Keysight Combiner and Mechanical Switches Upgrade Kit

To Upgrade PNA-X N5247A Option 419 to Option 423

Upgrade Kit Order Numbers: N5247AU-927

Keysight Kit Number: N5247-60104

KEYSIGHT TECHNOLOGIES

Installation Note

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.**

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Safety Notes

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

WARNING	**Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.**

CAUTION	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution note until the indicated conditions are fully understood and met.

Description of the Upgrade

This upgrade converts your standard 4-port configurable test set analyzer (N5247A Option 419) to an N5247A Option 423 by adding:

- a mechanical switch to each source port channel
- a source combiner to the port 1 channel
- rear-panel test set inputs
- source outputs routed to the rear panel
- a new cable guard for Port 1 front panel jumpers
- a modified front panel
- many additional new cables

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.

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 6.

- Enough time - refer to "About Installing the Upgrade" on page 6.

- 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].

License Key Redemption

NOTE The enclosed Option 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 a license key from: http://www.keysight.com/find/softwarelicense. To complete the request, you will need to gather the following information:

- From the certificate

  ❏ Order number

  ❏ Certificate number

- From your instrument

  ❏ Model number

  ❏ Serial number

  ❏ Host ID

The instrument information is available on the network analyzer – on the analyzer's **Help** menu, click **About Network Analyzer**.

If you provide an email address, Keysight will promptly email your license key. Otherwise, you will your receive your license key via postal mail.

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1. See "Downloading the Online PNA Service Guide" on page 5.

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 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

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1. See "Downloading the Online PNA Service Guide" on page 5.

Tools Required for the Installation

Description	Qty	Part Number
T-6 TORX driver - set to 4 in-lbs (0.45 N.m)	1	N/A
T-8 TORX driver - set to 6 in-lbs (0.68 N.m)	1	N/A
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
5/16-in (8 mm) nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1	N/A
3/16-in (5 mm) nutsetter or open end torque wrench - set to 6 in-lbs (0.68 N.m)	1	N/A
5/8-in (16 mm) nutsetter or open end torque wrench - set to 21 in-lbs (2.38 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

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 . . . . .N5247A Option 419

Installation to be performed by . . . . .Keysight service center or personnel qualified by Keysight

Estimated installation time . . . . .5.0 hours

Estimated adjustment time . . . . .0.5 hour

Estimated full instrument calibration time . . . . .4.5 hours

Items Included in the Upgrade Kit[1]

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 3.

Table 1   Contents of Upgrade Kit N5247-60104

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5247-90104
A50	Port 1 mechanical switch	4	N1811-60010
A51	Port 3 mechanical switch		
A52	Port 4 mechanical switch		
A53	Port 2 mechanical switch		
A54	Combiner	1	11667-60016
--	Bracket for combiner	1	N5247-00007
--	Bracket for mechanical switches	2	N5247-20130
--	Lower overlay for front panel	1	N5247-80002
-	Cable guard, port 1 jumper cables	1	N5247-00018
--	Machine screw, M3.0 x 16, pan head (to attach mechanical switches to brackets)	10	0515-0375
--	Machine screw, M2 x 14, pan head (to attach combiner to bracket)	3	0515-0661
--	Machine screw, M3 x 8, pan head (8 to attach switch assemblies to deck)	10	0515-0372
--	Machine screw, M3 x 6, pan head (2 to attach combiner bracket to attenuator bracket)	3	0515-0430
--	Termination, 2.4 mm 50 GHz load	1	0955-2394 Was N5247-20138
--	Cable clamp [2 to secure W142 (N5247-20089), W141 (N5247-20099), W138 (N5247-20098) and W137 (N5245-20097); 1 to secure W134 (N5247-20095); 1 to secure W145 (N5247-20066); 1 to secure W137 (N5247-20070)]	10	1400-1334
--	Cable tie [2 to secure W137 (N5247-20070) and W54 (N5247-20062)]	6	1400-0249
--	Rear panel 1.85 mm female bulkhead connectors	5	5065-4673
--	Front panel 1.85 mm female bulkhead connectors	4	
--	Nut for rear panel 1.85 mm female bulkhead connectors	5	1250-3516
--	Nut for front panel 1.85 mm male bulkhead connectors	4	
--	Washer for rear panel 1.85 mm female bulkhead connectors	5	1250-3310
--	Washers for front panel 1.85 mm female bulkhead connectors	4	
W60	RF cable, front panel jumper	2	N5247-20107

1. In addition to the upgrade kit, the shipment includes an Option Entitlement Certificate. Refer to "License Key Redemption" on page 4 for important information about this certificate.

Table 1   Contents of Upgrade Kit N5247-60104

Ref Desig.	Description	Qty	Part Number
W125	RF cable, A50 port 1 mechanical switch to A60 port 1 70 GHz doubler	1	N5247-20030
W126	RF cable, A50 port 1 mechanical switch to A29 port 1 reference coupler	1	N5247-20031
W127	RF cable, A50 port 1 mechanical switch to PORT 1 SW SRC OUT	1	N5247-20091
W128	RF cable, Front-panel PORT 1 COMB THRU IN to A54 combiner	1	N5247-20092
W129	RF cable, Front-panel PORT 3 COMB ARM IN to A54 combiner	1	N5247-20093
W130	RF cable, A50 port 1 mechanical switch to A54 combiner	1	N5247-20094
W131	RF cable, A51 port 3 mechanical switch to A61 port 3 70 GHz doubler	1	N5247-20032
W132	RF cable, A51 port 3 mechanical switch to A30 port 3 reference coupler	1	N5247-20033
W133	RF cable, A51 port 3 mechanical switch to PORT 3 SW SRC OUT	1	N5247-20090
W134	RF cable, rear-panel PORT 3 SW TSET IN (J7) to A51 port 3 mechanical switch	1	N5247-20095
W135	RF cable, A52 port 4 mechanical switch to A62 port 4 70 GHz doubler	1	N5247-20030
W136	RF cable, A52 port 4 mechanical switch to A31 port 4 reference coupler	1	N5247-20031
W137	RF cable, A52 port 4 mechanical switch to PORT 4 SW SRC OUT (J4)	1	N5247-20097
W138	RF cable, A52 port 4 mechanical switch to PORT 4 SW TSET (J3)	1	N5247-20098
W139	RF cable, A53 port 2 mechanical switch to A63 port 2 70 GHz doubler	1	N5247-20032
W140	RF cable, A53 port 2 mechanical switch to A32 port 2 reference coupler	1	N5247-20033
W141	RF cable, A53 port 2 mechanical switch to PORT 2 SW SRC OUT (J2)	1	N5247-20099
W142	RF cable, A53 port 2 mechanical switch to PORT 2 TSET IN (J1)	1	N5247-20089
W143	RF cable, rear panel jumper	2	N5247-20107

NOTE   Extra quantities of items such as protective plastic caps, screws, cable ties, and cable clamps are 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 Inner Cover.

Step 4. Remove the Cable Guard for the Port 1 Front Panel Jumper Cables.

Step 5. Remove the Front Panel Assembly.

Step 6. Remove the Braces on the Bottom Side of the PNA.

Step 7. Remove the A23 Test Set Motherboard.

Step 8. Remove the A24 IF Multiplexer Board.

Step 9. Remove Some Bottom-Side (Test Set) Cables.

Step 10. Assemble the A50, A51, A52, and A53 Mechanical Switch Assemblies.

Step 11. Install the Mechanical Switch Assemblies.

Step 12. Assemble and Install the A54 Combiner Assembly.

Step 13. Install the New Bulkhead Connectors in the Test Set Front Plate.

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

Step 15. Install Rear Panel Hardware.

Step 16. Reinstall the A24 IF Multiplexer Board.

Step 17. Reinstall the A23 Test Set Motherboard.

Step 18. Reinstall the Braces on the Bottom Side of the PNA.

Step 19. Replace the Lower Front Panel Overlay.

Step 20. Reinstall Front Panel Assembly.

Step 21. Install New Front Panel Jumper Cables.

Step 22. Install Rear Panel Jumpers and Load.

Step 23. Position the Cables and Wires to Prevent Pinching.

Step 24. Reinstall the Inner Cover.

Step 25. Reinstall the Outer Cover.

Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Option Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to "License Key Redemption" on page 4.

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 3.

Once the license key has been received and the information verified, you can proceed with the installation at step 2.

Step 2. Remove the Outer Cover

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

Step 3. Remove the Inner Cover

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

Step 4. Remove the Cable Guard for the Port 1 Front Panel Jumper Cables

Gently pull the cable guard off of the Port 1 front panel jumper cables, and discard it. A new cable guard will be reinstalled later in the procedure.

Step 5. 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 6. Remove the Braces on the Bottom Side of the PNA

Remove the braces from the bottom side of the PNA. Keep all parts for reinstallation later.

Step 7. Remove the A23 Test Set Motherboard

For instructions, click the Chapter 7 bookmark "Removing and Replacing the A23 Test Set Motherboard" in the PDF Service Guide[1].

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1. See "Downloading the Online PNA Service Guide" on page 5.

Step 8. Remove the A24 IF Multiplexer Board

For instructions, click the Chapter 7 bookmark "Removing and Replacing the A24 IF Multiplexer Board" in the PDF Service Guide[1].

Step 9. Remove Some Bottom-Side (Test Set) 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.

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 cables. To see an image showing the location of these cables, click the Chapter 6 bookmark "Bottom RF Cables, Standard 4-Port Configuration, Option 419" in the PDF Service Guide[1].

   These four cables may be discarded - they will <u>not</u> be reinstalled.

   - W27 (N5247-20044) A60 port 1 70 GHz doubler to A29 port 1 reference coupler
   - W28 (N5247-20043) A61 port 3 70 GHz doubler to A30 port 3 reference coupler
   - W29 (N5247-20044) A62 port 4 70 GHz doubler to A31 port 4 reference coupler
   - W30 (N5247-20043) A63 port 2 70 GHz doubler to A32 port 2 reference coupler

These cables must be saved - they will be reinstalled.

   - W12 (N5247-20059) A60 port 1 70 GHz doubler to W11
   - W14 (N5247-20072) A60 port 1 70 GHz doubler to W13
   - W16 (N5247-20060) A61 port 3 70 GHz doubler to W15
   - W18 (N5247-20084) A61 port 3 70 GHz doubler to W17
   - W20 (N5247-20015) A62 port 4 70 GHz doubler to W19
   - W24 (N5247-20061) A63 port 2 70 GHz doubler to W23
   - W26 (N5247-20051) A63 port 2 70 GHz doubler to W25
   - W37 (N5247-20070) A30 port 3 ref coupler to front-panel REF 3 SOURCE OUT
   - W53 (N5247-20048) A37 reference mixer switch to A27 mixer brick (R1)
   - W54 (N5247-20062) REF 3 RCVR R3 IN to A28 mixer brick (R3)
   - W62 (N5247-20111) A25 HMA26.5 to A26 splitter
   - W118 (N5247-20047) A46 port 1 receiver attenuator to A27 mixer brick (A)
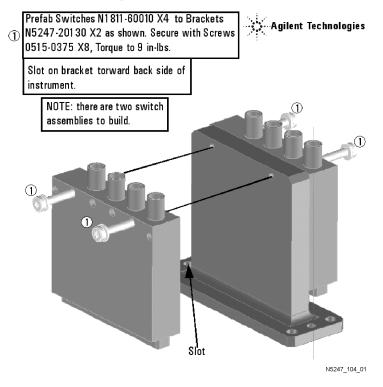   - W120 (N5247-20064) A47 port 3 receiver attenuator to A28 mixer brick (C)

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1. See "Downloading the Online PNA Service Guide" on page 5.

- W124 (N5247-20046) A49 port 2 receiver attenuator to A27 mixer brick (B)

- W145 (N5247-20066) REF 2 RCVR R2 IN to A27 mixer brick (R2)

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 10. Assemble the A50, A51, A52, and A53 Mechanical Switch Assemblies

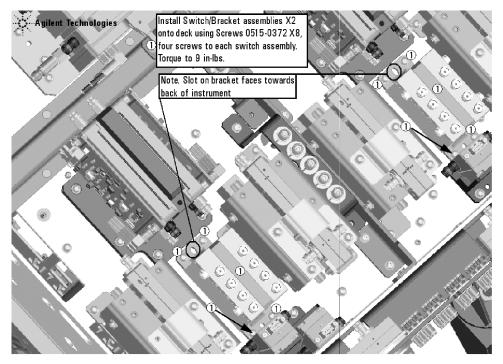Refer to Figure 1 for this step of the procedure. New parts are listed in Table 1 on page 7.

Figure 1   Mechanical Switch Assembly

Prefab Switches N1811-60010 X4 to Brackets N5247-20130 X2 as shown. Secure with Screws 0515-0375 X8, Torque to 9 in-lbs.

Slot on bracket torward back side of instrument.

NOTE: there are two switch assemblies to build.

Agilent Technologies

Slot

N5247_104_01

Step 11. Install the Mechanical Switch Assemblies

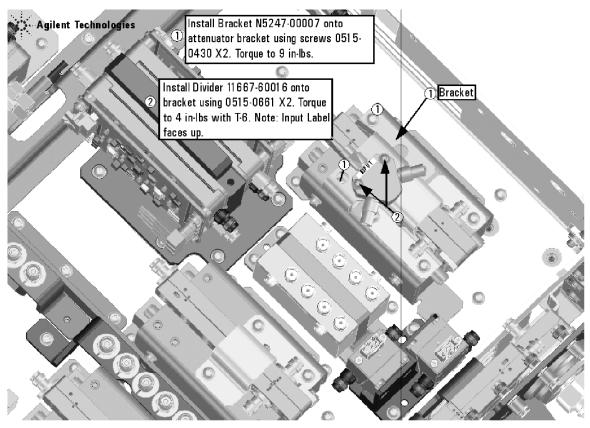Refer to Figure 2 for this step of the procedure. New parts are listed in Table 1 on page 7.

Figure 2   Mechanical Switch Installation

N5247_104_02

Step 12. Assemble and Install the A54 Combiner Assembly

Refer to Figure 3 for this step of the procedure. New parts are listed in Table 1 on page 7.

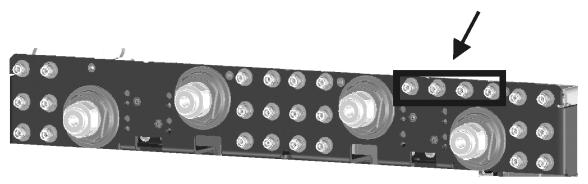**Figure 3   A54 Combiner Assembly and Installation**

N5247_104_03

Step 13. Install the New Bulkhead Connectors in the Test Set Front Plate

Refer to Figure 4 for this step of the procedure. New parts are listed in Table 1 on page 7.

1. Install four bulkhead connectors (5065-4673), washers (1250-3310), and nuts (1250-3616). Hand tighten at first, then, after all have been installed, torque to 21 in-lbs.

Figure 4   Front Panel Bulkhead Connectors Installation

N5247_104_09

Step 14. 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 semirigid cables. Some flexing of the cables may be necessary but do not over-bend them.

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 423" in the PDF Service Guide[1]. New parts are listed in Table 1 on page 7.
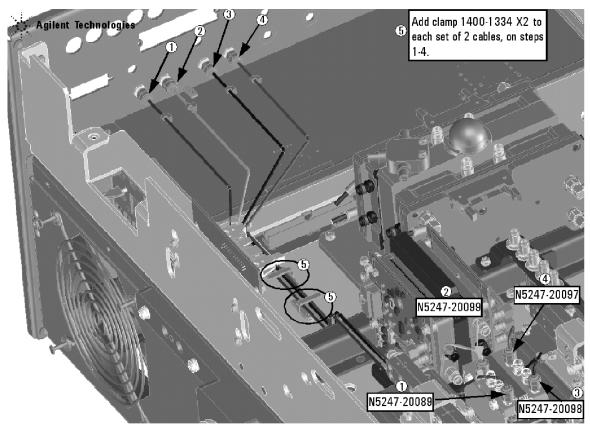
Install the following new cables in the order listed.

- W142 (N5247-20089)A53 port 2 mechanical switch to PORT 2 TSET IN (J1)
- W141 (N5247-20099)A53 port 2 mechanical switch to PORT 2 SW SRC OUT (J2)
- W138 (N5247-20098)A52 port 4 mechanical switch to PORT 4 SW TSET (J3)
- W137 (N5247-20097)A52 port 4 mechanical switch to PORT 4 SW SRC OUT (J4)

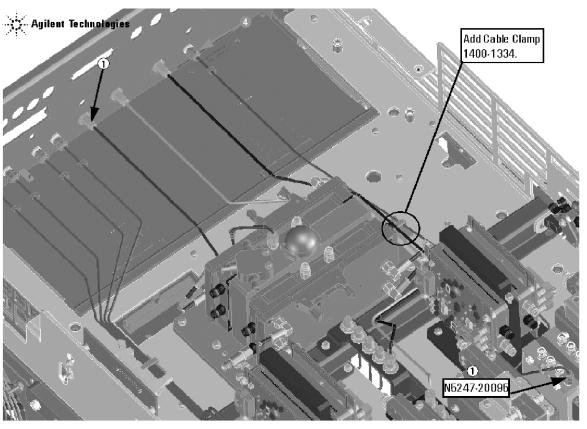1. See "Downloading the Online PNA Service Guide" on page 5.

* As shown in Figure 5, install two cable clamps (part number 1400-1334) to secure W142 (N5247-20089), W141 (N5247-20099), W138 (N5247-20098) and W137 (N5245-20097).

Figure 5   **Location of Cable Clamps to Secure W142 (N5247-20089), W141 (N5247-20099), W138 (N5247-20098) and W137 (N5245-20097)**

N5247_104_04

- W134 (N5247-20095) Rear-panel PORT 3 SW TSET IN (J7) to A51 port 3 mechanical switch

* As shown in Figure 6, install a cable clamp (part number 1400-1334) to secure W134 (N5247-20095).

Figure 6   Location of Cable Clamp to Secure W134 (N5247-20095)

N5247_104_05

- W145 (reuse) (N5247-20066) REF 2 RCVR R2 IN to A27 mixer brick (R2)

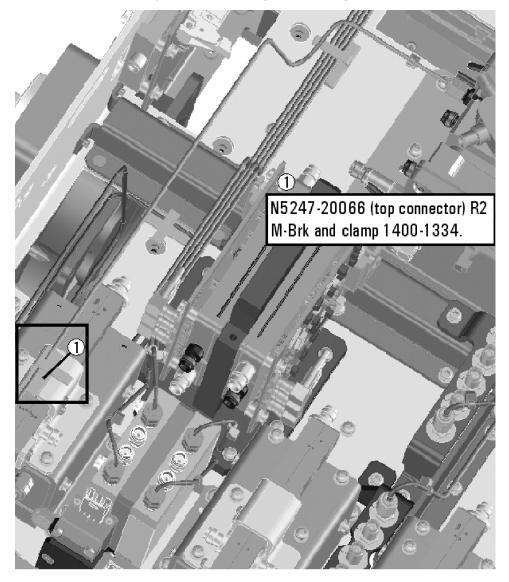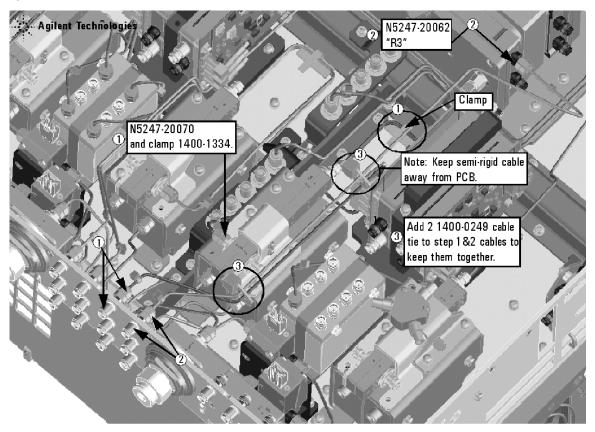* As shown in Figure 7, install a cable clamp (part number 1400-1334) to secure W145 (N5247-20066).

Figure 7   Location of Cable Clamp to Secure W145 (N5247-20066)

N5247_104_07

- W37 (reuse) (N5247-20070) A30 port 3 ref coupler to front-panel REF 3 SOURCE OUT

- W54 (reuse) (N5247-20062) REF 3 RCVR R3 IN to A28 mixer brick (R3)

* As shown in Figure 8, install a cable clamp (part number 1400-1334) to secure W137 (N5247-20070) and two cable ties (1400-0249) to secure W137 (N5247-20070) and W54 (N5247-20062).

Figure 8   Location of Cable Clamp and Cable Ties to Secure W137 (N5247-20070) and W54 (N5247-20062)
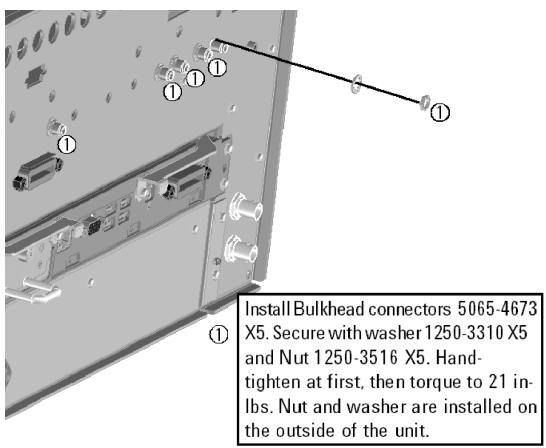

N5247_104_08

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

- W120 (reuse) (N5247-20064) A47 port 3 receiver attenuator to A28 mixer brick (C)

- W118 (reuse) (N5247-20047) A46 port 1 receiver attenuator to A27 mixer brick (A)

- W132 (N5247-20033) A51 port 3 mechanical switch to A30 port 3 reference coupler

- W140 (N5247-20033) A53 port 2 mechanical switch to A32 port 2 reference coupler

- W126 (N5247-20031) A50 port 1 mechanical switch to A29 port 1 reference coupler

- W136 (N5245-20031) A52 port 4 mechanical switch to A31 port 4 reference coupler

- W26 (reuse) (N5247-20051) A63 port 2 70 GHz doubler to W25

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

- W124 (reuse) (N5247-20046) A49 port 2 receiver attenuator to A27 mixer brick (B)

- W18 (reuse) (N5247-20084) A61 port 3 70 GHz doubler to W17

- W14 (reuse) (N5247-20072) A60 port 1 70 GHz doubler to W13

- W16 (reuse) (N5247-20060) A61 port 3 70 GHz doubler to W15

- W125 (N5247-20030) A50 port 1 mechanical switch to A60 port 1 70 GHz doubler

- W135 (N5247-20030) A52 port 4 mechanical switch to A62 port 4 70 GHz doubler
- W12 (reuse) (N5247-20059) A60 port 1 70 GHz doubler to W11
- W131 (N5247-20032)A51 port 3 mechanical switch to A61 port 3 70 GHz doubler
- W139 (N5247-20032)A53 port 2 mechanical switch to A63 port 2 70 GHz doubler
- W20 (reuse) (N5247-20015) A62 port 4 70 GHz doubler to W19
- W133 (N5247-20090)A51 port 3 mechanical switch to PORT 3 SW SRC OUT
- W130 (N5247-20094)A50 port 1 mechanical switch to A54 combiner
- W127 (N5245-20091)A50 port 1 mechanical switch to PORT 1 SW SRC OUT
- W129 (N5247-20093) Front-panel PORT 3 COMB ARM IN to A54 combiner
- W128 (N5247-20092) Front-panel PORT 1 COMB THRU IN to A54 combiner
- W62 (reuse)(N5247-20111) A25 HMA26.5 to A26 splitter

Step 15. Install Rear Panel Hardware

Follow the instructions shown in Figure 9. New parts are listed in Table 1 on page 7.

Figure 9   Rear Panel Hardware

Install Bulkhead connectors 5065-4673 X5. Secure with washer 1250-3310 X5 and Nut 1250-3516 X5. Hand-tighten at first, then torque to 21 in-lbs. Nut and washer are installed on the outside of the unit.

N5247_104_10

Step 16. Reinstall the A24 IF Multiplexer Board

For instructions, click the Chapter 7 bookmark "Removing and Replacing the A24 IF Multiplexer Board" in the PDF Service Guide[1].

Step 17. Reinstall the A23 Test Set Motherboard

1. For instructions on reinstalling the board, click the Chapter 7 bookmark "Removing and Replacing the A23 test set motherboard" in the PDF Service Guide[1].

2. If not already done in a previous step, install the following new wire harnesses in the order listed. To see an image showing their location, click the Chapter 6 bookmark "Bottom Ribbon Cables and Wire Harnesses, 4-Port, Option 423" in the PDF Service Guide[1]. New parts are listed in Table 1 on page 7.

    • Wire harness (part of mechanical switch assembly), A23 test set motherboard J101 to A50 port 1 mechanical switch

    • Wire harness (part of mechanical switch assembly), A23 test set motherboard J102 to A51 port 3 mechanical switch

    • Wire harness (part of mechanical switch assembly), A23 test set motherboard J103 to A52 port 4 mechanical switch

    • Wire harness (part of mechanical switch assembly), A23 test set motherboard J104 to A53 port 2 mechanical switch

Step 18. Reinstall the Braces on the Bottom Side of the PNA

Reinstall the braces on the bottom side of the PNA, reusing all of the parts you saved earlier. To see an image showing the location of these braces, click the Chapter 6 bookmarks "Bottom RF Cables, 4-Port Configuration, Option 423" in the PDF Service Guide[1].

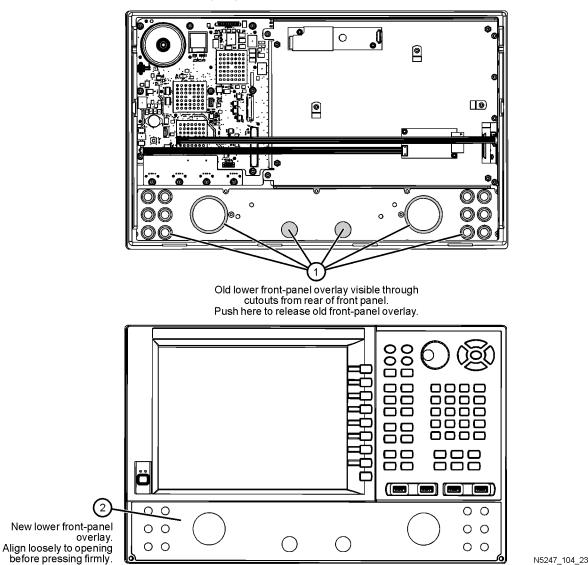## Step 19. Replace the Lower Front Panel Overlay

Refer to Figure 10 for this step of the procedure. Although this figure shows a 2-port PNA, the procedure is the same. New parts are listed in Table 1 on page 7.

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.

4. Install two 0515-1946 screws, one on either side of the new 1.85 mm male bulkhead connectors. Torque to 9 in-lbs.

5. Remove the protective backing from the new front panel overlay, N5247-80002 (item ②).

6. 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.

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1. See "Downloading the Online PNA Service Guide" on page 5.

7. Once the overlay is in place, press it firmly onto the frame to secure it.

Figure 10   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.

N5247_104_23

Step 20. 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[1].
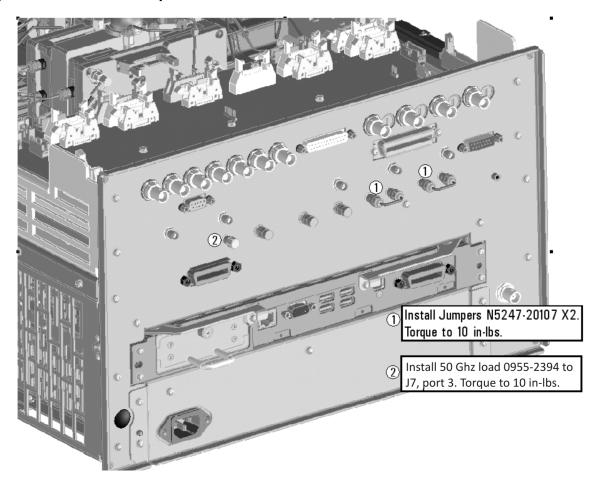
Step 21. Install New Front Panel Jumper Cables

Install two new W60 jumper cables, N5247-20107, on the front panel. To see an image of the front panel jumper cables, click the Chapter 7 bookmark "Removing and Replacing the Front Panel Assembly" in the PDF Service Guide[1].

Step 22. Install Rear Panel Jumpers and Load

Install two new W143 jumper cables, N5247-20107, on the rear panel. Refer to Figure 11 for instructions. New parts are listed in Table 1 on page 7.

Figure 11   Rear Panel Jumper Installation

① Install Jumpers N5247-20107 X2. Torque to 10 in-lbs.

② Install 50 Ghz load 0955-2394 to J7, port 3. Torque to 10 in-lbs.

N5247_104_06

Step 23. Position the Cables and Wires to Prevent Pinching

On the top side of the PNA, carefully position the grey 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 24. Reinstall the Inner Cover

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

Step 25. Reinstall the Outer Cover

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

Step 26. Enable Option 423

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- A keyboard must be connected to the network analyzer.

Option Enable 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 **423 - Combiner & Switches**.
4. Using the keyboard, enter the license key in the box provided. The license key is printed on the 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**.

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

| NOTE | If Option 423 has not been enabled, perform the "Option Enable Procedure" again. If the option is still not enabled, contact Keysight Technologies. Refer to "Getting Assistance from Keysight" on page 3. |

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1. See "Downloading the Online PNA Service Guide" on page 5.

Step 27. Perform Post-Upgrade Adjustments and Calibration

Adjustments

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

- source adjustment
- receiver adjustment

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.

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 3.

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 28. 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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1. See "Downloading the Online PNA Service Guide" on page 5.

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