

Keysight Add Bias Tees Upgrade Kit

To Upgrade PNA N5221A/B or N5222A/B Option 217 to Option 219 or
PNA-X N5241B, N5244B, N5249B Option 217 to Option 219 or
PNA-X N5241B, N5244B, N5249B Option 222 to Option 224

Upgrade Kit Order Numbers:

N5221AU-219 or N5222AU-219 or N5221BU-219 or
N5222BU-219 or N5241B 219, N5244B-219,
N5249B-219 or N5241B-224, N5244B-224, N5249B-224

Keysight Kit Number: N5222-60104

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.



Notices

© Keysight Technologies, Inc.
2009-2019

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies, Inc. as governed by United States and international copyright laws.

Trademark Acknowledgments

Manual Part Number

N5222-90104

Edition

Edition 2, June 2019
Supersedes: May 2017

Printed in USA/Malaysia

Published by:
Keysight Technologies
1400 Fountaingrove Parkway
Santa Rosa, CA 95403

Warranty

THE MATERIAL CONTAINED IN THIS DOCUMENT IS PROVIDED "AS IS," AND IS SUBJECT TO BEING CHANGED, WITHOUT NOTICE, IN FUTURE EDITIONS. FURTHER, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, KEYSIGHT DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED WITH REGARD TO THIS MANUAL AND ANY INFORMATION CONTAINED HEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. KEYSIGHT SHALL NOT BE LIABLE FOR ERRORS OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, USE, OR PERFORMANCE OF THIS DOCUMENT OR ANY INFORMATION CONTAINED HEREIN. SHOULD KEYSIGHT AND THE USER HAVE A SEPARATE WRITTEN AGREEMENT WITH WARRANTY TERMS

COVERING THE MATERIAL IN THIS DOCUMENT THAT CONFLICT WITH THESE TERMS, THE WARRANTY TERMS IN THE SEPARATE AGREEMENT WILL CONTROL.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

U.S. Government Rights

The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public.

Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at

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

The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software

documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Safety Notices

CAUTION

A **CAUTION** 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 damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

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.

Keysight Add Bias Tees Upgrade Kit
Keysight Kit Number: N5222-60104
Installation Note

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.

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.

This upgrade adds the following items to your N5221A/B Option 217 or N5222A/B Option 217 or N5241B Option 217 or N5242B Option 217 or N5249B Option 217 or N5241B Option 222, N5242B Option 222, N5249B Option 222 analyzer:

- a bias tee in each source port channel
- a replacement overlay for the lower front panel
- new RF cables

After installation of this upgrade, your analyzer will be an N5221A/B Option 219 or N5222A Option 219 or N5241B Option 219 or N5242B Option 219 or N5249B Option 219 or N5241B Option 224, N5242B Option 224, N5249B Option 224.

Getting Assistance from Keysight

By internet or phone, get assistance with all your test and measurement needs.

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.

If You Have Problems With the Upgrade Kit Contents

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>

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.

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 5.
- Enough time - refer to **“About Installing the Upgrade”** on page 5.
- 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 Guide¹.

1. See **“Downloading the Online PNA Service Guide”** on page 4.

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.

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>.

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.

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 - N2221A, N5222A, N5241A, N5242A, or N5249A.

- Host ID

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 3**.

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 1**.

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.
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 Guide¹.

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

1. See **“Downloading the Online PNA Service Guide” on page 4**.

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 panel and rear panel bulkhead connectors. Torque these connections to 21 in-lb.

About Installing the Upgrade

Products affected	N5221A/B and N5222A/B Option 217 and N5241/4/9B Option 217 and N5241/4/9B Option 222
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 1**.

Table 1 Contents of Upgrade Kit N5222-60104

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5222-90104
--	Software Entitlement Certificate	1	5964-5145
A38- A41	Bias tee	2	5067-4865
--	Machine screw, M3 x 6, pan head (to attach bias tee brackets to deck)	8	0515-0430
--	Machine screw, M3 x 14, pan head (to secure bias tees to brackets)	5	0515-2994
--	Cable clamp	7	1400-1334
--	Front panel overlay – PNA "A" models	1	N5222-80003
--	Front panel overlay – PNA and PNA-X "B" models	1	N5222-80010
W73	RF cable, Front-panel Port 1 CPLR THRU to A38 port 1 bias tee	1	N5222-20029
W85	RF cable, Front-panel Port 2 CPLR THRU to A41 port 2 bias tee	1	N5222-20035
W119	RF cable, A38 port 1 bias tee to A29 port 1 coupler	1	N5222-20072
W120	RF cable, A41 port 2 bias tee to A32 port 2 coupler	1	N5222-20065

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.

Overview of the Installation Procedure

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.

“Step 1. Obtain a Keyword and Verify the Information.”

“Step 2. Remove the Outer Cover.”

“Step 3. Remove Some Bottom-Side (Test Set) Cables.”

“Step 4. Remove the Front Panel Assembly.”

“Step 5. Install the Bias Tees.”

“Step 6. Install Some Bottom-Side (Test Set) Cables.”

“Step 7. Remove the Old Lower Front Panel Overlay.”

“Step 8. Reinstall Front Panel Assembly.”

“Step 9. Install the New Lower Front Panel Overlay.”

“Step 10. Reinstall Front Panel Jumpers.”

“Step 12. Reinstall the Outer Cover.”

“Step 13. Remove Option 217 or 222 License.”

“Step 14. Enable Option 219/224.”

“Step 15. Perform Post-Upgrade Adjustments and Calibration.”

“Step 16. 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 3**.

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 1**.

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 8**.

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 1**.

Step 2. Remove the Outer Cover

For instructions, click the Chapter 7 bookmark “Removing the Covers” in the PDF Service Guide¹.

Step 3. Remove Some Bottom-Side (Test Set) Cables

CAUTION

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

NOTE

When removing a cable, also remove the plastic cable clamp, if present. It is normal for some of the cable clamp’s adhesive to remain.

1. Place the analyzer bottom-side up on a flat surface.
2. Remove the cables in the following list. To see an image showing the location of these cables, click the Chapter 6 bookmark “Bottom RF Cables, Standard 2-port Configuration, Option 217 (or 222)” in the PDF Service Guide

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

- W114 (N5222-20068) A29 port 1 coupler to front-panel Port 1 CPLR THRU
 - W116 (N5222-20069) A32 port 2 coupler to front-panel Port 2 CPLR THRU
- These cables must be saved - they will be reinstalled.
- W25 (N5222-20038) A28 port 2 receiver coupler to front-panel REF 2 SOURCE OUT

1. See **“Downloading the Online PNA Service Guide” on page 4**.

Installation Procedure for the Upgrade

- W30 (qty 6) (N5222-20033) Front panel jumper
- W35 (N5222-20091) A33 reference mixer switch to front-panel REF 1 SOURCE OUT
- W36 (N5222-20032) Front-panel REF 1 RCVR R1 IN to A33 reference mixer switch
- W40 (N5222-20039) Front-panel REF 2 RCVR R2 IN to A23 mixer brick (R2)
- W30 (N5222-20091) Front panel jumpers (quantity = 6)

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

3. Leave the gray flexible cables, the wire harnesses, and the ribbon cables connected where possible. Any that are removed should be labeled for reconnection later.

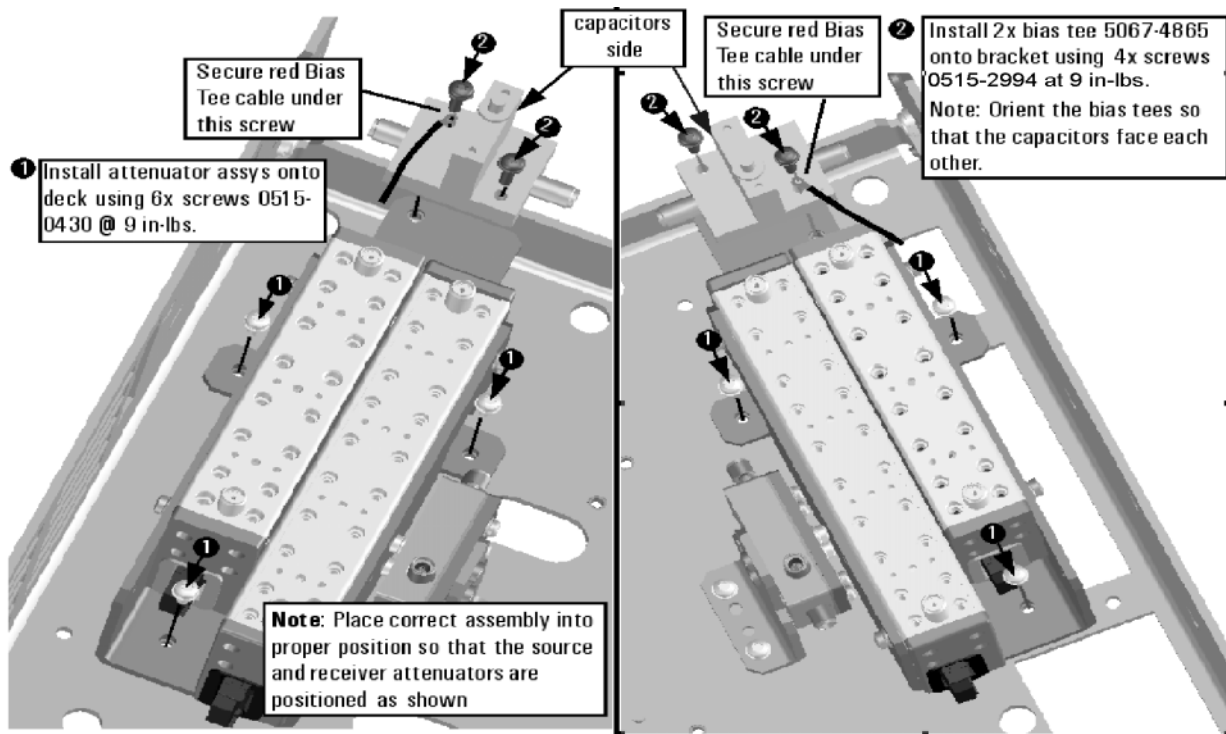
Step 4. Remove the Front Panel Assembly

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

Step 5. Install the Bias Tees

Refer to **Figure 1** for this step of the procedure. New parts are listed in **Table 1 on page 6**.

Figure 1 Bias Tees Installation



N5222_104_01

Step 6. Install Some Bottom-Side (Test Set) Cables

CAUTION

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

CAUTION

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

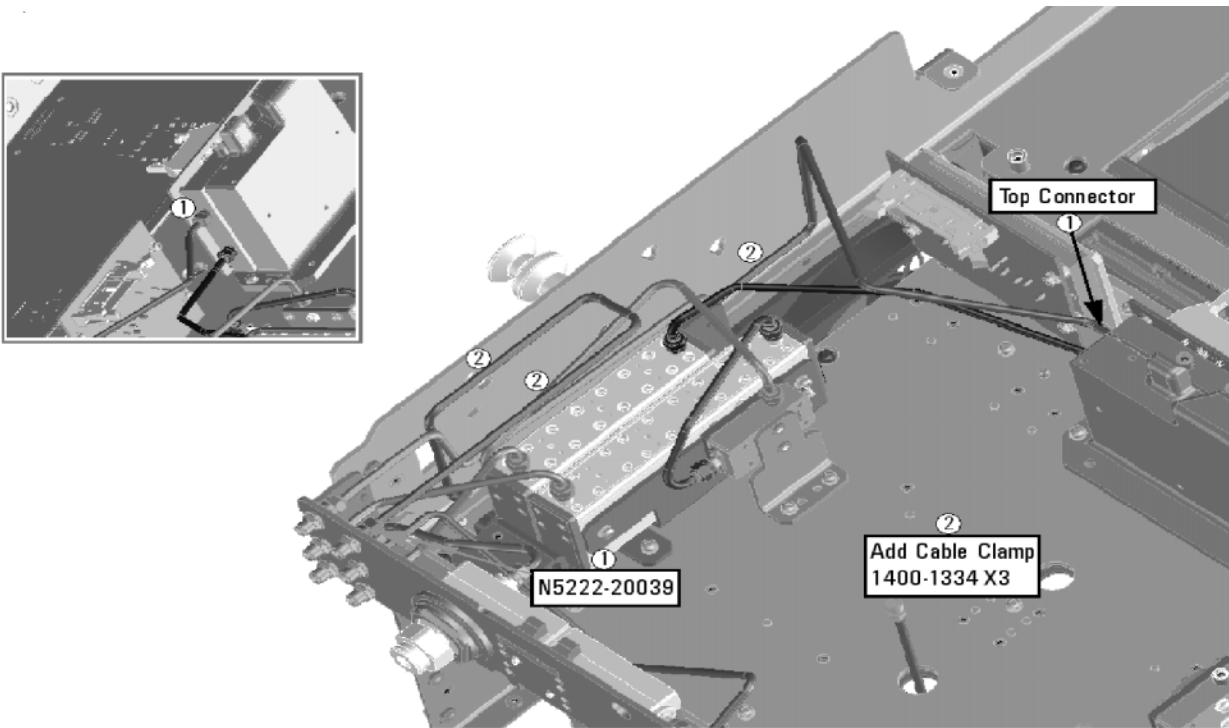
Install the Semi-rigid Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom RF Cables, 2-port Configuration, Option 219 (or Option 224)” in the PDF Service Guide. New parts are listed in [Table 1 on page 6](#).

Install the following new cables in the order listed.

- W85 (N5222-20035) Front-panel Port 2 CPLR THRU to A41 port 2 bias tee
- W120 (N5222-20065) A41 port 2 bias tee to A32 port 2 coupler
- W25 (reuse) (N5222-20038) A28 port 2 receiver coupler to front-panel REF 2 SOURCE OUT
- W40 (reuse) (N5222-20039) Front-panel REF 2 RCVR R2 IN to A23 mixer brick (R2)
 - * As shown in [Figure 2 on page 11](#), install three cable clamps (part number 1400-1334) to secure W40 (part number N5222-20039).

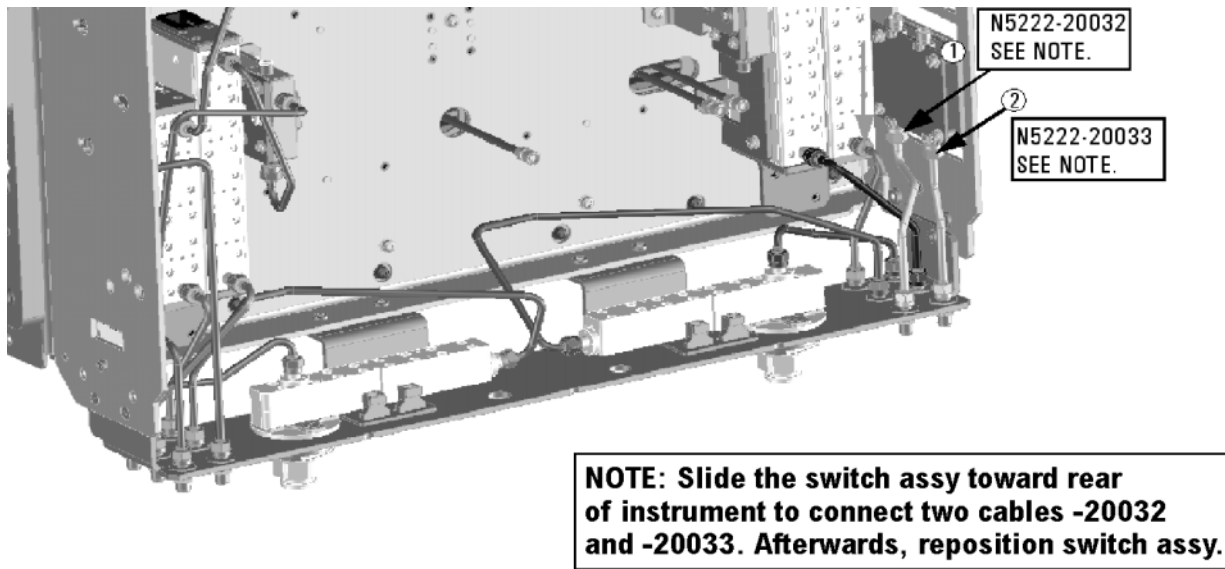
Figure 2 Location of Cable Clamps to Secure W40



N5222_103_01

- W73 (N5222-20029) Port 1 CPLR THRU to A38 port 1 bias tee
 - W36 (reuse) (N5222-20032) Front-panel REF 1 RCVR R1 IN to A33 reference mixer switch
- * As shown in the note in [Figure 3](#), follow the instructions to install W36 (part number N5222-20032).

Figure 3 Instructions to Install W36



N5222_103_02

- W35 (reuse) (N5222-20033) A33 reference mixer switch to front-panel REF 1 SOURCE OUT
 - * If the screws that attach the reference mixer switch to the test set deck were loosened, torque these screws now to 9 in-lbs.
- W119 (N5222-20072) A38 port 1 bias tee to A29 port 1 coupler

Install the Ribbon Cables And Wire Harnesses

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom Ribbon Cables and Wire Harnesses, 2-port, Option 219 (or Option 224)” in the PDF Service Guide¹. New parts are listed in [Table 1 on page 6](#).

If not already done, connect bias tee cable harnesses as follows:

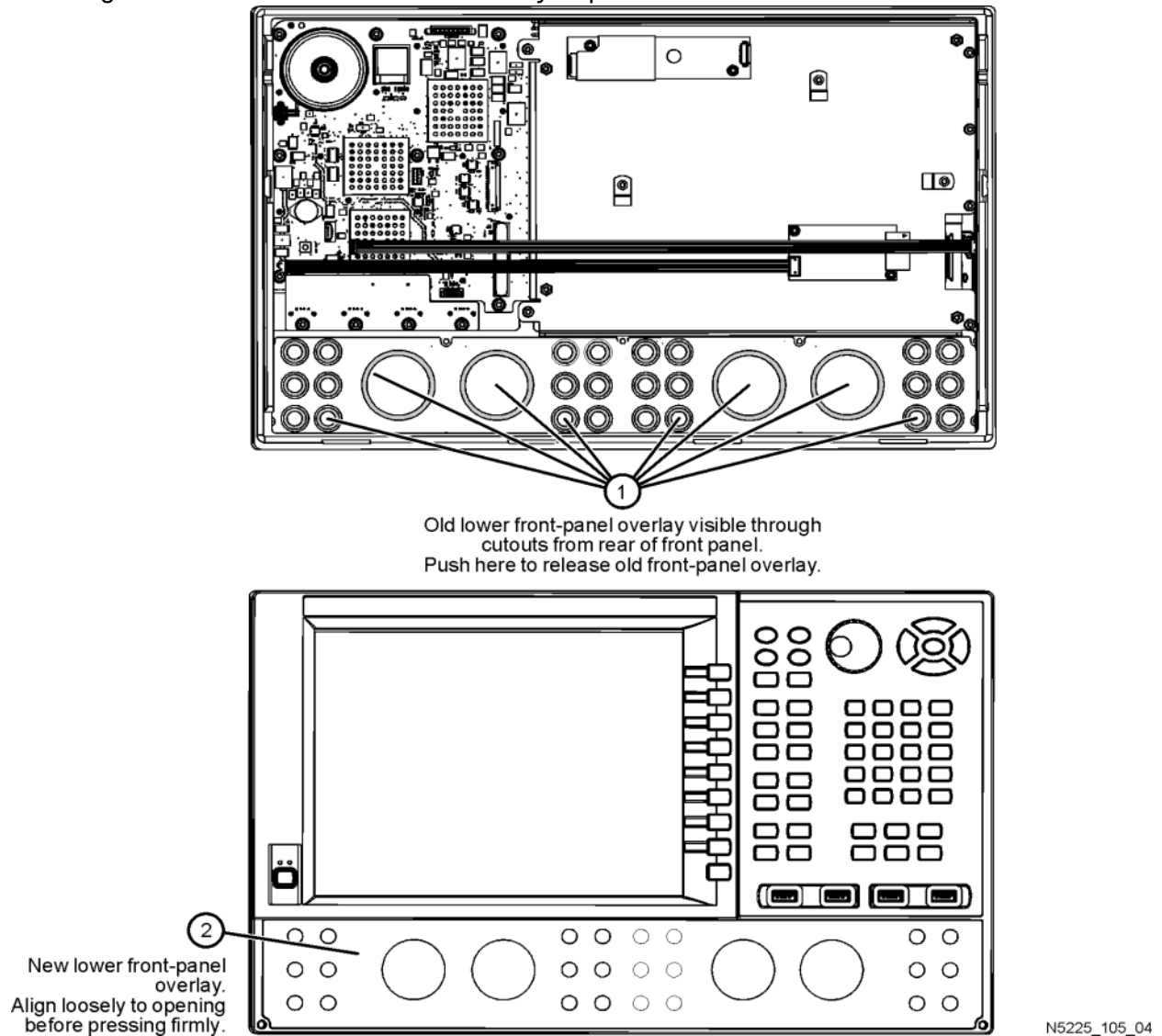
- A38 port 1 bias tee to A23 test set motherboard J541
- A41 port 2 bias tee to A23 test set motherboard J542

Step 7. Remove the Old Lower Front Panel Overlay

Refer to [Figure 4](#) for this step of the procedure. Although this figure shows a 4-port PNA, the concept is the same for a 2-port PNA. New parts are listed in [Table 1 on page 6](#).

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 4 Lower Front Panel Overlay Replacement



Step 8. 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 Guide¹.

Step 9. Install the New Lower Front Panel Overlay

Refer to [Figure 4 on page 13](#) for this step of the procedure. New parts are listed in [Table 1 on page 6](#).

1. Remove the protective backing from the new front panel overlay, N5222-80003 (N5221/2A) and N5222-80010 (N5221/2B and N5241/2/9B)—(item ?).
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.

Step 10. Reinstall Front Panel Jumpers

Reinstall the 6 front panel jumper cables (reference designator W30; part number N5222-20091). Torque to 10 in-lbs.

Step 11. 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 12. Reinstall the Outer Cover

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

1. See ["Downloading the Online PNA Service Guide" on page 4](#).

Step 13. Remove Option 217 or 222 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 217 or 222 License Removal Procedure

For B models, refer to “[B Model Option 217 or 222 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 217 or 222.
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 217 or 222 License Removal Procedure

For A models, refer to “[A Model Option 217 or 222 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 14. Enable Option 219/224

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 16](#).

For "B" models refer to ["Option Enable Procedure for "B" Model Instruments" on page 17](#).

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 **219 (or Option 224) - Configurable TS + Attens + Bias Tees**.
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 "219" (or Option "224") 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 1](#).

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.

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 7.**
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

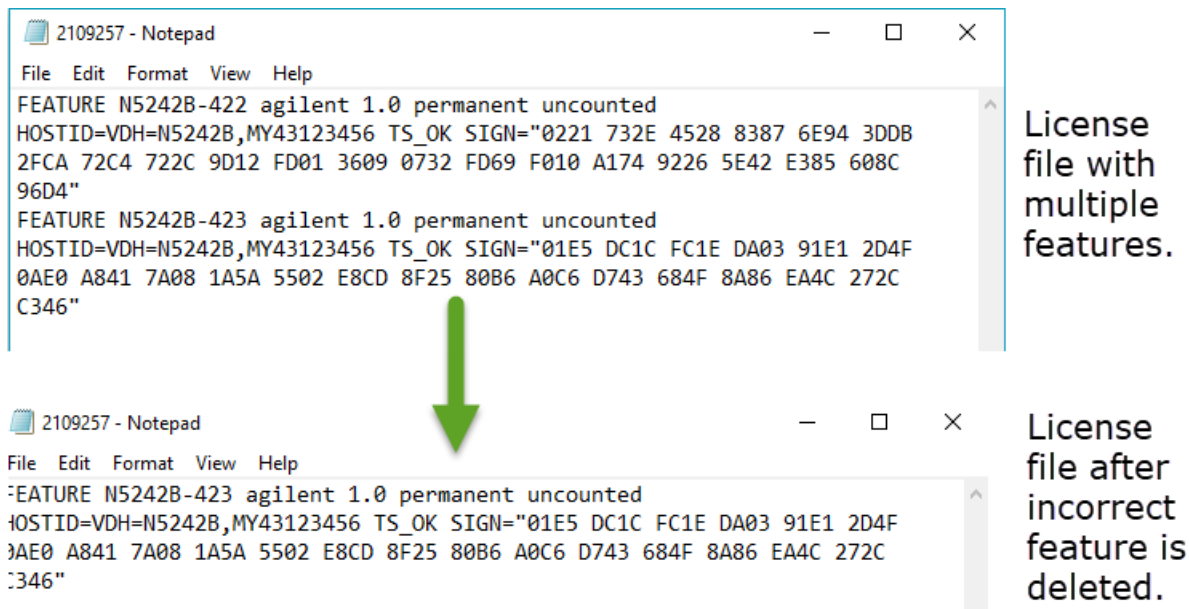
A single license file may contain more than one feature.

3. Verifying and editing the license file:

For these steps, refer to the example in **Figure 5 on page 18.**

- 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 5 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.

- 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 1](#).

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 217 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 15. 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 Guide¹.

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

1. See ["Downloading the Online PNA Service Guide" on page 4](#).

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 Guide¹.

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to **"Contacting Keysight" on page 1**.

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 Guide¹.

Step 16. 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.

© Keysight Technologies 2009-2019

Edition 2, June 2019

N5222-90104

www.keysight.com