

Installation Note

**Agilent Technologies ESG Vector Signal Generator
Upgrade Kits for Options 601 and 602 (Digital Bus Baseband
Generator with 8 and 64 Msample Memory, respectively)**

Kit Part Numbers:

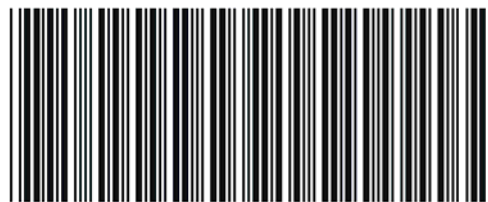
E4438CK-601

E4438CK-602



Agilent Technologies

Part Number E4400-90585
Printed in USA May 2005
Supersedes January 2004



E4400-90585

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Digital Bus Baseband Generator Upgrade Kit

Product Affected:	E4438C
Serial Numbers:	All
Options:	
To Be Performed By:	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent Technologies (X) Customer
Estimated Installation Time:	0.5 hours
Estimated Verification Time:	1.0 hours

Introduction

This upgrade kit adds the Digital BUS Baseband Generator with 8 Msample memory (Option 601) or Digital BUS Baseband Generator with 64 Msample Memory (Option 602) to the E4438C.

NOTE This upgrade kit contains hardware only for the standard front panel connector setup. This kit requires a PC or UNIX computer with LAN, GPIB, or RS232 access.

Installation includes completing the following major steps, in the order given:

1. Check signal generator operation.
2. Install new firmware. (Firmware version \geq C.03.30 must be installed before completing Step 6.)
3. Initialize the signal generator memory.
4. Remove the outer and inner signal generator covers.
5. Replace A25 Rear Panel board.
6. Install the A7 Digital BUS Baseband Generator board.
7. Install the Digital Bus cable and retainer.
8. Verify installation of Option 601 or 602.
9. Re-assemble the signal generator.
10. Run the I/Q Calibration.
11. Verify Signal Generator calibration.

Installation Kit Parts List

Item	Quantity	Description	Part Number
1	1	Installation Note ¹	E4400-90585
2	1	ESG-C Firmware Upgrade Kit	E4400-60597
3	1	A25 Rear Panel Board	E4400-60655
4	1	W92 Digital Bus Cable	8121-0690
5	1	Digital Bus Cable Retainer ^a	E4400-00546
6	1	Digital Bus Label ^a	E4400-80545
7	1	W10 AUX I/O Cable	8121-0679
8	1	W12 BNC Cable (Baseband Generator Reference IN)	8121-0643
9	2	Screw SMM 3.0x8 for Digital Bus Cable Retainer	0515-0372
10	5	Hex Nut 15/21-32 (AUX I/O)	2950-0035
11	5	Washer .4721D (BNC)	2190-0102
12	2	Washer LK .115ID (AUX I/O)	2190-0003
13	2	Screw .312HX4 (AUX I/O)	0380-2079
14	2	Screw LK 2.5X6MM (Digital Bus)	0515-4439
For Option 601 (8 Msamples) with serial numbers < MY4426/US4426			
15	1	A7 Digital Bus Baseband Generator 8 Msample	E4400-60652
16	1	Option 601 Label	7120-1232
For Option 602 (64 Msamples) with serial numbers < MY4426/US4426			
15	1	A7 Digital Bus Baseband Generator 64 Msample	E4400-60654
16	1	Option 602 Label	7120-1232
For Option 601 (8 Msamples) or Option 602 (64 Msamples) with serial numbers ≥ MY4426/US4426			
17	1	A7 Digital Bus Baseband Generator (Firmware configured with License Key)	E4400-60744
18	1	Option 601 or Option 602 Label	7120-1232
19	1	Entitlement Certificate ^b	5964-5143

a. This item cannot be ordered separately.

b. Must be ordered separately if installed by the Agilent Service Center.

IMPORTANT If the Agilent Service Center orders the Option 601 or 602 upgrade kit using the 5x5 part number, then they must contact Agilent and order the entitlement certificate.

Tools Required

- TORX T-10 driver

- TORX T-15 driver
- TORX T-20 driver
- 9/16" nut driver
- 5mm nut driver
- 9/16" socket
- 5mm socket
- Torque Wrench (9-21 in-lb.)
- Small Phillips screw driver
- Long-nose pliers

Safety Considerations

WARNING **Before you disassemble the signal generator, turn the power switch off and unplug the power 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.

Check Signal Generator Operation

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.

1. Turn on the signal generator and let it warm up for at least five minutes.

NOTE When signal generators with Option 1E5 are first turned on, the reference oven will be cold and an error message `ERROR 514, Reference Oven Cold` appears on the front-panel display. In addition, both the `OVEN COLD` annunciator and the `ERR` annunciator appear on the front-panel display.

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.

2. Run the signal generator self test. Press **Utility > Instrument Info/Help Mode > Self Test > Run Complete Self Test**. A summary of the test results is displayed after completion of the self test. Refer to the service guide to troubleshoot any failures detected by the test.

NOTE Some circuits may require up to 50 minutes to warm up before passing the self-test. If self-tests continue to fail after 50 minutes of warm up, troubleshoot the signal generator.

3. Check to see if the `ERR` annunciator is on.

- If the `ERR` annunciator is on, review the error messages in the error queue. Press **Utility > Error Info**. 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 self-tests passed.

Install New Firmware

NOTE Firmware version \geq C.03.30 must be downloaded before installing the new A7 Digital BUS Baseband Generator board.

1. Use the installation note provided in the ESG firmware upgrade kit, E4400-60597, to install the new firmware.
2. Perform the verification procedure described in the firmware upgrade installation note.

Initialize the Signal Generator Memory

If you have access to a LAN

1. Connect the signal generator to the LAN, using the instructions in the ESG Vector Programming Guide.
2. Press: **Utility > GPIB/ RS-232/ LAN > LAN Setup**.
3. Write down the IP address shown.
4. Use the web browser on your PC and enter the following URL:
`http://<ip-address>/update`
where <ip-address> is your signal generator's IP address obtained in step 2.
5. Click "Initialize Option 601 and 602".

NOTE To undo the previous steps, press "Restore Factory Setup"

If you do not have access to a LAN

1. Use a PC or UNIX workstation with GPIB or RS-232 IO capabilities.
2. Use the PC or UNIX workstation and send the following command to the signal generator:
`:DIAG:MFG "UPDATE_FIXED_SETUP_P7"`.
3. Verify that no error messages appear on the signal generator's front-panel display.
4. If an error appears, press: **Utility > Error Info > Clear Error Queue** and repeat step 2.

NOTE To undo the previous steps, send the command `:DIAG:MFG "RESTORE_FIXED_SETUP"`.

Remove the Outer and Inner Signal Generator Covers

Removing the Outer Cover

Refer to [Figure 1](#).

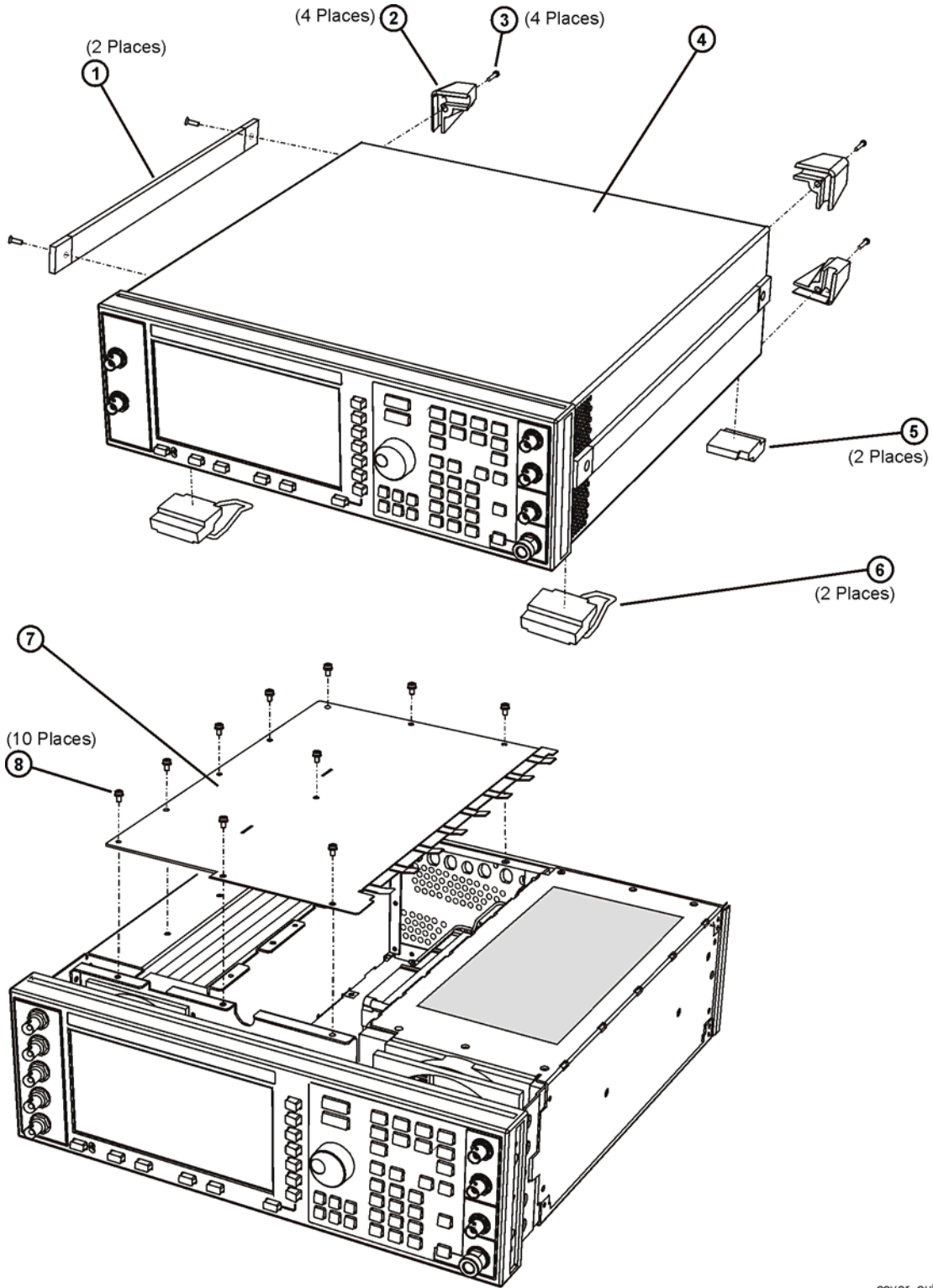
1. Disconnect the power cord.
2. Using a T-20 driver, remove the two strap handles (1) by loosening the screws.
3. Using a T-15 driver, remove the center screws (3) on the four rear-panel feet (2).
4. Remove the four bottom feet (5) and (6) from the cover by lifting the tab and sliding the foot.
5. Slide the outer cover (4) off the frame.

Removing the Inner Top Cover

Refer to [Figure 1](#).

1. Using a T-10 driver, remove the ten screws (8) from the inner-top cover (7).
2. Remove the inner-top cover.

Figure 1 **Outer and Inner Cover Removal**



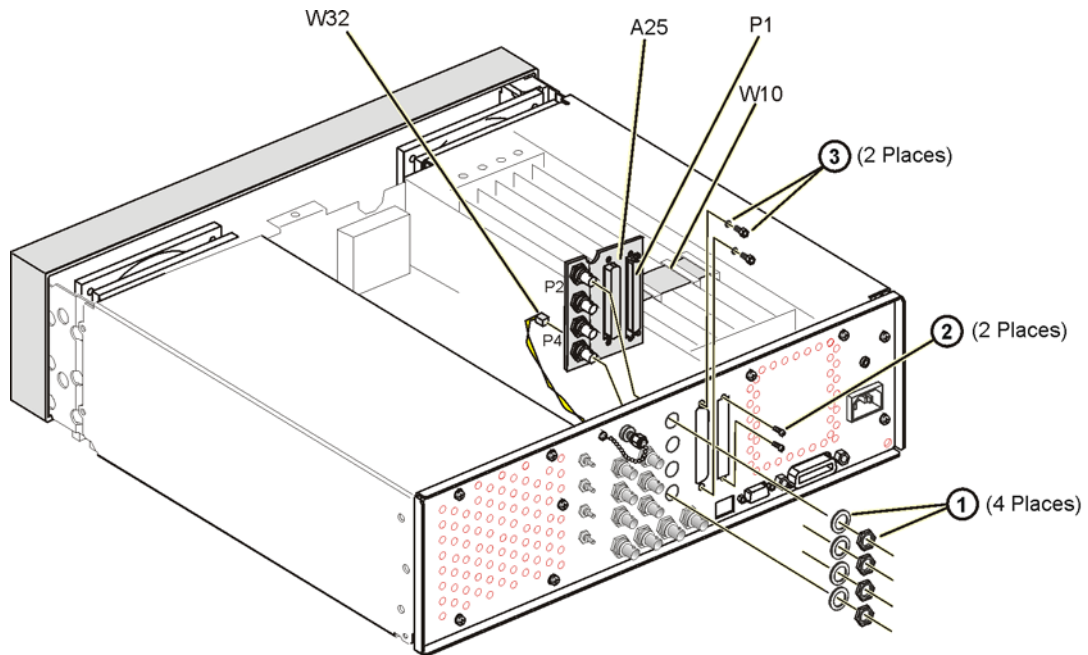
cover_out&ir

Replace the A25 Rear Panel Board

Refer to [Figure 2](#) for this procedure.

1. If present, disconnect W10 from the A25 Rear Panel Board.
2. Disconnect W32 from the A25 Rear Panel Board.
3. Using the 9/16" nut driver, remove the nuts on the EVENT 1, EVENT 2, PATT TRIG IN, and BURST GATE IN connectors (1).
4. Using a small Phillips screw driver, remove the two screws from the DIG I/Q I/O connector (2).
5. Using the 5 mm nut driver remove the shoulder nuts and washers from the AUX I/O connector (3).
6. Remove the A25 Rear Panel Board from the chassis.
7. Install the new A25 Rear Panel Board by reversing steps 1 thru 6.
8. Torque all BNC nuts to 21 in-lbs.

Figure 2 **A25 Rear Panel Board**



a25-bd_rmv

Install the A7 Digital Bus Baseband Generator Board

NOTE If this upgrade kit is used to upgrade an instrument that does not already have an A7 Internal Baseband Generator board, skip steps 1–4 in the following procedure.

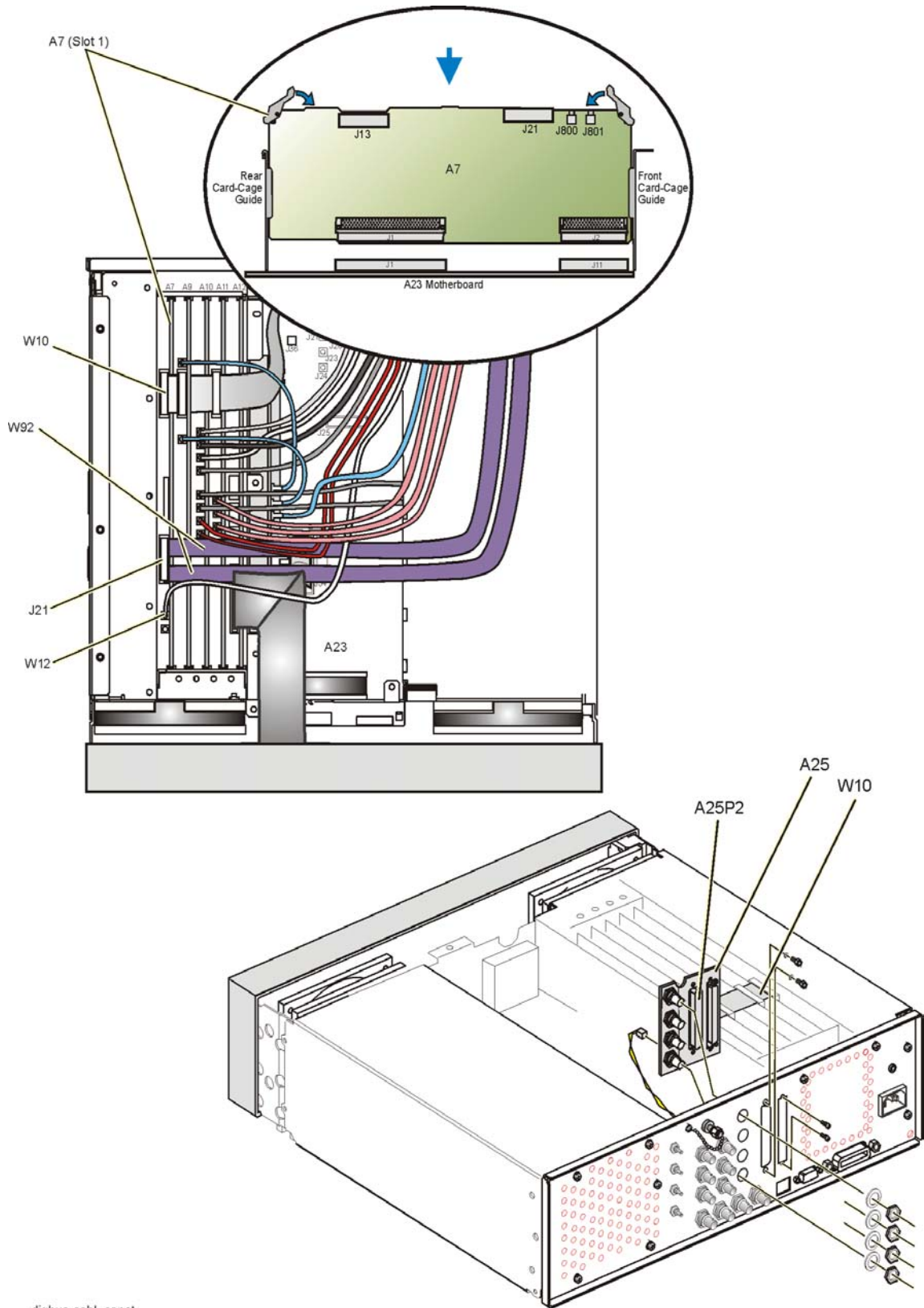
Refer to [Figure 3](#) for this procedure.

1. Disconnect the W10 ribbon cable from A7J13.
2. Using long-nose pliers, disconnect the W12 cable from A7J800.
3. Locate Top-Slot 1, lift the retention levers and disconnect the A7 Digital Bus Baseband Generator Board from the A23 Motherboard.
4. Remove the A7 Digital Bus Baseband Generator board.
5. Insert the new A7 Digital Bus Baseband Generator board into the front and rear card cage guides in Slot 1.
6. Connect the W92 cable end to A7J21.
7. Install the A7 Digital BUS Baseband Generator board onto the A23 Motherboard.

NOTE Skip step 8 if W12 is already installed on the rear panel.

8. Install the W12 cable to the rear panel slot labeled “BASEBAND GEN REF IN.” Use a lock washer and a hex-nut to secure one end of the cable to the rear panel. Torque to 21 in-lb.
9. Connect the loose end of the W12 cable to A7J800.
10. Connect W10 from A25P2 of the rear panel board to A7J13.

Figure 3 **Connecting W92**



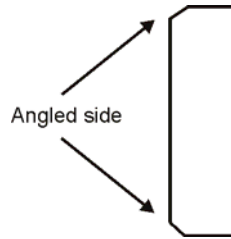
digbus-cabl_conct

Install the Digital Bus cable and retainer

1. Connect the loose end of W92 to A25P1 on the A25 Rear Panel Board. Refer to [Figure 5](#).

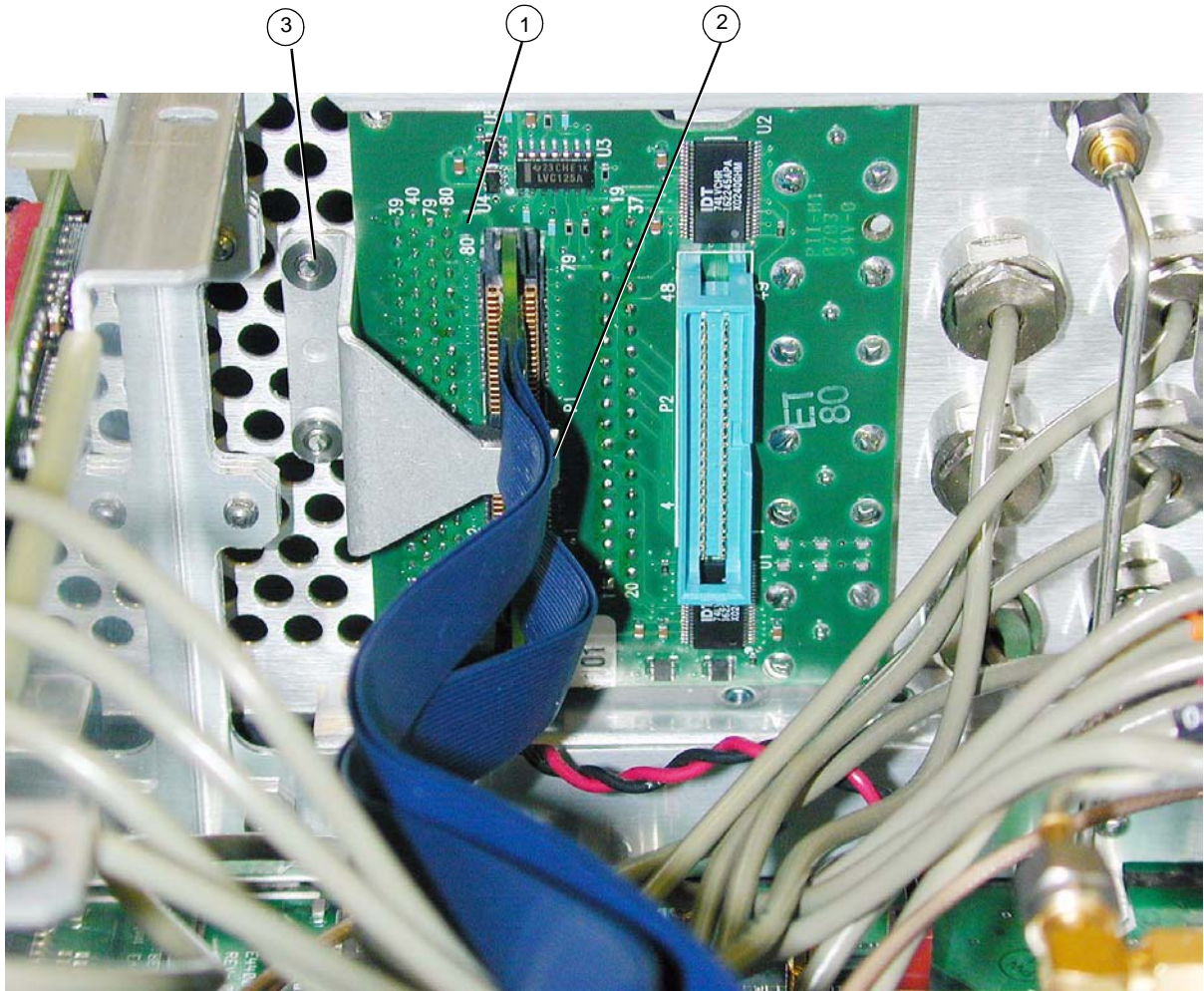
CAUTION Make sure the angled side of the cable connector, shown in [Figure 4](#), that is attached to A25P1 on the A25 Rear Panel Board, is towards the assembly labeled (1) in [Figure 5](#). Failure to do so could result in damage to the A25 Rear Panel Board connector.

Figure 4 Cable Connector



2. Insert the narrow side of the Digital Bus retainer (2) between the two ribbon cables of W92. Refer to [Figure 5](#).
3. Secure the retainer to the rear panel by inserting two SMM screws (3) through the rear panel cooling holes. Torque the screws to 9 in-lbs.

Figure 5 **Digital Bus Cable Retainer**



Verify Installation of Option 601 or 602 for serial numbers < MY4426/US4426

1. Turn the signal generator on.
2. Access instrument option information. On the front panel, press: **Utility > Instrument Info/Help Mode > Options Info**.
3. Review the display to see if the `BASEBAND GENERATOR` is listed. If the option is listed, the installation was successful.
4. Using the installation note provided in the ESG firmware upgrade kit, E4400-60597, install the latest revision of the Digital Bus Baseband Generator digital signal processing (DSP) code. In the Upgrade Selection window choose only the “Baseband Generator” selection to upgrade the DSP code.
5. Perform the [Check Signal Generator Operation](#) procedure, as described on [page 6](#).
6. Verify that the Baseband Generator self-tests pass.

Verify Installation of Option 601 or 602 for serial numbers ≥ MY4426/US4426

1. Turn the signal generator on.
2. Retrieve the signal generator’s Host ID. Press **Utility > Instrument Adjustments > Instrument Options > Software Options**. The Host ID is shown on the front-panel display. The Host ID is needed to obtain the license key for Option 601 or 602.
3. Go to the GSDC website, “http://www.agilent.com/find/software_license” with your Entitlement certificate. The certificate has your order number. You also need the signal generator’s serial number and Host ID.
Follow the instructions on the website to retrieve the license for Option 601 or 602. An email will be sent to you with the license key and a procedure for installing the key in the signal generator.
4. Preset the signal generator after installing the license key.
5. Access instrument option information. On the front panel, press: **Utility > Instrument Info/Help Mode > Options Info**.
6. Review the display to see if the `BASEBAND GENERATOR` is listed. If the option is listed, the installation was successful.
7. Using the installation note provided in the ESG firmware upgrade kit, E4400-60597, install the latest revision of the Digital Bus Baseband Generator digital signal processing (DSP) code. In the Upgrade Selection window choose only the “Baseband Generator” selection to upgrade the DSP code.
8. Perform the “Check Signal Generator Operation” procedure, as described on [page 6](#).
9. Verify that the Baseband Generator self-tests pass.

Re-Assemble the Instrument

Refer to [Figure 1](#).

1. Reinstall the inner and outer instrument covers by reversing the order for removal.
2. Torque all T-10 screws to 9 in-lbs.
3. Torque all T-15 and T-20 screws to 21 in-lbs.
4. Attach the Option 601 or Option 602 label to the rear panel, near the original serial number label.
5. Attach the Digital Bus label over “DIG I/Q I/O” on the rear panel.

Run the I/Q Calibration

1. Turn the instrument on and let it warm up for 30 minutes.
2. Press: **I/Q > I/Q Calibration > Calibration Type Full > Execute Cal**

Verify Instrument Calibration

The new baseband generator will function properly in most applications, without recalibrating the signal generator. If EVM performance is critical to your application, run the performance tests listed below. Refer to the ESG Vector Signal Generator Service Guide for more information.:

1. Self Test
2. I/Q Gain/Offset/Quadrature Calibration
3. I/Q Impairment Calibration
4. Harmonic, Subharmonic, and Nonharmonic Spurious Signals
5. Internal Digital Modulation Quality (Option 402 only)
6. Custom I/Q RF Modulation Quality (Option 402 only)
7. CDMA Adjacent Channel Power (Not used with Option UNB or Option 506)
8. WCDMA Adjacent Channel Power (Option 400)
9. Dual Arbitrary Waveform Generator Check
10. GSM Loopback BER Check (Option 300 only)
11. I/Q Timeskew Calibration-Baseband
12. I/Q Timeskew Calibration-RF