

# **Installation Note**

---

**Agilent Technologies ESG-D and ESG-DP  
Series Signal Generators  
Upgrade Kit for Option UN8+UN9  
Kit Part Number E4400-60185**

**Models: E4430B, E4431B, E4432B, E4433B, E4434B,  
E4435B, E4436B, and E4437B**



Part Number E4400-90252

Printed in USA May 2000 Supersedes February 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.

# Introduction

This installation note covers different configurations of signal generators depending on whether Option UN7 or UND or both are installed or neither. Use the list below to determine which sections to use for the configuration being upgraded and perform them in the order shown:

- All signal generator configurations
  1. E4400-60185 Upgrade Kit Add Option UN8+UN9 ..... page 4
  2. Verifying the Functionality of the Signal Generator..... page 7
  3. Removing the Top Chassis Cover (All Signal Generators) ..... page 8
- Signal generators without Option UN7/UND
  4. Removing Hardware (Option UN7/UND not Installed)..... page 10
  5. UN8+UN9 Installation (Option UN7/UND not Installed)..... page 12
  6. Completing the Installation (All Signal Generators)..... page 18
- Signal generators with Option UN7 or UND or both installed
  4. UN8+UN9 Installation (Options UN7/UND Installed) ..... page 16
  5. Completing the Installation (All Signal Generators)..... page 18

# E4400-60185 Upgrade Kit Add Option UN8+UN9

Use this upgrade kit to add Option UN8+UN9, Real-Time I/Q Baseband Generator with TDMA Standards, (with 8M of RAM).

Product Affected: . . . . .	ESG-D and ESG-DP Series Signal Generators
Serial Numbers: . . . . .	All
To Be Performed By: . . . . .	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent Technologies (X) Agilent Technologies personnel on-site
Estimated Installation Time: . . . . .	2.0 hours
Estimated Verification Time: . . . . .	0.1 hours

## Parts List

Item	Quantity			Description	Part Number
	Std No Opt's <sup>a</sup>	W/Opt UN7	W/Opt UND		
1	1	0	0	Front Panel Overlay (Opt UN8+UN9)	E4400-80006
2	1	0	0	Blank rear panel (Opt UN8+UN9)	E4400-00031
3	1	1	1	Real-Time I/Q Baseband Generator (A7)	E4400-60070
4	1	1	1	Board Assy-Generator/8 Meg (A8)	E4400-60195
5	1	0	0	Rear Panel Board Assembly RP INT BNC (A17)	E4400-60145
6	1	0	0	Firmware Upgrade Kit Digital	E4400-60230
7	11	0	0	Washer 0.472 ID	2190-0102
8	14	0	0	Nut Hex 15/32-32	2950-0035
9	3	0	0	Washer 0.490 ID	3050-1919
10	3	0	0	Hole Plug 0.500 D	6960-0002
11	1	1	1	UN9 Option Label	7120-1232
12	1	0	0	BNC Cable (W3), A14P5 to DATA	8120-5063
13	1	0	0	BNC Cable (W4), A14P6 to DATA CLOCK	8120-5063
14	1	0	0	BNC Cable (W5), A14P7 to SYMBOL SYNC	8120-5063
15	1	0	0	BNC Cable (W15), A7P403 to BASEBAND GENREF IN	8120-5055
16	1	0	0	BNC Cable (W16), A7P404 to Q OUT	8120-5055
17	1	0	0	BNC Cable (W17), A7P405 to I OUT	8120-5055
18	1	1	1	Ribbon Cable (W18), A17 to A8	8120-8457
19	1	1	1	Ribbon Cable Interconnect (W19), A7 to A8	8120-8349
20	1	0	1	Coax Cable (W24), A7 (Opt. UN8+UN9) to A5 (Opt. UND)	E4400-20131
21	2	0	0	SMB Cable (W25 & W26)	8120-8748
22	1	1	1	Ribbon Cable (W27), A7 to A8	8120-8725
23	1	0	0	Safety Solvent	8500-6296

<b>Item</b>	<b>Quantity</b>			<b>Description</b>	<b>Part Number</b>
24	1	0	0	Installation Note	E4400-90252
25 <sup>p</sup>	2	0	0	SMB to BNC Cable (W25 & W26)	8120-8781
26	1	0	0	ESG Digital Document Set	E4400-90322

- a. No other digital hardware options are installed.
- b. For ESG–DP models: E4434B, E4435B, E4436B, and E4437B.

## Tools Required

- T-10 TORX screwdriver
- T-15 TORX screwdriver
- Long-nose pliers
- Scissors
- 3/8 in. Socket
- 5/8 in. Socket
- 3/16 in. Socket
- 9/16 in. Socket
- 9/32 in. Socket
- 5.5 mm Socket
- Ratchet 21 in-lb
- Hand Torque Wrench 6 in-lb
- Hand Torque Wrench 9 in-lb

### 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.

# Verifying the Functionality of the Signal Generator

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

1. Turn on power to the signal generator by pressing the power switch. The green LED will light. Let the instrument warm up for at least 5 minutes.

---

**NOTE** For instruments with Option 1E5, ERROR 514, Reference Oven Cold occurs when you first connect the signal generator to AC line power. The OVEN COLD annunciator and the ERR annunciator both turn on. The OVEN COLD annunciator automatically clears after approximately 5 minutes. You *cannot* clear the error queue, however, until the OVEN COLD annunciator turns off.

---

2. Cycle the power to the signal generator. The green LED should again be lit and the instrument performs a check.
3. When the display is lit, check to see if the ERR annunciator is on.
4. If the ERR annunciator is 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.

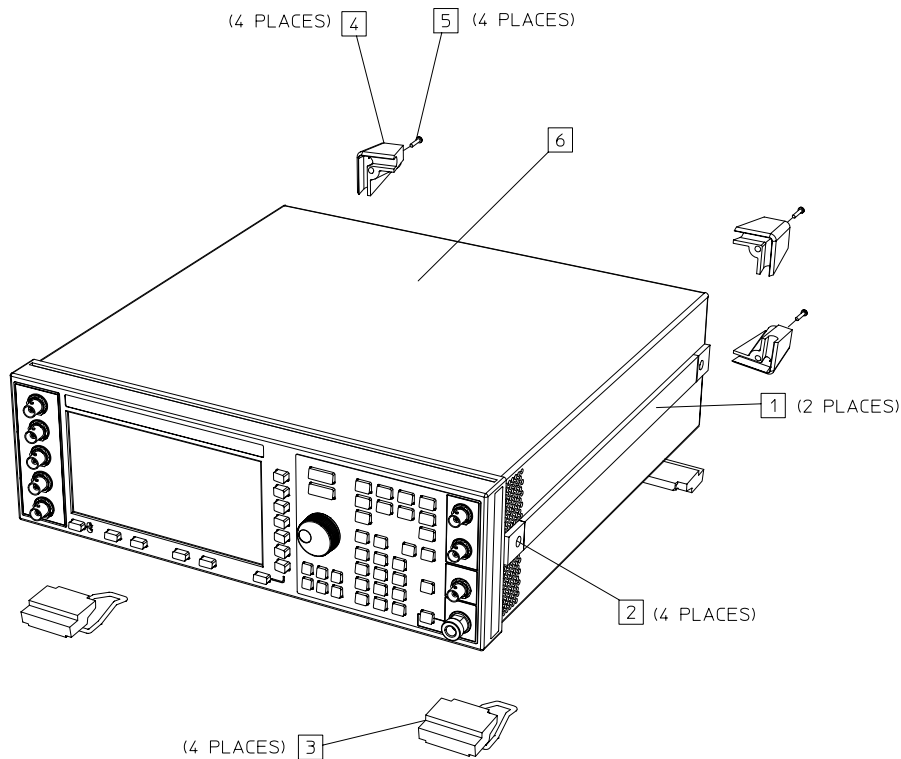
If there is more than one error message (each message will be designated as 1 of *n*), press **View Next Error Message** until you have seen all of the messages.

5. After you have resolved all of the error messages, press **Clear Error Queue(s)** to delete the messages. Then restart this procedure at step two.

# Removing the Top Chassis Cover (All Signal Generators)

1. Turn the instrument's power switch off, and unplug the instrument.
2. Refer to Figure 1. To remove the two strap handles (item 1, one on each side of the instrument), loosen and remove the two screws (item 2) on each handle.
3. Remove the four bottom feet (item 3).
4. Remove the four rear feet (item 4), by removing the four screws (item 5).
5. Slide the instrument cover (item 6) off the back of the signal generator.
6. Refer to Figure 2. Remove the 11 screws (item 1) that secure the top chassis cover (item 2).
7. Proceed to the next section depending on the signal generator configuration as stated:
  - If options UN7/UND are installed, go to "UN8+UN9 Installation (Options UN7/UND Installed)" on page 16.
  - If option UN7/UND are not installed, go to "Removing Hardware (Option UN7/UND not Installed)" on page 10.

**Figure 1 Exterior Cover Removal**

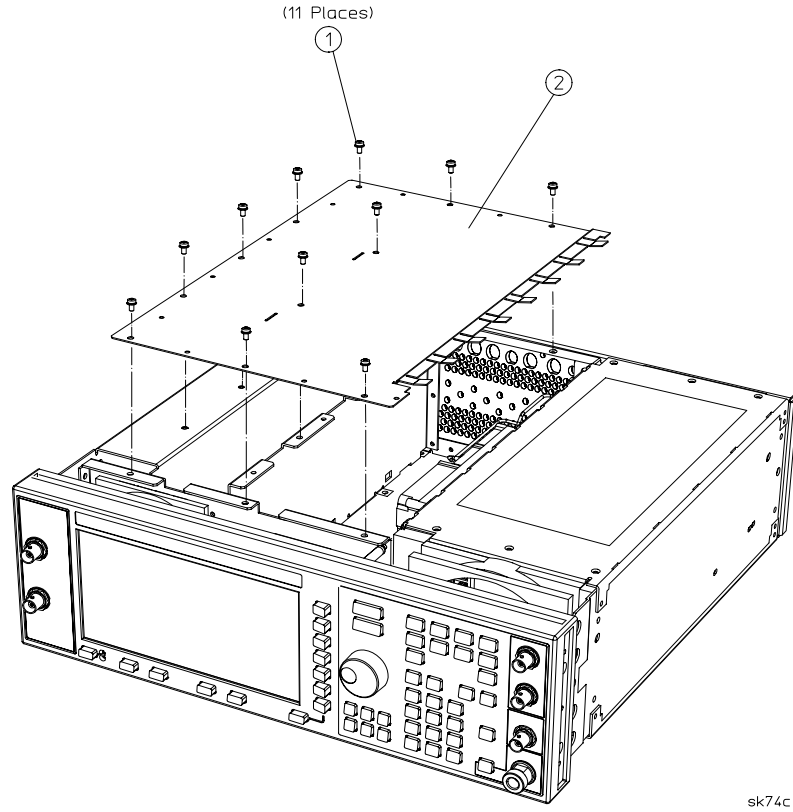


sk795a



**Figure 2**

**Top Chassis Cover Removal**

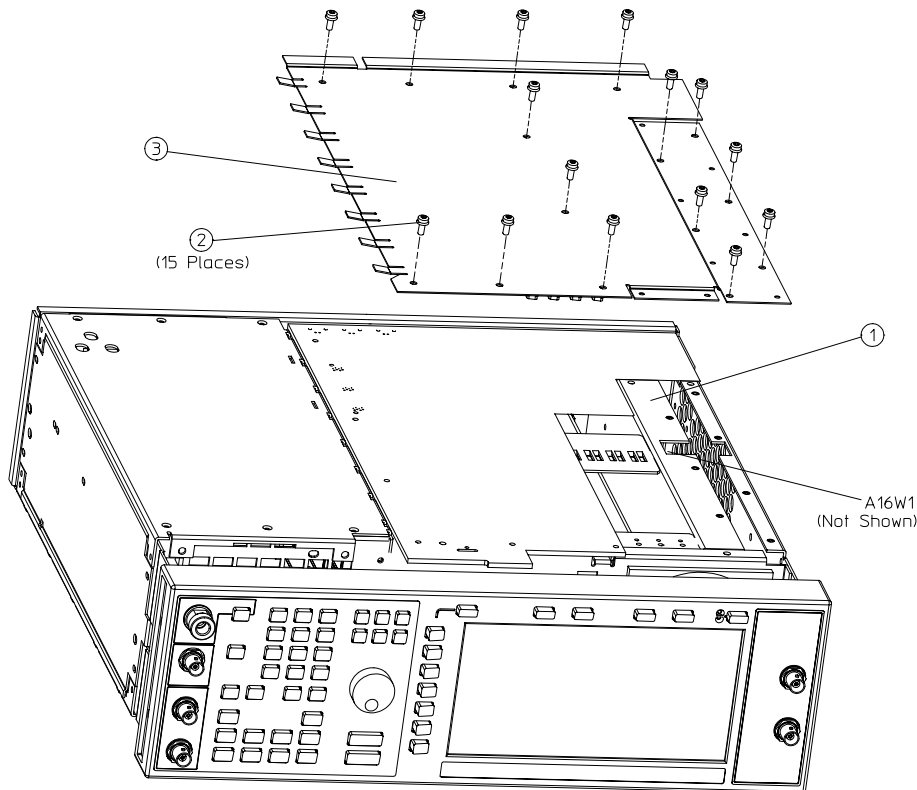


# Removing Hardware (Option UN7/UND not Installed)

## Removing the Rear Panel

1. Refer to Figure 3. Remove the 15 screws (item 2) that secure the bottom chassis cover (item 3) and lift it off.
2. Refer to Figure 3 and Figure 4. Disconnect A16W1 from the power supply (A4). You can access A16W1 through an opening in the bottom of the power supply shield (item 1).
3. Refer to Figure 4. Remove the nuts and washers that secure the five BNC connectors (item 2).
4. Remove the hex screws and washers that secure the AUXILIARY INTERFACE (item 3) and GPIB (item 4) connectors to the rear panel.
5. Remove the 10 screws (item 5) that secure the rear panel to the instrument chassis.
6. Remove the two screws and the bracket from top of the rear chassis; save the bracket.
7. Disconnect the coherent carrier cable (W12) from the rear panel.
8. Pull the rear panel assembly away from the instrument chassis.

**Figure 3**                      **Bottom Chassis Cover Removal**



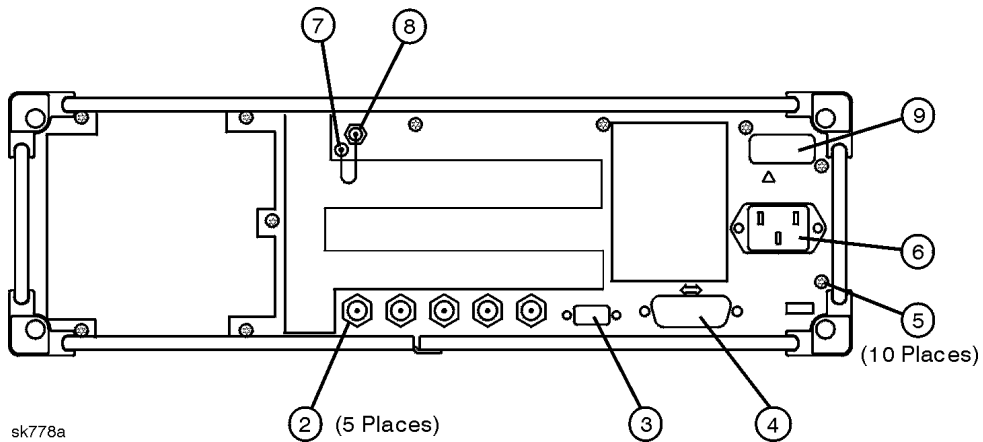
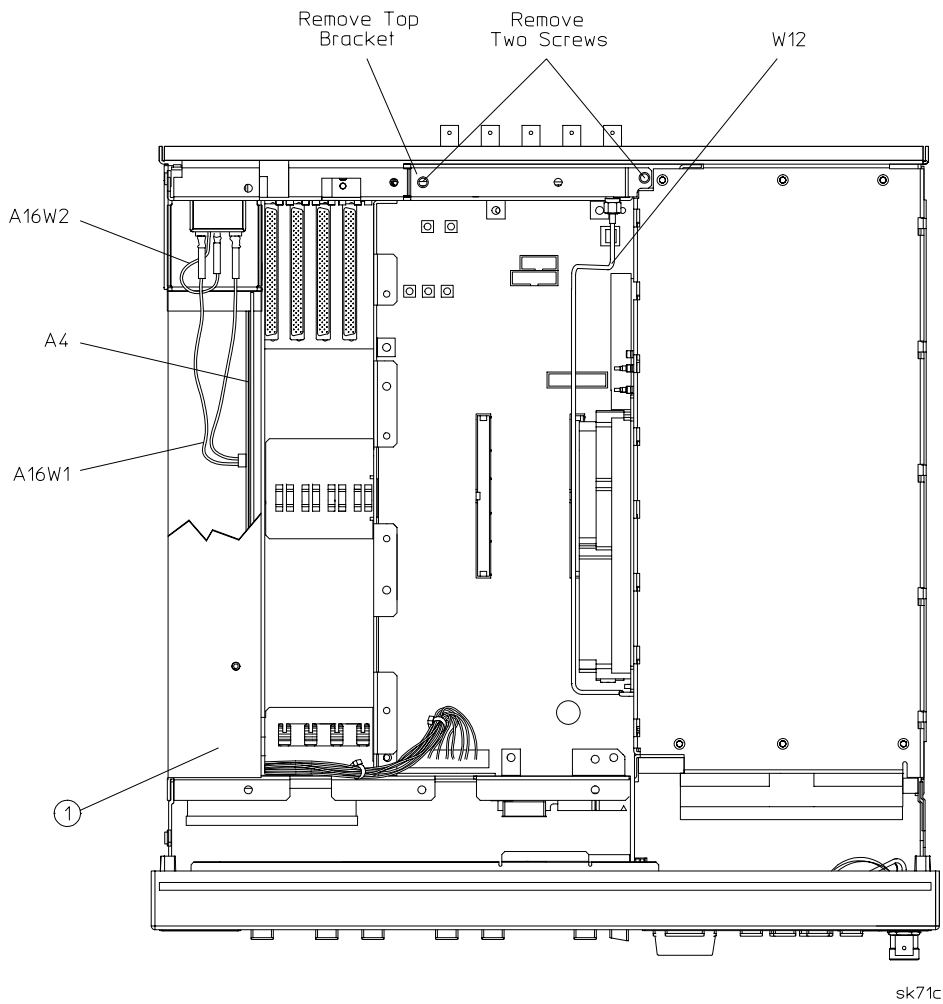
sk73c

## Removing Parts from the Rear Panel

1. Refer to Figure 4. Remove the nut (not shown) that attaches the green ground wire (A16W2) to the rear panel and the screws that secure the line module, (item 6).
2. Remove the screw that holds the chain for the coherent carrier dust cap (item 7),
3. Remove the nut (not shown) from the coherent carrier RF connector (item 8). Then remove the RF connector.

4. Remove the nut (not shown) that secures the serial tag (item 9). Then remove the serial tag.
5. Discard the old rear panel.

**Figure 4 Removing the Rear Panel and Rear Panel Parts**



# UN8+UN9 Installation (Option UN7/UND not Installed)

## Assembling and Installing the Rear Panel

1. Using the 8 washers and 8 hex nuts supplied in this upgrade kit, attach the A17 rear panel interface (E4400-60145) to the new UN8+UN9 rear panel (E4400-00031). Torque to 21 in-lb.
2. Attach the coherent carrier RF connector to the rear panel. Add one washer and hex nut; torque to 21 in-lb.
3. Secure the coherent carrier dust cap and chain to rear panel. Tighten screw to 9 in-lb.
4. Insert W15 into the BASEBAND GENREF IN hole and secure with a washer and nut. Torque to 21 in-lb.
5. Insert W16 into the Q-Out hole and secure with a washer and nut. Torque to 21 in-lb.
6. Insert W17 into the I-Out hole and secure with a washer and nut. Torque to 21 in-lb.
7. Insert three hole plugs into the three remaining holes.
8. Re-install the serial tag and torque the nut to 9 in-lb.
9. Cut out one UN9 label and attach it to the serial tag option location. This indicates that Option UN8+UN9 is installed.
10. Reinstall the line module with the ground plug pointed down. Torque the two flat head screws to 9 in-lb.
11. Connect the green ground wire, A16W2, from the line module to the ground stud on the rear panel. Torque the nut to 9 in-lb.
12. Reconnect the line module cable, A16W1, to the power supply A4.
13. Reverse the rear panel procedure to attach the UN8+UN9 rear panel to the instrument.
  - a. Route the cables accordingly.
  - b. Reconnect the coherent carrier cable (W12) to the rear panel connector. Torque the nut to 9 in-lb.

---

**NOTE** The coherent carrier must be installed before the top bracket, due to clearance.

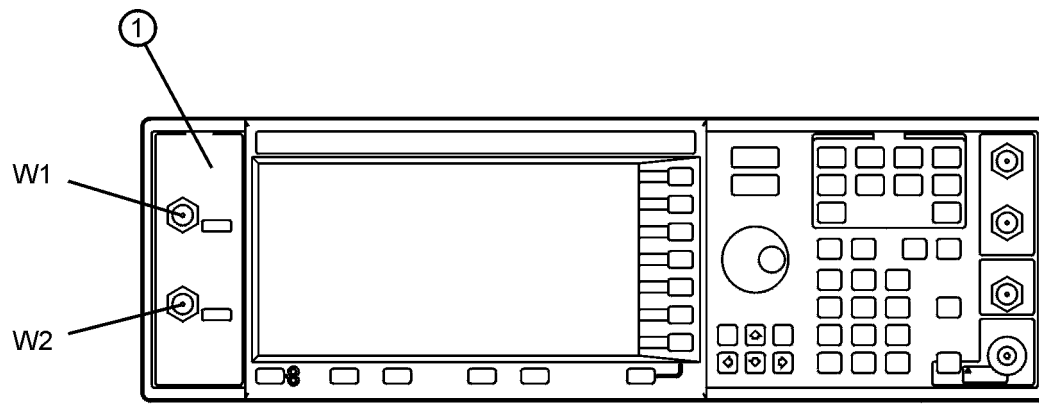
---

- c. Reinstall the top bracket to the rear top of the chassis with two screws. Torque to 9 in-lb.
  - d. Torque all T-10 TORX screws to 9 in-lb.
  - e. Torque the AUXILARY INTERFACE hex screws to 6 in-lb.
  - f. Torque the GPIB hex screws to 9 in-lb.
  - g. Torque the five BNC connector nuts to 21 in-lb.
14. Reinstall the bottom chassis cover, and torque the 15 screws to 9 in-lb.

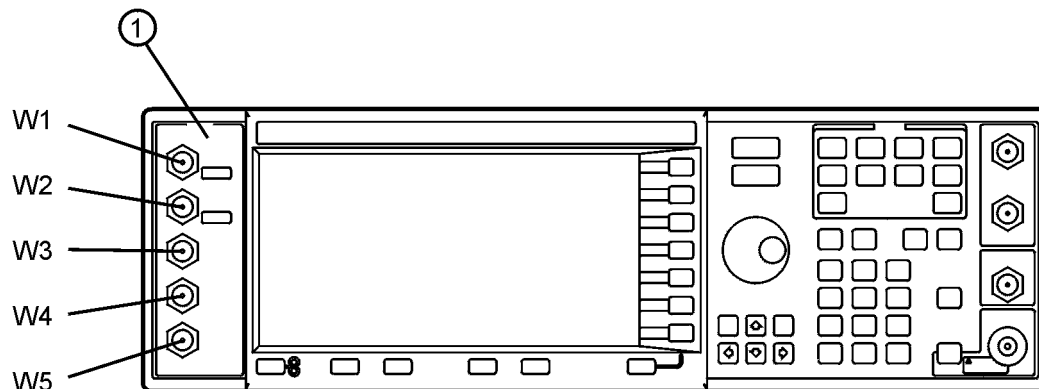
## Modifying the Front Panel

1. Refer to Figure 5. Remove the I-INPUT (W1) and Q-INPUT (W2) BNCs from the front panel.
2. Remove the old input overlay (item 1) from the left side of the front panel. Use Safety Solvent Cleaner (supplied in this kit) to remove the old label glue from the front panel.
3. Install the Option UN8+UN9 overlay supplied in this kit, and align with holes. Press firmly from the center outward on the label, to eliminate air bubbles.
4. Reinstall the I-INPUT cable (W1) in the top hole, and secure with a hex nut and wavy washer. Torque to 21 in-lb.
5. Reinstall the Q-INPUT cable (W2) in the front panel, and secure with a hex nut and wavy washer. Torque to 21 in-lb.
6. Install the DATA cable (W3) in the front panel, and secure with a hex nut and wavy washer. Torque to 21 in-lb.
7. Install the DATA CLOCK cable (W4) in the front panel, and secure with a hex nut and wavy washer. Torque to 21 in-lb.
8. Install the SYMBOL SYNC cable (W5) in the front panel, and secure with a hex nut and wavy washer. Torque to 21 in-lb.

**Figure 5**                      **Front Panel**



Standard ESG-D Front Panel



UN8 + UN9

dk710b

## Installing the A7 and A8 Assemblies

1. Refer to Figure 6. Insert the Board Assy-Generator/8 Meg (A8) into the A14J4 motherboard connector.
2. Insert the Real-Time I/Q Baseband Generator Board (A7) into the A14J3 motherboard connector.

## Connecting Cables

Refer to Figure 6 and Figure 7. Connect and route the cables shown in Table 1.

**NOTE** The ESG-D uses different cables for W25 and W26 than the ones for the ESG-DP model. Refer to the “Parts List” on page 4 for the proper cables to use.

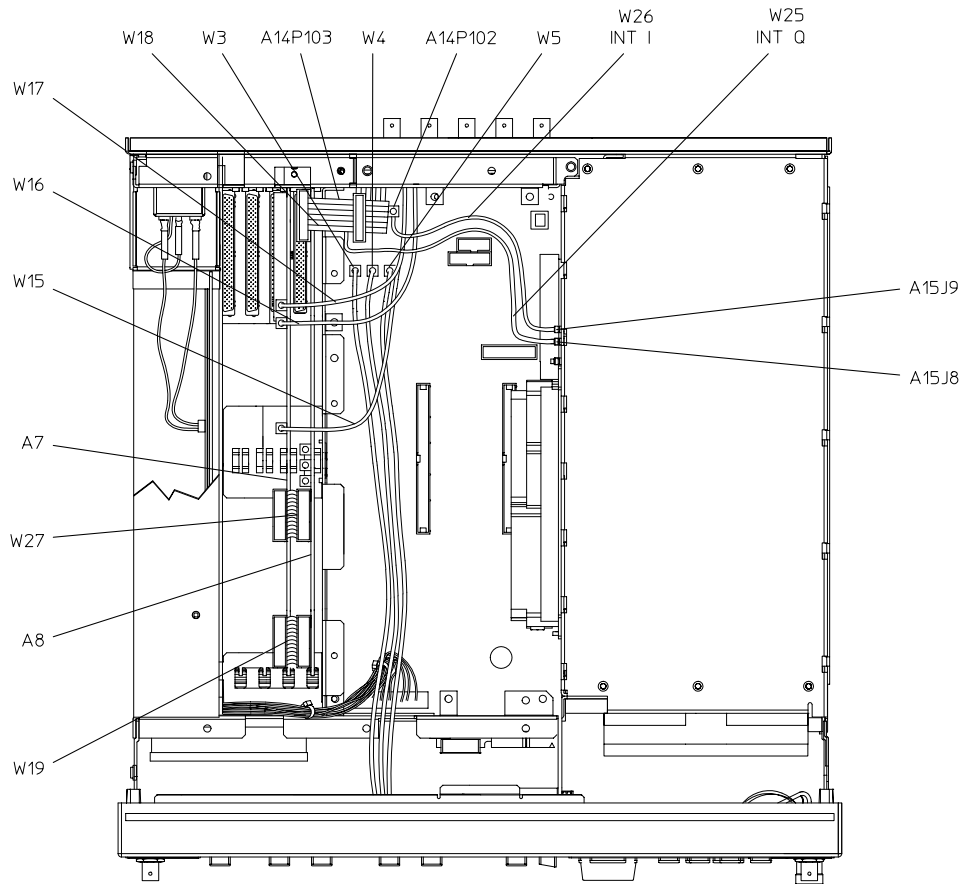
**Table 1 Cable Routing**

Cable Description	Reference Designator	Color Number <sup>a</sup>	Connection Point to Point
Ribbon Cable Interconnect	W19	–	A7P300 to A8P3
Ribbon Cable Interconnect	W27	–	A7P10 to A8P4
DATA	W3	5	Front Panel to A14P5
SYMBOL SYNC	W5	6	Front Panel to A14P7
DATA CLOCK	W4	7	Front Panel to A14P6
INT Q	W25	05	Daughter Board A15J8 to A14P103
INT I	W26	06	Daughter Board A15J9 to A14P102
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
Rear Panel Interface Cable	W18	–	Rear Panel Interface (A17) to A8P2

- a. Cable color numbers appear in the Connect/Cable Diagram located on the top of the inside cover of the instrument.

**Figure 6**

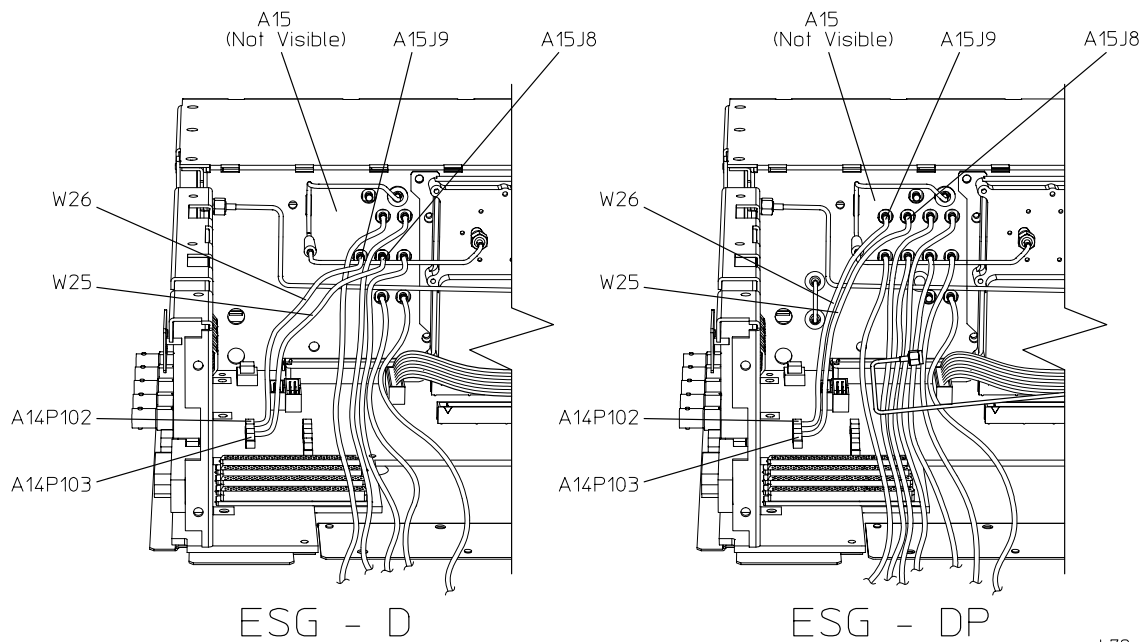
**Option UN8+UN9 (Option UN7/UND not Installed) Top View**



sk75c

**Figure 7**

**Cables W25 and W26**



sk72c

# UN8+UN9 Installation (Options UN7/UND Installed)

## Installing the A7 and A8 Assemblies

1. Refer to Figure 8. If the A7 or A8 boards or both are currently installed:
  - a. Remove all cables that will interfere with removing the A7 and A8 boards.
  - b. Remove the existing A7 and A8 boards.
2. Refer to Figure 8. Insert the Board Assy-Generator/8 Meg (A8) that came with the kit (see “Parts List” on page 4) into the A14J4 motherboard connector.
3. Insert the Real-Time I/Q Baseband Generator Board (A7) that came with the kit (see “Parts List” on page 4) into the A14J3 motherboard connector.

## Connecting Cables

Refer to Figure 8 and Figure 9. Using existing cables along with the new ones as specified in the “Parts List” on page 4, connect and route the cables shown in Table 2.

**Table 2 Cable Routing**

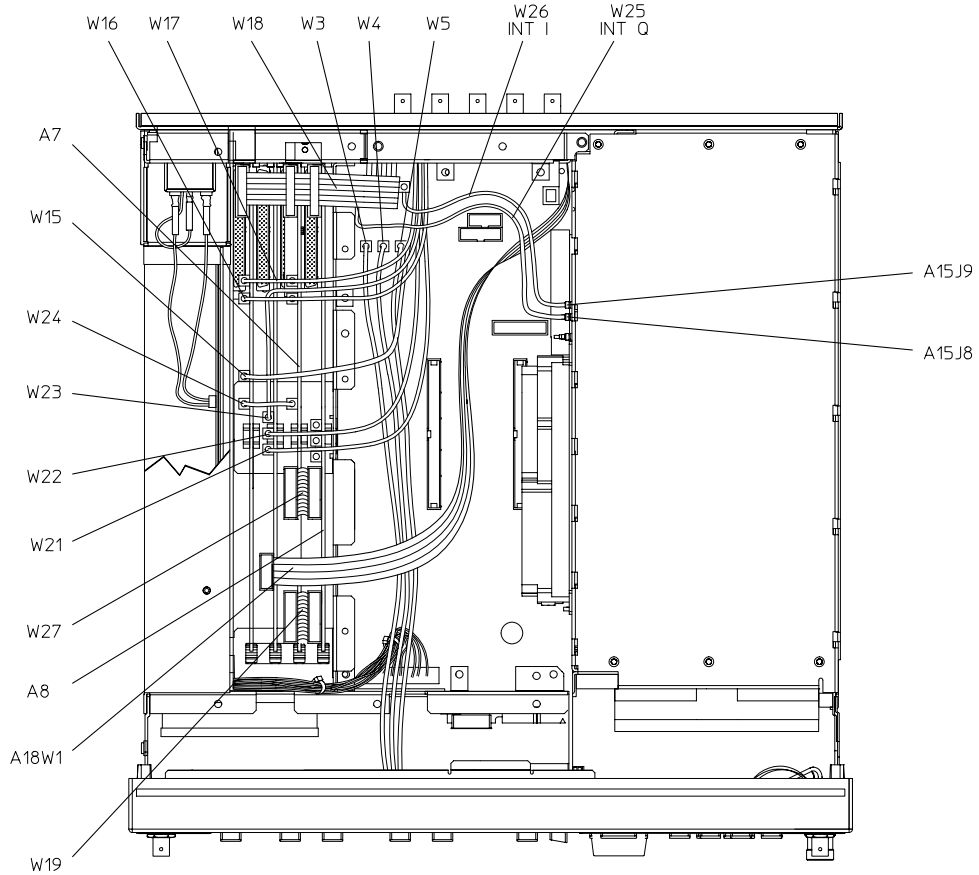
Cable Description	Reference Designator	Color Number <sup>a</sup>	Connection Point to Point
Ribbon Cable Interconnect	W19	–	A7P300 to A8P3
Ribbon Cable Interconnect	W27	–	A7P10 to A8P4
DATA	W3	5	Front Panel to A14P5
SYMBOL SYNC	W5	6	Front Panel to A14P7
DATA CLOCK	W4	7	Front Panel to A14P6
INT Q	W25	05	Daughter Board A15J8 to A14P103
INT I	W26	06	Daughter Board A15J9 to A14P102
Ribbon Cable	A18W1	–	A6P4 to A18 UN7 Rear Panel Interface
BER GATE IN	W21	04	Rear Panel to A6P3
BER CLOCK IN	W22	03	Rear Panel to A6P2
BER DATA IN	W23	02	Rear Panel to A6P1
BASEBAND 13 MHZ	W24 <sup>b</sup>	–	A5J4 to A7J3
BASEBAND GENREF IN	W15	8	Rear Panel to A5J3
Q OUT	W16	9	Rear Panel to A5 Q OUT
I OUT	W17	09	Rear Panel to A5 I OUT
Rear Panel Interface Cable	W18	–	Rear Panel (A17) A8P2 to A7P2 to A5P1

- a. Cable color numbers appear in the Connector/Cable Diagram located on the top of the inside cover of the instrument.
- b. Used with Option UND.



**Figure 8**

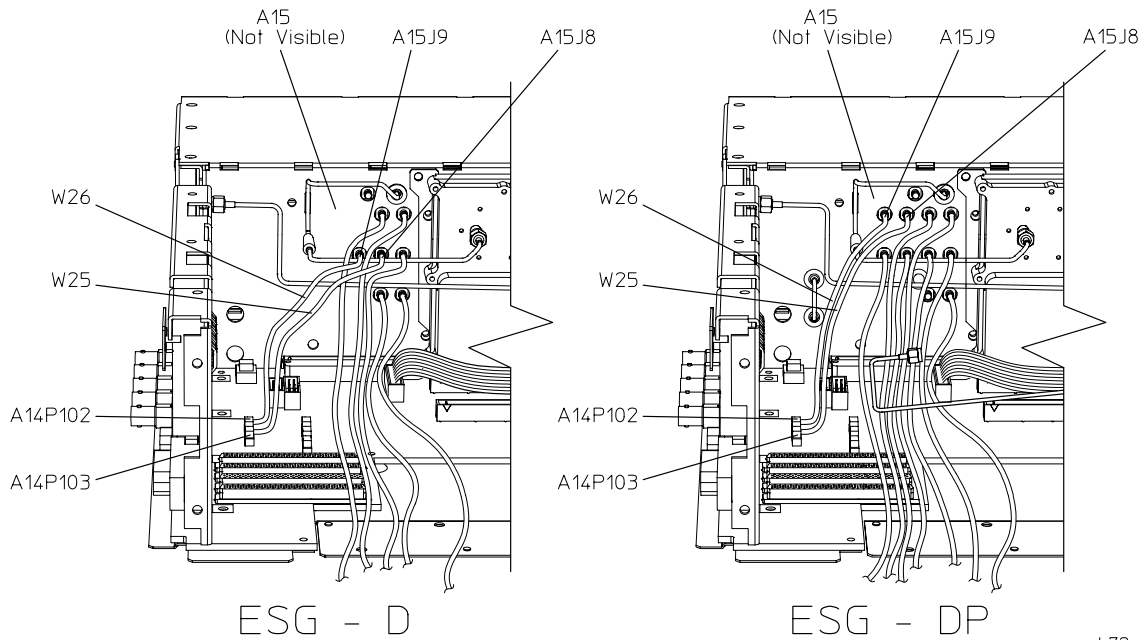
**Option UN8+UN9 (Option UN7/UND Installed) Top View**



sk76c

**Figure 9**

**Cables W25 and W26**



sk72c

# Completing the Installation (All Signal Generators)

## Installing New Firmware

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

## Verifying the New Firmware

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

## Activating Option UN8+UN9

1. Plug in and turn the signal generator on. Let it warm up for at least 20 minutes.
2. Press **Preset > Utility > Instrument Adjustments > Hardware Options**.
3. Select Option UN8 and UN9 by highlighting **Option UN8** and **UN9** using the arrow keys, or the front-panel knob, then press **Select Item**. An **X** will be placed in each of the selected column.
4. Press **Proceed With Configuration > Confirm Change** to install Options UN8 and UN9. The instrument will reboot and return to preset conditions.

---

**NOTE** If you enable an option that does not have the required hardware installed the menus for that option will be activated, but they will be inoperable, despite what the menus may seem to indicate.

---

## Internally Recalibrating the Signal Generator

1. Press **Preset > Utility > Instrument Adjustments > Hardware Options > Calibrate Selected Items**.
2. Press **Start Calibration > Store Results**. The calibration takes several minutes. During the calibration, a message is displayed indicating the calibration is in progress and showing the percent complete. When the calibration is finished, the Hardware Options menu is returned.

## Reassembling the Signal Generator

Refer to Figure 1 on page 8 and Figure 2 on page 9.

1. Turn the instrument off and unplug it.
2. Replace the top cover, and torque the 11 screws that secure it to 9 in-lb.
3. From the back, slide the instrument cover (item 6) onto the signal generator.
4. Replace the four rear feet (item 4), and torque the four screws (item 5) to 21 in-lb.
5. Replace the two strap handles (item 1, one on each side of the instrument), and torque the two screws (item 2) on each handle to 21 in-lb.
6. Replace the four bottom feet (item 3).