# Installation Note

## CPU Board Upgrade Kit

**For PNA Series RF Network Analyzers (E8356A, E8357A, and E8358A)**

| Network Analyzer Model Number | Upgrade Kit Part Number |
|---|---|
| E8356A, E8357A, E8358A | E8356-60106 |

**Agilent Technologies**

E8356-90053

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|---|---|---|
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# About the Upgrade Kit

| | |
|---|---|
| Products affected. . . . . . . . . . . . . . . . . . . . . . . . | E8356A, E8357A, and E8358A (all options) |
| Installation to be performed by . . . . . . . . . . . . . | Agilent service center, personnel qualified by Agilent, or customer |
| Estimated time to back up and restore files . . . . | 15 minutes |
| Estimated time to install the hardware. . . . . . . . | 30 minutes |
| Estimated time to run the Operator's Check. . . . | 30 minutes |

If you need assistance, refer to "Getting Assistance from Agilent" on page 2.

# Description of the Upgrade

This upgrade kit is used to replace the standard 266 MHz CPU board with a new 500 MHz CPU board for the E8356A, E8357A, or E8358A PNA series RF network analyzer.

# Items Included in the Upgrade Kit

The following table lists the parts included in the upgrade kit for the E8356A, E8357A, and E8358A network analyzers. Check the contents of your kit against this list. If any item is missing or damaged, contact Agilent Technologies. Refer to "Getting Assistance from Agilent" on page 2.

**Table 1**      **Option 098, CPU Board Upgrade Kit (E8356-60106)**

| Description | Qty | Part Number |
|---|---|---|
| Installation note (this document) | 1 | E8356-90053 |
| CPU board, 500 MHz | 1 | E8801-60055 |
| Programmed hard disk drive | 1 | E8801-10001 |

# Installation Procedure for the Upgrade Kit

The network analyzer must be in proper working condition prior to installing this option. Any necessary repairs must be made before proceeding with this installation.

| | |
|---|---|
| **WARNING** | **This installation requires the removal of the analyzer's protective outer covers. The analyzer must be powered down and disconnected from the mains supply before performing this procedure.** |

## Electrostatic Discharge Protection

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the network analyzer. Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* have a grounded, conductive table mat in front of your test equipment.
- *always* wear a grounded wrist strap, connected to a grounded conductive table mat, having a 1 MΩ resistor in series with it, when handling components and assemblies or when making connections.
- *always* wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.

Figure 1 shows a typical ESD protection setup using a grounded mat and wrist strap. Refer to "Tools and Equipment Required for the Installation" on page 6 for part numbers.

**Figure 1    ESD Protection Setup**
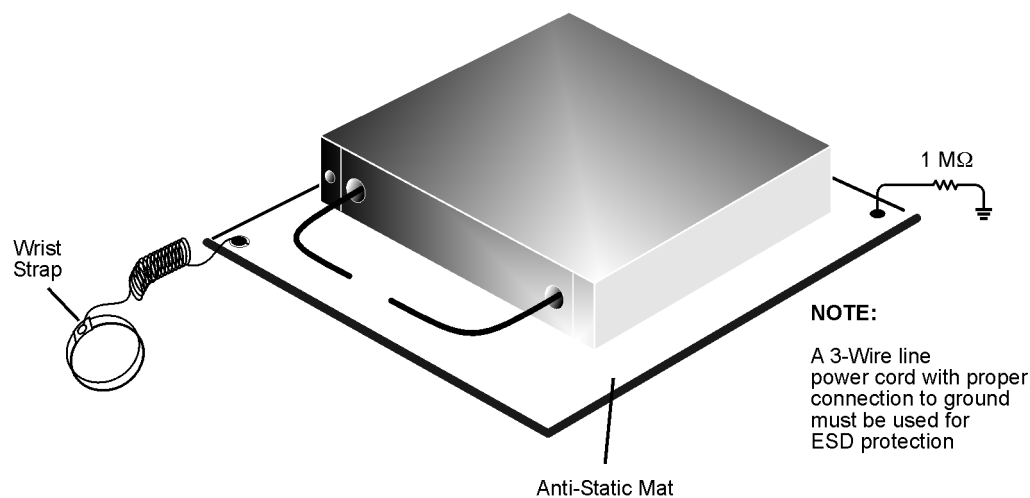


esd_setup

## Overview of the Installation Procedure

1.  Copy needed files from the existing hard disk drive for later installation onto the new hard disk drive using Windows® Explorer.

2.  Remove and replace the A15 CPU board assembly and the A31 hard disk drive assembly.

    A.  Remove the outer and inner covers from the analyzer.

    B.  Remove and replace the A15 CPU board and A31 hard disk drive.

    C.  Reinstall the inner and outer covers.

3.  Install backup files (from step 1) onto the new hard disk drive.

4.  Set up the Agilent administrator password.

5.  Perform the Operator's Check to verify basic analyzer operation.

## Tools and Equipment Required for the Installation

| Description | Model/Part Number |
|---|---|
| **Tools for A15 CPU Board Assembly and A31 Hard Disk Drive Assembly Replacement** | |
| T-10 TORX driver (set to 4 in-lbs; for hard disk drive replacement) | N/A |
| T-10 TORX driver (set to 7 in-lbs; for hard disk drive replacement) | N/A |
| T-10 TORX driver (set to 9 in-lbs; for all other T-10 applications) | N/A |
| T-20 TORX driver (set to 21 in-lbs) | N/A |
| **ESD Equipment** | |
| ESD grounding wrist strap | 9300-1367 |
| 5 ft grounding cord for wrist strap | 9300-0980 |
| 2 x 4 ft conductive table mat and 15 ft grounding wire | 9300-0797 |
| ESD heel strap (for use with conductive floors) | 9300-1308 |
| **Equipment for the Operator's Check** | |
| Male short, type-N (from the 85032F calibration kit)[a] | E8356-60016 |

a. Alternate choice: a 3.5 mm short from the 3.5 mm 85033E calibration kit and a type-N to 3.5 mm adapter.

Windows® and Windows® Explorer are U.S. registered trademarks of Microsoft Corporation.

## Step 1.  Back Up Unique Files Located on the Hard Disk Drive

As part of the procedure for installing this upgrade kit, the hard disk drive within the analyzer is replaced. Certain unique files exist on the hard disk drive that are necessary for proper operation of your analyzer. These files must be copied to another location to allow them to be installed onto the new hard disk drive after it has been installed.

The files to be copied include:
- license file
- mixer calibration files
- user calibration kit file
- any user data files or program files that need to be preserved

**Procedure**

The network analyzer must be powered up and operating for this procedure.

1. Insert a writable floppy disk into the floppy disk drive.

2. Open two copies of **Windows Explorer**:

   a. Click on **START**. (It may be necessary to exit the **Network Analyzer** application.)

   b. Point to **Programs**, **Accessories**, and then click on **Windows Explorer**.

   c. Adjust the horizontal width of the **Windows Explorer** window to approximately one-half the width of the display and position it to either the left or right side of the display.

   d. Repeat this procedure to create another copy of the **Windows Explorer** window and position it to the opposite side of the display so that the two copies are displayed side-by-side.

3. Set one copy of **Windows Explorer** to the **A:** drive and the other to the **C:** drive:

   a. In one copy of **Windows Explorer**, double-click on **My Computer**, and then double-click on **3 1/2 Floppy (A:)**. A listing of the files on the floppy disk will appear in the right-hand side of the window.

   b. In the other copy of **Windows Explorer**, double-click on **My Computer**, and then double-click on **Hard Disk (C:)**.

   c. Navigate to `C:\Program Files\Agilent\Network Analyzer` by double-clicking on each of the names in this path name, in turn. A listing of the files in this directory on the hard disk will appear in the right-hand side of the window.

4. Copy each of the following files from the hard disk drive to the floppy disk drive:

   a. Files to copy:

      gen.lic      user_calkitfile      mxcalfile_pxx (where xx is a 1 or 2 digit number)

      Any personal user files that you wish to preserve.

   b. Click and drag each of the files on the **C:** drive from the `C:\Program Files\Agilent \Network Analyzer` directory by clicking and holding on the file name in the directory and, while holding the mouse button down, drag the file name to the **A:** drive. If you need help with this "dragging" process, refer to Windows Help.

5. After all files have been copied, remove the floppy disk from the analyzer's disk drive and exit both copies of **Windows Explorer**.

## Step 2.  Remove and Replace the A15 CPU Board Assembly and the A31 Hard Disk Drive Assembly

### A.  Remove the Outer and Inner Covers from the Analyzer

Refer to Figure 2 for this procedure.

**Remove the Outer Cover**

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CAUTION     This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles*. This will damage the front panel assemblies.

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1. Disconnect the power cord (if it has not already been disconnected).

2. With a T-20 TORX driver, remove the strap handles (item ①) by loosening the screws (item ②) on both ends until the handle is free of the analyzer.

3. With a T-20 TORX driver, remove the four rear panel feet (item ③) by removing the center screws (item ④).

4. Slide the four bottom feet (item ⑤) off the cover.

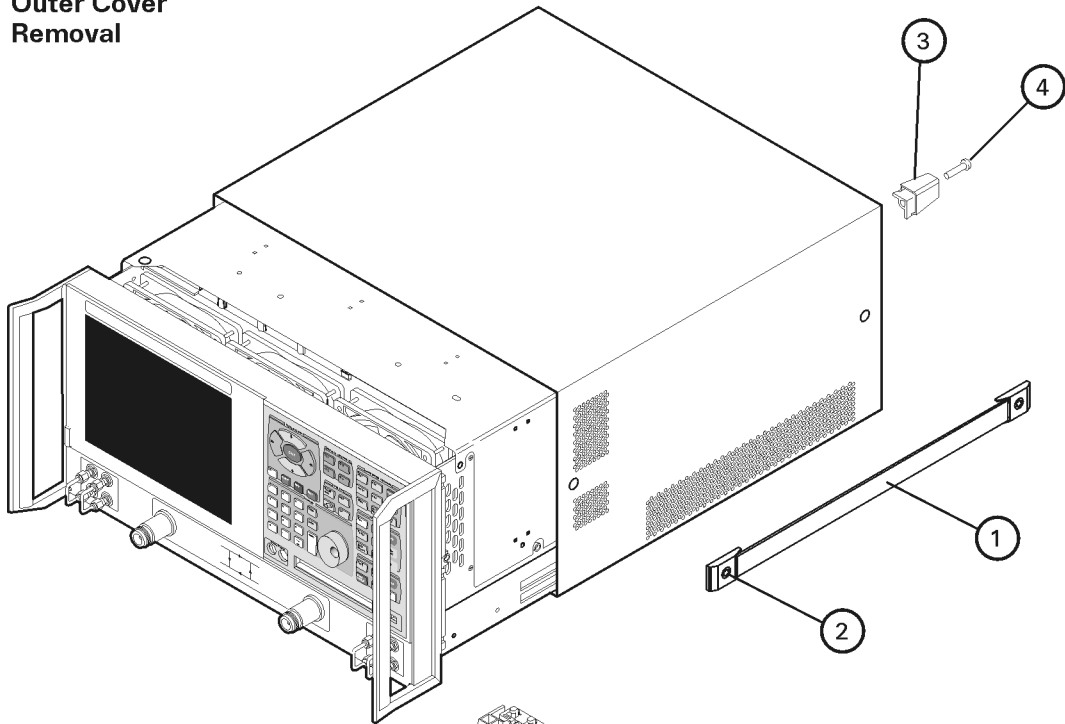5. Slide the cover off of the frame.

**Remove the Inner Cover**

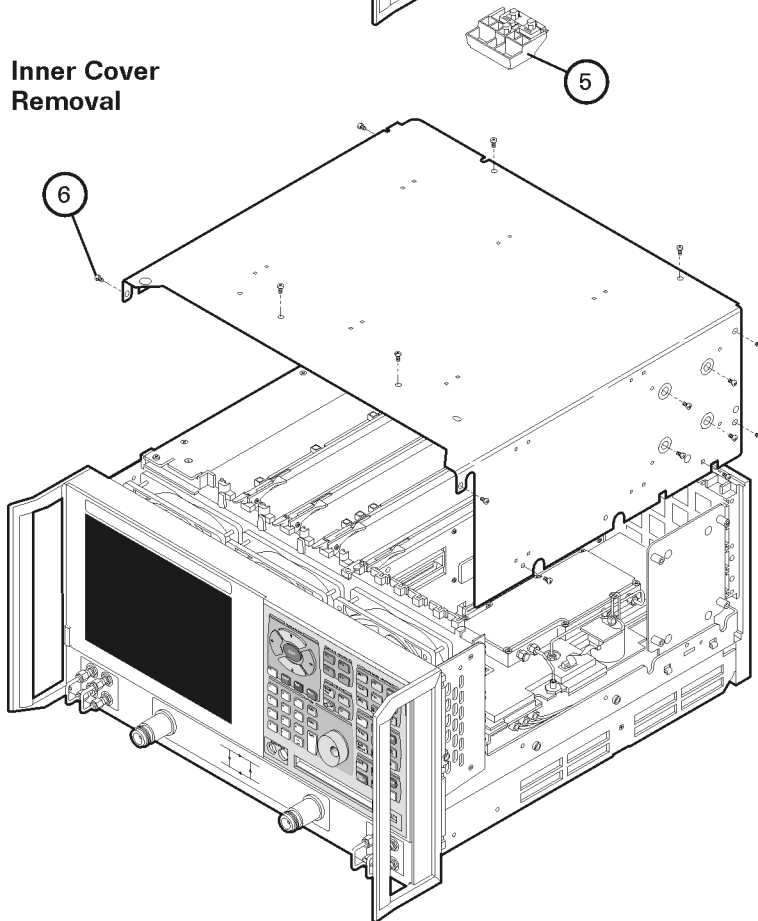1. With a T-10 TORX driver, remove the 15 screws (item ⑥).

2. Lift off the cover.

## Figure 2    Outer and Inner Cover Removal

**Outer Cover Removal**

**Inner Cover Removal**

sc857a

## B. Remove and Replace the A15 CPU Board and A31 Hard Disk Drive

### Remove the A31 Hard Disk Drive Assembly (HDDA)

Refer to Figure 3 for this procedure.

1. With a T-10 TORX driver, remove the mounting screw (item ①).

2. Move the HDDA to the outside of the analyzer and slide the HDDA bracket feet into the slots in the frame to place the disk drive in the horizontal position.

3. With a T-10 TORX driver, loosen the mounting screws (item ②) and disconnect the interface board from the A15 CPU board assembly.

4. Remove the HDDA bracket feet from the slots in the frame and remove the A31 hard disk drive assembly from the analyzer.

**Figure 3    A31 Hard Disk Drive Assembly Removal**
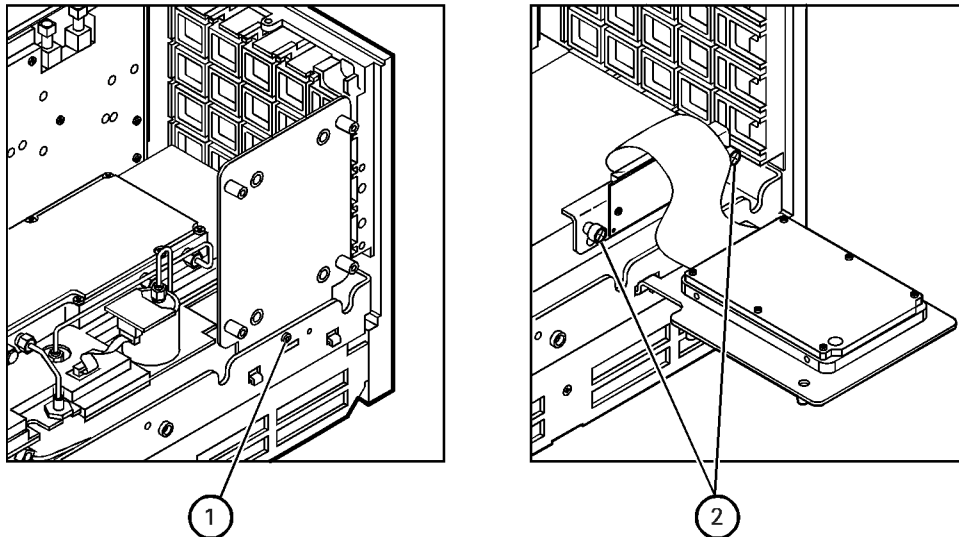


sc840a.cdr

### Replace the Hard Disk Drive

Refer to Figure 4 for this procedure.

1. With a T-10 TORX driver, remove the four screws (item ③), flat washers, and bushings that mount the hard disk drive to the bracket.

2. Disconnect the ribbon cable (item ④) from the hard disk drive. Discard the hard disk drive.

**Figure 4    A31 Hard Disk Drive Assembly (Exploded View)**



Bushing

Washer

A31

3

4
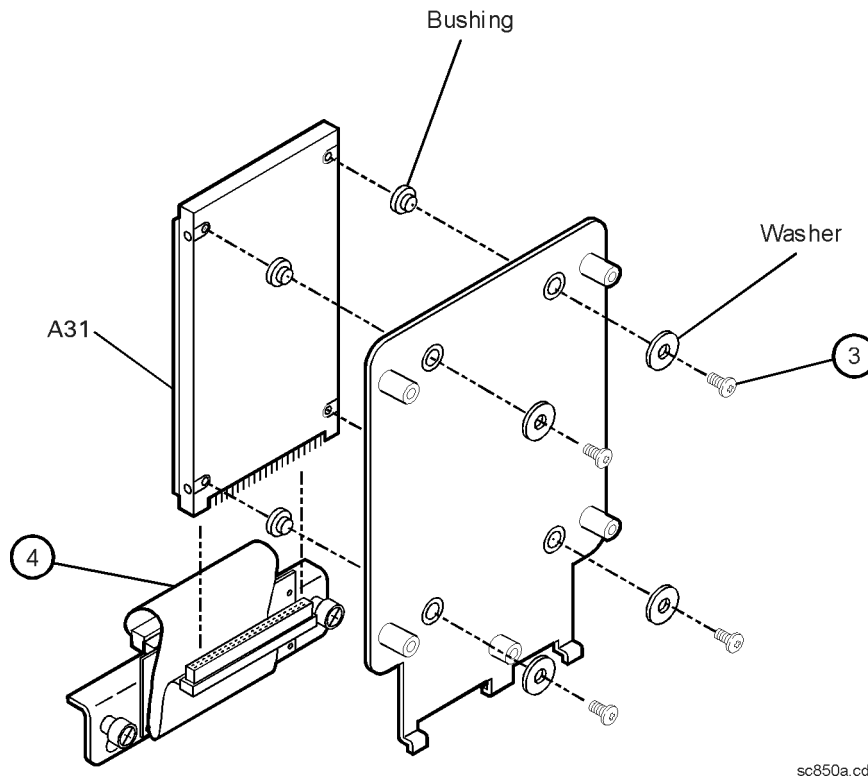
sc850a.cdr

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WARNING      **When connecting the ribbon cable (item ④ in Figure 4) to the hard disk drive, take special care to align the connector pins. Applying power to a misaligned connection can permanently damage the hard disk drive.**

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IMPORTANT      When replacing the hard disk drive, first torque all four screws (item ③) to 4 in-lb with a T-10 TORX driver. Then secure each screw to 7 in-lb with a T-10 TORX driver.

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3. Install the new hard disk drive:

   a. Connect the ribbon cable (item ④) to the new hard disk drive. Refer to **WARNING** above.

   b. With a T-10 TORX driver, install the four screws (item ③), flat washers, and bushings that mount the hard disk drive to the bracket. Refer to **IMPORTANT** note above.

4. Do not reinstall the hard disk drive assembly into the analyzer at this time.
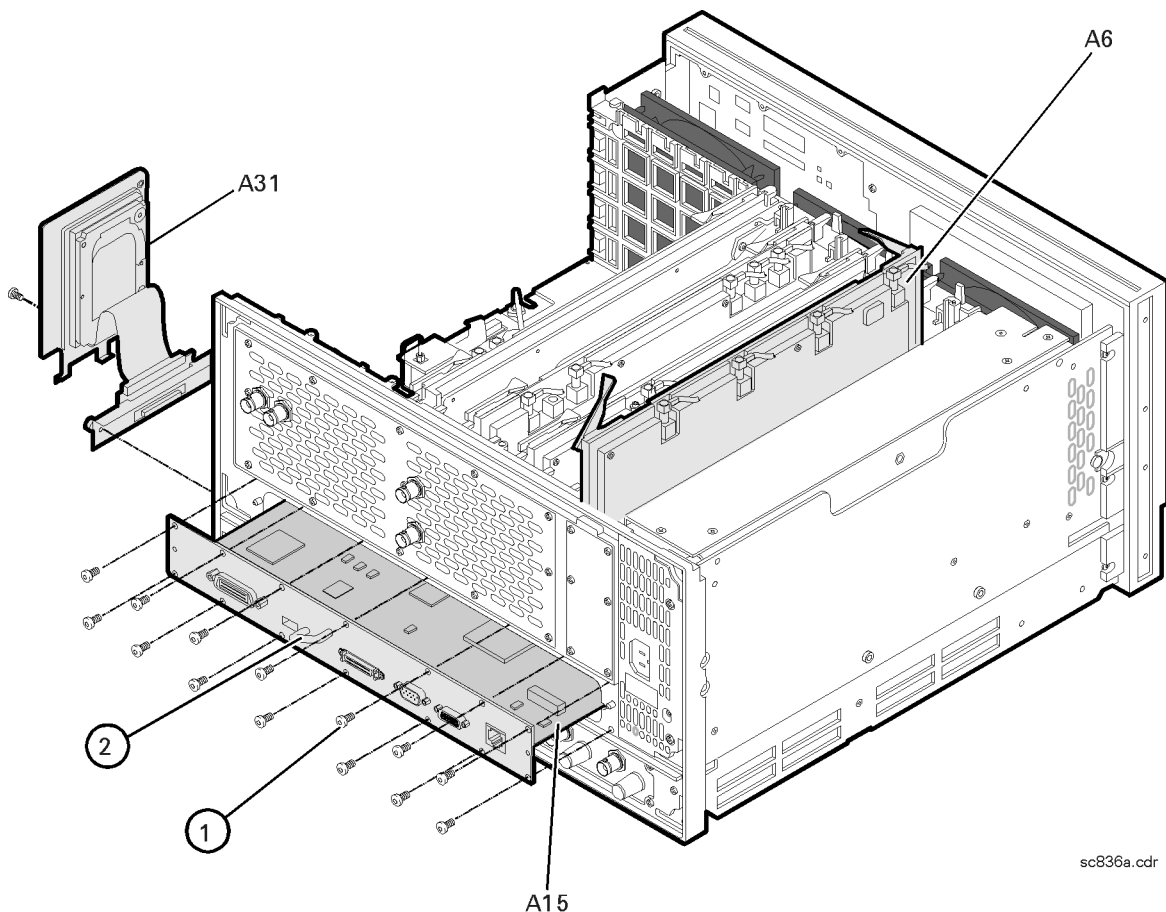
**Remove the A15 CPU Board Assembly**

Refer to Figure 5 for this procedure.

1. Disengage the A6 SPAM board assembly from the A15 CPU board assembly by performing the following steps.

   a. Lift the two extractors located at each end of the board.

   b. While holding onto the extractors, lift the board halfway out of the slot.

   c. Let the extractors drop to their normal position.

   d. Let the board drop into the slot.

   The board should now rest above its normal seated position.

2. With a T-10 TORX driver, remove the 14 screws (item ①) from the rear panel of the A15 CPU board assembly.

3. Gently pull on the finger grip (item ②) to disengage the A15 CPU board assembly from the analyzer.

4. Slide the A15 CPU board assembly out of the analyzer.

**Figure 5    A15 CPU Board Assembly Removal**

**Install the New A15 CPU Board Assembly**

Refer to Figure 5 for this procedure.

1. Slide the new A15 CPU board into the analyzer slot while being sure that nothing is in its path that may obstruct it, such as the A6 SPAM board assembly.

2. With a T-10 TORX driver, install the 14 screws (item ①) into the A15 CPU board assembly.

3. Reinstall the A6 SPAM board assembly into the A15 CPU board assembly by aligning it with the connector and pressing down on the board to firmly seat it into position. Make sure the board extractors are down in a horizontal position.

**Reinstall the A31 Hard Disk Drive Assembly (HDDA)**

Refer to Figure 3 for this procedure.

1. Place the HDDA in the service position by inserting the bracket feet into the slots in the frame.

2. Place the interface board into position and, with a T-10 TORX driver, tighten the mounting screws (item ②).

3. Remove the HDDA from the service position and place it into its permanent location.

4. With a T-10 TORX driver, install the mounting screw (item ①).

## C. Reinstall the Inner and Outer Covers

Refer to Figure 6 for this procedure.

### Reinstall the Inner Cover

1. Place the inner cover on the analyzer. There are two alignment pins on the front frame that must be aligned with holes in the cover.

2. With a T-10 TORX driver, install the 15 screws (item ①).
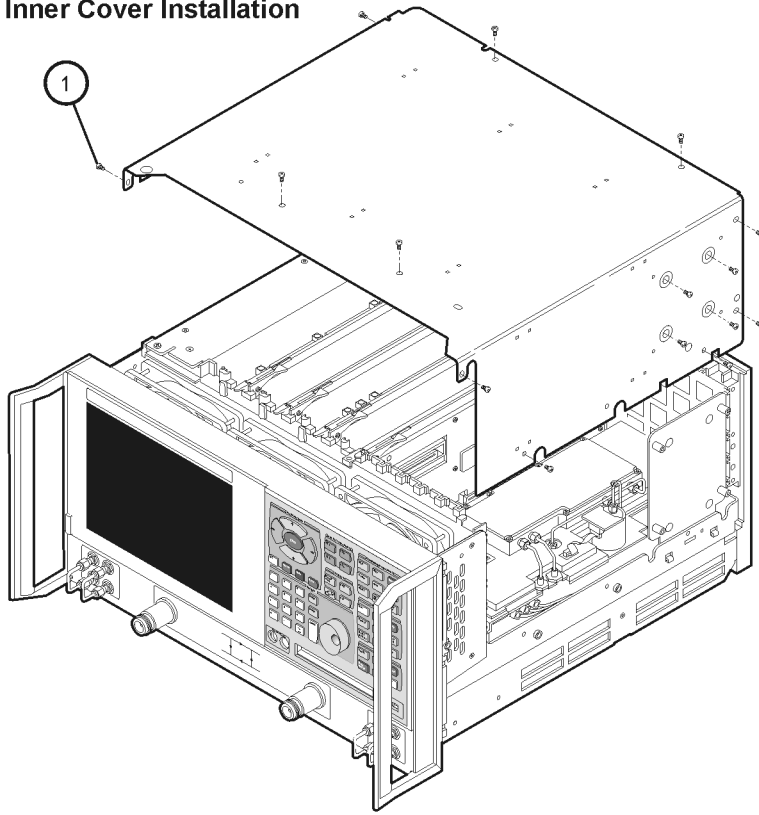
### Reinstall the Outer Cover

CAUTION    This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles*. This will damage the front panel assemblies.

1. Slide the cover onto the frame.

2. With a T-20 TORX driver, install the four rear panel feet (item ②) by installing the center screws (item ③).

3. Slide the four bottom feet (item ④) onto the cover.

4. With a T-20 TORX driver, install the strap handles (item ⑤) by tightening the screws (item ⑥) on both ends.

**Figure 6    Inner and Outer Cover Reinstallation**

**Inner Cover Installation**

**Outer Cover Installation**
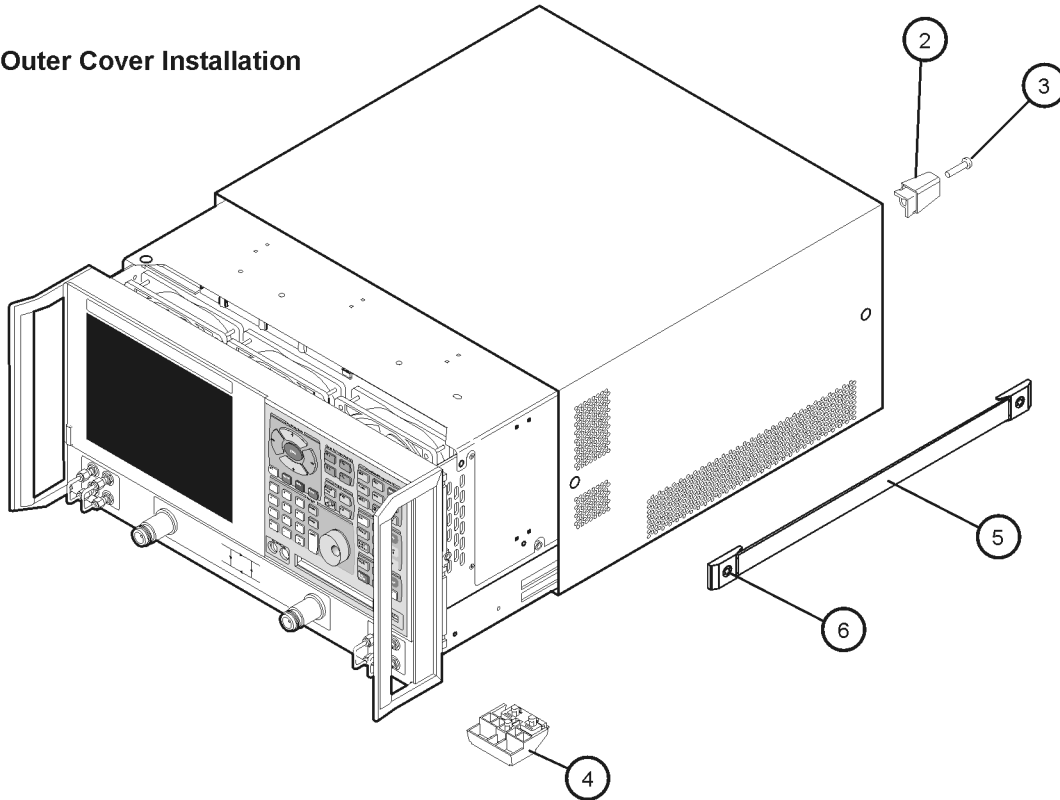
dc802o

## Step 3.  Install Backup Files onto the New Hard Disk Drive

The files that were saved onto a floppy disk in Step 1 must now be installed onto the new hard disk drive for the analyzer to operate properly.

**Procedure**

The network analyzer must be powered up and operating for this procedure.

1. Insert the floppy disk containing the backup files into the floppy disk drive.

2. Open two copies of **Windows Explorer**:

    a. Click on **START**. (It may be necessary to exit the **Network Analyzer** application.)

    b. Point to **Programs**, **Accessories**, and then click on **Windows Explorer**.

    c. Adjust the horizontal width of the **Windows Explorer** window to approximately one-half the width of the display and position it to either the left or right side of the display.

    d. Repeat this procedure to create another copy of the **Windows Explorer** window and position it to the opposite side of the display so that the two copies are displayed side-by-side.

3. Set one copy of **Windows Explorer** to the **A:** drive and the other to the **C**: drive:

    a. In one copy of **Windows Explorer**, double-click on **My Computer**, and then double-click on **3 1/2 Floppy (A:)**. A listing of the files on the floppy disk will appear in the right-hand side of the window.

    b. In the other copy of **Windows Explorer**, double-click on **My Computer**, and then double-click on **Hard Disk (C:)**.

    c. Navigate to `C:\Program Files\Agilent\Network Analyzer` by double-clicking on each of the names in this path name, in turn. A listing of the files in this directory on the hard disk will appear in the right-hand side of the window.

4. Copy each of the backup files from the floppy disk to the hard disk drive:

    a. Click and drag each of the files from the **A:** drive to the `C:\Program Files\Agilent\Network Analyzer` directory by clicking and holding on the file name in the **A:** directory and, while holding the mouse button down, drag the file name to the `Network Analyzer` directory on the **C:** drive. If you need help with this "dragging" process, refer to Windows Help.

5. After all files have been copied, remove the floppy disk from the analyzer's disk drive and exit both copies of **Windows Explorer**.

## Step 4.  Set Up the Agilent Administrator Password

If the hard disk has been replaced, it is necessary to set up the Agilent administrator password for the analyzer. This requires obtaining a password from Agilent:

### Obtain a Password

• If this procedure is being performed by Agilent personnel, go to the following Internet site and follow the instructions under "Agilent Administrator Password."

> http://mktwww.soco.agilent.com/field/service/network/pna/support.htm

• If this procedure is being performed by non-Agilent personnel and email is available:

Send email to: componenttest_pgu@agilent.com and include the following items:

1. Complete model number and serial number of your analyzer

2. Subject line: "Subject: Agilent Administrator Password"

3. Attention line: "Attn: PNA Customer Support Engineer"

• If this procedure is being performed by non-Agilent personnel and email is not available:

Contact Agilent for a password before beginning this procedure. Refer to "Getting Assistance from Agilent" on page 2.

### Enter Your Agilent Administrator Password

The network analyzer must be powered up and operating for this procedure.

1. Exit the Network Analyzer program, if it is running.

2. On the **Windows Desktop**, right-click on **My Computer**, and then click **Manage**.

3. In the **Computer Management** window, navigate to **System Tools**, **Local Users and Groups**, **Users**.

4. Right-click on **Agilent**, and then click on **Set Password**.

   a. Type the password obtained from Agilent as the **Password**. Refer to "Obtain a Password" for information if you have not yet obtained this password.

   b. Type the password again in the **Confirm password** block.

   c. Click **OK**.

5. Right-click on **Agilent**, and then click on **Properties**.

   a. Unselect **User must change password at next logon** (if not already unselected).

   b. Unselect **User cannot change password** (if not already unselected).

   c. Select **Password never expires** (if not already selected).

   d. Click **OK**.

6. Close the **Computer Management** window.

# Step 5.  Perform the Operator's Check

The operator's check is a software driven test that checks the basic operation of the assemblies in the Port 1 and Port 2 paths. By performing the operator's check, the following is determined:

- operation of the transfer switch (switch repeatability check)
- phase-lock capability across the entire frequency band (switch repeatability check)
- function of the four receivers (switch repeatability check)
- operation of the step attenuators (attenuator range check)
- receivers' linearity (attenuator range check)

## Switch Repeatability Check

This check performs a reflection measurement of a short and stores the resulting trace in memory. The transfer switch is toggled to the opposite port and back, and then another reflection measurement is made. The difference between the stored trace and the return trace is the switch repeatability. This test also checks the phase lock across the entire frequency band and operation of all four receivers.

## Attenuator Range Check

This check performs a reflection measurement of a short and stores the resulting trace in memory. As the internal attenuator is switched in 10 dB steps over its 70 dB range, reflection measurements are made and compared with the stored trace. The resulting measurements must fall within a limit testing window to pass the test. The window size is based on source and receiver specifications. By performing the Port 1 and Port 2 tests, rough checks of the linearity for all four receivers (from 0 dB to 70 dB) are verified and operation of the attenuator is verified.

## Run the Operator's Check

The network analyzer must be powered up and operating for this procedure and the Network Analyzer application must be running.

1.  From the **System** menu, point to **Service**, and then click **Operator's Check**.

2.  In the **Operator's Check** dialog box, under **Sequencing,** select **Automatic** to run through the test without stopping or select **Prompted** to pause at each step in the test process.

3.  To check Port 1, click the **Start--Port 1** or to check Port 2, click **Start--Port 2**.

4.  The test will prompt you to connect the short.

5.  The result of the operator's check will be shown as a PASS or FAIL next to the test title.

## If the Operator's Check Fails

1.  Clean the test ports, shorts, and adapters. Torque to specification. Repeat the check.

2.  If the check still fails, refer to troubleshooting in your analyzer's service guide for additional information.