

Installation Note

Frequency Offset Mode Upgrade Kit

For PNA Series Microwave Network Analyzers

Network Analyzer Model Number	Upgrade Kit Part Number
E8361A/C, E8362B/C, E8363B/C, E8364B/C	E8362-60111



Agilent Part Number: E8362-90010

Printed in USA December 1, 2010

Supersedes print date: December 2007

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E8362-90010

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Safety Notes

The following safety notes are used throughout this document. Familiarize yourself with each of these notes and its meaning before performing any of the procedures in this document.

WARNING	Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
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CAUTION	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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About Installing the Upgrade Kit

IMPORTANT Option 080 can only be installed on analyzers with the option combinations listed below as “Products affected”. If your analyzer does not have the proper options (as listed below), it will be necessary to install those options **BEFORE** installing this option (Option 080).

Products affected.	E8361A/C, E8362B/C, E8363B/C, and E8364B/C; all option combinations that include Option 014
Installation to be performed by	Agilent service center or personnel qualified by Agilent
Estimated installation time	1 hour
Estimated verification time	5 minutes

Description of Option 080 Frequency Offset Mode

Frequency offset mode allows the PNA source and receiver to be tuned to different frequencies. This is convenient, if not necessary, for testing frequency conversion devices, such as mixers and converters, where the input and output frequencies are different.

The PNA source, at one frequency, can be used as the input to the DUT, and the PNA receiver can be tuned to the output signal of the DUT at a different frequency.

Items Included in the Upgrade Kit

Check the contents of your kit against the following list. If any item is missing or damaged, contact Agilent Technologies. Refer to [“Contacting Agilent” on page 22](#).

Table 1 Contents of the Option 080 Upgrade Kit (E8362-60111)

Ref. Desig.	Description	Qty	Part Number
	Installation note (this document)	1	E8362-90010
	License key certificate	1	5964-5136
A9	Fractional-N synthesizer board	1	E8364-60099
A13	Frequency offset receiver board	1	E8364-60097
	Frequency offset receiver module	1	E8356-60018
	Gasket	1	N3381-20032
	RF cable, receiver module to receiver board	1	E8364-20142
	Machine screw	3	0515-1349
W91	RF cable, semi-rigid, A9 fractional-N synthesizer board J106 to A13 frequency offset receiver board J4	1	E8364-20140
W92	RF cable, semi-rigid, A9 fractional-N synthesizer board J101 to A13 frequency offset receiver board J2	1	E8364-20141
W93	RF cable, semi-rigid, A12 source 20 to A13 frequency offset receiver board RF IN	1	E8364-20143
W105	RF cable, flexible, A10 frequency reference board J11 to A9 fractional-N synthesizer board J105	1	E8364-60018
W106	RF cable, flexible, A13 frequency offset receiver board J6 to A35 receiver motherboard J502	1	E8364-60017

Installation Procedure for the Upgrade Kit

The network analyzer must be in proper working condition prior to installing this option. Any necessary repairs must be made before proceeding with this installation.

WARNING **This installation requires the removal of the analyzer's protective outer covers. The analyzer must be powered down and disconnected from the mains supply before performing this procedure.**

Electrostatic Discharge Protection

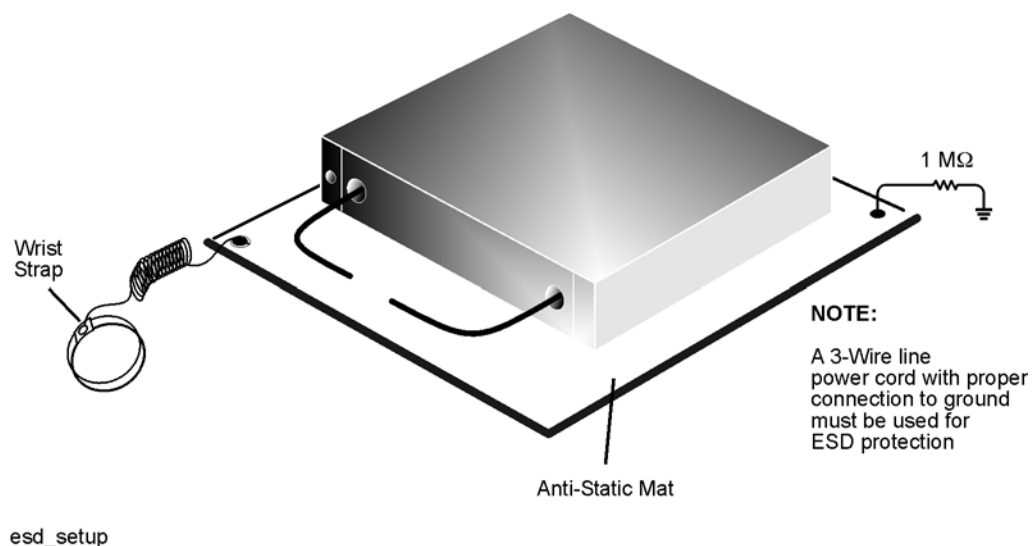
Protection against electrostatic discharge (ESD) is essential while removing or connecting cables or assemblies within the network analyzer.

Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* wear a grounded wrist strap having a 1 M Ω resistor in series with it when handling components and assemblies.
- *always* use a grounded, conductive table mat while working on the instrument.
- *always* wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.

Figure 1 shows a typical ESD protection setup using a grounded mat and wrist strap. Refer to “Tools and Equipment Required for the Installation” on page 6 for part numbers.

Figure 1 ESD Protection Setup



Overview of the Installation Procedure

Step 1. Remove the Outer and Inner Covers.

Step 2. Install the A13 Frequency Offset Receiver Assembly.

Step 3. Install the A9 Fractional-N Synthesizer Board.

Step 4. Install the Remaining New Cables.

Step 5. Reinstall the Inner and Outer Covers.

Step 6. Enable Option 080.

Step 7. Perform Post-Upgrade Adjustments and Calibration.

Tools and Equipment Required for the Installation

Description	Qty	Part Number
T-10 TORX driver (set to 9 in-lbs)	1	N/A
T-20 TORX driver (set to 21 in-lbs)	1	N/A
5/16-inch torque wrench (set to 10 in-lbs)	1	N/A
ESD grounding wrist strap	1	9300-1367
5-ft grounding cord for wrist strap	1	9300-0980
2 x 4 ft conductive table mat and 15-ft grounding wire	1	9300-0797
ESD heel strap (for use with conductive floors)	1	9300-1308

CAUTION

The PNA contains extremely sensitive components that can be ruined if mishandled. Follow instructions carefully when making cable connections, especially wire harness connections.

The person performing the work accepts responsibility for the full cost of the repair or replacement of damaged components.

Step 1. Remove the Outer and Inner Covers

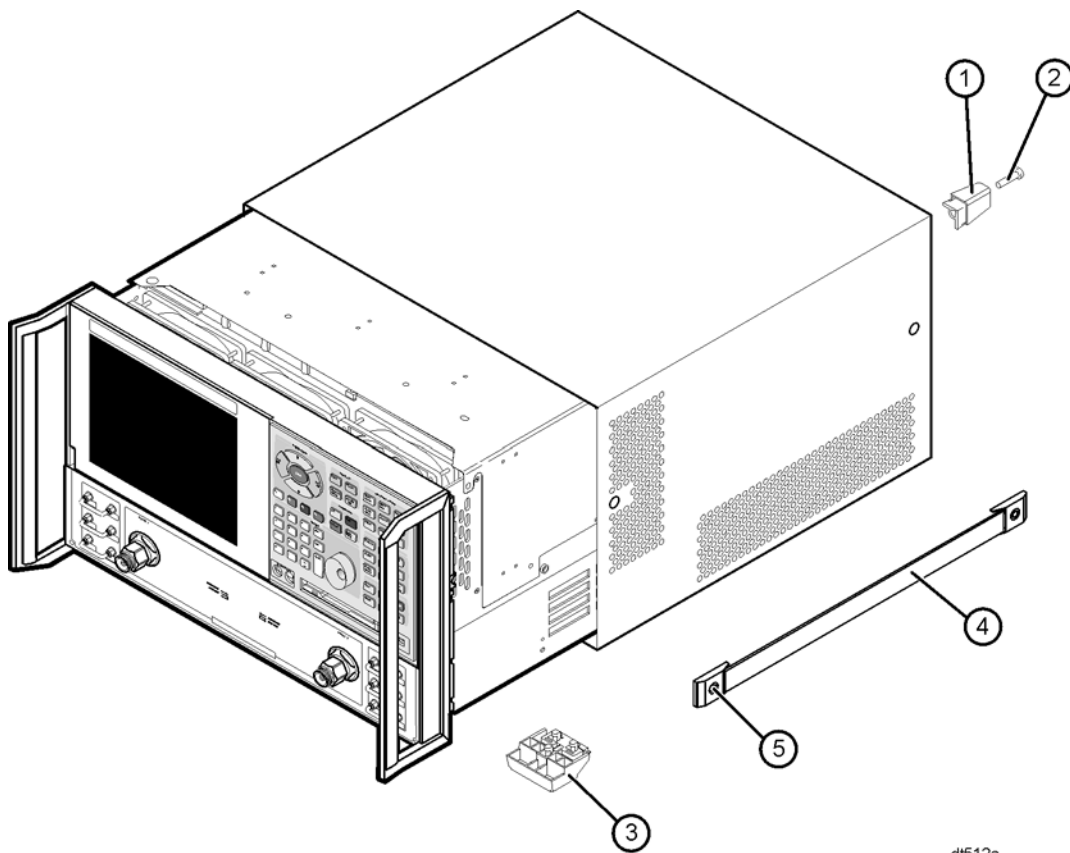
Remove the Outer Cover

Refer to [Figure 1-2](#) for this procedure.

CAUTION This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles.* This will damage the front panel assemblies.

1. Disconnect the power cord (if it has not already been disconnected).
2. With a T-20 TORX driver, remove the four rear panel feet (item ①) by removing the center screws (item ②).
3. Slide the four bottom feet (item ③) off of the cover.
4. With a T-20 TORX driver, remove the strap handles (item ④) by loosening the screw (item ⑤) on each end until the handle is free of the analyzer.
5. Slide the cover off of the frame.

Figure 1-2 Outer Cover Removal



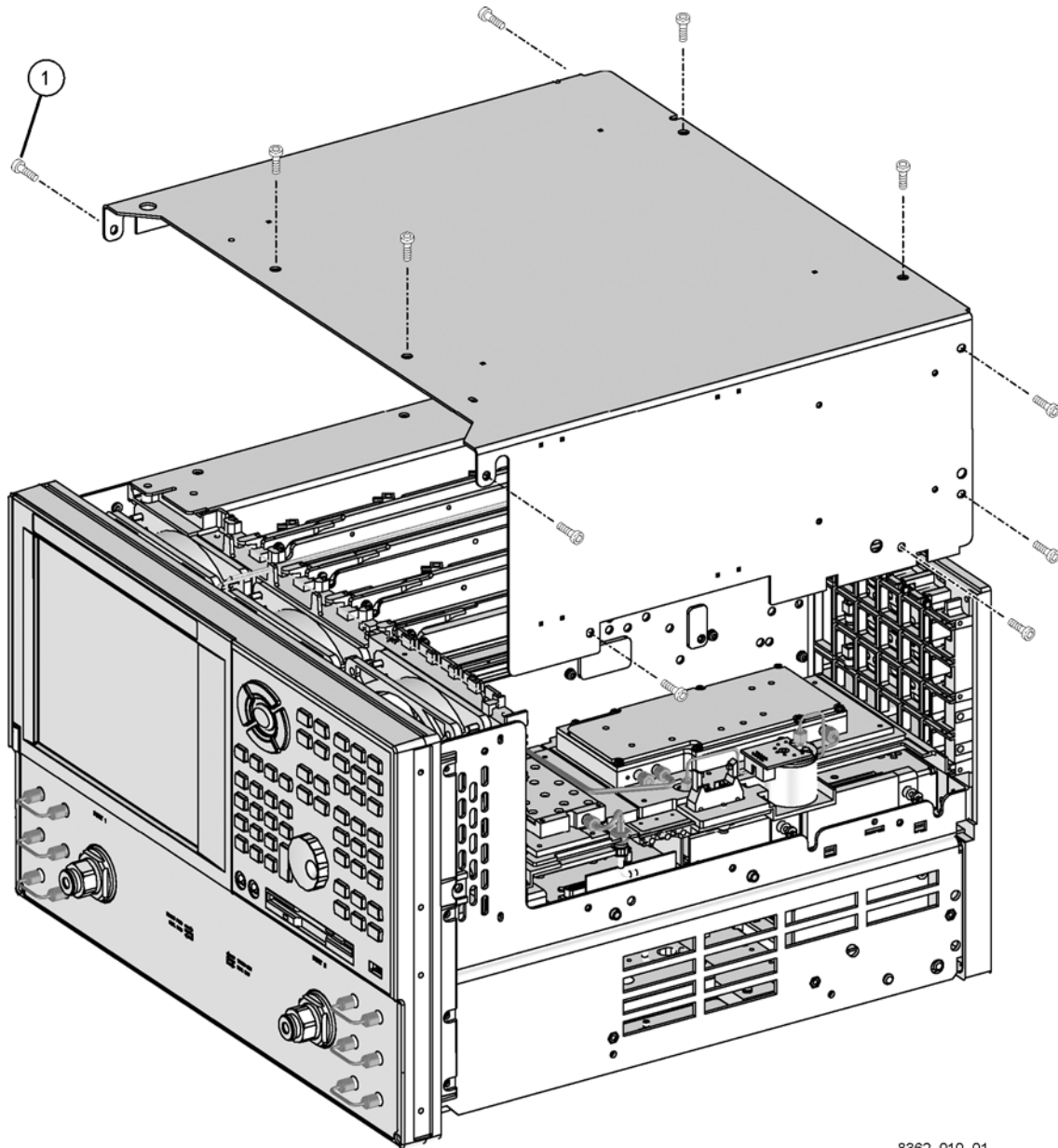
NOTE The figure above shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Remove the Inner Cover

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

1. Place the analyzer top-side up on a flat surface.
2. With a T-10 TORX driver, remove the 11 screws (item ①).
3. Lift off the cover.

Figure 2 Inner Cover Removal



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NOTE

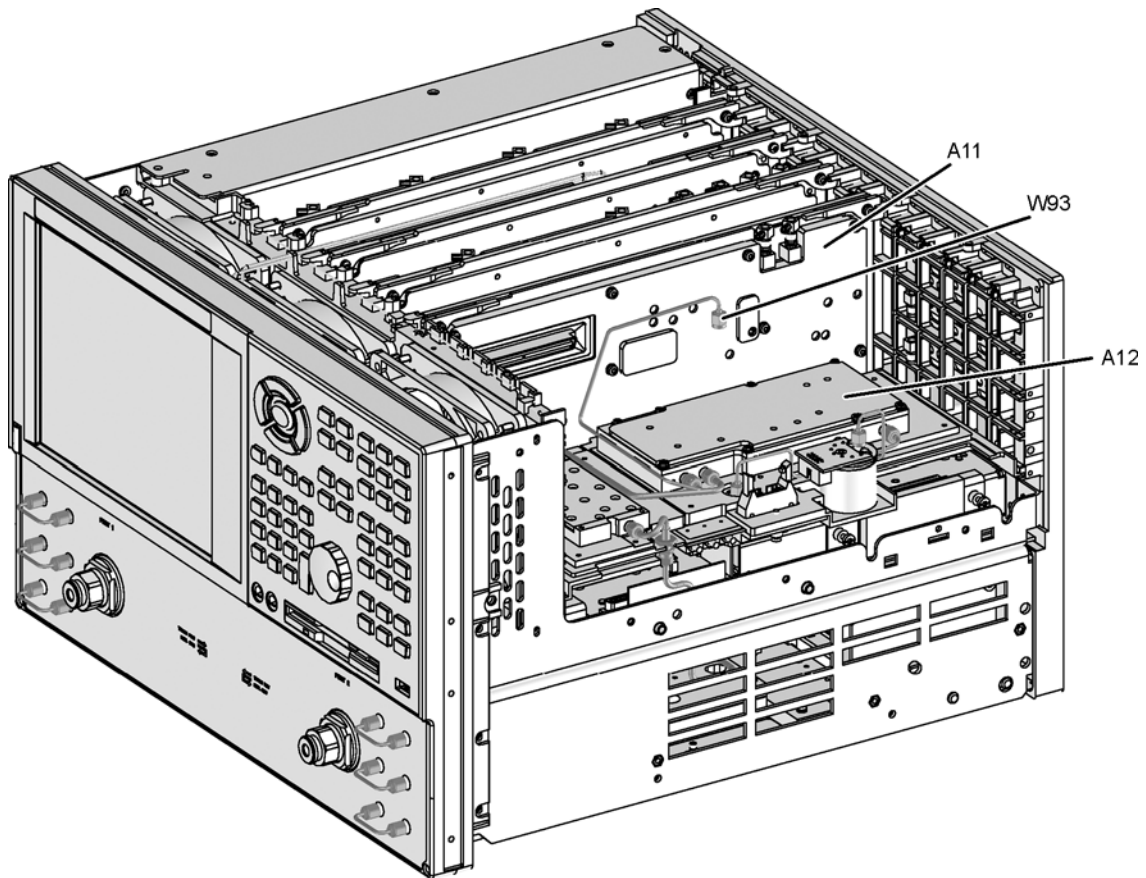
The figure above shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Step 2. Install the A13 Frequency Offset Receiver Assembly

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

1. Assemble the A13 frequency offset receiver assembly (parts are listed in [Table 1](#)):
 - a. Position the frequency offset receiver module on the frequency offset receiver board, as shown in [Figure 3-3](#), with the gasket between the receiver module and the receiver board. Install the three screws to secure the receiver module to the receiver board.
 - b. Install the cable between the receiver module and the receiver board.
2. Connect cable W93 (E8364-20143) to the A12 source 20 assembly. Position the cable as shown and, while holding the cable in position with one hand, use a 5/16-inch torque wrench set to 10-in-lbs to tighten the connector nut with the other hand.
3. Loosely insert the A13 frequency offset receiver assembly into the analyzer in the location shown. As you insert the A13 assembly, lift cable W93 slightly to prevent the center conductor pin from being damaged.
4. Make sure the connectors on the A13 assembly are properly aligned with the connectors on the A11 board. Make sure that cable W93 moves freely behind the A13 assembly.
5. Firmly push the A13 assembly toward the A11 board to fully engage the connectors.
6. Connect the loose end of cable W93 to the A13 receiver RF IN. Using a 5/16-inch torque wrench set to 10-in-lbs, tighten the connector nut.

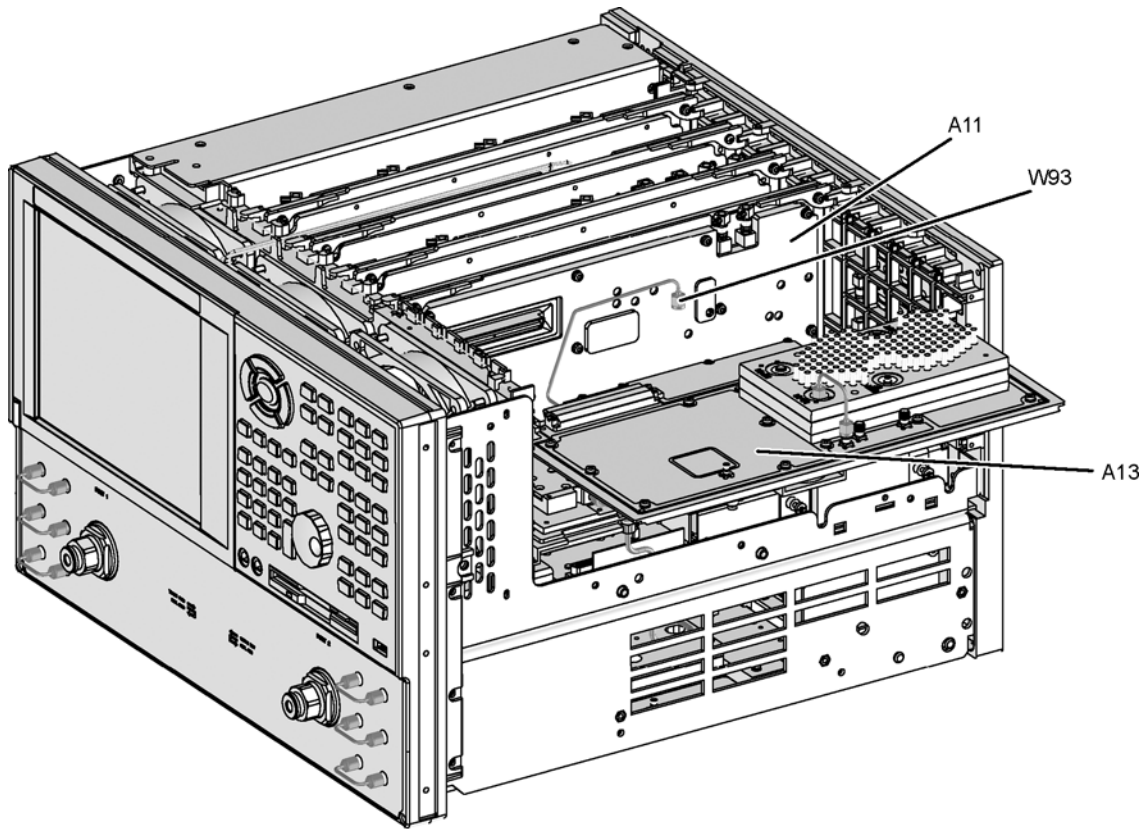
Figure 3 A13 Frequency Offset Receiver Assembly, Cable Installation



8362_010_02

NOTE The figure above shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Figure 3-3 **A13 Frequency Offset Receiver Assembly, Installation**



8362_010_03

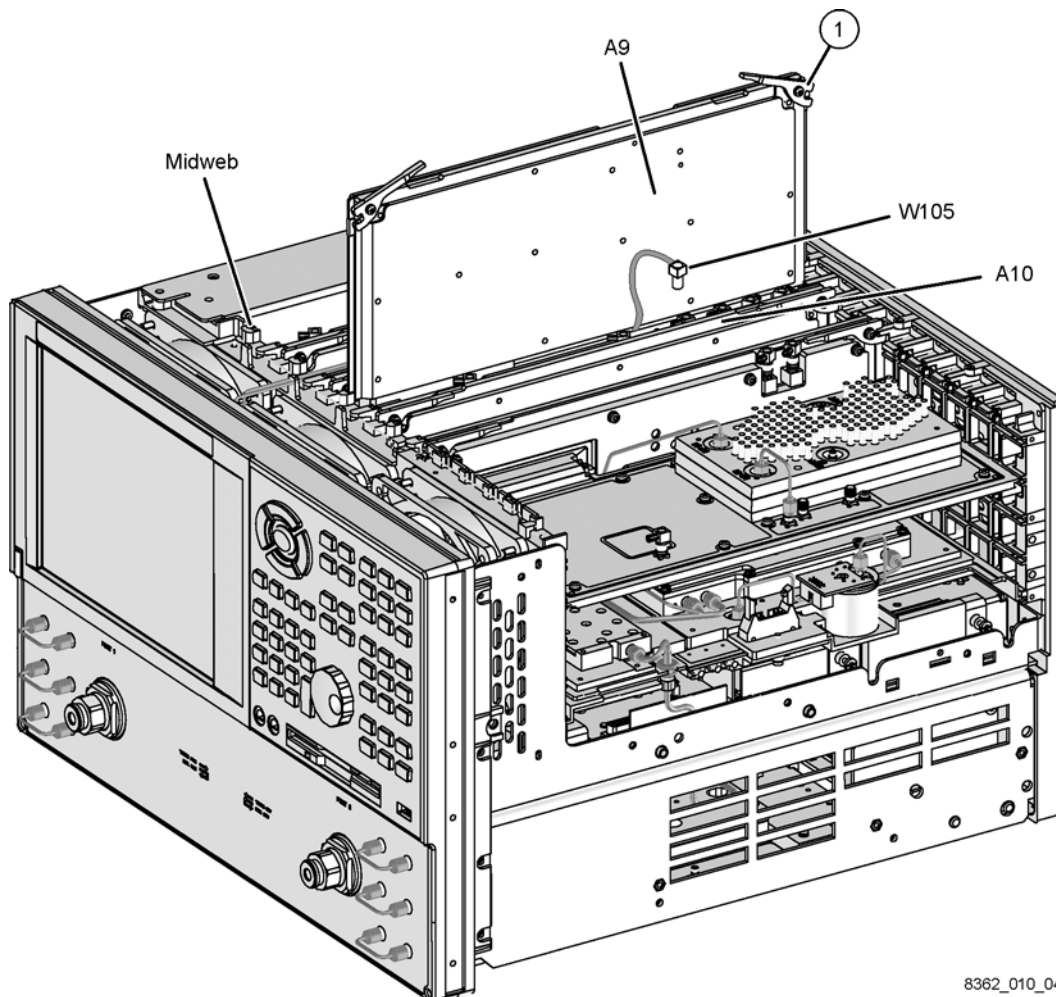
NOTE The figure above shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Step 3. Install the A9 Fractional-N Synthesizer Board

Refer to [Figure 4](#) for this procedure.

1. With a T-10 TORX driver, remove the two brackets that secure cables to the top of the midweb.
2. Connect one end of cable W105 (E8364-60018) to A9 J105 at the bottom of the A9 board. Route the cable beneath the A9 board so that the other end can be connected to the A10 board.
3. Loosely insert the A9 fractional-N synthesizer board into the analyzer in the location shown. Be careful not to drop cable W105 between the boards.
4. Connect the loose end of W105 to A10 J11. Make sure that the cable moves freely under the A9 board.
5. Make sure the connectors at the bottom of the A9 board are properly aligned with the motherboard connectors and that the board extractors (item ①) are in the down position.
6. Press firmly on the top of the A9 board to fully engage the connectors.

Figure 4 A9 Fractional-N Synthesizer Board, Installation



8362_010_04

NOTE The previous figure shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Step 4. Install the Remaining New Cables

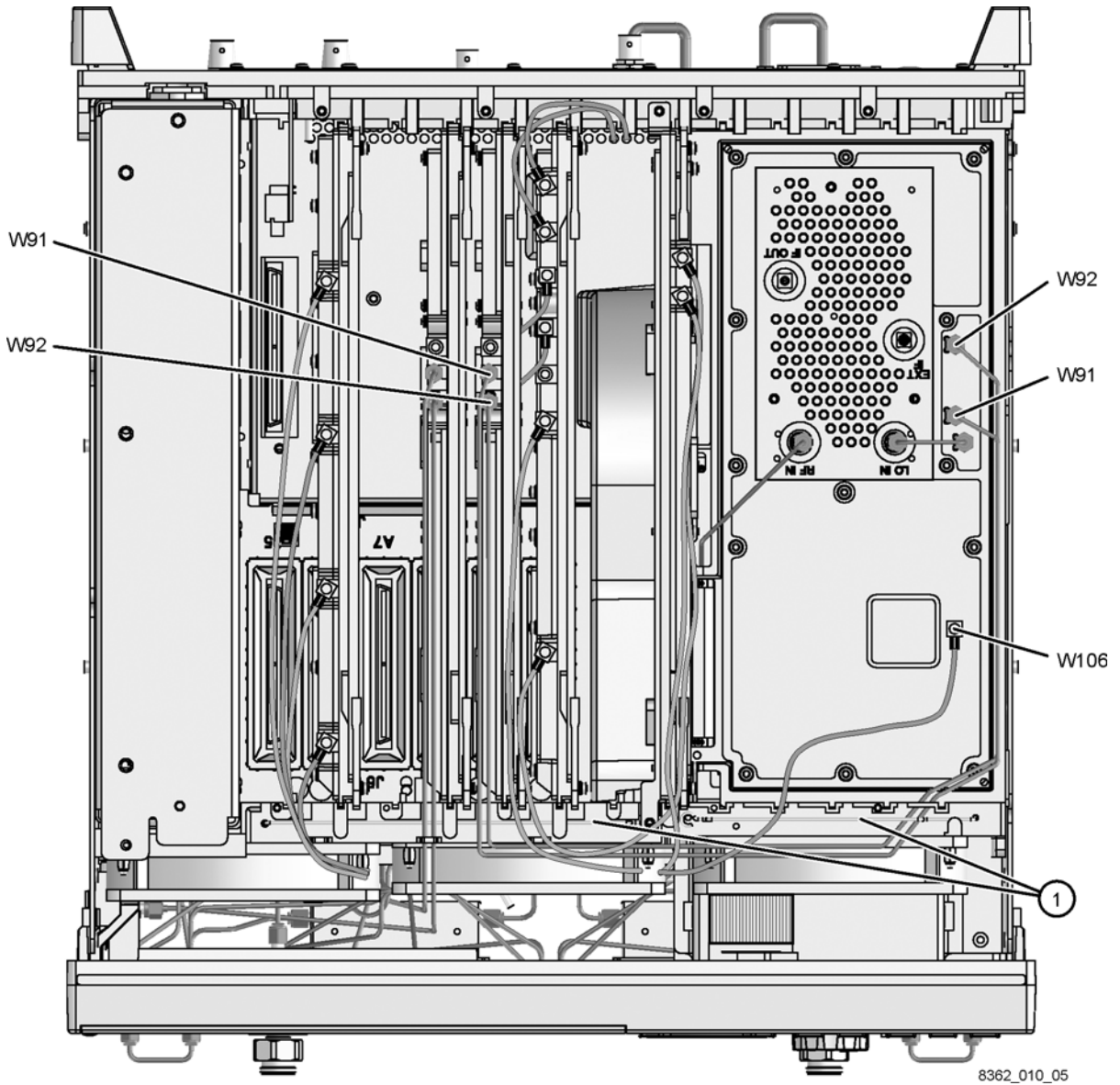
CAUTION Follow instructions carefully when making cable connections, especially wire harness connections. Incorrect connections can destroy components, resulting in additional customer costs.

Top Cable Connections

Refer to [Figure 5](#) for this procedure.

1. Install the following cables as indicated:
 - W91 E8364-20140 A9 J106 to A13 J4.
 - W92 E8364-20141 A9 J101 to A13 J2.
 - W106 E8364-60017 A13 J6 to bottom side of analyzer. Route W106 through the hole in the chassis as shown.
2. With a T-10 TORX driver, reinstall the two brackets (item ①) to the top of the midweb.

Figure 5 Top Cable Connections



Bottom Cable Connection

Raise the Receiver Deck

Refer to [Figure 6](#) for this procedure.

1. Place the analyzer bottom-side up on a flat surface.
2. With a T-10 TORX driver, remove the four screws (item (①)), securing the receiver deck.
3. Pull the latch pin (item (②)) toward the other side of the analyzer to release the receiver deck.
4. Lift the receiver deck to partially raise it, then release the latch pin (item (②)). Lift the receiver deck to its fully raised position and ensure that the latch pin latches in the raised position.

Make the Cable Connection

Refer to [Figure 7](#) for this procedure.

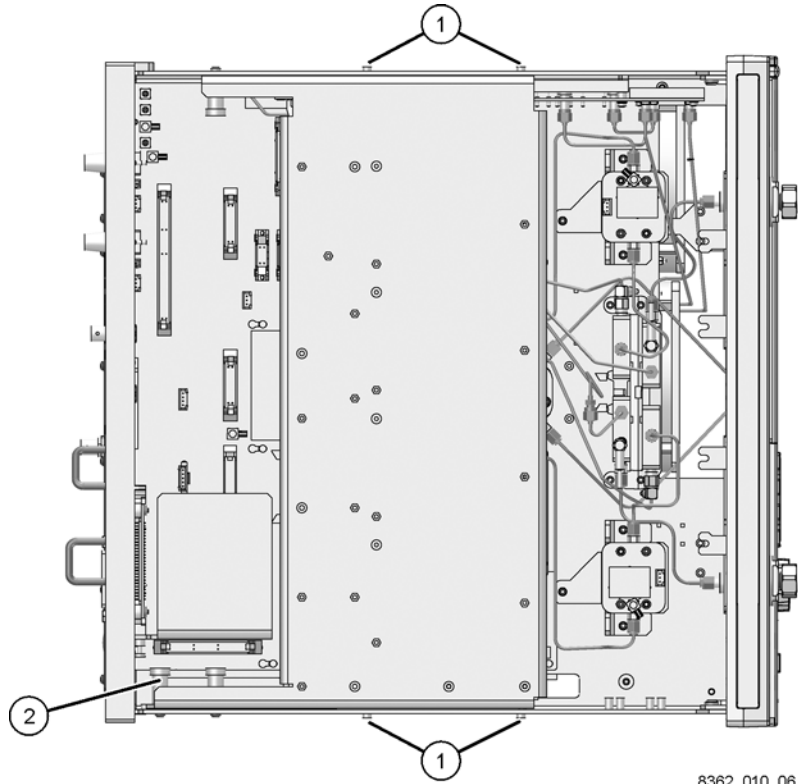
1. Route cable W106 beneath the semirigid cables and through the cable clamp as shown.
2. Connect the end of cable W106 to A35 J502 as shown.

Lower the Receiver Deck

Refer to [Figure 6](#) and [Figure 7](#) for this procedure.

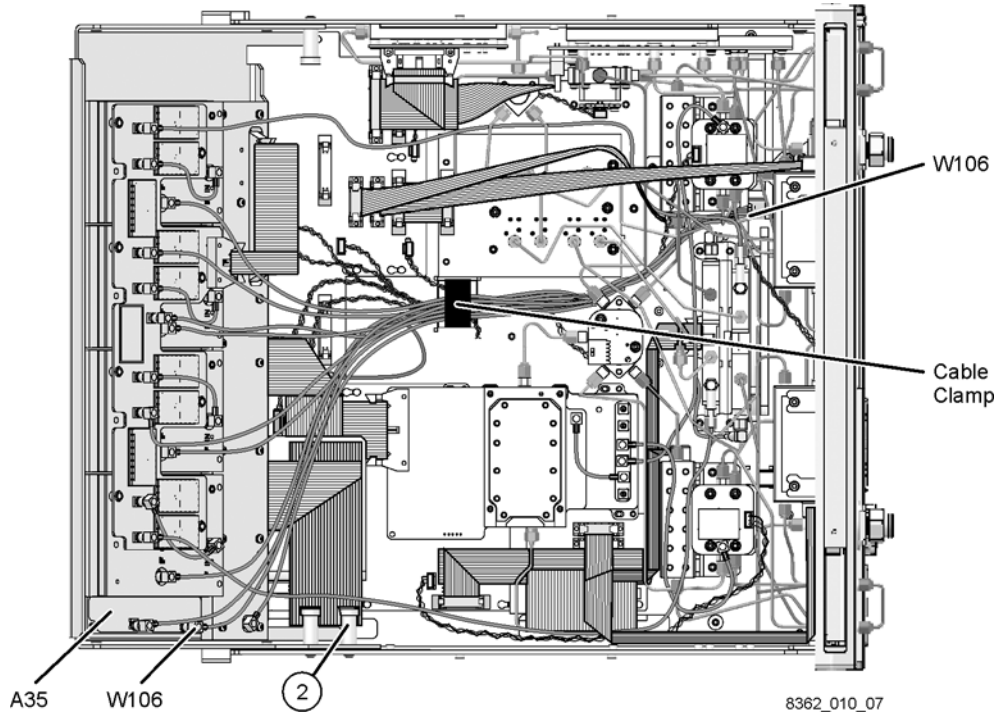
1. Pull the latch pin (item (②)) toward the other side of the analyzer to release the receiver deck.
2. Lift the receiver deck to partially lower it, then release the latch pin (item (②)). Lower the receiver deck to its fully lowered position and ensure that the latch pin latches in the lowered position.
3. With a T-10 TORX driver, install the four screws (item (①)), to secure the receiver deck.

Figure 6 Receiver Deck Raising



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Figure 7 Bottom Cable Connection



8362_010_07

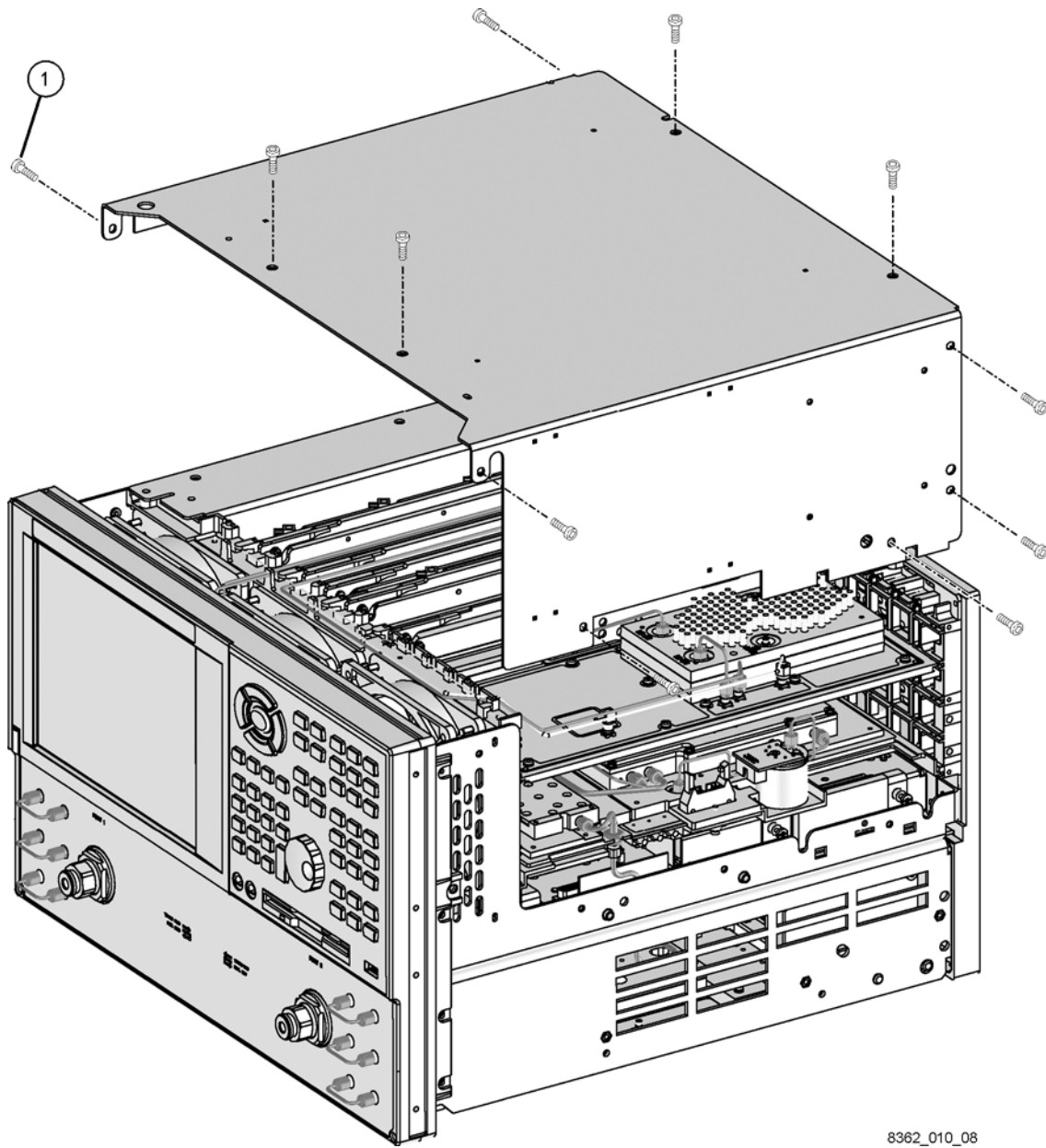
Step 5. Reinstall the Inner and Outer Covers

Refer to [Figure 8](#) for this procedure.

Reinstall the Inner Cover

1. Place the inner cover in position on the analyzer. There are two alignment pins on the front frame that must be aligned with holes in the cover.
2. With a T-10 TORX driver, install the 11 screws (item ①).

Figure 8 Inner Cover Reinstallation



8362_010_08

NOTE

The previous figure shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.

Reinstall the Outer Cover

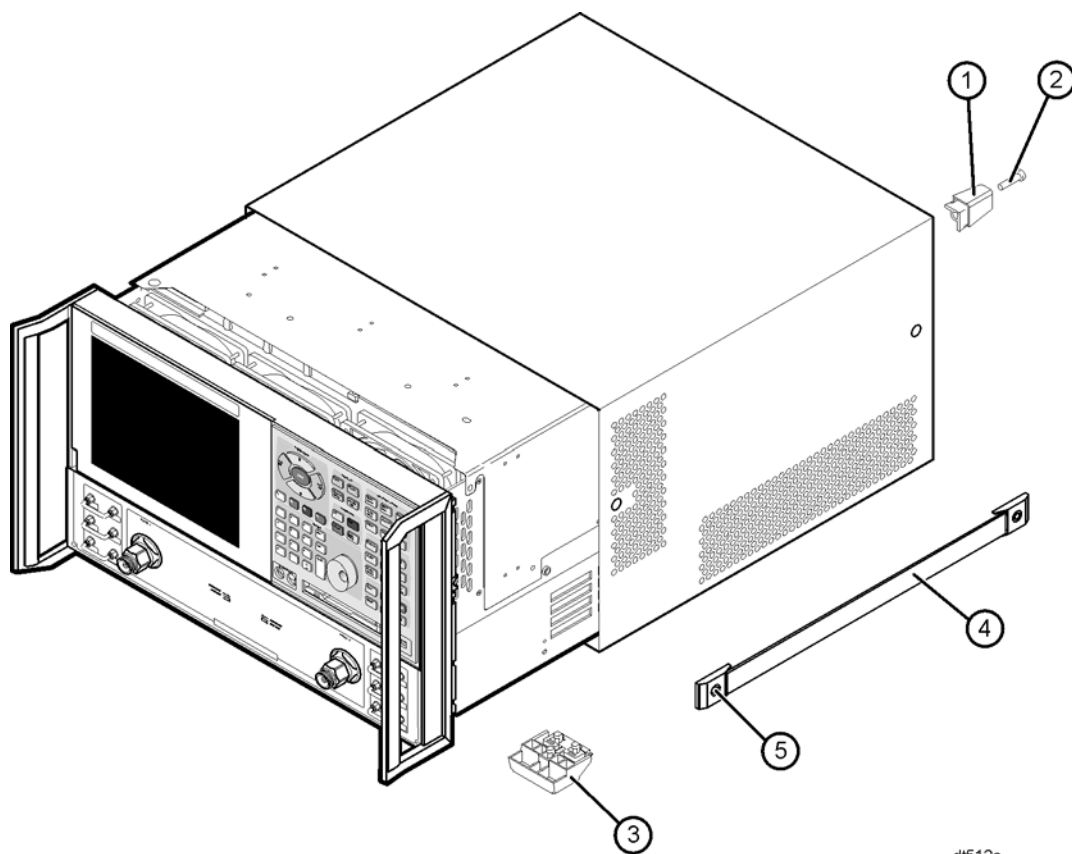
Refer to [Figure 9](#) for this procedure.

CAUTION

This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles.* This will damage the front panel assemblies.

1. Slide the cover onto the analyzer.
2. With a T-20 TORX driver, install the four rear-panel feet (item ①) by installing the center screws (item ②).
3. Slide the four bottom feet (item ③) onto the cover.
4. With a T-20 TORX driver, install the strap handles (item ④) by tightening the screw (item ⑤) on each end.

Figure 9 Outer Cover Reinstallation



dt512a

NOTE	The previous figure shows the E8361A and E8362/3/4B front panel and floppy disk drive. The C-model front panel has a slightly different appearance and does not include a floppy disk drive.
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Step 6. Enable Option 080

Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- This installation requires that a keyboard and a mouse be connected to the network analyzer.

Verify the Model, Serial, and Option Numbers

Refer to the License Key Certificate supplied with the kit:

- Verify that the analyzer's model and serial numbers match those on the certificate.
- Verify that the option number on the certificate matches the option number described in this installation note.

If the model number, serial number, or option number do not match the expected results, you will not be able to enable the option. If this is the case, contact Agilent for assistance. Refer to [“Contacting Agilent” on page 22](#).

Procedure

1. On the analyzer's **System** menu, point to **Service**, and then click **Option Enable**.
2. In the **Select Desired Option** list, click **080 - Frequency Offset Mode**.
3. Using the keyboard, enter the keyword in the box provided. The keyword is printed on the License Key Certificate provided in the kit. Enter this keyword *exactly* as it is printed on the certificate.
4. Click **Enable**.
5. Click **Yes** in answer to the displayed question in the **Restart Analyzer?** box.
6. When the installation is complete, click **Exit**.
7. Once the analyzer has restarted and the Network Analyzer program is again running: On the analyzer's **Help** menu, click **About Network Analyzer**.
8. Verify that “080” is listed after “Options:” in the display. Click **OK**.

NOTE	If Option 080 has not been enabled, perform step 6 again. If the option is still not enabled, contact Agilent Technologies. Refer to “Contacting Agilent” on page 22 .
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Step 7. Perform Post-Upgrade Adjustments and Calibration

The following adjustments must be made due to the change in the full frequency range of the analyzer.

- offset LO adjustment
- source calibration
- receiver calibration

These adjustments are described in the PNA service guide and in the PNA on-line HELP. A list of equipment required to perform these adjustments can be found in the PNA service guide.

Downloading the Online PNA Service Guide

To view the online Service Guide for your PNA model number, use the following steps:

1. Go to www.agilent.com
2. In the Search box, enter the model number of the analyzer (Ex: E8361C) and click **Search**.
3. Click [Technical Support > Manuals](#).
4. Click [Service Manual](#).
5. Click the service guide title to load the PDF file.
6. When the PDF of the Service Guide is displayed, scroll through the Contents section bookmarks to locate the information needed.

Performance Tests and System Verification

The analyzer should now operate and phase lock over its entire frequency range.

If you experience difficulty with the basic functioning of the analyzer, contact Agilent. Refer to [“Contacting Agilent” on page 22](#).

Although the analyzer functions, its performance relative to its specifications has not been verified for the additional frequency range enabled by this upgrade.

It is recommended that a full instrument calibration be performed using the PNA performance test software.

If the testing of the analyzer’s full range of specifications is not required, a system verification can be performed.

Refer to the analyzer’s service guide for information on performance tests and system verification.

Contacting Agilent

Assistance with test and measurements needs and information on finding a local Agilent office are available on the Web at:

www.agilent.com/find/assist

If you do not have access to the Internet, please contact your Agilent field engineer.

NOTE In any correspondence or telephone conversation, refer to the Agilent product by its model number and full serial number. With this information, the Agilent representative can determine whether your product is still within its warranty period.
