Installation Note

Agilent Technologies ESG-D Series Signal Generators E4430B, E4431B, E4432B, and E4433B

Upgrade Standard ESG–D “B” (Add Option UN8)

Kit Part Number E4400-60170

Agilent Technologies

HP Part Number E4400-90218
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E4400-60170 Upgrade Kit (Add Option UN8)

Use this upgrade kit to add Option UN8, Real-Time I/Q Baseband Generator with TDMA Standards, (with 1M of RAM) to a standard instrument.

Product Affected:	E4430B, E4431B, E4432B, E4433B ESG-D Series Signal Generators
Serial Numbers:	All
Options:	–
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:	2.0 hours
Estimated Verification Time:	0.1 hours

Installation Kit Parts List

Quantity	Description	Part Number
1	Front Panel Overlay (Opt UN8)	E4400-80006
1	Blank rear panel (Opt UN8)	E4400-00031
1	Real-Time I/Q Baseband Generator (A7)	E4400-60070
1	Board Assy-Generator/1 Meg (A8)	E4400-60154
1	Rear Panel Board Assembly RP INT BNC (A17)	E4400-60145
1	Firmware Upgrade Kit Digital	E4400-60172
11	Washer 0.472 ID	2190-0102
14	Nut Hex 15/32-32	2950-0035
3	Washer 0.490 ID	3050-1919
3	Hole Plug 0.500 D	6960-0002
1	UN8 Option Label	7120-1232
1	BNC Cable (W3), A14P5 to DATA	8120-5063
1	BNC Cable (W4), A14P6 to DATA CLOCK	8120-5063
1	BNC Cable (W5), A14P7 to SYMBOL SYNC	8120-5063
1	BNC Cable (W15), A7P403 to BASEBAND GENREF IN	8120-5055
1	BNC Cable (W16), A7P404 to Q OUT	8120-5055
1	BNC Cable (W17), A7P405 to I OUT	8120-5055
1	Ribbon Cable (W18), A17 to A8	8120-8457
1	Ribbon Cable Interconnect (W19), A7 to A8	8120-8349
1	Coax Cable (W24), A7 (Opt. UN8) to A5 (Opt. UND)	E4400-20131
2	SMB Cable (W25 & W26)	8120-8748
1	Ribbon Cable (W27), A7 to A8	8120-8725
1	Safety Solvent	8500-6296
1	Installation Note	E4400-90218

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

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 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.

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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.

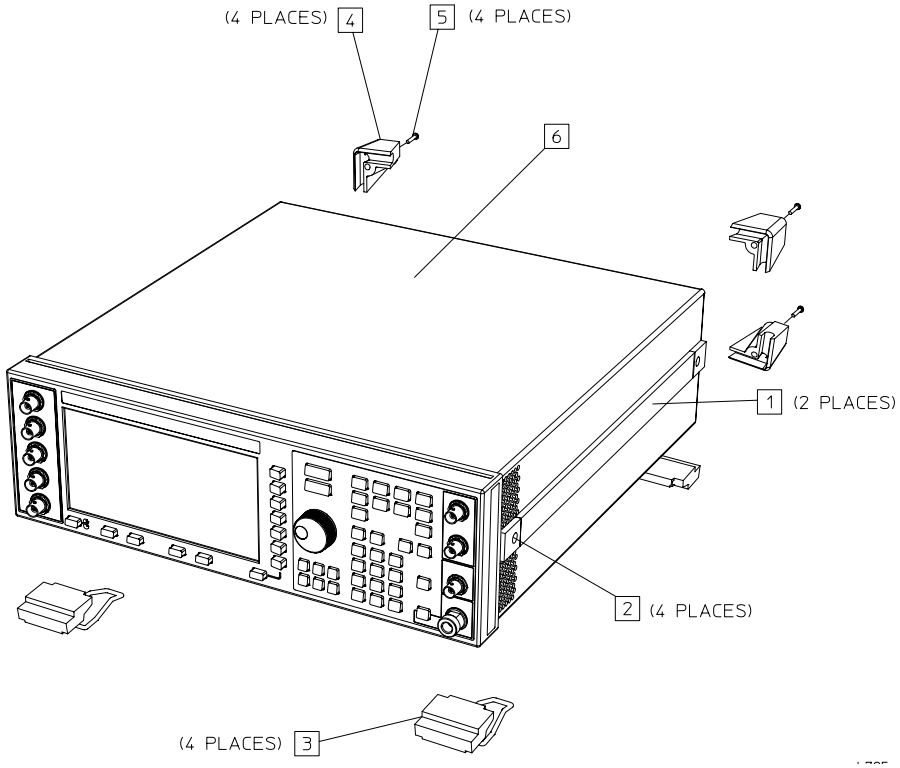
   If there is more than one error message (each message will be designated as 1 of *n*), press the **View Next Error Message** softkey until you have seen all of the messages.
5. After you have resolved all of the error messages, press **Clear Error Queue(s)** to delete the messages. Then restart this procedure at step two.

Removing Standard Hardware

Removing Covers and A16W1

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 the two screws (item 2) on each handle.
3. Remove the four bottom feet (item 3).
4. To remove the four rear feet (item 4), remove the four screws (item 5).
5. Slide the instrument cover (item 6) off the back of the signal generator.
6. To remove the top cover, remove the 11 screws that secure it.
7. To remove the bottom cover, remove the 15 screws that secure it.
8. Refer to Figure 2 on page 7. Disconnect A16W1 from the power supply (A4). You can access A16W1 through an opening in the bottom of the power supply shield (item 1).

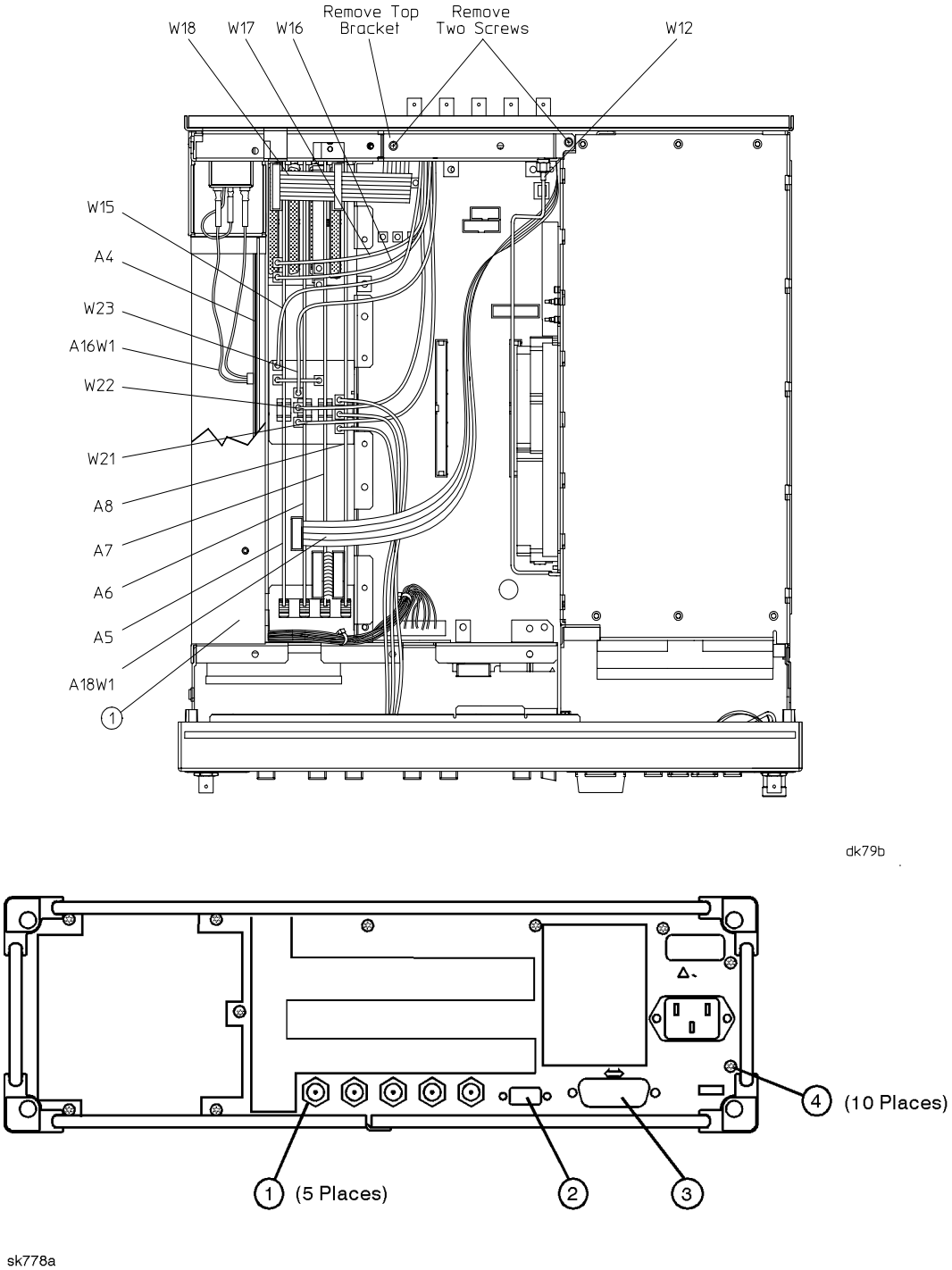
Figure 1 Cover Removal



Removing the Rear Panel

1. Refer to Figure 2. Remove the nuts and washers that secure the 5 BNC connectors (item 1).
2. Remove the hex screws and washers that secure the AUXILIARY INTERFACE (item 2) and GPIB (item 3) connectors to the rear panel.
3. Remove the 10 screws (item 4) that secure the rear panel to the instrument chassis.
4. Remove the two screws and the bracket from top of the rear chassis; save the bracket.
5. Disconnect the coherent carrier cable (W12) from the rear panel.
6. Pull the rear panel assembly away from the instrument chassis.

Figure 2 Removing the Rear Panel



Removing Hardware and Parts from the Rear Panel

1. Remove the screws that secure the line module, and the nut that attaches the green ground wire.
2. Loosen the nut that secures the coherent carrier dust cap.
3. Remove the screw that holds the chain, and remove it from the rear panel.
4. Loosen the nut that secures the serial tag, and remove the serial tag.
5. Discard the old rear panel.

Installing Option UN8 Hardware and Cables

Assembling and Installing the UN8 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 rear panel (E4400-00031). Torque to 21 in-lb.
2. Attach the coherent carrier (W12) to the rear panel. Add 1 washer and hex nut, and 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 UN8 label and attach it to the serial tag option location. This indicates that Option UN8 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 ground wire 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 rear panel to the instrument.
    a. Route the cables accordingly.
    b. Reconnect the coherent carrier (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.

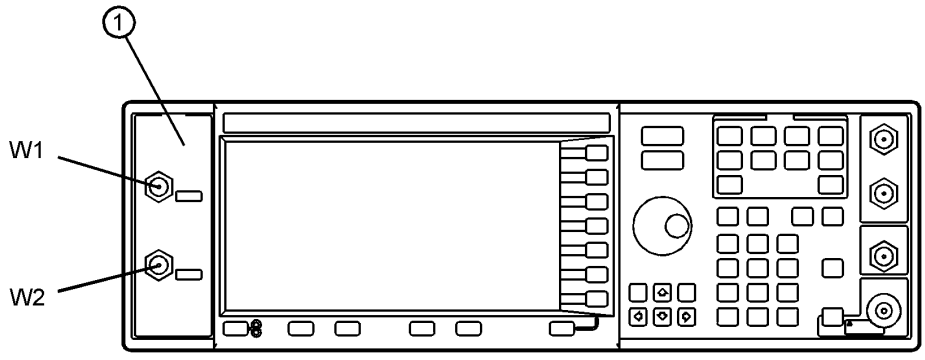
Reinstalling the Bottom Cover

Reinstall the bottom chassis cover, and torque the 15 screws to 9 in-lb.

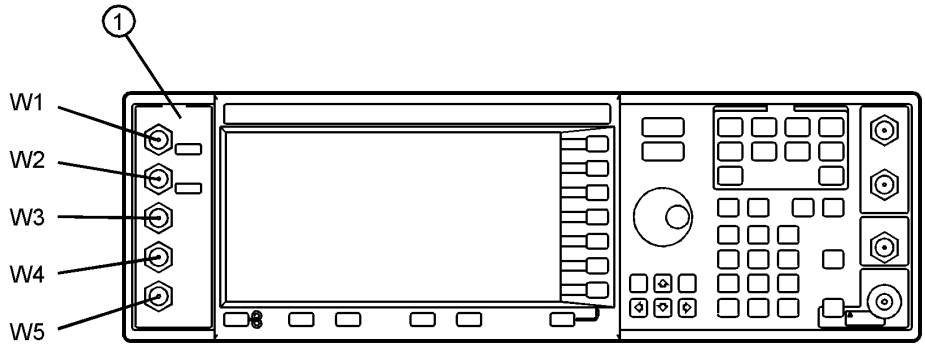
Modifying the Front Panel

1. Refer to Figure 3. 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 to remove the old label glue (supplied in this kit) from the front panel.
3. Install the Option UN8 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 wavey washer. Torque to 21 in-lb.
5. Reinstall the Q–INPUT cable (W2) in the front panel, and secure with a hex nut and wavey washer. Torque to 21 in-lb.
6. Install the DATA cable (W3) in the front panel, and secure with a hex nut and wavey washer. Torque to 21 in-lb.
7. Install the DATA CLOCK cable (W4) in the front panel, and secure with a hex nut and wavey washer. Torque to 21 in-lb.
8. Install the SYMBOL SYNC cable (W5) in the front panel, and secure with a hex nut and wavey washer. Torque to 21 in-lb.

Figure 3 Front Panel



Standard ESG-D Front Panel



UN8, UN9

dk710b

Installing the A7 and A8 Assemblies

1. Refer to Figure 4. 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.

Connecting Cables

1. For all instruments, connect and route the cables shown in Table 1. Refer also to Figure 4 and Figure 5 as needed.

Table 1 Cable Routing - All Instruments

Cable Description	Reference Designator	Color Number*	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 (A15) to A14P103
INT I	W26	06	Daughter Board (A15) to A14P102
*Cable color numbers appear in the Connector/Cable Diagram located on the top of the inside cover of the instrument.			

2. If your instrument has no additional options, connect and route the cables shown in Table 2. Refer also to Figure 4 as needed.

Table 2 Cable Routing - Instruments with No Additional Options

Cable Description	Reference Designator	Color Number	Connection Point to Point
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

Figure 4 Option UN8 Top View

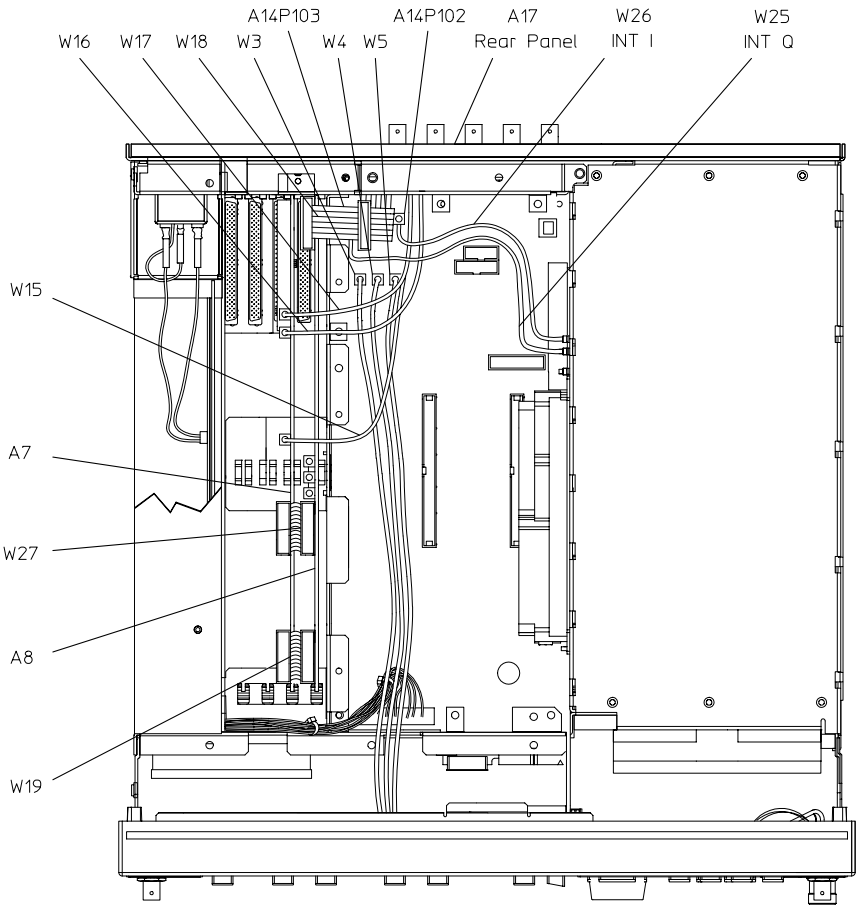
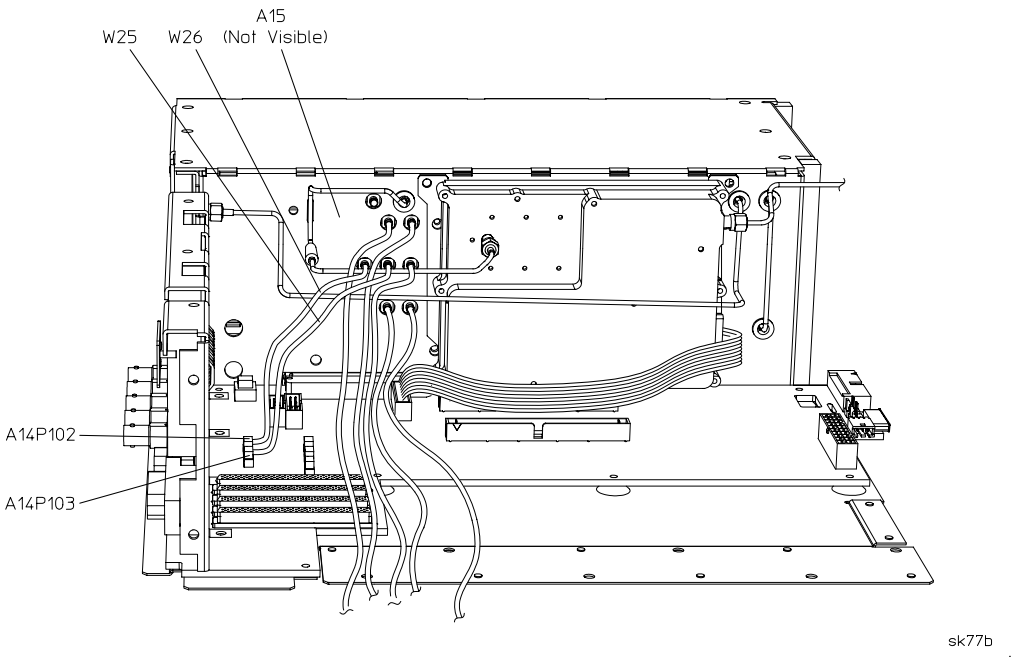


Figure 5 Cables W25 and W26

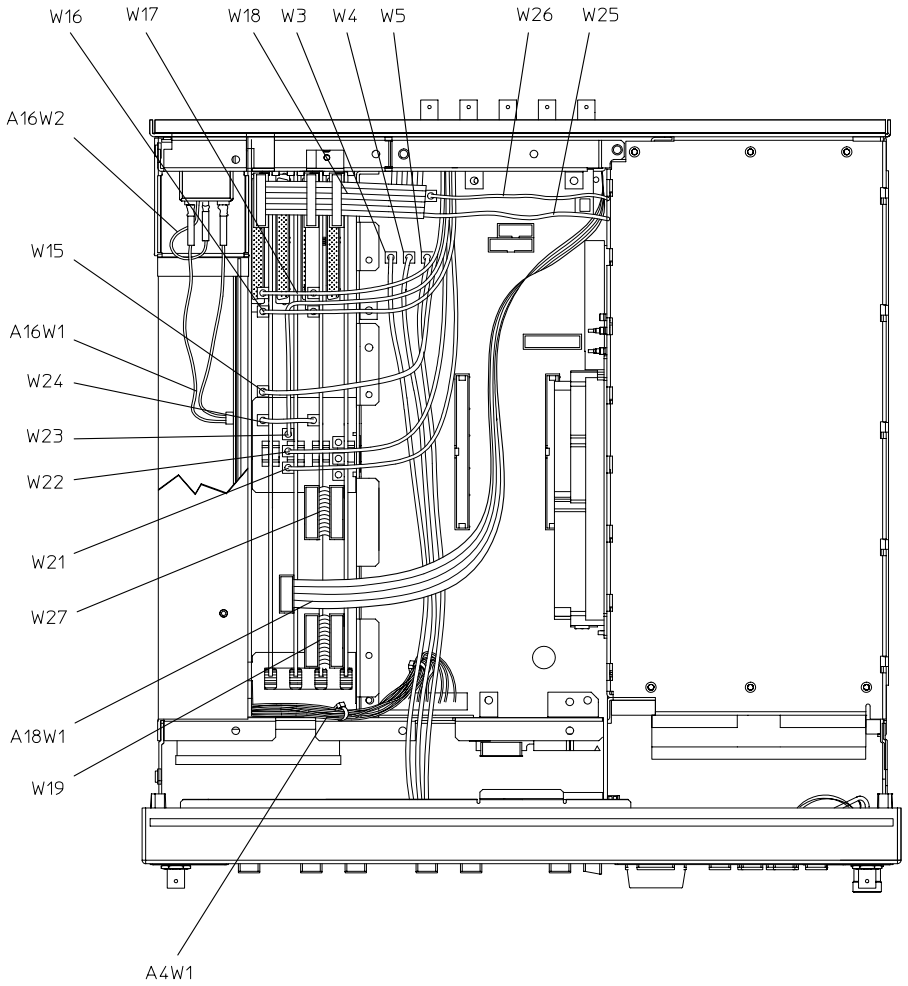


3. If your instrument's option configuration includes Option UN7 and UND, connect and route the cables shown in Table 3. Refer also to Figure 6.

Table 3 Cable Routing - Instruments with Options UN7 and UND

Cable Description	Reference Designator	Color Number	Connection Point to Point
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	–	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

Figure 6 Options UN8/UN7/UND Top View



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 instrument and allow it to warm up for at least 30 minutes.
2. Preset the instrument, then press the **Utility** hardkey.
3. In the Utility menu, select **Instrument Adjustments.**
4. Select **Hardware Options**. The instrument 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 instrument, then press the **Utility** hardkey.
2. In the Utility menu, select **Instrument Adjustments.**
3. Select **Hardware Options**. Confirm that an `X` appears in the `Selected` column for Option 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 6.

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).