Keysight Add Configurable Test Set Upgrade Kit For Version 6 Synthesizers

To Upgrade PNA N5227A/B Option 200 to Option 201

Upgrade Kit Order Number: N5227AU-201 and N5227BU-201

Kit Number: N5227-60101

This is Installation Note is for upgrading the N5227A/B Microwave Network Analyzers from Option 200/201 to Option 219.

Notices

Trademark Acknowledgments

Manual Part Number

N5227-90101

Edition

Edition 2, June 2023
Supersedes: October 2022

Printed in USA/Malaysia

Warranty

Technology Licenses

U.S. Government Rights

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.

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.

This upgrade converts your Option 200 2-port analyzer (N5227A/B Option 200) to an Option 201 analyzer by adding:

— configurable test set (front panel loops)

— a reference mixer switch

After installation of this upgrade, your analyzer will be an N5227A/B Option 201.

Refer to "Overview of the Installation Procedure" on page 13.

CAUTION	This repair must be done at a service center or a self-maintainer service center! Refer to "Getting Assistance from Keysight" on page 6.

KEYSIGHT
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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.

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 and the **Contact Keysight** ( ) link.
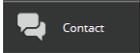
Getting Prepared

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.

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 10.

— Enough time - refer to "About Installing the Upgrade" on page 10.

— 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[1].

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1. See "Downloading the Online PNA Service Guide" on page 9.

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
   https://www.keysight.com/us/en/assets/9018-03565/installation-guides/9018-03565.pdf (N5225-90110).

— For B models: Refer to
   https://www.keysight.com/us/en/assets/9018-04534/installation-guides/9018-04534.pdf (N5242-90024).

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 determine your new HostID, Keysight personnel should use the new model number with the utility at go to

http://mktwww.srs.is.keysight.com/field/service/network/pna/upgrades. html. Non–Keysight personnel should contact Keysight at http://www.keysight.com/key/contactus.

— 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 8.

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 6.

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 (e.g., N5232B) and click **Search**.

3. Click **Support** > **Keysight Product Support**.

4. In the **Search Support** area type your instrument's model number (e.g., N2222B).

5. Press **Enter**.

6. Scroll down to the **PRINT DOCUMENTATION** section and click to select **Service Manual**.

   The **Service Manual** for your instrument will be displayed near the top of the right column.

7. Click the hyperlink of the Service Guide title to download the PDF file.

8. 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[1].

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
9 mm nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1	N/A
1/4-in (6 mm) open end wrench	1	N/A
1-in (25.4 mm) torque wrench - set to 72 in-lbs (8.15 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 bulkhead connectors. On these, use a 5/16 inch nutsetter or open end torque wrench set to 21 in-lb.

About Installing the Upgrade

Products affected	N5227A/B Option 200
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	3 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 6.

Table 1   Contents of Upgrade Kit N5227-60101

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5227-90101
--	Software Entitlement Certificate (provided separately)	1	9030-0000
--	China RoHS Addendum	1	9320-6722
A37	Reference mixer switch	1	5087-7759
--	Bracket for A37 reference mixer switch	1	N5245-00024
--	Wire harness cable for A37 reference mixer switch	1	8121-0966
--	Bulkhead connector, 1.85 mm, f-f, 50-ohm	12	1250-4747[a]
--	Hex nut (for bulkhead connectors)	12	1250-3516
--	Washer for bulkhead connectors, front panel	12	1250-3310
--	Test set front plate (subpanel) (For 2-port models with front-panel jumpers.)	1	N5247-00008
--	Front panel overlay, 2-port (Option 201) - "A" Models	1	N5227-80015
--	Front panel overlay, 2-port (Option 201) - "B" Models	1	N5227-80028
--	Cable tie	7	1400-0249
--	Cable clamp	5	1400-1334
--	Cable guard, jumper cables, side 2-Port - "A" Models	2	N5242-00029
--	Cable guard, jumper cables, side 2-Port - "B" Models	2	N5242-00048
--	Machine screw, M3.0 x 8, pan head (to attach reference mixer switch to bracket; to attach reference mixer switch assy to wall of test set deck)	5	0515-0372
W12	RF cable, A60 port 1 70 GHz doubler to W11	1	N5247-20059
W27	RF cable, A60 port 1 70 GHz doubler to A29 port 1 receiver coupler	1	N5247-20074
W30	RF cable, A63 port 2 70 GHz doubler to A32 port 2 receiver coupler	1	N5247-20052
W31	RF cable, A29 port 1 receiver coupler to front-panel port 1 SOURCE OUT	1	N5247-20037
W32	RF cable, front-panel port 1 CPLR THRU to A33 port 1 coupler	1	N5247-20049
W33	RF cable, A29 port 1 receiver coupler to A37 reference mixer switch	1	N5247-20056
W34	RF cable, A33 port 1 coupler to front-panel port 1 CPLR ARM	1	N5247-20039

Table 1   Contents of Upgrade Kit N5227-60101

Ref Desig.	Description	Qty	Part Number
W43	RF cable, A32 port 2 receiver coupler to front-panel port 2 SOURCE OUT	1	N5247-20036
W44	RF cable, front-panel port 2 CPLR THRU to A36 port 2 coupler	1	N5247-20050
W45	RF cable, A32 port 2 receiver coupler to front-panel REF 2 SOURCE OUT	1	N5247-20057
W46	RF cable, A36 port 2 coupler to front-panel port 2 CPLR ARM	1	N5247-20041
W47	RF cable, front-panel port 1 RCVR A IN to A27 mixer brick (A)	1	N5247-20053
W50	RF cable, front-panel port 2 RCVR B IN to A27 mixer brick (B)	1	N5247-20054
W51	RF cable, front-panel REF 1 SOURCE OUT to A37 reference mixer switch	1	N5247-20011
W52	RF cable, front-panel REF 1 RCVR R1 IN to A37 reference mixer switch	1	N5247-20012
W53	RF cable, A37 reference mixer switch to A27 mixer brick (R1)	1	N5247-20048
W56	RF cable, front-panel REF 2 RCVR R2 IN to A27 mixer brick (R2)	1	N5247-20055
W60	Front-panel jumper	6	N5247-20107

a. This upgrade kit may contain either a bulkhead adapter part number 5065-4673 or 1250-4747.

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

"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 Bottom-Side (Test Set) Cables."

"Step 5. Remove Port 1 and Port 2 Coupler Assemblies from Brackets Underneath."

"Step 6. Remove Brackets From Test Set Deck."

"Step 7. Reinstall the Port 1 and Port 2 Coupler Assemblies to Test Set Deck."

"Step 8. Assemble the Reference Mixer Switch."

"Step 9. Install the Reference Mixer Switch."

"Step 10. Remove the Test Set Front Plate Assembly From the Test Set Deck."

"Step 11. Move the LED Boards and Couplers to the New Test Set Front Plate."

"Step 12. Install Bulkhead Connectors on the Test Set Front Plate Assembly."

"Step 13. Install New Test Set Front Plate Assembly to Test Set Deck."

"Step 14. Install Some Bottom-Side (Test Set) Cables."

"Step 15. Remove the Old Lower Front Panel Overlay."

"Step 16. Reinstall Front Panel Assembly."

"Step 17. Install the New Lower Front Panel Overlay."

"Step 18. Install Front Panel Jumpers."

"Step 19. Position the Cables and Wires to Prevent Pinching."

"Step 20. Reinstall the Outer Cover."""."

"Step 21. Enable Options 201."

"Step 22. Perform Post-Upgrade Adjustments and Calibration."

"Step 23. 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 8.

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.

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 14.

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 6.

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 Guide[1].

Step 4. 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 following semi-rigid cable, but keep it for re-installation later. To see an image showing the location of the cable, click the Chapter 6 bookmark "Bottom RF Cables, Standard 2-Port Configuration, Option 200 (S/N Prefixes <6021)" in the PDF Service Guide[1].

       — W24 (N5247-20061) A63 port 2 70 GHz doubler to W23

3. Remove and discard the following semi-rigid cables:

       — W30 (N5227-20045) A63 port 2 70 GHz doubler to A32 port 2 reference coupler

       — W12 (N5227-20041) A60 port 1 70 GHz doubler to W11

       — W27 (N5227-20044) A60 port 1 70 GHz doubler to A29 port 1 reference coupler

       — W134 (N5227-20005) A32 port 2 receiver coupler to A36 port 2 coupler

       — W131 (N5227-20004) A29 port 1 receiver coupler to A33 port 1 coupler

       — W135 (N5227-20007) A33 port 1 coupler to A27 mixer brick (A)

       — W127 (N5227-20003) A29 port 1 receiver coupler to A27 mixer brick (R1)
   NOTE: Remove and discard the 3 dB pad on A27 mixer brick (R1).

       — W130 (N5227-20006) A32 port 2 receiver coupler to A27 mixer brick (R2)

       — W138 (N5227-20008) A36 port 2 coupler to A27 mixer brick (B)

4. 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 5. Remove Port 1 and Port 2 Coupler Assemblies from Brackets Underneath

Loosen the 3 screws on each coupler assembly and remove the assembly from the bracket underneath.

Step 6. Remove Brackets From Test Set Deck

Remove the two brackets from the test set deck and discard. These are the brackets that had been connected to the Port 1 and Port 2 coupler assemblies.

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1. Refer to "Downloading the Online PNA Service Guide" on page 9.

Step 7. Reinstall the Port 1 and Port 2 Coupler Assemblies to Test Set Deck

Refer to **Figure 1** for this step of the procedure. Use a T-10 TORX driver to tighten all screws.

Figure 1   **Port 1 and Port 2 Coupler Assemblies Re-installation**

Reinstall 2X coupler/bracket assembly to deck as shown. Note the orientation and position of couplers. Reuse 3X existing screws in each coupler bracket. Torque to 9 in-lbs.

Port2

Port1
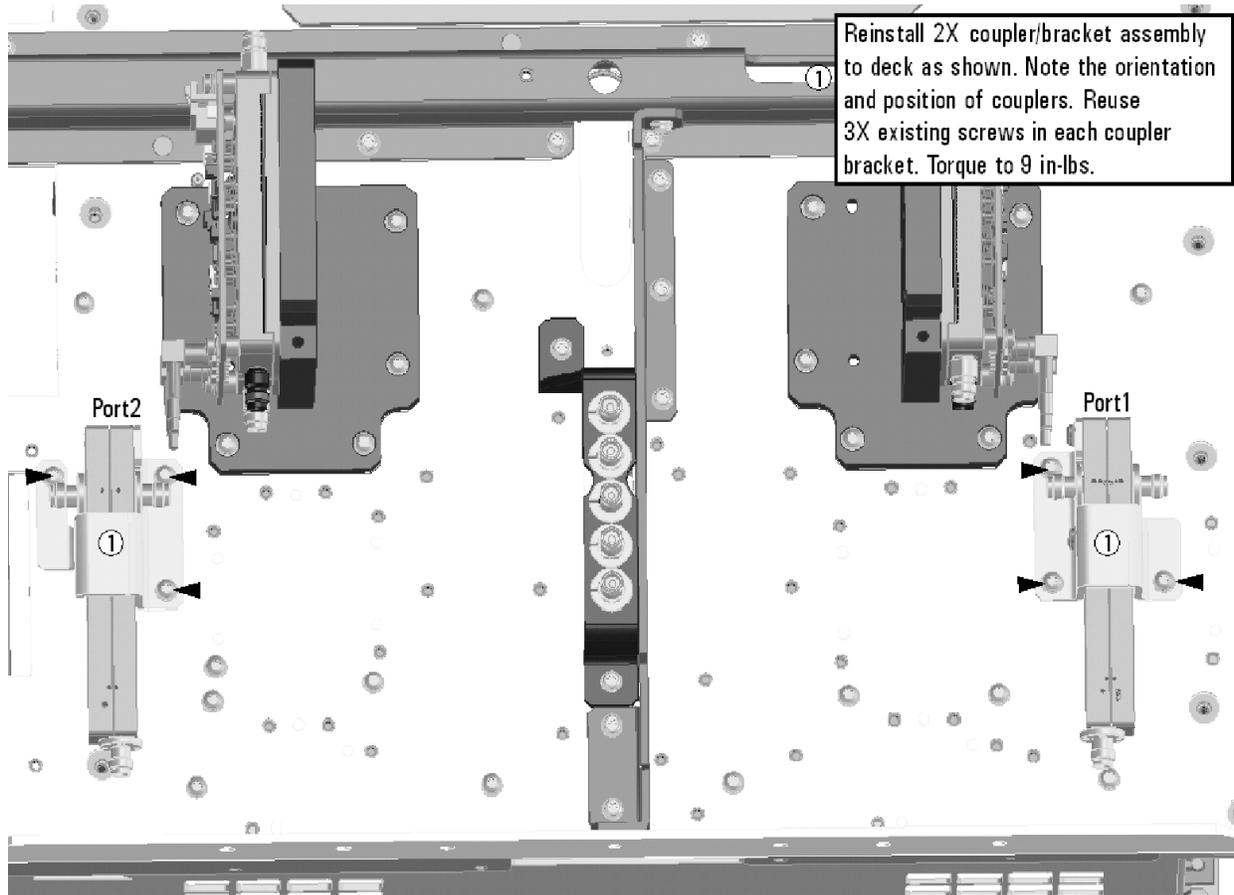
Step 8. Assemble the Reference Mixer Switch

Install bracket N5245-00024 to the reference mixer switch 5087-7759 using two screws 0515-0372. Torque screws to 9 in-lbs.

Step 9. Install the Reference Mixer Switch

Refer to Figure 2 for this step of the procedure. Use a T-10 TORX driver to tighten all screws.

Figure 2   Reference Mixer Switch Installation (5087-7758, 8121-0966, 0515-0372)

① Gather Switch 5087-7759 and install Harness 8121-0966.

② Secure switch to deck with screws 0515-0372 X2. Do Not Torque.

Side View

Harness

Switch
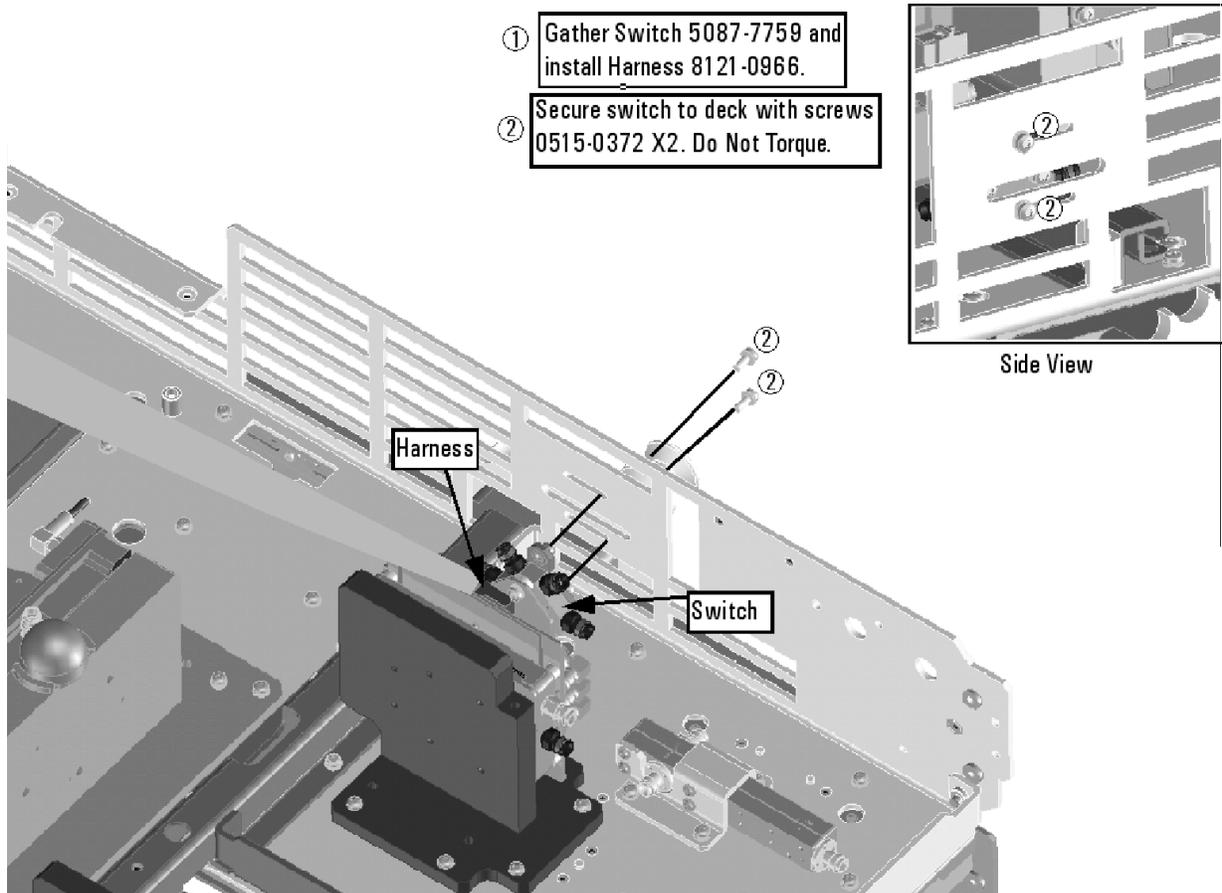
Step 10. Remove the Test Set Front Plate Assembly From the Test Set Deck

Refer to Figure 4 on page 19 to see the screws that must be removed. Keep the screws for reuse later.

Step 11. Move the LED Boards and Couplers to the New Test Set Front Plate

Move the LED boards, test port couplers and their mounting nuts to the new test set front plate (part number N5247-00008).

Refer to Figure 3 for this step of the procedure. New parts are listed in Table 1 on page 11.

Figure 3   Test Set Front Plate Assembly (N5247-00008)

① Reinstall 2x LED boards to new test set front plate N5247-00008 reusing 4x screws. Torque to 9 in·lbs.

② Reinstall 2x couplers onto front plate. Reuse 2x mounting nuts. Hand tighten, then **torque to 9 in·lbs.**

③ Reinstall LED harness X2 to LED boards.

Mounting nuts

Torque to 72 in-lbs using a 1" open-end wrench.
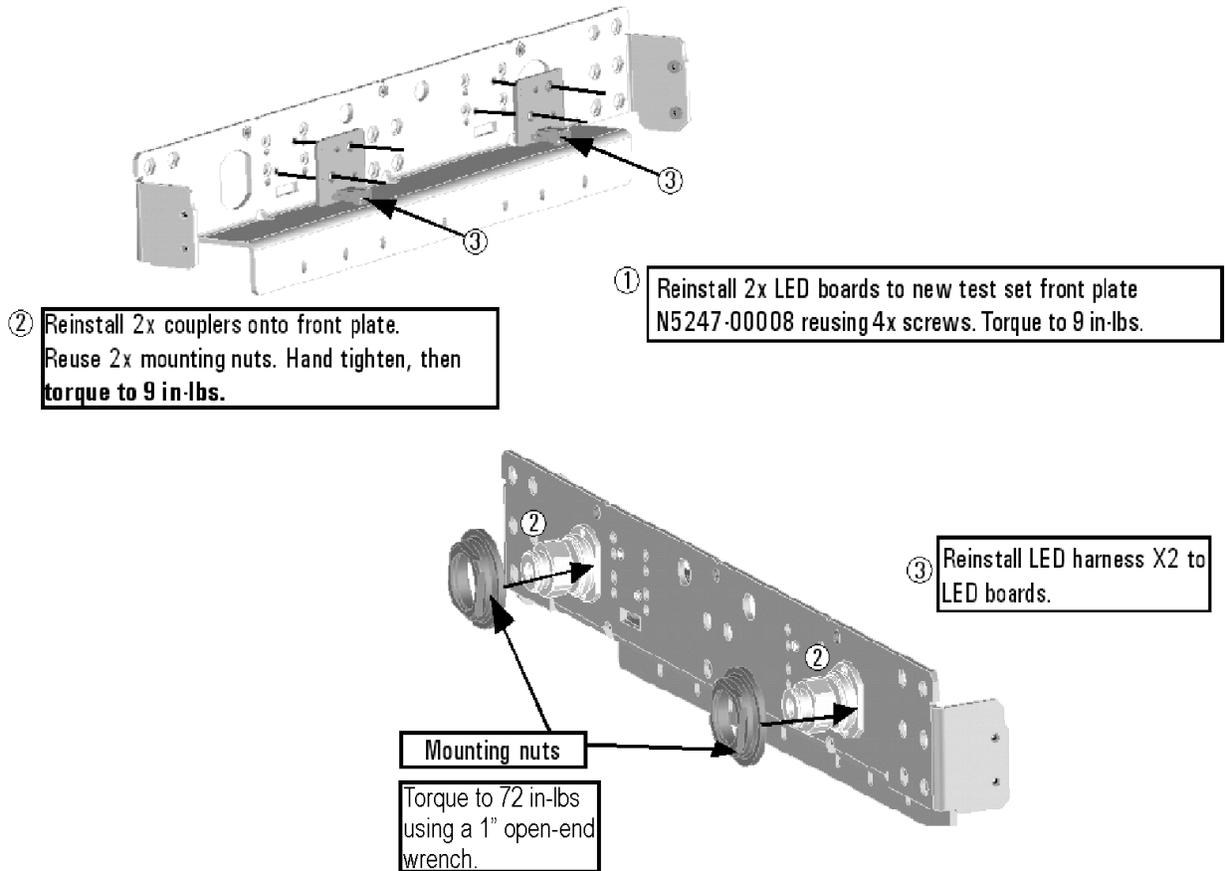
Step 12. Install Bulkhead Connectors on the Test Set Front Plate Assembly

Install twelve bulkhead connectors to the test set front plate along with washers and nuts (hardware equipped with connector). Torque all nuts to 21 in-lbs. Refer to Figure 4 on page 19 to see the location of the bulkhead connectors. New parts are listed in Table 1 on page 11.

Step 13. Install New Test Set Front Plate Assembly to Test Set Deck

Refer to Figure 4 for this step of the procedure. New parts are listed in Table 1 on page 11.

Figure 4   Test Set Front Plate Assembly Installation (0515-0372, 0515-1227)

③ Torque the 7 x screws in step 1 to 9 in·lbs.

① Install coupler plate assy to deck. Reinstall 6x screws 0515-0372 and 1 X 0515-0664. **Do not torque**.

② Reinstall 4 x screws 0515-1227. Torque to 9 in-lbs. Alternate sides in torque sequence, as shown in the alphabetic circles.

0515-0664
1X
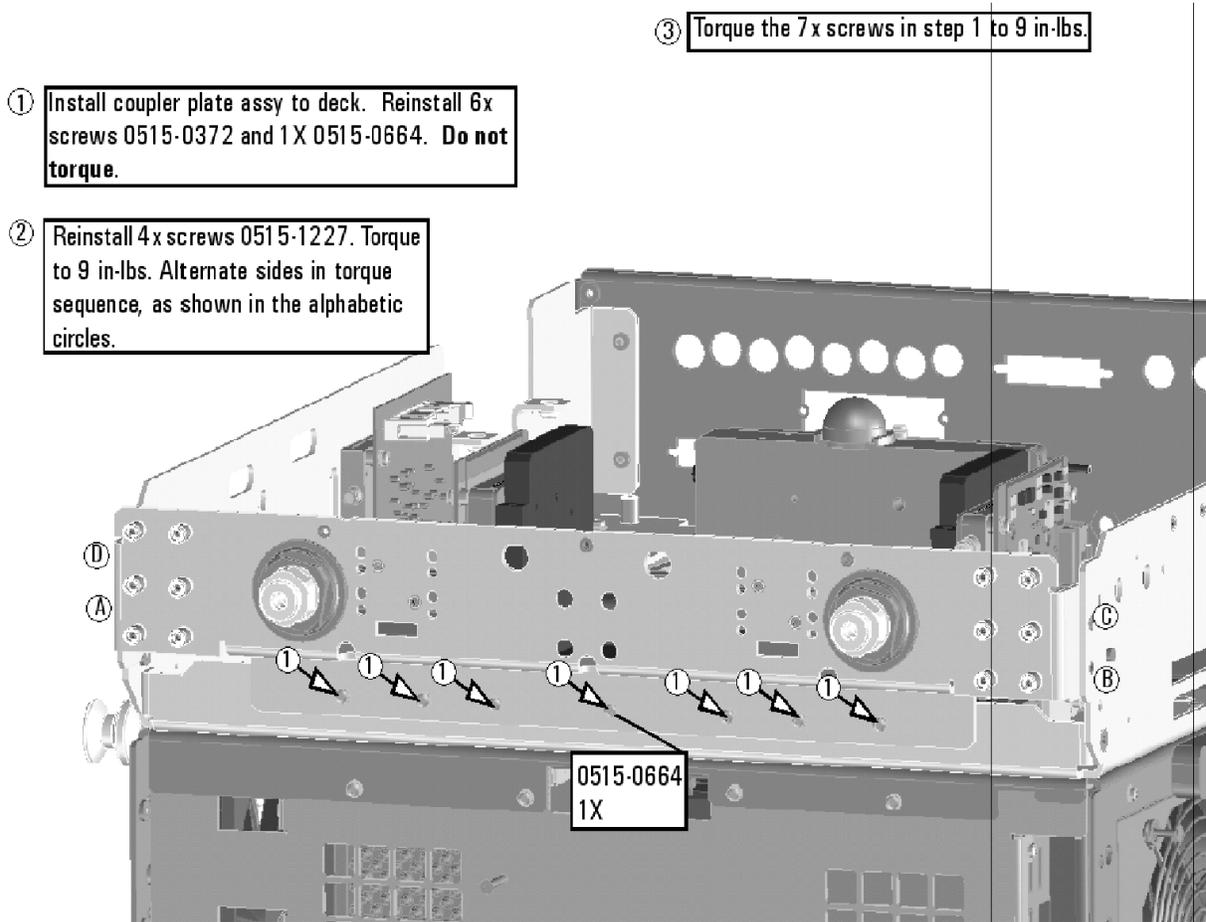
Step 14. Install Some Bottom-Side (Test Set) Cables

CAUTION	Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel bulkhead connectors. Torque these connections to 21 in-lb.

| 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.

Semi-rigid Cables Required for Upgrading to an Option 201 PNA

To see images showing the location of these cables, click the Chapter 6 bookmark "Bottom RF Cables, 2-Port, Option 201 (S/N Prefixes <6021)" in the PDF Service Guide[1]. New parts are listed in Table 1 on page 11.

— W45 (N5247-20057) A32 port 2 receiver coupler to front-panel REF 2 SOURCE OUT

   * As shown in Figure 5, install clamp (part number 1400-1334) to secure cable W45.

Figure 5   Location of Cable Clamps to Secure W45 (1400-1334, N5247-20057)
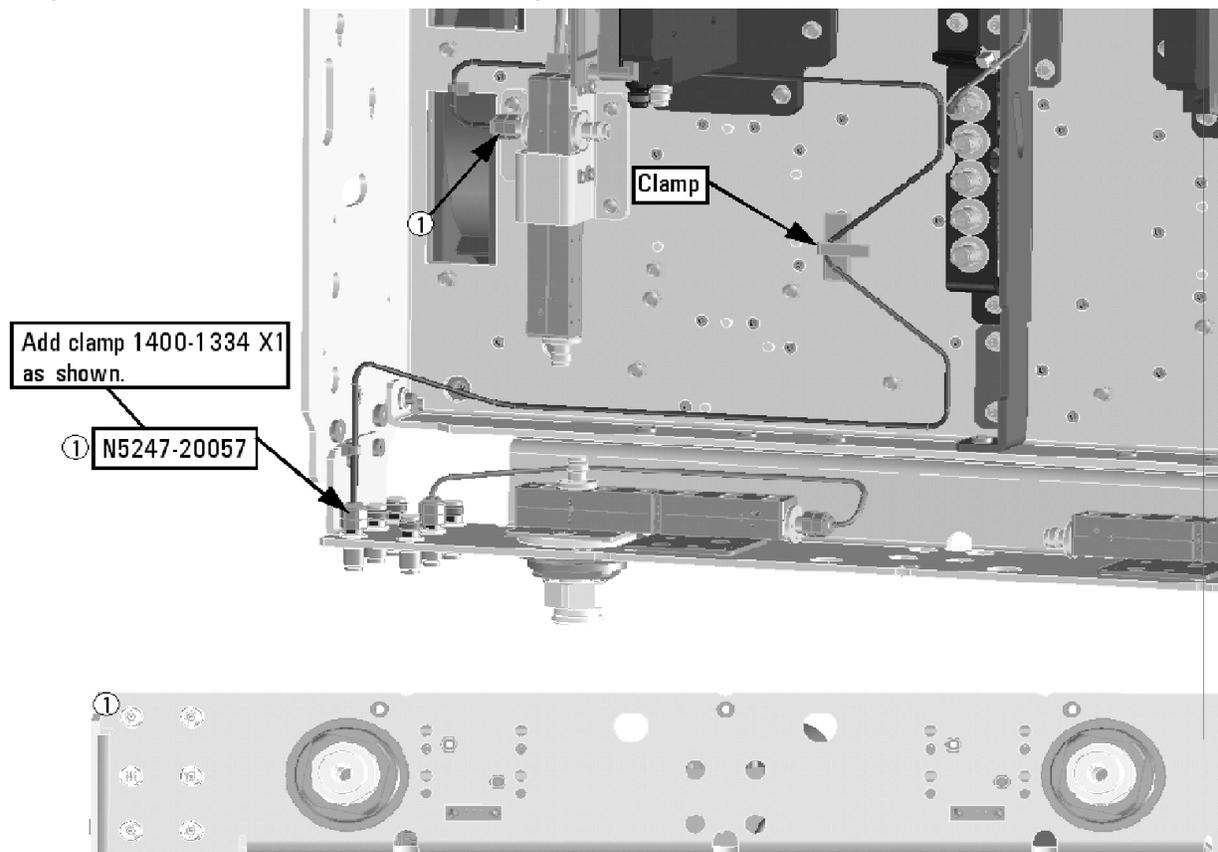
— W44 (N5247-20050) Port 2 CPLR THRU to A36 port 2 coupler

— W50 (N5247-20054) Front-panel port 2 RCVR B IN to A27 mixer brick (B)

— W46 (N5247-20041) A36 port 2 coupler to front-panel port 2 CPLR ARM

— W43 (N5247-20036) A32 port 2 receiver coupler to front-panel port 2 SOURCE OUT

— W56 (N5247-20055) REF 2 RCVR R2 IN to A27 mixer brick (R2)

— W24 (reuse) (N5247-20061) A63 port 2 70 GHz doubler to W23

— W30 (N5247-20052) A63 port 2 70 GHz doubler to A32 port 2 receiver coupler

— W51 (N5247-20011) Front-panel REF 1 SOURCE OUT to A37 ref mixer switch

— W33 (N5247-20056) A29 port 1 receiver coupler to A37 reference mixer switch

* As shown in Figure 6, install clamp (part number 1400-1334) to secure cable W33.

Figure 6   Location of Cable Clamps to Secure W33 (1400-1334, N5247-20056)
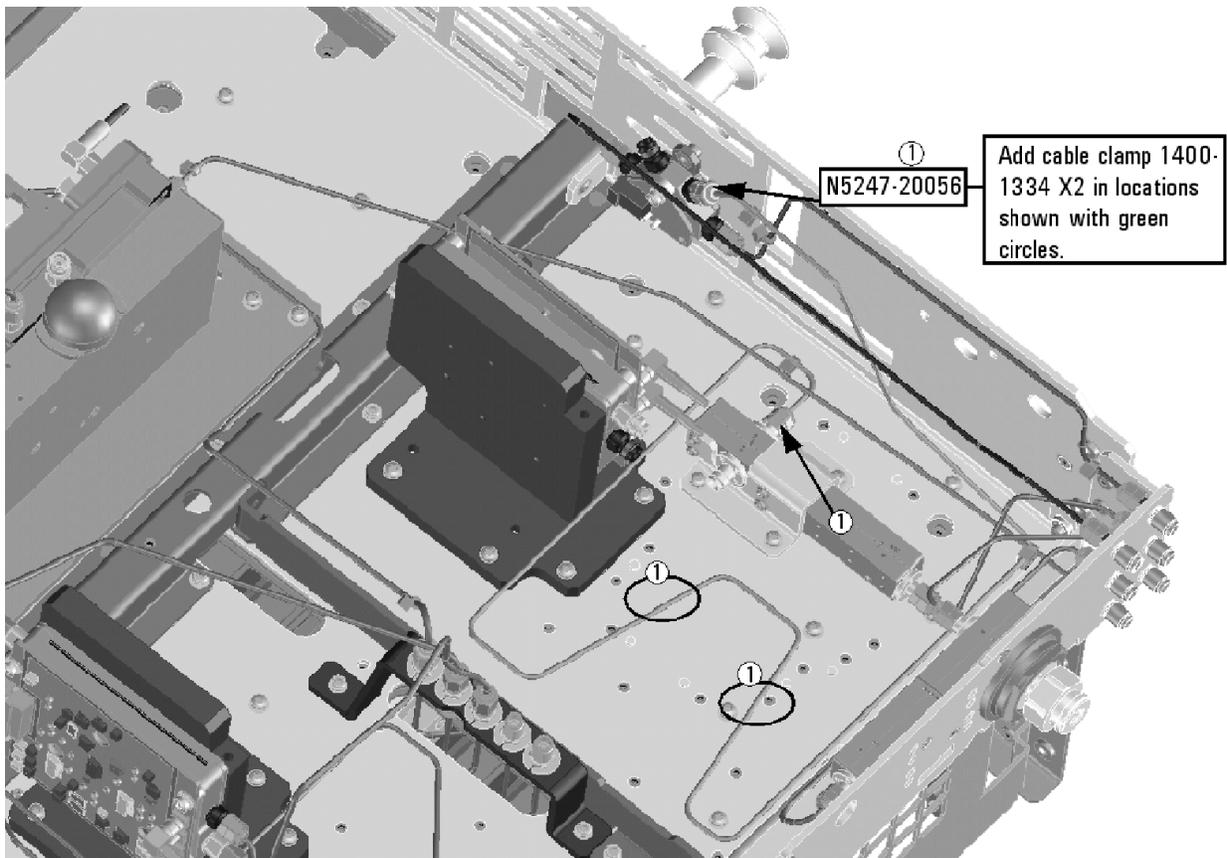
N5227_101_07

— W52 (N5247-20012) REF 1 RCVR R1 IN to A37 reference mixer switch

Torque the two screws securing the reference mixer switch to 9 in-lbs

— W47 (N5247-20053) Port 1 RCVR A IN to A27 mixer brick (A)

— W34 (N5247-20039) A33 port 1 coupler to front panel port 1 CPLR ARM

— W31 (N5247-20037) A29 port 1 receiver coupler to front-panel port 1 SOURCE OUT

— W32 (N5247-20049) Port 1 CPLR THRU to A33 port 1 coupler

— W27 (N5247-20074) A60 port 1 70 GHz doubler to A29 port 1 receiver coupler

— W12 (N5247-20059) A60 port 1 70 GHz doubler to W11

— W53 (N5247-20048) A37 reference mixer switch to A27 mixer brick (R1)

Install the Wire Harnesses

To see an image showing the location of these wire harnesses, click the Chapter 6 bookmarks "Bottom Ribbon Cables and Wire Harnesses, 2-Port, Option 201" in the PDF Service Guide[1]. New parts are listed in Table 1 on page 11.

If not already done, connect these wire harnesses:

— 8121-0966 A23 test set motherboard J554 to A37 reference mixer switch

— N5247-60016 (reuse) A19 test set motherboard J221 to port 1 LED board J1

— N5247-60016 (reuse) A19 test set motherboard J222 to port 2 LED board J1

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1. See "Downloading the Online PNA Service Guide" on page 9.

Step 15. Remove the Old Lower Front Panel Overlay

Refer to Figure 6-1 for this step of the procedure. Although a 4-port PNA is shown in the graphic, the concept is the same for the 2-port PNA. New parts are listed in Table 1 on page 11.

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.

NOTE	**IMPORTANT!** To avoid possible damage to the lower front panel overlay, do not attempt to attach the lower front panel label until "Step 17. Install the New Lower Front Panel Overlay" on page 26.

Figure 6-1   Lower Front Panel Overlay Replacement
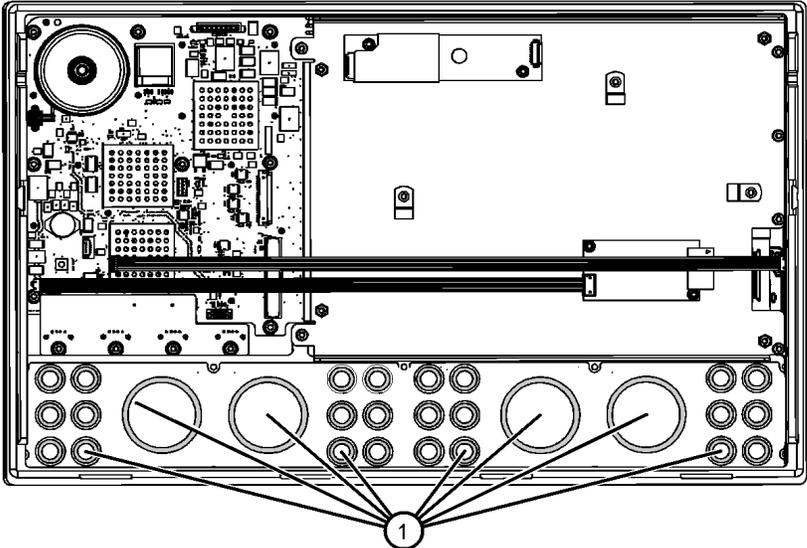
Old lower front-panel overlay visible through
cutouts from rear of front panel.
Push here to release old front-panel overlay.
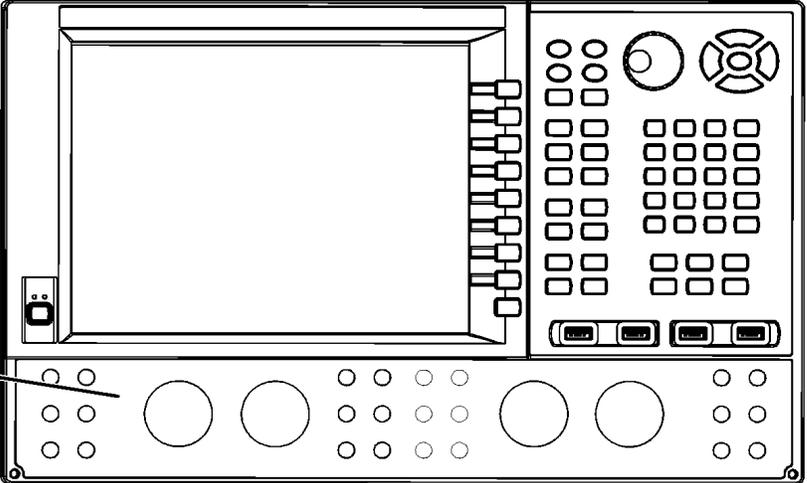
New lower front-panel
overlay.
Align loosely to opening
before pressing firmly.

N5225_105_04

Step 16. Reinstall Front Panel Assembly

Refer to Figure 7 for this step of the procedure.

Figure 7   Front Panel Assembly Installation

> Torque front panel
> screws in sequence
> shown in the circles
> on the left and right
> sides. Torque to
> 21 in-lbs. (x12)
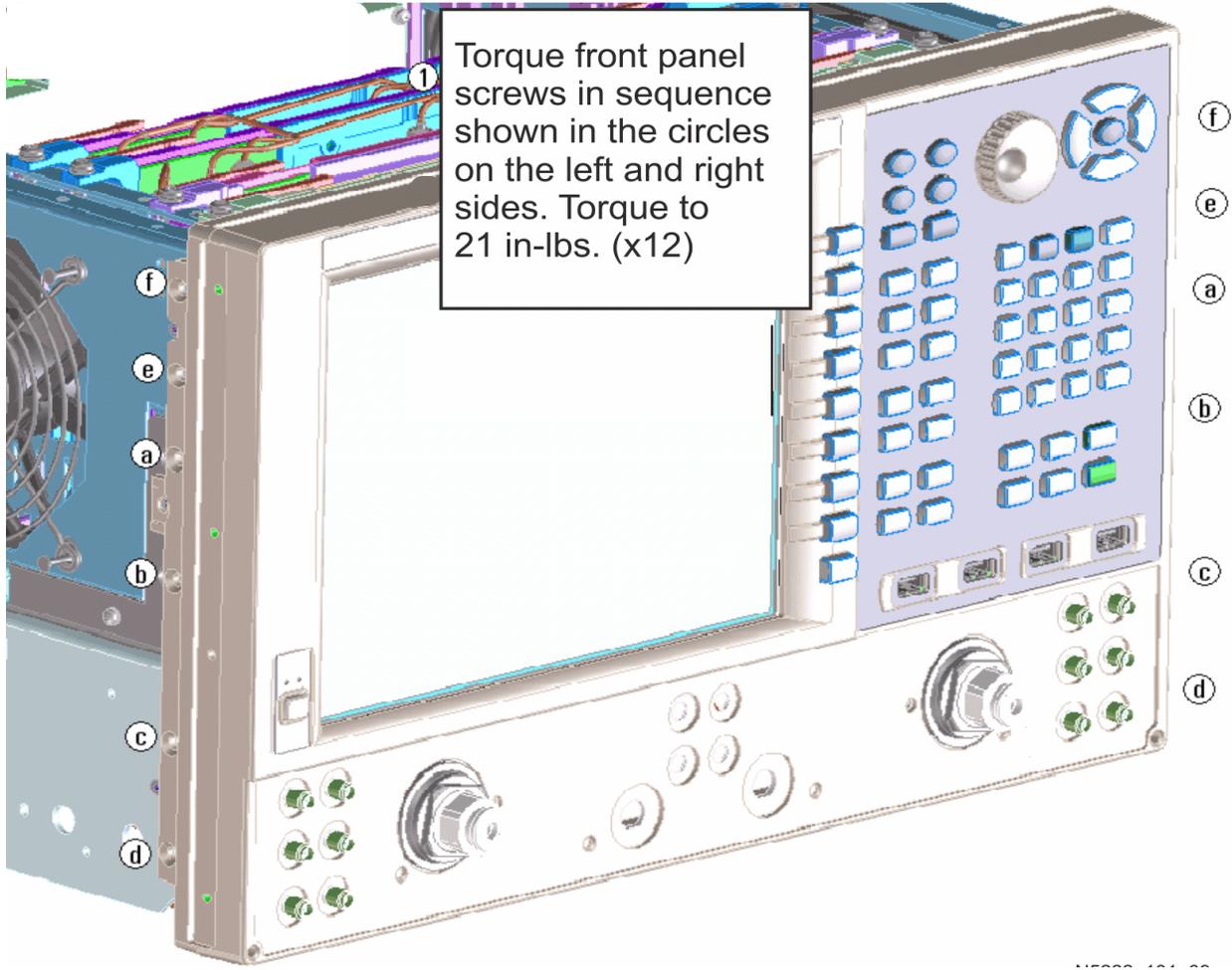
Step 17. Install the New Lower Front Panel Overlay

Refer to Figure 6-1 on page 24 for this step of the procedure. Although a 4-port PNA is shown in the graphic, the concept is the same for the 2-port PNA. New parts are listed in Table 1 on page 11.

1. Remove the protective backing from the new front panel overlay, N5227-80015 for "A" models and N5227-80028 for "B" models (item ①).

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.

4. Be sure to install the two new screws (0515-1946) in the front panel, next to test ports 3 and 4. Torque these screws to 9 in-lbs.

Step 18. Install Front Panel Jumpers

As shown in Figure 8, install 6 front panel jumper cables (part number N5247-20107).

Figure 8   Front Panel Jumper Cables Installation (N5247-20107)
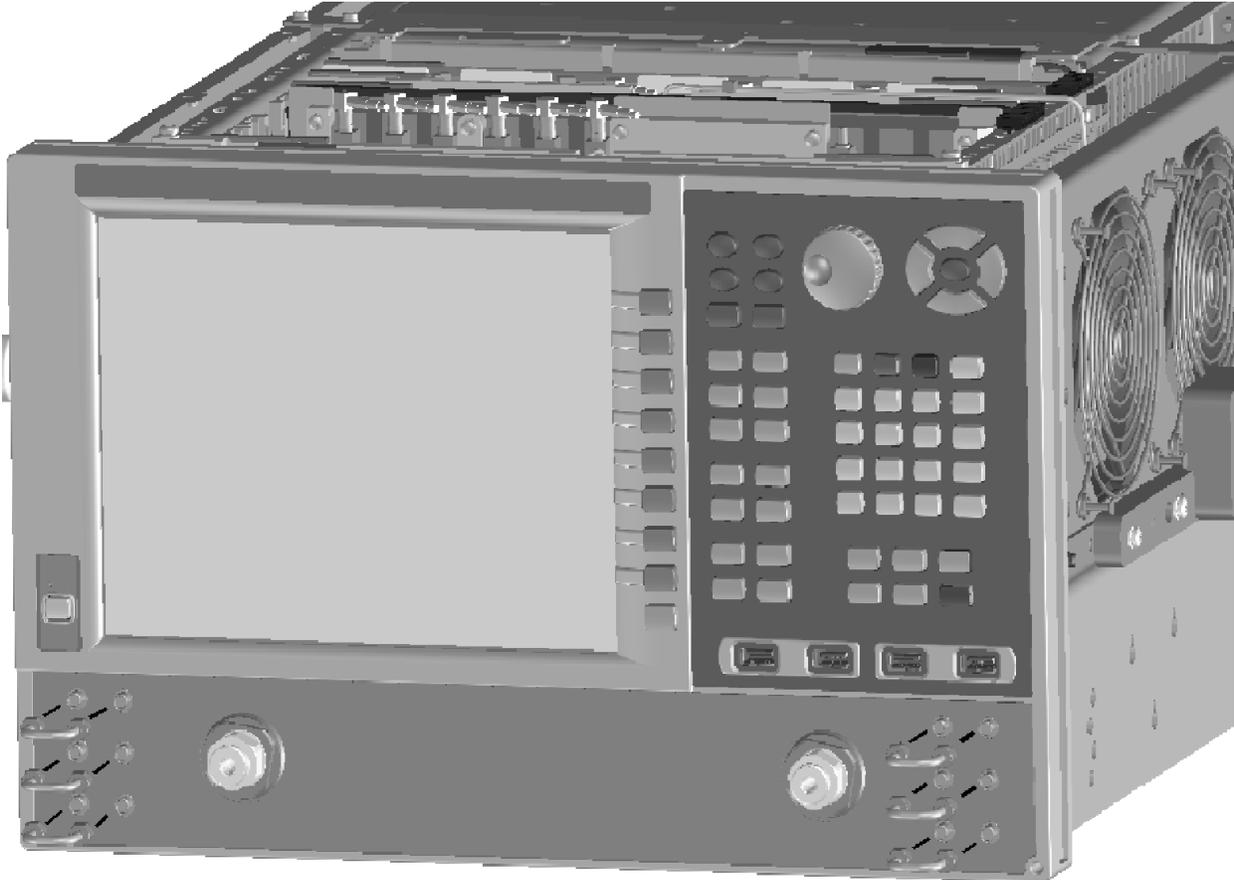
① Install 6x jumper cables N5247-20107 and torque to 10" lbs

N5227_101_05

Step 19. 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 20. Reinstall the Outer Cover

For instructions, click the Chapter 7 bookmark "Removing the Covers" in the PDF Service Guide[1].

Step 21. Enable Options 201

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.

— A keyboard and mouse must be connected to the network analyzer.

For "A" models, refer to "Option Enable Procedure for "A" Model Instruments" on page 28.

For "B" models refer to "Option Enable Procedure for "B" Model Instruments " on page 29.

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 **201 - Src/Rcvr Atten & Bias Ts 2-Port**.

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 "201" is listed after "Options:" in the display. Click **OK**.

| NOTE | If Option 201 has not been enabled, perform the "Option Enable Procedure" (above) again. If the option is still not enabled, contact Keysight Technologies. Refer to "Getting Assistance from Keysight" on page 6. |

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 3 on "License Key Redemption" on page 8.

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 license file may contain more than one feature. |

3. 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. |

4. Disconnect the USB flash drive from the PNA.

5. 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 6. |

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 201 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 Adjustments (i.e., Diagnostic Tools, Utilities, and Adjustments) topic in the PNA Online Help: https://rfmw.em.keysight.com/wireless/helpfiles/N52xxB/help.htm.

Step 22. Perform Post-Upgrade Adjustments and Calibration

Adjustments

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

<table>
<tr><td>

NOTE

</td><td>

IMPORTANT!

The 10 MHz reference crystal oscillator is the most accurate after running for three hours. The 10 MHz Frequency Reference Adjustment can be run after the PNA has warmed up for 90 minutes, and the other adjustments can be completed in the order presented, but then the 10 MHz Frequency Reference Adjustment should be repeated after the PNA has been able to warm up for three hours.

</td></tr>
</table>

— 10 MHz frequency reference adjustment

— EE default adjustment: Synth LO only (Version 6 synthesizers)

— synthesizer bandwidth adjustment (only if EE default adjustment is insufficient)

— source adjustment

— IF gain adjustment

— receiver characterization

— receiver adjustment

— IF Response adjustment (For A models: Options 090, 092, 093, or 094 Only. For B models: Options S93090xA/B, S93093A/B, or S93094A/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[1].

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

EEPROM Backup

The analyzer uses arrays of correction constants to enable the analyzer to produce accurate, leveled source signals and receive clean test signals. These constants are stored in non-volatile EEPROM memory and in flash memory files.

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1. See .

The adjustments listed here generate new correction constants. The analyzer must have a backup of this new data in case any of the data becomes corrupted.

To store the backup data, perform these steps:

— Navigate to the EEPROM Backup Utility, located at:

   — Windows 7 -- `C:\Program Files (x86)\Keysight\Network Analyzer\Service\eebackup.exe`

      — Windows 10 -- `C:\Program Files\Keysight\Network Analyzer\Service\eebackup.exe`

— Run the program.

— Click Backup EEPROM.

— Click Backup TSMB Mem.

— Click Backup Synth Mem. (Applies to Version 7 Synthesizers Only)

— Click Exit when the program has finished.

Figure 9   EEPROM Backup Menu
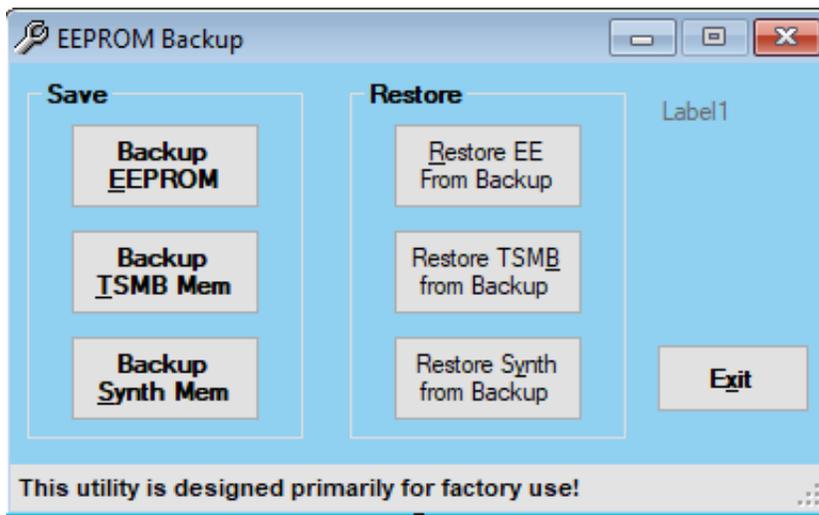
Operator's Check

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[1].

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to "Contacting Keysight" on page 6.

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1. See "Downloading the Online PNA Service Guide" on page 9.

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[1].

Step 23. Prepare the PNA for the User

1. If necessary, reinstall front jumper cables.

2. Install 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.

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