Installation Note

Agilent Technologies ESG-D Series Signal Generators Digital Upgrade Kit (Option UN3 to UN8) Kit Part Number E4400-60160

Models: E4430B, E4431B, E4432B and E4433B

Agilent Technologies

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E4400-60160 Digital Upgrade Kit (Option UN3 to UN8)

Product Affected:	E4430B, E4431B, E4432B, and E4433B ESG-D Series Signal Generators
Serial Numbers:	All
Options:	UN3
Compatibilities:	
To Be Performed By:	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent Technologies (X) Agilent Technologies personnel on-site
Estimated Installation Time:	1.5 hours
Estimated Verification Time:	0.1 hours

Introduction

The Option UN8, Real-Time I/Q Baseband Generator with TDMA Standards, replaces Option UN3, Baseband I/Q Generator with 1M of RAM.

The installation of this kit comprises the following basic steps:

1. verifying the functionality of the signal generator

2. removing Option UN3

3. installing Option UN8

4. installing and verifying new firmware

5. activating Option UN8

6. recalibrating and reassembling the signal generator

Installation Kit Parts List

Table 1   **Option UN8 Upgrade Kit E4400-60160 Contents**

Item	Quantity			Description	Part Number
	Std No Opt's[*]	U8 to UN7	U8 to UND		
1	1	1	1	Board Assembly, Real-Time I/Q Baseband Generator (A7)	E4400-60070
2	1	1	1	Board Assembly, Generator/1 Meg (A8)	E4400-60154
3	1	0	0	Firmware Upgrade Kit, Digital	E4400-60230
4	1	1	1	UN8 Option Label	7120-1232
5	1	1	1	Ribbon Cable Interconnect (W19)	8120-8349
6	1	1	1	Ribbon Cable (W18)	8120-8457
7	2	0	0	SMB Cable (W25/W26)	8120-8748
8	3	0	0	Coax Cable (W3/W4/W5) Longer cables, if needed	8120-5063
9	1	0	0	Installation Note	E4400-90167
10	1	1	1	Ribbon Cable (W27), A7 to A8	8120-8725
11	1	0	1	Coax Cable (W24), A7 (Option UN8) to A5 (Option UND)	E4400-20131
12	1	0	0	ESG Digital Documentation Set	E4400-90322

   * Implies no other digital hardware options are installed.

Tools Required

❏ T-10 TORX screwdriver

❏ T-15 TORX screwdriver

❏ Long-nose pliers

❏ 9/16-in. Socket

WARNING	**Before you disassemble the signal generator, turn the power switch off, and disconnect the line cord. 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

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 on power 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

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

Removing Option UN3 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**, then select **Hardware Options.**

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

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

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

5. To disable Option UN3, press the softkey **Proceed With Reconfiguration.**

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

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

Removing Option UN3 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, 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 baseband generator board (Figure 2, page 7).

NOTE If Option UND is also installed, refer to Figure 3 on page 8 and disconnect W15, W16, W17, W18, and W24 from the dual arb board (A5).

   If Option UN7 is also installed, refer to Figure 4 on page 9 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, and W5, and W19 from the A8 data generator board (Figure 5, 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).
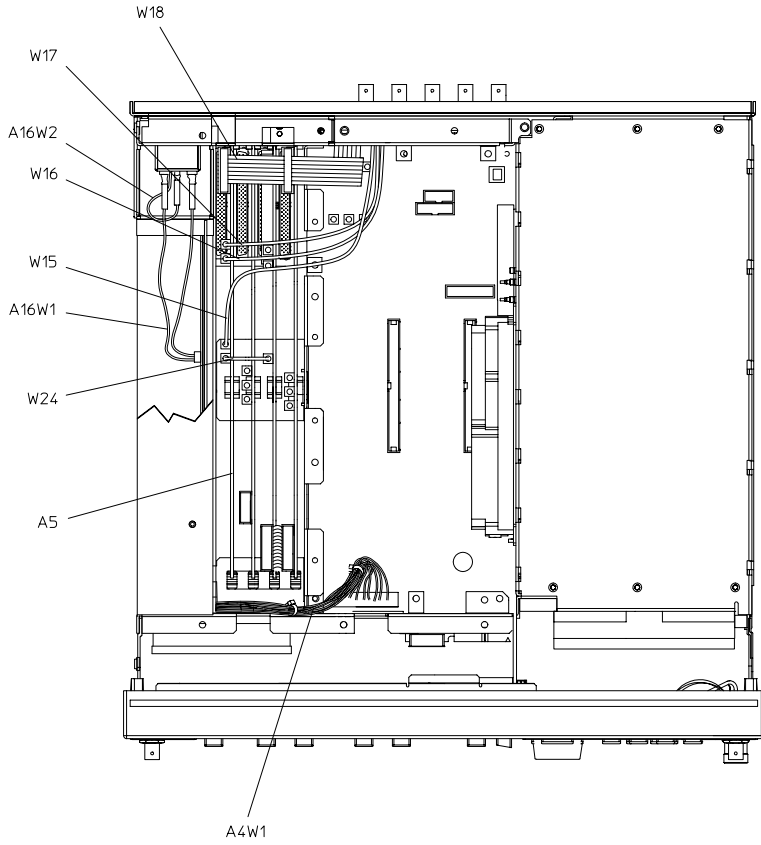
Figure 1   **Cover Removal**
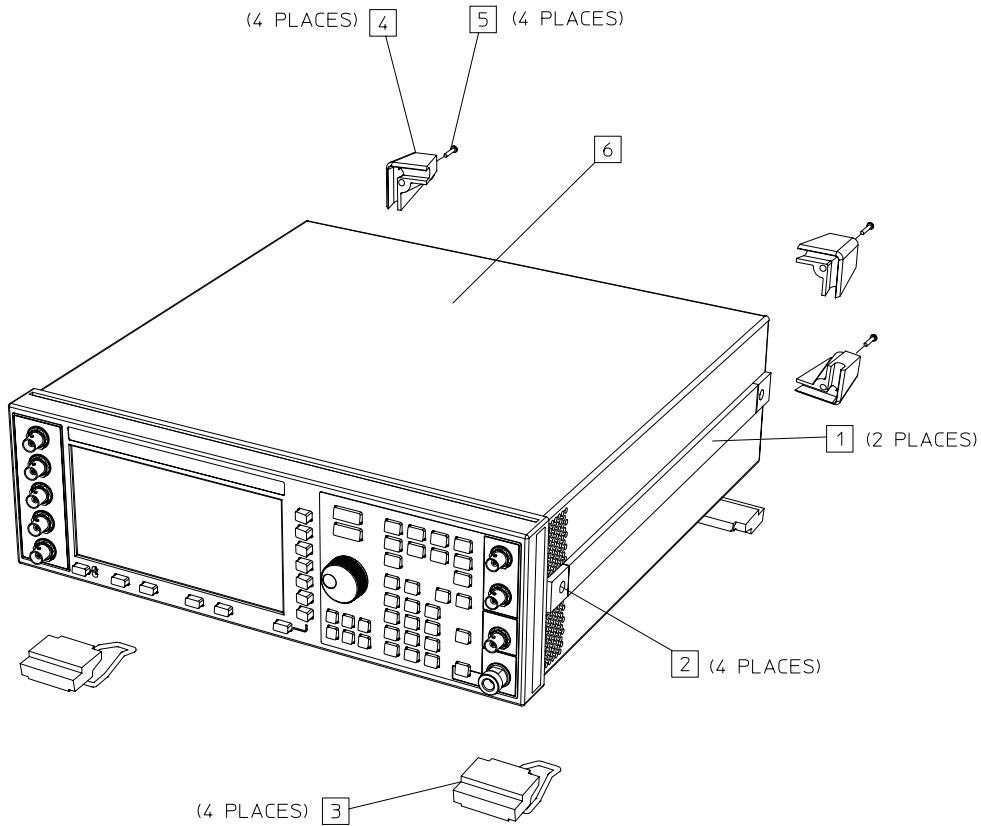
Figure 2   **Option UN3 A7 Baseband Generator Board and Cables**
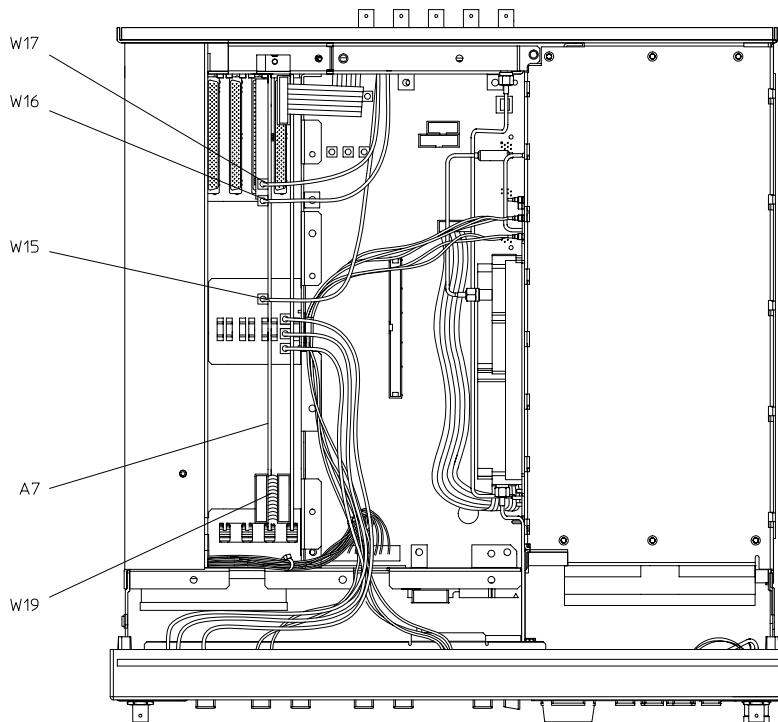
Figure 3   Option UND A5 Dual Arb Board and Cables

W18

W17

A16W2

W16

W15

A16W1

W24

A5

A4W1

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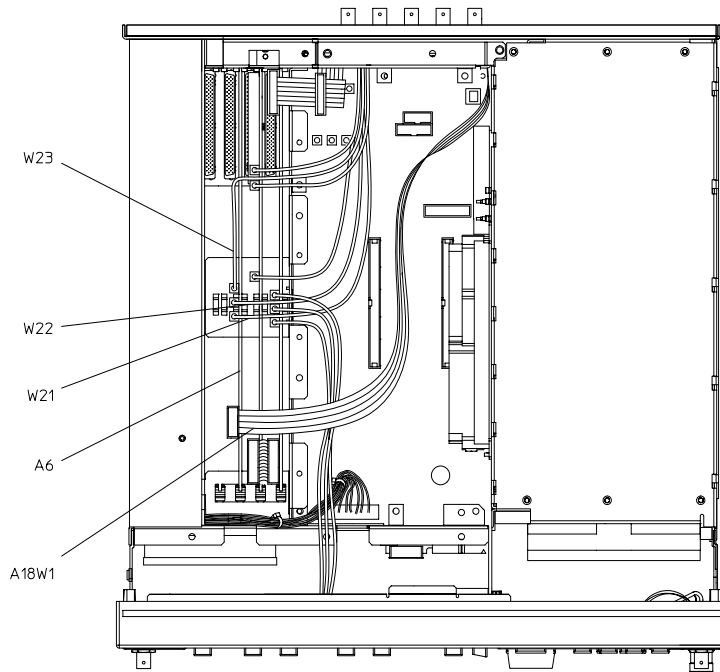**Figure 4**   **Option UN7 A6 Bit Error Rate Test Board and Cables**
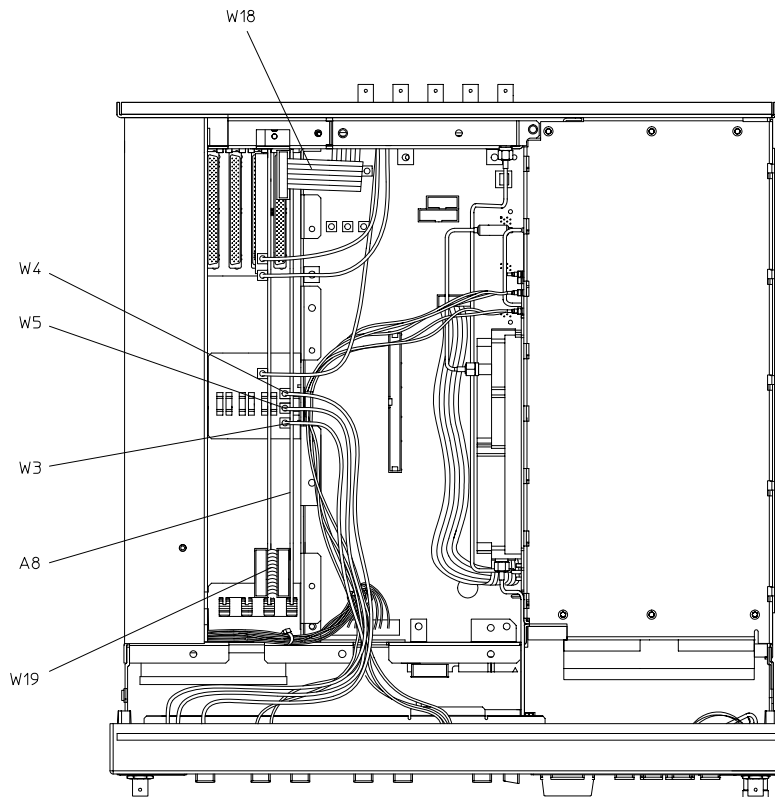

Figure 5   **Option UN3 A8 Data Generator Board and Cables**

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Installing Option UN8 Hardware and Cables

Refer to Figures 6 and 7 on page 11 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 refer to Figure 3 on page 8.

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 with wavey washer and hex nuts. Torque to 21 in-lb.

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.

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

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

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

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

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.

10. If the 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 from A7P10 to A8P4.

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

13. Remove the W25 (`INT Q`) cable from between the motherboard connector A14P103 and the A15 daughterboard, and replace it with the W25 cable provided in this upgrade kit (Figure 7, page 11).

NOTE A14P103 and A14P102 are located under W18.

14. Remove theW26 (`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.
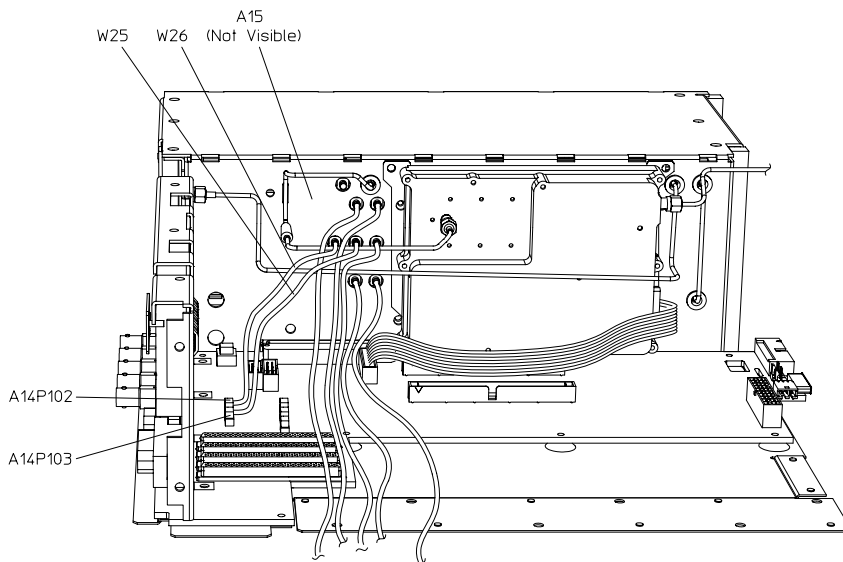
Figure 6   Option UN8 Top View
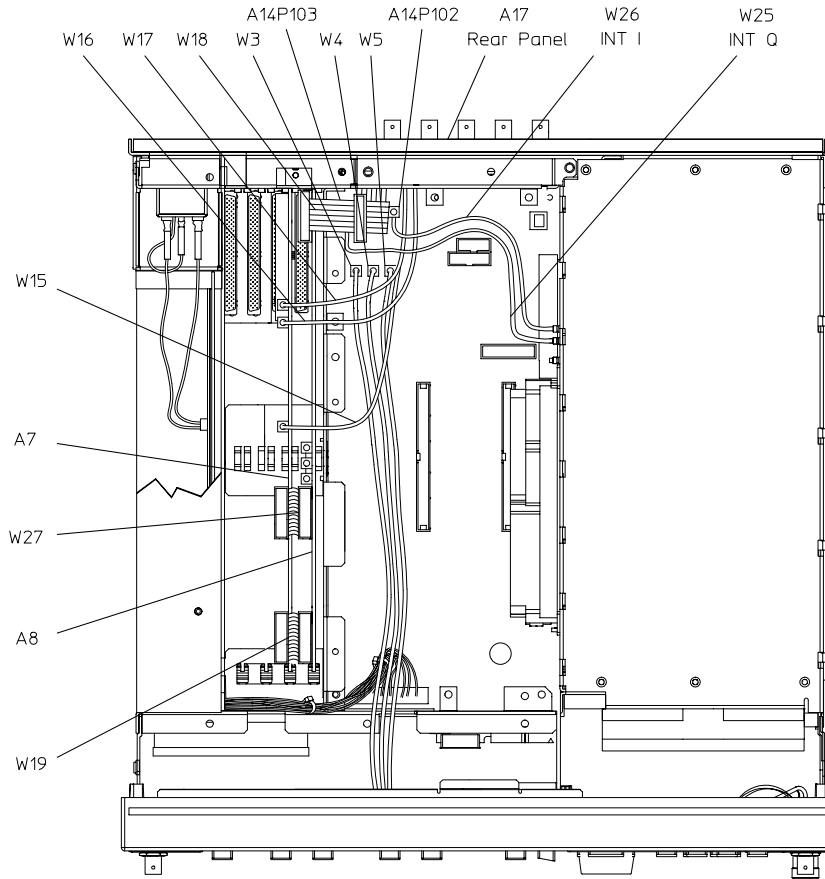
Figure 7   Cables W25 and W26

Verifying Cable Connections

Verify that all cables listed in the following table are installed and routed as shown in Figures 3 and 4 on page 9, Figure 6 on page 11, and Figure 8 on page 13.

Table 2   **Cable Routing (front to rear)**

Cable Description	Reference Designator	Color Number*	Connection Point to Point
Option UN8 Only (Figure 6 on page 11)			
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	Daughter Board (A15) to A14P103
INT I	W26	06	Daughter Board (A15) to A14P102
Option UN8 & Option UN7 (Option UN7 Connections, Figure 4 on page 9)			
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 & Option UND (Option UND Connections, Figure 3 on page 8)			
BASEBAND 13 MHz	W24	–	A5J4 to A7J3
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

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

Figure 8   Options UN8/UN7/UND Top View
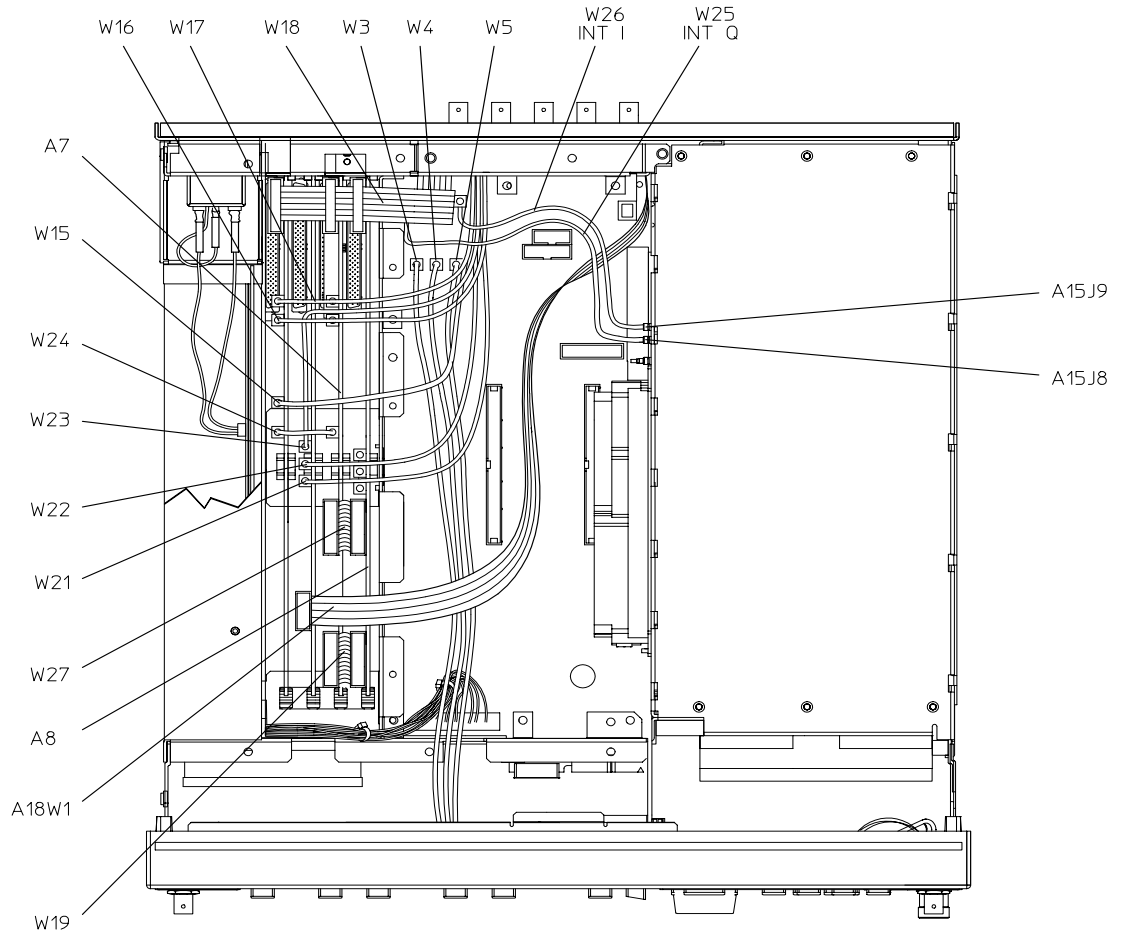
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Installing New Firmware

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

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

2. Preset the signal generator, then press the MENUS hardkey **Utility**.

3. In the Utility softkey menu, select **Instrument Adjustments**.

4. Select **Hardware Options**. As when you removed Option UN3, the signal generator displays a list of hardware options.

5. Highlight Option UN8.

6. Press the **Select Item** softkey. An X is placed in the Selected column for Option UN8.

7. 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, then press the MENUS hardkey **Utility**.

2. In the Utility softkey menu, select **Instrument Adjustments**.

3. Select **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 Option UN8"**.

4. Select **Calibrate Selected Items**, then **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 on 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 instrument), and torque the two screws on each handle to 21 in-lb (Figure 1 and 2).

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

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