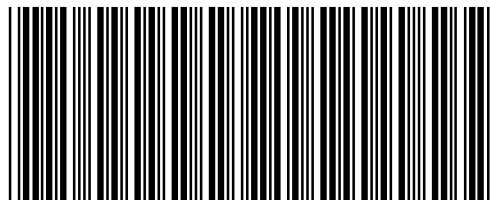# Installation Note

**Agilent Technologies ESG Vector Signal Generator
Upgrade Kit for Option 002
(Internal Baseband Generator with 32 Msample Memory)
Kit Part Number E4400-60598**

⁛ Agilent Technologies

E4400-90550

Notice

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ESG Vector Signal Generator Upgrade Kit for Option 002 (Internal Baseband Generator with 32 Msample Memory)
Kit Part Number E4400-60598

Product Affected:	E4438C
Serial Numbers:	All
Options:	
To Be Performed By:	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent Technologies ( ) Customer
Estimated Installation Time:	0.5 hours
Estimated Verification Time:	1.0 hours

Introduction

This upgrade kit adds the Internal Baseband Generator with 32 Msample Memory to the E4438C.

NOTE   This upgrade kit contains hardware for both the standard front panel connector setup and Option 1EM rear panel connector setup.

Installation includes the following major steps:

1. Check Functionality.
2. Remove the instrument covers.
3. Install the A7 Internal Baseband Generator board.
4. Install new firmware.
5. Activate Option 002.
6. Re-assemble the signal generator.
7. Calibrate the signal generator.

Installation Kit Parts List

Item	Quantity	Description	Part Number
1	1	Installation Note	E4400-90550
2	1	ESG-C Firmware Upgrade Kit	E4400-60597
3	1	Option 002 Label	7121-1232
4	1	A7 Internal Baseband Generator 32 Msample Memory	E4400-60501
5	1	W10 Ribbon Cable	8121-0679
For Non Option 1EM signal generators only			
6	1	Cable-BNC W12	8121-0643
7	1	Hex Nut 15/21-32	2950-0035
8	1	Washer 0.4721D	2190-0102
For Option 1EM signal generators only			
9	1	Cable-SMB W78	8121-0655
10	1	Hex Nut SMB	2950-0078
11	1	Washer SMB	2190-0124

Tools Required

- TORX T-10 driver
- TORX T-15 driver
- TORX T-20 driver
- Needle-Nose pliers
- 1/4 socket
- 9/16 socket
- Ratchet 21 in-lb.
- Hand Torque wrench 9 in-lb.

Safety Considerations

WARNING	**Before you disassemble the instrument, turn the power switch off and unplug the signal generator. 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.

Checking Signal Generator Functionality

Use the following procedure to confirm that the signal generator powers up and that the internal check identifies no errors. The internal check evaluates the operation of the signal generator and returns an error message if it detects a problem.

NOTE   When signal generators with Option 1E5 are first connected to ac line power, the error message ERROR 514, Reference Oven Cold occurs which causes both the OVEN COLD annunciator and the ERR annunciator to turn on.

After approximately five minutes, the OVEN COLD annunciator automatically clears, but the ERR annunciator remains on until all errors are cleared from the error queue.

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1. Turn on the signal generator and let it warm up for at least five minutes.

2. Run the instrument self-test by pressing **Utility** > **Instrument Info/Help Mode** > **Self Test** > **Run Complete Self Test**. Upon completion a summary of the self-test will be displayed. Use the service guide to troubleshoot any failures detected by the test.

NOTE   Some circuits may require up to 50 minutes to warm up before passing the self-test. If self-tests continue to fail after 50 minutes of warm up, troubleshoot the instrument.

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3. Check to see if the ERR annunciator is on.

   - If the ERR annunciator is on, review the error messages in the error queue by pressing **Utility** > **Error Info** > **View Next Error Message**. The first error message in the error queue appears in the display text area. (Refer to the signal generator error messages document for information about each error message.)

     After resolving all problems causing errors, press **Clear Error Queue(s)**.

   - If the ERR annunciator is off, the signal generator functionality check has passed.

Removing Outer and Inner Covers

Tools Required

- T-10 driver
- T-15 driver
- T-20 driver

Removing the Outer Cover
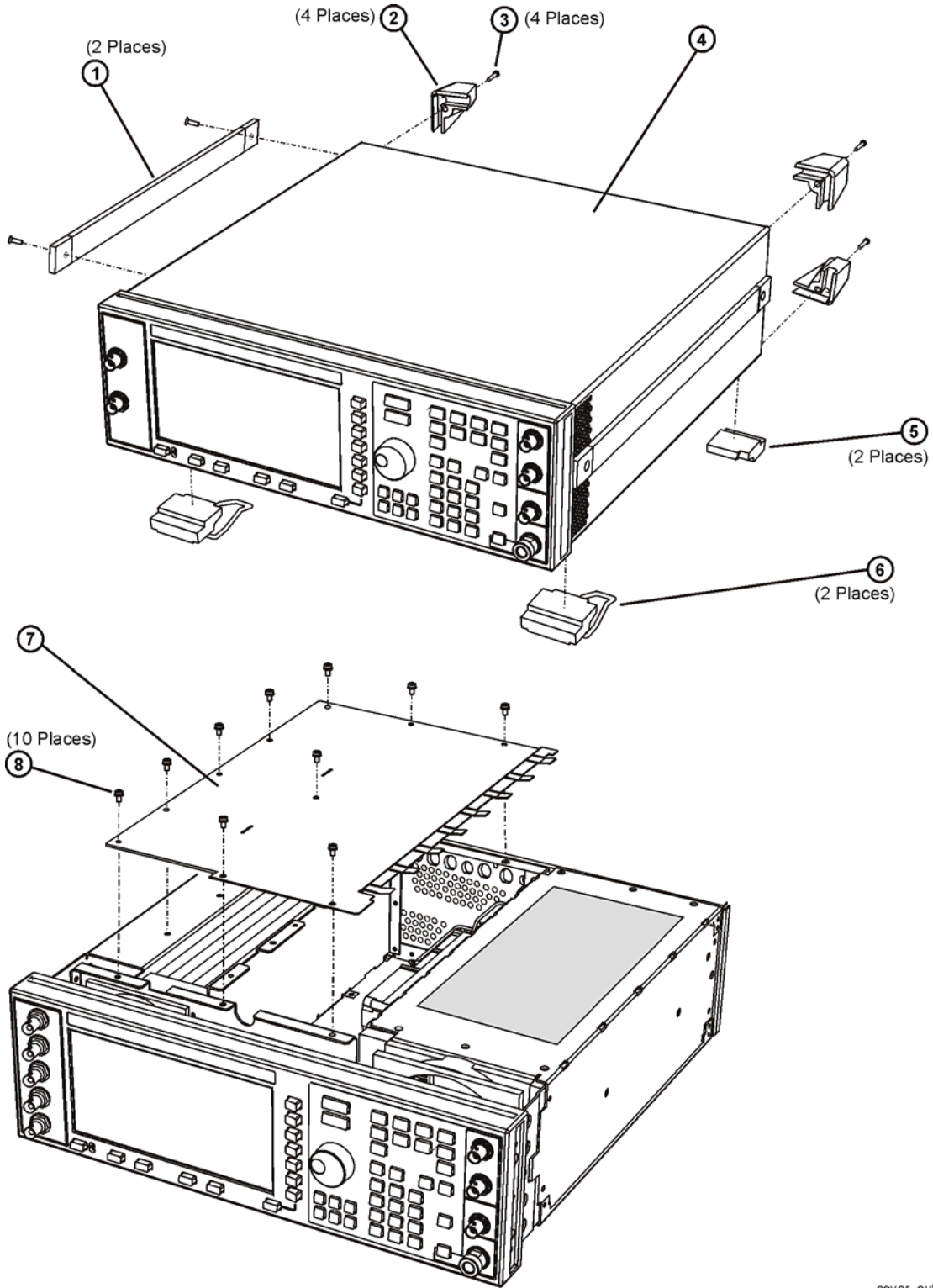
Refer to Figure 1.

1. Disconnect the power cord.
2. Using a T-20 driver, remove the two strap handles (1) by loosening the screws.
3. Using a T-15 driver, remove the center screws (3) on the four rear-panel feet (2).
4. Remove the four bottom feet (5) and (6) from the cover by pushing and pulling the tab.
5. Slide the outer cover (4) off the frame.

Removing the Inner Top Cover
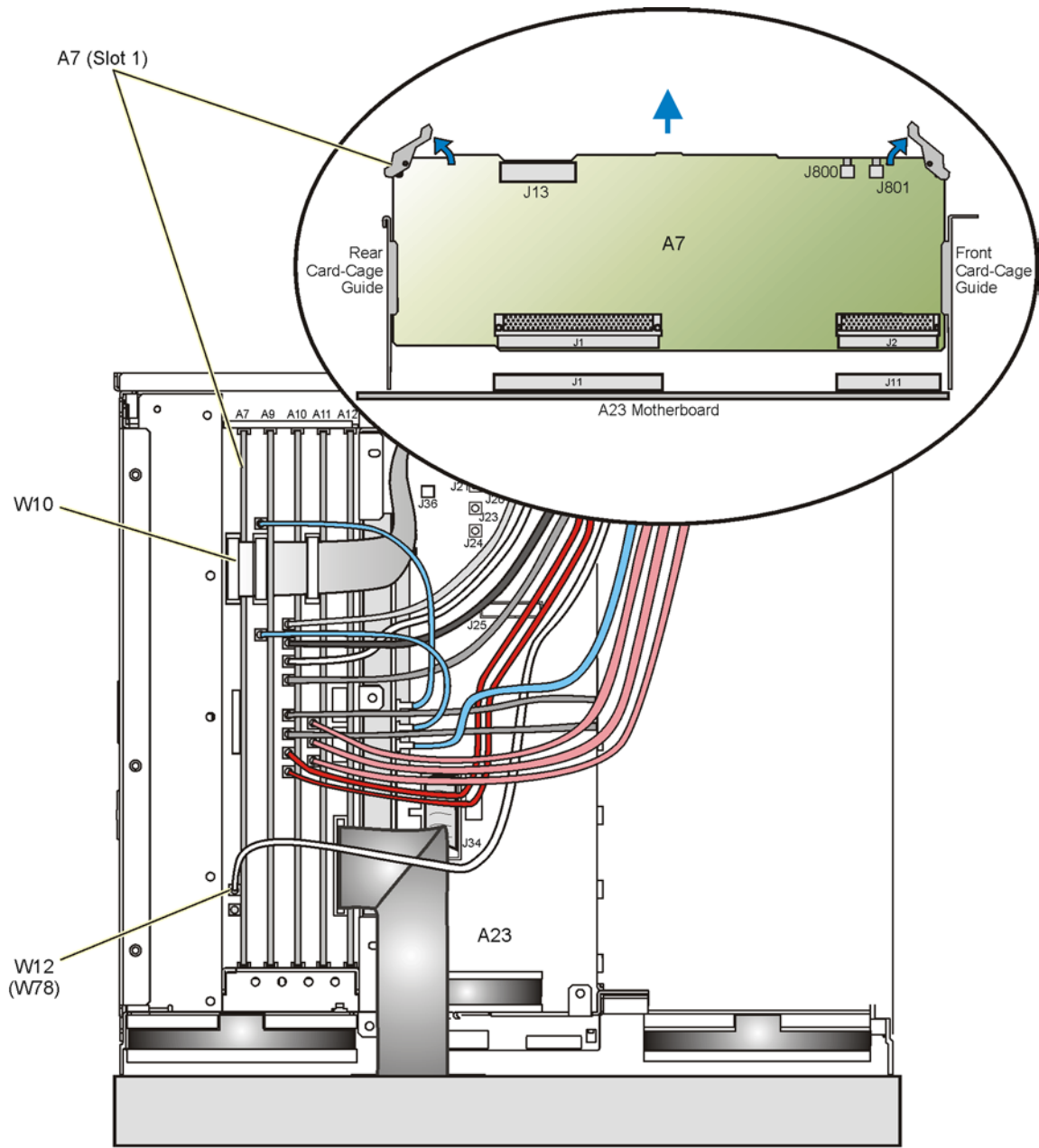
Refer to Figure 1.

1. Using a T-10 driver, remove the ten screws (8) from the inner-top cover (7).
2. Remove the inner-top cover.

Figure 1   Outer and Inner Cover Removal

cover_out&ir

Figure 2

A7 (Slot 1)

J13

J800 J801

Rear
Card-Cage
Guide

A7

Front
Card-Cage
Guide

J1

J2

J1

J11

A23 Motherboard

A7 A9 A10 A11 A12

W10

J36

J27 J26

J23

J24

J25

J34

W12
(W78)

A23

NOTE	Use the following procedure only if the instrument does not include Option 1EM.

Installing the A7 Internal Baseband Generator Board

Refer to Figure 2 for this procedure.

1. Locate Top-SLOT 1.

2. Insert the A7 assembly into the front and rear card cage guides.

3. Install the A7 Assembly onto the A23 motherboard.

4. Install the W12 cable to the rear panel slot labeled "BASEBAND GEN REF IN". Use a lock washer and a hex-nut to secure one end of the cable to the rear panel. Torque to 21 in-lb.

5. Connect the loose end of the W12 cable to A7J800.

6. Connect W10 from A25P2 of the rear panel board to A7J13.

NOTE	Use the following procedure only for instruments with Option 1EM.

Installing the A7 Internal Baseband Generator Board

Refer to Figure 2 for this procedure.

1. Locate Top-SLOT 1.

2. Insert the A7 assembly into the front and rear card cage guides.

3. Install the A7 Assembly onto the A23 motherboard.

4. Install the W78 cable to the rear panel slot labeled "BBG REF IN". Use a lock washer and a hex-nut to secure one end of the cable to the rear panel. Torque to 9 in-lb.

5. Connect the loose end of the W78 cable to A7J800.

6. Connect W10 from A26P2 of the rear panel board to A7J13.

Verifying Proper Installation of Option 002

1. Perform the "Checking Signal Generator Functionality, as described on page 5.

2. Verify that the Baseband Generator self-tests 16xx are included in the list and that all pass.

Installing New Firmware

1. The firmware upgrade kit contains an installation note. Using the installation note, install the new firmware.

2. Perform the verification procedure described in the firmware upgrade installation note.

Re-Assembling the Instrument

Refer to Figure 1.

1. Reinstall the inner and outer instrument covers by reversing the order for removal.

2. Torque all T-10 screws to 9 in-lbs.

3. Torque all T-15 and T-20 screws to 21 in-lbs.

4. Attach the Option 002 label provided to the rear panel, near the original serial number label.

Re-Calibrating the Instrument

Refer to the ESG Vector Signal Generator Service Guide.

1. Turn the instrument on and let it warm up for 30 minutes.

2. Perform the following A7 Baseband Generator adjustments, in the order listed:

   - Self Test
   - I/Q Gain/Offset/Quadrature Calibration
   - I/Q Impairment Calibration

Verifying Instrument Calibration

To ensure proper calibration of the A7 Baseband Generator use the following performance tests, in the order listed:

- Self Test
- Harmonic, Subharmonic, and Nonharmonic Spurious Signals
- Digital Modulation Level Accuracy
- Internal Digital Modulation Quality (Option 402 only)
- Custom I/Q RF Modulation Quality (Option 402 only)
- CDMA Adjacent Channel Power (Not Used with Option UNB or Option 506)
- WCDMA Adjacent Channel Power (Option 400)
- Dual Arbitrary Waveform Generator Check
- GSM Loopback BER Check (Option 300 only)