

# Keysight Add Source and Receiver Attenuators Upgrade Kit

To Upgrade PNA N5221A/B or N5222A/B Option 401 to Option 417 or N5241B or N5242B or N5249B Option 401 to 417

Upgrade Kit Order Number: N5221AU-417, N5222AU-417, N5221BU-417, N5222BU-417, N5241BU-417, N5242BU-417, and N5249BU-417

Keysight Kit Number: N5222-60107

NOTICE: This document contains references to Agilent Technologies. Agilent's former Test and Measurement business has become Keysight Technologies. For more information, go to [www.keysight.com](http://www.keysight.com).



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N5222-90107

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### CAUTION

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### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

## Description of the Upgrade

**NOTE**

Some of the assembly drawings in this document may be different from your instrument, but the process is similar for both an "A" model and "B" model instruments.

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**NOTE**

If you had an A model PNA-X with Option 219/419 with Option H85 that was upgraded to a B model, please refer to Options 217/417. If you had an A model PNA-X with Option 224/423 with Option H85 that was upgraded to a B model then refer to Option 222/422.

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This upgrade adds the following items to your N5221A/B Option 401 or N5222A/B Option 401 or N5241B Option 401 or N5242B Option 401 or N5249B Option 401 network analyzer:

- a 65-dB source attenuator in each source port channel
- a 35-dB receiver attenuator in each receiver channel
- front panel overlay replacement
- new cables

After installation of this upgrade, your analyzer will be an N5221A/B Option 417 or N5222A/B Option 417 or N5241B Option 417 or N5242B Option 417 or N5249B Option 417.

## Getting Assistance from Keysight

Installing this upgrade kit requires special skills and experience. If you think you may not be qualified to do the work, or need advice, contact Keysight.

### Contacting Keysight

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

<http://www.keysight.com/find/assist>

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

#### NOTE

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

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### If You Have Problems With the Upgrade Kit Contents

Keysight stands behind the quality of the upgrade kit contents. If you have problems with any item in the kit, refer to [www.keysight.com](http://www.keysight.com) and the **Contact Keysight** link.

## Getting Prepared

### 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.

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To successfully install this upgrade kit, you will need the following:

- A license key - refer to [“License Key Redemption”](#) below.
- A PDF copy or a paper copy of the PNA Service Guide - refer to [“Downloading the Online PNA Service Guide”](#) below.
- An ESD-safe work area - refer to [“Protecting Your Workspace from Electrostatic Discharge”](#) below.
- Correct tools - refer to [“Tools Required for the Installation” on page 8.](#)
- Enough time - refer to [“About Installing the Upgrade” on page 9.](#)
- Test equipment for the post-upgrade adjustments and full instrument calibration. To view the equipment list, click the Chapter 3 bookmark [“Tests and Adjustments”](#) in the PDF Service Guide<sup>1</sup>.

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1. See [“Downloading the Online PNA Service Guide” on page 7.](#)

## License Key Redemption

**NOTE**

The only difference between an A model license key redemption and a B model is that the A model uses a 12-character license key and the B model uses a license key file.

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**NOTE**

Ensure that you are connected to an external server, before attempting to download your email and license key file.

If you are unfamiliar with the licensing process:

For A models: Refer to

<http://literature.cdn.keysight.com/litweb/pdf/N5225-90110.pdf>.

For B models: Refer to

<http://literature.cdn.keysight.com/litweb/pdf/N5242-90024.pdf>.

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**NOTE**

The enclosed Software Entitlement Certificate is a receipt, verifying that you have purchased a licensed option for the PNA of your choice. You must now use a Keysight Web page to request a license key for the instrument that will receive the option.

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To enable the option product, you must request license key(s) (A models) or license key files(s) (B models) from the Keysight Software Manager: <http://www.keysight.com/find/softwaremanager>.

To complete the request, you will need to gather the following information:

- From the certificate
  - Order number
  - Certificate number
- From your instrument

(Instrument information is available in the network analyzer - on the toolbar, click Help, then click About Network Analyzer.)

- Model number
- Serial number
- **A models ONLY:** From the online Keysight HostID utility

Part of the OEC procedure to obtain the 12-digit license key online requires you to provide the HostID number of the PNA. This HostID number is NOT the one currently shown on the PNA. To find your new HostID, go to <http://www.na.support.keysight.com/pna/upgrades.html> and, using the HostID utility, enter the PNA serial number and your new, upgraded PNA-X model number - N221A, N5222A, N5241A, N5242A, or N5249A.

- Host ID

## Getting Prepared

Using the information just gathered, you must request license key(s) for your A model or for your B models, a license key file(s) from the Keysight Software Manager:

<http://www.keysight.com/find/softwaremanager>.

You will need to provide an email address, Keysight will promptly email your A model license key(s) or a for a B model, license key file(s) attachment message. Refer to **“License Key Redemption” on page 6**.

### Verify the License Contents

Refer to the license message you received from Keysight:

If the model number, serial number, or option number do not match those on the license message you received from Keysight, you will not be able to install the license key file. If this is the case, contact Keysight for assistance. Refer to **“Getting Assistance from Keysight” on page 4**.

### 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.keysight.com](http://www.keysight.com).
2. In the Search box, enter the model number of the analyzer (Ex: N5242A) and click **Search**.
3. Click **Technical Support > Manuals**.
4. Click **Service Manual**.
5. Click the service guide title to download the PDF file.
6. When the PDF of the Service Guide is displayed, scroll through the Contents section bookmarks to locate the information needed.

## Protecting Your Workspace from Electrostatic Discharge

For information, click on the Chapter 1 bookmark, “Electrostatic Discharge Protection” in the PDF Service Guide<sup>1</sup>.

### ESD Equipment Required for the Installation

Description	Keysight Part Number
ESD grounding wrist strap	9300-1367
5-ft grounding cord for wrist strap	9300-0980
2 x 4 ft conductive table mat and 15-ft grounding wire	9300-0797
ESD heel strap (for use with conductive floors)	9300-1308

### Tools Required for the Installation

Description	Qty	Part Number
T-10 TORX driver - set to 9 in-lbs (1.02 N.m)	1	N/A
T-20 TORX driver - set to 21 in-lbs (2.38 N.m)	1	N/A
5/16-in (8 mm) nutsetter or open end torque wrench- set to 10 in-lbs (1.13 N.m)	1	N/A

#### CAUTION

Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel cable connectors. On these, use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

## About Installing the Upgrade

Products affected	N5221A/B and N5222A/B and N5241B and N5242B and N5249B Option 401
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	2 hours
Estimated adjustment time	0.5 hours
Estimated full instrument calibration time	4.5 hours

## Items Included in the Upgrade Kit

Check the contents of your kit against the following list. If any part is missing or damaged, contact Keysight Technologies. Refer to [“Getting Assistance from Keysight” on page 4](#).

**Table 1** Contents of Upgrade Kit N5222-60107

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5222-90107
--	Software Entitlement Certificate	1	5964-5145
--	China RoHS Addendum	1	9320-6722
A34- A37	0-65 dB source step attenuator	4	33321-60077
A42- A45	0-35 dB receiver step attenuator	4	33321-60078
--	Attenuator bracket	4	N5242-00007
--	Machine screw, M3 x 8, pan head (to attach brackets to attenuators)	20	0515-0372
--	Machine screw, M3 x 6, pan head (to attach attenuator assemblies to deck)	15	0515-0430
--	Front panel overlay – N5221/2A models	1	N5222-80007
--	Front panel overlay – N5221/2B models	1	N5222-80014
--	Front panel overlay – N5241/2/9B models	1	N5242-80031
--	Cable clamp	10	1400-1334
--	Cable tie	7	1400-0249
--	Test port caps	4	1401-0214
W25	RF cable, A28 port 2 receiver coupler to front-panel REF 2 SOURCE OUT	1	N5222-20038
W48	RF cable, A33 reference mixer switch to A23 mixer brick (R1)	1	N5222-20101
W38	RF cable, REF 3 RCVR R3 IN to A24 mixer brick (R3) – N5222B	1	N5222-20024
	RF cable, REF 3 RCVR R3 IN to A24 mixer brick (R3) – N5242B		N5242-20270
W39	RF cable, REF 4 RCVR R4 IN to A24 mixer brick (R4) – N5222B	1	N5222-20027
	RF cable, REF 4 RCVR R4 IN to A24 mixer brick (R4) – N5242B		N5242-20271
W71	RF cable, A25 port 1 receiver coupler to A34 port 1 source attenuator	1	N5222-20002
W72	RF cable, RF cable, A34 port 1 source attenuator to front-panel Port 1 SOURCE OUT	1	N5222-20028
W75	RF cable, A26 port 3 receiver coupler to A35 port 3 source attenuator	1	N5222-20002
W76	RF cable, A35 port 3 source attenuator to front-panel Port 3 SOURCE OUT	1	N5222-20019
W79	RF cable, A27 port 4 receiver coupler to A36 port 4 source attenuator	1	N5222-20001

Table 1 Contents of Upgrade Kit N5222-60107

Ref Desig.	Description	Qty	Part Number
W80	RF cable, A36 port 4 source attenuator to front-panel Port 4 SOURCE OUT	1	N5222-20020
W83	RF cable, A28 port 2 receiver coupler to A37 port 2 source attenuator	1	N5222-20001
W84	RF cable, A37 port 2 source attenuator to front-panel Port 2 SOURCE OUT	1	N5222-20036
W87	RF cable, Port 1 RCVR A IN to A42 port 1 receiver attenuator	1	N5222-20031
W88	RF cable, A42 port 1 receiver attenuator to A23 mixer brick (A)	1	N5222-20004
W89	RF cable, Port 3 RCVR C IN to A43 port 3 receiver attenuator	1	N5222-20021
W90	RF cable, A43 port 3 receiver attenuator to A24 mixer brick (C) – (N5222B)	1	N5222-20006
	RF cable, A43 port 3 receiver attenuator to A24 mixer brick (C) – (N5242B)		N5242-20306
W91	RF cable, Port 4 RCVR D IN to A44 port 4 receiver attenuator	1	N5222-20022
W92	RF cable, A44 port 4 receiver attenuator to A24 mixer brick (D) – (N5222B)	1	N5222-20026
	RF cable, A44 port 4 receiver attenuator to A24 mixer brick (D) – (N5242B)		N5242-20307
W93	RF cable, Port 2 RCVR B IN to A45 port 2 receiver attenuator	1	N5222-20037
W94	RF cable, A45 port 2 receiver attenuator to A23 mixer brick (B)	1	N5222-20010
--	Ribbon cable, A19 test set motherboard J206 to A43 port 3 receiver attenuator		
--	Ribbon cable, A19 test set motherboard J205 to A42 port 1 receiver attenuator	4	8121-0982
--	Ribbon cable, A19 test set motherboard J207 to A44 port 4 receiver attenuator		
--	Ribbon cable, A19 test set motherboard J208 to A45 port 2 receiver attenuator		
--	Ribbon cable, A19 test set motherboard J202 to A35 port 3 source attenuator		
--	Ribbon cable, A19 test set motherboard J201 to A34 port 1 source attenuator	4	N5242-60008
--	Ribbon cable, A19 test set motherboard J203 to A36 port 4 source attenuator		
--	Ribbon cable, A19 test set motherboard J204 to A37 port 2 source attenuator		

**NOTE**

Extra quantities of items such as protective plastic caps, screws, cable ties, and cable clamps may be included in this upgrade kit. It is normal for some of these items to remain unused after the upgrade is completed.

## Installation Procedure for the Upgrade

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.

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### NOTE

Some of the following figures provided in this procedure contain bias tees. Bias tees are included in the Option 219/419 upgrade kits and can be ignored for Options 217/417 and 222/422.

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### Overview of the Installation Procedure

- “Step 1. Obtain a Keyword and Verify the Information.”
- “Step 2. Remove the Outer Cover.”
- “Step 3. Remove the Front Panel Assembly.”
- “Step 4. Remove Some Existing Cables.”
- “Step 5. Assemble the Attenuator Assemblies.”
- “Step 6. Install the Attenuator Assemblies.”
- “Step 7. Install the Cables.”
- “Step 8. Remove the Old Lower Front Panel Overlay.”
- “Step 9. Reinstall Front Panel Assembly.”
- “Step 10. Install the New Lower Front Panel Overlay.”
- “Step 11. Reinstall Front Panel Jumpers.”
- “Step 12. Position the Cables and Wires to Prevent Pinching.”
- “Step 13. Reinstall the Outer Cover.”
- “Step 14. Remove Option 401 License.”
- “Step 15. Enable Option 417.”
- “Step 16. Perform Post-Upgrade Adjustments and Calibration.”
- “Step 17. Prepare the PNA for the User.”

### Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Software Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to [“License Key Redemption” on page 6](#).

Verify that the model number, serial number, and option number information on the license key match those of the instrument on which this upgrade will be installed.

If the model number, serial number, or option number do not match those on your license key, you will not be able to install the option. If this is the case, contact Keysight for assistance before beginning the installation of this upgrade. Refer to **“Contacting Keysight” on page 4**.

Once the license key (A models) or license key file (B models) has been received and the information verified, you can proceed with the installation at **“Step 2. Remove the Outer Cover” on page 13**.

**NOTE**

If the model number, serial number, or option number do not match those on your license key (A models) or license key file (B models), you will not be able to install the option. If this is the case, contact Keysight for assistance before beginning the installation of this upgrade. Refer to **“Contacting Keysight” on page 4**.

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## Step 2. Remove the Outer Cover

For instructions, click the Chapter 7 bookmark “Removing the Covers” in the PDF Service Guide.

## Step 3. Remove the Front Panel Assembly

For instructions, click the Chapter 7 bookmark “Removing and Replacing the Front Panel Assembly” in the PDF Service Guide1.

## Step 4. Remove Some Existing Cables

**CAUTION**

Be careful not to damage the center pins of the semirigid cables. Some flexing of the cables may be necessary but do not over-bend them.

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1. Place the analyzer bottom-side up on a flat surface
2. Remove the following cables. To see an image showing the location of these cables, click the Chapter 6 bookmark “Bottom RF Cables, Standard 4-Port Configuration, Option 401” in the PDF Service Guide.

These cables may be discarded - they will not be reinstalled.

- W11 (N5222-20044) A25 port 1 receiver coupler to front-panel Port 1 SOURCE OUT
- W15 (N5222-20047) A26 port 3 receiver coupler to front-panel Port 3 SOURCE OUT
- W19 (N5222-20050) A27 port 4 receiver coupler to front-panel Port 4 SOURCE OUT
- W23 (N5222-20051) A28 port 2 receiver coupler to front-panel Port 2 SOURCE OUT
- W25 (N5222-20059) A28 port 2 receiver coupler to front-panel REF 2 SOURCE OUT
- W31 (N5222-20046) Port 1 RCVR A IN to A23 mixer brick (A)
- W32 (N5222-20048) Port 3 RCVR C IN to A24 mixer brick (C)

## Installation Procedure for the Upgrade

- W33 (N5222-20055) Port 4 RCVR D IN to A24 mixer brick (D)
- W34 (N5222-20052) Port 2 RCVR B IN to A23 mixer brick (B)
- W48 (N5222-20056) A33 reference mixer switch to A23 mixer brick (R1)
- W49 (N5222-20057) REF 3 RCVR R3 IN to A24 mixer brick (R3)
- W50 (N5222-20058) REF 4 RCVR R4 IN to A24 mixer brick (R4)

These cables must be saved - they will be reinstalled.

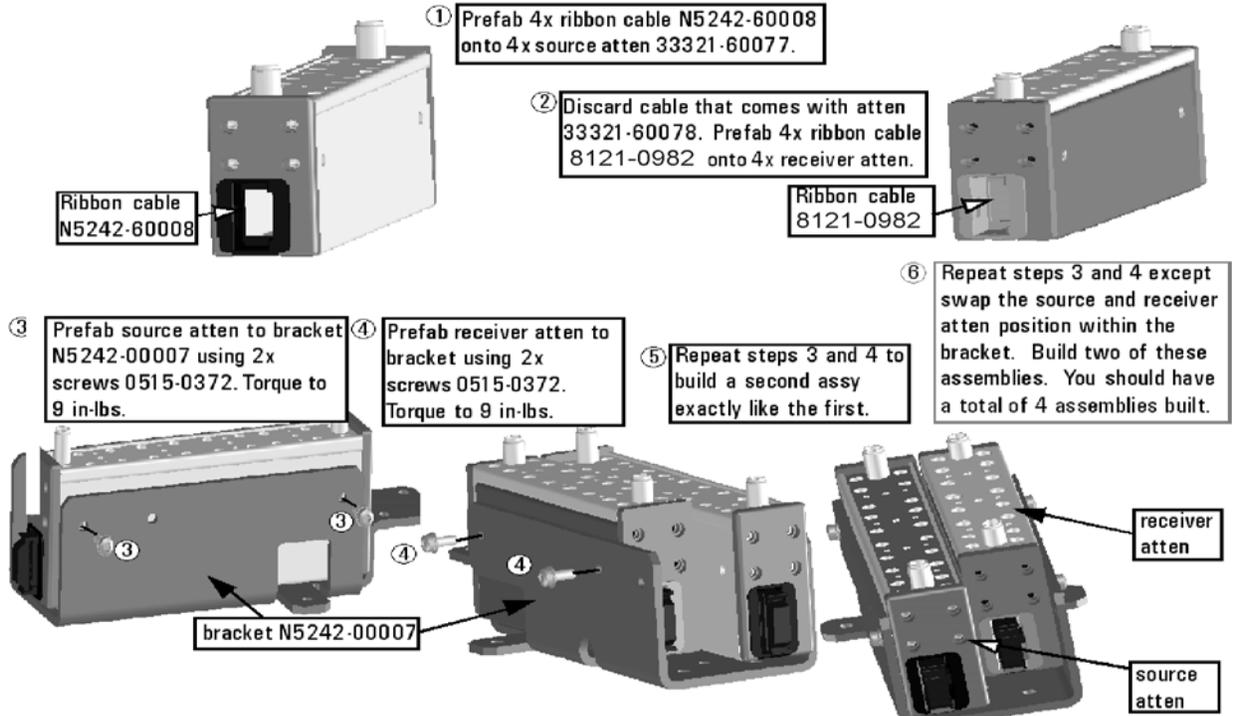
- W4 (N5222-20040) W3 to A25 port 1 receiver coupler
- W8 (N5222-20042) W7 to A27 port 4 receiver coupler
- W10 (N5222-20043) W9 to A28 port 2 receiver coupler
- W12 (N5222-20045) Port 1 CPLR THRU to A29 port 1 coupler
- W13 (N5222-20005) A25 port 1 receiver coupler to A33 reference mixer switch
- W14 (N5222-20030) A29 port 1 coupler to front-panel Port 1 CPLR ARM
- W16 (N5222-20049) Port 3 CPLR THRU to A30 port 3 coupler
- W20 (N5222-20054) Port 4 CPLR THRU to A31 port 4 coupler
- W24 (N5222-20053) Port 2 CPLR THRU to A32 port 2 coupler
- W35 (N5222-20033) A33 reference mixer switch to front-panel REF 1 SOURCE OUT
- W36 (N5222-20032) REF 1 RCVR R1 IN to A33 reference mixer switch
- W40 (reuse) (N5222-20039) REF 2 RCVR R2 IN to A23 mixer brick (R2)
- W30 (N5222-20091) Front panel jumpers (quantity = 12)

NOTE: Remove and save the cable guards for the front panel jumpers.

## Step 5. Assemble the Attenuator Assemblies

Refer to **Figure 1** for this step of the procedure. New parts are listed in **Table 1 on page 10**. Use a T-10 TORX driver to tighten all screws.

Figure 1 Attenuator Assembly

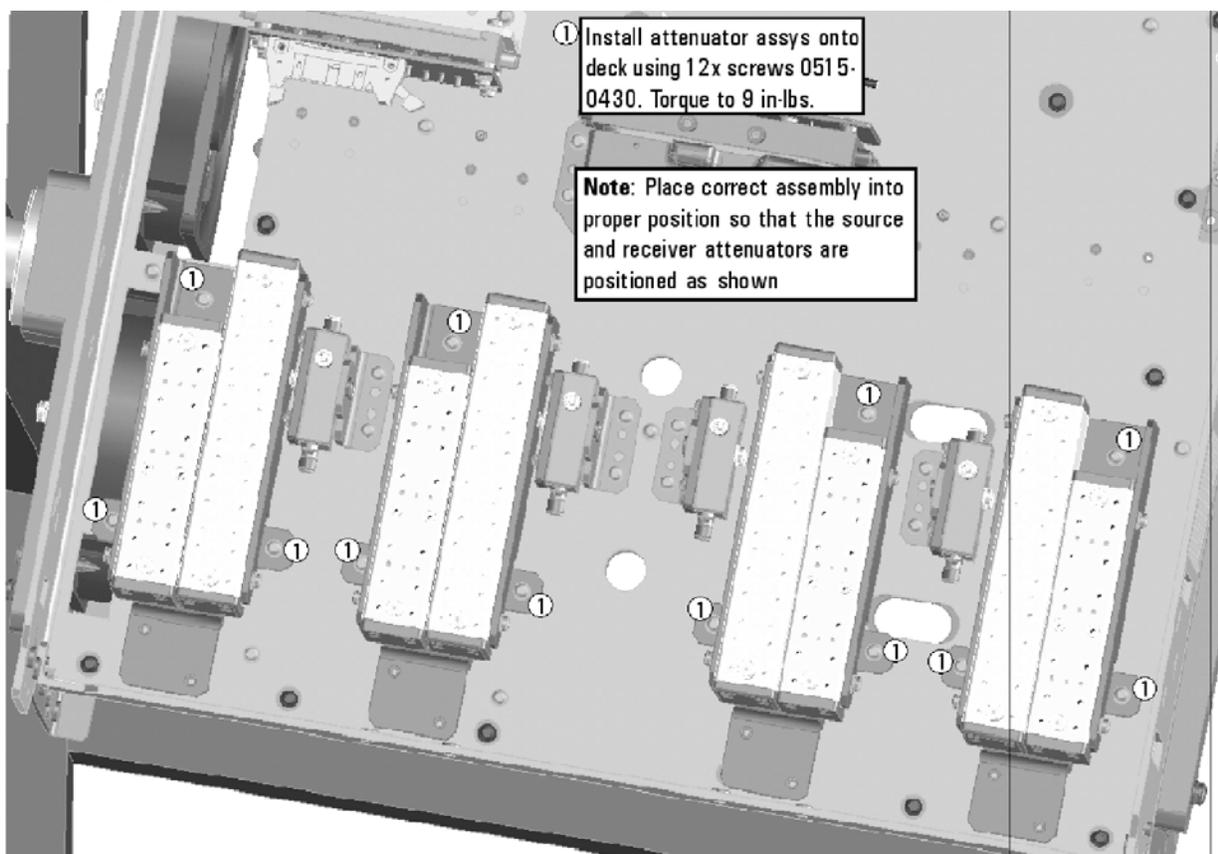


N5222\_107\_03

## Step 6. Install the Attenuator Assemblies

Refer to **Figure 2** for this step of the procedure. New parts are listed in **Table 1 on page 10**. Use a T-10 TORX driver to tighten all screws.

**Figure 2** Attenuator Assemblies Installation



N5222\_107\_04

## Step 7. Install the Cables

### CAUTION

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

### Install the Semirigid Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom RF Cables, 4-Port Configuration, Option 417” in the PDF Service Guide. New parts are listed in **Table 1 on page 10**.

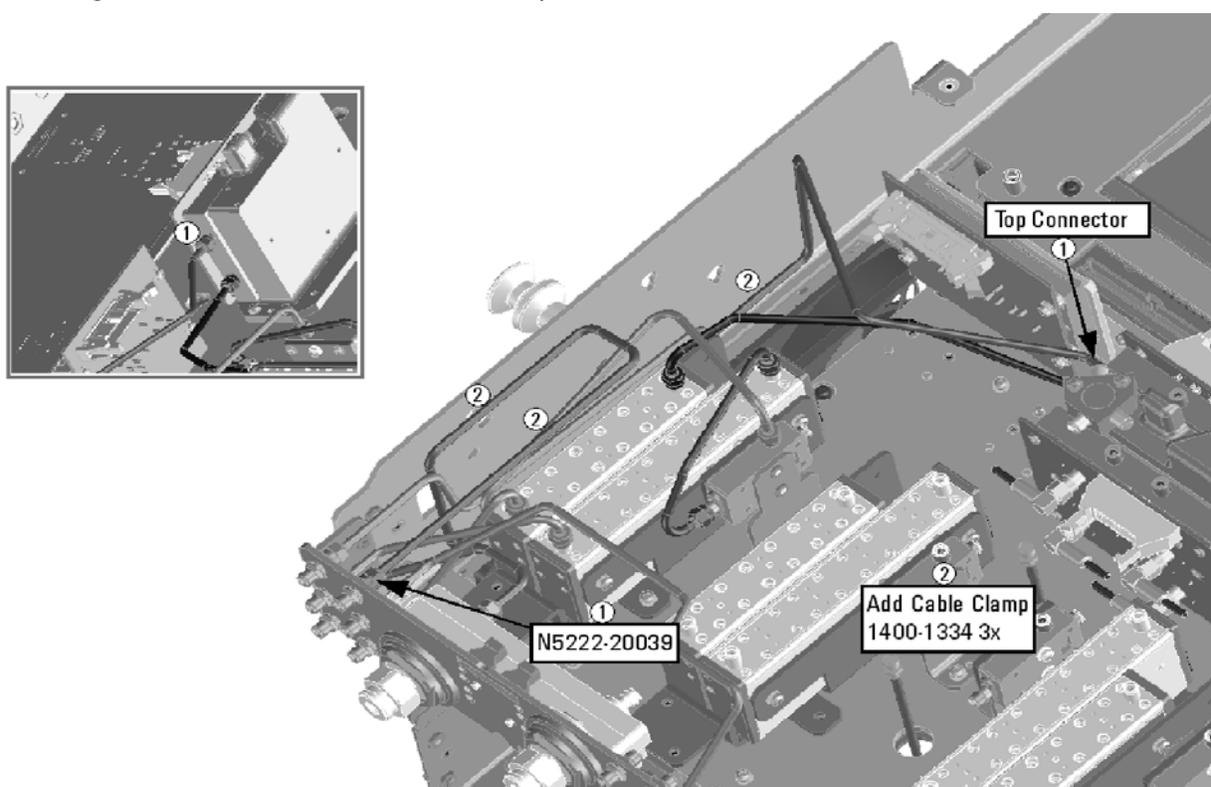
Install the following cables in the order listed.

- W93 (N5222-20037) Port 2 RCVR B IN to A45 port 2 receiver attenuator

- W84 (N5222-20036) A37 port 2 source attenuator to front-panel Port 2 SOURCE
- W24 (reuse) (N5222-20053) Port 2 CPLR THRU to A32 port 2 coupler
- W79 (N5222-20001) A27 port 4 receiver coupler to A36 port 4 source attenuator
- W25 (N5222-20038) A28 port 2 receiver coupler to front-panel REF 2 SOURCE OUT
- W94 (N5222-20010) A45 port 2 receiver attenuator to A23 mixer brick (B)
- W40 (reuse) (N5222-20039) REF 2 RCVR R2 IN to A23 mixer brick (R2)

\* As shown in **Figure 5**, install three cable clamps (part number 1400-1334) to secure W40 (part number N5222-20039).

**Figure 3** Location of Cable Clamps to Secure W40



N5222\_107\_05

- W20 (reuse) (N5222-20054) Port 4 CPLR THRU to A31 port 4 coupler
- W91 (N5222-20022) Port 4 RCVR D IN to A44 port 4 receiver attenuator
- W80 (N5222-20020) A36 port 4 source attenuator to front-panel Port 4 SOURCE OUT
- W39 (N5222-20027) REF 4 RCVR R4 IN to A24 mixer brick (R4) – **(N5222B)**  
W39 (N5242-20271) REF 4 RCVR R4 IN to A24 mixer brick (R4) – **(N5242B)**
- W92 (N5222-20026) A44 port 4 receiver attenuator to A24 mixer brick (D) – **(N5222B)**  
W92 (N5242-20307) A44 port 4 receiver attenuator to A24 mixer brick (D) – **(N5242B)**

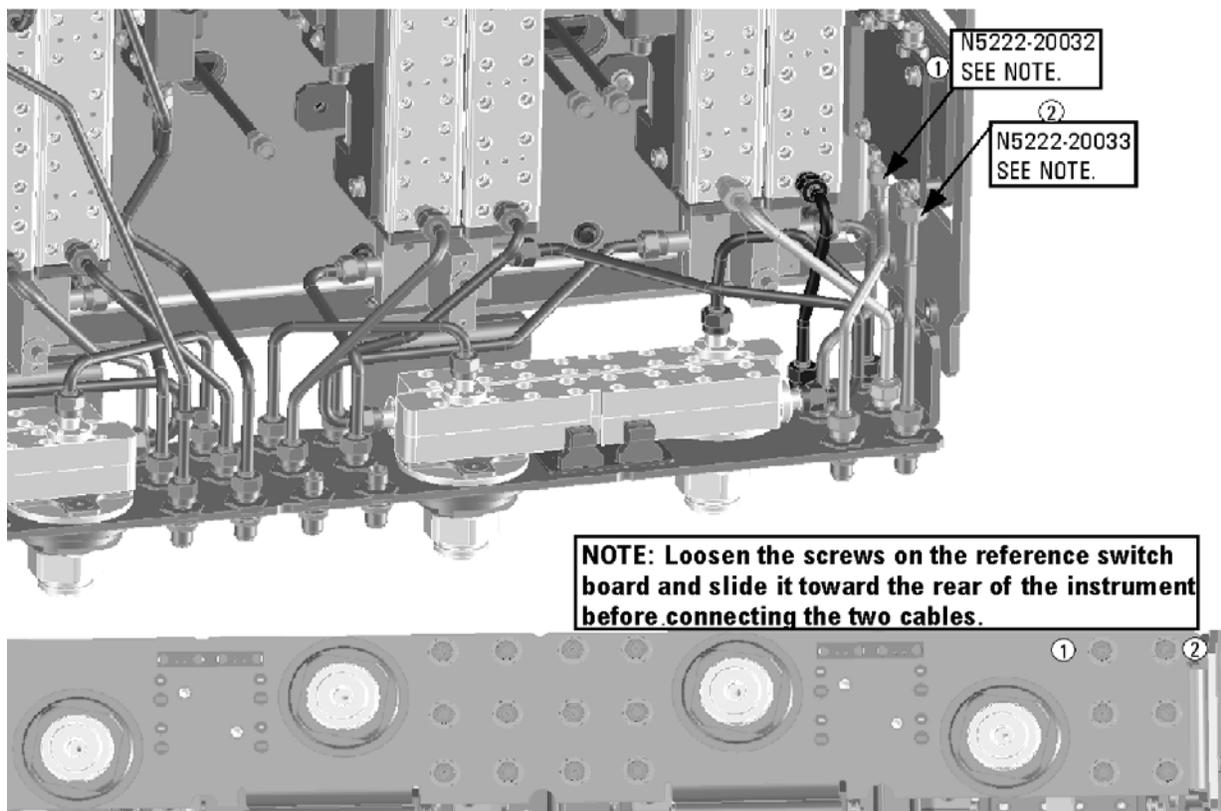
- W83 (N5222-20001) A28 port 2 receiver coupler to A37 port 2 source attenuator
- W89 (N5222-20021) Port 3 RCVR C IN to A43 port 3 receiver attenuator
- W12 (reuse) (N5222-20045) Port 1 CPLR THRU to A29 port 1 coupler
- W16 (reuse) (N5222-20049) Port 3 CPLR THRU to A30 port 3 coupler
- W76 (N5222-20019) A35 port 3 source attenuator to front-panel Port 3 SOURCE OUT
- W14 (reuse) (N5222-20030) A29 port 1 coupler to front-panel Port 1 CPLR ARM
- W87 (N5222-20031) Port 1 RCVR A IN to A42 port 1 receiver attenuator
- W72 (N5222-20028) A34 port 1 source attenuator to front-panel Port 1 SOURCE OUT

NOTE: Slide the reference switch assembly toward the rear of the instrument to connect the N5222-20033 and N5222-20032 cables. Afterwards, reposition the switch assembly.

- W35 (reuse) (N5222-20033) A33 reference mixer switch to front-panel REF 1 SOURCE OUT

\* Refer to the note shown in **Figure 4** for information on installing W35 (part number N5222-20033)

**Figure 4** Information to Secure W35 and W36



N5222\_107\_06

- W36 (reuse) (N5222-20032) REF 1 RCVR R1 IN to A33 reference mixer switch

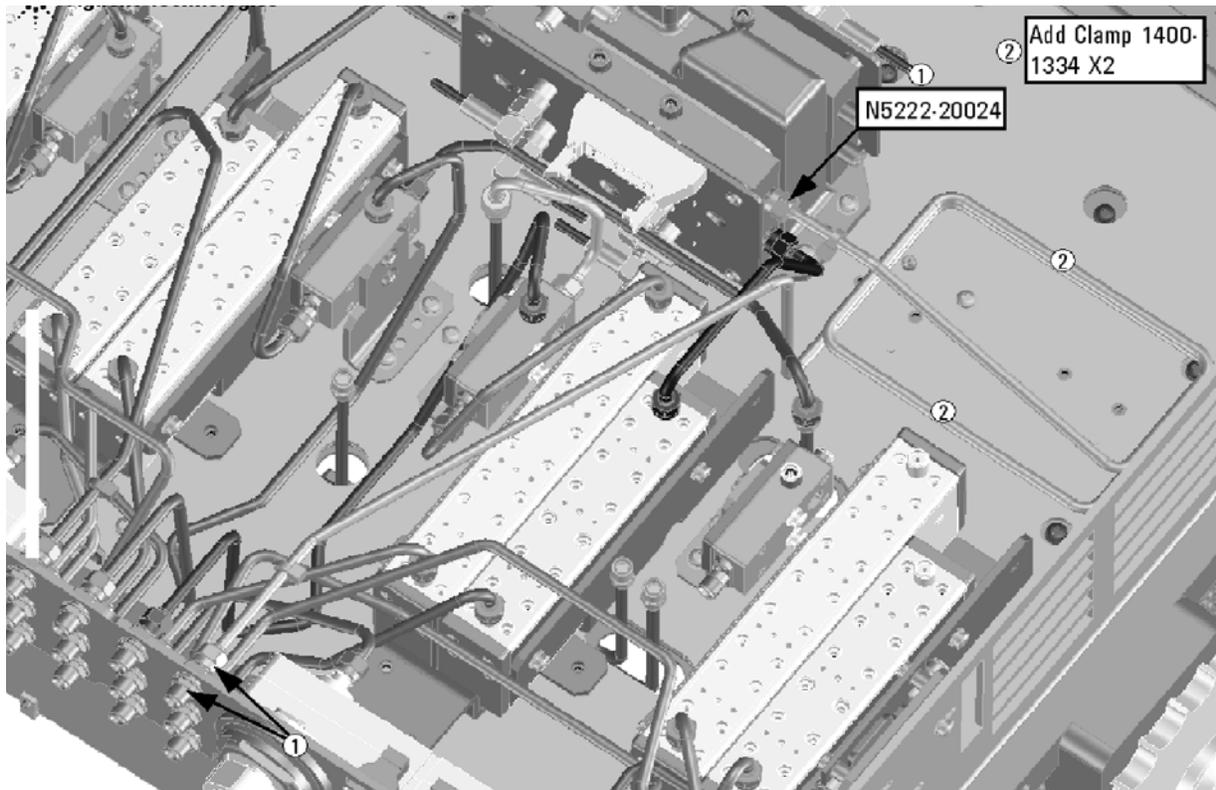
\* Refer to the note shown in **Figure 4** for information on installing W36 (part number N5222-20032).

- W75 (N5222-20002) A26 port 3 receiver coupler to A35 port 3 source attenuator
- W90 (N5222-20006) A43 port 3 receiver attenuator to A24 mixer brick (C) – **(N5222B)**  
W90 (N5242-20306) A43 port 3 receiver attenuator to A24 mixer brick (C) – **(N5242B)**
- W8 (reuse) (N5222-20042) W7 to A27 port 4 receiver coupler
- W38 (N5222-20024) REF 3 RCVR R3 IN to A24 mixer brick (R3) – **(N5222B)**  
W38 (N5242-20270) REF 3 RCVR R3 IN to A24 mixer brick (R3) – **(N5242B)**

\* As shown in **Figure 5**, install two cable clamps (part number 1400-1334) to secure N5222B's W38 (part number N5222-20024).

No clamps are required for the N5242B, W38 (N5242-20270) cable.

**Figure 5** Location of Cable Clamps to Secure N5222B, W38 (N5222-20024)

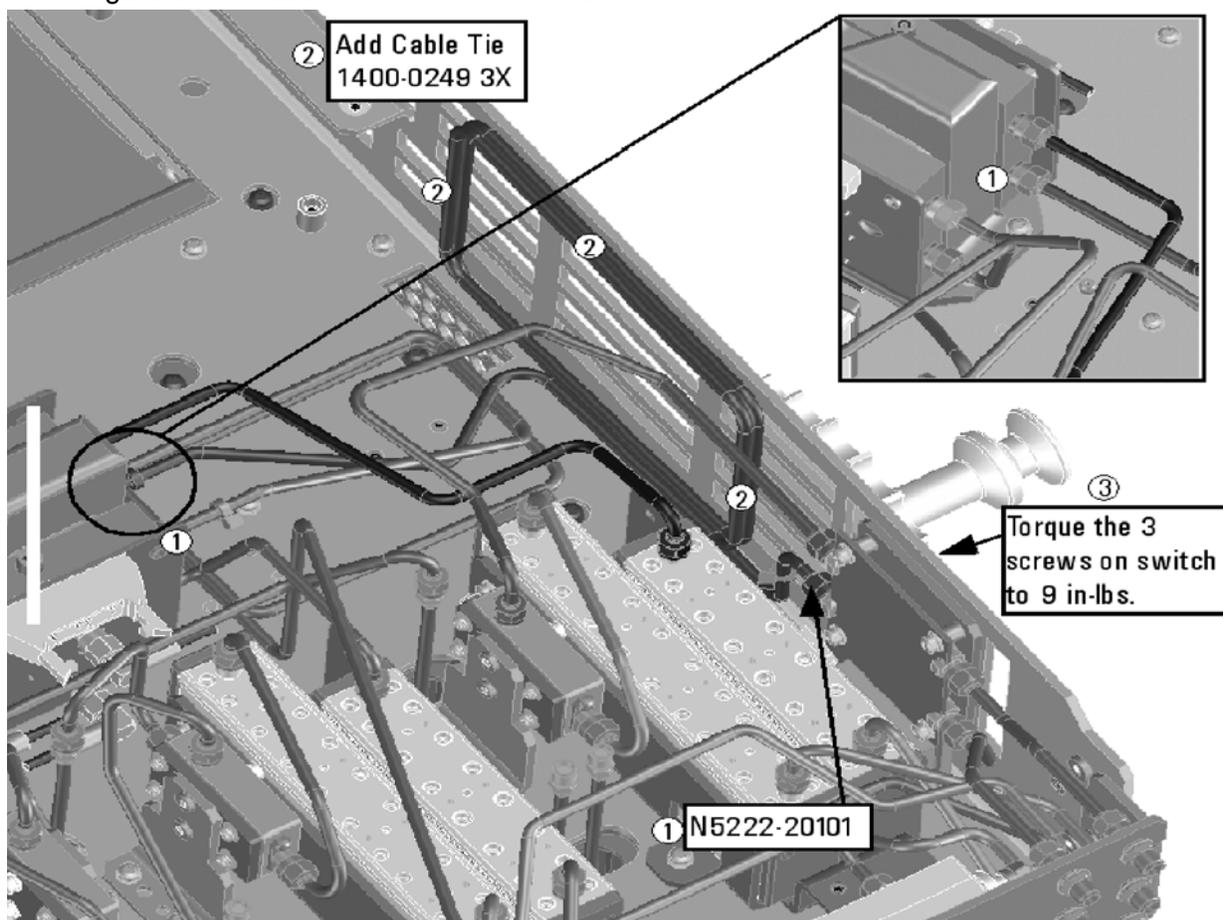


N5222\_107\_01

- W48 (N5222-20101) A33 reference mixer switch to A23 mixer brick (R1)

\* As shown in **Figure 6 on page 20**, install three cable ties (part number 1400-0249) to secure W48 (part number N5222-20101).

Figure 6 Location of Cable Ties to Secure W48



N5222\_107\_02

- W71 (N5222-20002) A25 port 1 receiver coupler to A34 port 1 source attenuator
- W88 (N5222-20004) A42 port 1 receiver attenuator to A23 mixer brick (A)
- W13 (reuse) (N5222-20005) A25 port 1 receiver coupler to A33 reference mixer switch
- W10 (reuse) (N5222-20043) W9 to A28 port 2 receiver coupler
- W4 (reuse) (N5222-20040) W3 to A25 port 1 receiver coupler

### Install the Ribbon Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom Ribbon Cables and Wire Harnesses, 4-Port, Option 417” in the PDF Service Guide<sup>1</sup>. New parts are listed in [Table 1 on page 10](#).

If not already done, connect the step attenuator ribbon cables as follows:

- (8121-0982) A19 test set motherboard J206 to A43 port 3 receiver attenuator
- (8121-0982) A19 test set motherboard J205 to A42 port 1 receiver attenuator

1. See [“Downloading the Online PNA Service Guide” on page 7](#).

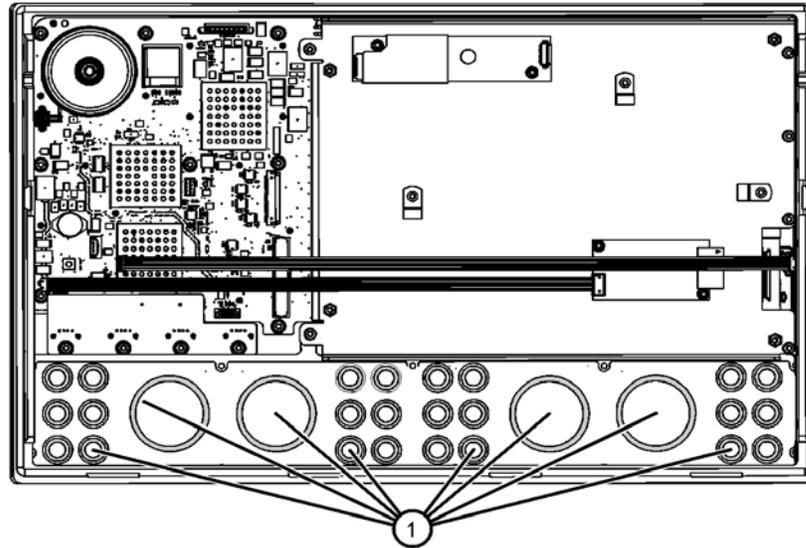
- (8121-0982) A19 test set motherboard J207 to A44 port 4 receiver attenuator
- (8121-0982) A19 test set motherboard J208 to A45 port 2 receiver attenuator
- (N5242-60008) A19 test set motherboard J202 to A35 port 3 source attenuator
- (N5242-60008) A19 test set motherboard J201 to A34 port 1 source attenuator
- (N5242-60008) A19 test set motherboard J203 to A36 port 4 source attenuator
- (N5242-60008) A19 test set motherboard J204 to A37 port 2 source attenuator

### Step 8. Remove the Old Lower Front Panel Overlay

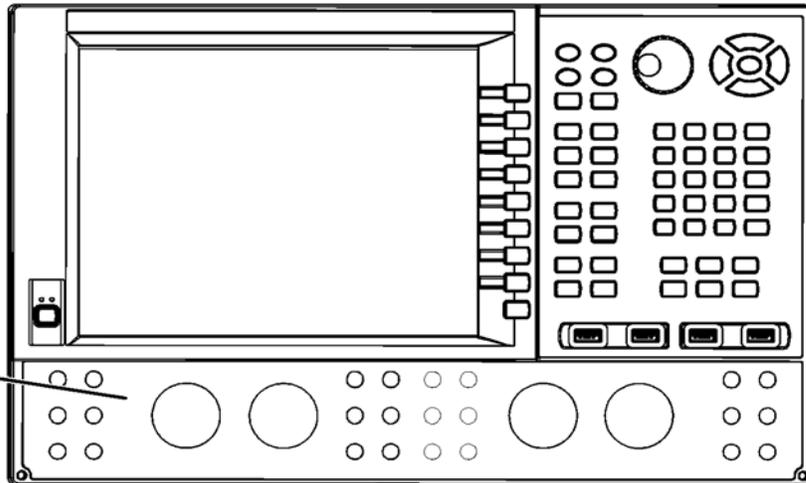
Refer to **Figure 7** or this step of the procedure. New parts are listed in **Table 1 on page 10**.

- 1. From the back side of the front panel, use a blunt object in the cutouts in the lower front dress panel to push on the old overlay (item ①) and separate it from the front dress panel.**
- 2. From the front side of the front panel, pull off the overlay completely and discard it.**
- 3. Remove any adhesive remaining on the front panel.**

Figure 7 Lower Front Panel Overlay Replacement



Old lower front-panel overlay visible through cutouts from rear of front panel. Push here to release old front-panel overlay.



New lower front-panel overlay. Align loosely to opening before pressing firmly.

N5225\_105\_04

## Step 9. Reinstall Front Panel Assembly

For instructions on reinstalling the front panel assembly, click the Chapter 7 bookmark “Removing and Replacing the Front Panel Assembly” in the PDF Service Guide<sup>1</sup>.

## Step 10. Install the New Lower Front Panel Overlay

Refer to **Figure 7 on page 22** for this step of the procedure. New parts are listed in **Table 1 on page 10**.

1. Remove the protective backing from the new front panel overlay, N5222-80007 (N5221/2A) or N5222-80031 (N5221/2B) or N5242-80031 (N5241/2/9B)—(item ②).
2. Starting from either side, **loosely** place the overlay in the recess on the lower front panel, ensuring that it fits tightly against the edges of the recess.
3. Once the overlay is in place, press it firmly onto the frame to secure it.

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1. See “[Downloading the Online PNA Service Guide](#)” on page 7.

## Step 11. Reinstall Front Panel Jumpers

As shown in **Figure 8**, reinstall the 12 front panel jumper cables (reference designator W30; part number N5222-20091).

**Figure 8** Front Panel Jumper Cables Installation



① **Reinstall 12x jumper cables N5222-20091 and torque to 10 in-lbs.**

N5225\_105\_05

## Step 12. Position the Cables and Wires to Prevent Pinching

On the top side of the PNA, carefully position the gray flex cables so they can't be pinched between the covers and the rails.

On the bottom side of the PNA, carefully fold or push down the ribbon cables and wires so they can't be pinched between the hardware and the outer cover. Ribbon cables and wires must never be positioned on top of hardware.

## Step 13. Reinstall the Outer Cover

For instructions, click the Chapter 7 bookmark “Removing the Covers” in the PDF Service Guide<sup>1</sup>.

## Step 14. Remove Option 401 License

### Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must **not** be running.
- A keyboard and mouse must be connected to the network analyzer.

### A Model Option 401 License Removal Procedure

For B models, refer to [“B Model Option 401 License Removal Procedure.”](#)

1. To start the option enable utility, press UTILITY **System**, then **Service**, then **Option Enable**. An option enable dialog box will appear.
2. Click the arrow in the Select Desired Option box. A list of available options will appear.
3. In the Select Desired Option list, click **401**.
4. Click Remove.
5. Click OK to confirm that you want to remove the license for the selected option.
6. Click Yes in answer to the displayed question in the Restart Analyzer? box.

### B Model Option 401 License Removal Procedure

For A models, refer to [“A Model Option 401 License Removal Procedure.”](#)

1. To start the Keysight License Manager, press **Start > Keysight License Manager > Keysight License Manager**. A Keysight License Manager dialog box will appear.
2. Right click the on the desired option and click **Delete**.
3. In the Keysight License Manager dialog box that appears, press or click **Yes** to confirm delete.
4. A message displays stating that the option removal was successful.

## Step 15. Enable Option 417

### Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must **not** be running.
- Refer to the license message you received from Keysight: Verify that the analyzer’s model and serial numbers match those on the license message you received from Keysight.

- Obtain a license key (A models) or license key file (B models) for installation of this upgrade by following the instructions on the supplied Software Entitlement Certificate.
- A keyboard must be connected to the network analyzer.

For "A" models, refer to [“Option Enable Procedure for "A" Model Instruments” on page 26.](#)

For "B" models refer to [“Option Enable Procedure for "B" Model Instruments ” on page 26.](#)

### Option Enable Procedure for "A" Model Instruments

1. To start the option enable utility, press UTILITY **System**, then **Service**, then **Option Enable**. An option enable dialog box will appear.
2. Click the arrow in the Select Desired Option box. A list of available options will appear.
3. In the Select Desired Option list, click 417 - Configurable TS + Attens.
4. Using the keyboard, enter the license key in the box provided. The license key is printed on the license message you received from Keysight. Enter this key exactly as it is printed on the message.
5. Click Enable.
6. Click Yes in answer to the displayed question in the Restart Analyzer? box.
7. When the installation is complete, click Exit.

### "A" Model Option Verification Procedure

Once the analyzer has restarted and the Network Analyzer program is again running:

1. On the analyzer's Help menu, click About Network Analyzer.
2. Verify that "417" is listed after "Options:" in the display. Click OK.

#### NOTE

If the option is still not enabled, contact Keysight Technologies. Refer to [“Getting Assistance from Keysight” on page 4.](#)

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### Option Enable Procedure for "B" Model Instruments

#### NOTE

For this step, you will need a USB flash drive.

A single license file may contain more than one feature.

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1. Locate the email(s) from Keysight which contain license file attachments. These emails are a result of [“Step 1. Obtain a Keyword and Verify the Information” on page 12.](#)

2. Copy the license file(s) from the email(s) to the root directory of the USB flash drive. More than one license file may be copied to the USB flash drive.

**NOTE**

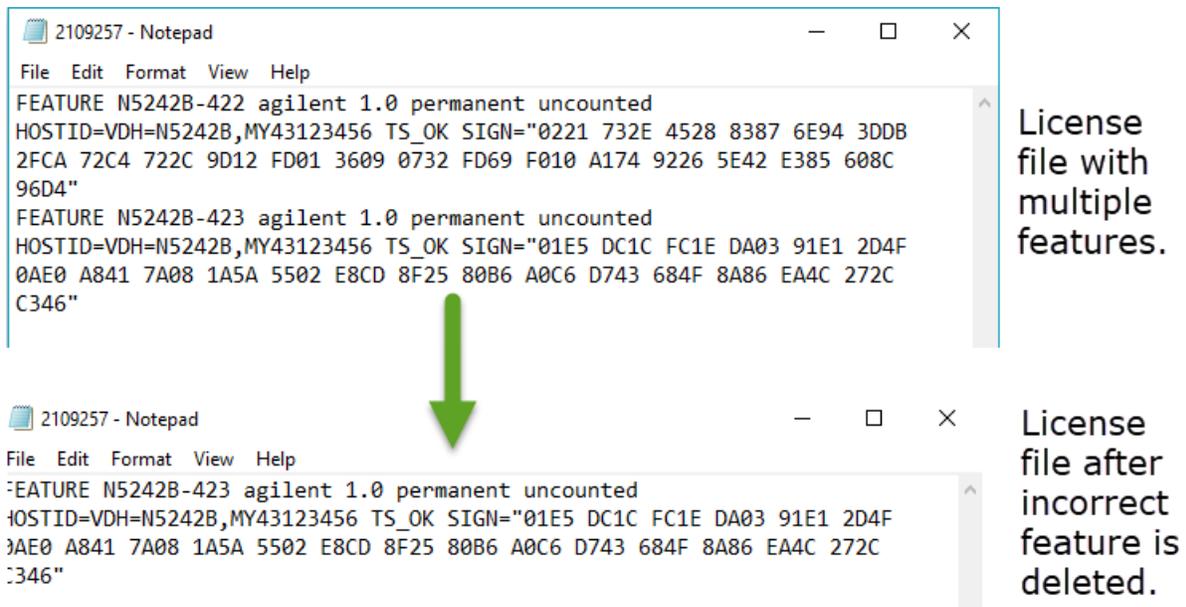
A single license file may contain more than one feature.

3. Verifying and editing the license file:

For these steps, refer to the example in [Figure 9 on page 27](#).

- a. Verify your USB flash drive is connected to a PC.
- b. Open your license file using a text read/write program similar to Notepad.
- c. If you have more than one licensed feature, delete the feature that is not required for this upgrade. (e.g., in this case N5242B-423 is the correct upgrade. So, N5242B-422 is to be deleted from the text file.)

Figure 9 Editing a Keysight License File Using a Text Editor



**NOTE**

The figure above may not contain your specific features and is an example only. In this example N5242B-422 is the incorrect feature. N5242B-423 is the correct feature.

- d. Re-save the text license file to the root directory of your USB flash drive.
- e. Verify that only the single correctly edited text license file is in the root directory of your USB drive.
- f. Eject your USB flash drive and remove the USB flash drive from your PC.

4. Connect the USB flash drive to the PNA. Within 5 seconds, the PNA should display a small "New licenses installed" message.

Else, load the license key file(s), manually move your license file(s) to C:\Program Files\Agilent\licensing. It may take Keysight License Manager an extra ~5 seconds to enable the licenses.

**NOTE**

Attempting to re-install a license file that is already installed may generate a "Corrupt Media" error message. Ignore this message.

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5. Disconnect the USB flash drive from the PNA.
6. On the analyzer, click or press to open the KLM software from your PNA's Windows taskbar by pressing **Start > More Programs > Keysight License Manager folder > Keysight License Manager** and verify the options are correct.

### "B" Model Option Verification Procedure

**NOTE**

If the option(s) have not been enabled or if your older options have not been removed, contact Keysight Technologies. Refer to "[Getting Assistance from Keysight](#)" on page 4.

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Once the Network Analyzer program is again running:

1. Start the Network Analyzer program.
2. Once the Network Analyzer program is running:
  - Press **Help > About NA** and verify that Option 417 is listed in the PNA application.
3. After successful installation of all upgrades, some features require some adjustments to ensure the instrument meets its specified performance. Refer to the following Web site: <http://na.support.keysight.com/pna>.

## Step 16. Perform Post-Upgrade Adjustments and Calibration

### Adjustments

The following adjustments must be made due to the hardware changes of the analyzer.

- source adjustment
- IF gain adjustment
- receiver characterization
- receiver adjustment
- IF Response adjustment (For A model: Options 090, 093, or 094 Only. For B models: Options S93090xA/B, S93093A/B, or S93094A/B Only.)
- Noise adjustment (For N5241/2/9B models: Option 029 with S93029A/B Only.)

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 is also found in the service guide.

To view this service guide information, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

After the specified adjustments have been performed, the analyzer should operate and phase lock over its entire frequency range.

### Operator's Check

Perform the Operator's Check to check the basic functionality of the analyzer. For instructions, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to **“Contacting Keysight” on page 4.**

### Calibration

Although the analyzer functions, its performance relative to its specifications has not been verified. It is recommended that a full instrument calibration be performed using the analyzer's internal performance test software. To view information on the performance test software, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

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1. See **“Downloading the Online PNA Service Guide” on page 7.**

### Step 17. Prepare the PNA for the User

1. If necessary, reinstall front jumper cables.
2. If necessary, reinstall the cable guards, pushing them over the front jumper cables until the cushioning material touches the front panel of the PNA.
3. Install the dust caps on the test ports.
4. Clean the analyzer, as needed, using a damp cloth.





This information is subject to change without notice.

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[www.keysight.com](http://www.keysight.com)