

Installation Note

**Agilent Technologies ESG-B Family Signal Generators
Option 300 Enhancement Kit: Part Number E4400-60246**



**Part Number E4400-90392
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ESG-B Family Signal Generators Option 300 Enhancement Kit: Part Number E4400-60246

Product Affected:	E4430B, E4431B, E4432B, E4433B
Serial Numbers:	All
Options:	300
To Be Performed By:	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent Technologies (X) Customer
Estimated Installation Time:	2 hours
Estimated Verification Time:	0.25 hour

Introduction

This kit implements EDGE Loopback BERT for Option 300. The implementation consists of replacing two digital boards and upgrading the firmware. A confirmation procedure is included to check for proper functionality. For documentation on EDGE Loopback BERT for Option 300, refer to the *Option 300 User's and Programming Guide* that is included in this kit.

Enhancement Kit Parts List

Item	Quantity	Description	Part Number
1	1	A6 Board Assembly (BERT Board II)	E4400-60507
2	1	A21 Board Assembly (Demodulator Board II)	E4400-60241
3	1	Option 300 Installation Note	E4400-90392
4	1	Option 300 User's and Programming Guide	E4400-90305
5	1	Firmware Upgrade CD-ROM	E4400-10014

Checking Signal Generator Functionality

Use the following procedure to confirm that the signal generator powers up and that the internal check identifies no errors. The internal check evaluates the operation of the signal generator and returns an error message if it detects a problem.

NOTE

The signal generator must warm up for at least five minutes and all errors must be cleared from the error queue before a firmware upgrade can be successfully completed.

If errors exist in the error queue and a firmware upgrade is attempted, the firmware upgrade will be unsuccessful; new DSP code cannot be upgraded until the error queue has been cleared.

When signal generators with Option 1E5 are first connected to ac line power, the error message `ERROR 514, Reference Oven Cold` occurs which causes both the `OVEN COLD` annunciator and the `ERR` annunciator to turn on.

After approximately five minutes, the `OVEN COLD` annunciator automatically clears, but the `ERR` annunciator remains on until all errors are cleared from the error queue.

To check signal generator functionality

1. Turn on power to the signal generator and let it warm up for at least five minutes.
2. Cycle power on the signal generator. The green LED should light and the signal generator should perform a functionality check.
3. When the display lights, check to see if the `ERR` annunciator is on.
 - If the `ERR` annunciator is on, review the error messages in the error queue by pressing **Utility > Error Info > View Next Error Message**. The first error message in the error queue appears in the display text area. (Refer to the signal generator error messages document for information about each error message.)

After resolving all problems causing errors, press **Clear Error Queue(s)**.

- If the `ERR` annunciator is off, the signal generator functionality check has passed.

Tools Required

- TORX T-10 driver
- TORX T-15 driver
- TORX T-20 driver
- Long nose pliers

Other Requirements

Hardware Option UN8 or UN8/9, with the software Option 202 Edge must be installed on the signal generator.

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.

Confirming Required Equipment

This section lists the minimum computer, its associated hardware, operating system, and software that are required to perform firmware upgrades on ESG-B family signal generators with Option 300.

Hardware	
Computer	IBM compatible PC with a 486 MHz processor or greater
RAM Required	64 MB or more
Hard Disk Space Required	20 MB or more This could increase significantly if a large library of firmware upgrade files are expected to be maintained on the PC. A single firmware release consists of approximately 5 to 7 MB of data.
CD-ROM Drive or Modem	Use of a CD-ROM drive is only required when the computer being used does not have Internet access. Use of a 56 k modem is only required for systems downloading firmware updated from the Internet.
GPIB Connection	Refer to “GPIB Interface Requirements” on page 7.
Operating System	
IBM PC Operating System	Windows 98, or Windows 2000, or Windows NT 4.0 (with Service Pack 5 or above)
Software	
Internet Browser	Use of an Internet Browser is only required for downloading firmware files from the Internet or for viewing firmware release information on your local PC or over the Internet. Microsoft Internet Explorer 4.0 and above, or Netscape Navigator 4.0 and above Either browser must be Java enabled with Java 1.02 or above.

GPIB Interface Requirements

Interface Cards	Manufacturer	Driver Software	Revision	Windows Version
Agilent 82341C for ISA bus computers	Agilent Technologies	I/O Libraries SICL & VISA	J.01.01.00	98/2000/NT 4.0
Agilent 82350A for PCI bus computers				
PCI-GPIB	National Instruments	NI-488.2M	1.60	98/2000/NT 4.0
PCI-GPIB+				2000/NT 4.0
PCMCIA-GPIB				98/2000/NT 4.0

Preparing the Signal Generator for an Option 300 Configuration

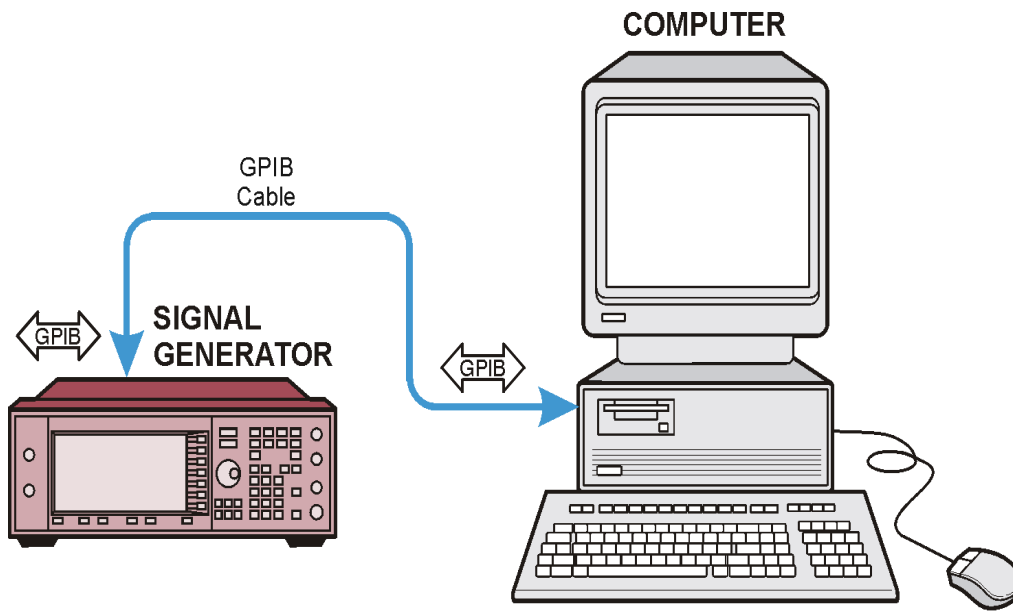
The following procedure will temporarily disable Option UN7 as an option selection.

Removing Option UN7 Firmware

1. Press **Preset**.
2. Press **Utility > Instrument Adjustments > Hardware Options**.
The signal generator displays a list of hardware options, and an X indicates a selected option.
3. Highlight Option UN7 and press **Deselect Item**.
This removes the X, indicating that Option UN7 is no longer selected.
4. Press **Proceed With Reconfiguration**.
This disables Option UN7.
5. Press **Confirm Change (Instrument will Reboot)**.
The signal generator reboots to the preset condition and removes Option UN7.

Connecting the Signal Generator to a PC Using a GPIB Interface Card

1. Connect the signal generator to the PC as shown in the following diagram.
GPIB communications require a GPIB interface card installed in the PC and a GPIB cable connected between the interface card and the signal generator's GPIB connector.
Two common GPIB interface cards are the National Instruments PCI-GPIB and the Agilent GPIB interface cards. (Refer to [“GPIB Interface Requirements” on page 7](#) and refer to the documentation that came with the GPIB interface card for information related to installing and configuring the GPIB interface card in your computer.)



2. Set GPIB parameters as follows on ESG-B family signal generators:

- a. Press **Utility > GPIB/RS-232 > GPIB Address > 19**.
- b. Use the numeric keypad, the arrow keys, or rotate the front panel knob to set the desired address and press **Enter**.

The signal generator's GPIB address is set to 19 at the factory. The acceptable range of addresses is 0 through 30. Once initialized, the state of the GPIB address is not affected by a signal generator preset or by a power cycle. Other instruments on the GPIB cannot use the same address as the signal generator.

Installing ESG-B Upgrade Assistant 3.3

ESG Upgrade Assistant 3.3, or greater, must be used along with the firmware release files to upgrade firmware on ESG-B family signal generators. The upgrade assistant and the latest firmware release are both available for download from a CD-ROM or from the Agilent Technologies website.

Method 1: To Install ESG-B Upgrade Assistant 3.3 from CD-ROM

1. Insert the firmware upgrade CD-ROM into the computer's CD-ROM drive.
2. Install ESG-B Upgrade Assistant 3.3:
 - **Install_Upgrade_Assistant_3.3.exe** places ESG-B Upgrade Assistant 3.3 in the default installation folder (C:\Program Files\Agilent\ESG-B Upgrade Assistant). The default installation folder can be changed using the **Browse** button.

After installation, run ESG-B Upgrade Assistant 3.3 from either the Windows Programs menu (for example, **Start/Programs/Agilent/ESG-B Upgrade Assistant 3.3**) or from the desktop's shortcut icon (if this option was selected during installation) and follow all program prompts.

3. Proceed to [“Performing ESG-B Firmware Upgrade Using the ESG-B Upgrade Assistant” on page 11.](#)

Method 2: To Install ESG-B Upgrade Assistant 3.3 and Firmware Release Files from the Internet

1. Access the Agilent Technologies website at: <http://www.tm.agilent.com>
2. From the Agilent Technologies website, in the **Quick Search** box, type “Upgrade Assistant”.
3. From the list that is displayed, select ESG-B Upgrade Assistant 3.3 and download the installation program onto your computer.
4. Install ESG-B Upgrade Assistant 3.3:
The installation program places ESG-B Upgrade Assistant 3.3 in the default installation folder (C:\Program Files\Agilent\ESG-B Upgrade Assistant). The default installation folder can be changed using the **Browse** button.
5. From the Agilent Technologies website, in the **Quick Search** box, type the version of the firmware upgrade files to be downloaded. For Option 300 Rev B, version B.03.84 or greater is required.
6. From the list that is displayed, select the version of firmware upgrade files and download them onto your computer.
7. After installing both ESG-B Upgrade Assistant 3.3 and a version of firmware upgrade files from the Internet, run ESG-B Upgrade Assistant 3.3 from either the Windows Programs menu (for example, **Start/Programs/Agilent/ESG-B Upgrade Assistant 3.3**) or from the desktop icon (if this option was selected during installation) and follow all program prompts.

8. Proceed to [“Performing ESG-B Firmware Upgrade Using the ESG-B Upgrade Assistant” on page 11.](#)

Performing ESG-B Firmware Upgrade Using the ESG-B Upgrade Assistant

ESG-B Upgrade Assistant 3.3 is used along with firmware release files to upgrade firmware on ESG-B family signal generators.

Use the following procedure to upgrade ESG-B family signal generators by transferring the firmware upgrade files to the signal generator.

1. Start the upgrade assistant program.
2. From the program’s **Setup Parameters** dialog box, select the **Connection Type** to be GPIB. Use GPIB Port 0 and Address 19. These values should correspond with the values that are set on your signal generator.

For example, the signal generator is usually set to GPIB Port 0 and Address 19 and the GPIB interface card in the computer is usually set to GPIB Port 0 and Address 21. These values are chosen by convention, but any address in the range 0-30, inclusive, may be used. (For further information, refer to the documentation that came with your GPIB interface card.)

3. From the program’s **Setup Parameters** dialog box, under **Firmware Release**, click the **Browse** button.
4. From the **Select Release File** dialog box, locate and double-click the folder for the version of firmware that you would like to install. For Option 300 Rev B, version B_03_84_2001_Sep or greater is required.
5. When the folder opens, double-click the filename for the version of firmware that you would like to install (for example, B_03_84.esg).
 - a. To review the firmware release information, click the **View Release Information** button.
 - b. Click any Special Case that may apply to the upgrade:
 - Select the **Added New Hardware** checkbox if new hardware has been added to the signal generator.
 - Select the **Recover Failed Upgrade** checkbox if a previous firmware upgrade had been aborted or failed and a recovery is required. This checkbox can only be used on ESG-B family signal generators.
 - c. Click the **Next** button to proceed.
6. From the program’s **Select Components** dialog box:
 - a. Verify, under **Selected Release**, that the correct firmware version has been selected.
 - If the firmware version needs to be changed, use the **Back** button and return to step 3 of this procedure.
 - b. Verify, under **Firmware Revision**, that the version of the firmware designated as Installed is to be replaced by the version designated as New.

Verify, under **Upgrade Selection**, that all firmware components are to be upgraded. By default, all upgrade components are selected.

c. Click the **Next** button.

7. From the program's **Confirm Upgrade** dialog box, click the **Next** button to begin the firmware upgrade.

An Upgrade in progress area is displayed that indicates the estimated time remaining to complete the upgrade process.

The program performs a number of checks to confirm proper configuration for the PC and the signal generator. The ESG-B Upgrade Assistant will then proceed with downloading the selected firmware release into the signal generator.

CAUTION

When the firmware download is complete, the ESG-B Upgrade Assistant will display the following message:

“Power Cycle the signal generator and IMMEDIATELY click OK”

For this upgrade, **DO NOT** power the signal generator or click OK at this time. This step will be done later.

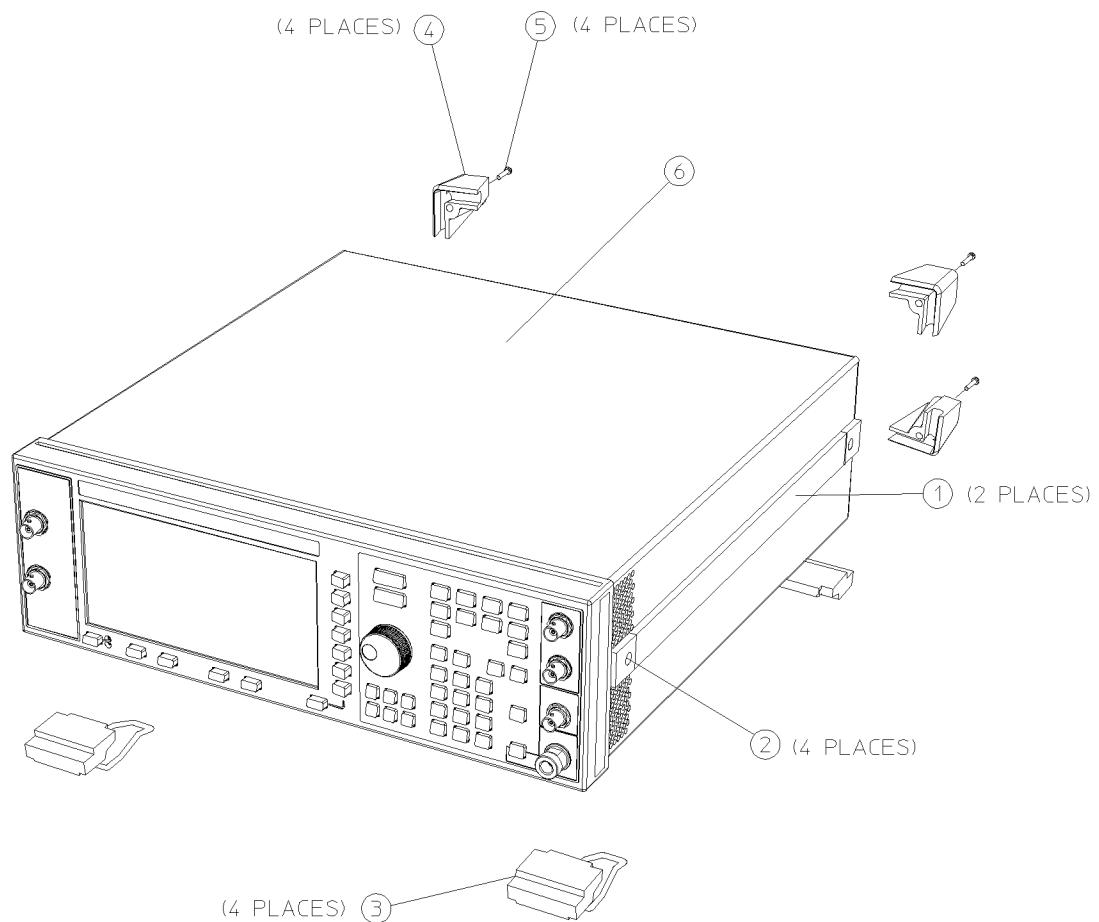
8. Proceed to [“Removing and Replacing Option 300” on page 13.](#)

Removing and Replacing Option 300

Removing the Top Chassis Cover

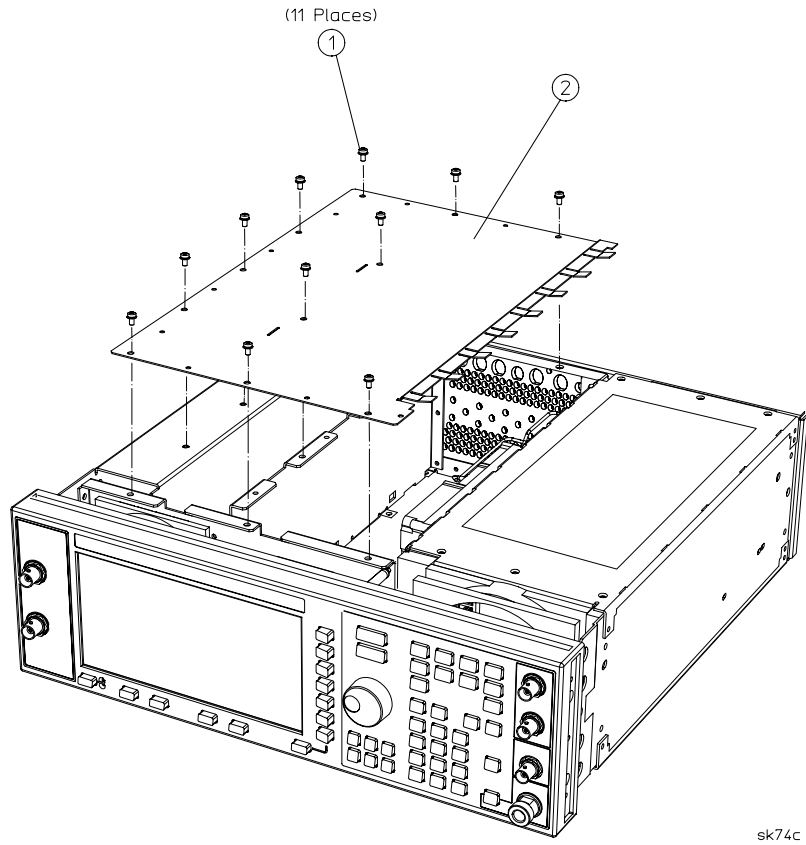
1. Turn the signal generator power switch off.
2. Disconnect the signal generator from the power source and the GPIB cable.
3. Refer to [Figure 1](#). Remove the two strap handles (item 1) from each side of the signal generator by loosening the two screws (item 2) on each handle.
4. Remove the four bottom feet (item 3).
5. Remove the four rear feet (item 4) from the signal generator by removing the four screws (item 5) that secure them.
6. Slide the instrument cover (item 6) off the back of the signal generator.
7. Refer to [Figure 2 on page 14](#). Remove the 11 screws (item 1) that secure the top chassis cover (item 2).

Figure 1 Exterior Cover Removal



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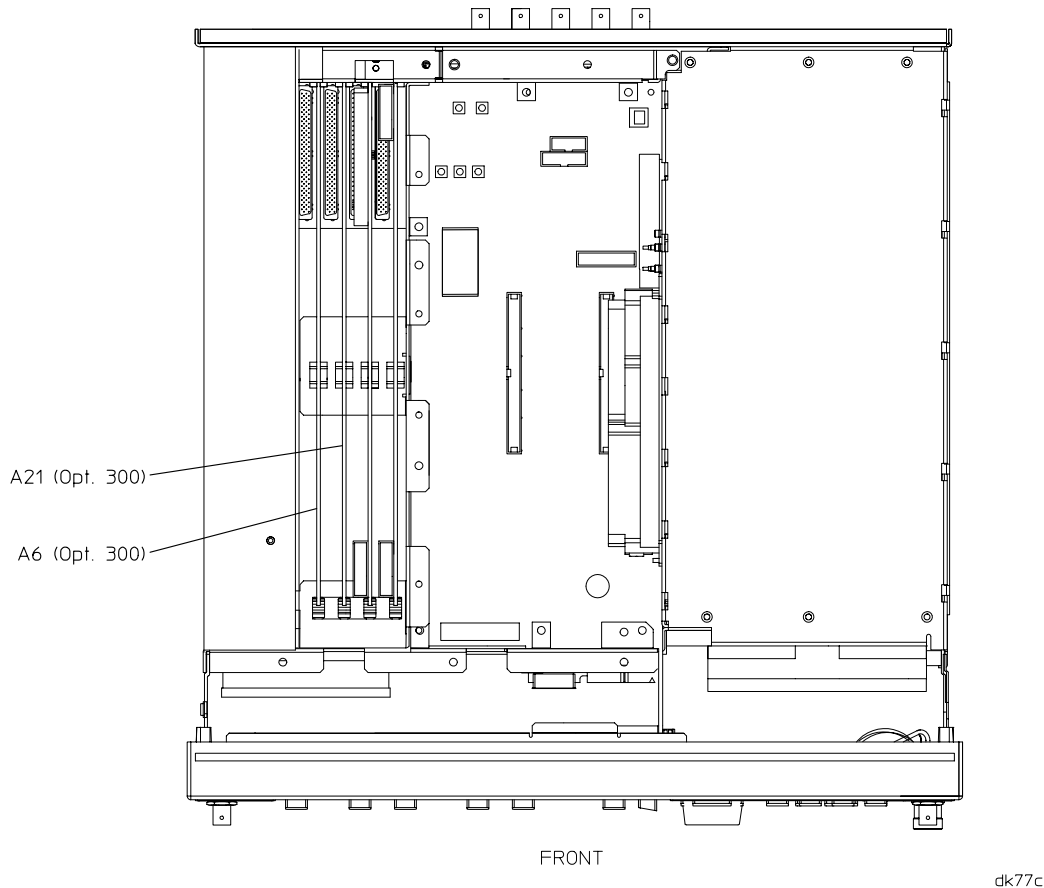
Figure 2 **Top Chassis Cover Removal**



Removing and Replacing Option Specific Hardware

1. Refer to [Figure 3](#). Disconnect all of the cables and harnesses from the A6 and A21 boards.

Figure 3 Location of Option 300 Card Cage Boards

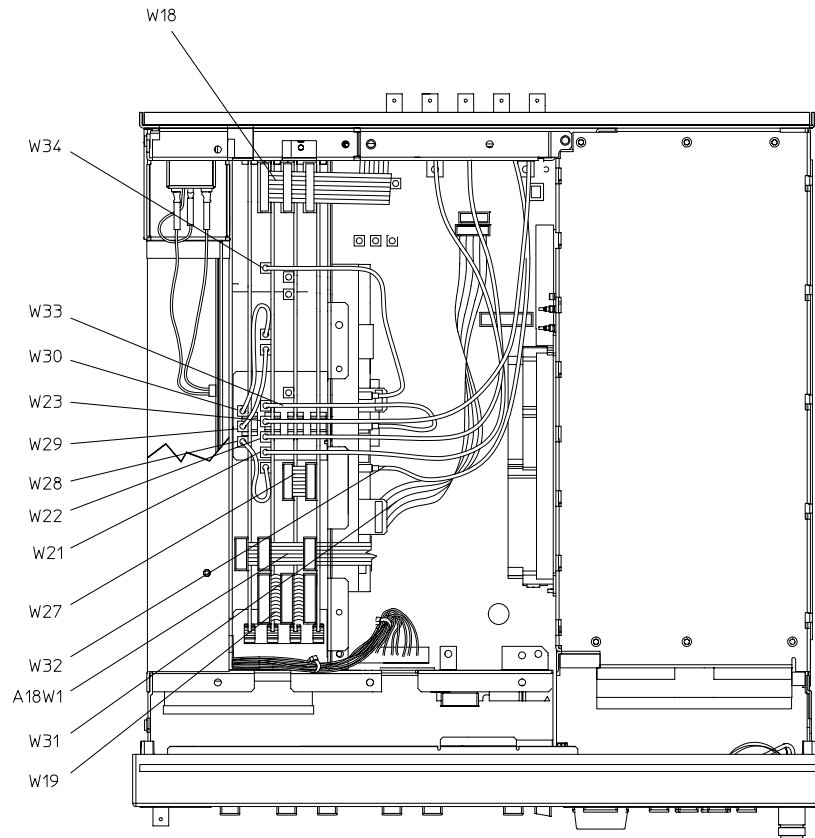


2. Pull up on the A6 and A21 boards to remove them from the CPU/motherboard connector.
3. Replace the A6 and A21 boards with the A6 and A21 boards from the kit.
4. Refer to [Table 1 on page 16](#) and [Figure 4 on page 17](#). Make the proper connections for the cables and connectors.

Table 1 Connector and Ribbon Cable Reference (ESG-D Series - Option 300)

Reference Designator	Part Number	Qty	Description
W18	8121-0042	1	16-Pin Ribbon Cable, Rear Panel I/O, Rear Panel Interface Board (A17) to Data Generator (A8), Baseband Generator (A7), and Demodulator (A21) (connects in four places)
W19	8121-0040	1	24-Pin Ribbon Cable, BBG I/O, Data Generator (A8) to Demodulator (A21)
W21	8120-5055	1	Flexible Cable, BER GATE IN (RP) to Demodulator (A21)
W22	8120-5055	1	Flexible Cable, BER CLK IN (RP) to Demodulator (A21)
W23	8120-5055	1	Flexible Cable, BER DATA IN (RP) to Demodulator (A21)
W27	8120-8725	1	16-Pin Ribbon Cable, Parallel Data In, Data Generator (A8) to Baseband Generator (A7)
W28	8120-5206	1	Flexible Cable, BERT (A6, BER Gate In) to Demodulator (A21)
W29	8121-0045	1	Flexible Cable, BERT (A6, BER Clk In) to Demodulator (A21)
W30	8120-5014	1	Flexible Cable, BERT (A6, BER Data In) to Demodulator (A21)
W31	8120-8789	1	Ribbon Cable, Motherboard (A14J26) to Down Convertor (A20)
W32	8121-0044	1	Flexible Cable, 321.4 MHZ IN (RP) to Down Convertor (A20)
W33	8121-0043	1	Flexible Cable, Down Convertor (A20, 26 MHz) to Demodulator (A21, Freq Ref 26 MHz)
W34	8121-0043	1	Flexible Cable, Down Convertor (A20, IF In) to Demodulator (A21, IF In)
A18W1	(part of A18)	1	10-Pin Ribbon Cable, BER Status, BERT Rear Panel Interface (A18) to Data Generator (A8), Baseband Generator (A7), and BERT (A6)

Figure 4 Connector and Ribbon Cable Location (ESG-D Series Option 300)



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Reassembling the Signal Generator

1. Refer to [Figure 2 on page 14](#). Replace the top cover (item 2), and torque the 11 screws (item 1) that secure it to 9 in-lbs.
2. Refer to [Figure 1 on page 13](#). From the back, slide the instrument cover (item 6) onto the signal generator.
3. Replace the four rear feet (item 4), and torque the four screws (item 5) to 21 in-lb.
4. 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.
5. Replace the four bottom feet (item 3).

Activating Options BER/300

1. Connect the signal generator to the power source and attach the GPIB cable.
2. Turn on the signal generator and allow it to warm up for at least 10 minutes.

NOTE Ignore any errors that may be displayed.

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

The signal generator displays a list of hardware options.

4. Highlight Option UN7.

5. Press **Select Item**.

An X is placed in the *Selected* column for Option UN7.

6. Press **Proceed With Reconfiguration > Confirm Change (Instrument will Reboot)**.

This enables the selected option.

After the signal generator has completed the reboot, repeat the following steps:

1. Press **Utility > Instrument Adjustments > Hardware Options**.
2. Verify that Opt BER has an X placed in the *Selected* column. An X indicates the hardware has been identified by the firmware. Go to step 3.

If no X appears, one of the following has occurred:

- the hardware was improperly installed
- the installation process failed

Review the complete installation process.

If no resolution can be found, there may be a problem with the new hardware. Contact the closest Agilent sales office.

3. Press **Utility > Error Info > Clear Error Queue(s)**.

This should remove any residual errors.

4. Power cycle the signal generator and IMMEDIATELY click OK as directed by the ESG Upgrade Assistant.

- Wait for the ESG Upgrade Assistant to re-boot the signal generator.
- The ESG Upgrade Assistant will verify the download and provide an “Upgrade Summary” indicating the status of the download.

5. When the display lights, check to see if the ERR annunciator is on.

- If the ERR annunciator is on, review the error messages in the error queue by pressing **Utility > Error Info > View Next Error Message**. The first error message in the error queue appears in the display text area. (Refer to the signal generator error messages document for information about each error message.)

After resolving all problems causing errors, press **Clear Error Queue(s)**.

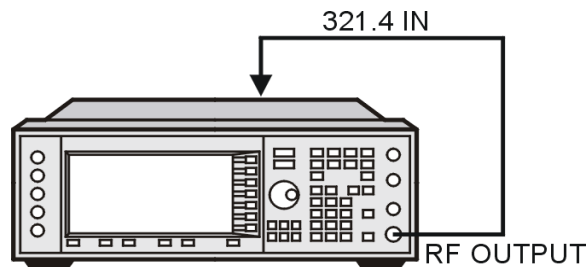
- If the ERR annunciator is off, the signal generator functionality check has passed.

Checking Option 300 Functionality

The following procedure verifies the operation of Option 300 by looping the uplink transmitted signal directly back to the ESG.

Configure the ESG 1. Refer to [Figure 5](#). Connect the RF output to the 321.4 IN connector on the rear of the signal generator.

Figure 5 Equipment Setup



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2. Press **Preset**.
3. Press **Frequency** > **321.4** > **MHz**, then press **Amplitude** > **-10** > **dBm**.
4. Press **RF ON/OFF**.

The RF ON annunciator is now displayed.

5. Press **Mode** > **BERT** > **BTS BERT EDGE Loopback** > **Configure Measurement** > **Transmit Settings**.
 6. Press **Data Format Pattern Framed** until Framed is highlighted.
 7. Press **Configure Timeslots** > **Configure Normal** > **E** > **Multiframe Channel** > **Uncoded** > **PN9** > **Return** > **Return** > **Return** > **Return**.
 8. Press **EDGE ON/OFF**.
- ON is now highlighted indicating that the EDGE transmission is active.

Set Up the BER% Measurement

1. Press **Return > BLER % Configure > BER % Uncoded Configure > Bit count > 100000 > Enter > Return > Return > Return.**

2. Press **Configure Triggers > Uplink Timing Advance > 469 > Enter.**

3. Press **Spectrum invert Off On.**

Off is now highlighted.

4. Press **BERT Trigger Source > Immediate > Return.**

5. Press **Sync Source BCH PDCH.**

PDCH is now highlighted.

6. Press **EDGE BERT Off/On.**

On is now highlighted and the signal generator is synchronizing in time to the valid EDGE burst.

The ESG will display the following statement:

Synchronizing to PDCH

7. Press **Synchronize to BCH/PDCH.**

The ESG will display the following statements:

Waiting for PDCH

The signal generator is extracting a valid PDCH framing structure.

Ready-PDCH Sync Lock

PDCH and PN9 are synchronized and the signal generator is ready to perform a measurement.

Measuring-PDCH Sync Lock

The ESG BER field should display 0.0000%. Refer to [Figure 6](#).

Figure 6 BER% Measurement

