

# Keysight Combiner and Mechanical Switches Upgrade Kit

To Upgrade PNA-X N5244A or N5245A Option 419 to Option 423

Upgrade Kit Order Numbers: N5244AU-927 and N5245AU-927

Keysight Kit Number: N5245-60104

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](http://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.

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

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

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## Description of the Upgrade

This upgrade converts your standard 2-port configurable test set analyzer (N5244A Option 419 or N5245A Option 419) to an N5244A Option 423 or N5245A 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

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## 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.

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

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

Keysight stands behind the quality of the upgrade kit contents. If you have problems with any item in the kit, email Keysight Component Test Division (CTD) Support at [support\\_ctd-soco@keysight.com](mailto:support_ctd-soco@keysight.com), or telephone the CTD Hotline at (707) 577-6802 and leave a voice mail message. Please include details of the problem.

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## Getting Prepared

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

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

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

- A license key - refer to “[License Key Redemption](#)” below.
- A PDF copy or a paper copy of the PNA Service Guide - refer to “[Downloading the Online PNA Service Guide](#)” below.
- An ESD-safe work area - refer to “[Protecting Your Workspace from Electrostatic Discharge](#)” below.
- Correct tools - refer to “[Tools Required for the Installation](#)” on page 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<sup>1</sup>.

## License Key Redemption

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**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.

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

## Protecting Your Workspace from Electrostatic Discharge

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

### ESD Equipment Required for the Installation

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

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 bulkhead connectors. On these, use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

## About Installing the Upgrade

Products affected . . . . .	N5244A and N5245A 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<sup>1</sup>

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 N5245-60104**

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5245-90007
A50	Port 1 mechanical switch	4	N1811-60031 Was N1811-60009
A51	Port 3 mechanical switch		
A52	Port 4 mechanical switch		
A53	Port 2 mechanical switch		
A54	Combiner	1	11667-60021 Was N5532-60002
--	Cap, protective	1	5188-5406
--	Bracket for combiner	1	N5245-00020
--	Bracket for mechanical switches	4	N5245-00014
-	Machine screw, M2.0 x 20, pan head (to attach mechanical switches to brackets)	8	0515-1992
--	Machine screw, M2 x 14, pan head (to attach combiner to bracket)	2	0515-0661
--	Machine screw, M3 x 6, pan head (8 to attach switch assemblies to deck; 2 to attach combiner bracket to deck)	10	0515-0430
--	Cable clamp	2	1400-1334
-	Dust cap for test port	4	1401-0214
-	Termination, 2.4 mm 50 GHz load	1	0955-2394
W105	A50 port 1 mechanical switch to W11	1	N5245-20064
W106	A50 port 1 mechanical switch to A29 port 1 reference coupler	1	N5245-20065
W107	A50 port 1 mechanical switch to PORT 1 SW SRC OUT (J11)	1	N5245-20068
W108	Rear-panel PORT 1 COMB THRU IN (J10) to A54 combiner	1	N5245-20094
W109	Rear-panel PORT 1 COMB ARM IN (J9) to A54 combiner	1	N5245-20093
W110	A50 port 1 mechanical switch to A54 combiner	1	N5245-20067
W111	A51 port 3 mechanical switch mechanical switch to W13	1	N5245-20058
W112	A51 port 3 mechanical switch to A30 port 3 reference coupler	1	N5245-20059
W113	A51 port 3 mechanical switch to PORT 3 SW SRC OUT (J8)	1	N5245-20069
W114	Rear-panel PORT 3 SW TSET IN (J7) to A51 port 3 mechanical switch	1	N5245-20070

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 N5245-60104**

Ref Desig.	Description	Qty	Part Number
W115	A52 port 4 mechanical switch to W15	1	N5245-20060
W116	A52 port 4 mechanical switch to A31 port 4 reference coupler	1	N5245-20061
W117	A52 port 4 mechanical switch to PORT 4 SW SRC OUT (J4)	1	N5245-20092
W118	A52 port 4 mechanical switch to PORT 4 SW TSET (J3)	1	N5245-20091
W119	A53 port 2 mechanical switch to W17	1	N5245-20063
W120	A53 port 2 mechanical switch to A32 port 2 reference coupler	1	N5245-20062
W121	A53 port 2 mechanical switch to PORT 2 SW SRC OUT (J2)	1	N5245-20071
W122	A53 port 2 mechanical switch to PORT 2 TSET IN (J1)	1	N5245-20072
W123	Rear panel jumper	4	N5245-20155 Was N5245-20104

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**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.

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## 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.

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

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### 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 Front Panel Assembly.
- Step 5. Remove the A23 Test Set Motherboard.
- Step 6. Remove the A24 IF Multiplexer Board.
- Step 7. Remove Some Existing Cables.
- Step 8. Assemble the A50, A51, A52, and A53 Mechanical Switch Assemblies.
- Step 9. Install the Mechanical Switch Assemblies.

Step 10. Assemble and Install the A54 Combiner Assembly.

Step 11. Install the Cables.

Step 12. Install Rear Panel Hardware.

Step 13. Reinstall the A24 IF Multiplexer Board.

Step 14. Reinstall the A23 Test Set Motherboard.

Step 15. Reinstall Front Panel Assembly.

Step 16. Position the Cables and Wires to Prevent Pinching.

Step 17. Reinstall the Inner Cover.

Step 18. Reinstall the Outer Cover.

Step 19. Enable Option 423.

Step 20. Perform Post-Upgrade Adjustments and Calibration.

Step 21. Prepare the PNA for the User.

## **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<sup>1</sup>.

## **Step 3. Remove the Inner Cover**

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

## **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 Guide<sup>1</sup>.

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1. See [“Downloading the Online PNA Service Guide” on page 5](#).

## Step 5. 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<sup>1</sup>.

## Step 6. 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<sup>1</sup>.

## Step 7. Remove Some Existing Cables

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

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**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.

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1. Place the analyzer bottom-side up on a flat surface.
2. Remove the following cables. To see an image showing the location of these cables, click the Chapter 6 bookmark “Bottom RF Cables, Standard 2-Port Configuration, Option 419” in the PDF Service Guide<sup>1</sup>.

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

- W12 (N5245-20050) A29 port 1 reference coupler to W11
- W14 (N5245-20043) A30 port 3 reference coupler to W13
- W16 (N5245-20044) A31 port 4 reference coupler to W15
- W18 (N5245-20049) A32 port 2 reference coupler to W17

These cables must be saved - they will be reinstalled.

- W21 (N5245-20008) A29 port 1 reference coupler to A37 reference mixer switch
- W22 (N5245-20014) A33 port 1 coupler to front-panel Port 1 CPLR ARM
- W25 (N5245-20116) A30 port 3 ref coupler to front-panel REF 3 SOURCE OUT
- W29 (N5245-20117) A31 port 4 ref coupler to front-panel REF 4 SOURCE OUT
- W43 (N5245-20009) A37 reference mixer switch to A27 mixer brick (R1)
- W45 (N5245-20021) REF 4 RCVR R4 IN to A28 mixer brick (R4)
- W46 (N5245-20115) REF 2 RCVR R2 IN to A27 mixer brick (R2)
- W52 (N5245-20013) A25 HMA26.5 to A26 splitter
- W82 (N5245-20077) A38 port 1 source attenuator to front-panel Port 1 SOURCE OUT
- W83 (N5245-20076) Front-panel Port 1 CPLR THRU to A42 port 1 bias tee

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1. See “[Downloading the Online PNA Service Guide](#)” on page 5.

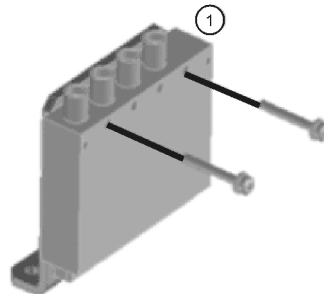
- W84 (N5245-20085) A42 port 1 bias tee to A33 port 1 coupler
- W86 (N5245-20027) A39 port 3 source attenuator to front-panel Port 3 SOURCE OUT
- W90 (N5245-20028) A40 port 4 source attenuator to front-panel Port 4 SOURCE OUT
- W94 (N5245-20031) A41 port 2 source attenuator to front-panel Port 2 SOURCE OUT
- W95 (N5245-20030) A45 port 2 bias tee to A36 port 2 coupler
- W97 (N5245-20054) Front-panel Port 1 RCVR A IN to A46 port 1 receiver attenuator
- W98 (N5245-20056) A46 port 1 receiver attenuator to A27 mixer brick (A)
- W99 (N5245-20073) Port 3 RCVR C IN to A47 port 3 receiver attenuator
- W100 (N5245-20066) A47 port 3 receiver attenuator to A28 mixer brick (C)
- W101 (N5245-20074) Port 4 RCVR D IN to A48 port 4 receiver attenuator
- W102 (N5245-20075) A48 port 4 receiver attenuator to A28 mixer brick (D)
- W103 (N5245-20055) Port 2 RCVR B IN to A49 port 2 receiver attenuator
- W104 (N5245-20057) A49 port 2 receiver attenuator to A27 mixer brick (B)

## Step 8. 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**

① Prefab switches N1811-60031 X4 to brackets N5245-00014 X4 as shown. Secure with screws 0515-1992 X8, two screws to each switch. Torque to 6 in-lbs.



N5245\_007\_01

## Step 9. Install the Mechanical Switch Assemblies

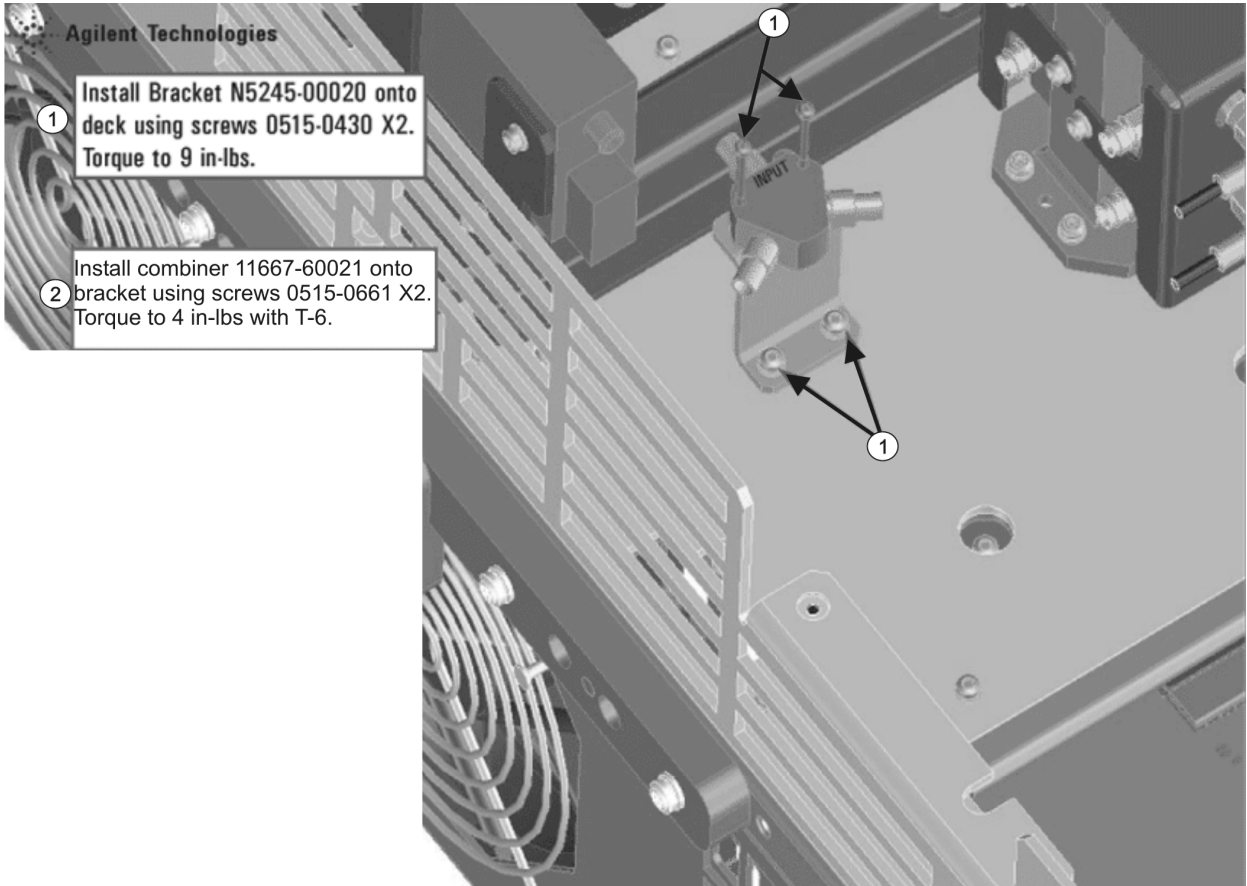
Install the A50, A51, A52, and A53 mechanical switches. For instructions, click the Chapter 7 bookmark, “Removing and Replacing the A50-A53 Mechanical Switches and the A54 Combiner” in the PDF Service Guide<sup>1</sup>.

New parts are listed in [Table 1 on page 7](#) of this document.

## Step 10. Assemble and Install the A54 Combiner Assembly

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

**Figure 2** A54 Combiner Assembly and Installation



N5245\_005\_03

1. See [“Downloading the Online PNA Service Guide” on page 5](#).

## Step 11. Install the Cables

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

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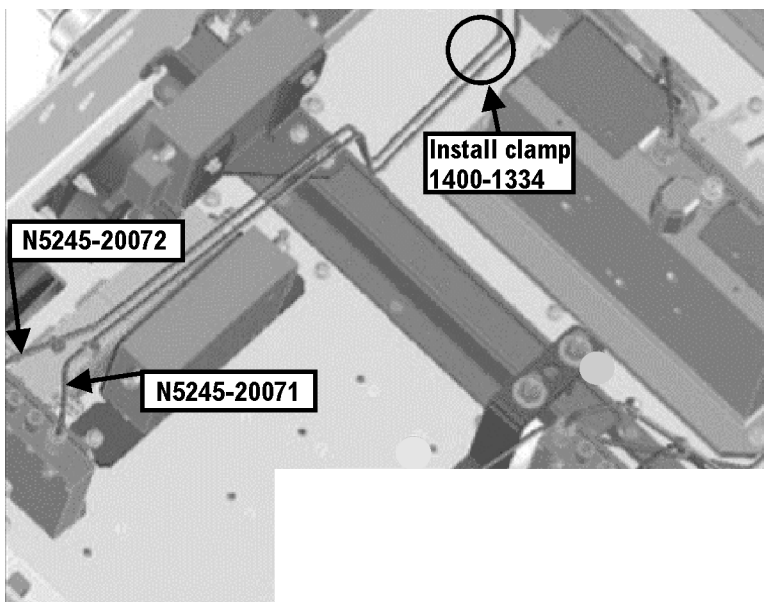
### Install the Semirigid Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom RF Cables, 2-Port Configuration, Option 423” in the PDF Service Guide<sup>1</sup>. New parts are listed in [Table 1 on page 7](#).

Install the following new cables in the order listed.

- W122 (N5245-20072) A53 port 2 mechanical switch to PORT 2 TSET IN (J1)
  - W121 (N5245-20071) A53 port 2 mechanical switch to PORT 2 SW SRC OUT (J2)
- \* As shown in [Figure 3](#), install a clamp (part number 1400-1334) to secure W121 (N5245-20071) and W122 (N5245-20072).

**Figure 3** Location of Cable Clamp to Secure W121 (N5245-20071) and W122 (N5245-20072)



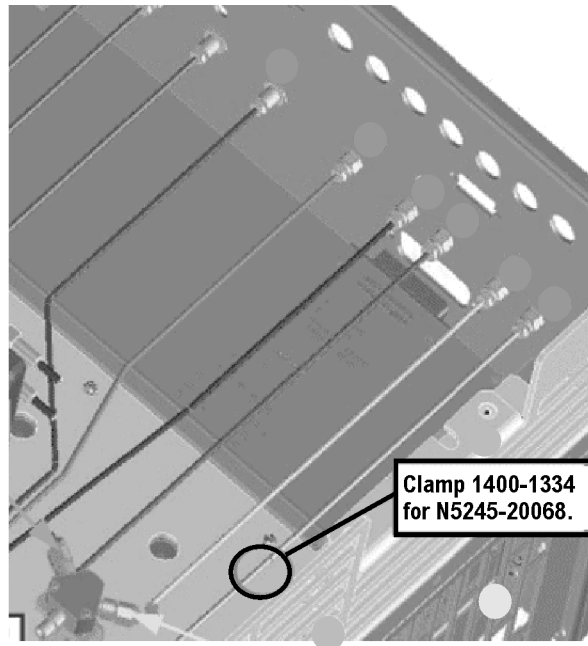
N5245\_005\_01

- W118 (N5245-20091) A52 port 4 mechanical switch to PORT 4 SW TSET (J3)
  - W117 (N5245-20092) A52 port 4 mechanical switch to PORT 4 SW SRC OUT (J4)
  - W114 (N5245-20070) Rear-panel PORT 3 SW TSET IN (J7) to A51 port 3 mechanical switch
- \*\*\* Install a protective cap (5188-5406) on the rear panel connector of W114. \*\*\*

1. See [“Downloading the Online PNA Service Guide” on page 5](#).

- W113 (N5245-20069) A51 port 3 mechanical switch to PORT 3 SW SRC OUT (J8)
- W109 (N5245-20093) Rear-panel PORT 1 COMB ARM IN (J9) to A54 combiner
- W108 (N5245-20094) Rear-panel PORT 1 COMB THRU IN (J10) to A54 combiner
- W107 (N5245-20068) A50 port 1 mechanical switch to PORT 1 SW SRC OUT (J11)  
\* As shown in **Figure 4**, install clamp part number 1400-1334 to secure W107 (N5245-20068).

**Figure 4** Location of Cable Clamp to Secure W107 (N5245-20068)



N5245\_010\_23

- W84 (reuse) (N5245-20085)A42 port 1 bias tee to A33 port 1 coupler
- W120 (N5245-20062)A53 port 2 mechanical switch to A32 port 2 reference coupler
- W116 (N5245-20061)A52 port 4 mechanical switch to A31 port 4 reference coupler
- W112 (N5245-20059)A51 port 3 mechanical switch to A30 port 3 reference coupler
- W25 (reuse) (N5245-20116) A30 port 3 ref coupler to front-panel REF 3 SOURCE OUT
- W106 (N5245-20065) A50 port 1 mechanical switch to A29 port 1 reference coupler
- W103 (reuse) (N5245-20055)Port 2 RCVR B IN to A49 port 2 receiver attenuator
- W95 (reuse) (N5245-20030)A45 port 2 bias tee to A36 port 2 coupler
- W43 (reuse) (N5245-20009)A45 port 2 bias tee to A36 port 2 coupler
- W94 (reuse) (N5245-20031)A41 port 2 source attenuator to front-panel Port 2 SOURCE OUT
- W46 (reuse) (N5245-20115)REF 2 RCVR R2 IN to A27 mixer brick (R2)
- W101 (reuse) (N5245-20074) Port 4 RCVR D IN to A48 port 4 receiver attenuator
- W90 (reuse) (N5245-20028) A40 port 4 source attenuator to front-panel Port 4 SOURCE OUT

- W45 (reuse) (N5245-20021) REF 4 RCVR R4 IN to A28 mixer brick (R4)
- W29 (reuse) (N5245-20117) A31 port 4 ref coupler to front-panel REF 4 SOURCE OUT
- W99 (reuse) (N5245-20073) Port 3 RCVR C IN to A47 port 3 receiver attenuator
- W86 (reuse) (N5245-20027) A39 port 3 source attenuator to front-panel Port 3 SOURCE OUT
- W83 (reuse) (N5245-20076) Front-panel Port 1 CPLR THRU to A42 port 1 bias tee
- W22 (reuse) (N5245-20014) A33 port 1 coupler to front-panel Port 1 CPLR ARM
- W97 (reuse) (N5245-20054) Front-panel Port 1 RCVR A IN to A46 port 1 receiver attenuator
- W82 (reuse) (N5245-20077) A38 port 1 source attenuator to front-panel Port 1 SOURCE OUT
- W21 (reuse) (N5245-20008) A29 port 1 reference coupler to A37 reference mixer switch
- W119 (N5245-20063) A53 port 2 mechanical switch to W17
- W105 (N5245-20064) A50 port 1 mechanical switch to W11
- W110 (N5245-20067) A50 port 1 mechanical switch to A54 combiner
- W102 (reuse) (N5245-20075) A48 port 4 receiver attenuator to A28 mixer brick (D)
- W100 (reuse) (N5245-20066) A47 port 3 receiver attenuator to A28 mixer brick (C)
- W115 (N5245-20060) A52 port 4 mechanical switch to W15
- W111 (N5245-20058) A51 port 3 mechanical switch to W13
- W104 (reuse) (N5245-20057) A49 port 2 receiver attenuator to A27 mixer brick (B)
- W98 (reuse) (N5245-20056) A46 port 1 receiver attenuator to A27 mixer brick (A)
- W52 (reuse) (N5245-20013) A25 HMA26.5 to A26 splitter

## Step 12. Install Rear Panel Hardware

To see an image of the rear panel assembly, click the Chapter 6 bookmark “Rear Panel Assembly, All Options” in the PDF Service Guide<sup>1</sup>.

1. Secure seven hex nuts on the rear panel bulkhead connectors to 21 in-lbs using a 9mm nut bit.
2. Go back and re-torque the seven hex nuts to 21 in-lbs using a manual torque wrench.
3. Install the 2.4 mm 50 GHz termination (0955-2394) on J7, port 3.
4. Install four rear panel jumpers (N5245-20155) between the following connector pairs:
  - SW TSET IN (J1) and SW SRC OUT (J2)
  - SW TSET IN (J3) and SW SRC OUT (J4)
  - COMB ARM IN (J10) and SW SRC OUT (J11)
  - COMB ARM IN (J9) and SW SRC OUT (J8)



### **Step 13. 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<sup>1</sup>.

### **Step 14. 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<sup>1</sup>.
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<sup>1</sup>. 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 A53 port 4 mechanical switch
  - Wire harness (part of mechanical switch assembly), A23 test set motherboard J104 to A53 port 2 mechanical switch

### **Step 15. Reinstall Front Panel Assembly**

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

### **Step 16. 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 17. Reinstall the Inner Cover**

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

### **Step 18. Reinstall the Outer Cover**

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

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1. See [“Downloading the Online PNA Service Guide” on page 5](#).

## Step 19. 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**.

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**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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## Step 20. 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<sup>1</sup>.

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

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

### **Operator's Check**

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

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to "[Contacting Keysight](#)" on page 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<sup>1</sup>.

## **Step 21. Prepare the PNA for the User**

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

This information is subject to change without notice.  
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