Installation Note

**Agilent Technologies ESG-D Series Signal Generators
Data Generator Assembly Replacement Kit
(Option UN3/UN4 to UN8 + UN9)
Kit Part Number E4400-60767**

Models: E4430B, E4431B, E4432B, and E4433B

Agilent Technologies

E4400- 90663

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E4400-60767 Data Generator Assembly Replacement Kit Option UN3/UN4 to UN8 + UN9

Product Affected:	E4430B, E4431B, E4432B, E4433B ESG-D Series Signal Generators
Serial Numbers:	All
Options:	UN3 or UN4
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:	0.1 hours

Introduction

The Option UN8 and UN9 Data Generator Assembly Replacement Kit is intended to repair an ESG-D series signal generator that has a faulty Option UN3 or UN4 data generator assembly. Option UN8 and UN9 will provide 8M of data pattern RAM, replacing the Option UN3 (Baseband I/Q Generator with 1M of RAM) or the Option UN4 (Baseband I/Q Generator with 8M of RAM).

The installation process consists of the following basic steps:

1. verifying the functionality of the signal generator

2. removing Option UN3 or UN4

3. installing Option UN8 and UN9

4. installing and verifying new firmware

5. activating Option UN8 and UN9

6. recalibrating and reassembling the signal generator

Installation Kit Parts List

Item	Quantity			Description	Part Number
	Std No Opts	**UN9 to UN7**	**UN9 to UND**		
1	1	1	1	Board Assembly, Real-time I/Q Baseband Generator (A7)	E4400-60070
2	1	1	1	Board Assembly, Generator/8 Meg (A8)	E4400-60195
3	1	1	1	Option UN9 Label	7120-1232
4	1	1	1	Ribbon Cable Interconnect (W19)	8120-8349
5	1	1	1	Ribbon Cable (W18)	8120-8457
6	2	2	2	SMB Cable (W25/W26)	8120-8748
7	3	3	3	Coax Cable (W3/W4/W5) Longer cables, if needed	8120-5063
8	1	1	1	Installation Note	E4400-90663
9	1	0	1	Ribbon Cable (W27), A7 to A8	8120-8725
10	1	0	0	Coax Cable (W24), A7 (Opt. UN8) to A5 (Opt. UND)	E4400-20131

Tools Required

- T-10 TORX screwdriver
- T-15 TORX screwdriver
- Long-nose pliers
- 9/16-in. 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.

Verifying the Functionality of the Signal Generator

Power On the Signal Generator and Check for Error Messages

This procedure verifies that the signal generator powers up and that the internal instrument check identifies no errors.

1. Turn power on to the signal generator by pressing the power switch. The green LED will light. Let the signal generator warm up for one hour.

2. Cycle the power to the signal generator. The green LED should again be lit and the signal generator performs 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**. The first error message in the queue is 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*), press 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   For signal generators with Option 1E5, 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.

Removing Option UN3 or UN4

Use the following procedure to remove Option UN3 or UN4 as a firmware selection and to remove the hardware associated with Option UN3/UN4.

Removing Option UN3/UN4 in Firmware

1. Preset the signal generator

2. In the MENUS key group, press the hardkey **Utility**.

3. In the **Utility** menu, press the softkey **Instrument Adjustments**, and then select **Hardware Options**.

   The signal generator displays a list of hardware options, and an X indicates a selected option.

4. Highlight Option UN3 or UN4, then press the softkey **Deselect Item**.

   This removes the X, indicating that Option UN3/UN4 is no longer selected.

5. To disable Option UN3/UN4, press the softkey **Proceed with Reconfiguration**.

6. To verify that you want to reconfigure the signal generator without Option UN3/UN4, press the softkey **Confirm Change (Instrument will Reboot)**.

   The signal generator reboots to the preset condition, and removes Option UN3/UN4.

Removing Option UN3/UN4 Hardware

1. Turn off the line power switch on the signal generator and disconnect the line cord.

2. Loosen the two screws on each handle and remove the two strap handles (Figure 1 on page 7, items 1 and 2).

3. Remove the four bottom feet (Figure 1, item 3).

4. Remove the four rear feet (Figure 1, items 4 and 5).

5. Slide the top cover off the signal generator (Figure 1, item 6).

6. Remove the 11 top cover screws and remove the top cover.

7. Disconnect cables W15, W16, W17, and W19 from the A7 board (Figure 2 on page 7).

NOTE   If Option UND is installed, refer to Figure 3 on page 8 and disconnect W15, W16, W17, W18, and W14 from the dual arb board (A5).

If Option UN7 is installed, refer to Figure 4 on page 8 and disconnect A18W1, W21, and W23 from the bit error rate test board (A6).

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8. Remove the baseband generator board (A7).

9. Disconnect cables W3, W4, W5, and W19 from the A8 board (Figure 5 on page 9).

10. Disconnect W18, the rear panel interface ribbon cable, from both the data generator board (A8) and the rear panel interface board (A17). Discard this older version of W18.

11. Remove the data generator board (A8).
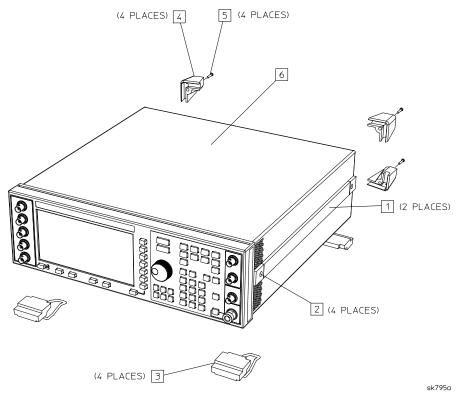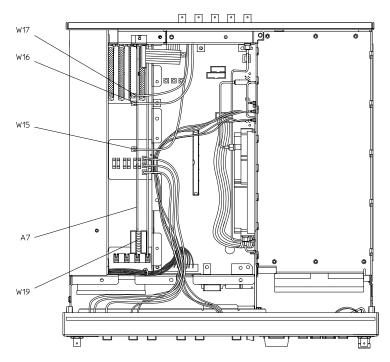
Figure 1   **Cover Removal**

sk795a

Figure 2   **Option UN3/UN4 A7 Baseband Generator Board and Cables**

sk730b

Figure 3   **Option UND A5 Dual Arb Board and Cables**
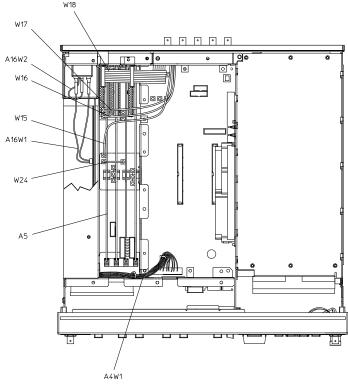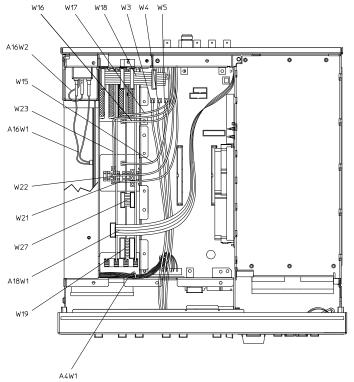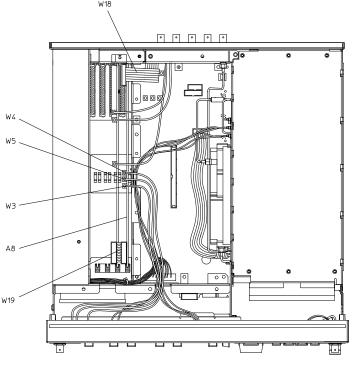

sk79b

Figure 4   **Option UN7 A6 Bit Error Rate Test Board and Cables**

sk7116b

Figure 5   **Option UN3/UN4 A8 Data Generation Board and Cables**

sk731b

Installing Option UN8 + UN9 Hardware and Cables

Refer to Figure 6 and Figure 7 on page 12 to assist you in installing the new A7 and A8 assemblies.

NOTE   If the signal generator has Option UND installed, you will also need to refer to Figure 3 on page 8.

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1. Insert the Board Assy-Generator/1 Meg (A8) into the A14J4 motherboard connector.

2. Insert the Real-Time I/Q Baseband Generator Board (A7) into the A14J3 motherboard connector.

3. Connect W3 (`Data`) from the front panel to A14P5 on the motherboard.

NOTE   If longer cables are required for W3, W4, and W5, use those provided in this upgrade kit.

Using a 9/16-in. socket, remove the shorter cables from the front panel. Resecure them with the wavey washer and hex nuts. Torque to 21 in-lb.

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4. Connect W4 (`Data Clock`) from the front panel to A14P6 on the motherboard.

5. Connect W5 (`Symbol Sync`) from the front panel to A14P7 on the motherboard.

6. Insert the W18 ribbon cable provided in this upgrade kit between the A17 ribbon cable interconnect and A8P2.

NOTE   If Option UND is installed, reconnect W18 to both A8P2 *and* A5P1.

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7. Connect W17 (`I Out`) to the rear panel to A7P405.

NOTE   If Option UND is installed, reconnect W17 to A5J1 *instead of* A7P405.

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8. Connect W16 (`Q Out`) to the rear panel to A7P404.

NOTE   If Option UND is installed, reconnect W16 to A5J2 *instead of* A7P404.

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9. Connect W15 (`BASEBAND GENREF IN`) to the rear panel to A7P403.

NOTE   If Option UND is installed, reconnect W15 to A5J3 *instead of* A7P403. Then connect W24 from A5J4 to A7P403.

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10. If Option UN7, bit error rate test board (A6) is installed, refer to Figure 4 on page 8 and reconnect the following cables:

    a. W23 (`BER DATA IN`) from the rear panel to A6P1

    b. W22 (`BER CLK IN`) from the rear panel to A6P2

    c. W21 (`BER GATE IN`) from the rear panel to A6P3

    d. A18W1 ribbon cable from the A18 board to A6P4

11. Connect the W27 ribbon cable between A7P10 and A8P4.

12. Connect the W19 ribbon cable between A7P300 and A8P3.

13. Remove the W25 (`INT Q`) cable between the motherboard connector A14P103 and the A15 daughterboard and replace it with the W25 cable provided in this upgrade kit (Figure 7 on page 12).

NOTE   A14P103 and A14P102 are located under W18.

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14. Remove the W26 (`INT I`) cable from between the motherboard connector A14P102 and the A15 daughterboard and replace it with the W26 cable provided in this upgrade kit.
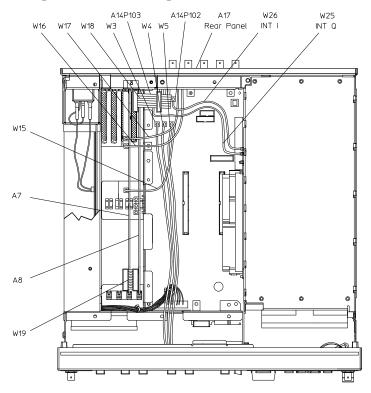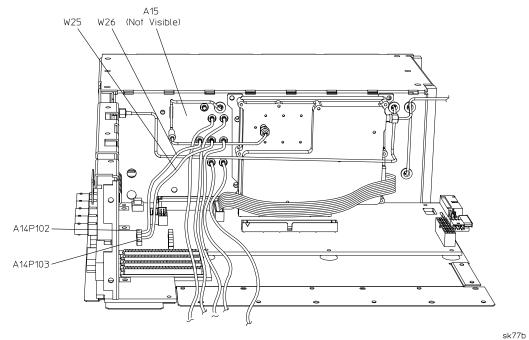
Figure 6   Option UN8/UN9 Top View

W16 W17 W18 A14P103 A14P102 A17 W26 W25
          W3   W4 W5   Rear Panel INT I INT Q

W15

A7

A8

W19

dk78b

Figure 7   Cables W25 and W26

W25 W26 A15
           (Not Visible)

A14P102

A14P103

sk77b

Figure 6   Option UN8/UN9 Top View

W16 W17 W18 A14P103 A14P102 A17 W26 W25
          W3   W4 W5   Rear Panel INT I INT Q

W15

A7

A8

W19

dk78b

Figure 7   Cables W25 and W26

W25 W26 A15
           (Not Visible)

A14P102

A14P103
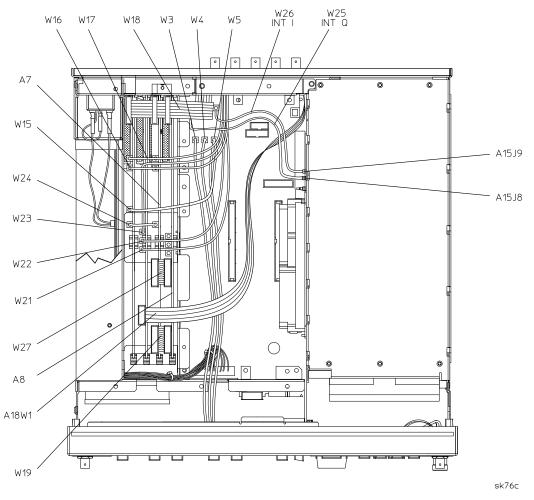
sk77b

Verifying Cable Connections

Verify that all cables listed in the following table are installed and routed as shown in Figure 3, Figure 4, Figure 6 and Figure 8.

Cable Routing (Front to Rear)

Cable Description	Reference Designator	Color Number[1]	Connection Point to Point
Option UN8/UN9 Only (Figure 6 on page 12)			
Ribbon Cable Interconnect	W19	-	A7P300 to A8P3
Ribbon Cable Interconnect	W27	-	A7P10 to A8P4
BASEBAND GENREF IN	W15	8	Rear Panel to A7P403
Q OUT	W16	9	Rear Panel to A7P404
I OUT	W17	09	Rear Panel to A7P405
DATA	W3	5	Front Panel to A14P5
SYMBOL SYNC	W5	6	Front Panel to A14P7
DATA CLOCK	W4	7	Front Panel to A14P6
Rear Panel Interface Cable	W18	-	Rear Panel Interface (A17) to A8P2
INT Q	W25	05	Daughterboard (A15) to A14P103
INT I	W26	06	Daughterboard (A15) to A14P102
Option UN8/UN9 & Option UN7 (Option UN7 Connections, Figure 4 on page 8)			
Ribbon Cable BERT, Rear Panel	A18W1		Rear Panel to A6P4
BER GATE IN	W21		Rear Panel to A6P3
BER CLK IN	W22		Rear Panel to A6P2
BER DATA IN	W23		Rear Panel to A6P1
Option UN8/UN9 & Option UND (Option UND Connections, Figure 3 on page 8)			
13 MHz	W24		A5J4 to A7P403
BASEBAND GEN REF	W15		Rear Panel to A5J3
Q OUT	W16		Rear Panel to A5J2
I OUT	W17		Rear Panel to A5J1
Rear Panel Interface Cable	W18		Rear Panel Interface (A17) to A5P1

1. Cable color numbers appear in the Connector/Cable Diagram located on the top of the inside cover of the signal generator.

Figure 8　　　　　**Options UN9/UN7/UND Top View**

W16　W17　　W18　　W3　　W4　　W5　　W26 INT I　　W25 INT Q

A7

W15

W24

W23

W22

W21

W27

A8

A18W1

W19

A15J9

A15J8

sk76c

Installing New Firmware

If required, upgrade the instrument to the latest ESG-B firmware.

Verifying the New Firmware

To verify the new firmware has been downloaded into the signal generator, press **Utility** > **Instrument Info/Help Mode** > **Diagnostic Info**. The new firmware revision and firmware date should be displayed under "Instrument Information".

Activating Options UN8 and UN9

1. Turn on the signal generator and allow it to warm up for at least 30 minutes.

2. Preset the signal generator.

3. Press **Utility** > **Instrument Adjustments** > **Hardware Options**.

4. As when you removed Option UN3/UN4, the signal generator displays a list of hardware options. Highlight Options UN8 and UN9.

5. Press the **Select Item** softkey. An X is placed in the `Selected` column for both Option UN8 and UN9

6. To enable the selected options, press **Proceed With Reconfiguration**, then press **Confirm Change (Instrument will Reboot)**.

CAUTION	If you enable an option without the required hardware installed, only the menus for that option are activated; the option does *not* function.

Internally Recalibrating the Signal Generator

1. Preset the signal generator.

2. Press **Utility** > **Instrument Adjustments** > **Hardware Options**. Confirm that an X appears in the `Selected` column for UN8. If it does not, go to step 5 in the procedure above, "Activating Options UN8 and UN9".

3. Select **Calibrate Selected Items** > **Start Calibration and Store Results**.

The calibration takes about five minutes, during which, a message appears indicating that the calibration is in progress. The message also shows the progress of the calibration, as percent complete. When the calibration finishes, the message is replaced by the Hardware Options menu.

Reassembling the Signal Generator

Refer to Figure 1 on page 7.

1. Turn off the line power switch on the signal generator and disconnect the line cord.

2. Replace the top cover and torque the 11 screws that secure it to 9 in-lb.

3. Slide the top cover back onto the signal generator (Figure 1, item 6).

4. Replace the four rear feet and torque the four screws to 21 in-lb (Figure 1, items 4 and 5).

5. Replace the two strap handles (one on each side of the signal generator) and torque the two screws on each handle to 21 in-lb (Figure 1, items 1 and 2).

6. Replace the four bottom feet (Figure 1, item 3).

7. Cut out a single UN9 label and attach it over the UN3/UN4 serial tag option located on the rear panel. This identifies the signal generator as having Options UN8 and UN9 installed.