

Keysight Extended Power Range and Bias Tees Upgrade Kit

To Upgrade PNA-X N5241A, N5242A or N5249A
Option 400 to Option 419

Upgrade Kit Order Numbers: N5241AU-926,
N5242AU-926 and N5249AU-926

Keysight Kit Number: N5242-60103

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.
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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 sign until the indicated conditions are fully understood and met.
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Description of the Upgrade

IMPORTANT In June 2013, the N5241A/AS and N5242A/AS analyzers underwent significant hardware changes. Some components that have 2.4 mm connectors (bias tees, couplers, and some semi-rigid cables) were replaced with components that have 3.5 mm connectors.

If your analyzer's serial number prefix is MY/SG/US5310 and below:
Your analyzer was originally shipped with 2.4 mm components. Bias tees with 2.4 mm connectors are no longer available, so the bias tees and connecting cables included in this kit have 3.5 mm connectors. Since they are interconnected, the 2.4 mm couplers and connecting cables in your analyzer must be replaced with the new 3.5 mm items included in this kit.

If your analyzer's serial number prefix is MY/SG/US5321 and above:
Your analyzer was shipped with 3.5 mm components, so it is not necessary to replace the couplers and connecting cables. These items are included in this kit, but will not be used for your upgrade. Set them aside for possible use in the future.

Be very careful to use the appropriate hardware in your analyzer. Using the wrong hardware can ruin analyzer components, resulting in additional customer costs.

This upgrade converts your standard 4-port configurable test set analyzer (Option 400) to an extended power range analyzer with bias tees by adding:

- a 60-dB source attenuator in each source port channel
- a bias tee in each source port channel
- a 35-dB receiver attenuator in each receiver channel
- cables
- test port couplers
- bulkhead connectors

After installation of this upgrade, your analyzer will be an Option 419.

Getting Assistance from Keysight

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

Contacting Keysight

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

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

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

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

If You Have Problems With the Upgrade Kit Contents

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, or telephone the CTD Hotline at (707) 577-6802 and leave a voice mail message. Please include details of the problem.

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 7.
- Test equipment for the post-upgrade adjustments. To view the equipment list, click the Chapter 3 bookmark [“Tests and Adjustments”](#) in the PDF Service Guide¹.

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

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 receive your license key via postal mail.

Downloading the Online PNA Service Guide

To view the online Service Guide for your PNA model number, use the following steps:

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

Protecting Your Workspace from Electrostatic Discharge

For information, click on the Chapter 1 bookmark, “Electrostatic Discharge Protection” in the PDF Service Guide¹.

ESD Equipment Required for the Installation

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

Tools Required for the Installation

Description	Qty	Part Number
T-10 TORX driver (set to 9 in-lbs)	1	N/A
T-20 TORX driver (set to 21 in-lbs)	1	N/A
5/16-in torque wrench (set to 10 in-lbs)	1	N/A
5/16-in torque wrench (set to 21 in-lbs)	1	N/A
1-in torque wrench (set to 72 in-lbs)	1	N/A

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

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

About Installing the Upgrade

Products affected	N5241A, N5242A and N5249A Option 400
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	3.0 hours
Estimated adjustment time	0.5 hours
Estimated full instrument calibration time	4.5 hours

Items Included in the Upgrade Kit¹

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 N5242-60103

Ref Desig.	Description	Qty	Part Number
	Installation note (this document)	1	N5242-90004
A29– A32	Test port couplers	4	5087-7813 Was 5087-7710
A34– A37	0–60 dB source step attenuator	4	33321-60077
A38– A41	Bias tee (includes wire harness, part number 8121-0836)	4	5067-4865
A42– A45	0-35 dB receiver step attenuator	4	33321-60078
	Attenuator bracket	4	N5242-00007
	Machine screw, M3 x 8, pan head (to attach attenuator to attenuator bracket)	16	0515-0372
	Machine screw, M3 x 14, pan head (to attach bias tee to attenuator bracket)	8	0515-2994
	Cable tie wrap	3	1400-0249
	Machine screw, M3 x 6, pan head (to attach attenuator bracket to analyzer)	12	0515-0430
	Bulkhead connector assembly for test set front plate	22	1250-3805
	Gap pad (between each coupler and test set front plate)	4	E4403-20033
	Vibration mount (between couplers 1 & 3, and 2 & 4)	2	0460-2725
W14	RF cable, A29 port 1 coupler to front-panel Port 1 CPLR ARM	1	N5222-20030
W17	RF cable, A26 port 3 bridge to front-panel REF 3 SOURCE OUT	1	N5222-20023

1. In addition to the upgrade kit, the shipment includes an Option Entitlement Certificate. Refer to [“License Key Redemption” on page 5](#) for important information about this certificate.

Table 1 Contents of Upgrade Kit N5242-60103

Ref Desig.	Description	Qty	Part Number
W18	RF cable, A30 port 3 coupler to front-panel Port 3 CPLR ARM	1	N5222-20015
W21	RF cable, A27 port 4 bridge to front-panel REF 4 SOURCE OUT	1	N5222-20025
W22	RF cable, A31 port 4 coupler to front-panel Port 4 CPLR ARM	1	N5222-20018
W25	RF cable, A28 port 2 bridge to front-panel REF 2 SOURCE OUT	1	N5222-20038
W26	RF cable, A32 port 2 coupler to front-panel Port 2 CPLR ARM	1	N5222-20034
W37	RF cable, A33 reference mixer switch to A23 mixer brick (R1)	1	N5222-20003
W38	RF cable, front-panel REF 3 RCVR R3 IN to A24 mixer brick (R3)	1	N5242-20270
W39	RF cable, front-panel REF 4 RCVR R4 IN to A24 mixer brick (R4)	1	N5242-20271
W40	RF cable, front-panel REF 2 RCVR R2 IN to A23 mixer brick (R2)	1	N5222-20039
W71	RF cable, A25 test port 1 bridge to A34 test port 1 source attenuator	1	N5222-20002
W72	RF cable, A34 test port 1 source attenuator to front-panel Port 1 SOURCE OUT	1	N5222-20028
W73	RF cable, front-panel Port 1 CPLR THRU to A38 test port 1 bias tee	1	N5222-20029
W74	RF cable, A38 test port 1 bias tee to A29 test port 1 coupler	1	N5222-20012
W75	RF cable, A26 test port 3 bridge to A35 test port 3 source attenuator	1	N5222-20002
W76	RF cable, A35 test port 3 source attenuator to front-panel Port 3 SOURCE OUT	1	N5222-20019
W77	RF cable, front-panel Port 3 CPLR THRU to A39 test port 3 bias tee	1	N5222-20016
W78	RF cable, A39 test port 3 bias tee to A30 test port 3 coupler	1	N5222-20011
W79	RF cable, A27 test port 4 bridge to A36 test port 4 source attenuator	1	N5222-20001
W80	RF cable, A36 test port 4 source attenuator to front-panel Port 4 SOURCE OUT	1	N5222-20020
W81	RF cable, front-panel Port 4 CPLR THRU to A40 test port 4 bias tee	1	N5222-20017
W82	RF cable, A40 test port 4 bias tee to A31 test port 4 coupler	1	N5222-20014
W83	RF cable, A28 test port 2 bridge to A37 test port 2 source attenuator	1	N5222-20001
W84	RF cable, A37 test port 2 source attenuator to front-panel Port 2 SOURCE OUT	1	N5222-20036
W85	RF cable, front-panel Port 2 CPLR THRU to A41 test port 2 bias tee	1	N5222-20035
W86	RF cable, A41 test port 2 bias tee to A32 test port 2 coupler	1	N5222-20013
W87	RF cable, front-panel Port 1 RCVR A IN to A42 port 1 receiver attenuator	1	N5222-20031
W88	RF cable, A42 port 1 receiver attenuator to A23 mixer brick (A)	1	N5222-20004
W89	RF cable, front-panel Port 3 RCVR C IN to A43 port 3 receiver attenuator	1	N5222-20021
W90	RF cable, A43 port 3 receiver attenuator to A24 mixer brick (C)	1	N5242-20306
W91	RF cable, front-panel Port 4 RCVR D IN to A44 port 4 receiver attenuator	1	N5222-20022
W92	RF cable, A44 port 4 receiver attenuator to A24 mixer brick (D)	1	N5242-20307
W93	RF cable, front-panel Port 2 RCVR B IN to A45 port 2 receiver attenuator	1	N5222-20037
W94	RF cable, A45 port 2 receiver attenuator to A23 mixer brick (B)	1	N5222-20010

Table 1 Contents of Upgrade Kit N5242-60103

Ref Desig.	Description	Qty	Part Number
	Ribbon cable, A19 test set motherboard J205 to A42 port 1 receiver attenuator	4	8121-0982
	Ribbon cable, A19 test set motherboard J206 to A43 port 3 receiver attenuator		
	Ribbon cable, A19 test set motherboard J207 to A44 port 4 receiver attenuator		
	Ribbon cable, A19 test set motherboard J208 to A45 port 2 receiver attenuator		
	Ribbon cable, A19 test set motherboard J201 to A34 test port 1 source attenuator	4	N5242-60008
	Ribbon cable, A19 test set motherboard J202 to A35 test port 3 source attenuator		
	Ribbon cable, A19 test set motherboard J203 to A36 test port 4 source attenuator		
	Ribbon cable, A19 test set motherboard J204 to A37 test port 2 source attenuator		

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

Installation Procedure for the Upgrade

The network analyzer must be in proper working condition prior to installing this option. Any necessary repairs must be made before proceeding with this installation.

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

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 the Existing Cables.

Step 5. Remove the A29 – A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 6. Assemble the New (3.5 mm) A29 – A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 7. Install the New (3.5 mm) A29 - A32 Test Port Couplers onto the Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 8. Install the Bulkhead Connectors in the Test Set Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 9. Assemble the Step Attenuators and Bias Tees.

Step 10. Install the Step Attenuators and Bias Tees into the Analyzer.

Step 11. Install the New Cables.

Step 12. Reinstall the Front Panel Assembly and Front Panel Jumpers.

Step 13. Position the Cables and Wires to Prevent Pinching.

Step 14. Reinstall the Outer Cover.

Step 15. Enable Option 419.

Step 16. Perform Post-Upgrade Adjustments and Calibration.

Step 17. Prepare the PNA for the User.

Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Option Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to [“License Key Redemption” on page 5](#).

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.

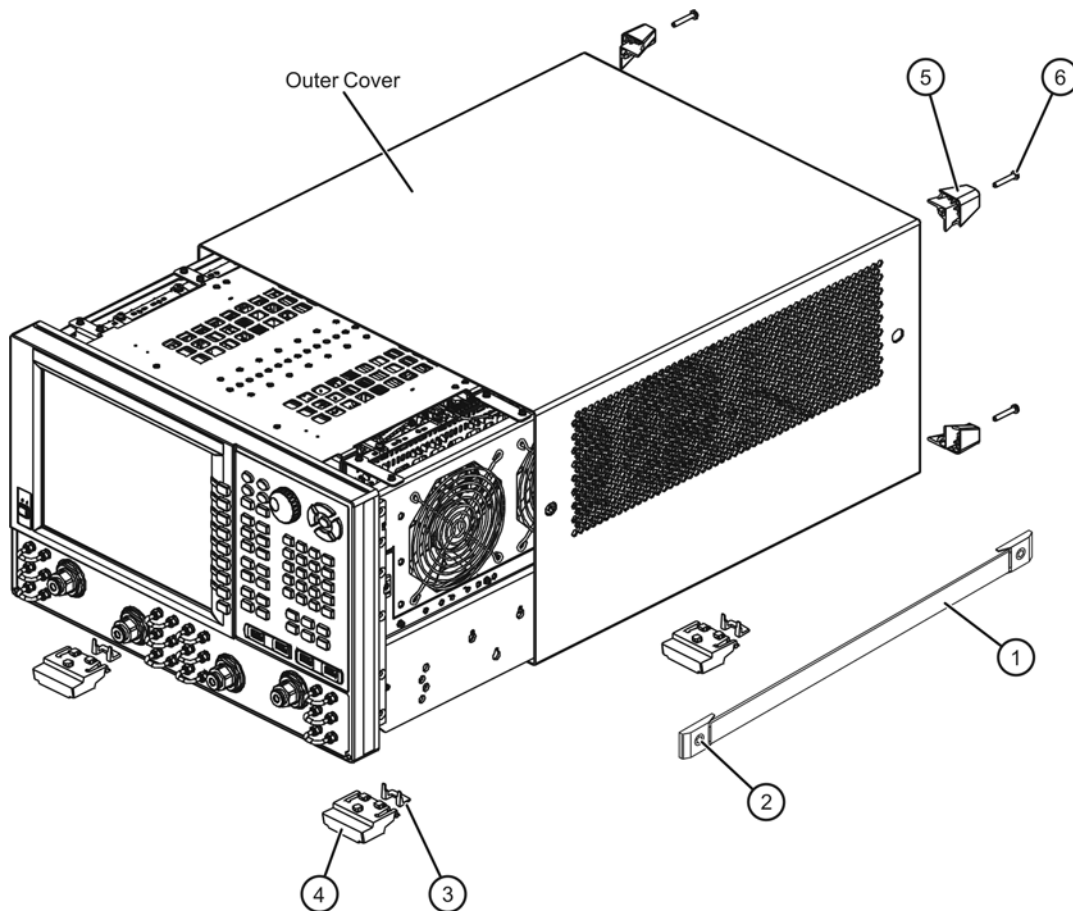
Step 2. Remove the Outer Cover

CAUTION This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles.* This will damage the front panel assemblies.

Refer to **Figure 1** for this step of the procedure.

1. Disconnect the power cord (if it has not already been disconnected).
2. Remove the strap handles (item ①) by loosening the screws (item ②), with a T-20 TORX driver, on both ends until the handle is free of the analyzer.
3. Remove the foot locks (item ③) from the four bottom feet (item ④) and then remove the four bottom feet from the outer cover.
4. Remove the four rear panel feet (item ⑤) by removing the center screws (item ⑥) with a T-20 TORX driver.
5. Slide the outer cover toward the rear of the analyzer and remove it.

Figure 1 Outer Cover Removal



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Step 3. Remove the Front Panel Assembly

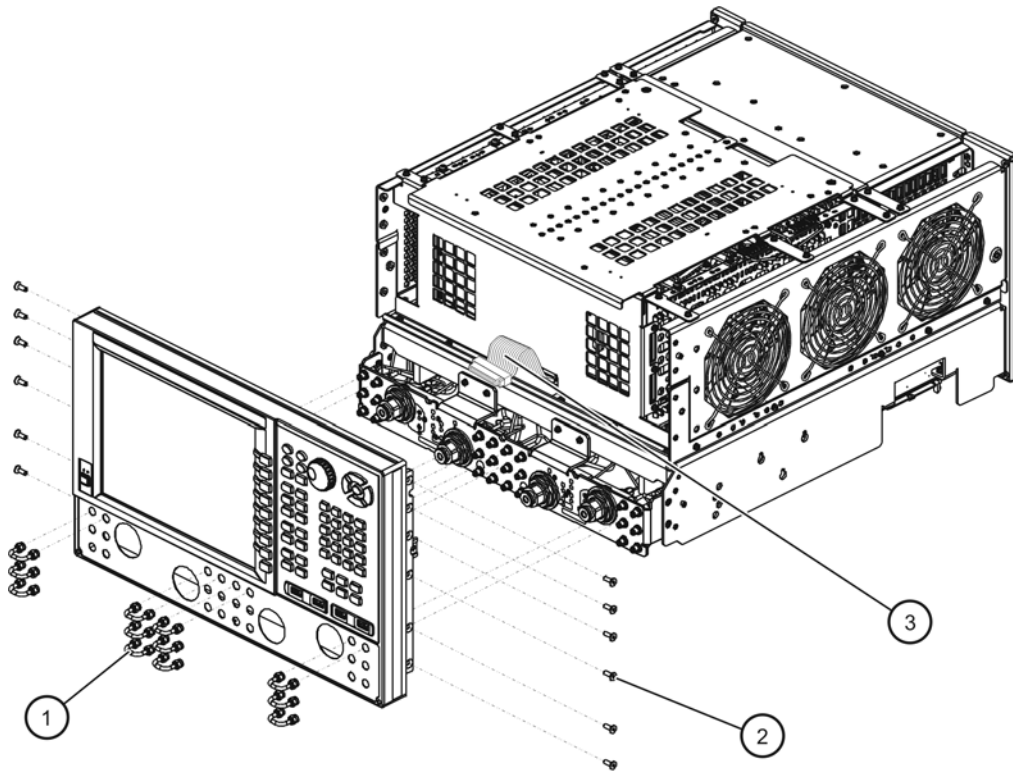
Refer to [Figure 2](#) for this step of the procedure.

1. With a 5/16-in wrench, remove all front panel jumpers (item ①).
2. With a T-10 TORX driver, remove the screws (item ②) from the sides of the frame.

CAUTION Before removing the front panel from the analyzer, lift and support the front of the analyzer chassis.

3. Slide the front panel over the test port connectors.
4. Disconnect the front panel interface ribbon cable (item ③). The front panel is now free from the analyzer.

Figure 2 Front Panel Assembly Removal



n5242_004_02

Step 4. Remove the Existing Cables

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

NOTE 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.**

Refer to **Figure 3** for this step of the procedure.

1. Place the analyzer bottom-side up on a flat surface.
2. Remove the following cables in the order listed:

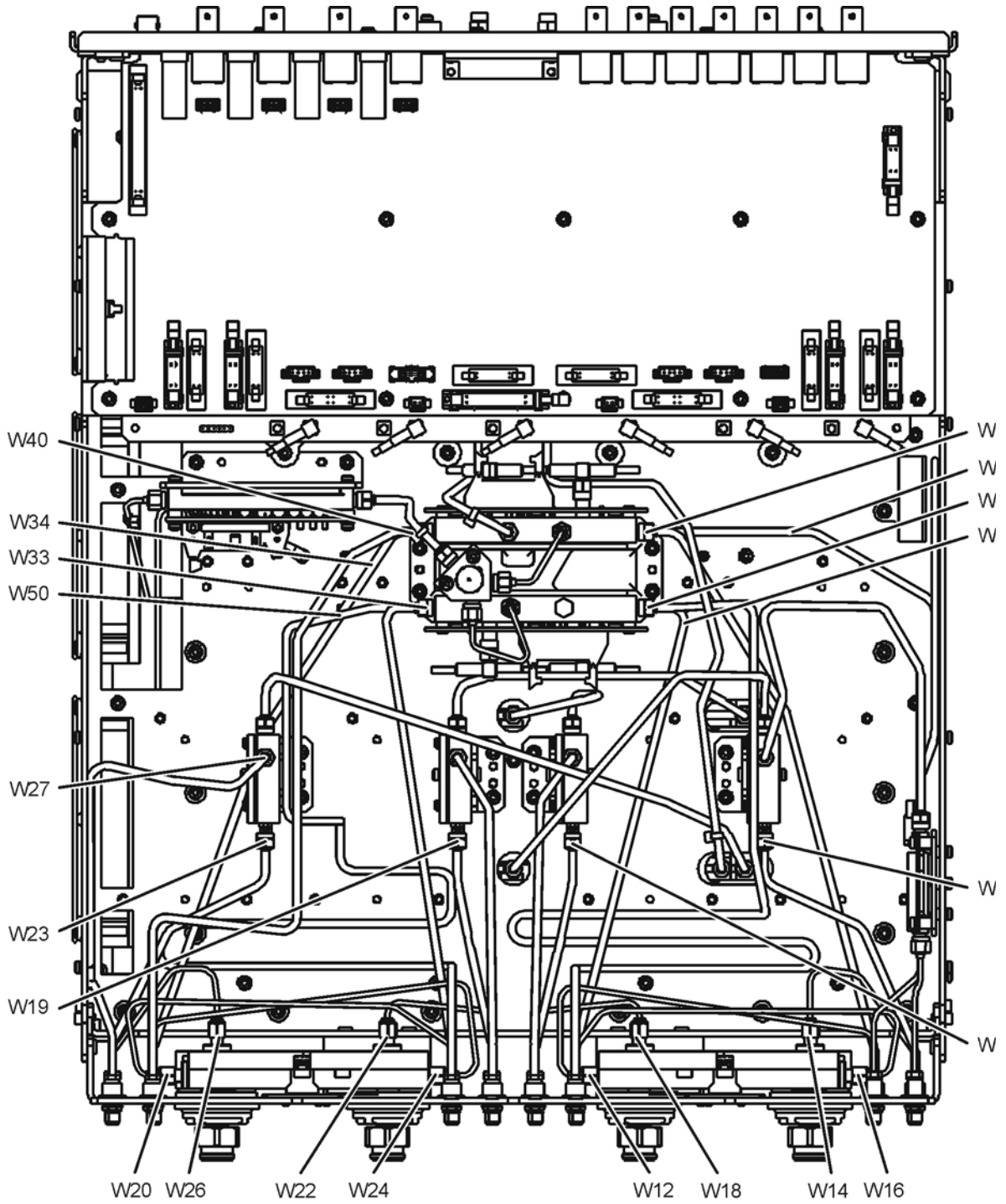
For all analyzer serial numbers:

- W40 Front-panel REF 2 RCVR R2 IN to A23 mixer brick (R2)
- W48 A33 reference mixer switch to A23 mixer brick (R1)
- W11 A25 test port 1 bridge to front-panel Port 1 SOURCE OUT
- W15 A26 test port 3 bridge to front-panel Port 3 SOURCE OUT
- W16 Front-panel Port 3 CPLR THRU to A30 test port 3 coupler
- W12 Front-panel Port 1 CPLR THRU to A29 test port 1 coupler
- W31 Front-panel Port 1 RCVR A IN to A23 mixer brick (A)
- W32 Front-panel Port 3 RCVR C IN to A24 mixer brick (C)
- W27 A28 test port 2 bridge to front-panel REF 2 SOURCE OUT
- W23 A28 test port 2 bridge to front-panel Port 2 SOURCE OUT
- W19 A27 test port 4 bridge to front-panel Port 4 SOURCE OUT
- W20 Front-panel Port 4 CPLR THRU to A31 test port 4 coupler
- W24 Front-panel Port 2 CPLR THRU to A32 test port 2 coupler
- W33 Front-panel Port 4 RCVR D IN to A24 mixer brick (D)
- W34 Front-panel Port 2 RCVR B IN to A23 mixer brick (B)
- W49 Front-panel REF 3 RCVR R3 IN to A24 mixer brick (R3)
- W50 Front-panel REF 4 RCVR R4 IN to A24 mixer brick (R4)

For analyzers with serial numbers prefixed MY/SG/US5310 and below:

- W26 Front-panel Port 2 CPLR ARM to A32 port 2 coupler
- W22 Front-panel Port 4 CPLR ARM to A31 port 4 coupler
- W18 Front-panel Port 3 CPLR ARM to A30 port 3 coupler
- W14 Front-panel Port 1 CPLR ARM to A29 port 1 coupler

Figure 3 Existing Cable Removal



n5242_004

Steps 5 - 8: For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below

If your analyzer serial number is prefixed MY/SG/US5321 and above, go to [“Step 9. Assemble the Step Attenuators and Bias Tees”](#) on page 20.

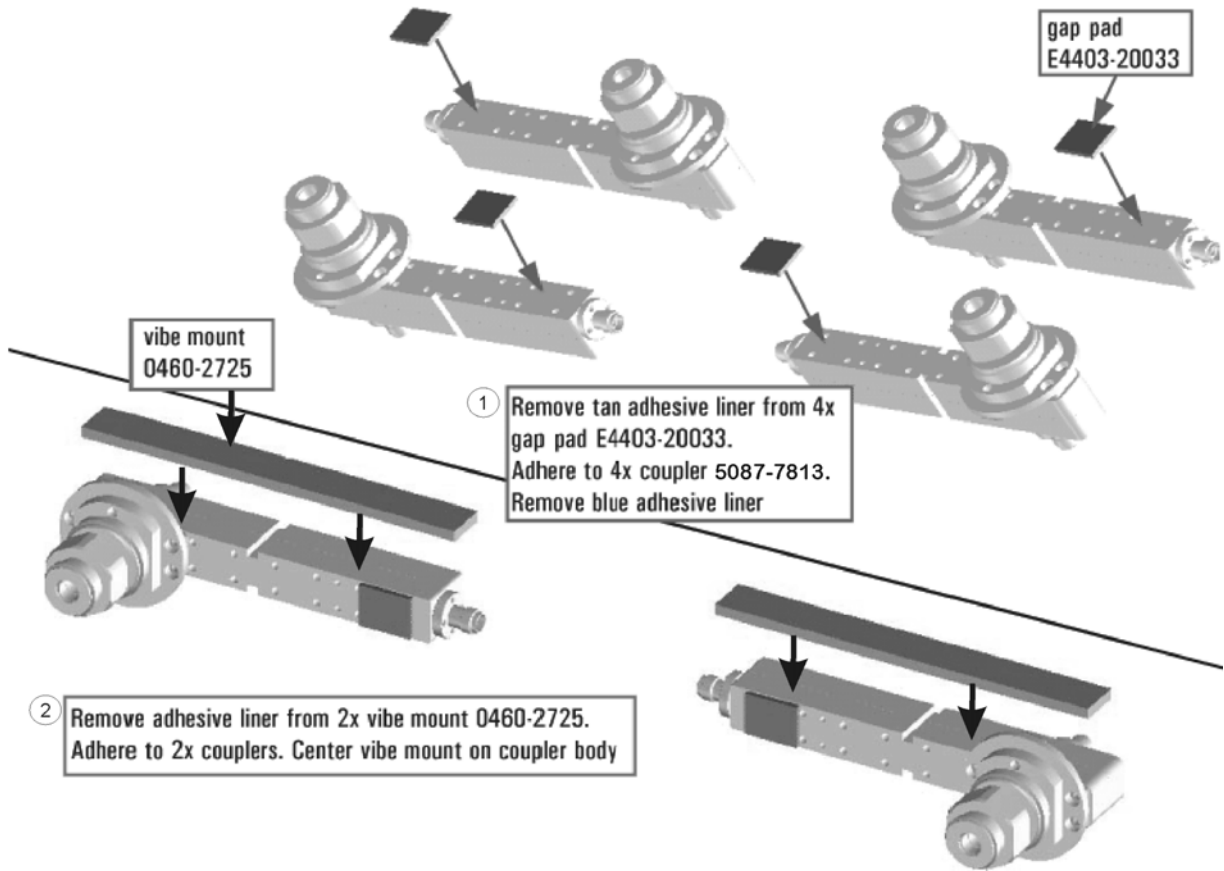
Step 5. Remove the A29 – A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

For instructions, click the Chapter 7 bookmark “Removing and Replacing the A29–A32 Test Port Couplers” in the PDF Service Guide. Refer to [“Downloading the Online PNA Service Guide”](#) on page 5.

Step 6. Assemble the New (3.5 mm) A29 – A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

1. Locate the four new test port couplers (5087-7813). These components have 3.5 mm connectors.
2. Follow the steps shown in [Figure 4](#).

Figure 4 A29 – A32 Test Port Couplers Assembly



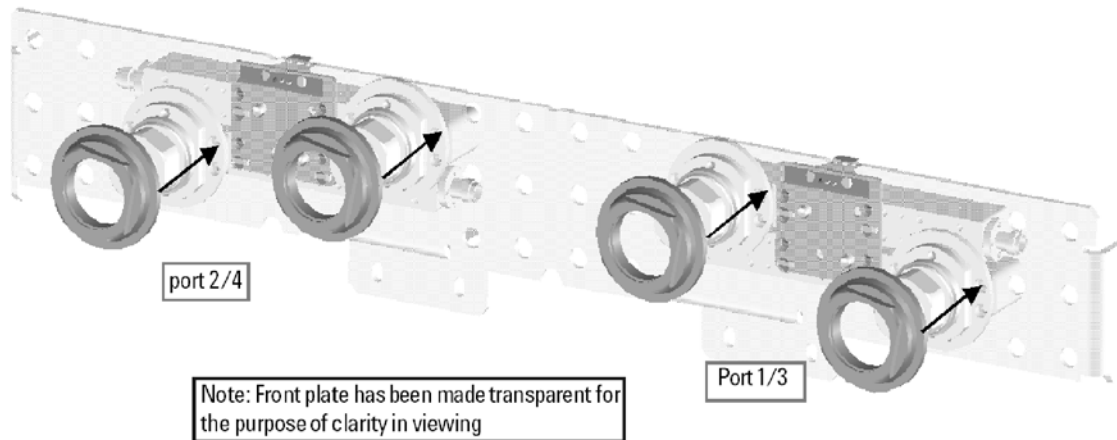
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**Step 7. Install the New (3.5 mm) A29 - A32 Test Port Couplers onto the Front Plate
(For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)**

Refer to **Figure 5** for this step of the procedure.

1. Install the four new test port couplers onto the front plate. Ports 1/3 and 2/4 couplers must be installed at the same time.
2. Reinstall the four mounting nuts, but hand tighten only. Do not torque. They will be fully tightened later.

Figure 5 A29 – A32 Test Port Couplers Installation onto Front Plate



N5242_004_08

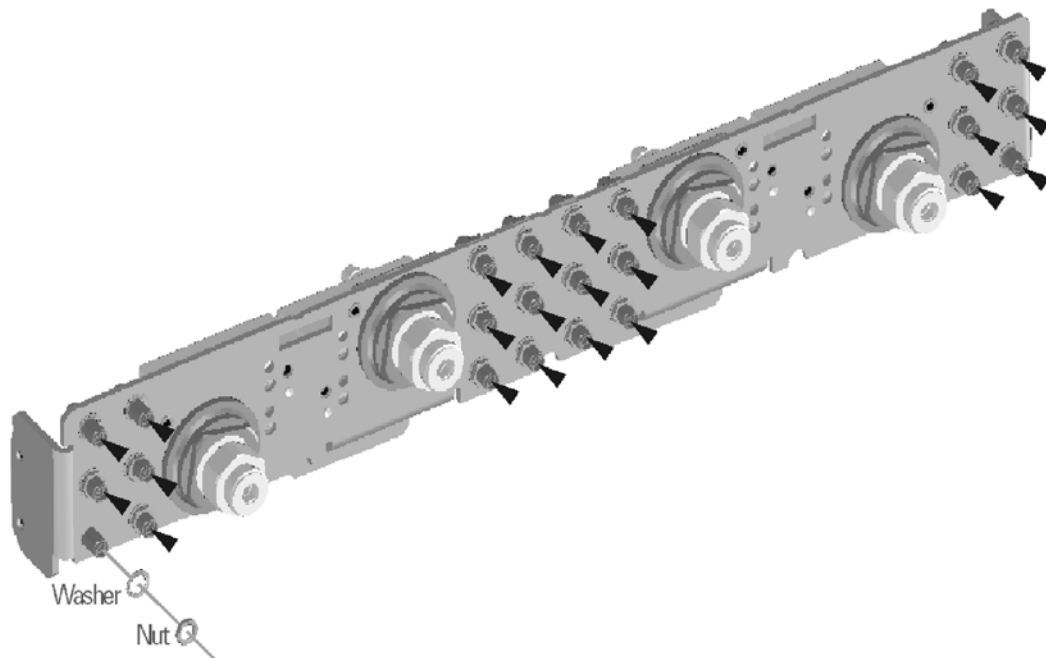
Step 8. Install the Bulkhead Connectors in the Test Set Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

If your analyzer's serial number is MY/SG/US5321 and above, ignore this step.

Refer to [Figure 6](#) for this procedure. Some bulkhead connectors may already be installed on your analyzer's front plate. New parts are listed in [Table 1 on page 7](#).

1. From the back side of the test set front plate, insert a bulkhead connector into a hole in the plate.
2. Install 1x washer and 1x nut. Hand tighten nut and ensure bulkhead connector hexagon nut, on the back side of test set front plate, is aligned to the test set subpanel hexagon indent.
3. Repeat previous two steps for the remaining bulkhead connectors.
4. Torque nuts, on the front side of test set front plate, to 21 in-lbs.
5. Torque mounting nuts for the test port couplers, on the front side of test set front plate, to 72 in-lbs.

Figure 6 Bulkhead Connectors Installation



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Step 9. Assemble the Step Attenuators and Bias Tees

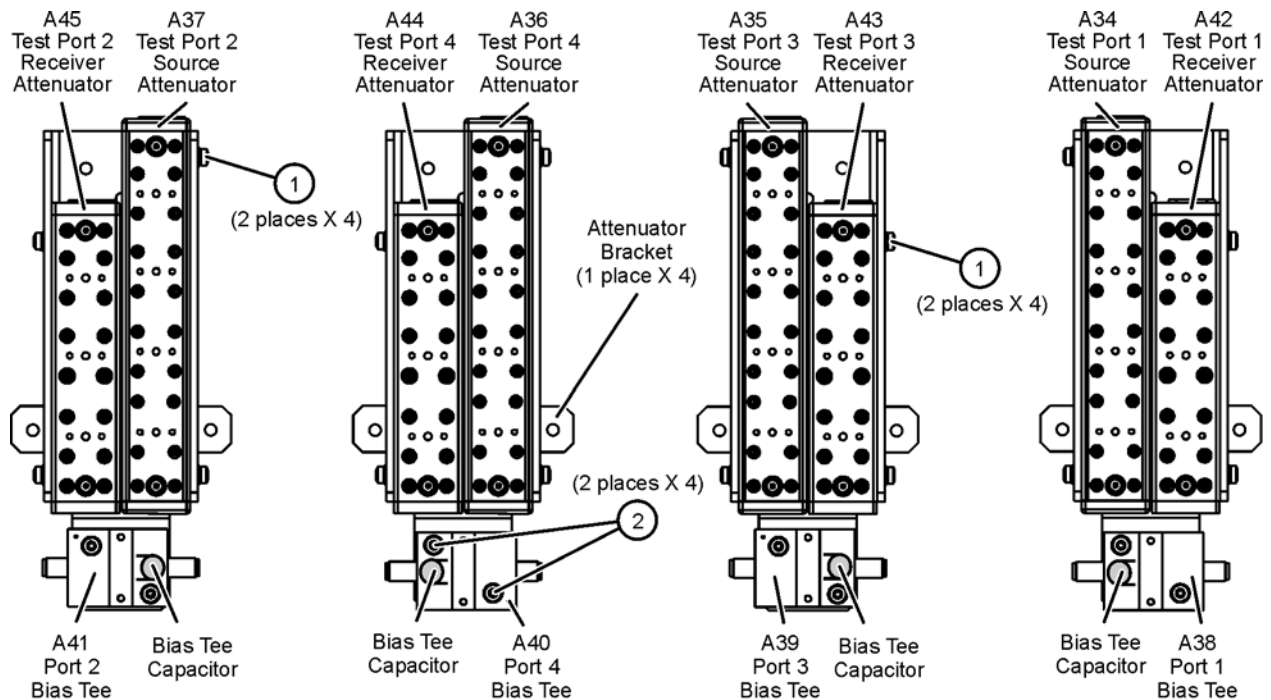
Refer to [Figure 7](#) for this step of the procedure. New parts are listed in [Table 1 on page 7](#).

1. Position the source and receiver attenuators on the attenuator brackets as shown.
2. Secure each attenuator to its attenuator bracket using two screws (item ①, 0515-0372) for each. Make sure that the attenuators are oriented as shown.
3. As shown, position the bias tees on the attenuator brackets so that the port 1 and port 3 bias tees capacitors face each other. The port 2 and port 4 bias tee capacitors should also face each other.

IMPORTANT Installing these bias tees backwards will cause damage to the analyzer source modules.

4. Secure each bias tee to the attenuator brackets using two screws (item ②, 0515-2994) for each. Make sure that the attenuators are oriented as shown.

Figure 7 Step Attenuators and Bias Tees Assembly



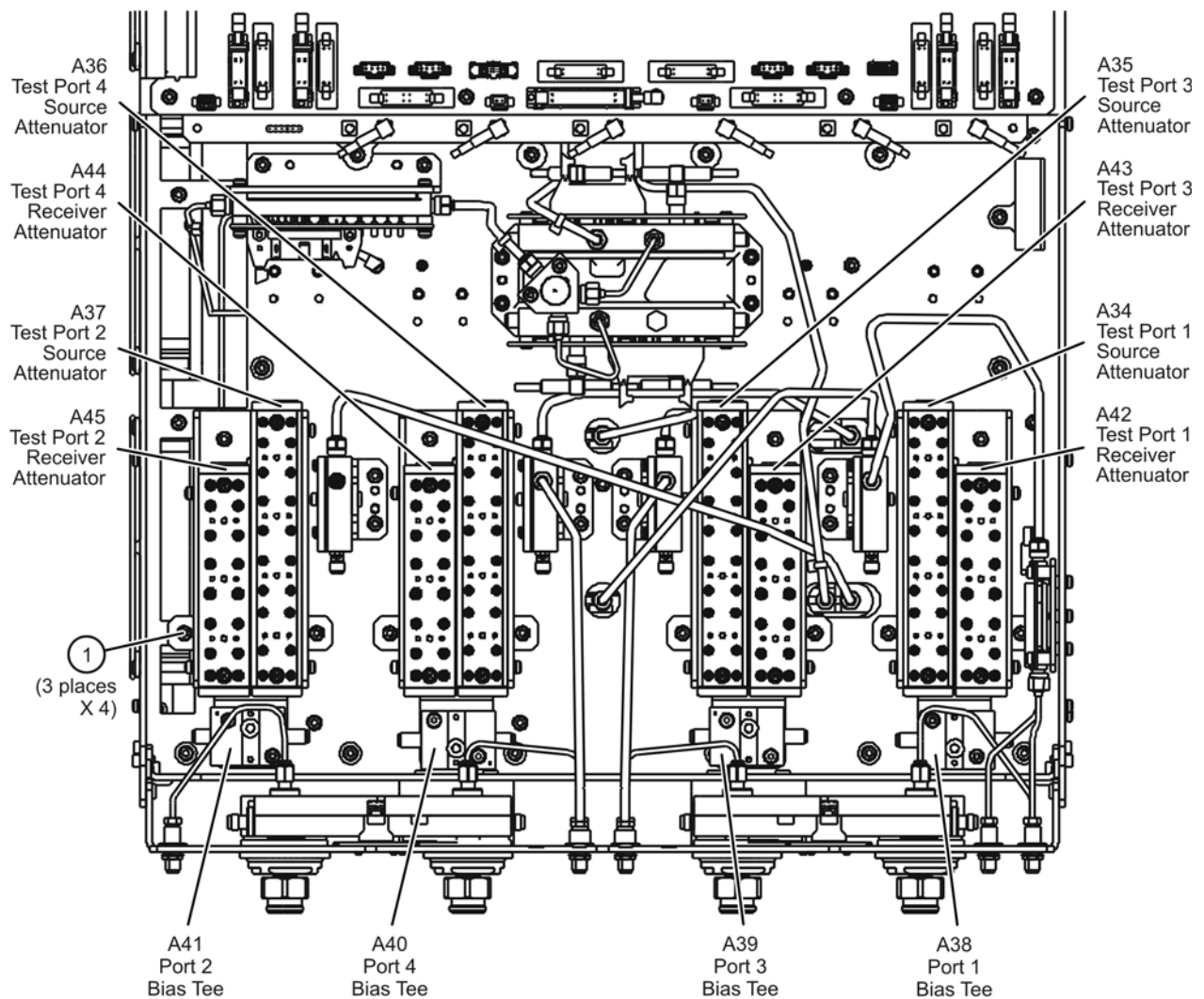
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Step 10. Install the Step Attenuators and Bias Tees into the Analyzer

Refer to [Figure 8](#) for this step of the procedure. New parts are listed in [Table 1 on page 7](#).

1. Position the attenuator brackets (with the attenuators and bias tees attached) in the analyzer as shown.
2. Secure the attenuator brackets to the analyzer test set deck using three screws (item ①, 0515-0430) each.

Figure 8 Step Attenuators and Bias Tees Installation into the Analyzer



N5242_004_05

Step 11. Install the New 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.

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.

CAUTION Some of these cables may have different dimensions from those shown in the graphics.

Install the RF Cables

Refer to [Figure 9](#) for this part of this step of the procedure. New parts are listed in [Table 1 on page 7](#).

1. Install the following cables in the order listed. Use a 5/16-in torque wrench set to 10 in-lbs to tighten all cable connectors, except front panel connectors; tighten these to 21 in-lbs.

For analyzers with serial numbers prefixed MY/SG/US5310 and below:

- W26 (N5222-20034) A32 port 2 coupler to front-panel Port 2 CPLR ARM
- W82 (N5222-20014) A40 test port 4 bias tee to A31 test port 4 coupler

For all analyzer serial numbers:

- W85 (N5222-20035) Front-panel Port 2 CPLR THRU to A41 test port 2 bias tee
- W93 (N5222-20037) Front-panel Port 2 RCVR B IN to A45 port 2 receiver attenuator
- W84 (N5222-20036) A37 test port 2 source attenuator to front-panel Port 2 SOURCE OUT
- W91 (N5222-20022) Front-panel Port 4 RCVR D IN to A44 port 4 receiver attenuator
- W81 (N5222-20017) Front-panel Port 4 CPLR THRU to A40 test port 4 bias tee

For analyzers with serial numbers prefixed MY/SG/US5310 and below:

- W86 (N5222-20013) A41 test port 2 bias tee to A32 test port 2 coupler
- W22 (N5222-20018) A31 port 4 coupler to front-panel Port 4 CPLR ARM

For all analyzer serial numbers:

- W80 (N5222-20020) A36 test port 4 source attenuator to front-panel Port 4 SOURCE OUT
- W83 (N5222-20001) A28 test port 2 bridge to A37 test port 2 source attenuator
- W25 (N5222-20038) A28 port 2 bridge to front-panel REF 2 SOURCE OUT

Secure W25 to the side of the deck with 1x cable tie wrap, part number 1400-0249 (included in the kit).

- W92 (N5222-20307) A44 port 4 receiver attenuator to A24 mixer brick (D)
- W39 (N5222-20271) Front-panel REF 4 RCVR R4 IN to A24 mixer brick (R4)
- W94 (N5222-20010) A45 port 2 receiver attenuator to A23 mixer brick (B)
- W79 (N5222-20001) A27 test port 4 bridge to A36 test port 4 source attenuator

For analyzers with serial numbers prefixed MY/SG/US5310 and below:

- W21 (N5222-20025) A27 port 4 bridge to front-panel REF 4 SOURCE OUT
- W74 (N5222-20012) A38 test port 1 bias tee to A29 test port 1 coupler
- W18 (N5222-20015) A30 port 3 coupler to front-panel Port 3 CPLR ARM
- W40 (N5222-20039) Front-panel REF 2 RCVR R2 IN to A23 mixer brick (R2)

For all analyzer serial numbers:

- W89 (N5222-20021) Front-panel Port 3 RCVR C IN to A43 port 3 receiver attenuator
- W77 (N5222-20016) Front-panel Port 3 CPLR THRU to A39 test port 3 bias tee
- W76 (N5222-20019) A35 test port 3 source attenuator to front-panel Port 3 SOURCE OUT
- W73 (N5222-20029) Front-panel Port 1 CPLR THRU to A38 test port 1 bias tee
- W87 (N5222-20031) Front-panel Port 1 RCVR A IN A42 port 1 receiver attenuator
- W72 (N5222-20028) A34 test port 1 source attenuator to front-panel Port 1 SOURCE OUT

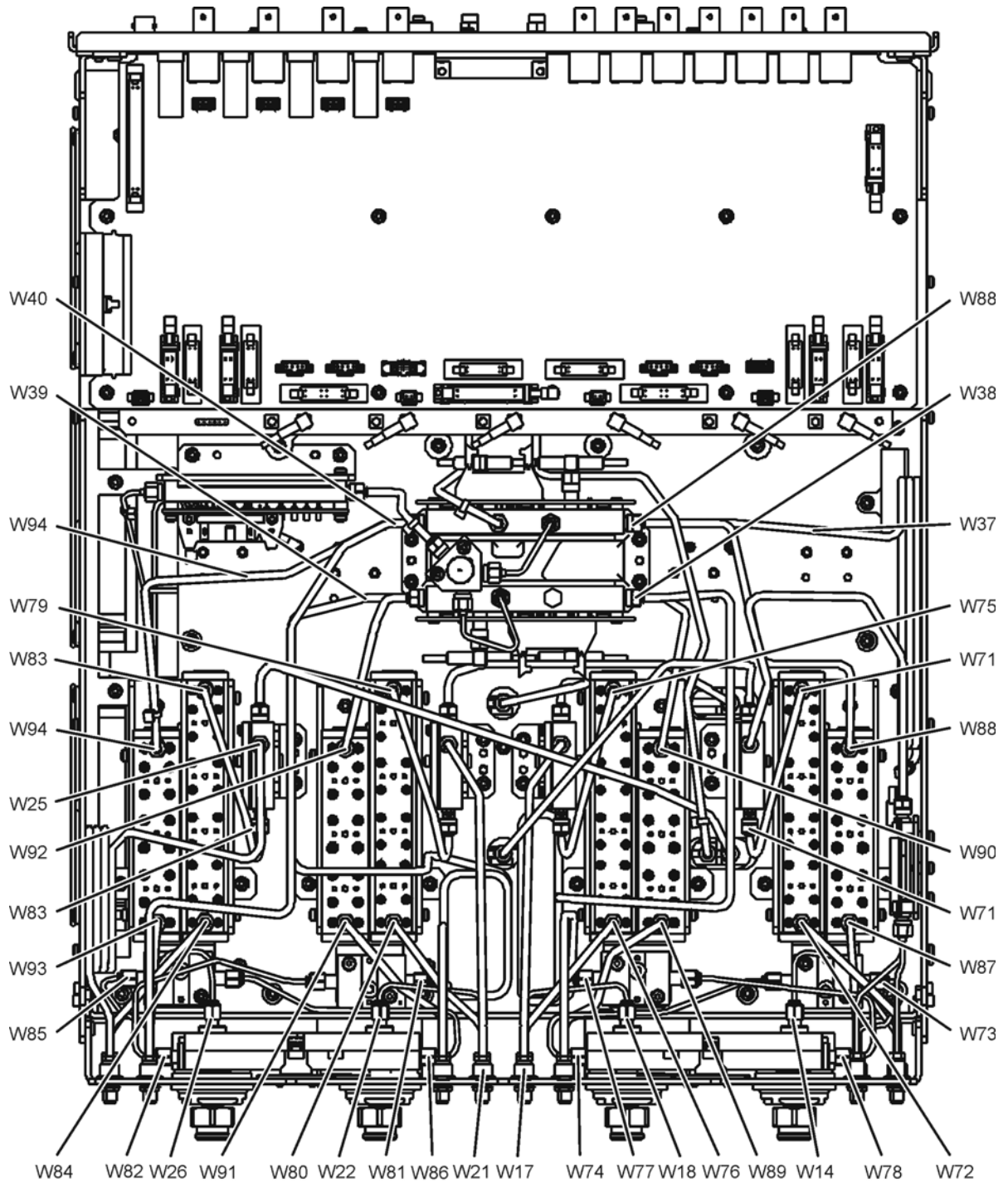
For analyzers with serial numbers prefixed MY/SG/US5310 and below:

- W14 (N5222-20030) A29 port 1 coupler to front-panel Port 1 CPLR ARM
- W78 (N5222-20011) A39 test port 3 bias tee to A30 test port 3 coupler
- W17 (N5222-20023) A26 port 3 bridge to front-panel REF 3 SOURCE OUT

For all analyzer serial numbers:

- W71 (N5222-20002) A25 test port 1 bridge to A34 test port 1 source attenuator
- W90 (N5242-20306) A43 port 3 receiver attenuator to A24 mixer brick (C)
- W38 (N5222-20270) Front-panel REF 3 RCVR R3 IN to A24 mixer brick (R3)
- W75 (N5222-20002) A26 test port 3 bridge to A35 test port 3 source attenuator
- W88 (N5222-20004) A42 port 1 receiver attenuator to A23 mixer brick (A)
- W37 (N5222-20003) A33 reference mixer switch to A23 mixer brick (R1)

Figure 9 New RF Cable Installation



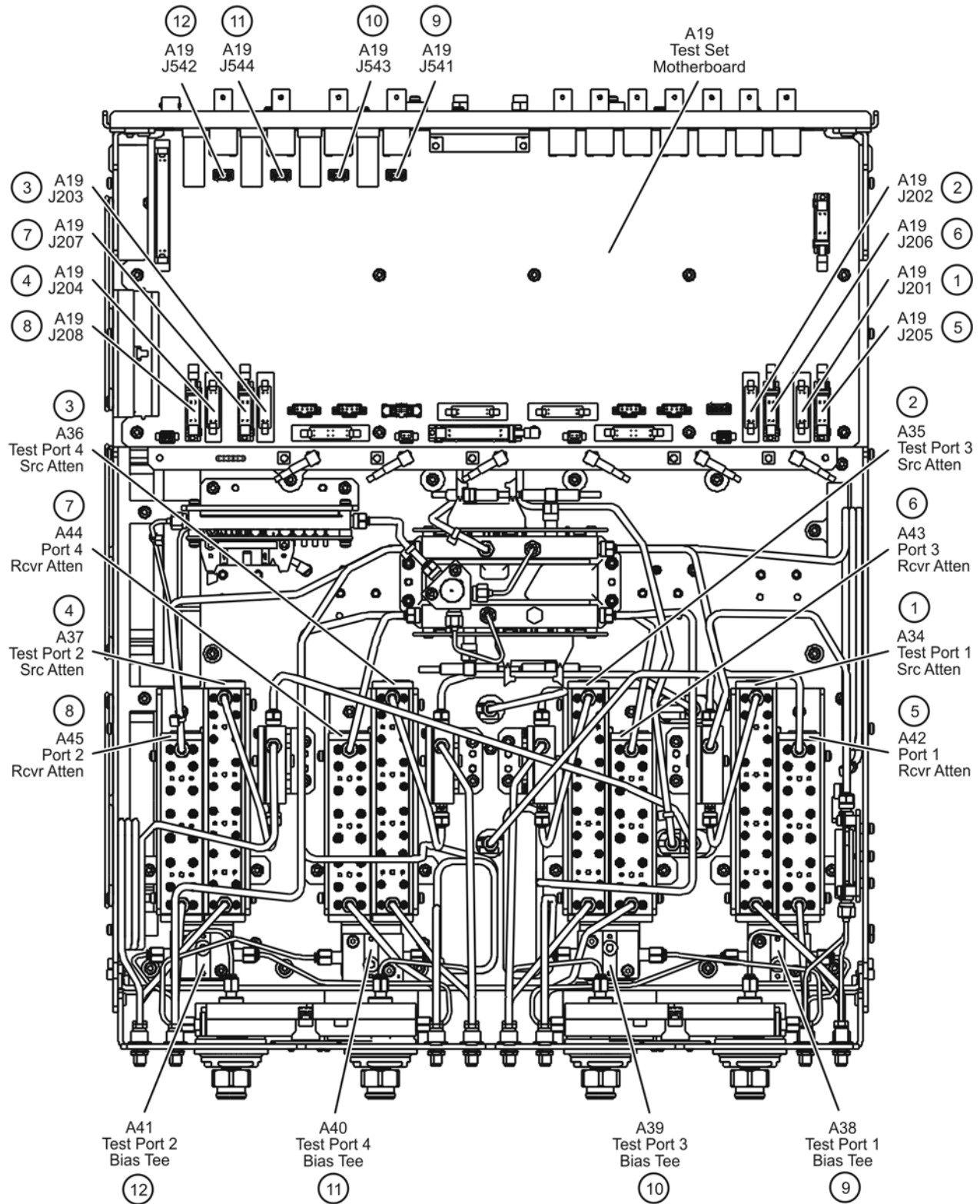
n5242_004_06-1

Install the Ribbon Cables and Wire Harnesses

Refer to [Figure 10](#) for this part of this step of the procedure. New parts are listed in [Table 1 on page 7](#).

1. Connect step attenuator ribbon cables as follows:
 - a. Item ① – A42 port 1 source step attenuator to A19 test set motherboard J201
 - b. Item ② – A43 port 3 source step attenuator to A19 test set motherboard J202
 - c. Item ③ – A44 port 4 source step attenuator to A19 test set motherboard J203
 - d. Item ④ – A45 port 2 source step attenuator to A19 test set motherboard J204
 - e. Item ⑤ – A34 port 1 receiver step attenuator to A19 test set motherboard J205
 - f. Item ⑥ – A35 port 3 receiver step attenuator to A19 test set motherboard J206
 - g. Item ⑦ – A36 port 4 receiver step attenuator to A19 test set motherboard J207
 - h. Item ⑧ – A37 port 2 receiver step attenuator to A19 test set motherboard J208.
2. Connect bias tee cable harnesses as follows:
 - a. Item ⑨ – A38 port 1 bias tee to A19 test set motherboard J541
 - b. Item ⑩ – A39 port 3 bias tee to A19 test set motherboard J543
 - c. Item ⑪ – A40 port 4 bias tee to A19 test set motherboard J544
 - d. Item ⑫ – A41 port 2 bias tee to A19 test set motherboard J542.

Figure 10 New Ribbon Cable and Wire Harness Installation



n5242_004_06-2

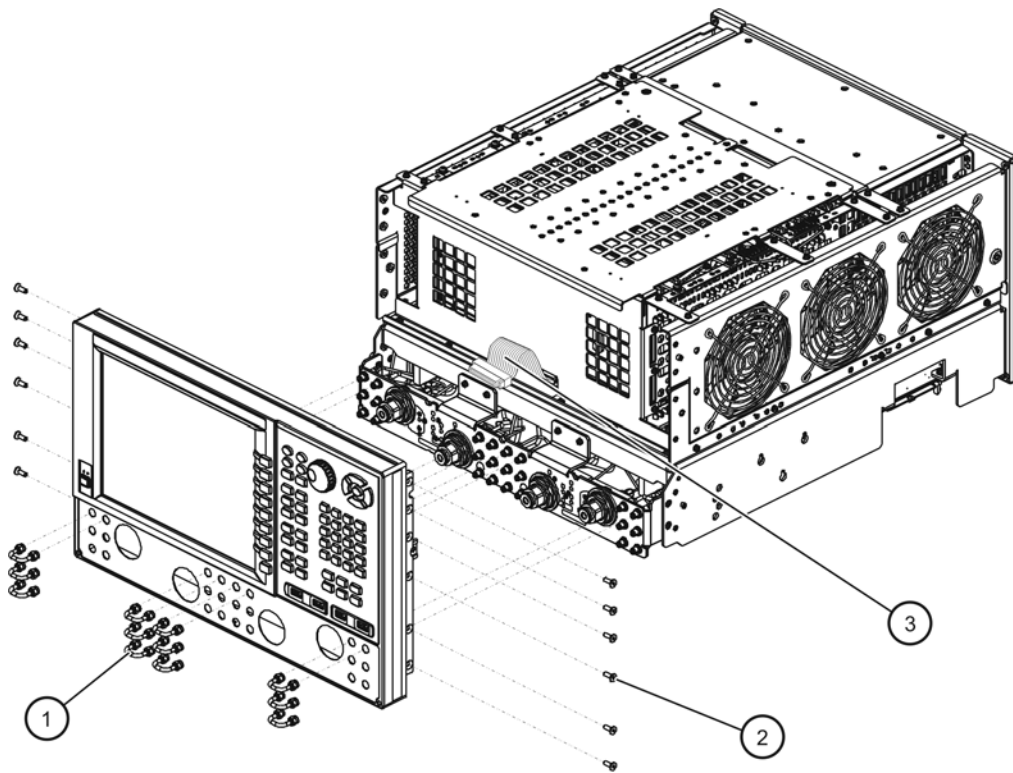
Step 12. Reinstall the Front Panel Assembly and Front Panel Jumpers

CAUTION Before installing the front panel assembly onto the analyzer, lift and support the front of the analyzer chassis.

Refer to [Figure 11](#) for this step of the procedure. New parts are listed in [Table 1 on page 7](#).

1. Make sure all of the hex nuts on the front-panel cable connectors have been tightened using a 5/16-in torque wrench set to 21-in lbs.
2. Reconnect the ribbon cable (item ③) to the A1 front panel interface board.
3. Slide the front panel over the front-panel connectors.
4. With a T-10 TORX driver, reinstall the 12 screws (item ②) in the sides of the frame.
5. Reinstall the semirigid jumpers (item ①) on the front panel, and tighten each of the connectors to 10-in lbs.

Figure 11 Front Panel Assembly Reinstallation



n5242_004_02

Step 13. 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.

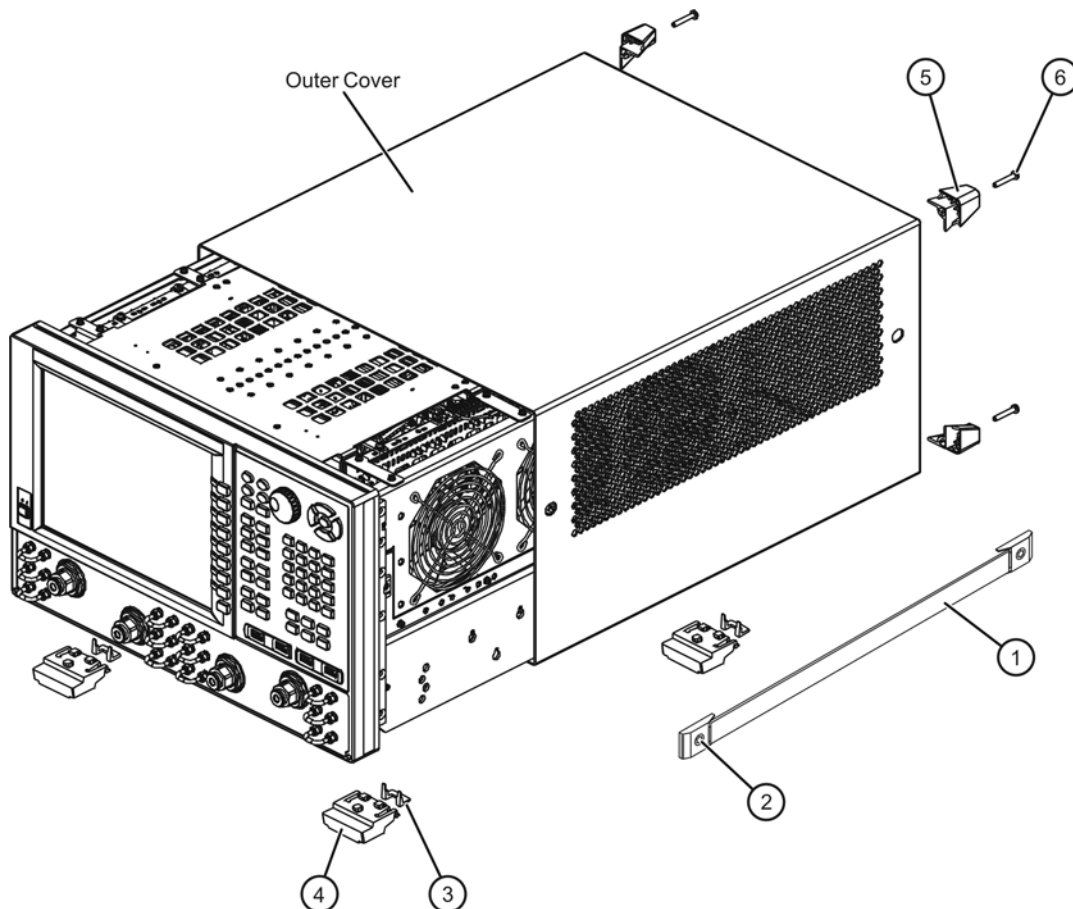
Step 14. Reinstall the Outer Cover

CAUTION This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles.* This will damage the front panel assemblies.

Refer to [Figure 12](#) for this step of the procedure.

1. Slide the outer cover over the analyzer frame.
2. Install the four rear panel feet (item ⑤) by installing the center screws (item ⑥) with a T-20 TORX driver.
3. Install the four bottom feet (item ④) onto the bottom of the outer cover then install the foot locks (item ③).
4. Install the strap handles (item ①) by tightening the screws (item ②) on both ends of the strap handle with a T-20 TORX driver.

Figure 12 Outer Cover Reinstallation



n5242_004_01

Step 15. Enable Option 419

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- A keyboard and mouse 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 **419 - Src/Rcvr Atten & Bias Ts 4-Port**. Click **Enable**.
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**.

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

NOTE If Option 419 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.

Step 16. Perform Post-Upgrade Adjustments and Calibration

Adjustments

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

- source adjustment
- 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 Guide¹.

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 Guide¹.

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 Guide¹.

Step 17. 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.

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

This information is subject to change without notice.
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