Installation Note

HP 8753DU
Option 000 Performance Upgrade Kit
for the HP 8753D and HP 8753D Option 011 Network Analyzers
Kit Number 08753-60313

IMPORTANT! Be sure to read the enclosed section, "Installation Options" before starting.

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Notice.

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PRODUCT **A**FFECTED:	**HP** 8753D network analyzer HP 8753D Option 011 network analyzer
SERIAL **N**UMBERS:	All serials
To **B**E **P**ERFORMED **B**Y:	[**X**] HP Service Center [**X**] HP personnel on-site [**X**] Customer *See "Installation Options" below.*
ESTIMATED **I**NSTALLATION **T**IME:	1 hour (add 2 hours if power supply modification is necessary. Because this modification involves soldering and extensive disassembly, it is recommended that it be performed by HP personnel. Also add the time needed to back up instrument states, if desired.)
ES IMATED **V**ERIFICATION **T**IME:	*30* minutes

Description

The HP 8753DU Option 000 Performance Upgrade Kit is used to replace the A9 CPU board in the analyzer with a new board designed with a faster microprocessor and enhanced firmware. Faster measurement speeds, data transfers, and instrument state recalls are made possible with this upgrade. Loading new firmware revisions can now be accomplished with a 3.5 inch floppy disk rather than by replacing EEPROMs.

This note contains the information required to install the new A9 CPU board in the HP 8753D and HP 8753D Option 011 network analyzers.

Installation Options

1. Installation at HP Service Center

   ■ included in the kit price

   ■ call 1-800-403-0801 to schedule with a service center

   ■ send the analyzer and upgrade kit to the designated service center

   ■ does not include repair – requires an operational analyzer

2. Installation by HP personnel at customer's site

   ■ travel time and labor (including backup of instrument states, if desired) in excess of the 1 hour estimated installation time to be paid by customer.

3. Installation by customer

Warranty

For warranty information, refer to the User's Guide Supplement for the Option 000 Performance Upgrade Kit.

Performance Upgrade Kit: Parts List

Qty	Description	HP Part Number
1	CPU board1	08753-60272
1	User's Guide Supplement	08753-9042 1
1	Installation Note	08753-90414
1	Electrolytic capacitor	0180-4316
1	Firmware disk	08753-10034
1	OPT 000 label	7120-1232

1 CPU Repair Kit (Rebuilt-Exchange): 08753-69315

Caution   The capacitor included in this upgrade kit may need to be installed to avoid a problem with the analyzer display. 'Ib determine if you need to install the capacitor, refer to the section "Determine If the Power Supply Modification is Necessary, " located later in this document.

Required Equipment and Tools

Table l-l. Equipment and Tools to Install the New CPU Board

Item	HP Part/Model Number
3.5-inch floppy disk	HP 92192A (box of 10)
T- 10 TORX screwdriver	N/A
T- 15 TORX screwdriver	N/A
Antistatic Wrist Strap	9300-1367
Antistatic Wrist Strap Cord	9300-0980
Static-Control Table Mat and Earth Ground Wire	9300-0797

Equipment and Tools to Modify the Power Supply

- #2 POZIDRIV screwdriver

- 5/16-inch open-end torque wrench (set to 21 in-lb)

- Soldering equipment

Safety Considerations

Warning   Before you disassemble the instrument, turn the power switch OFF and unplug the instrument. **Failure** to unplug the instrument can result. **in personal injury.**

Caution   Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to the documentation that pertains to your instrument for information about static-safe workstations and ordering static-safe accessories.

Record the Analyzer Information

1. Turn on the analyzer.

2. Record the firmware revision, serial number, and option numbers that appear on the display.

Perform the Operator's Check

1. Press (PRESET) (SYSTEM) SERVICE MENU TESTS (21) (x1) EXECUTE TEST .

2. Follow the displayed prompts for making the necessary connections.

3. Press CONTINUE.

   When the analyzer passes the test, it will display: PORT 1 Op Chk DONE.

4. Press RETURN TESTS 122) (x1) EXECUTE TEST .

5. Follow the displayed prompts for making the necessary connections.

6. Press CONTINUE.

   When the analyzer passes the test, it will display: PORT 2 Op Chk DONE.

Note   If either check did not pass, the instrument must be adjusted or repaired before being upgraded. Repair costs are *not* included in the cost of the upgrade installation.

Back Up the Correction Constants

The correction constants, which are unique to the instrument, are stored in EEPROM on the A9 CPU board. By creating an EEPROM backup disk, you will have a copy of all the correction constants data that you need to replace the A9 CPU board.

7. Insert a 3.5-inch disk into the analyzer disk drive.

8. If the disk is not formatted, follow these steps:

   a. Press (SAVE/RECALL) FILE UTILITIES FORMAT DISK.

   b. Select the format type:

      . to format a LIF disk, select FORMAT : LIF .

      ■ to format a DOS disk, select FORMAT:DOS.

   c. Press FORMAT INT DISK and answer YES at the query.

9. Press (SYSTEM) SERVICE MENU SERVICE MODES MORE STORE EEPR ON (SAVE/RECALL)
   SELECT DISK INTERNAL DISK RETURN SAVE STATE.

Note	The analyzer creates a default file: "FILEnn" (nn= 00 or the next highest available number). The filename appears in the upper-left corner of the display. The file type: "ISTATE(E)", indicates that the file is an instrument-state with EEPROM backup.

10. Press FILE UTILITIES RENAME FILE ERASE TITLE . Use the front panel knob and the SELECT LETTER softkey (or an external keyboard) to rename the file "FILE0" to "N*12345*" where 12305 represents the last 5 digits of the instrument's serial number. (The first character in the filename must be a letter.) When you are finished renaming the file, press DONE.

11. Write the following information on the disk label:

   ■ analyzer serial number

   ■ today's date

   ■ "EEPROM Backup Disk"

Back Up the Instrument States

All instrument states that you have saved to the analyzer's internal memory will be lost, when the A9 CPU board is replaced. If you want to save these instrument states, you must back them up on a disk before replacing the board. For an explanation of this procedure, refer to "Printing, Plotting, and Saving Measurement Results," located in the User's Guide. This procedure may be very time consuming, depending on the number of instrument states that you choose to back up. Each instrument state file will have to be renamed.

Remove the Analyzer Rear Panel

1. Put on the antistatic wrist strap that is connected to the antistatic mat and earth ground.

2. Turn off the analyzer and remove the power line cord.

3. Remove the two corner bumpers from the top of the instrument with the T-15 TORX screwdriver.

4. Loosen the captive screw on the top cover's back edge with the T-15 TORX screwdriver.

5. Remove the analyzer top cover.

6. Locate and record the keyword(s) for options, located on the deck above the analyzer display. Note that there is an option keyword for each option installed in the instrument.

7. Turn the instrument on its side.

8. Remove the analyzer bottom cover using the procedure described in previous steps for removing the top cover.

9. Remove six screws (item 1) from the rear frame: two from the top edge and four from the bottom edge. Refer to Figure 1-l.

10. Remove the six screws (item 3) next to the preregulator, from the rear panel as shown.

11. Remove the four screws (item 4), surrounding the connector interfaces, from the rear panel as shown.
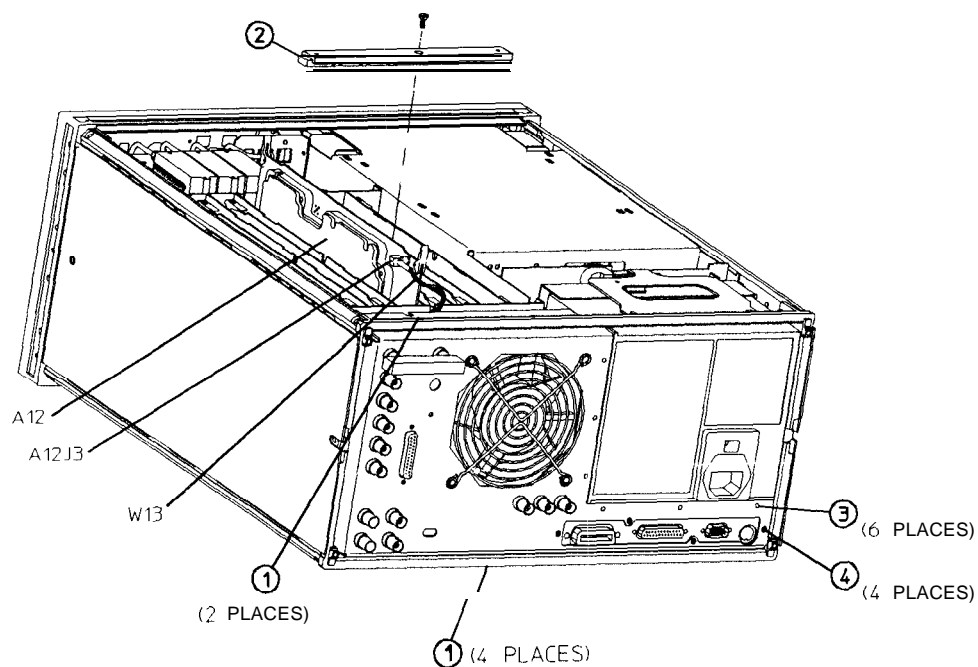
Figure l-1. Rear Panel: All Instruments

Determine If the Power Supply Modification is Necessary

Caution   The capacitor included in this upgrade kit may need to be installed to avoid a problem with the analyzer display.

If the analyzer has an instrument serial number of OOOOAOOOOO to 3410A06400 and a firmware revision number lower than 6.12, you may need to install the capacitor in the power supply. To determine if you need to do this modification, refer to the section "Power Supply Modification," located later in this document.

If you have determined that it is *not* necessary to install the capacitor in the power supply, go to the next section, "Remove the A9 CPU Board".

Remove the A9 CPU Board

1. Turn the analyzer upside down.

2. **For Standard instruments only:** Disconnect ribbon cable W34 from A25J1.

3. Pull the rear panel away from the frame. Refer to Figure l-2.

4. Disconnect ribbon cables W35 and W36 from the A9 CPU board. This is done by placing a finger underneath the ribbon cable next to the connector and lifting the cable upwards while holding down the A9 CPU board. Refer to Figure 1-3 or Figure 1-4.

5. Disconnect ribbon cable W37. This is done by pulling up on the corners of the connector base.

6. Disconnect ribbon cable W20 from the A9 CPU board.

7. Remove the screw (item 2) that secures the A9 CPU board to the deck. While lifting the front edge, slide the board towards the front of the instrument so that it disconnects from the three standoffs (item 3).

8. Remove the A9 CPU board from the analyzer and place it in an antistatic bag.
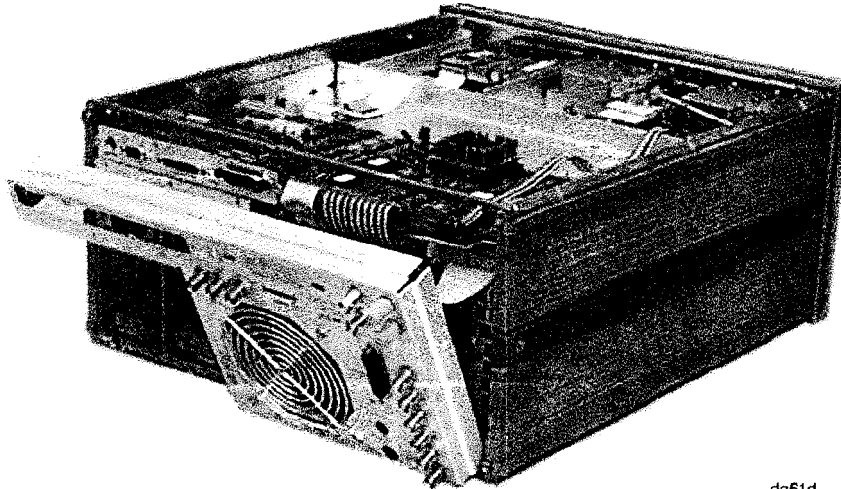
Install the new A9 CPU Board

1. Slide the new A9 CPU board towards the back of the instrument so that it connects with the three standoffs (item 3).

2. Fit ribbon cable W20 through the access hole in the board. Do not connect yet.

3. Replace the screw (item 2) that secures the A9 CPU board to the deck.

4. Reconnect ribbon cables W35 and W36 to the A9 CPU board. Tuck the extra length of the W36 ribbon cable under the A9 CPU board so that it does not interfere with the connector interface bracket.

5. Reconnect ribbon cable W20 to the board. Pinch the connector locks of the connector base to ensure proper mating.

6. Using the clip on the deck to secure the ribbon cable, reconnect W37. Pull up on the corners of the connector base before inserting the ribbon cable. Push down on the corners to lock
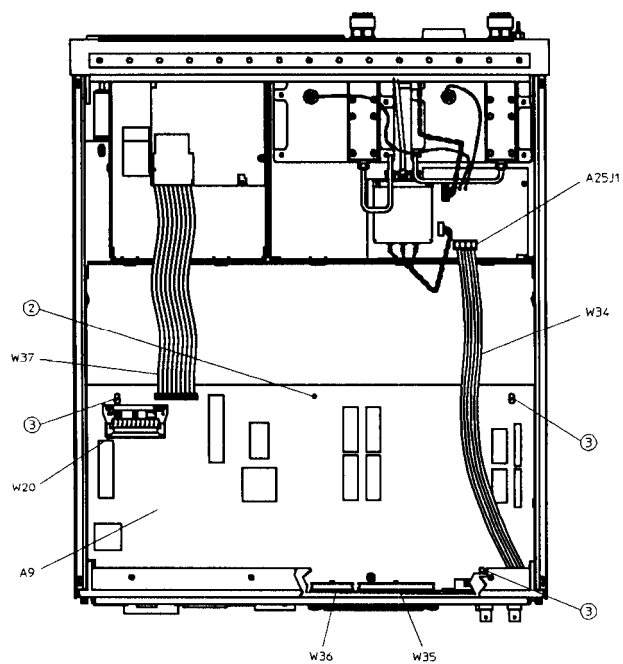
the ribbon cable in place. Take special care with this connection to ensure proper analyzer operation.

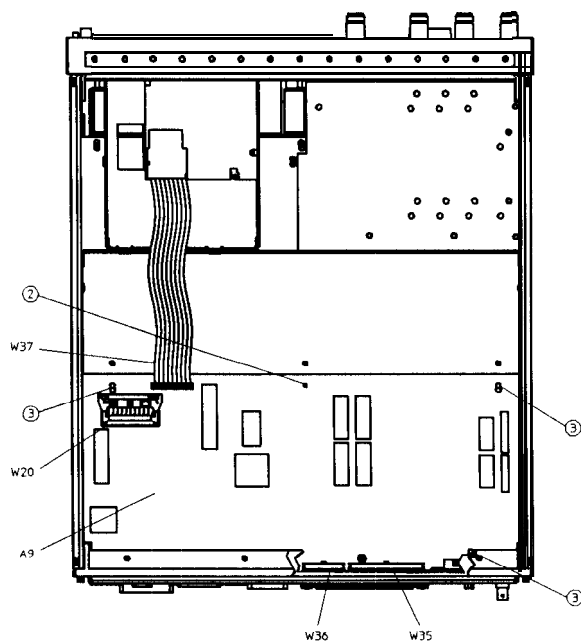i. **For Standard instruments only: Using the clip** on the deck to secure the ribbon cable, reconnect W34 to A25J1.

dg61d

Figure l-2. Rear Panel Pulled Away From the Frame: All Instruments

Figure 1-3. A9 CPU Board: Standard Instrument

Figure 1-4. A9 CPU Board: Option 011 Instrument

Reassemble the Analyzer

1. To reassemble the analyzer rear panel, reverse the order of the procedure titled "Remove the Analyzer Rear Panel," located earlier in this document.

2. On the A9 CPU board, set the switch to the Alter Mode configuration (see Figure 1-5).

3. Reinstall the top cover and corner bumpers and reconnect the power line cord.

sg6106e
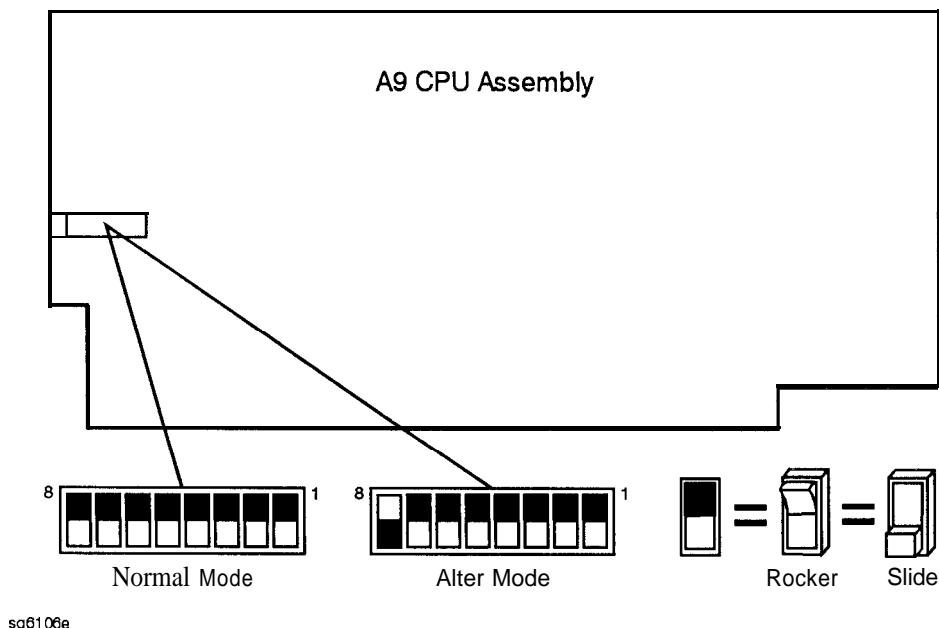
Figure 1-5. Switch Positions: All Instruments

Load the New Firmware

1. Place the firmware disk into the disk drive.

2. Turn on the analyzer. The firmware is loaded automatically during the power-on sequence When loading is completed, the LEDs will be on for Channel 1 and Testport 1.

   The display may indicate No IF or No Phase Lock. This is normal for this point in the procedure.

   Troubleshooting:

   ■ If the instrument display does not come on, the analyzer may be unable to load the firmware. Recheck the W37 ribbon cable connection on the A9 CPU board and try step 2 again.

   . If the LEDs come on but the display does not, press (DISPLAY) SOFTKEY 8 SOFTKEY 4
   SOFTKEY 4 . If the display now works, you need to perform the power supply modification. Refer to the section "Power Supply Modification," located later in this document.

   ■ The red LED (DS407) will flash if the switch is in the wrong position. Refer to Figure 1-5.

3. Remove the firmware disk from the disk drive.

Store the Analyzer Serial Number

This procedure stores the analyzer serial number in the A9 CPU assembly EEPROMs.

1. Press (Preset) DISPLAY MORE TITLE ERASE TITLE to erase the HP logo from the display.

2. Enter the analyzer serial number (recorded earlier) by rotating the front panel knob to position the arrow below each character of the instrument serial number, and then pressing SELECT LETTER to enter each character. Enter a total of ten characters.

   Press BACKSPACE if you made a mistake.

3. Press DONE when you have finished entering the title.

Caution	You *CANNOT* correct mistakes after you perform step 4, unless you contact the factory for a keyword to clear the serial number. If needed, this keyword should be used in the next procedure, "Store the Analyzer Option(s) Information," for clearing the incorrect serial number. After this is done, repeat the procedure "Store the Analyzer Serial Number. "

4. Press (System) SERVICE MENU TESTS (55) (x1) EXECUTE TEST YES .

5. Observe the analyzer for the results of the routine:

   ▪ If the analyzer displays the message Serial Cor DONE, you have completed this procedure.

   ▪ If the analyzer does not display DONE, then either the serial number that you entered in steps 3 and 4 did not match the required format or a serial number was already stored. Check the serial number recognized by the analyzer:

   a. Press (Preset) (System) SERVICE MENU FIRMWARE REVISION .

   b. Look for the serial number displayed on the analyzer screen.

   c. Rerun this adjustment test.

   ▪ If the analyzer continues to fail this adjustment routine, contact your nearest HP Sales and Service Office, listed at the end of this document.

Store the Analyzer Option(s) Information

This procedure stores instrument option(s) information in A9 CPU assembly EEPROMs. You can also use this procedure to remove a serial number by using the factory supplied keyword, as referred to in "Store the Analyzer Serial Number."

1. Press (Preset) (Display) **MORE TITLE ERASE TITLE** .

2. Enter an option keyword (recorded earlier in the section "Remove the Analyzer Rear Panel") by rotating the front panel knob to position the arrow below each character of the keyword, and then pressing SELECT, LETTER to enter each letter.

   Press BACKSPACE if you made a mistake.

3. Press DONE when you have finished entering the title.

Caution   Do not confuse "I" with "1" or "0" with "0" (zero).

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4. Press (System) SERVICE MENU TESTS (56) (x1) EXECUTE TEST YES.

5. Observe the analyzer for the results of the adjustment routine:

   - If the analyzer displays Option Cor DONE, you have completed this procedure.
   - If the analyzer has more than one option, repeat steps 2-5 to enter the remaining keyword(s) for options.
   - If the analyzer displays Option Cor FAIL, check the keyword used in step 3 and make sure it is correct. Pay special attention to the letters "I" or "O", the numbers "1" or "0" (zero). Repeat this entire adjustment test.
   - If the analyzer continues to fail the adjustment routine, contact your nearest HP Sales and Service Office, listed at the end of this document.

Re-load the Correction Constants

1. Insert the "EEPROM Backup Disk" (created earlier) into the disk drive.

2. Press (Save/Recall] SELECT DISK INTERNAL DISK. Use the front panel knob to highlight the file "N12345" where N12345 represents the file name of the EEPROM data for the analyzer.

3. Press RETURN RECALL STATE' to down load the correction constants data into the instrument EEPROMs.

4. Press (Preset) to load the EEPROM Constants. Verify that good data was transferred to EEPROM by performing a simple measurement.

Re-load the Instrument States

If you want to reload the analyzer's instrument states from your backup disk (created earlier), refer to "Printing, Plotting, and Saving Measurement Results," located in the User's *Guide.* This procedure may be very time consuming, depending **on** the number of instrument states that you choose to re-load. Each instrument state file will have to be renamed.

Configure the Analyzer to Produce a Time Stamp

You can set a clock, and then activate it, if you want the time and date to appear on your hardcopies.

1. Press (System) SET CLUCK .

2. Press SET YEAR and enter the current year (four digits), followed by (x1).

3. Press SET MONTH and enter the current month of the year, followed (xl.

4. Press SET DAY and enter the current day of the month, followed by (x1).

5. Press SET HOUR and enter the current hour of the day (O-23), followed by (xl).

6. Press SET MINUTES and enter the next immediate minute, followed by (x1).

7. Press ROUND SECONDS when the current time is exactly as you have set it.

8. Press TIME STAMP until TIME STAMP ON appears on the softkey label.

Verify Successful Installation

1. Turn the analyzer off and then on.

2. Verify the following information on the display:

    a. The new firmware revision number matches the number printed on the firmware disk.

    b. Option 000 has been added to the list of analyzer options.

    c. All other options have been re-established.

3. Repeat the section titled "Perform the Operator's Check," located earlier in this document.

4. Turn the analyzer off.

5. Move the A9 switch back to its NORMAL position. Refer to Figure l-5.

6. Reinstall the analyzer bottom cover.

7. Affix the "OPT 000" label below the serial number label on the analyzer rear panel.

Troubleshooting

1. If the display information is not observed, as listed previously in the section titled "Verify Successful Installation," examine all connections to the A9 CPU board. Improper connections may be diagnosed as follows:

   a. If the Channel 1 and Testport 1 LEDs are on but the display is blank, examine the W20 ribbon cable connector. Refer to Figure l-3 or Figure l-4.

   b. If the Testport 2 LED is on but the display is blank, examine the W37 ribbon cable connector.

   c. **For Standard instruments only:** If the Channel 1 LED is on and the display shows a trace but neither Testport LED is on, examine the W34 ribbon cable connector.

Power Supply Modification

Overview

After installing the new firmware as per this upgrade kit, some analyzers may demonstrate CRT problems related to the power-down routine of the A9 CPU. Typical symptoms include a blank display, unusual colors, or lack of colors after the power has been cycled twice following the installation of the firmware. To assure correct display operation, modify the power supply by replacing capacitor C7 with the new capacitor supplied in the upgrade kit.

Is the Modification Required?

To determine if your analyzer will require the power supply modification, you will need to remove the preregulator and inspect its underside to find the power supply serial number.

Step 1: Remove the Preregulator

1. Remove the screw from the pc board stabilizer (item 2) and remove the stabilizer. Refer to Figure l-l.

2. Lift the reference board (A12) from its motherboard connector and disconnect W13 from A12J3.

3. Remove the two screws that attach the graphics board bracket (item 5) to the rear frame. Refer to Figure l-6 or Figure l-7. *The preregulator is now sitting loosely in the instrument.* Gently press the top of the graphics board (A19) towards the display (A18), then lift, up on the bracket and remove it.

4. Remove the preregulator (A15) from the frame. Refer to Figure 1-8.

Note   ■ When reinstalling the preregulator (A15), make sure the three grommets (item 1) on A15W1 are seated in the two slots (item 2) on the back side of the preregulator and the slot (item 3) in the card cage wall. Refer to Figure l-8.

   ■ After reinstalling the preregulator (A15), be sure to set the line voltage selector to the appropriate setting, 115 V or 230 V.
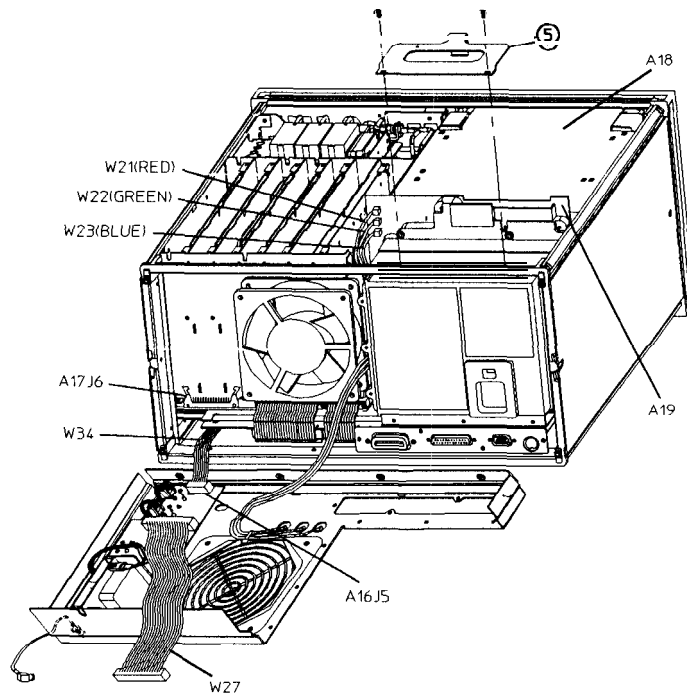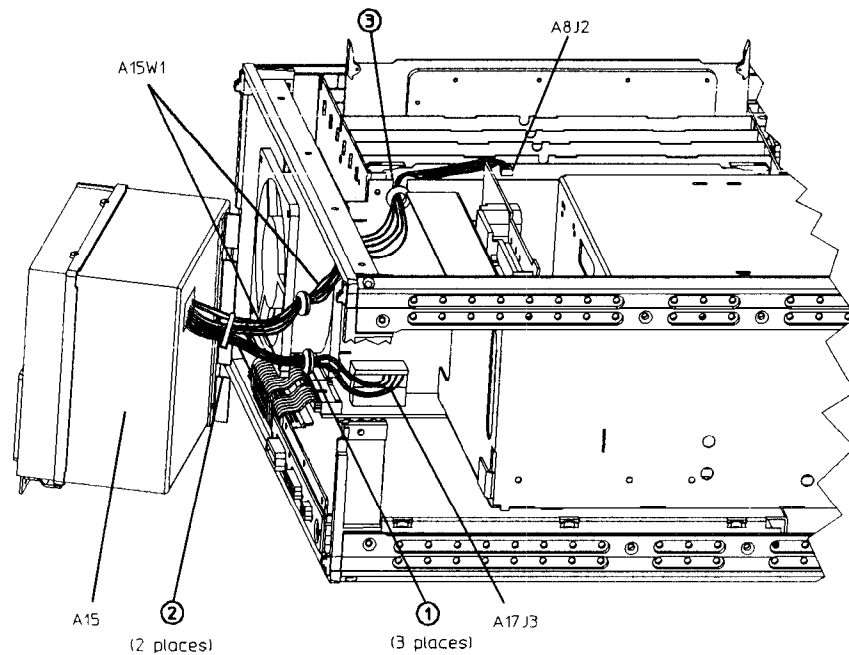
Figure l-6. Rear Panel: Standard Instrument
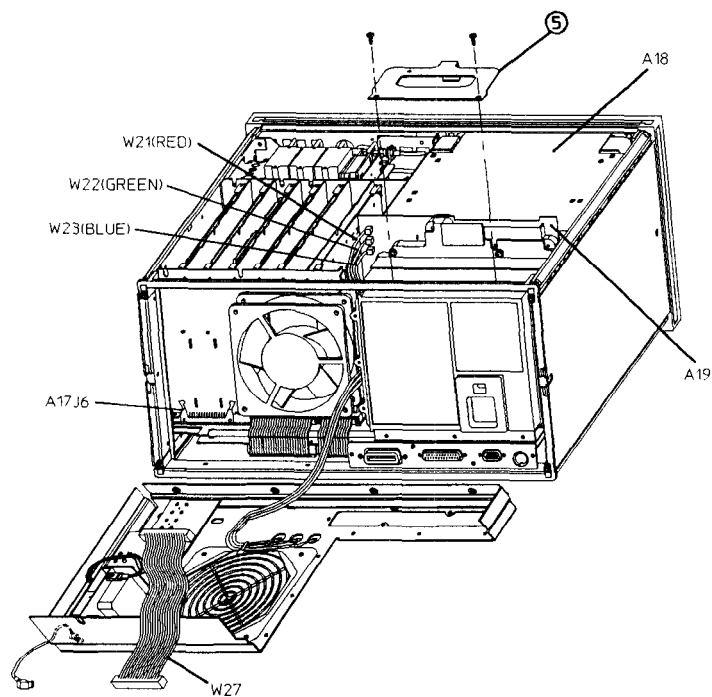
sg6117da

Figure l-7. Rear Panel: Option 011 Instrument

Figure 1-8. Preregulator: All Instruments

Step 2: Verify the Power Supply Serial Number

Find the power supply serial number, located on the underside of the preregulator. If the serial number is lower than 53224159, it is necessary to modify the power supply by continuing with Step 3.

Note	If you have determined that it is not necessary to modify the power supply, reassemble the preregulator into the analyzer by reversing the order of Step 1. Next, return to "Remove the A9 CPU Board," located earlier in this document.

Step 3: Modify the Power Supply

Tools Required

■ #2 POZIDRIV screwdriver

■ 5/16-inch open-end torque wrench (set to 21 in-lb)

■ soldering equipment

■ ESD (electrostatic discharge) grounding wrist strap

Removal and Modification

1. Disconnect the wire bundle (A15W1) from A8J2 and A17J3. Refer to Figure 1-8.

2. Remove the four large screws and lock-washers from the housing of the preregulator. Separate the preregulator housing, being careful not to break the white plastic line switch push rod (HP 08753-40002). Refer to Figure 1-9.

3. Disconnect the J1 and J2 connectors from the Pre Reg In board

4. Remove the four standoffs from the Pre Reg In board (HP 08753-60215). Refer to Figure 1-10.

5. Locate the two spade connectors on the receptacle for the AC power cable. Note that the polarity of each connector is distinguished by a color-coded wire. Record the correct polarity for each spade connector and then disconnect them.

6. Remove the Pre Reg In board from the housing and replace C7, using the 220 μF, 50 V electrolytic capacitor provided in the Upgrade Kit. Refer to Figure 1-11.
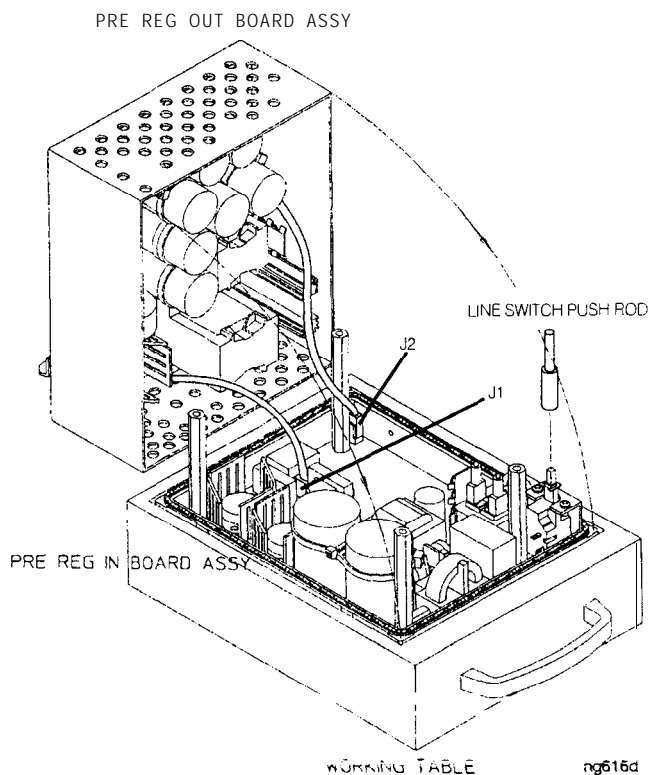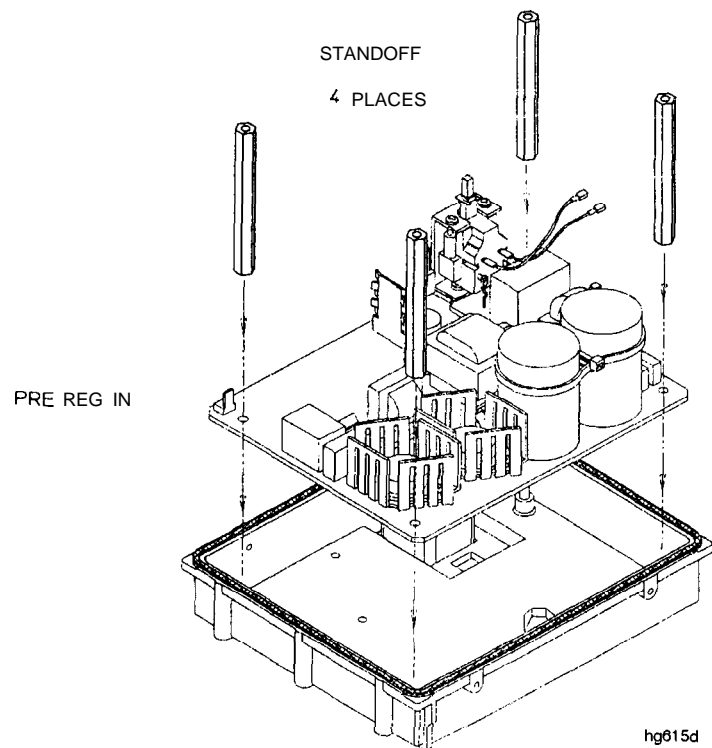

Figure 1-9. Preregulator Assembly: All Instruments

Figure l-10. Pre Reg In Board with Standoffs: All Instruments
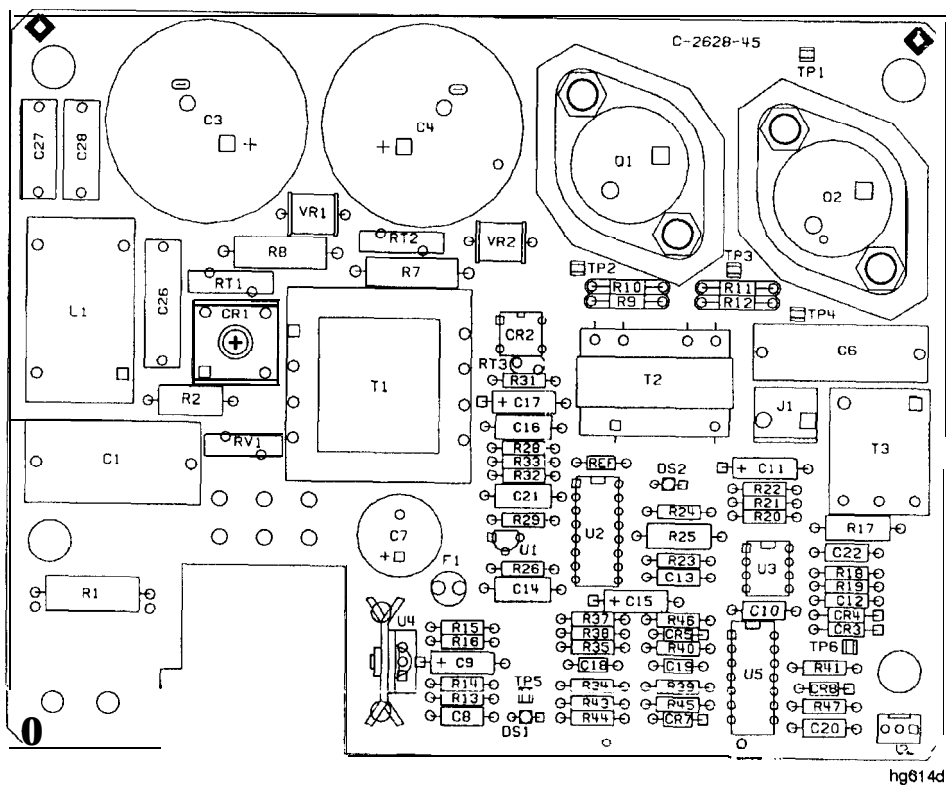
Figure l-11. Pre Reg In Board: All Instruments

Replacement

1. Reverse the order of the removal procedure.

Note	When reassembling the preregulator housing, be sure that the J1 and J2 connector wires are made to fit into the area of U2, U3, and U5.

Step 4: Reassemble the Preregulator into the Analyzer

To reassemble the preregulator into the analyzer, reverse the order of the removal procedure of Step 1. Next, return to "Remove the A9 CPU Board," located earlier in this document.

Firmware History

Firmware Revision 7.10 (includes all features of revisions 6.14 and 6.12)

Firmware Enhancements and Features

1. A new IF bandwidth filter setting of 6000 Hz can now be selected in addition to the previously available settings of 10, 30, 100, 300, 1000, 3000, and 3700 Hz.

2. Swept list mode, a new list frequency sweep mode, takes data while sweeping through the defined frequency points, increasing throughput by up to 6 times over a stepped sweep. In addition, this mode allows the test port power and IF bandwidth to be set independently for each segment that is defined.

3. New HP-IB commands:

HP-IB Cmd	**Description**
LISIFBW<**ON|OFF**>	Enables/disables the IFBW setting for a list-frequency table in swept list mode.
LISPWRM<**ON|OFF**>	Enables/disables the power setting for a list-frequency table in swept list mode.
LISTTYPE<**LSTP|LSWP**>	Selects either the stepped list mode or the swept list mode to use with a list-frequency table.
SEGIFBW[D]	Sets the IFBW for the active segment of a list-frequency table in swept list mode.
SEGPOWER[D]	Sets the power for the active segment of a list-frequency table in swept list mode.

Firmware Revision 6.14 (includes all features of revision 6.12)

Firmware Enhancements and Features

1. A major improvement has been made in disk writes for the CITIfile and S2P (Touchstone) ASCII formats.

2. Error numbers (error table) are now synchronized with all revisions.

3. Data files with S2P now have suffixes dependent on the channel number (Sl or S2).

4. In operating parameters pages, the specific model number has been replaced with the word ANALYZER.

5. Calibration kit labels under the SELECT CAL KIT menu now include the HP calibration kit most commonly associated with that connector geometry.

6. Single parameter, linear magnitude marker display format now shows in engineering units (autoscales to $U, mU, \mu U$, etc.).

7. The DEFINE STANDARD menu for the selection of calibration standard "type" has been modified.

Firmware Problems Fixed

1. Fixed the problem experienced with downloading cal coefficients using INPUCALC when the number of coefficients in the current I-state does not match the download number of points.

2. Fixed the slow HP-IB access to the internal disk.

3. Fixed the inadvertent test set switching by programming the test port on each sweep.

4. Fixed the sampler correction phase error experienced when measuring B/R with an IF bandwidth setting of 3700 Hz.

5. Option 011, HP 85047A Test Set: fixed the unwanted activation of the doubler during attenuator changes.

Firmware Revision 6.12

Note	To make sure you have all of the information on firmware revision 6.12 and previous firmware changes, verify that the print date of your manual set is July 1997 or later. If your manual set has an earlier print date, it lacks a full explanation of all of your current analyzer features. For part number information used in ordering new manuals, refer to the section "Information on Manuals," located in the User's *Guide Supplement for Option 000*.

Firmware Enhancements and Features

1. There are now 5 markers per channel (previously 4 per channel). The MARKER FCTN menu has been revamped accordingly.

2. Calibration features, such as the softkey DO BOTH FWD & REV in Full 2-Port or TRL calibration, are improved and more user friendly. It is easier to modify or create a TRL cal kit because separate TRL class entries are now allowed. HP-IB commands are like those for the HP 8510 Network Analyzer.

3. Minor improvements have been made to the user interface for disk operations. The file last selected on the disk directory page is remembered when the user selects SAVE/RECALL. If the user tries to save a file to the internal disk drive when the disk has been removed, the internal disk drive remains the selected drive.

4. Waveguide delay can now be selected by pressing (SCALE REF) ELECTRICAL DELAY .

5. The dump-graphics feature, previously added as a carry-over from the 8720C, can be selected by pressing (SYSTEM) SERVICE MENU TEST OPTIONS DUMP GRAPH . This feature can be toggled between on and off, which enables/disables the dumping of the graphical output during the System Verification service tests (SYS VER TESTS).

6. The SELL (set learn string revision) command has been updated to work with post 5.00 revisions. The current HP 875x can now generate and receive instrument learn strings from all the previous shipment releases. Disk compatibility between the various HP 8753 revisions and the current revision is now supported.

7. The following are the choices from the new CONFIGURE menu, selected by pressing (SYSTEM] CONFIGURE :

   ■ TESTSET SW Toggles testset switching between continuous and hold.

   . RAW OFFSET Toggles attenuator and sampler cal offsets on or off.

   . SPUR AVOID Toggles spur avoidance on or off.

8. The capability to store S-parameter data to component data files using the "Touchstone" format (S2P) has been added.

9. A new IF bandwidth filter setting of 3700 Hz has been added.

10. The individual power ranges will now allow 3 dB over and under the values shown with each power range selection.

11. Enhancements have been made to the file naming capability for files generated by the instrument during execution of a sequence. The new menu can be found by pressing (SAVE/RECALL) **FILE UTILITIES SEQUENCE FILENAMING**. The TITLE FILE menu also gained a new softkey to support the inclusion of the sequence loop counter in the filenames.

12. A method of external calibration, Take 4 mode, provides a remote-only command that directs the network analyzer to take a single "group" or sweep (consisting of a forward and reverse sweep) and to collect the raw data for all 4 S-parameters. The user can then extract the raw data for the S-parameters (or the pre-raw data, which has not had sampler correction nor attenuator offsets applied) and perform the error correction in an external computer (using previously extracted calibration arrays).

13. A new feature, Adapter Removal, is designed for cases where the device under test is "non-insertable" and thus an adapter is required. This feature requires two full 2-port calibrations, one for each port, and subsequently provides a calibration for the test device with the effects of the adapter removed. The menu is found by pressing (CAL) **MORE** ADAPTER REMOVAL .

14. New HP-IB commands:

HP-IB Cmd	Description
IFBW3700	Set IF Bandwidth to 3700 Hz.
SWPSTART	Sweep start (Take4).
RAWOFFS<ON|OFF>	Raw Offsets (Take4).
TAKE4<ON|OFF>	lake4 mode On/off.
SM8<ON|OFF>	Spur Avoidance On/off.
OUTPPREx	Output "pre-raw" arrays, $x = 1$-4 (Take4).
TITP	Title Plot to Disk file.
TITF0	Title the save state filename, only in sequence mode.
ADAP1[D]	Set adapter electrical delay.
ADPTCOAX	Set adapter to COAXial.
ADPTWAVE	Set adapter to WAVEguide.
MODS	Compute new cal set using adapter removal.
CALSPORT1	Recall cal set associated with Port 1 for adapter removal.
CALSPORT2	Recall cal set associated with Port 2 for adapter removal.

15. Additional Limit Line and Data Point Functions:

These HPIB-only functions were previously available only with option K96, but have now been added to the standard firmware set. Example programs using these functions are available in the Programmer's Guides with a print date of July 1997 or later.

HP-IB Cmd	Description
MINMAX	Enable/disable **min/max** recording per segment. Min and max values are recorded per limit segment.
OUTPAMAX	Output max values for all limit line segments.
OUTPAMIN	Output min values for all limit line segments.
OUTPSEGAM	Output limit test **min/max** all segments. Output the segment number, max stimulus, max value, min stimulus, min value for all active segments.
OUTPSEGM[n]	Output limit test **min/max** for a specified segment.
SELSEG[n]	Select segment number for the OUTPSEGF and OUTPSEGM commands to report on.
SELMAXPT	Select the last point number in the range of points that the OUTPDATR command will report.
SELMINPT	Select the first point number in the range of points that the OUTPDATR command will report.
SELPT[n]	Select point number that OUTPDATP will report.
OUTPDATP	Output trace data indexed by point (see SELPT).
OUTPDATR	Output trace data for range of points (see SELMINPT, SELMAXPT).
OUTPLIM1	Output status of limit test for channel 1.
OUTPLIM2	Output status of limit test for channel 2.
SELSEG[n]	Select segment number for the OUTPSEGF and OUTPSEGM commands to report on.
OUTPSEGAF	Output the segment number and its status for all active segments.
OUTPSEGF	Output limit test status per segment.
OUTPFAIP	Output Fail Point: this command is similar to OUTPLIMF except that it reports the number of failures first, followed by the stimulus and trace values for each failed point in the test (note: use command LIMITEST<ON> to function properly).

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