

**Agilent Technologies**  
**85103E**  
**Network Analyzer**  
**Performance Upgrade**  
**Installation Manual**



**Agilent Technologies**

**Manufacturing Part Number: 85103-90013**

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## What You'll Find in This Manual...

Using this document and an Agilent Technologies 85103E upgrade package, a trained Agilent Technologies service engineer can upgrade an Agilent Technologies 8510A (with serial number below 03000) to full Agilent Technologies 8510C capability.

*Agilent Technologies does not recommend customer installation.*

The Agilent Technologies 85103E performance upgrade package comes with prepaid installation. Please contact Agilent to arrange for a service engineer to install the upgrade kit. Refer to [“Contacting Agilent” on page iv](#).

---

## **Certification**

*Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS) to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.*

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## **Warranty**

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## **Assistance**

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For assistance, refer to [“Contacting Agilent” on page iv](#).

---

## Contacting Agilent

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact Agilent for assistance.

<b>Online assistance:</b> <a href="http://www.agilent.com/find/assist">www.agilent.com/find/assist</a>			
<b>United States</b> <i>(tel)</i> 1 800 452 4844	<b>Latin America</b> <i>(tel)</i> (305) 269 7500 <i>(fax)</i> (305) 269 7599	<b>Canada</b> <i>(tel)</i> 1 877 894 4414 <i>(fax)</i> (905) 282-6495	<b>Europe</b> <i>(tel)</i> (+31) 20 547 2323 <i>(fax)</i> (+31) 20 547 2390
<b>New Zealand</b> <i>(tel)</i> 0 800 738 378 <i>(fax)</i> (+64) 4 495 8950	<b>Japan</b> <i>(tel)</i> (+81) 426 56 7832 <i>(fax)</i> (+81) 426 56 7840	<b>Australia</b> <i>(tel)</i> 1 800 629 485 <i>(fax)</i> (+61) 3 9210 5947	<b>Singapore</b> <i>(tel)</i> 1 800 375 8100 <i>(fax)</i> (65) 836 0252
<b>Malaysia</b> <i>(tel)</i> 1 800 828 848 <i>(fax)</i> 1 800 801 664	<b>Philippines</b> <i>(tel)</i> (632) 8426802 <i>(tel)</i> (PLDT subscriber only): 1 800 16510170 <i>(fax)</i> (632) 8426809 <i>(fax)</i> (PLDT subscriber only): 1 800 16510288	<b>Thailand</b> <i>(tel)</i> outside Bangkok: (088) 226 008 <i>(tel)</i> within Bangkok: (662) 661 3999 <i>(fax)</i> (66) 1 661 3714	<b>Hong Kong</b> <i>(tel)</i> 800 930 871 <i>(fax)</i> (852) 2506 9233
<b>Taiwan</b> <i>(tel)</i> 0800-047-866 <i>(fax)</i> (886) 2 25456723	<b>People's Republic of China</b> <i>(tel)</i> (preferred): 800-810-0189 <i>(tel)</i> (alternate): 10800-650-0021 <i>(fax)</i> 10800-650-0121	<b>India</b> <i>(tel)</i> 1-600-11-2929 <i>(fax)</i> 000-800-650-1101	

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## Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

---

### WARNING

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

---

### CAUTION

The CAUTION notice 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 the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

---

## Instrument Markings



When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.



This symbol indicates hazardous voltages.



The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia.



This symbol indicates that the instrument requires alternating current (ac) input.



The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.



The CSA mark is a registered trademark of the Canadian Standards Association.

---

ISM1-A

This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).



This symbol indicates that the power line switch is ON.



This symbol indicates that the power line switch is OFF or in STANDBY position.

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## Safety Earth Ground

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

---

## Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

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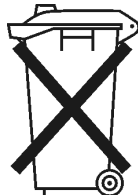
## Battery Information

The 8510C uses a lithium polycarbon monofluoride battery to power the instrument clock. The battery is located on the A7 I/O board of the 85101C display/processor. This battery is not field replaceable. Replace the A7 I/O board if the battery requires replacement.

---

WARNING

**Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.**



DO NOT THROW BATTERIES AWAY BUT  
COLLECT AS SMALL CHEMICAL WASTE.

---

## Typeface Conventions

### *Italics*

- Used to emphasize important information:  
Use this software *only* with the Agilent Technologies xxxxxX system.
- Used for the title of a publication:  
Refer to the *Agilent Technologies xxxxxX System-Level User's Guide*.
- Used to indicate a variable:  
Type LOAD BIN *filename*.

### Instrument Display

- Used to show on-screen prompts and messages that you will see on the display of an instrument:  
The Agilent Technologies xxxxxX will display the message  
**CAL1 SAVED.**

### Keycap

- Used for labeled keys on the front panel of an instrument or on a computer keyboard:  
Press **Return**.

### [Softkey]

- Used for simulated keys that appear on an instrument display:  
Press [**Prior Menu**].

### User Entry

- Used to indicate text that you will enter using the computer keyboard; text shown in this typeface must be typed *exactly* as printed:  
Type LOAD PARMFILE
- Used for examples of programming code:  
#endif//ifndef NO\_CLASS

### *Path name*

- Used for a subdirectory name or file path:  
Edit the file *usr/local/bin/sample.txt*

### Computer Display

- Used to show messages, prompts, and window labels that appear on a computer monitor:  
The **Edit Parameters** window will appear on the screen.
- Used for menus, lists, dialog boxes, and button boxes on a computer monitor from which you make selections using the mouse or keyboard:  
Double-click **EXIT** to quit the program.

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# Contents

Installing the Upgrade .....	2
Warranty Information .....	2
Source Compatibility .....	2
Performance Verification .....	3
Time Domain Option .....	3
Procedure Overview .....	4
Checking 8510 System Operation .....	8
Procedure .....	8
Converting Files from Tape to Disk .....	10
Procedure .....	10
Attended Mode .....	11
Storing a Binary Version .....	12
Converting Cal Kit Files .....	12
Installing a BNC Connector .....	13
Procedure .....	13
Installing Assemblies .....	16
Rerouting Cables .....	18
Attaching New Labels .....	20
Procedure .....	20
Upgrading an 8360 Source .....	22
Reconnecting the System .....	23
Procedure .....	23
Loading the 8510C Operating System .....	24
Procedure .....	24
Checking the 8510C .....	25
85101C Functional Check .....	25
85102 Functional Check .....	25
LO Phase Lock Out Functional Check .....	26
Trigger In Functional Check .....	28
Time Domain Option Functional Check .....	30
Checking Calibration Kit Definitions .....	31
Viewing Calibration Kit Labels .....	31
Loading a Calibration Kit Definition .....	31



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**85103E Upgrade Package  
(8510A to 8510C)**

## Installing the Upgrade

Use this package to upgrade an 8510A (with serial number below 03000) to an 8510C. With this package, you will do the following:

- Check the 8510A operation.
- Transfer data from tape to disk.
- Install a BNC connector.
- Replace three printed circuit board assemblies.
- Reroute cables.
- Attach new labels.
- If required, upgrade the 8360.
- Reconnect the system.
- Load the 8510C operating system.
- Check the 8510C operation.
- Load and check the calibration kit definitions.

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### NOTE

*Agilent Technologies does not recommend customer installation of this upgrade.* The Agilent 85103E performance upgrade package comes with prepaid installation. Refer to [“Contacting Agilent” on page iv](#) to arrange for a service engineer to install the upgrade package.

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## Warranty Information

Installation of an upgrade does not affect the existing instrument warranty in any way. Specifically, it does not extend the current instrument warranty. Any parts supplied in an upgrade package carry a 90-day replacement-part warranty.

## Source Compatibility

For complete compatibility with revision C.07.00 or greater firmware, your source must be an Agilent 8360 series source. If an 8360 series source is not used, power domain and receiver calibration functions will not work.

The 8510C works with all 8360 synthesized sweeper models. However, some 8360 instruments must be upgraded to take advantage of two 8510C system features (quick step mode and test port power flatness correction). Refer to [“Upgrading an 8360 Source.”](#)

## Performance Verification

Performance verification of the system is not included in the upgrade package. If you wish to do a performance verification of your upgraded system, this additional service can be arranged with the Agilent service engineer installing your upgrade.

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NOTE                      A functional check of the 85101C and the 85102 is performed in the section [“Checking the 8510C” on page 25.](#)

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## Time Domain Option

If your existing 8510 is equipped with the time domain option (Option 010), either originally or through an upgrade, then the upgrade package that was ordered should also be equipped with Option 010. (If there is a discrepancy, contact the Agilent sales engineer who placed the order.) Refer to [“Time Domain Option Functional Check” on page 30](#) to verify that it has been properly installed.

## Procedure Overview

### Step 1. Check the Upgrade Package Contents

Refer to [Table 1](#). If an item is missing, refer to “[Contacting Agilent](#)” on page iv for assistance.

### Step 2. Assemble Items Not Included in the Upgrade Package

If needed, obtain the required items listed in [Table 2](#) for your upgrade that are not supplied in this package.

### Step 3. Be Sure You Have a Static-Safe Work Station

Check for the following:

- The static mat sits on a clean, flat, sturdy surface.
- The static mat has a connection to earth ground.
- The static mat has a wrist strap connected to it.

### Step 4. Familiarize Yourself with the Upgrade Process

Refer to “[Installing the Upgrade](#)” for an overview of the required upgrade steps.

### Step 5. Follow the Upgrade Instructions

Follow the detailed instructions provided beginning with “[Checking 8510 System Operation](#)” to install and check your upgrade installation.

### Step 6. Dispose of the Replaced 85101A Display/Processor

Recycle or dispose of the 85101A display/processor according to your state or local requirements. The battery on the A7 I/O board and the A11 display (CRT) may have special requirements. When disposing of the cathode ray tube (CRT display), observe the following precautions:

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**WARNING**

**The CRT can pose a shock hazard if not properly discharged. Explosion or implosion of the CRT may cause personal injury. Only a properly trained individual should release the vacuum.**

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**Table 1 85103E Upgrade Package Contents**

Item	Quantity	Part Number
<b>Assemblies</b>		
A16 remote applications	1	85102-60235
A20 sweep ADC	1	85102-60234
A23 main phase lock	1	85102-60240
85102 emulator	1	85101-60209
<b>Tools</b>		
0.655-inch countersink drill bit	1	8920-0388
Rear panel hole alignment guide	1	85103-00001
Self-adhesive foam tape (2.5 ft)	1	0460-0114
9/16-inch nut driver	1	8720-0008
SMB connector remover	1	85103-00002
<b>Labels</b>		
LO phase lock out	1	08510-80019
Trigger In	1	08510-80020
8510C network analyzer (aluminum panel)	1	08510-80030
8510C network analyzer (plastic panel)	1	85102-80118
A20J2	1	9320-5875
Serial tag (old) Sys #	1	5180-8444
Serial tag (new)	1	9320-5959
Installation date (A to C)	2	9320-5958
<b>Connector Parts</b>		
BNC connector body	1	1250-1091
15/32-inch hex nut	1	0590-1251
Internal star washer	1	2190-0102
Shouldered insulating washer	2	00310-48801
Flat washer	2	3050-1094
BNC cap (short)	1	1250-0929
Plastic SMB connector cover	1	1401-0050
<b>Cables</b>		
W40 A16J6 to rear panel J9	1	85102-60249
W42 A16J5 to A23J1	1	85102-60248
SMB(f) to BNC(m)	1	5062-7230
Gray cable tie	5	1400-0493
White cable tie marker	1	1400-0836
85101C cables:	5	p/o 85101C
BNC (2)		
GPIB (1)		
IF Display Interconnect (1)		
RS-232 (1)		
<b>Software</b>		
8510C software kit contains:		p/o 85101C
Performance/verification disk	1	85101-60271
Master cal constants disk	1	08510-10033
Service adjustments disk	1	08510-10024
Software tool kit disk	1	85103-10002
Operating system disk for 8510C	1	85101-80116
Blank data disks (2 black, 2 gray)	4	85103-60002

**Table 1 85103E Upgrade Package Contents (Continued)**

Item	Quantity	Part Number
<b>Documentation</b>		
Upgrade Installation Manual	1	85103-90013
8510C Manual set contains:		p/o 85101C
8510C Keyword Dictionary	1	08510-90275
8510C Operating and Programming Manual	1	08510-90281
8510C On-Site Service Manual	1	08510-90282
<b>Miscellaneous</b>		
SMB adapter tee	2	1250-1391
Safety glasses	1	9300-0914
Masking tape	1	0460-0030
Clear plastic sheet (chip shield)	1	85103-20001
7-inch rack mount flange kit (w/o handles)	1	5062-4072
85102 service adapter	1	85102-60210
85101C display processor	1	85101C
Accessory tray	1	08510-40001
DISC key	1	5041-4512
USER PRESET key	1	5041-4903

**Table 2 Equipment Required But Not Supplied**

Item	Agilent Part Number
Source	8350B with plug-in, 8340A/B, 8341A/B, or 8360-series
Test Set	8511A/B, 8512A, 8513A, 8514A/B, 8515A, 8516A, 8517A/B, or 85110A/L
Static control table mat	9300-0797
Wrist strap	9300-1367
Wrist-strap-to-mat cord (5 ft)	9300-1980
Small Pozi-drive (#1)	8710-0899
Medium Pozi-drive (#2)	8710-0900
1/2-inch open-end wrench	8720-0025
5/16-inch open-end wrench	8720-0015
7/16-inch open-end wrench	8720-0017
Wire cutters	8710-0012
Flat blade screwdriver	8730-0001
Plastic-tipped hammer	8740-0002
Center punch	8890-0001
BNC to BNC cable	10503A
Disk drive	9122C
Controller	HP 9000 series 200/300 <sup>a</sup>
GPIB cables	10388A
Variable speed electric drill (3/8 in)	
Pocket knife or scissors	
Alligator clip leads	
For 8511A Only:	
Power splitter	5086-7408
Semirigid cable	08510-20005 <sup>b</sup>
Semirigid cable	08510-20006 <sup>b</sup>

a. Except for an 9826A.

b. From an 8510 service kit or 8511A test set.

## Checking 8510 System Operation

Use this procedure to ensure that the 8510A system works properly.

### Procedure

1. Configure the system as shown in [Figure 1](#).
2. Turn on the instruments in the following order:
  - a. Source (be sure to turn the switch to power on, not standby)
  - b. Test set
  - c. Analyzer
3. On the 85102, press the green preset key.
4. Does the system pass self-test (85101 self tests, 85102 running error messages, and test set unratio power tests) and display a log MAG S<sub>11</sub> trace? If not, do not perform the upgrade until the system has been serviced.
5. Initialize a blank or used tape (customer supplied), as follows:
  - a. Load the tape (with write-protect off).
  - b. On the 85102, press **AUXILIARY MENUS TAPE**.
  - c. On the 85101, select **INITIALIZE TAPE YES**.
6. Does the system initialize the tape (this takes approximately three minutes) and display `TAPE INITIALIZED?`

---

<b>NOTE</b>	The tape drive must be working to transfer information from tape to disk.
-------------	---

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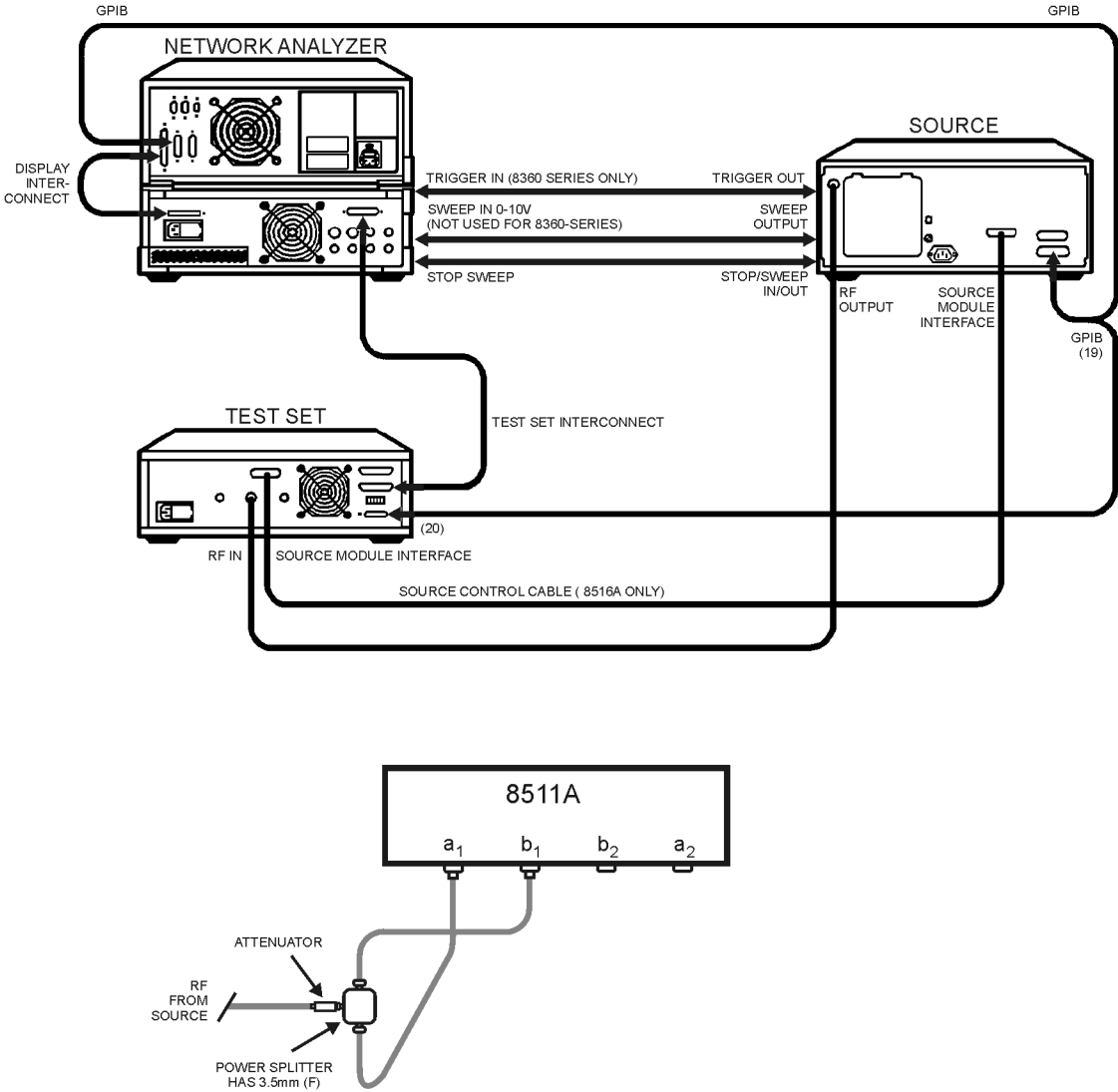
7. If the system displays a self-test,<sup>1</sup> running error message, or unratio power test failure, check the equipment setup. Do not perform the upgrade until either you correct the setup problem, or you have the system serviced.
8. Continue with [“Converting Files from Tape to Disk.”](#)

---

1. You may have to rely on the red LEDs rather than the display.



**Figure 1 Typical Equipment Setup and 8511A-Specific Connections**



jp502j

---

## Converting Files from Tape to Disk

Each performance upgrade package includes a tape to disk conversion program. Use this program to convert DATA, MEMORY, MEMORY ALL, and DELAY TABLE files from tape to disk. This conversion will make these files available to the 8510C.

The utility program creates CITIfile versions of the tape files on a standard double-sided (720 kByte) or a high-density (1.4 MByte) 3.5-inch diskette. For best performance, we recommend that you use a 9122C drive and high-density diskettes.

---

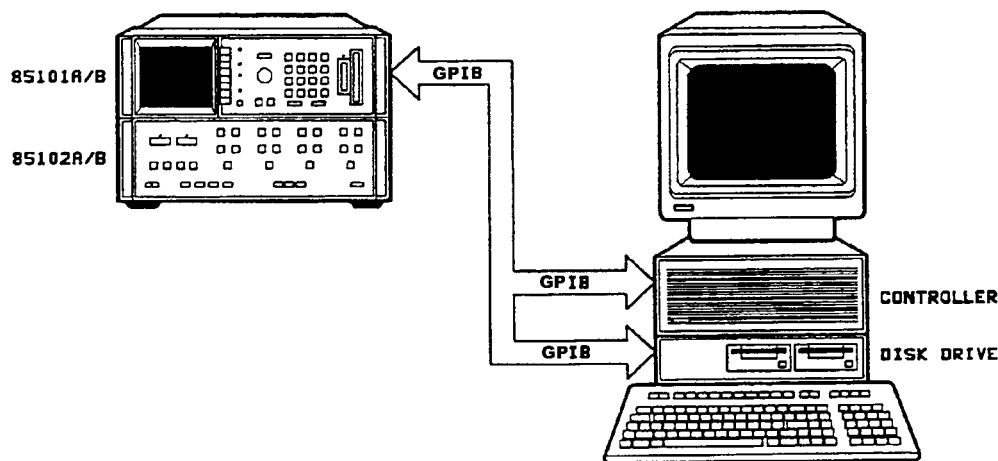
**NOTE** You *cannot* convert instrument and hardware state files, or calibration kit files under this procedure. Refer to “[Converting Cal Kit Files](#)” at the end of this procedure. The 8510C *cannot* use the learn strings of earlier analyzer versions.

---

### Procedure

1. Connect the equipment as shown in [Figure 2](#).
2. Turn the equipment on.
3. On the 8510, press INSTRUMENT STATE RECALL and select [MORE], [FACTORY PRESET].

**Figure 2** Equipment Setup for Data Transfer



Re101

4. Insert the Software Tool Kit disk included in the upgrade kit into drive 0 of the 9122 disk drive.

5. On the controller, load the program:
  - a. Type GET "TAPE\_DISC", and press **Return**.
  - b. Wait approximately 2 minutes.

---

**NOTE** You can store a version of this program so that it loads faster for future use. See "Storing a Binary Version" at the end of this procedure.

---

- c. Select **Run**.
  - d. In approximately 10 seconds, the analyzer presets and the controller displays:

```
HP 8510A/B TO HP 8510C TAPE FILE CONVERSION UTILITY
```
6. Read and follow the main menu instructions displayed on the controller.
7. Replace the tool kit disk with a blank, initialized disk (the data disk).
8. Place the data tape you want to convert to disk into the 8510A/B tape drive.
9. If you wish the conversion process to run unattended, select **Convert**. If not, see "[Attended Mode](#)." The controller shows the transfer activity, and displays a conversion summary when the transfer completes. A complete tape to disk conversion can take from 1 to 20 minutes.

---

**NOTE** When transfer completes, you can use the **[RENAME]** softkey to rename disk files. Because transferred files overwrite existing disk files, you *must* rename files if you transfer the contents of more than one tape to a single disk.

---

10. Remove the data disk from the disk drive and label it appropriately.
11. When you have completed the upgrade to 8510C, verify that the necessary files have been transferred:
  - a. Insert the data disk into the 8510C disk drive.
  - b. Press **AUXILLIARY MENUS TAPE** (or **DISC**) and select the **[DIRECTORY]**.

## Attended Mode

If you want to recall special instrument states before you recall each file from tape (to include S-parameter and frequency information), select **ConvertMode Attended**. The program prompts you to recall or set up the correct instrument state (for example S<sub>11</sub>, at 2 to 20 GHz) before the data loads from tape and transferred to disk. (In **Normal** conversion mode, all data files convert to User 1, and the preset frequency range.)

## Storing a Binary Version

To store a binary version of the utility program for faster loading in the future:

1. Type `STORE "TAPEDISC"`.
2. To load this program in the future, type `LOAD "TAPEDISC"`.

## Converting Cal Kit Files

You can convert cal kit tape files to disk by connecting the disk drive to the analyzer system interconnect bus on the rear panel, and using the 8510 capability to store directly to disk (8510B only).

Cal kits stored to disk this way can be read by an 8510C. For details on this procedure, see the analyzer documentation.

3. Continue with [“Installing a BNC Connector.”](#)

---

## Installing a BNC Connector

Use the following procedure to install a BNC connector on the rear panel of the 85102.

---

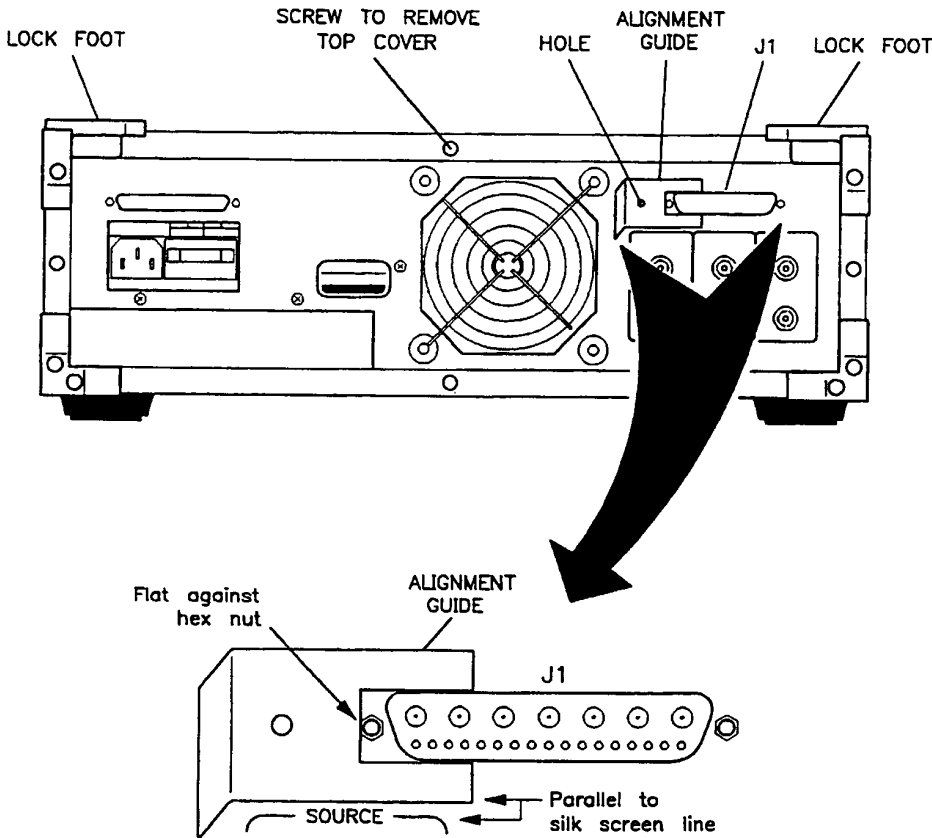
**WARNING**                    **The following procedure presents a danger to your eyes; the law requires that you use safety glasses during such procedures.**

---

### Procedure

1. Put on safety glasses.
2. Turn off line power to the 85102, remove all external cables, and move the instrument to a clear part of the work area.
3. Remove the lock feet (shown in [Figure 3](#)) and the top cover.
4. Position the rear alignment guide (shown in [Figure 3](#)) to locate the center of the hole for the BNC connector. Mark the location with a pencil.

**Figure 3                    85102 Rear Panel BNC Hole Location**



5. Remove the alignment guide, and center punch the marked spot (if you do not have an automatic center punch, use the countersink drill bit and a small hammer).
6. Cut the foam tape into four pieces (each three inches long).
7. Remove the backing from the foam tape and stack the strips (make sure you leave one adhesive side exposed).
8. Stick the tape to the inside of the rear panel, directly behind the punched indentation and against the side of the fan.

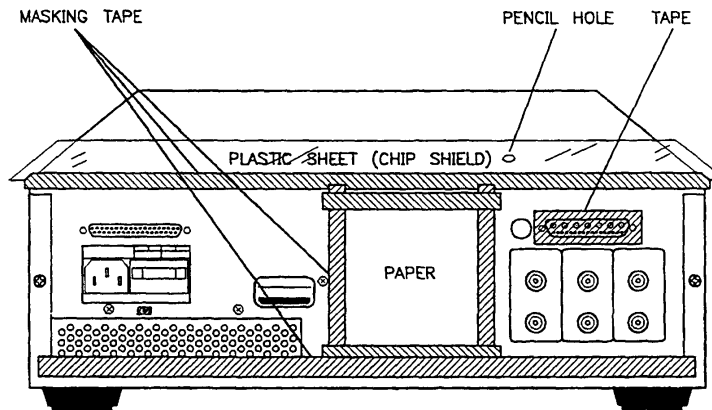
---

**NOTE** The foam keeps metal chips out of the instrument.

---

9. Refer to [Figure 4](#). To keep out metal chips, mask the fan opening and the lower edge of the rear panel with paper and masking tape.

**Figure 4 Masking Tape Applications**



Re104

10. Refer to [Figure 4](#). Tape a piece of plastic (supplied) across the top of the instrument from the rear panel forward. Make sure the hole in the plastic sheet sits above the location you will drill. The plastic keeps metal fragments from flying up into the instrument.
11. Place the top cover over the portion of the instrument still exposed.

12. At the spot punched on the rear panel, use the supplied 0.665-in bit to drill the BNC hole. Keep the following in mind:
  - Use a constant but slow clockwise RPM.
  - Press *very hard*. Try to cut an “apple peel” strip rather than many small chips.
  - Just before the bit fully penetrates the panel, hold the foam tape in place with the end of a pencil (stuck through the hole in the plastic). Just before the bit goes all the way through, use less pressure on the drill. Unlike other types of drill bits, this bit does not pull itself through the hole.

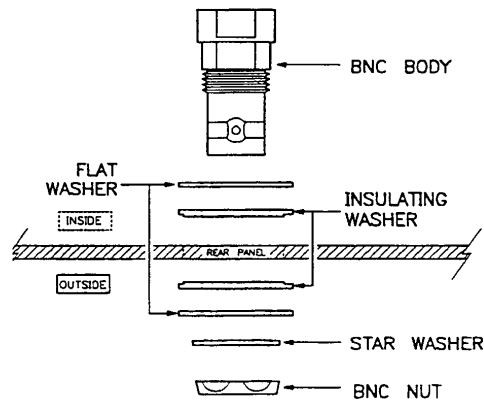
---

**NOTE** Do not get metal fragments inside the instrument.

---

13. Once you drill completely through the rear panel, press the foam tape one last time to trap as many metal fragments as possible. Do not remove the tape yet.
14. From the outside, clean any fragments out of the hole you just drilled.
15. Brush all metal fragments from the work bench, then *stand the instrument on its side panel*.
16. Carefully remove the foam tape stack so that any metal chips stuck to it do not fall into the instrument.
17. Search for any stray metal chips and pick them up with masking tape.
18. Place the instrument on its feet and remove all masking material.
19. If W40 is already connected to the BNC body, go to the next step. If not, screw cable W40 into the BNC connector body and tighten with a 7/16 inch open-end wrench.
20. Refer to Figure 5. Install the BNC connector body and hardware in the hole as shown. Tighten the BNC nut with a 9/16 inch nut driver until snug. Do not over tighten.
21. Continue with “[Installing Assemblies.](#)”

**Figure 5 BNC Parts Identification**



Re105

## Installing Assemblies

Use the following procedure to replace three assemblies in the 85102.

---

**CAUTION** Assemblies in this procedure are very sensitive to static electricity. Wear an anti-static wrist strap connected to earth ground. Place the instrument top cover (connected to earth ground) near the work area with the bare metal side facing up. When you must put them down, place assemblies on the metal surface.

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1. Refer to [Figure 6](#). Remove the metal plate.
2. Remove the machine screws that hold the metal covers of the A20 sweep ADC and A23 main phase lock assemblies, and the blank cover adjacent to the A17 assembly.

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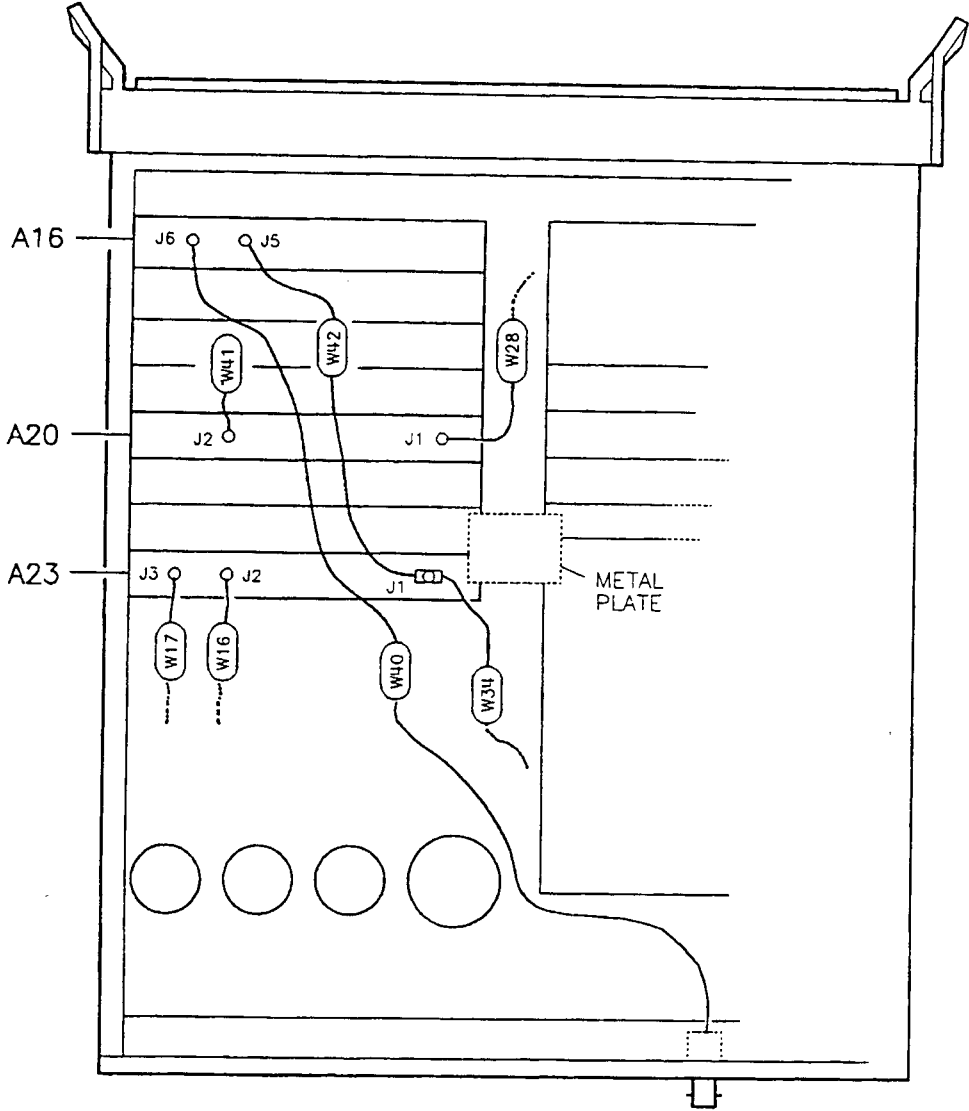
**NOTE** In the following step, be careful not to damage the metal gaskets (located under the metal covers) when you remove the assemblies.

---

3. Disconnect the cables from the A20 and A23 assemblies. Remove the two assemblies.
4. Remove the blank cover adjacent to the A17 sample and hold assembly.
5. Install the new A16, A20, and A23 assemblies from the upgrade package.
6. Reinstall all the machine screws *except* the four that hold down the metal plate shown in [Figure 6](#).
7. Continue with “[Rerouting Cables.](#)”



**Figure 6 85102 Assembly Locations**

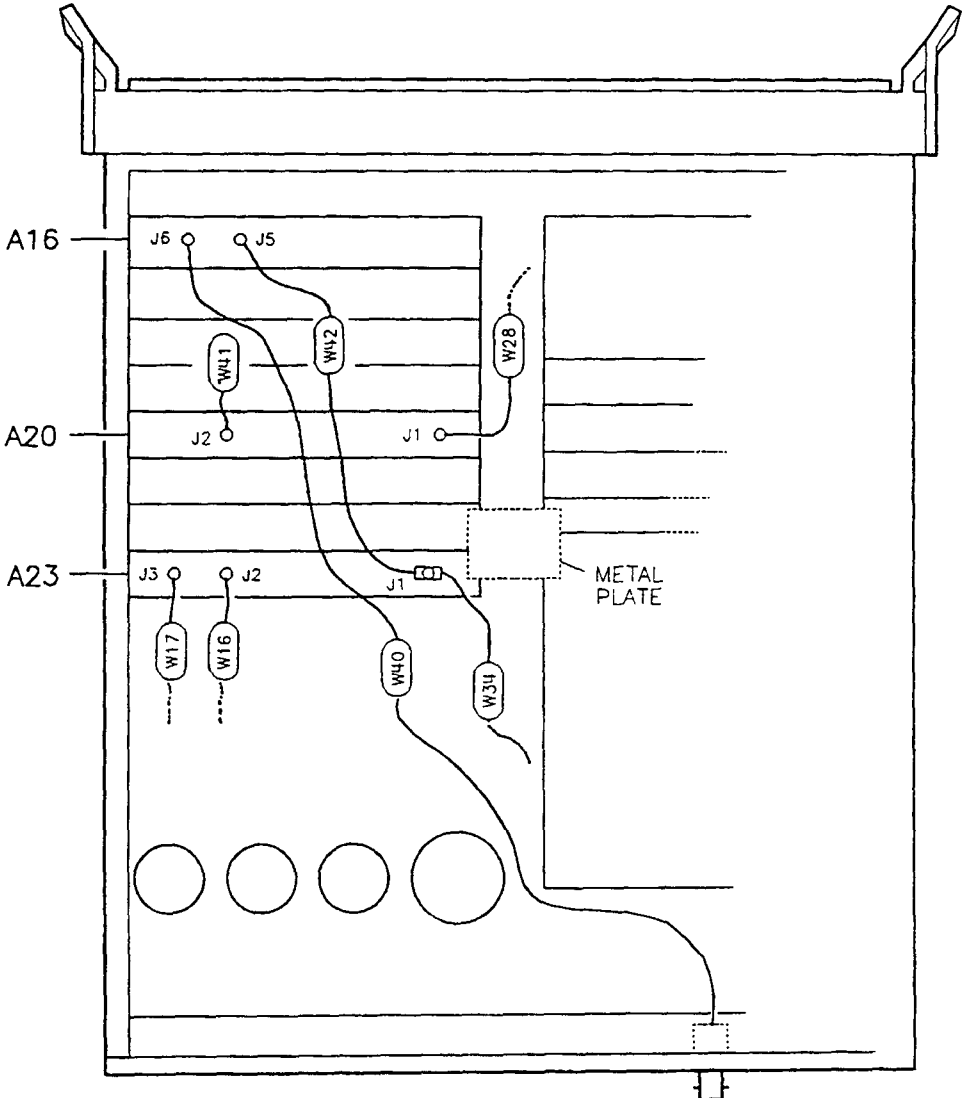


## Rerouting Cables

Use the following procedure to install an SMB adapter tee, and to reroute cables in the 85102.

1. Refer to [Figure 7](#). On the A23 assembly, install the supplied SMB adapter tee on A23J1.
2. Connect the following cables:
  - a. W34 to the SMB adapter tee at A23J1 (one end is still part of the IF cable bundle)
  - b. W42 (supplied) between the SMB adapter tee at A23J1 and A16J5
3. Reconnect the following cables:
  - a. W16 to A23J2
  - b. W17 to A23J3
4. Disconnect W27 from A19J2.
5. Attach the “A20J2” label to a cable tie and attach the cable tie to the loose end of W27. Re-label W27 to W41.
6. Reconnect W27 (now W41) to A20J2. Note that in [Figure 7](#), W27 is shown as W41.
7. Connect the loose end of W40 (the new cable from the rear panel) to A16J6.
8. Reconnect W28 to A20J1.
9. Note that A19J2 no longer has a cable connected to it.
10. Place the black rubber cover over A19J2.
11. Use as many cable ties as needed (supplied) to dress and secure the IF cables. Dress the cables so they go under the metal plate shown in [Figure 7](#).
12. Reinstall the metal plate with the four remaining screws.
13. Replace the instrument top cover and lock feet.
14. Continue with [“Attaching New Labels.”](#)

**Figure 7 85102 Cable Locations**



Re106

## Attaching New Labels

### Procedure

There are two grey labels in the upgrade kit, but you will use only one depending on the front dress panel of the analyzer (check the label size). The rest of the labels are metallic silver.

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<b>NOTE</b>	You may not need all the labels supplied in your kit. If you wish, use the supplied optional serial tags to note the original 85101 and 85102 serial numbers. If not, dispose of the unused tags.
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Using [Figure 8](#) for reference, attach the new labels as appropriate on the 85101C and the newly upgraded 85102.

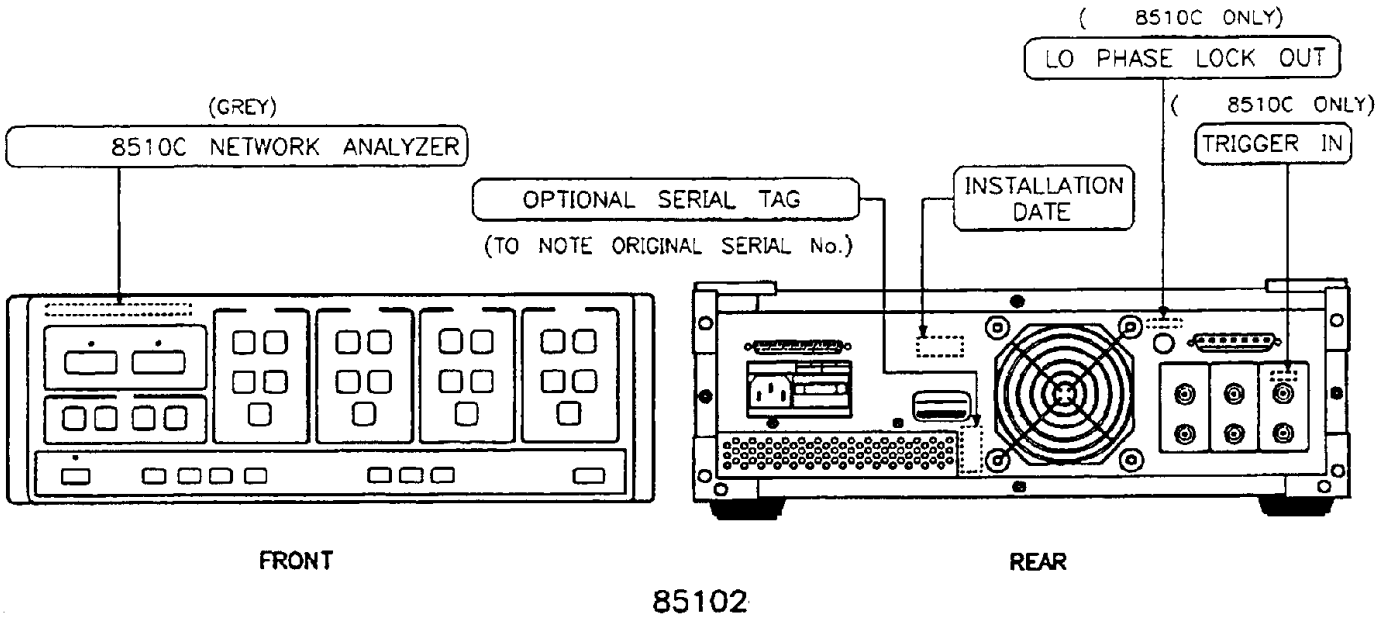
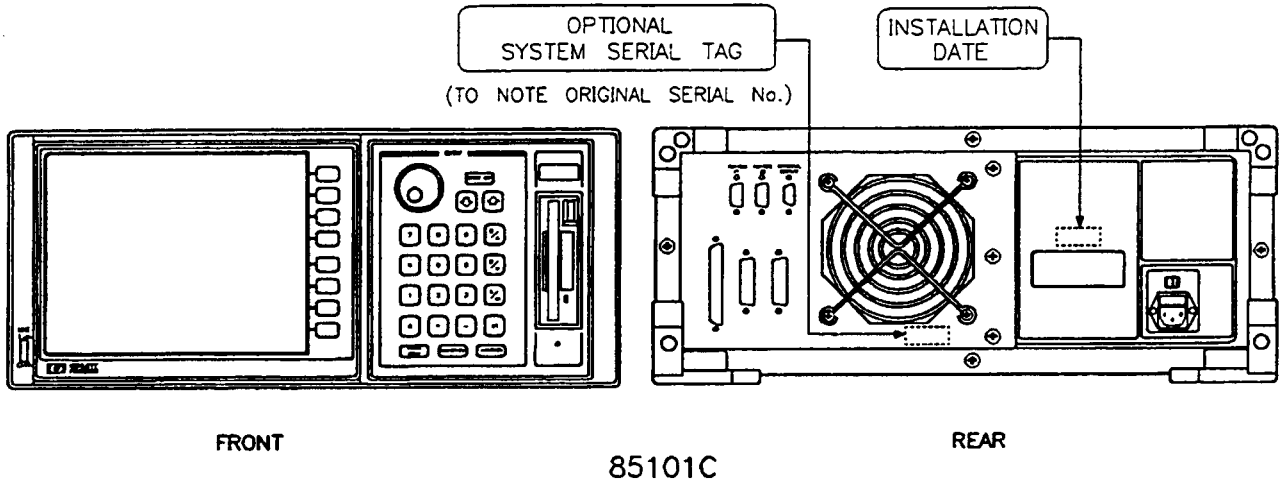
1. Place the appropriate *grey* label on the front panel of the 85102.
2. Affix the remaining labels as shown in [Figure 8](#).
3. Write the installation date (in ink) on the two installation date labels.
4. If the system has an 8360 as the source, continue with “[Upgrading an 8360 Source.](#)” If not, continue with “[Reconnecting the System.](#)”

---

<b>NOTE</b>	<p>While a <b>DISC</b> hardkey is supplied with the upgrade kit, unless absolutely necessary, do not try to replace the <b>TAPE</b> key. You can easily break the key holder behind the front panel when you remove the old key. This also applies to the <b>USER PRESET</b> hardkey.</p> <p>If replacing the hardkeys is absolutely necessary, the 85102 front panel should be disassembled and great care taken to minimize the chance for breakage.</p>
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**Figure 8**      **Location of New Labels**



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**NOTE**                      If you do not use the supplied optional serial tags to note the original 85101 and 85102 serial numbers, dispose of the unused tags.

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## Upgrading an 8360 Source

Refer to the chapter on “Main Troubleshooting Procedure” in the *8510C Network Analyzer On-Site Service Manual* (p/n 08510-90282).

After upgrading source(s), continue with [“Reconnecting the System.”](#)

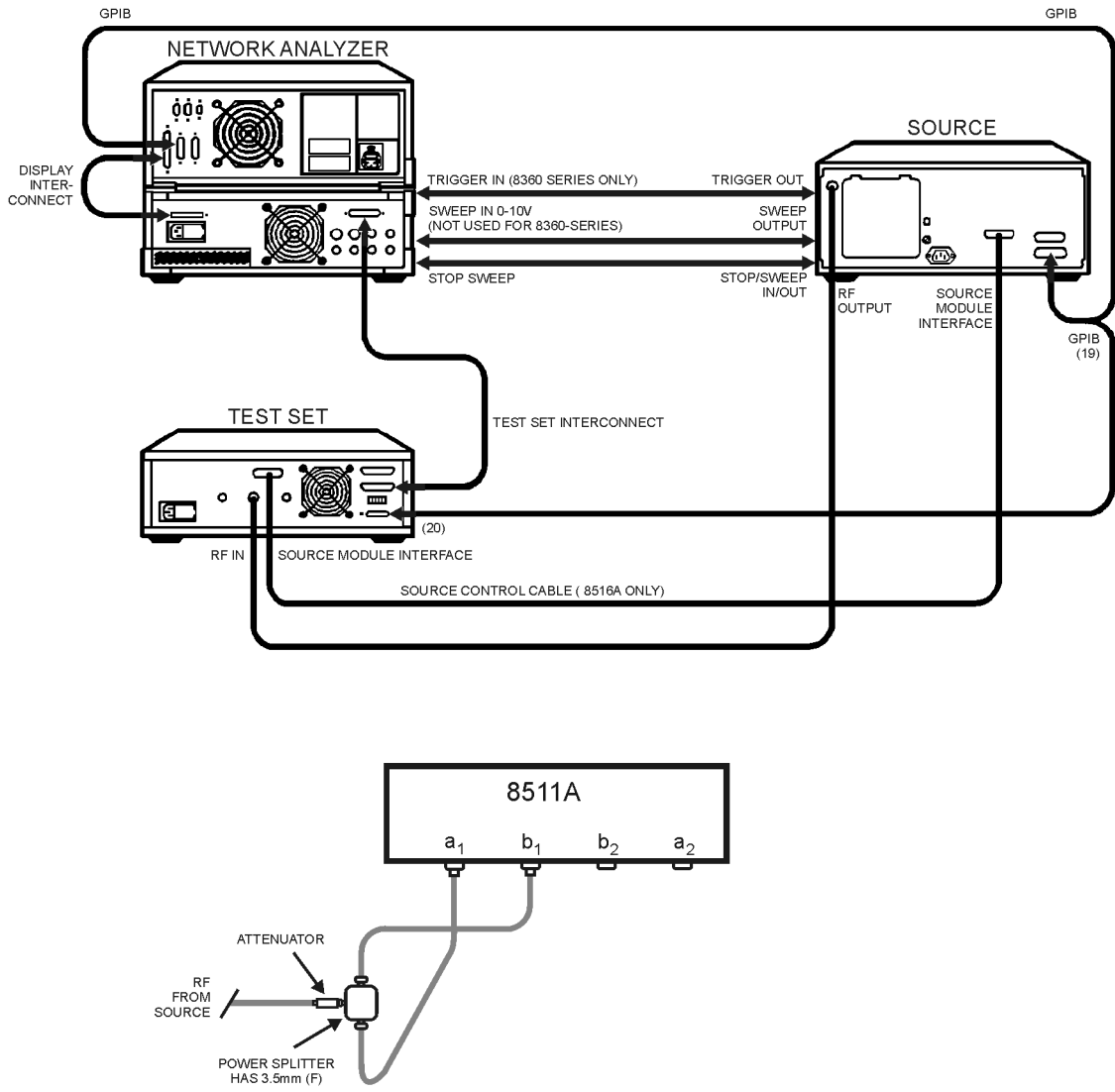
# Reconnecting the System

## Procedure

Use the following procedure to connect the 8510C system:

- 1. Using the 85101C, and the newly upgraded 85102C, connect the system as shown in Figure 9.
- 2. Continue with "Loading the 8510C Operating System."

**Figure 9 Typical 8510 System Connections**



jp502j

## Loading the 8510C Operating System

After you load the operating system, you will have an 8510C network analyzer, and it will be referenced as such. Often the letter designation “C” at the end of the 8510C model number is omitted.

The procedure for loading the operating system differs from the usual disk loading procedure. This method allows you to load a disk with or without an operating system previously loaded in the analyzer, and requires fewer keystrokes.

Selecting the appropriate 8510C operating system (CRT or LCD version) supplied in the upgrade package will ensure that the proper operating system is loaded. The time domain option firmware is included in both 8510C operating system versions and is enabled by the time domain option security key IC.

### Procedure

1. While holding down the **=MARKER** key, turn on the system instruments in the following order:
  - a. Source (turn the switch to power on, not standby)
  - b. Test set
  - c. Analyzer

This causes the instrument to detect an apparent keyboard failure and display `self-test error 14, subtest 2`. Ignore this error.

2. Press **=MARKER** again.
3. Insert the operating system disk into the analyzer disk drive, and press **1, 9, =MARKER**.
4. Select the file named `PG_8510C`, then select **[LOAD FILE]**.

The disk loads in three to four minutes, and the system begins normal operation. The screen displays: `S11 Log Mag`.

5. Press **INSTRUMENT STATE RECALL** and select **[MORE]**, **[FACTORY PRESET]**.
6. Continue with [“Checking the 8510C.”](#)



## Checking the 8510C

### 85101C Functional Check

Does the analyzer display any internal self-test failure on the self-test status LEDs or display? If not, the instrument passed the internal self tests, and functions fully. If a self-test fails, or a running error is displayed, refer to the *Agilent Technologies 8510C On-Site Service Manual*.

### 85102 Functional Check

Use these procedures to check that the LO phase lock out and trigger in are functioning properly.

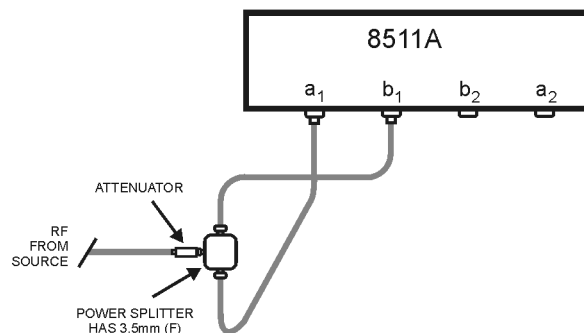
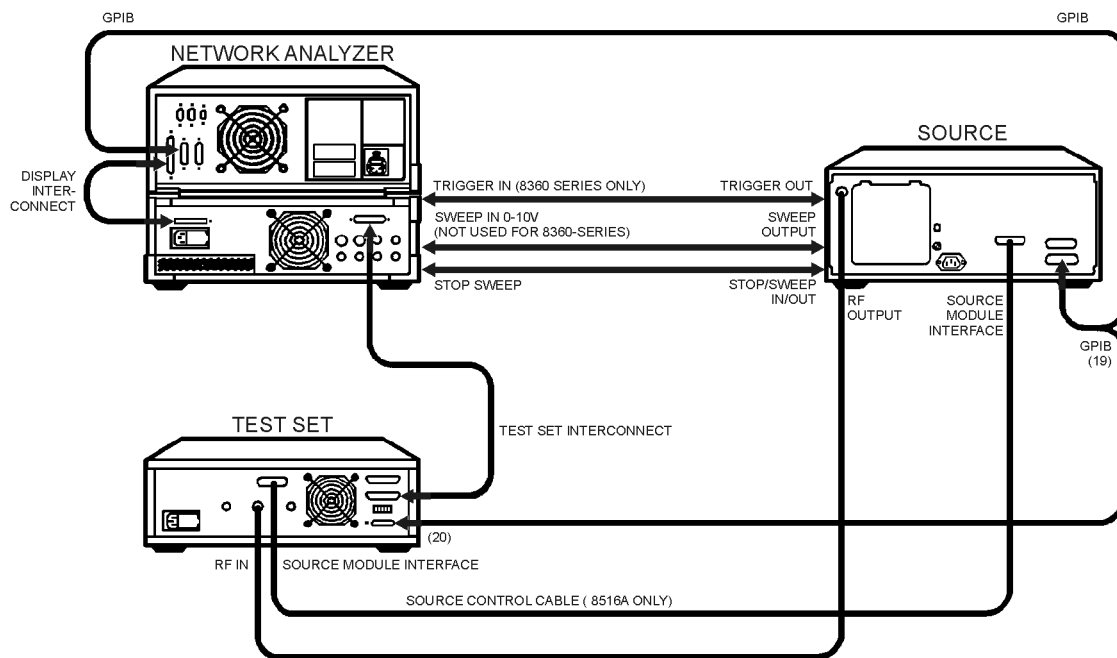
1. Turn both the 8510 and the source off (three line switches).
2. On the 85102:
  - a. From the rear panel, remove the test set interface cable.
  - b. Plug the service adapter (supplied with the upgrade package) into J1 Test Set Interconnect (the multi-pin rear-panel connector).
  - c. Connect the BNC end of the service adapter to the rear-panel 20 MHz output.
  - d. Connect the ANALOG  $\pm$  10V BNC to the SWEEP IN 0-10V BNC (failure to do this causes an error).
3. Turn on the 8510, and ignore the system bus address error.
4. Press **AUXILIARY MENUS SYSTEM**.
5. Select **[MORE]**, **[SERVICE FUNCTIONS]**, **[TEST MENU]**.
6. Press **2, 2, =MARKER**.
7. Press **2, =MARKER**.
8. Press **=MARKER**.
9. Run all of the tests: Press **M/u** (hexadecimal B), **=MARKER**.
10. After the tests pass, return to the 8510 Log Mag display:
  - Press **=MARKER**.
  - Press **.** (hexadecimal F), **=MARKER**.
  - Press **.** (hexadecimal F), **=MARKER** again.
  - Press **1, 5, =MARKER**.
11. At this point, disregard any running error messages and continue with [“LO Phase Lock Out Functional Check.”](#)

## LO Phase Lock Out Functional Check

The A16 assembly inverts the main phase lock signal to fine tune a sweep oscillator. In this check, you use the 8510C as an oscilloscope to check this function.

1. Turn the source on.
2. Connect SWEEP OUTPUT from the source to SWEEP IN on the 85102.
3. On the 85102:
  - a. Remove the service adapter.
  - b. Reconnect the test set IF interconnect cable from the 8510 to the test set.
4. Check that all connections are as shown in [Figure 10](#).

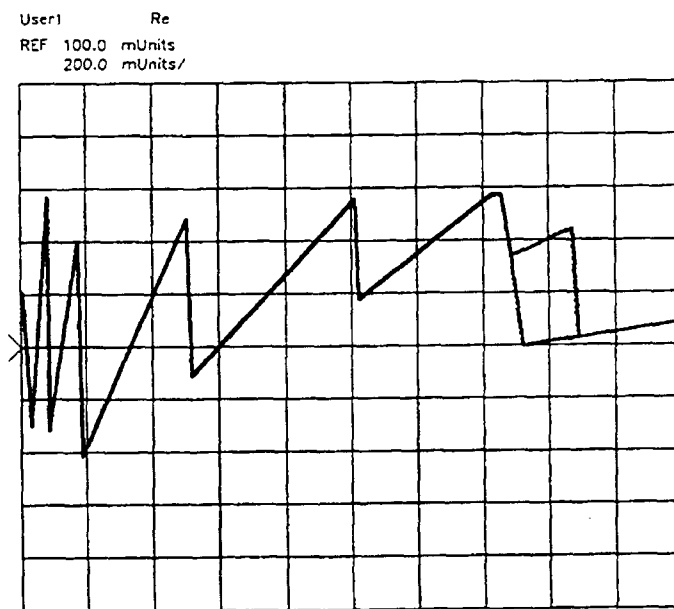
**Figure 10** Typical 8510 System Connections



jp502j

5. Turn off the 8510.
6. On the 85102:
  - a. Remove the top cover.
  - b. Disconnect W24 from the A17J4 Ref X connector.
  - c. Connect the BNC-to-SMB cable provided in the upgrade package from the rear panel LO Phase Lock Out jack to the A17J4 Ref X connector.
7. Turn on the 8510.
8. Press **INSTRUMENT STATE RECALL** and select **[MORE]**, **[FACTORY PRESET]**.
9. Press **PARAMETER MENU** and select **[USER 1 a1]**.
10. Press **FORMAT MENU** and select **[REAL]**.
11. Press **RESPONSE AUTO**.
12. The signal displayed should ramp up as shown in [Figure 11](#).

**Figure 11 LO Phase Lock Out and Main Phase Lock Signals**



Re109

13. On the 85102:
  - a. Remove the BNC-to-SMB cable.
  - b. Reconnect W24 to A17J4.
  - c. Leave the top cover off.

---

**NOTE** If the trace flattens out and the display shows an IF Failed Cal message, press **ENTRY OFF** to clear the error. This is not a true error.

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14. Continue with “[Trigger In Functional Check.](#)”

## Trigger In Functional Check

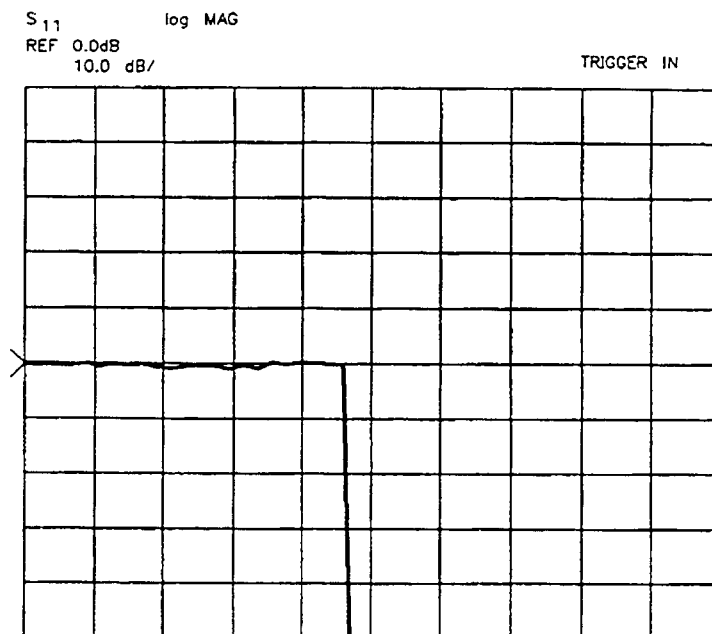
This check confirms the operation of the Trigger In connector and circuit. Any triggered trace confirms the operation of the circuit.

1. Turn off the 8510.
2. On the 85102:
  - a. Disconnect W28 from A20J1.
  - b. At A10/A12J5 Test/Ref IF amplifier:
    - i. Disconnect W23.
    - ii. Connect an SMB tee in its place.
    - iii. Reconnect W23 to the tee.
    - iv. Connect the SMB-to-BNC cable between the tee and the rear panel Trigger In (if necessary, remove the trigger cable from the 8360 source to the 85102).
3. Turn on the 8510.
4. Press **INSTRUMENT STATE RECALL**, **[MORE]**, **[FACTORY PRESET]**.
5. Look for a (partial) trace similar to [Figure 12](#), and disregard any error messages. Any triggered trace means the circuit functions, no matter how short or erratic the trace.

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**NOTE** If the source is not an 8360 series, you can make a longer trace by increasing the sweep time to > 200 ms.

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**Figure 12** Typical Partial Trace Confirming Trigger In Circuit Operation

Re110

6. Turn off the 8510.
7. On the 85102:
  - a. Remove the SMB-to-BNC cable.
  - b. For an 8360 series source, reconnect the Trigger In cable.
  - c. Reconnect W28 to A20J1.
  - d. Remove the SMB tee and reconnect W23 to A10/A12J5.
  - e. Replace the top cover.
  - f. For use with 8340 or 8350 series sources, place the BNC short over the TRIGGER IN BNC.
  - g. For use with 8360 sources, place the BNC short over the SWEEP IN 0-10V BNC.
8. Turn on the 8510.
9. Press **INSTRUMENT STATE RECALL**, **[MORE]**, **[FACTORY PRESET]**.
10. Continue with **“Time Domain Option Functional Check”** if you have installed the time domain option firmware (Option 010). If you did not install the time domain option firmware, proceed to **“Checking Calibration Kit Definitions”** on page 31.

## Time Domain Option Functional Check

If the 8510A was equipped with the time domain option (Option 010), either originally or through an upgrade, then the 85103E upgrade package ordered should also have been equipped with Option 010. If so, there should be a serial number label on the back of the 85101C with OPT: 010 printed on it.

The time domain option firmware is included in both the LCD and CRT 8510C operating system versions. It is enabled by the time domain option security key IC inside the 85101C. Refer to the *On-Site Service Manual* for the location of this IC.

Use this procedure to verify that the time domain option has been installed properly.

1. Turn on the instruments in the following order:
  - a. Source (make sure that the switch is turned to power on and not standby)
  - b. Test set
  - c. 85102 IF/detector
  - d. 85101 display/processor
2. On the 85101:
  - a. Press **INSTRUMENT STATE RECALL** and **[MORE]**, **[FACTORY PRESET]**.
  - b. Press **DOMAIN** and select **[TIME LOW PASS]**.

Does the instrument display the Set Frequency (low pass) menu? If so, the time domain option is installed properly. If not, recheck the installation of the IC.

## Checking Calibration Kit Definitions

After an upgrade, an 8510 contains calibration kit definitions that may be significantly different from those that were in the pre-upgraded analyzer. Ensure that the calibration kit definitions contained in the 8510 match the calibration kit used by reloading the definitions from disk.

### Viewing Calibration Kit Labels

1. On the 85102, press **CAL**.
2. Check the calibration kits listed.
3. Load the calibration kit definition for the calibration kit used from disk.

### Loading a Calibration Kit Definition

1. Insert the calibration kit data disk into the 8510 disk drive.

The master calibration constants disk included in the upgrade package (8510 Calibration Data disk p/n 08510-10034) contains calibration constants for many standard calibration kits. The calibration kits are listed by model number on the disk label. This disk can be used to load calibration kit definitions in case the calibration kit does not have a disk.

2. Press **AUXILIARY MENUS TAPE (or DISC)** and select **[LOAD]**.
3. Select **[CAL KIT 1-2]**.
4. Select the data file to load, normally **FILE 1**.
5. Select the calibration kit you want to replace with the definition from disk.
  - a. Using the **RPG** knob or up/down arrow keys, select the appropriate kit.
  - b. Select **[LOAD FILE]**.
  - c. Press **[CAL]** to verify that the calibration kit loaded properly.

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<b>NOTE</b>	For best measurement results, the 8510 must have the proper calibration kit definition. If you have any doubt, reload the definition from disk.
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