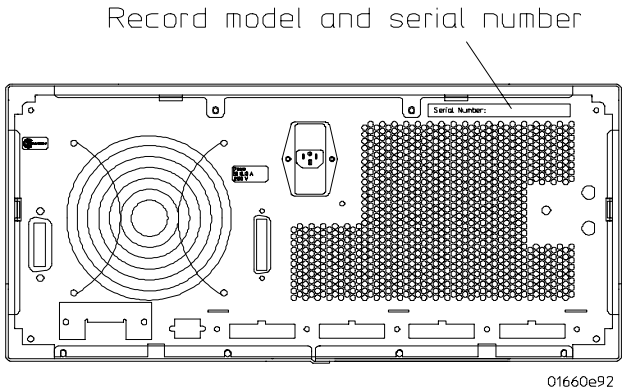



**Figure 5**

**Blank Serial Number Label Location**

## Install the ID Label (See Figure 6)

1. Peel off the old ID label; use a utility knife to raise a corner of the existing label.
2. Clean off existing label adhesive if needed.
3. Select the new ID label which corresponds to the upgraded logic analyzer
4. Attach the new ID label to the logic analyzer as seen in figure 6.

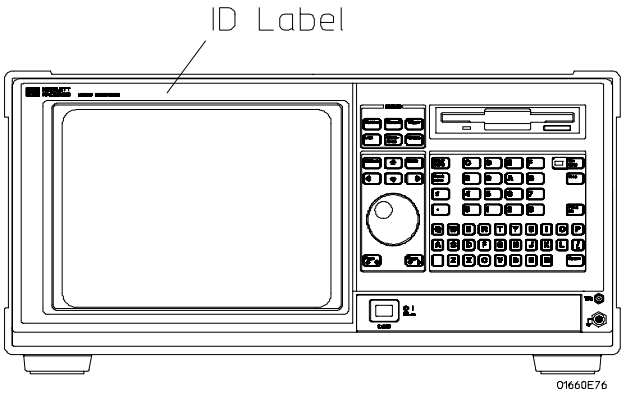



**Figure 6**

**ID Label Location**

## COPYING THE SYSTEM AND PV SOFTWARE

You must copy the following files from the disks in the SW DISK POUCH to the SYSTEM directory on the hard disk drive of the instrument.

1. Apply power to the instrument and allow completion of the Self Tests.
2. Press the System key in the MENU keys.
3. Using the arrow keys and Select key, highlight the second field from the left and press Select. Select Hard Disk in the pop-up menu.
4. Highlight and select the Load field. Select Change Directory in the pop-up menu.
5. Use the RPG knob to select the directory name: System, then highlight and select Flexible Disk in the pop-up menu.
6. Insert any on of the disks from the SW POUCH (01660-68717) into the Flexible Disk Drive and use the RPG knob to read the directory.
7. Highlight and select the Load field. Select Copy in the pop-up menu.
8. Use the RPG knob to select a file to copy. Highlight and select the field labeled to:. Press the Clear Entry key, Done key, and then confirm that the file name appears in the /System/ directory.
9. Highlight and select the Execute field. A warning will appear if an existing file is being overwritten. Select Continue in the pop-up menu. No warning or pop-up menu appears if the file is new to the hard disk. Only the SYS_025 file is new to the hard disk.
10. Continue copying files until all files on all disks in the SW POUCH (01660-68717) have been copied to the hard disk.

## LOADING THE SYSTEM SOFTWARE

You must load the system software to be able to run the instrument. Optionally, you may wish to load the Symbol Utility SW; it enables the instrument to download symbols created by other programs.

1. Apply power to the instrument.

2. Verify the presence of new System files in the /System/ directory of the hard disk.

3. Press the System key in the MENU keys.

4. Using the arrow keys, Done key, and Select key, highlight the second field from the left and press Select. Arrow down and select Select Utilities from the pop-up menu.

5. Using the arrow keys, highlight the Update FLASH ROM field, press the Select key. Select Continue from the pop-up menu. Press the Done key and wait for the disk to complete. Insert disk 2 of 2 and press Done.

6. If desirable, load the Symbol Utility SW. Insert the disk into the analyzer and cycle power. The program loads automatically but takes more than a minute. Symbol Utility can be found under the System menu.

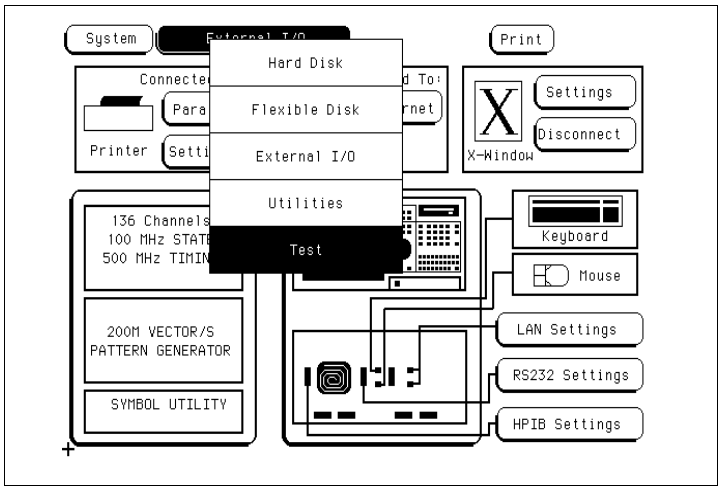
# LOGIC ANALYZER TESTING

## Self-Tests

The performance verification (PV) self-tests consist of system PV tests, analyzer PV tests, and pattern generator PV tests.

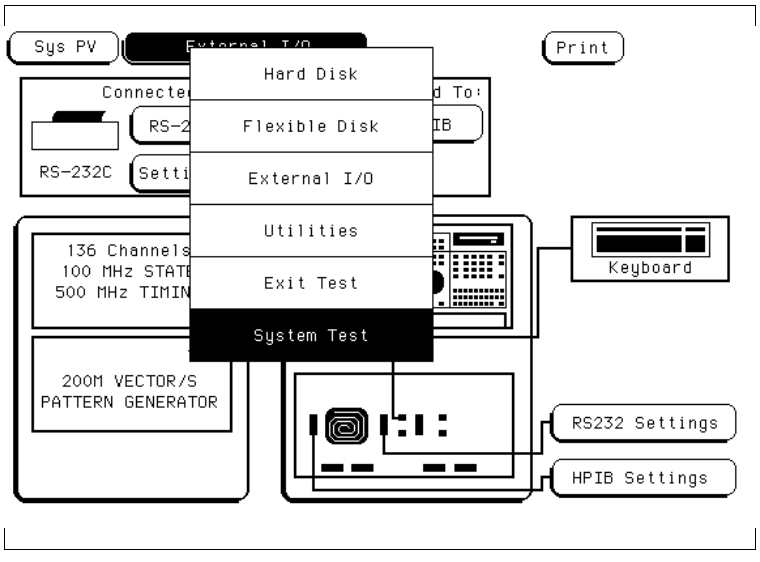
1. Disconnect all inputs, then turn on the power switch. Wait until the power-up tests are complete.

2. Press the System key. Select the field next to System, then select Test in the pop-up menu.



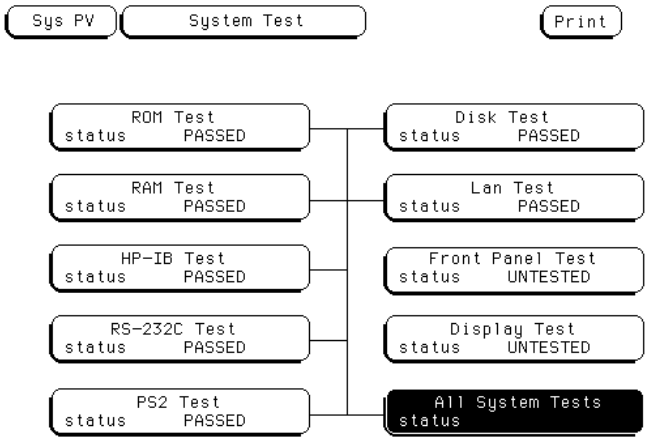

3. Insert the disk containing the PV self-tests into the disk drive. Select the box labeled Load Test System, then select Continue.

4. Press the System key. Select the field next to Sys PV, then select System Test in the pop-up menu.



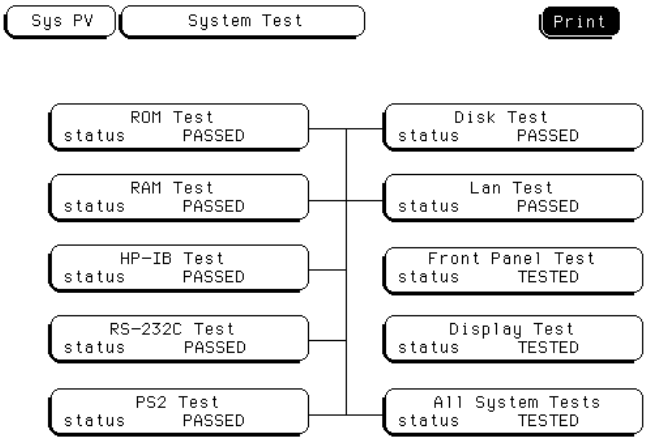
5. Install a formatted disk that is not write protected into the disk drive. Connect an RS-232-C loop back connector onto the RS-232-C port. The RS-232-C connector is supplied with the logic analyzer.

6. Select All System Tests. You can run all tests at one time, except for the Front Panel Test and Display Test, by running All System Tests. To see more details about each test when trouble shooting failures, you can run each test individually. When the tests finish, the status for each test shows PASSED or FAILED, and the status for the All System Tests changes from UNTESTED to TESTED. Note that the Front Panel Test and Display Test remain UNTESTED.

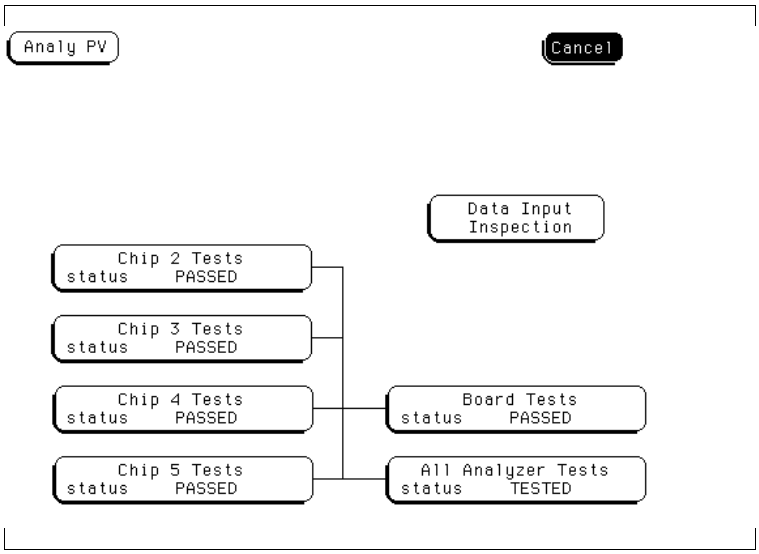



7. Select the Front Panel Test. A screen duplicating the front panel appears. Press each key on the front panel and the corresponding key on the screen will change from a light to a dark color. Test the knob by turning it in both directions. Note any failures, then press the Done key to exit the Front Panel Test. The status of the test changes from UNTESTED to TESTED.

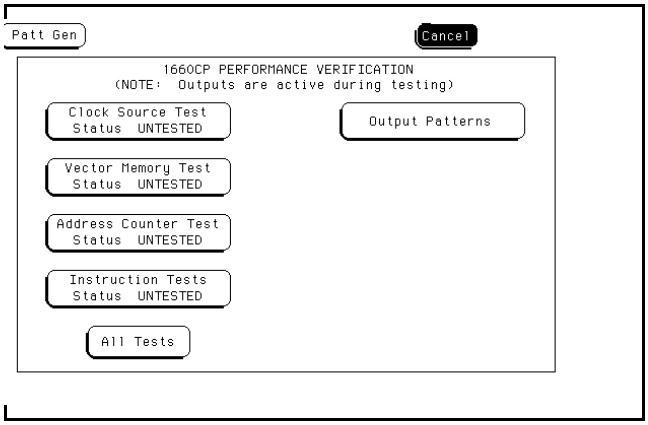
8. Select the Display Test. A white grid pattern is displayed. Refer to chapter 4, "Calibrating and Adjusting" of the Service Guide for display adjustments. Select Continue and the screen changes to full bright. Select Continue and the screen changes to half bright. Select Continue and the test screen shows the Display Test status changed to TESTED.



9. Select Sys PV, then select Analy PV in the pop-up menu. In the Analy PV menu, select All Analyzer Tests. You can run all tests at one time, except for the Data Input Inspection, by running All Analyzer Tests. To see more details about each test when trouble shooting failures, you can run each test individually. When the tests finish, the status for each test shows PASSED or FAILED, and the status for the All Analyzer Tests changes from UNTESTED to TESTED.




10. Select Analy PV , then select Patt Gen PV in the pop-up menu. In the Patt Gen PV menu, select All Tests. To see more details about each test when trouble shooting failures, you can run each test individually. When the tests finish, the status for each test shows PASSED or FAILED.




11. To exit the test system, press the System key. Select the field to the right of the Sys PV field. Select the Exit Test System.
12. The HP 1660E/ES/EP Logic Analyzer Service Guide should be ordered if trouble shooting is deemed necessary.