Installation Note

Agilent Technologies ESG Series Signal Generators (A Models) CPU/Motherboard (Q501 relocated to Chassis) Replacement Kit: Part Number E4400-60238

Part Number E4400-90388
Printed in USA September 2000 Supersedes: July 2000

Notice

The information contained in this document is subject to change without notice.

Agilent Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

ESG Series Signal Generators: Part Number E4400-60238

Product Affected:.	Agilent E4400A, E4420A, E4421A, E4422A, E4430A, E4431A, E4432A and E4433A Series Signal Generators.
Serial Numbers:	All
Options:	All
To Be Performed By:	(X) Agilent Technologies Service Center ( ) Personnel Qualified by Agilent Technologies ( ) Customer
Estimated Installation Time:	2 hours
Estimated Verification Time:	8 hours

Introduction

This kit enables you to install a replacement CPU/Motherboard and relocate Q501 onto the signal generator instrument chassis. The relocation of Q501 to the signal generator chassis eliminates the mechanical stress on this component. You will perform the following major steps:

- check instrument functionality
- disassemble the instrument - external shell, rear panel, PC boards and cables
- remove Q501 and the CPU/Motherboard
- install the new CPU/Motherboard
- install Q501 onto the signal generator's chassis
- connect Q501 to the CPU/Motherboard
- reassemble, verify, and calibrate the signal generator

Installation Kit Parts List

Item	Quantity	Description	Part Number
1	1	CPU/Motherboard	E4400-60001[1]
2	1	Q501 Assembly	E4400-60221
3	1	Q501 Plate with PEM	E4400-00040
4	1	Q501 Plate without PEM	E4400-00041
5	1	Insulator Bushing	0340-1162
6	1	Screw 3MMX10	0515-0374
7	1	Installation Note	E4400-90388

[1]Not available as a stand-alone

Tools Required

- ❑ Ratchet 21 in-lb
- ❑ Hand Torque Driver 9 in-lb
- ❑ Hand Torque Driver 6 in-lb
- ❑ Torxdriver T-10
- ❑ Torxdriver T-15
- ❑ 5/8 Socket
- ❑ 3/16 Socket
- ❑ 9/32 Socket

Safety Considerations

WARNING	**Before you disassemble the instrument, turn the power switch off and disconnect the line cord. Failure to unplug the Signal Generator 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.

Check Instrument Functionality

The functionality check verifies that the signal generator powers up and that the internal instrument check identifies no errors. The internal check returns an error message if a problem is detected.

1. Turn on power to the signal generator. Let the instrument warm up for at least five minutes.
2. Cycle the power to the signal generator. The green LED should light, and the instrument will perform a check.
3. When the display illuminates, check to see if the ERR annunciator is on.

NOTE For instruments with Option 1E5, the error message `ERROR 514, Reference Oven Cold` occurs whenever the signal generator is first connected to the AC line power. This error cannot be cleared from the error queue until the internal reference has warmed up (approximately five minutes).

---

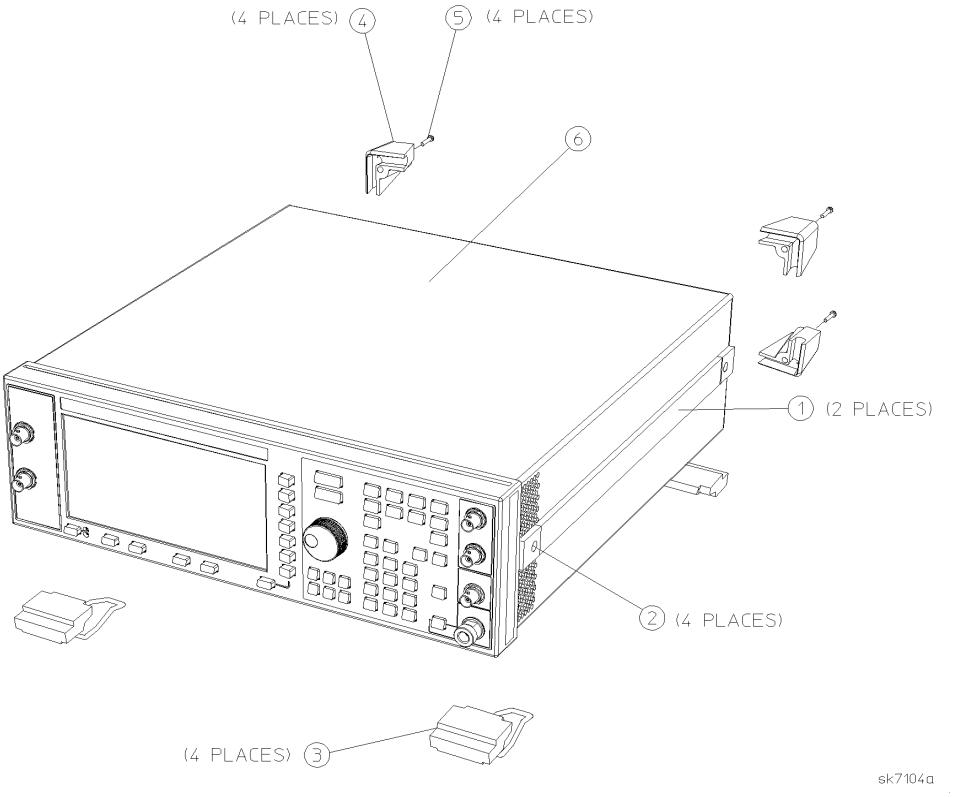
4. If the ERR annunciator is displayed, review the error messages in the queue by pressing **Utility > Error Info**. The first error message in the queue will be shown in the text area of the display. Refer to the service guide for information about the error message.

   If there is more than one error message (each message will be designated as 1 of n, 2 of n, etc.), continue pressing the **View Next Error Message** softkey until you have seen all of the messages.
5. When you have resolved all of the error messages, press **Clear Error Queue(s)** to delete the messages, then restart this procedure at step 2.

Remove the Signal Generator Covers

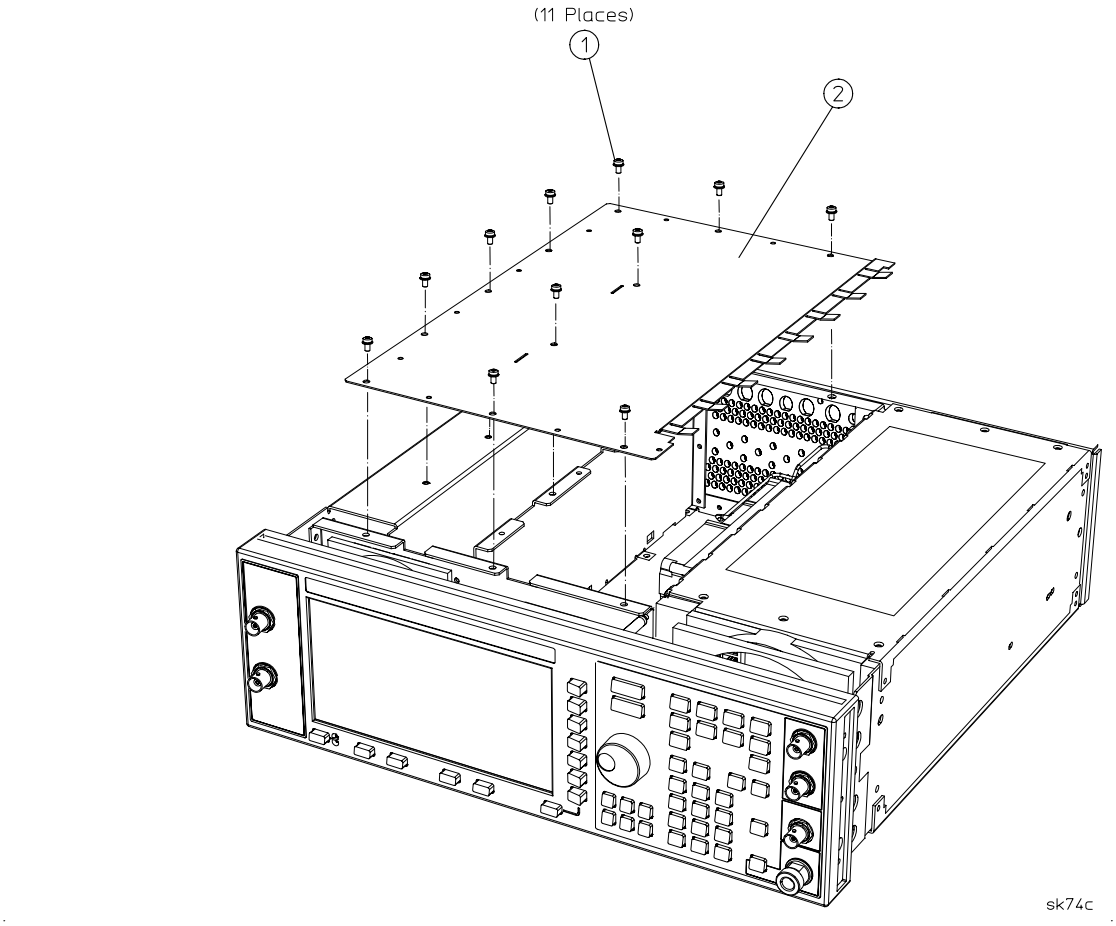
1. Turn the signal generator's power switch off and disconnect the line cord.
2. Refer to Figure 1. Remove the two strap handles (item 1) from each side of the signal generator by loosening the two handle screws (item 2).
3. Remove the four bottom feet (item 3).
4. Remove the four rear feet (item 4) from the signal generator by removing the four screws (item 5) that secure them.
5. Slide the signal generator cover (item 6) off the back of the signal generator.

Figure 1 Instrument Cover and Associated Parts



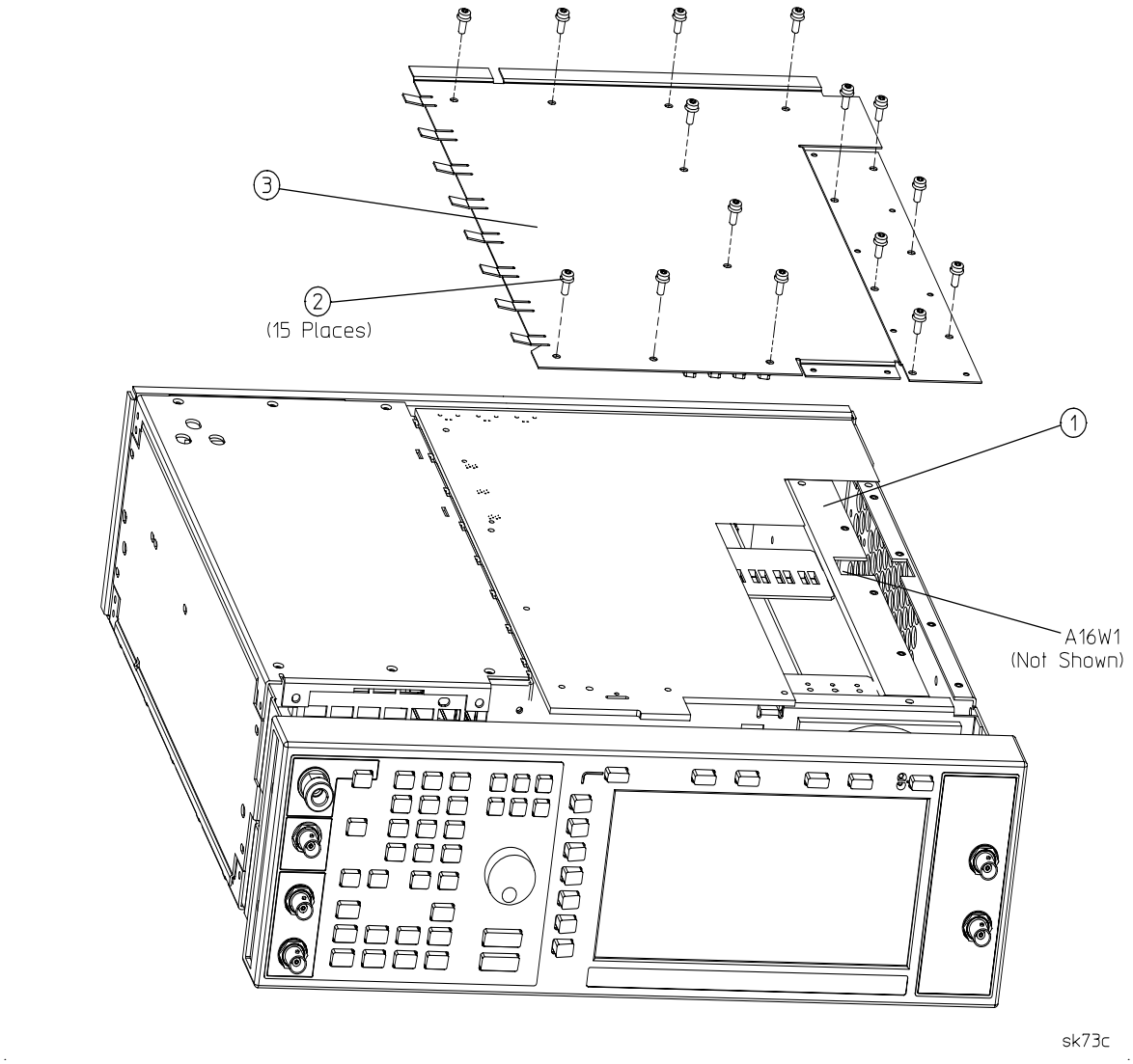
6. Refer to Figure 2. Remove the top chassis cover (item 2) by removing the 11 screws (item 1) that secure it.

Figure 2 Top Chassis Cover Removal



7. Refer to Figure 3. Turn the signal generator over and remove the bottom chassis cover (item 3) by removing the 15 bottom chassis cover screws (item 2).

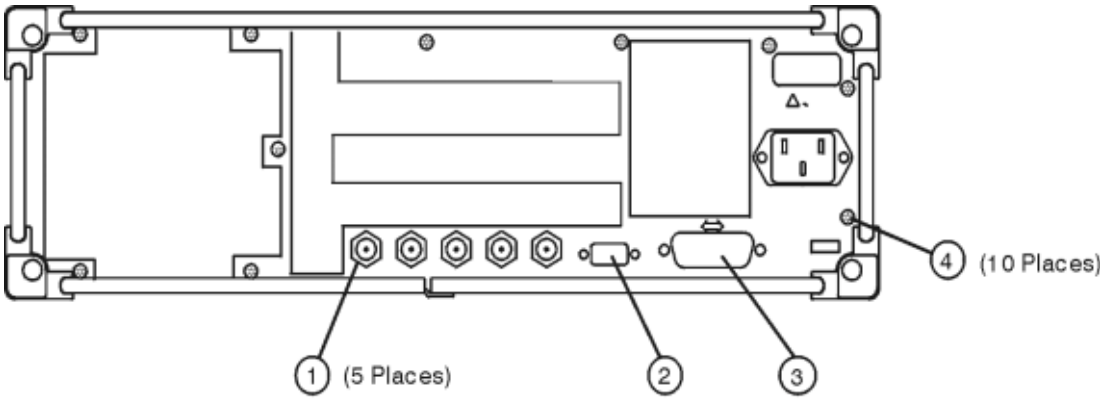
Figure 3 Bottom Chassis Cover Removal



Removing the Rear Panel

1. Refer to Figure 4. Remove the nuts and washers securing the five BNC connectors (item 1) at the base of the rear panel.
2. Remove the hex screws and washers that secure the AUXILIARY INTERFACE (item 2) and GPIB connectors (item 3) to the rear panel.
3. Remove the 10 screws (item 4) that secure the rear panel to the signal generator chassis.
4. Pull the rear panel assembly away from the signal generator chassis.

Figure 4 Rear Panel View

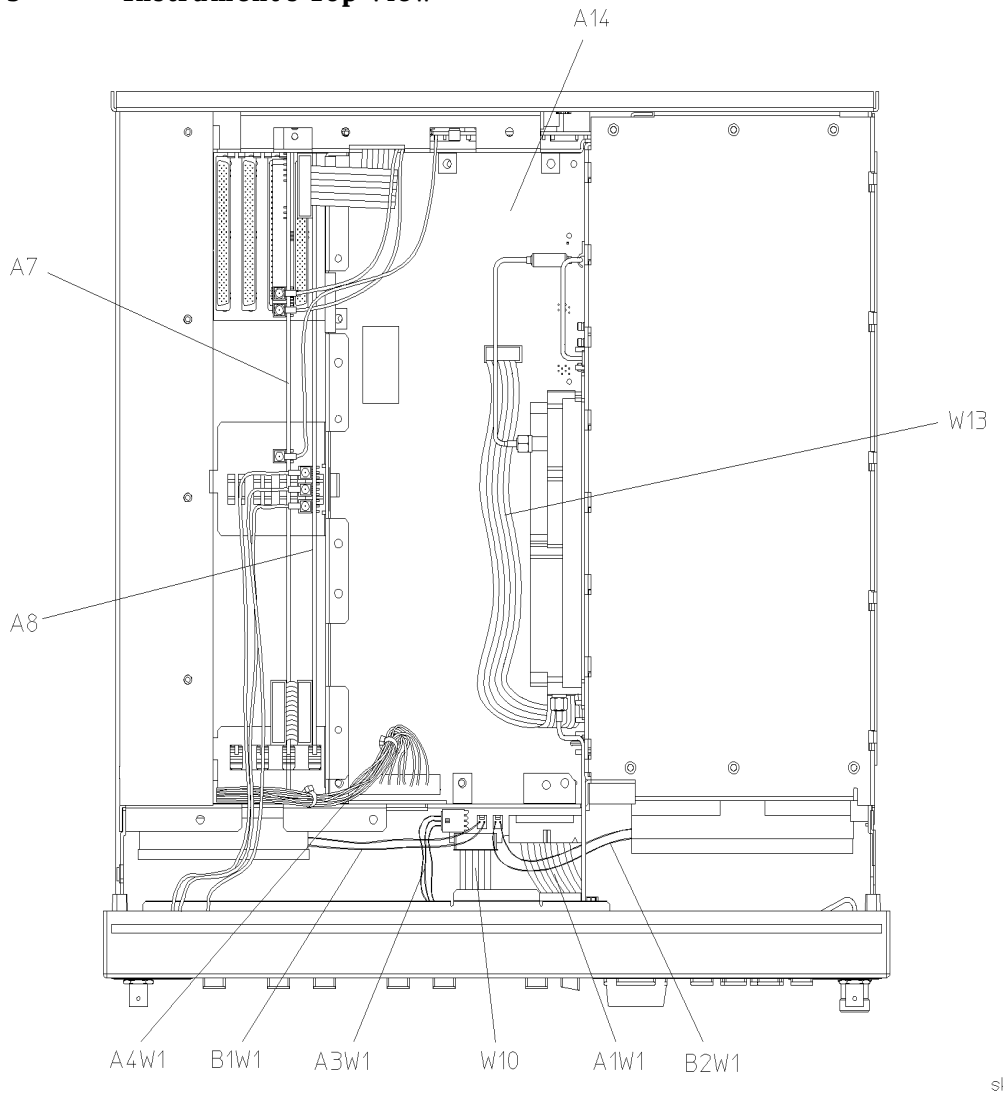


sk778a

Remove the PC Boards and Cables

1. Refer to Figure 5. If the signal generator has Option 1EH, remove the Baseband Generator board (A7).
2. If the signal generator has Option UN3/4, remove the Baseband Generator board (A7) and the Pattern Ram board (A8).

Figure 5 Instrument's Top View



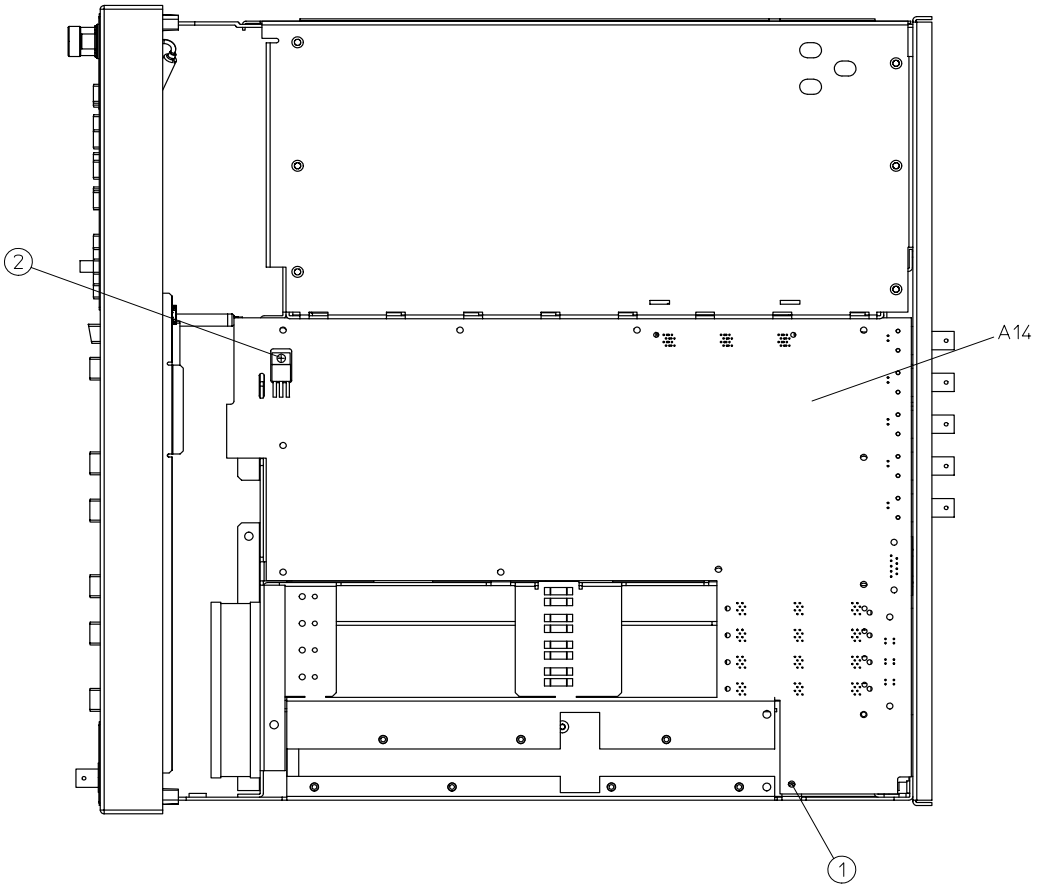
Remove the CPU/Motherboard

1. Refer to Figure 5. Disconnect A1W1, A3W1, B1W1, and B2W1 from the CPU/Motherboard (A14).
2. Disconnect W13 and A4W1 from the CPU/Motherboard (A14).

Removing Transistor Q501 and the CPU/Motherboard

1. Refer to Figure 6. The transistor, Q501, is located on the CPU/Motherboard (A14). Remove the screw (item 1) securing the CPU/Motherboard to the signal generator chassis.
2. Remove the Q501 transistor screw (item 2). An insulated bushing is between the CPU/Motherboard and the signal generator chassis.
3. Remove the old CPU/Motherboard.

Figure 6 Signal Generator bottom view

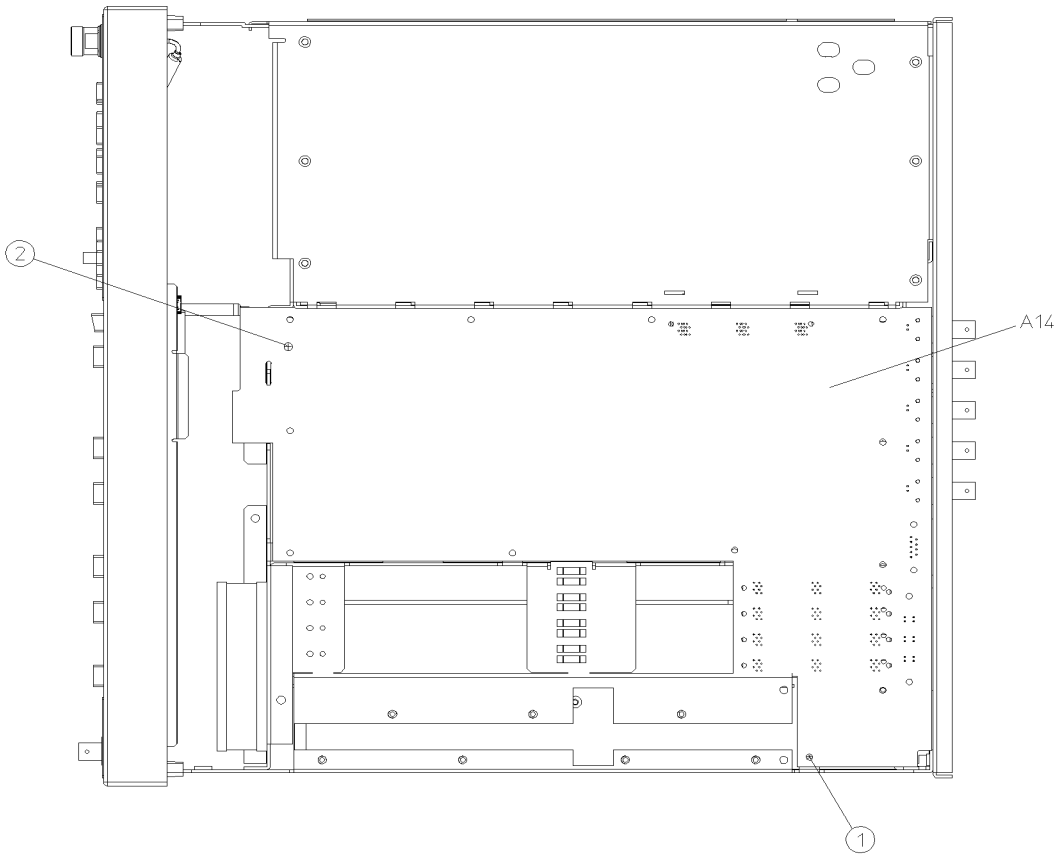


Installing the New CPU/Motherboard

NOTE When installing the new motherboard, remember to insert the tab and daughterboard connector into the corresponding slots of the signal generator chassis before securing it with the screws.

1. Refer to Figure 7. Secure the new CPU/Motherboard onto the signal generator chassis by installing a screw into the hole adjacent to item 2.

Figure 7 Signal Generator with New CPU/Motherboard



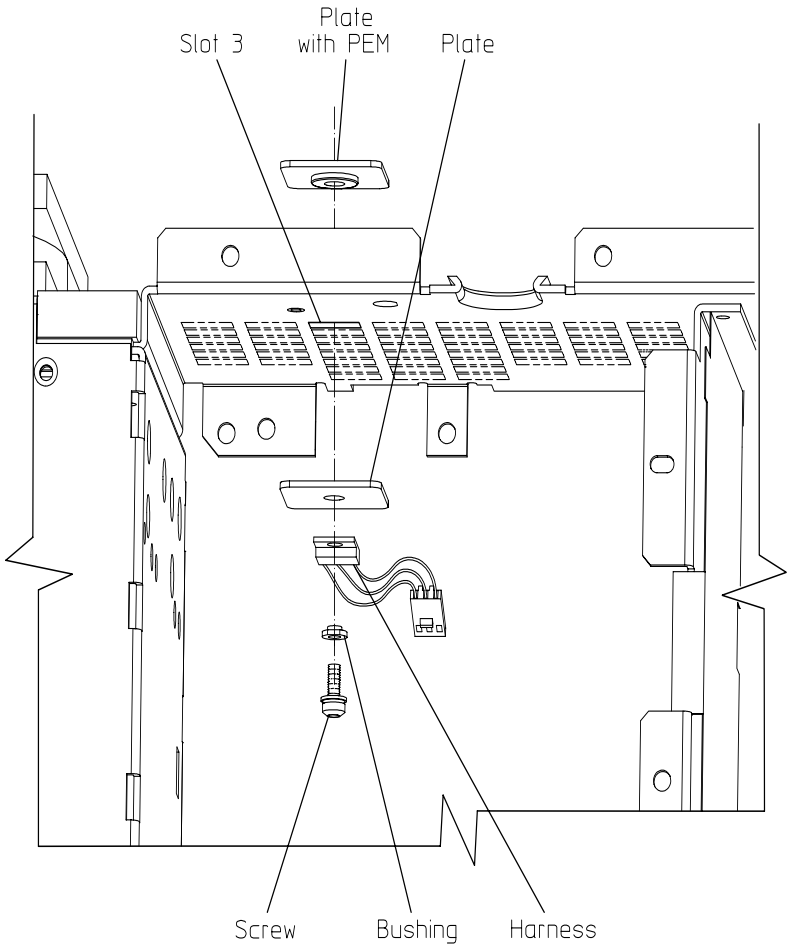
2. Secure the CPU/Motherboard by installing the screw (item 1) into the chassis. Torque the screw to 9 in-lbs.

Installing Q501 on the Signal Generator Chassis

NOTE Q501 is attached to the harness.

1. Refer to Figure 8. Place the plate (with pem nut) through the top opening in slot 3.
2. Hold Q501, the inner plate and the outer plate (with pem nut) and place the bushing against Q501.
3. Insert the screw through the bushing, Q501, and the inner and outer plate. Insure the plates and Q501 are properly seated. Install the Q501 assembly and torque the screw to 9 in-lbs.

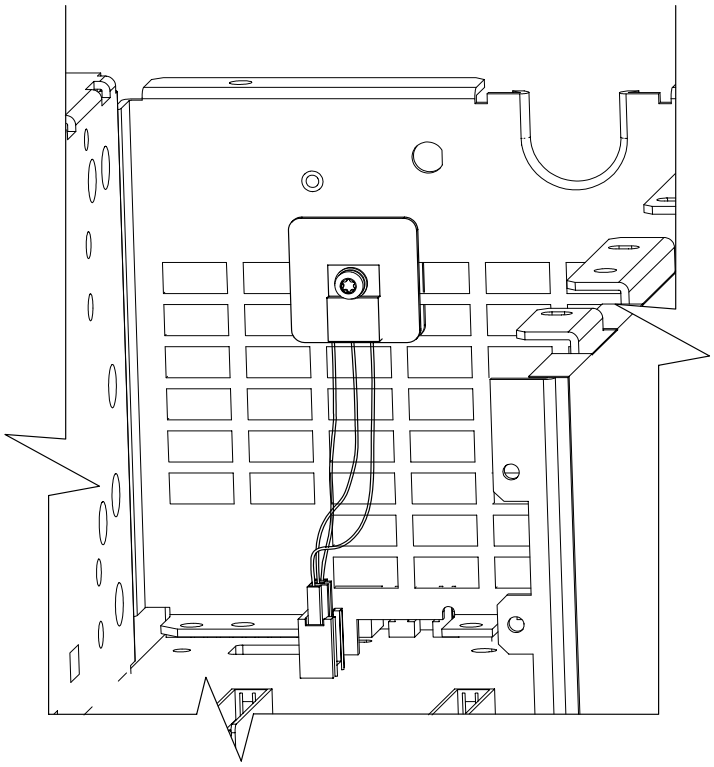
Figure 8 Relocation of Q501 on the signal generator chassis



Connect Q501 to CPU/Motherboard

1. Refer to Figure 9. Connect the Q501 assembly wiring harness connector to the CPU/Motherboard (A14).
2. Insure that the harness is properly seated.

Figure 9 Q501 Wiring Harness to CPU/Motherboard



pk716b

Reassemble the Signal Generator

1. Reconnect all cables to the CPU/Motherboard. Refer to the service guide if necessary. Verify that all cables are correctly reconnected.
2. Reinstall the rear panel to the signal generator. Reverse the rear panel procedure to attach the rear panel. Torque the screws and nuts to the following:
   - Torque all T-10 TORX screws to 9 in-lbs.
   - Torque the AUXILIARY INTERFACE hex screws to 6 in-lbs.
   - Torque the GPIB hex screws to 9 in-lbs.
   - Torque the five BNC connector nuts to 21 in-lbs.
3. Reinstall the signal generator's bottom cover with the 15 screws. Torque to 9 in-lbs.
4. Reinstall the Baseband Option 1EH (A7) or Option UN3/4 (A7 & A8) if applicable.
5. Reinstall the signal generator's cover-top with the 11 screws. Torque to 9 in-lbs.
6. Slide the signal generator top cover back onto the signal generator.
7. Attach the rear feet, the four bottom feet, and the two strap handles to the signal generator's cover. Torque the strap-handle screws to 21 in-lbs.

Verification of Signal Generator Operation

1. Turn the signal generator's power switch on. Let the signal generator warm up for five minutes.
2. Press the front panel **PRESET** button to reset the signal generator.
3. Review the **"Check Instrument Functionality**" on page 5.

Instrument Calibration

Refer to the "Post-Repair Procedures" chapter of the service guide to determine which performance tests and adjustments are required to calibrate your signal generator. You will then need to refer to the Calibration guide for performance tests and adjustment procedures.