

# Installation Note

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**Agilent ESG and ESG-D Series Signal Generators  
Add Option 1E5 Upgrade Kit  
Kit Part Number E4400-60032**



Part Number E4400-90111 Supersedes: July 1998

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# Option 1E5 Upgrade Kit

Product Affected: . . . . .	ESG and ESG-D Series Signal Generators
Models Affected: . . . . .	E4400B/BU, E4400BK, E4420B/BU, E4421B/BU, E4422B/BU, E4430B/BU, E4431B/BU, E4432B/BU, E4433B/BU, and E4430BK
Serial Numbers: . . . . .	All
To Be Performed By: . . . . .	( X ) Agilent Technologies Service Center ( X ) Personnel Qualified by Agilent Technologies ( X ) Customer
Estimated Installation Time: . . . . .	1.5 Hours
Estimated Verification Time: . . . . .	4.0 Hours

## Introduction

This kit contains the parts and instructions to replace the standard TCXO reference assembly with the high stability OCXO timebase reference.

## Installation Kit Parts List

**Table 1 Installation Kit E4400-60032 Parts List**

Item	Quantity	Description	Part Number
1	1	OCXO Reference Board, Option 1E5	E4400-60009
2	1	Label, Option 1E5	7120-1232
3	1	ESG and ESG-D Service Support Software	E4400-10006
4	1	Installation Note	E4400-90111

## Tools Required

- T-10 TORX screwdriver
- T-15 TORX screwdriver
- T-8 TORX screwdriver
- Long nose pliers

## Equipment Required

- 33120A Function Generator
- 3458A Digital Voltmeter
- 438A Power Meter
- 8482A Power Sensor
- 8491A/B Option 010 Attenuator
- 8491A/B Option 006 Attenuator
- 8902 Measuring Receiver
- 53131/32A Universal Counter
- 8563A Spectrum Analyzer
- 8663A Signal Generator
- 8904A Function Synthesizer
- MD/DMC-174 Mixer (Frequency 0.001 to 2.8 GHz)
- MD/MDC-164 Mixer (Frequency 0.5 to 9 GHz)
- HP Vectra personal Computer, with:
  - CPU: 386 (or better)
  - Clock: 33 MHz (or better)
  - RAM: 8 Mb (or more)
  - 3.5" Floppy Disk Drive
  - 350 Mb (or more) Hard Drive
  - 16-color VGA Monitor
  - MS Windows 3.X (Microsoft Windows is a registered trademark of Microsoft Corp.)
- HP LaserJet 5L Printer (MS Windows supported)
- 82341C GPIB Interface Card (No substitution allowed)

## Perform the Functionality Check

This procedure verifies that the signal generator powers up and that the internal instrument check identifies no errors. The internal check evaluates the correctness of operation and returns an error message if a problem is detected.

1. Turn power on to the signal generator by pressing the power switch. The green LED will light. Let the instrument warm up for one hour.
2. Cycle the power to the signal generator. The green LED should again be lit and the instrument will perform a check.
3. When the display is lit, check to see if the ERR annunciator is turned on.

4. If the `ERR` annunciator is turned on, review the error messages in the queue by pressing, **Utility > Error Info > View Next Error Message**. 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*), 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 two.

**NOTE**

Once Option 1E5 is installed, `ERROR 514, Reference Oven Cold` will occur whenever the signal generator is first connected to AC line power. The `OVEN COLD` annunciator and the `ERR` annunciator will both turn on. The `OVEN COLD` annunciator will automatically clear after approximately 5 minutes. The error queue cannot be cleared, however, until the `OVEN COLD` annunciator has turned off.

# Installation Procedure

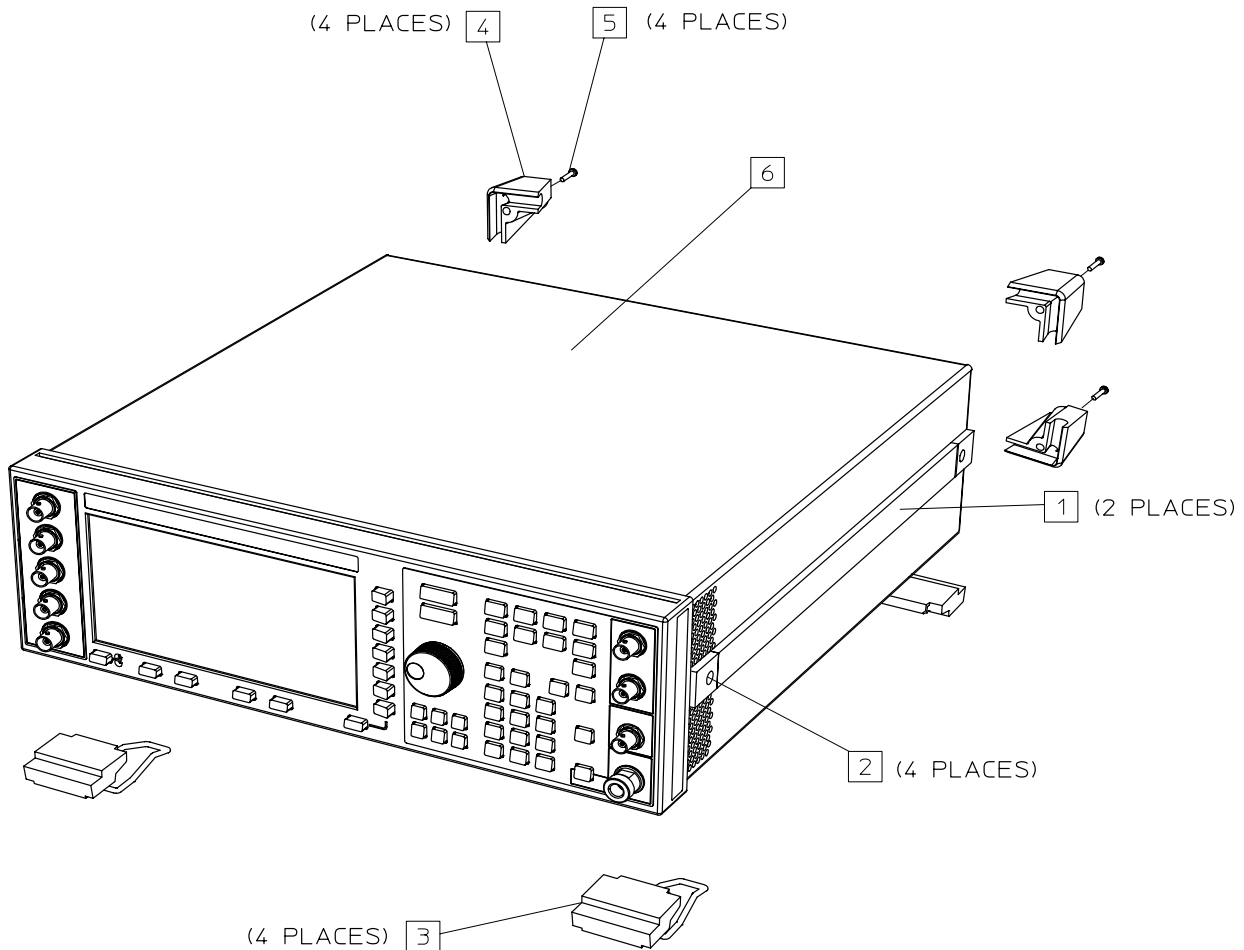
**WARNING** Before you disassemble the instrument, turn the power switch off and unplug the instrument. Failure to unplug the instrument can result in personal injury.

**CAUTION** Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation.

## Remove the Instrument Cover

1. Turn the power switch off and unplug the signal generator.
2. Remove the two strap handles (item 1 in Figure 1) from each side of the signal generator by loosening the two screws (item 2 in Figure 1).
3. Remove the four bottom feet (item 3 in Figure 1).
4. Remove the rear four feet (item 4 in Figure 1) from the signal generator by removing the four screws (item 5 in Figure 1) that secure them.
5. Slide the instrument cover (item 6 in Figure 1) off the back of the signal generator.

**Figure 1** Removing the Instrument Cover



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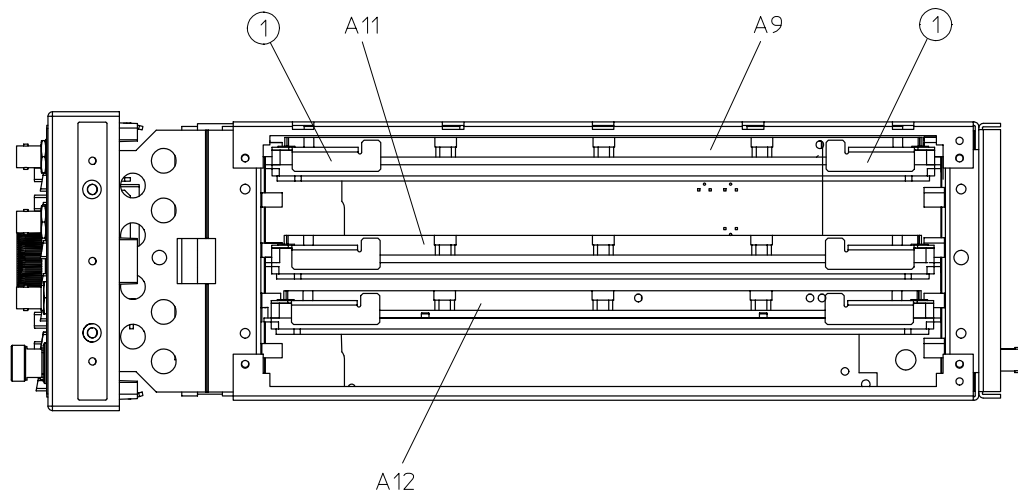
## Remove the Right-Side Cover

1. Remove the four screws that attach the right-side cover to the instrument chassis.
2. Push down on the cover while sliding it toward the front of the instrument thereby unhooking its tabs from the slots on the top of the chassis.

## Remove the A11 TCXO Reference Assembly

1. Simultaneously lift the left and right extractors on the A11 assembly and remove the assembly from the card cage slot. (Refer to [Figure 2](#) for location of A11.)

**Figure 2**      **A11 Location**



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## Install the Option 1E5 A11 OCXO Reference Assembly

1. Slide the Option 1E5 A11 assembly into the A11 card cage slot.
2. Push down on both extractors until the assembly is seated in the slot.

## Re-install the Right-Side Cover

1. Push down on the cover while sliding it toward the rear of the instrument. Hook the tabs into the slots on the top of the chassis.
2. Replace the four screws that attach the right-side cover to the instrument chassis. Torque the screws to 9 in-lbs.

## Repeat the Functionality Check

1. Turn power on to the signal generator and let the instrument warm up for five minutes.
2. Preset the instrument by pressing the front panel **Preset** key.
3. Repeat the functionality check beginning at step 2.

## Use the ESG/ESG-D Series Service Support Software to add Option 1E5 Data to the Instrument

1. Load the ESG/ESG-D Series Service Support Software into the PC.

- a. Insert the 82341C/C GPIB interface card into the PC.

**NOTE** The GPIB interface card is not included in this installation upgrade kit. To order a GPIB interface card contact your nearest Agilent Technologies sales office.

- b. Load the HP SICL Libraries that came with the GPIB card onto the PC.

**NOTE** The HP SICL Libraries must be installed and configured on the PC before the ESG/ESG-D Service Support Software will run.

2. Connect the instrument to the GPIB interface card, using a GPIB cable. Turn the instrument on.

3. From the PC start menu, run the ESG/ESG-D Service Support Software. Follow these steps to add Option 1E5 to the instrument:

- a. Select Agilent Service Software for PC, click on the ESG/ESG-D Motherboard Utility sub menu.
- b. Enter Falcon for the password (case sensitive).
- c. With the ESG/ESG-D Service Motherboard Configuration Utility screen showing, press **Query**, to view the instruments identity information.
- d. Under Option Configuration select 1E5 High Stability Timebase.
- e. Click download. The Option 1E5 data will be downloaded in the instrument.

**NOTE** To avoid error messages the hardware for Option 1E5 must be installed in the instrument prior to downloading the Option 1E5 data.

**NOTE** The latest ESG Calibration Guide, part number E4400-90325, may be used to assist you. To obtain a copy of the calibration guide please contact your nearest Agilent Technologies sales office.

## Activate the New Option

1. Preset the instrument by pressing the front panel **Preset** key.
2. Press **Utility > Instrument Adjustments > Hardware Options**. Arrow down to Option 1E5, press **Select Item > Proceed with Reconfiguration**.
3. Press **Confirm Change**. (The instrument will reboot to preset conditions.)

## Perform the Automated Adjustments

To adjust the new Option 1E5 reference assembly, perform the following adjustments in the order shown.

**NOTE** The instrument must be turned on for 30 minutes.

**NOTE** These adjustments are automated using the “ESG Series Support Software”. This software is included in the signal generator documentation set as a part of the calibration guide. To order an additional copy of the software, request part number E4400-10006.

1. Internal Source Calibration
2. AM Audio Path Offset Calibration



3. Timebase DAC Calibration
4. FM Scale DAC Offset Calibration
5. FM Path Offset Calibration
6. FM In-band DAC Offset Calibration
7. FM Inserting Amplifier Offset Calibration
8. FM 1/2 Path Ratio Gain Calibration
9. Modulation Source Relative Gain Calibration
10. FM Relay Pot Adjustment
11. Wide BW PM Cal
12. DCFM Cal
13. FM Out of Band Cal
14. LF Output Cal
15. Burst Audio Put Cal (ESG-D only)
16. AM audio Path Gain Cal

## **Verify Instrument Performance**

To verify the performance of the signal generator, complete the following performance tests.

**NOTE**                      These performance tests are automated using the “ESG Series Support Software”.

- |  |   |
|--|---|
| 1. AM Frequency Response                         | 8. Internal FM Distortion               |
| 2. Burst Modulation On/Off Ratio (HP ESG-D only) | 9. Nonharmonic Spurious Signals         |
| 3. DCFM Frequency Offset                         | 10. Phase Modulation Accuracy           |
| 4. FM Frequency Response                         | 11. Phase Modulation Distortion         |
| 5. Internal AM Accuracy                          | 12. Phase Modulation Frequency Response |
| 6. Internal AM Distortion                        | 13. Residual FM                         |
| 7. Internal FM Accuracy                          | 14. Timebase Aging Rate                 |

## Replace the Instrument Cover

1. Turn off and unplug the instrument.
2. Re-install the instrument top cover with the 11 screws that secure it. Torque the screws to 9 in-lbs.
3. Replace the four rear feet and torque the screws to 21 in-lbs.
4. Replace the strap handles and torque the screws to 21 in-lbs.

## Contacting Agilent Technologies

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Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
Hong Kong	800-930-871	(852) 2506 9233
Taiwan	0800-047-866	(886) 2 25456723
People's Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101