
Keysight Low Frequency Extension (LFE) For Version 6 and Version 7 Source Synthesizers Upgrade Kit

**To Upgrade PNA-X N5244/5B
Option 422/423 or
442/443 with 029
to Option 425 or
Option 445 with 029
Upgrade Kit Order Number:
N5244BU-425, N525BU-425
Keysight Kit Number: N5245-60122**

This is an Installation Note for the N5244/45B Option 422/423 or 442/443 with Option 029 to Option 425
Microwave Vector Network Analyzers.

Notices

© Keysight Technologies, Inc.
2009-2024

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

Trademark Acknowledgments

Manual Part Number

N5245-90122

Edition

Edition 1, February 2024

Printed in USA/Malaysia

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

Warranty

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

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

Technology Licenses

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

U.S. Government Rights

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

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

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

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

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

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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**.



Keysight Low Frequency Extension (LFE) Upgrade Kit
Upgrade Kit Number: N5245-60122
Installation Note

Description of the Upgrade

This upgrade adds the Option 425 low frequency extension (LFE) to an N5244/5B Option 423 or an Option 423 with 029. When you complete this upgrade your PNA-X will be a N5244/5B Option 425:

- PC assembly, low frequency extension (LFE)
- bias combiners to all ports
- additional new cables

Refer to **“Overview of the Installation Procedure” on page 14.**

CAUTION

This repair must be done at a service center or a self-maintainer service center! Refer to **“Getting Assistance from Keysight” on page 5.**

Getting Assistance from Keysight

Installing this upgrade kit requires special skills and experience. If you think you may not be qualified to do the work, or need advice, contact Keysight.

Contacting Keysight

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

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

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

NOTE

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

If You Have Problems With the Upgrade Kit Contents

Keysight stands behind the quality of the upgrade kit contents. If you have problems with any item in the kit, refer to www.keysight.com and the **Contact**

Keysight () link.

Getting Prepared

CAUTION

The PNA-X 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.

NOTE**IMPORTANT!**

- Verify your instrument's firmware is: A.13.55 or greater.
- Verify your instrument's IF Multiplexer (IF MUX) board, has P4, P204, P404, P604, P804 connectors. If not, Keysight will purchase a new IF MUX board. Refer to your instrument's Service Guide, Chapter 7 bookmark "Removing and Replacing the A20 IF Multiplexer Board" in the PDF Service Guide^a.
- Verify your Synthesizer board is version H or greater. If not, refer to [Appendix A: "Synthesizer Board Upgrade \(N5240-60074 \(with Tabs\)/N5240-60076 \(Without Tabs\) Version F/G to Version H\)"](#).

a. See ["Downloading the Online PNA-X Service Guide" on page 9](#).

NOTE**IMPORTANT!**

- This document contains references to legacy and to new A25 HMA26.5 Multiplier/Amplifier and A27/A28 mixer brick assemblies. Your model instrument may have some combination of legacy assemblies and new parts installed. Both types of assemblies are compatible with this upgrade. This note is for your reference, because some figures contain legacy assemblies that your instrument may not have installed.
- If you want to verify your instrument's A25 HMA26.5 Multiplier/Amplifier, refer to ["Verify the Model/Version of HMA26.5 Installed" on page 8](#).
- Your A27/A28 mixer brick might be a legacy part number 5087-7765 (with (x2) discrete 3dB attenuators 08490-60010) or new part number 5087-7417 (with integrated 3 dB attenuators). The legacy A27/A28 mixer bricks and the new integrated mixer bricks, look the same, except for the addition of the discrete A68/A69 attenuators on the legacy mixer bricks.
- See also, your instrument's PDF Service Guide ^a.

a. See ["Downloading the Online PNA-X Service Guide" on page 9](#).

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

- A license key - refer to ["License Key Redemption"](#) below.

Getting Prepared

- A PDF copy or a paper copy of the PNA-X Service Guide - refer to [“Downloading the Online PNA-X Service Guide”](#) below.
- An ESD-safe work area - refer to [“Protecting Your Workspace from Electrostatic Discharge”](#) below.
- Correct tools - refer to [“Tools Required for the Installation”](#) on page 10.
- Enough time - refer to [“About Installing the Upgrade”](#) on page 11.
- Test equipment for the post-upgrade adjustments and full instrument calibration. To view the equipment list, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide¹.

License Key Redemption

NOTE

Ensure that you are connected to an external server, before attempting to download your email and license key file.

If you are unfamiliar with the licensing process, refer to <https://www.keysight.com/us/en/assets/9018-04534/installation-guides/9018-04534.pdf> (N5242-90024).

NOTE

The enclosed Software Entitlement Certificate is a receipt, verifying that you have purchased a licensed option for the PNA-X of your choice. You must now use a Keysight Web page to request a license key for the instrument that will receive the option.

To enable the option product, you must request license key file(s) from the Keysight Software Manager:

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

To complete the request, you will need to gather the following information:

- From the certificate
 - Order number
 - Certificate number
- From your instrument
 - Model number
 - Serial number

Using the information just gathered, you must request license key file(s) from the Keysight Software Manager:

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

1. See [“Downloading the Online PNA-X Service Guide”](#) on page 9.

Getting Prepared

You will need to provide an email address, Keysight will promptly email your license key file(s) as a message attachment. This upgrade only applies to B models.

Verify the License Contents

Refer to the license message you received from Keysight:

If the model number, serial number, or option number do not match those on the license message you received from Keysight, you will not be able to install the license key file. If this is the case, contact Keysight for assistance. Refer to **“Getting Assistance from Keysight” on page 5.**

Verify the Model/Version of HMA26.5 Installed

NOTE

Depending on the type of Option upgrade that was purchased, your parts kit may or may not include the following cable part numbers.

This upgrade kit contains components for use with PNA-X models using the legacy HMA26.5 part number 5087-7765. If your PNA-X has the newer HMA26.5 part number N5240-60101 installed you may discard these parts:

- A26 splitter 5067-4086
- W52 N5245-20013
- W53 N5245-20023
- W54 N5245-20022

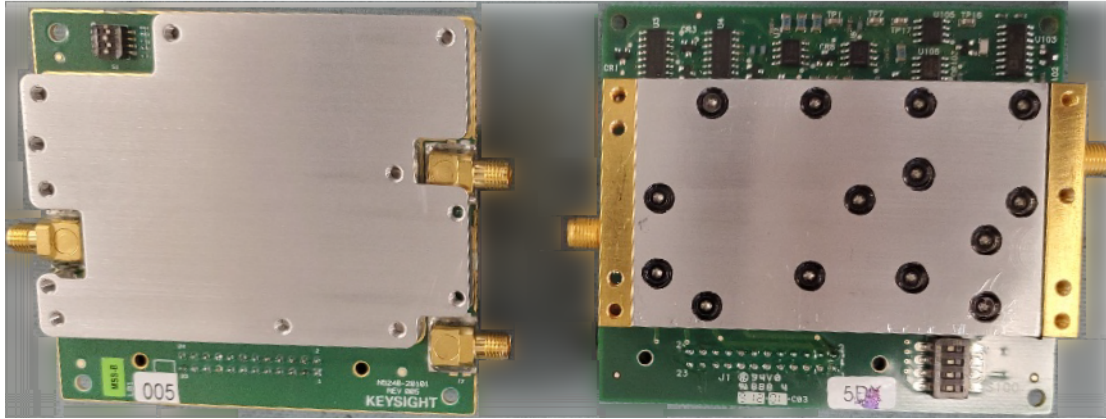
(If you have the legacy 5086-7765 HMA26.5, please discard the N5245-20195 semi-rigid cables. Refer to **Figure 1 on page 9.**)

The new N5240-60101 HMA26.5 has the splitter integrated into the assembly. Refer to **Figure 1 on page 9.**

Figure 1 Comparison of Legacy HMA26.5 (5087-7765) and New HMA26.5 (N5240-60101)

New HMA26.5 -- N5240-60101
Requires (x1) Cable.

Legacy HMA26.5 -- 5087-7765
Requires A26 Splitter and (x3) Cables.



Downloading the Online PNA-X Service Guide

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

1. Go to www.keysight.com.
2. In the Search box, enter the model number of the analyzer (e.g., N5225B) and click **Search**.
3. Click **Support** > **Keysight Product Support**.
4. In the **Search Support** area type your instrument's model number (e.g., N2225B).
5. Press **Enter**.
6. Scroll down to the **PRINT DOCUMENTATION** section and click to select **Service Manual**.

The **Service Manual** for your instrument will be displayed near the top of the right column.
7. Click the hyperlink of the Service Guide title to download the PDF file.
8. When the PDF of the Service Guide is displayed, scroll through the Contents section bookmarks to locate the information needed.

Protecting Your Workspace from Electrostatic Discharge

For information, click on the Chapter 1 bookmark, “Electrostatic Discharge Protection” in the PDF Service 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 (1.02 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 wrench (to stabilize the bias tee combiner when torquing cables)	1	N/A
T-6 TORX driver - set to 6 in-lbs (0.68 N.m)	1	N/A
5/16-in (8 mm) nutsetter or open end torque wrench- set to 8 in-lbs (0.9 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
Permanent marker (fine point)	1	N/A

CAUTION

Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections, except the front panel coupler to Bias-T combiner cable connections. Torque these to 8 in-lbs.

Additional exception: Torque the front and rear panel bulkhead connectors and these connections to 21 in-lb.

1. See “[Downloading the Online PNA-X Service Guide](#)” on page 9.

Items Included in the Upgrade Kit

About Installing the Upgrade

Products affected	N5244/5B Option 423 or N5244/5B Option 423+029
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	5 hours
Estimated adjustment time	2.5 hours
Estimated full instrument calibration time	8.0 hours

Items Included in the Upgrade Kit

Check the contents of your kit against the following list. If any part is missing or damaged, contact Keysight Technologies. Refer to **“Getting Assistance from Keysight” on page 5**.

CAUTION

This upgrade kit contains cables for Version 6 synthesizers and Version 7 direct digital synthesizer (DDS) assemblies. Please refer to your instrument’s Service Guide, if you are unclear which assembly you have installed. Refer to **“Downloading the Online PNA-X Service Guide” on page 9**.

Table 1 Contents of Upgrade Kit N5245-60122

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5245-90122
--	Software Entitlement Certificate	1	5964-5145
--	China RoHS	1	9320-6722
A71	Port 1 LFE Bias-T combiner	4	5087-7403
A72	Port 3 LFE Bias-T combiner		
A73	Port 4 LFE Bias-T combiner		
A74	Port 2 LFE Bias-T combiner		
A70	PC assy, low frequency extension (LFE)	1	N5291-60001
--	Bracket for IF MUX, low frequency extension (LFE)	1	N5240-00011
--	Bracket for Bias-T combiner – ports 1, 3, and 4	3	N5245-00036
--	Bracket for Bias-T combiner – port 2	1	N5245-00037
--	Machine screw, M3 x 14, pan head (2 to attach A70 LFE board to the deck)	2	0515-0665
--	Machine screw, M3 x 25, pan head (3 to reattach TSMB assembly to deck)	3	0515-0667

Items Included in the Upgrade Kit

Table 1 **Contents of Upgrade Kit N5245-60122**

Ref Desig.	Description	Qty	Part Number
--	Machine screw, M3.0 x 8, flat head	8	0515-0372
--	Machine screw, M3.0 x 6, flat head (8 to attach Bias T-combiners to bracket)	8	0515-1227
--	Machine screw, M2.5 x 14, pan head (4 to attach clamps to bias t combiners)	4	0515-2141
--	Cap, protective	4	1401-0214
--	clamps, cable	4	5023-3299
--	clamps, cable (LFE DC bias cables)	11	1400-1334
--	clamps, cable (LFE pressure sensitive)	3	1400-1391
--	Nameplate, Option 425, N5244B, LFE	1	N5244-80003
--	Nameplate, Option 425, N5245B, LFE	1	N5245-80036
--	Dress panel, overlay – Option 405/420/425, N5244/5B	1	N5245-80037
--	Cable, ribbon assy, motherboard (MB/IF MUX/LFE/TSMB))	1	N5240-60089
--	Cable, DC, 2 pin to R/A SMP	4	N5240-60091
W181	Cable, assy-RF, FP, A71 bias T combiner to port 1 CPLR THRU (Option 425 without Option 029)	1	N5245-20178
W182	Cable, assy-RF, FP, A33 test port coupler to A71 bias T combiner port 1	1	N5245-20182
W183	Cable, assy-RF, FP, Port 3 to CPLR THRU to A72 bias T combiner	1	N5245-20180
W184	Cable, assy-RF, FP, A34 test port coupler to A72 bias T combiner port 3	1	N5245-20184
W185	Cable, assy-RF, FP, Port 4 to CPLR THRU to A73 port 4 Bias T combiner	1	N5245-20181
W186	Cable, assy-RF, FP, A35 test port coupler to A73 bias T combiner port 4	1	N5245-20185
W187	Cable, assy-RF, FP, Port 2 to CPLR THRU to A74 bias T combiner (Option 425 without Option 029)	1	N5245-20179
W188	Cable, assy-RF, FP, A36port 2 test port coupler to A74 bias T combiner port 2	1	N5245-20183
W189	Cable, assy-RF, A56 port 1 noise bypass switch to port 1 bias T combiner (Option 425 with 029 only)	1	N5245-20189
W190	Cable, assy-RF, A57 port 2 noise bypass switch to port 2 bias T combiner (Option 425 with 029 only)	1	N5245-20188
W191 ^a	Cable, assy RF CA, A4 Source 1 Synth J102 to A70 LFE J20	1	N5245-60027
W192 ^a	Cable, assy RF CA, A17 Source 2 Synth J102 to A70 LFE J21	1	N5242-60079
W193 ^a	Cable, assy RF CA, A15 LO Synth J102 to A70 LFE J18	1	N5242-60080

Table 1 Contents of Upgrade Kit N5245-60122

Ref Desig.	Description	Qty	Part Number
W194	Cable, assembly, coaxial LFE (Port 1 bias combiner “RF-IN” to “Port1” A70 LFE board, long)	4	N5240-60097
W195	Cable, assembly, coaxial LFE (Port 3 bias combiner “RF-IN” to “Port3” A70 LFE board, long)		
W196	Cable, assembly, coaxial LFE (Port 4 bias combiner “RF-IN” to “Port4” A70 LFE board, long)		
W197	Cable, assembly, coaxial LFE (Port 2 bias combiner “RF-IN” to “Port2” A70 LFE board, long)		
W208 ^b	A70/A75 LFE board to A15 DD Synth Source 1 J12	1	N5240-60112
W209 ^b	A70 LFE board to A15 DD Synth Source 2 J14	1	N5240-60114
W210 ^b	A70/A75 LFE board to A15 DD Synth LO J13	1	N5240-60113
W211	RF cable, A70/A75 LFE J14 to A24 IF Multiplexer P4	1	8120-5014
W212	RF cable, A70/A75 LFE J13 to A24 IF Multiplexer P204	1	8120-5017
W213	RF cable, A70/A75 LFE J7 to A24 IF Multiplexer P404	1	8120-5014
W214	RF cable, A70 LFE J12 to A24 IF Multiplexer P604	1	8120-5017
W215	RF cable, A70 LFE J11 to A40 IF Multiplexer P804 (4-port only)	1	8120-5017

- a. Version 6 synthesizers use these cables. If you have a Version 7 direct digital synthesizer (DDS) assembly installed, these cables may be discarded.
- b. Version 7 direct digital synthesizer (DDS) assemblies use these cables. If you have a Version 6 synthesizers installed, these cables may be discarded.

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.

NOTE

IMPORTANT! Save all screws, nuts, and washers for reuse that have been removed.

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. Inspect and (If Necessary) Remove the A4, A15, and A17 Synthesizer Boards, if They Are Not Version H."

"Step 5. Remove the Front Panel Assembly."

"Step 6. Remove the A23 Test Set Motherboard."

"Step 7. Remove the A24 IF Multiplexer (IF MUX) Board."

"Step 8. Remove Some Bottom-Side (Test Set) Cables."

"Step 9. Remove the A42–A45 Bias Tee Assemblies."

"Step 10. Prepare and Assemble and Install the A71–A74 Bias Tee Combiner Assemblies."

"Step 11. Connect the A18 Motherboard/IF Multiplexer (IF MUX)/Low Frequency Extension (LFE)/Test Set Motherboard (TSMB) Ribbon Cable (N5240-60089)."

"Step 12. Reinstall the A24 IF Multiplexer (IF MUX) Board and Connect the Motherboard / IF Multiplexer / Low Frequency Extension (LFE)/ Test set motherboard (MB/IF MUX/LFE/TSMB) ribbon cable (N5240-60089) and the IF MUX Rear Panel Hardware."

"Step 13. Reinstall the handler, Power and Other I/O Assemblies."

"Step 14. Reinstall the Mixer Brick (MXB) Cables."

"Step 15. Attach Lower Bracket (N5240-00011) to IF MUX Board Shield."

"Step 16. Connect and Route New LFE Cables (8120-5014 (x2) and 8120-5017 (x3)) to the on the IF Multiplexer (IF MUX) Board."

“Step 17. Install A70 Low Frequency Extension (LFE) Board.”

“Step 18. Connect A71-A74 Bias Tee Combiner’s New Cables to A70 Low Frequency Extension (LFE) Board and the Other Ends of the New Cables Connected to the IF Multiplier (IF MUX) Board.”

“Step 19. Install the New Bias Tee Combiner’s Semirigid Test Set Cables, Blue RF cables, and Install Cable Clamps Onto Ferrite Beads.”

“Step 20. Reinstall the A23 Test Set Motherboard (TSMB).”

“Step 21. Install the A71 and 74 Bias-Tee Combiner’s Gray Low Frequency Extension (LFE) DC bias Cables and Route Cables.”

“Step 22. Install the Other End of the Bias-Tee Combiner Cables to the Source Synthesizer and LO Synthesizer Board Gray Cables.”

“Step 23. Remove the Old Lower Front Panel Overlay.”

“Step 24. Reinstall the Front Panel Assembly.”

“Step 25. Install the New Lower Front Panel Overlay and Nameplate.”

“Step 26. DC Continuity Test the LFE Board and Test Ports.”

“Step 27. Position the Cables and Wires to Prevent Pinching.”

“Step 28. Reinstall the Inner Cover.”

“Step 29. Reinstall the Outer Cover.”

“Step 30. Remove Option 423 License.”

“Step 31. Enable Option 425.”

“Step 32. Verify the PNA-X Analyzer Program is Running with the Correct Options.”

“Step 33. Perform Post-Upgrade Adjustments and Calibration.”

“Step 34. Prepare the PNA-X for the User.”

Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Software Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to **“License Key Redemption” on page 7**.

Verify that the model number, serial number, and option number information on the license key match those of the instrument on which this upgrade will be installed.

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

NOTE

If the model number, serial number, or option number do not match those on your license key file, 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 5**.

Step 2. Remove the Outer Cover

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

Step 3. Remove the Inner Cover

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

Step 4. Inspect and (If Necessary) Remove the A4, A15, and A17 Synthesizer Boards, if They Are Not Version H

NOTE

The N5240-60074 (with tabs) or N5240-60076 (without tabs) pretested synthesizer boards will both show Board P/N: N5240-63074 in the EEPROM window (as shown in **Figure 2 on page 17**).

If the synthesizer board part number displayed in the EEPROM Header window is not N5240-63074 (e.g. N5242-63150), you will need to order new synthesizer boards. Refer to **“Contacting Keysight” on page 5**. Refer to **“Contacting Keysight” on page 5**.

Verify that the synthesizer boards are all version H or greater.

1. If your synthesizer boards are all H or greater, on the PNA: Press **Utility > System > Service > Utilities > View EEPROM Headers**.

1. See **“Downloading the Online PNA-X Service Guide” on page 9**.

2. Verify the LO Synthesizer, Src1 Synth, and Src2 Synth boards are all version H or greater.

Refer to [Figure 2 on page 17](#).

Figure 2

EERPOM Header Info Window

The screenshot shows the 'EEPROM Header Info' window with a teal title bar and standard window controls. The window is divided into several sections:

- Assembly:** A section with a light blue background containing a grid of radio buttons for selecting components. 'LO Synthesizer' is selected. Other options include TestSet Motherboard, IF Mux, Frequency Reference, Src2 ABC, Src2 Synth, Src1 Synth, Src1 ABC, GPIB, Noise Figure, and a column of ABC_50_P1 through P4 and N/A.
- Board Name:** A yellow highlighted field containing 'Synthesizer Board' with an 'Edit' button to its right.
- Metadata:** A section containing various identifiers: Memory Type ID (3), Hardware ID (0), Serial Number (00092), Firmware Rev (H, highlighted with a red box), Board P/N (N524063074), Checksum (22459), Vendor Code (23), Date Code (1742), Revision Code (99), Options (hex) (0001), and Spare (hex) (FFFF).
- Buttons:** An 'Edit' button (labeled 'Edit Requires Password') and an 'Exit' button are located on the right side.
- EE Num:** The value '1' is displayed on the right side.

3. If all of the boards are version H or greater, proceed to [“Step 5. Remove the Front Panel Assembly”](#).
4. If your boards are **not** version H or greater, remove the synthesizer boards for upgrading:

NOTE

IMPORTANT! This step includes disconnecting and laying aside several gray cables. Ensure that they are labeled.

For instructions, click the Chapter 7 bookmark “Removing and Replacing the A4-A17 Boards” (i.e., refer to your PNA’s serial number prefix section) in the PDF Service Guide¹.

Save all mounting hardware (except the stabilizer bracket) for reuse.

Refer to [Appendix A: “Synthesizer Board Upgrade \(N5240-60074 \(with Tabs\)/N5240-60076 \(Without Tabs\) Version F/G to Version H\)”](#).

1. See [“Downloading the Online PNA-X Service Guide” on page 9](#).

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 Guide¹.

Step 6. 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 Guide¹.

Step 7. Remove the A24 IF Multiplexer (IF MUX) Board

NOTE

IMPORTANT! If you have not done so, verify your instrument’s IF Multiplexer (IF MUX) board, has P4, P204, P404, P604, P804 connectors. If not, Keysight will purchase a new IF MUX board. Refer to your instrument’s Service Guide, Chapter 7 bookmark “Removing and Replacing the A20 IF Multiplexer Board” in the PDF Service Guide and to **“Contacting Keysight” on page 5**¹.

NOTE

IMPORTANT! This step includes disconnecting and laying aside several gray cables. Ensure that they are labeled.

For instructions, click the Chapter 7 bookmark “Removing and Replacing the A24 IF Multiplexer Board” in the PDF Service Guide¹.

Save all mounting hardware (except the stabilizer bracket) for reuse.

1. See **“Downloading the Online PNA-X Service Guide” on page 9**.

Step 8. 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

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.

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.

To see an image showing the location of some of the cables, click the Chapter 6 bookmark "Top Cables, All Cables - All Options (S/N Prefixes <6021)" or "Top Cables, All Cables - All Options (S/N Prefixes ≥6021)"¹.

And, to see an image showing the location of the other cables, click the Chapter 6 bookmark and then choose from the following:

- "Bottom RF Cables, 4-Port, Option 422 (S/N Prefixes <6021)" and then "Bottom RF Cables, 4-Port, Option 422 with 029 (serial numbers <6021)"¹
- "Bottom RF Cables, 4-Port, Option 422 (S/N Prefixes ≥6021)" and then "Bottom RF Cables, 4-Port, Option 422 with 029 (S/N Prefixes ≥6021)"¹.
- "Bottom RF Cables, 4-Port, Option 423 (S/N Prefixes <6021)" and then "Bottom RF Cables, 4-Port, Option 423 with 029 (serial numbers <6021)"¹
- "Bottom RF Cables, 4-Port, Option 423 (S/N Prefixes ≥6021)" and then "Bottom RF Cables, 4-Port, Option 423 with 029 (S/N Prefixes ≥6021)"¹.

Refer to **Figure 3 on page 21**.

1. Place the analyzer bottom-side up on a flat surface.
2. Remove the following cables in the order listed. Unless otherwise marked, discard these cables; they will not be reused.

For Option 422 only:

- N5245-20095 W58 – A28 mixer brick to 50 ohm load (1250-4261)
- N5245-20077 W82 – A38 port 1 source attenuator to front-panel Port 1 SOURCE OUT
- N5245-20099 W20 – Port 1 CPLR THRU to A33 port 1 coupler
- N5245-20098 W24 – Front panel port 3 CPLR THRU to A34 port 3 coupler
- N5245-20097 W32 – Port 2 CPLR THRU to A36 port 2 coupler

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

- N5245-20096 W28 – Front panel port 4 CPLR THRU to A35 port 4 coupler

For Option 423 only:

- N5245-20095 W58 – A28 mixer brick to 50 ohm load (1250-4261)
- N5245-20077 W82 – A38 port 1 source attenuator to front-panel Port 1 SOURCE OUT
- N5245-20076 W83 – Front-panel Port 1 CPLR THRU to A42 port 1 bias tee
- N5245-20030 Port 2 CPLR THRU to A45 port 2 bias tee
- N5245-20086 A43 port 3 bias tee to A34 port 3 coupler
- N5245-20085 A42 port 1 bias tee to A33 port 1 coupler
- N5245-20088 A44 port 4 bias tee to A35 port 4 coupler
- N5245-20087 A45 port 2 bias tee to A36 port 2 coupler

For Option 422 with 029 only:

- N5245-20098 W24 – Front panel port 3 CPLR THRU to A34 port 3 coupler
- N5245-20162 W159 – Front panel port 1 CPLR THRU to A56 port 1 noise bypass switch
- N5245-20096 W28 – Front panel port 4 CPLR THRU to A35 port 4 coupler
- N5245-20138 W125 – A57 port 2 noise bypass switch to A36 test port 2 coupler

For Option 423 with 029 only:

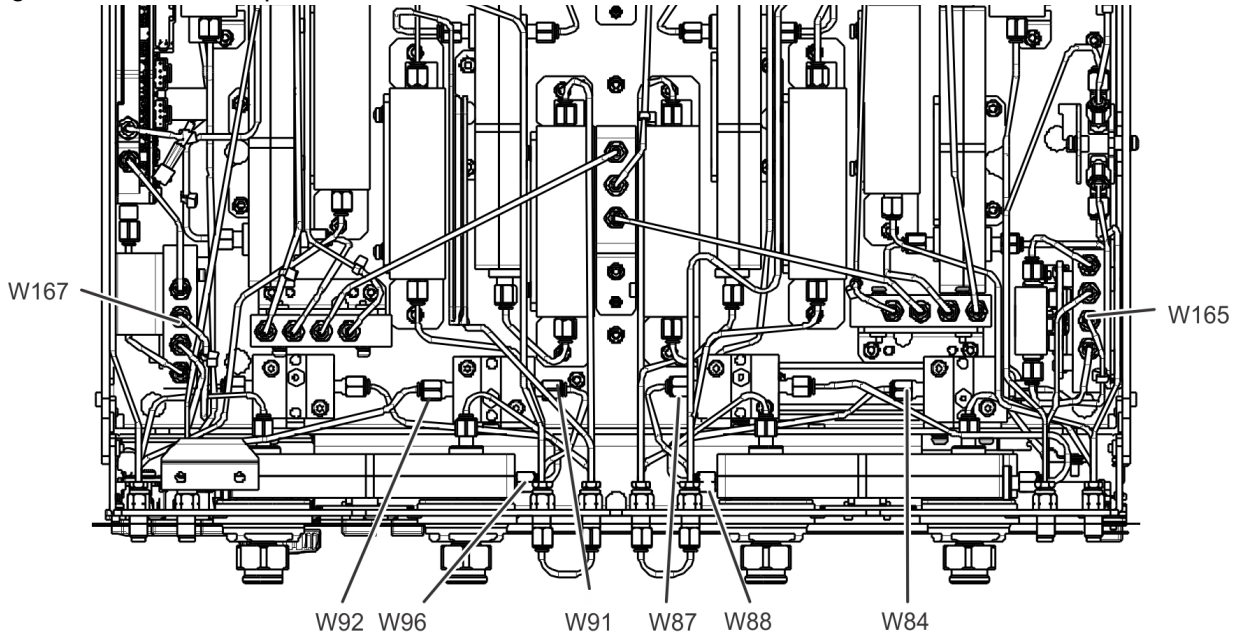
- N5245-20089 W87 – Port 3 CPLR THRU to A43 port 3 bias tee
- N5245-20090 W91 – Port 4 CPLR THRU to A44 port 4 bias tee
- N5245-20152 W165 – A42 port 1 bias tee to A56 port 1 noise bypass switch
- N5245-20086 W88 – A43 port 3 bias tee to A34 port 3 coupler
- N5245-20085 W84 – A33 port 1 coupler to A42 port 1 bias tee
- N5245-20087 W96 – A45 port 2 bias tee to A36 port 2 coupler
- N5245-20088 W92 – A44 port 4 bias tee to A35 port 4 coupler
- N5245-20105 W167 – A57 port 2 noise bypass switch to A45 port 2 bias tee

For all analyzers:

- (N5245-20089) Port 3 CPLR THRU to A43 port 3 bias tee

- (N5245-20090) Port 4 CPLR THRU to A44 port 4 bias tee

Figure 3 Option 423 with 029 Test Set Cables Removal



(Some parts removed for clarity.)

N5245_124_006

Step 9. Remove the A42–A45 Bias Tee Assemblies

NOTE

IMPORTANT!

This step applies to Option 423 instruments only. Option 422 instruments can skip this step.

For instructions, click the Chapter 7 bookmark “Removing and Replacing the A42–A45 Bias Tees” in the PDF Service Guide¹.

The bias tee assemblies will not be reused.

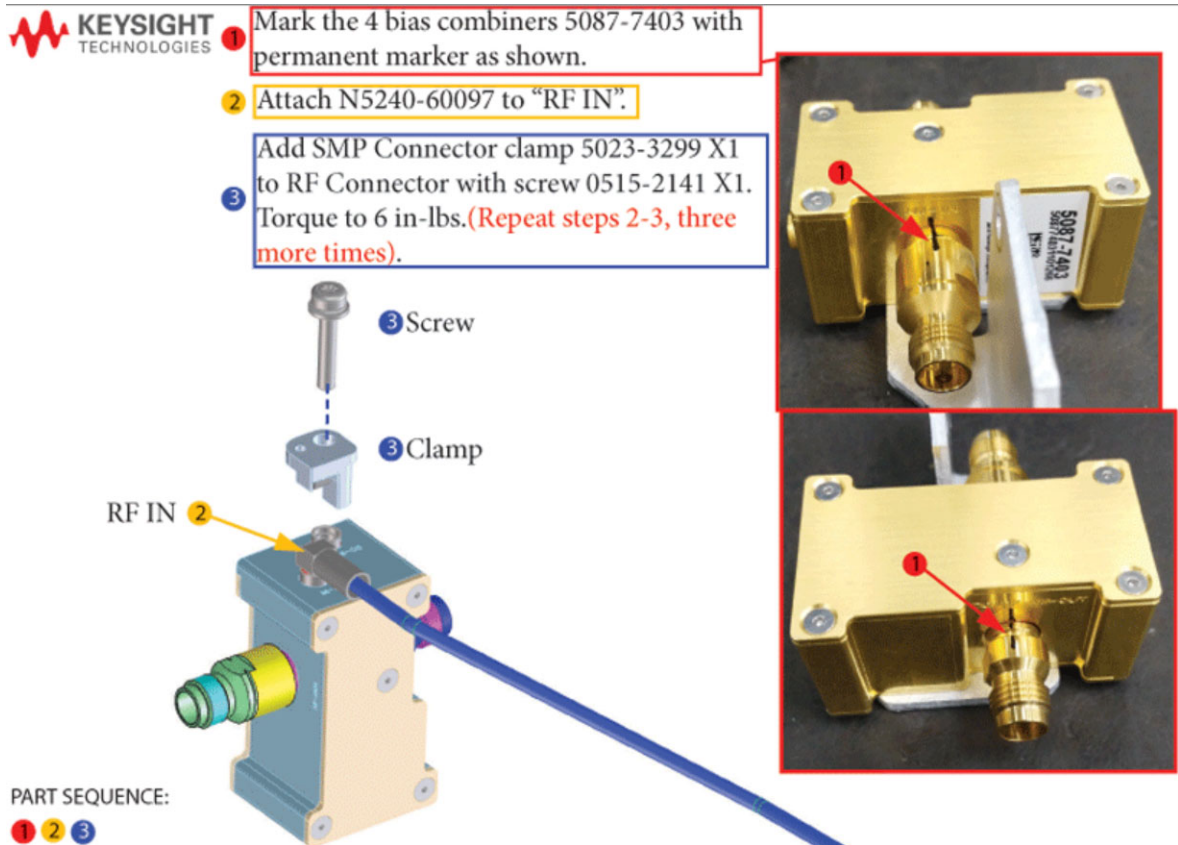
Step 10. Prepare and Assemble and Install the A71–A74 Bias Tee Combiner Assemblies

Refer to **Figure 4** through **Figure 6 on page 24** for this step of the procedure. New parts are listed in **Table 1 on page 11**.

1. Prepare the bias T combiners 5087-7403 (x1) using a fine point permanent marker, attach cable N5240-60097 to “RF IN” (x1), and SMP connector clamp 5023-3299 (x1) using screw 0515-2141 (x1). Repeat this process step for the other three bias T combiners. Refer to **Figure 4**.

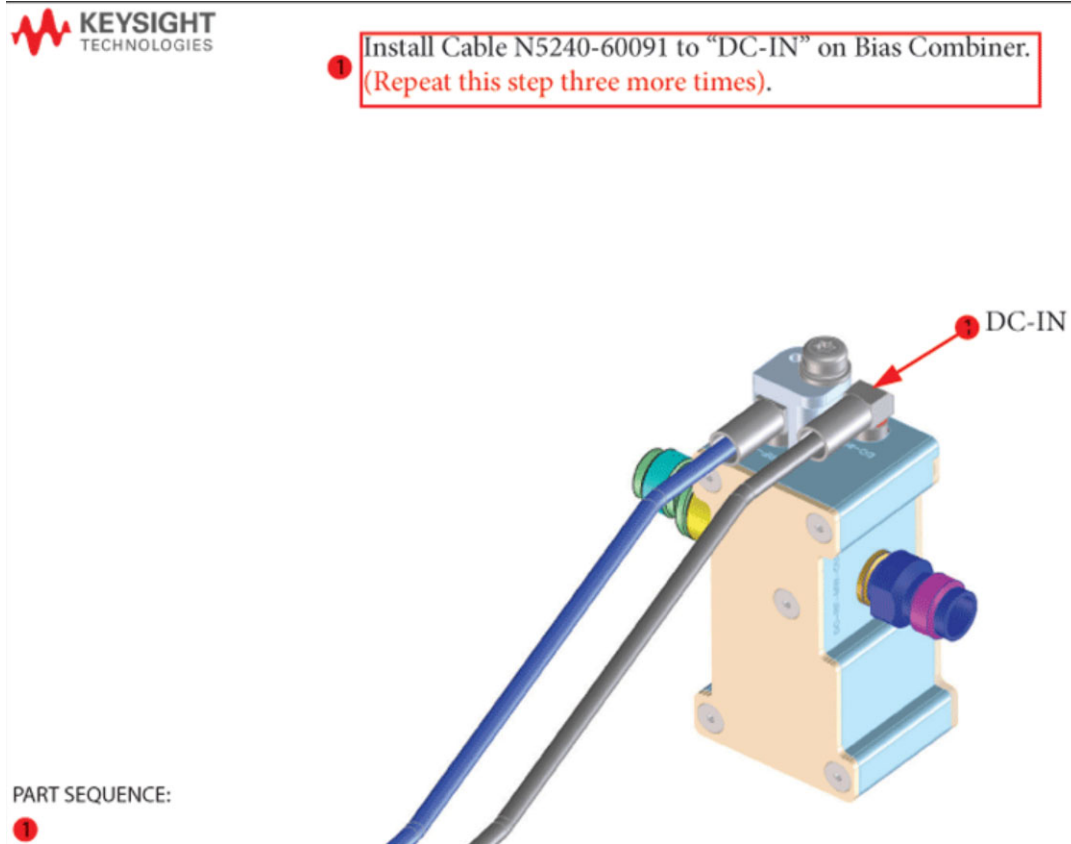
Figure 4

Prepare the Bias T Combiners Using a Permanent Marker, attach cables, clamps, and screws (0515-2141 x4, 5023-3299 x4, 5087-7403 x4, and N5240-60097 x4)



2. Install the N5240-60091 (x4) DC cables onto the bias tee combiners' "DC IN" connector. Repeat for the other three bias-T combiners. Refer to **Figure 5**.

Figure 5 Install DC cables to the bias tee combiners (N5240-60091)



3. Install bias T combiners and brackets into the chassis:

- a. Install bias T combiner brackets N5245-00036 (x3) and N5245-00037 (x1) to chassis. Secure with screws 0515-0372 (x8). Torque to 9 in-lbs (item ①).

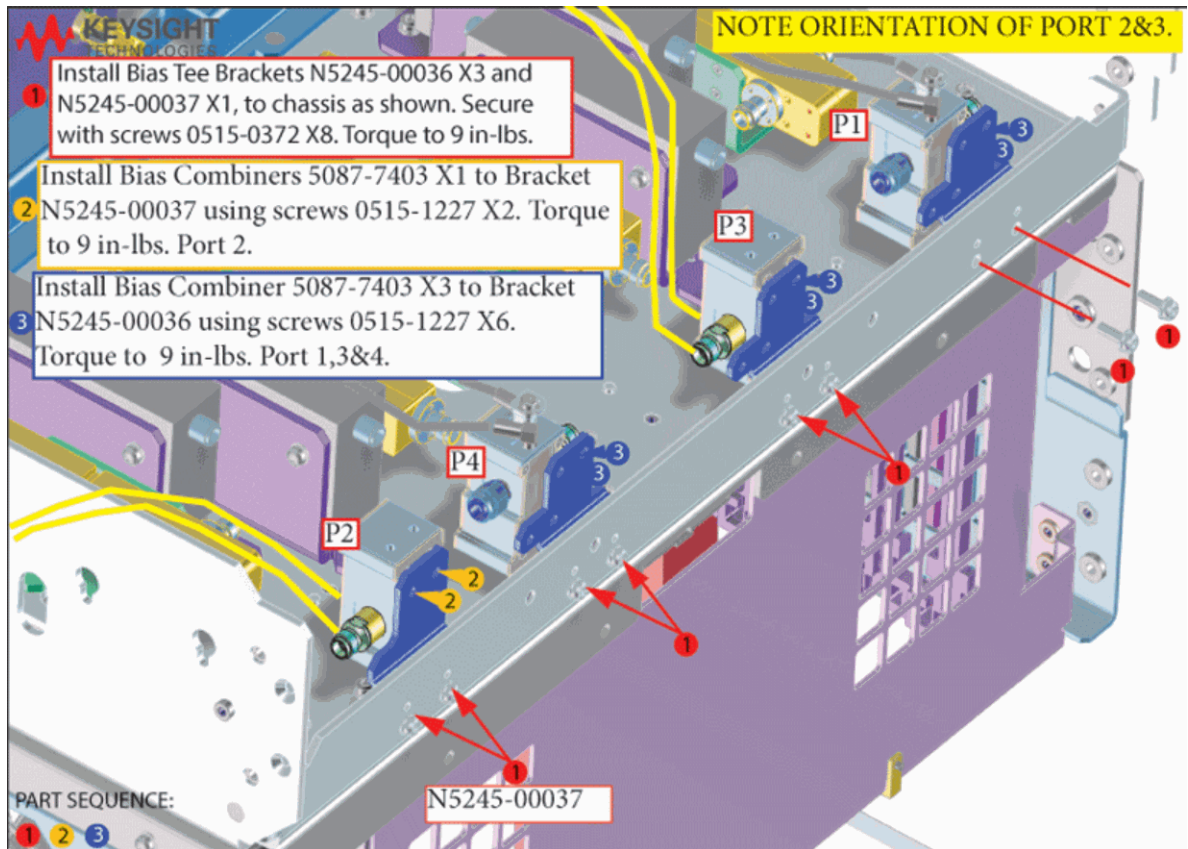
Pay close attention to the orientation of ports 2 (P3) and 3 (P4). Refer to **Figure 6**.

- b. Install Bias T Combiners 5087-7403 (x1) to Bracket N5245-00037 using screws 0515-1227 (x2). Torque to 9 in-lbs (item ②). Refer to **Figure 6**.

- c. Install Bias T Combiners 5087-7403 (x3) to Bracket N5245-00036 using screws 0515-1227 (x6). Torque to 9 in-lbs (item ③). Refer to **Figure 6**.

Figure 6

Assemble Bias T Combiners to Brackets and Install Into Chassis (N5245-0036 x3, N5245-00037 x1, 0515-1227 x8, 0515-0372 x8, and 5087-7403 x4)



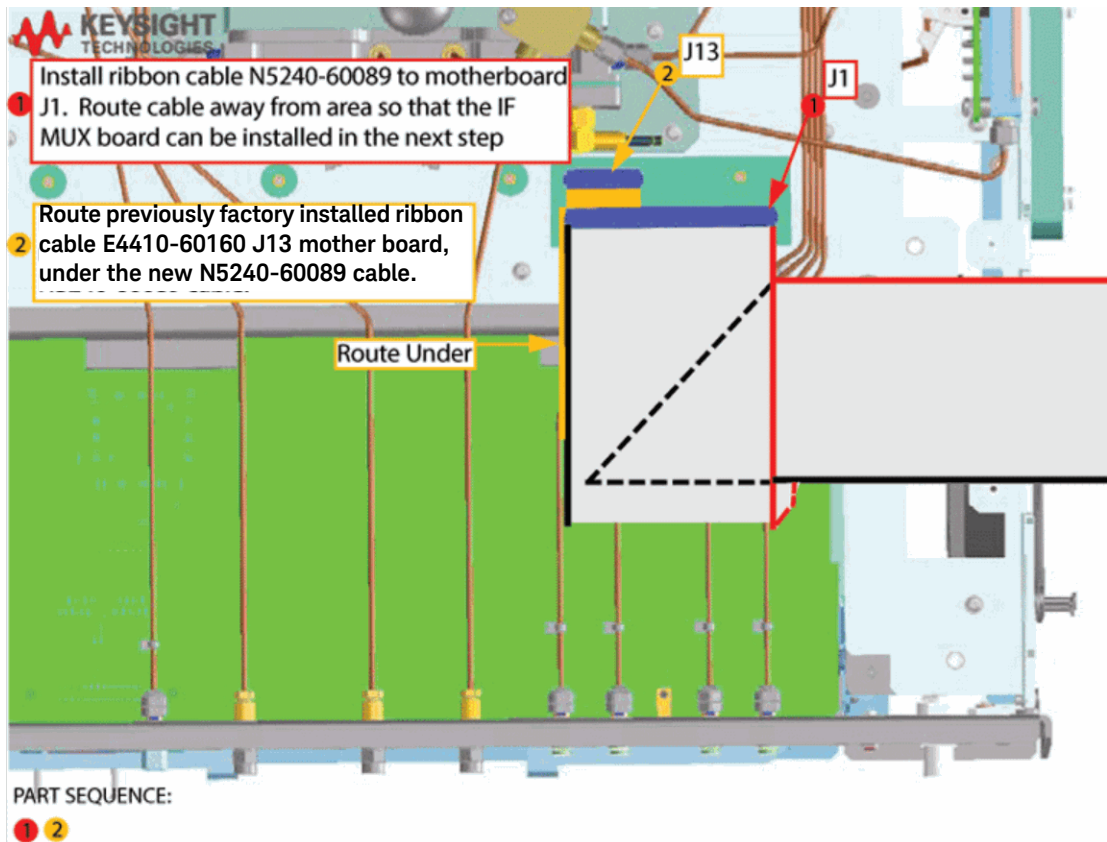
Step 11. Connect the A18 Motherboard/IF Multiplexer (IF MUX)/Low Frequency Extension (LFE)/Test Set Motherboard (TSMB) Ribbon Cable (N5240-60089)

1. Remove the N5242-60004 Motherboard/IF MUX/Test set motherboard (MB)/IF MUX/TSMB) ribbon cable from the A18 system motherboard connector J1 and discard this cable (item ①). Refer to **Figure 7** (N5240-60089 is shown, but N5242-60004 is similar).
2. Install the N5240-60089 to A18 system motherboard J1 (item ②). Refer to **Figure 7**.

NOTE

IMPORTANT! Be careful to route the cable as shown in **Figure 7** to avoid interference with the IF MUX board installation.

Figure 7 Install the N5240-60089 MB/IF MUX/TSMB Ribbon Cable to A18 Motherboard J1¹

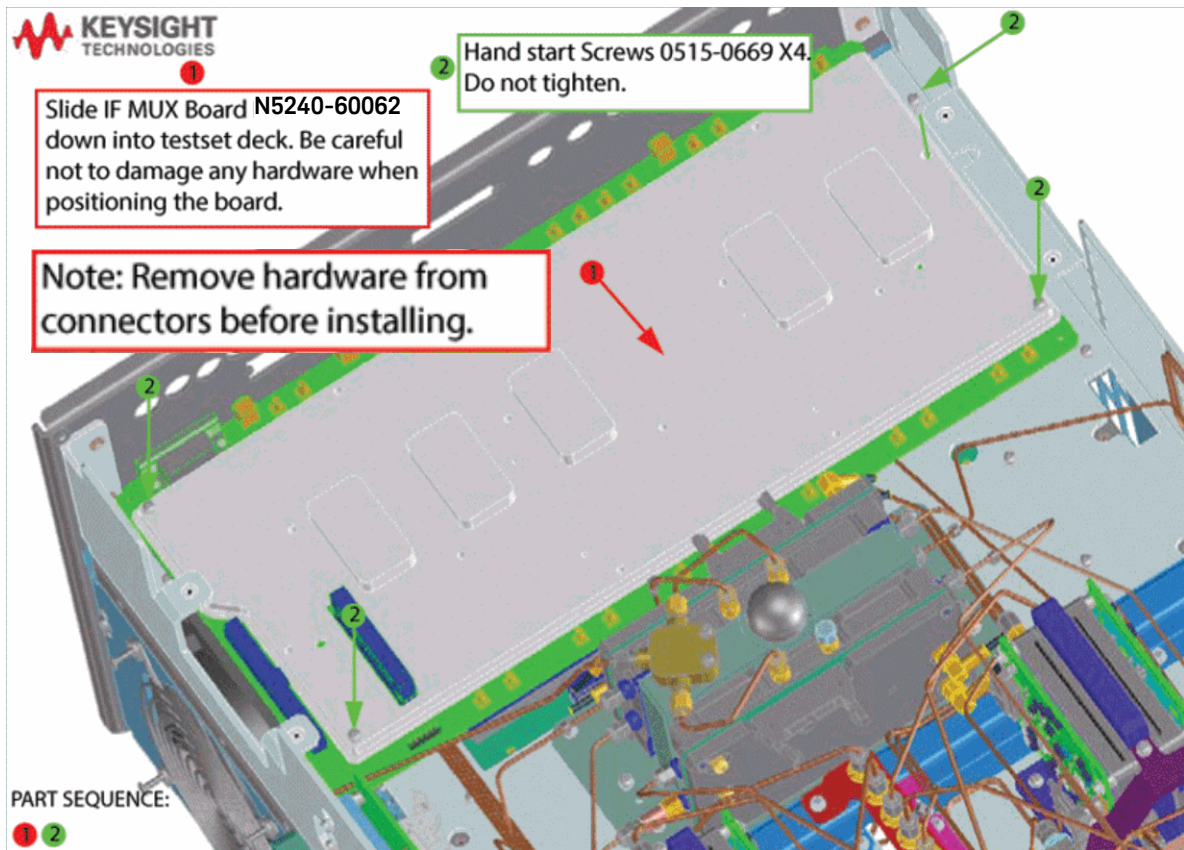


1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".

Step 12. Reinstall the A24 IF Multiplexer (IF MUX) Board and Connect the Motherboard / IF Multiplexer / Low Frequency Extension (LFE)/ Test set motherboard (MB/IF MUX/LFE/TSMB) ribbon cable (N5240-60089) and the IF MUX Rear Panel Hardware

1. Reinstall the IF MUX board using 0515-0669 (x4) screws (item ②).
2. For now, hand tighten only (item ②). Refer to **Figure 8**.

Figure 8 Reinstall the A24 IF MUX Board (N5240-60062 and 0515-0669)^{1, 2}

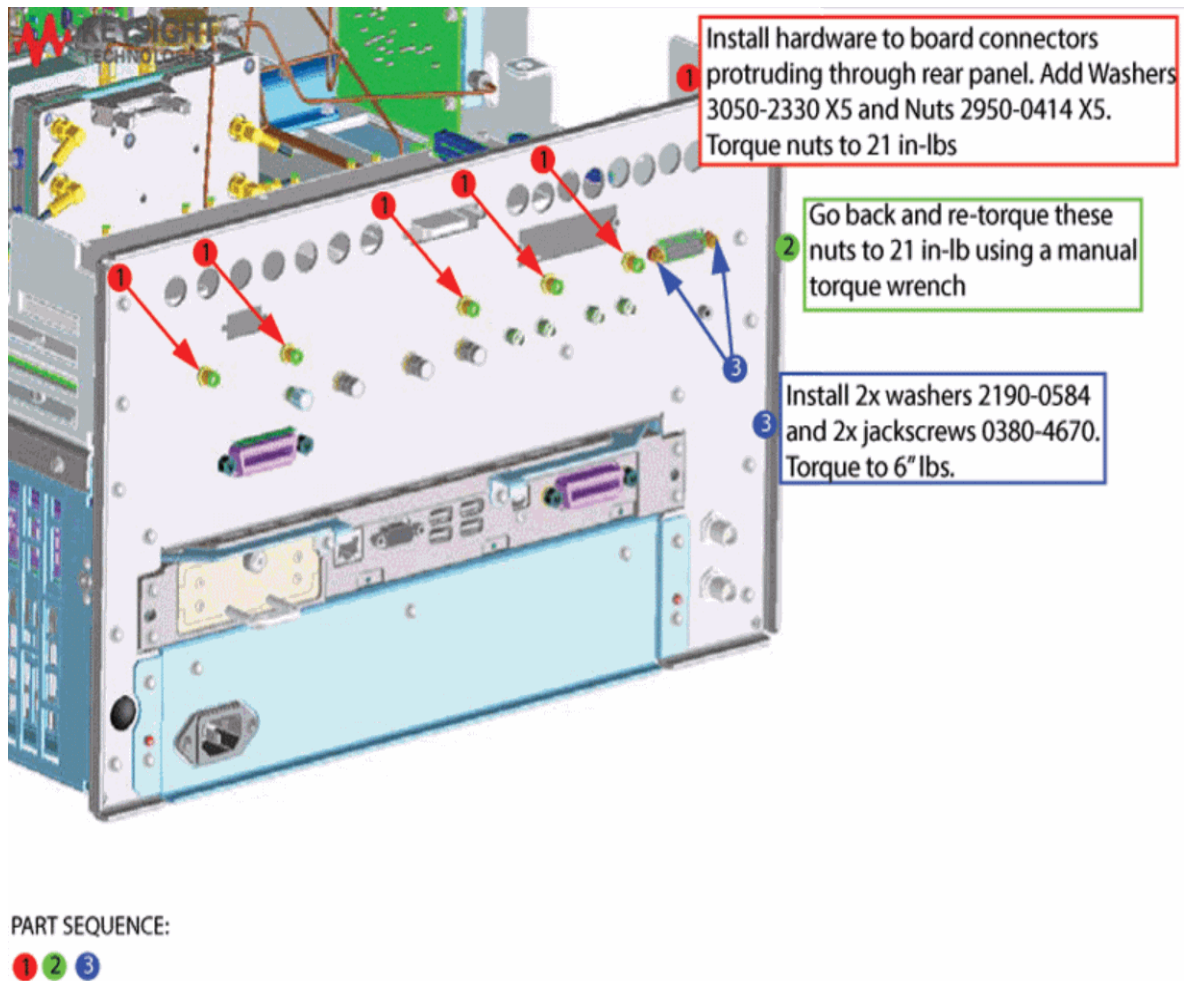


1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

3. Reinstall the IF MUX board rear panel connectors using the washers and nuts removed in “Step 7. Remove the A24 IF Multiplexer (IF MUX) Board” on page 18 (item ① and ③). Torque to 6 in-lbs. Refer to Figure 9.
4. Torque the 0515-0669 IF MUX board screws that were previously hand-tightened to 21 in-lbs (item ②). Figure 8 on page 26.

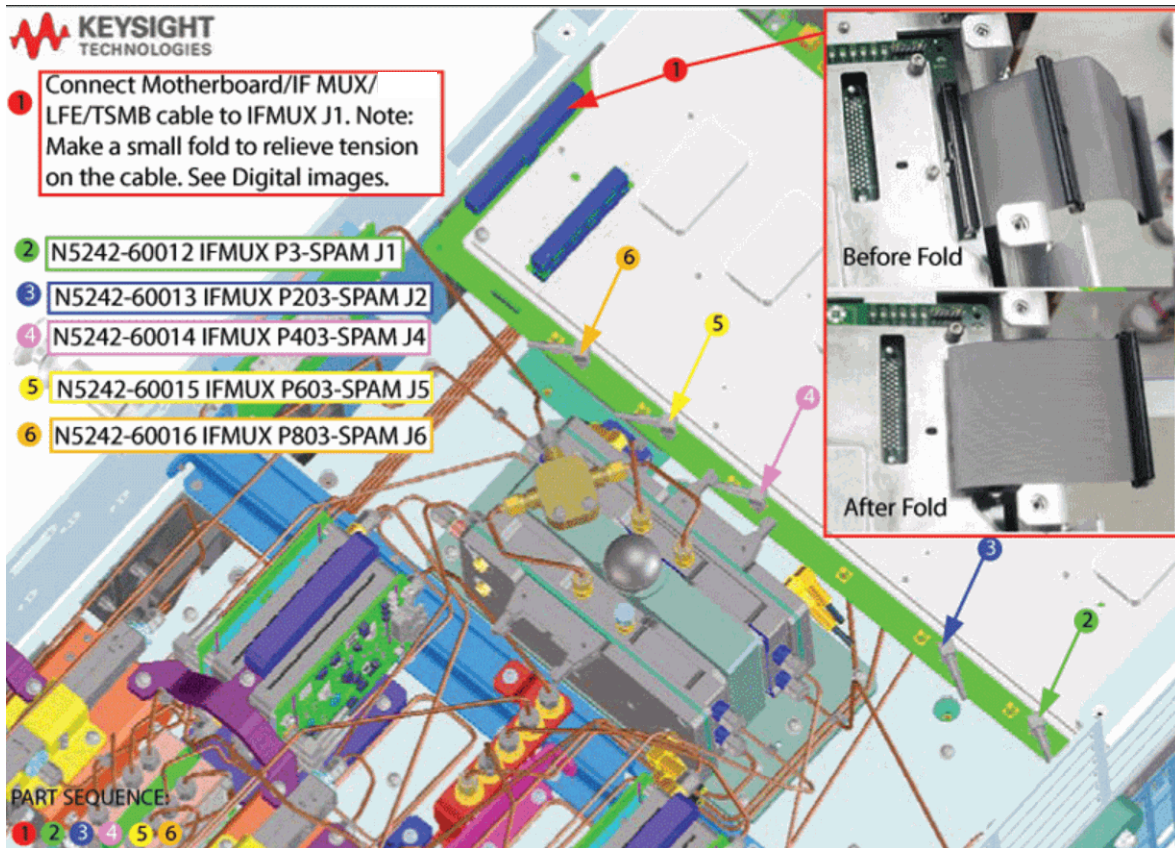
Figure 9

Install the A24 IF MUX Board (N5240-60062 and 0515-0669)



5. Connect N5240-60089 Motherboard / IF Multiplexer / Low Frequency Extension (LFE)/ Test set motherboard (MB/IF MUX/LFT/LFE/TSMB) ribbon cable to IF MUX J1 and fold as shown (item ①). Refer to **Figure 10**.
6. Reconnect the IF MUX/SPAM gray cables to the A24 IF MUX board as indicated in **Figure 10** (items ② through ⑥).

Figure 10 Connect the MB/IF MUX/ Low Frequency Extension (LFE)/TSMB ribbon cable to A24 IF MUX J1 (N5240-60089) and reconnect gray cables.^{1, 2}

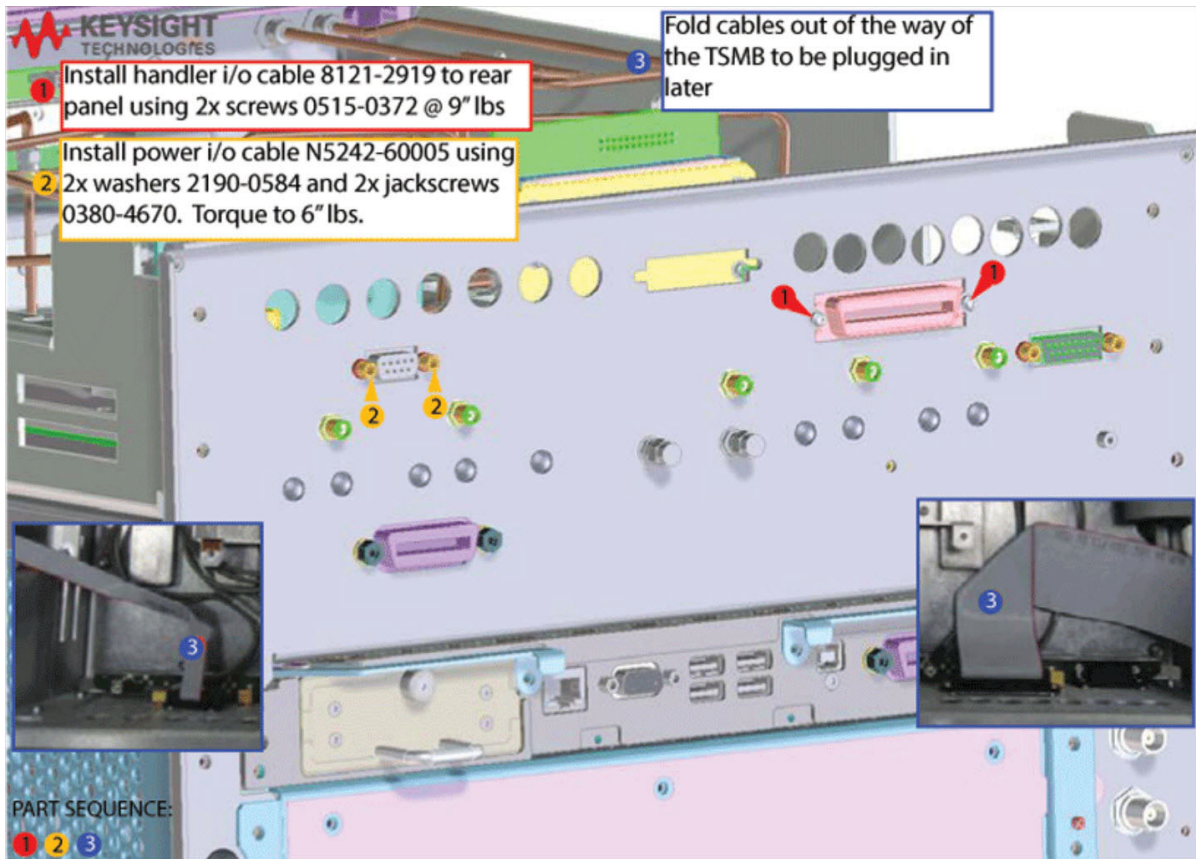


1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

Step 13. Reinstall the handler, Power and Other I/O Assemblies

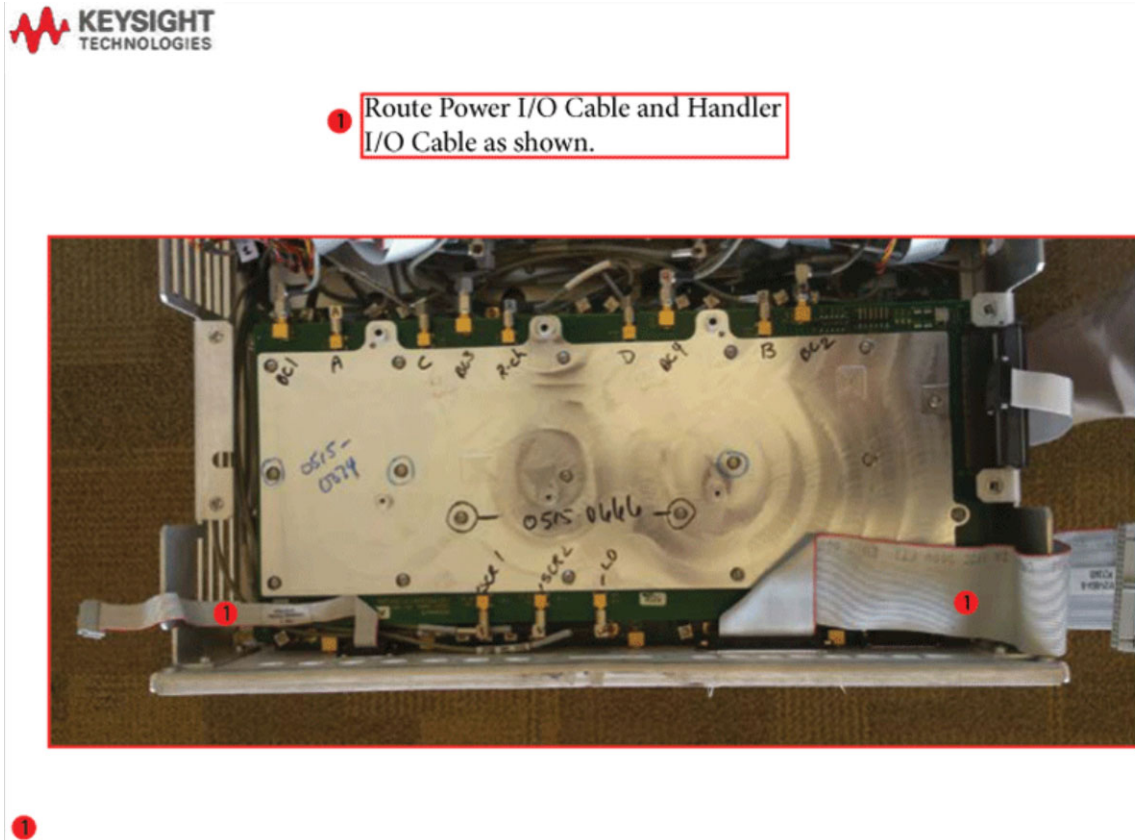
1. Reinstall the handler, power, and other I/O assemblies and fold cables out of the way of the LFE board to be plugged in (items ① through ③). Refer to [Figure 11](#).

Figure 11 Reinstall handler I/O cable, I/O cable assembly, power I/O assembly, and I/O Cables.



2. Route Power I/O and Handler I/O cables. Refer to **Figure 12**.

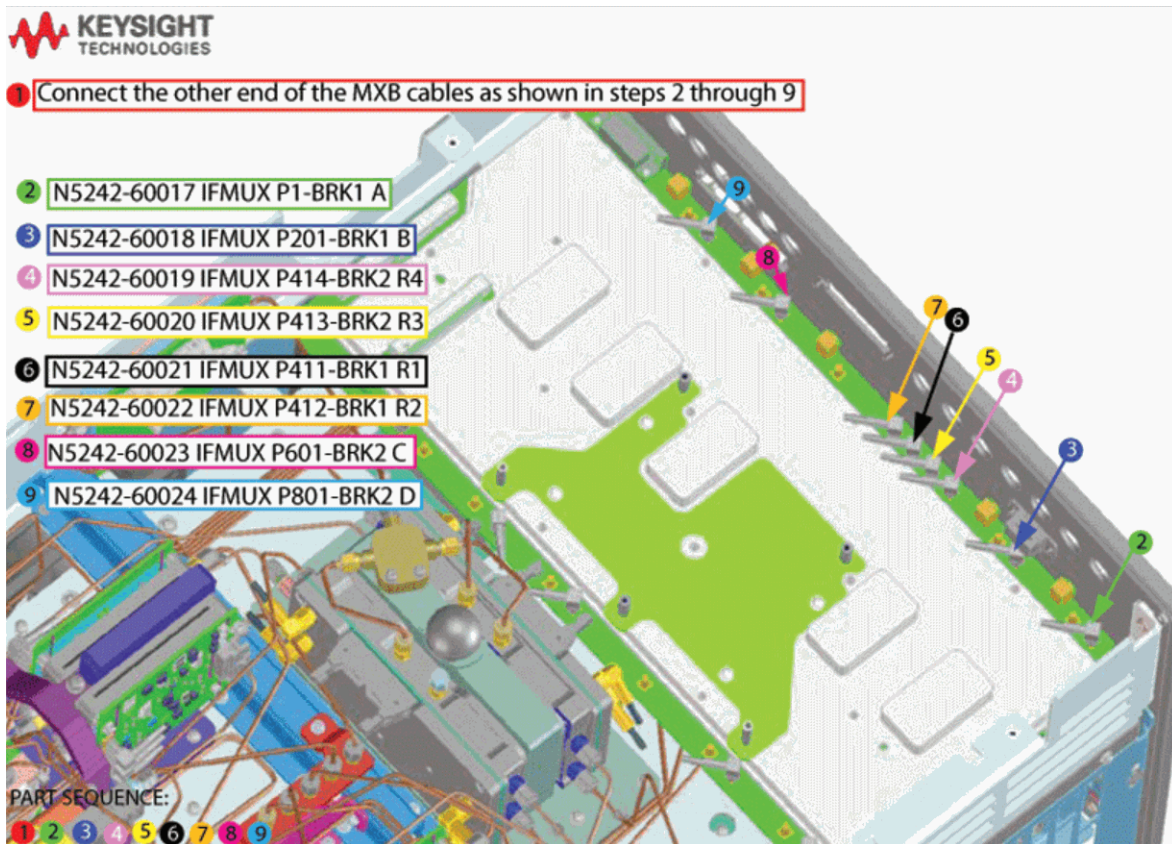
Figure 12 Route Power I/O and Handler I/O cables (8121-2919 and N5242-60005)



Step 14. Reinstall the Mixer Brick (MXB) Cables

Reconnect the other end of the mixer brick (MXB) cable (item ①) and all of the IF multiplexer (IF MUX) gray cables (IF MUX board as shown (items ② through ⑨)). Refer to **Figure 13**.

Figure 13 Reconnect the other end of the IF gray cables to the IF MUX board^{1, 2}

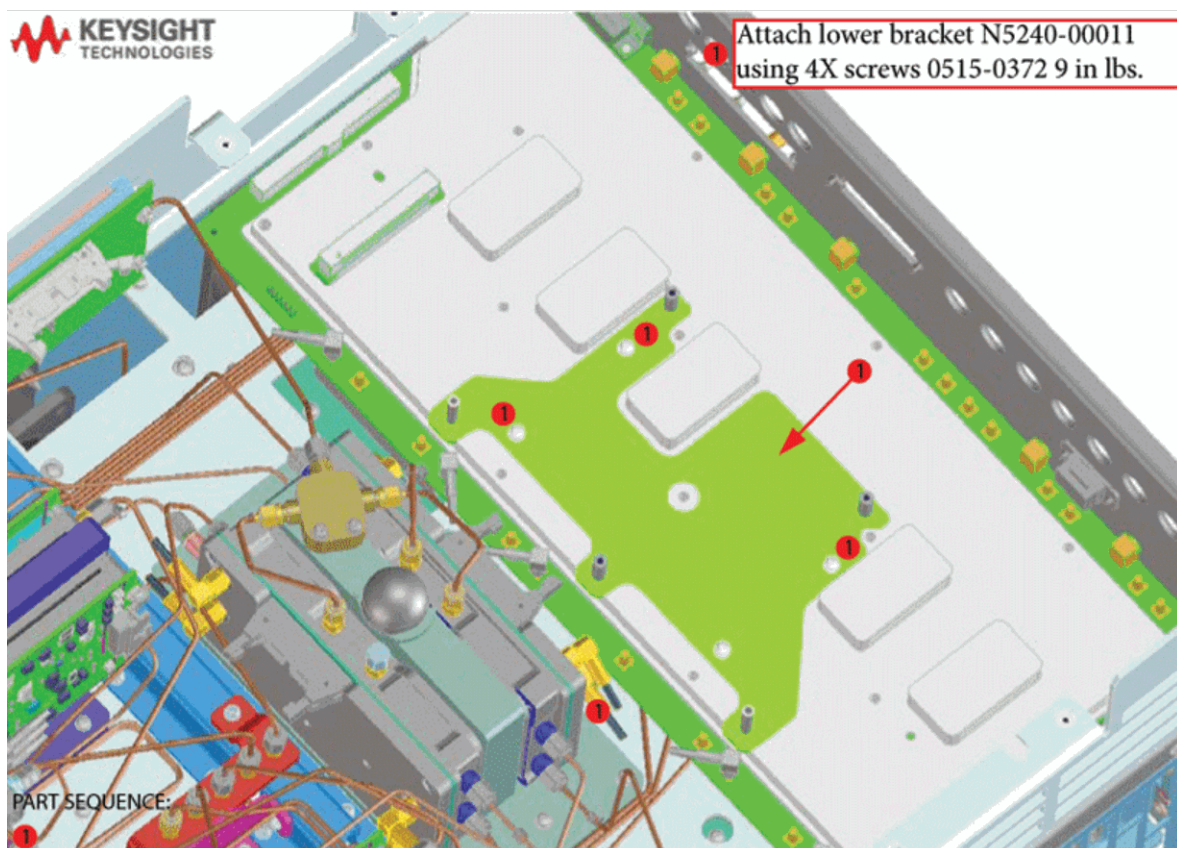


1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

Step 15. Attach Lower Bracket (N5240-00011) to IF MUX Board Shield

Attach lower bracket (N5240-00011) to IF MUX board using 0515-0372 screws (x4). Torque to 9 in-lbs. Refer to **Figure 14**.

Figure 14 Attach lower bracket to IF MUX board (N5240-00011 and 0515-0372)^{1, 2}



1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

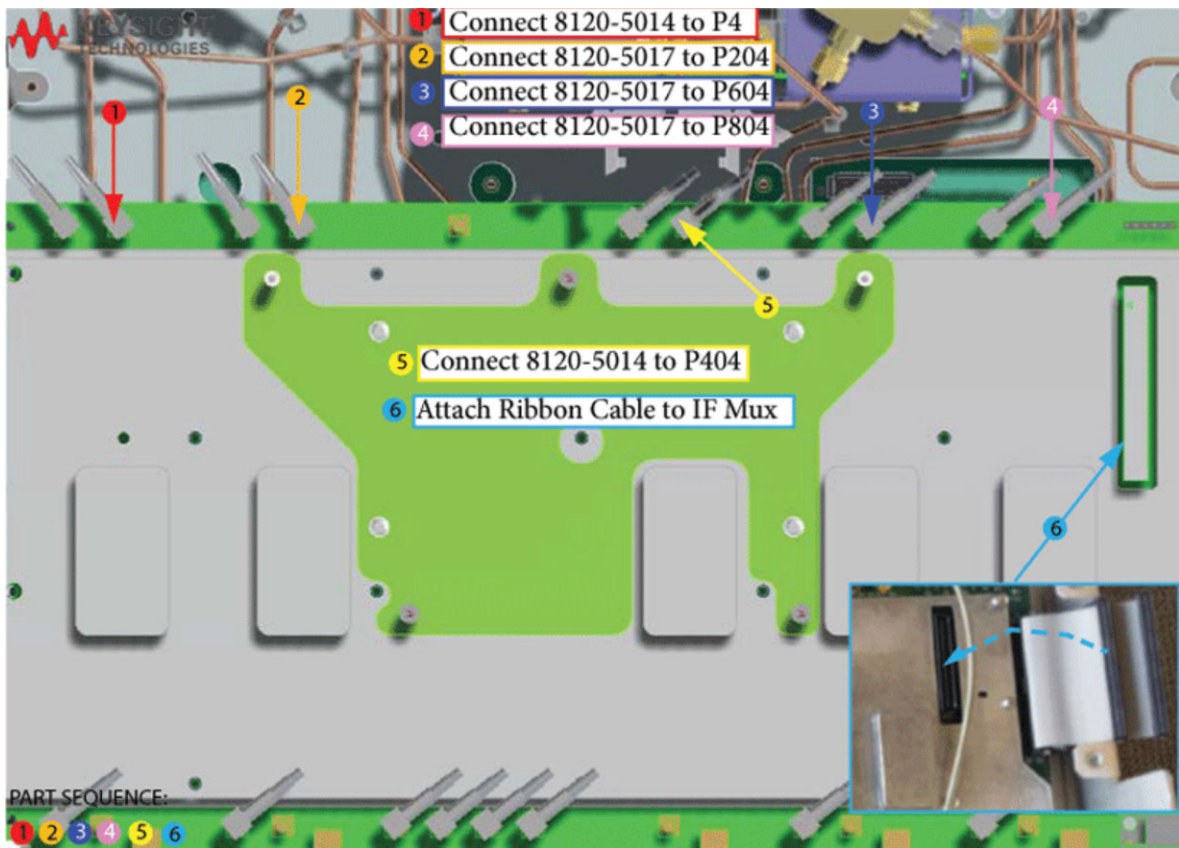
Step 16. Connect and Route New LFE Cables (8120-5014 (x2) and 8120-5017 (x3)) to the on the IF Multiplexer (IF MUX) Board

1. Connect and route the 8120-5014 (x2) and 8120-5017 (x3) cables as shown on the IF MUX board (items ① through ⑥). You will connect the other ends of the IF gray cables later on the process. Refer to **Figure 15**

NOTE

When connecting the IF gray cables, be careful to look for the correct connector labels on the IF multiplexer (IF MUX) board.

Figure 15 Connecting and Routing the Gray Cables on the IF MUX board (8120-5014 (x2) and 8120-5017 (x3))^{1, 2}



1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

2. Route the reconnected mixer brick (MXB) and IF multiplexer (IF MUX) gray cables that were reconnected in “**Step 14. Reinstall the Mixer Brick (MXB) Cables**” on page 31. Refer to **Figure 16**.

Figure 16 Routing the reconnected MXB and IF MUX Gray Cables on the IF MUX board

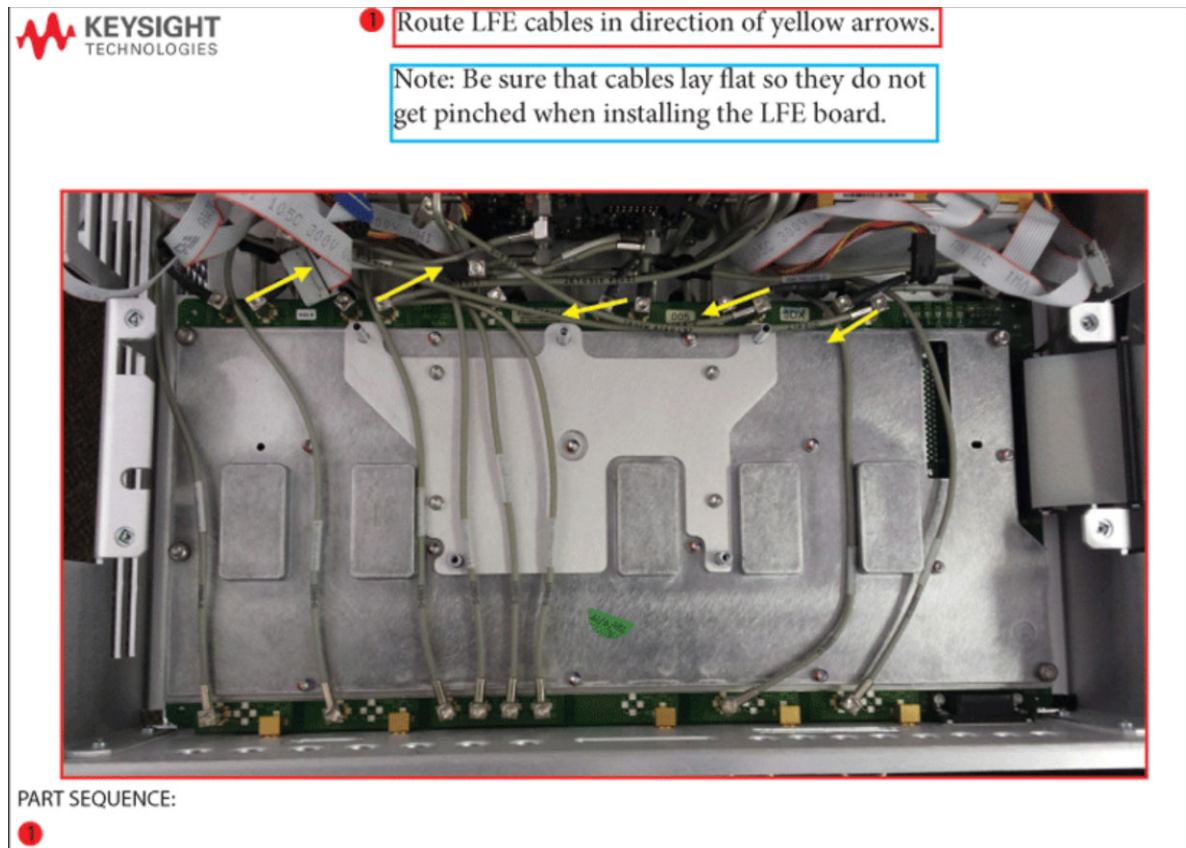
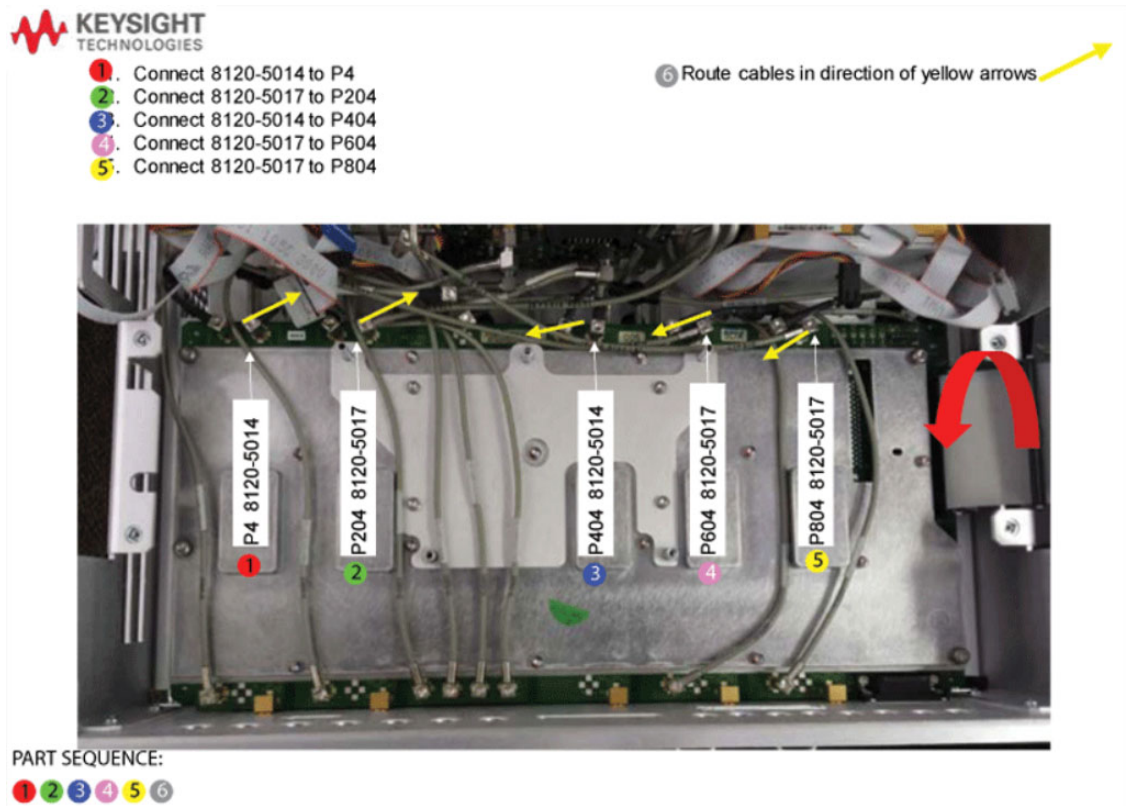


Figure 17

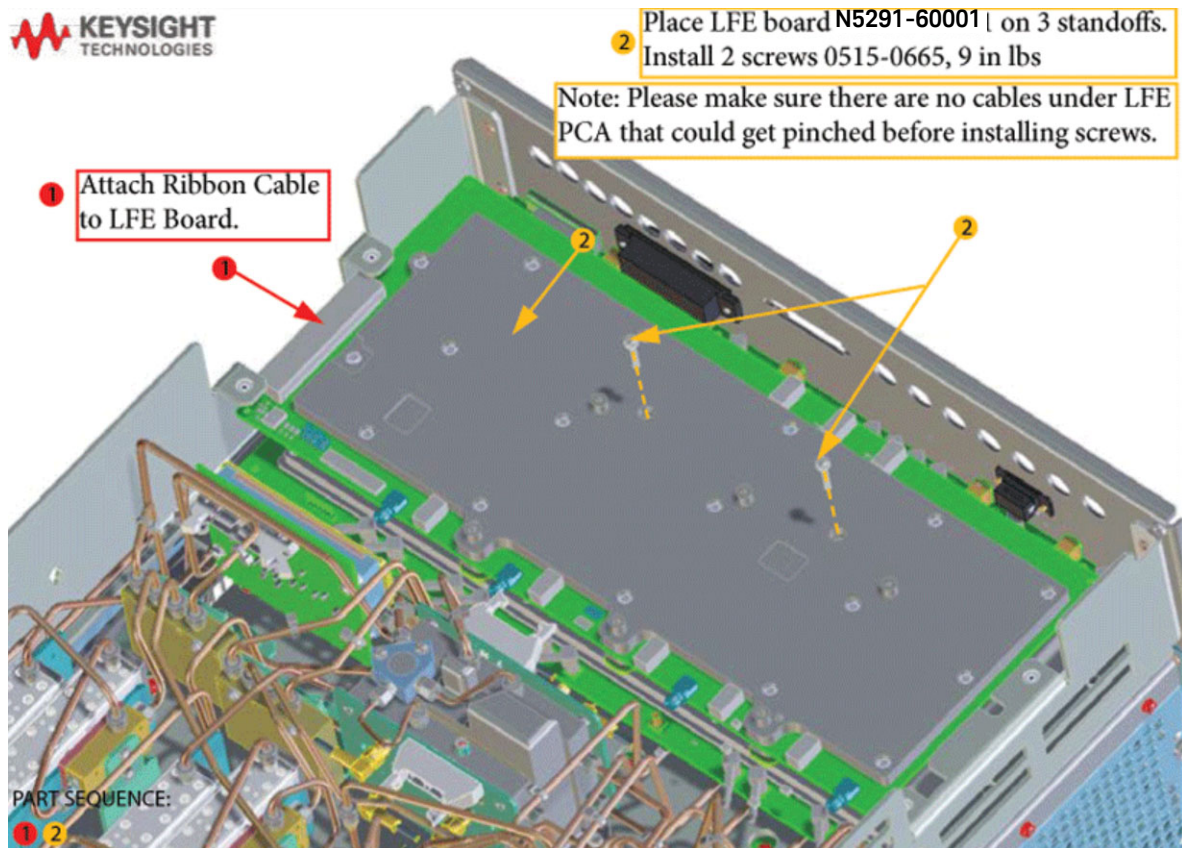
Routing the new low frequency extension (LFE) Gray Cables on the IF MUX board (8120-5014 (x2) and 8120-5017 (x3))



Step 17. Install A70 Low Frequency Extension (LFE) Board

1. Install the LFE A70 board using the standoffs as a guide.
2. Connect N5240-60089 Motherboard / IF Multiplexer / LFT/ LFE/ Test set motherboard (MB/IF MUX/LFT/LFE/TSMB) ribbon cable to LFE board J1 (item ①). Refer to **Figure 18**.
3. Install the N5291-60001 A70 LFE board using the 0515-0665 screws (x2). Torque to 9 in-lbs (item ②). Refer to **Figure 18**.

Figure 18 Install the A70 LFE board (N5240-60089, N5291-60001 and 0515-0665)^{1, 2}



1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

Step 18. Connect A71-A74 Bias Tee Combiner's New Cables to A70 Low Frequency Extension (LFE) Board and the Other Ends of the New Cables Connected to the IF Multiplier (IF MUX) Board

CAUTION

This upgrade kit contains cables for Version 6 synthesizers and Version 7 direct digital synthesizer (DDS) assemblies. Please refer to your instrument's Service Guide, if you are unclear which assembly you have installed. Refer to ["Downloading the Online PNA-X Service Guide" on page 9](#).

1. Connect the IF gray cables item ① through item ⑤ as shown in [Figure 19 on page 38](#) and [Figure 20 on page 39](#). (8120-5014 (x2), 8120-5017 (x3)). (i.e., one end was installed in [Figure 15 on page 33](#).)
2. Then choose one of the following:
 - **Version 6 Synthesizers:** Connect the Source 1, Source 2, and LO Source cables to the LFE board as shown (N5245-60027, N5242-60079, and N5242-60080) – (items ⑥ through ⑧). The other end of the N5245-60027, N5242-60079, and N5242-60080 are connected to Source1, Source 2, and LO Source boards in a later step. Refer to [Figure 19 on page 38](#)
 - **Version 7 Synthesizers:** Connect the Source 1, Source 2, and LO Source cables to the LFE board as shown ((N5240-60112, N5240-60113, and N5240-60114) – (items ⑥ through ⑧). The other end of the N5240-60112, N5240-60113, and N5240-60114 are connected to Source1, Source 2, and LO Source boards in a later step. Refer to [Figure 20 on page 39](#)

Figure 19

Version 6 Synthesizers: Connect the other ends of the IF gray cables and connect the Source 1, Source 2, and LO Source cables as shown (8120-5014 (x2), 8120-5017 (x3), N5245-60027, N5242-60079, and N5242-60080)

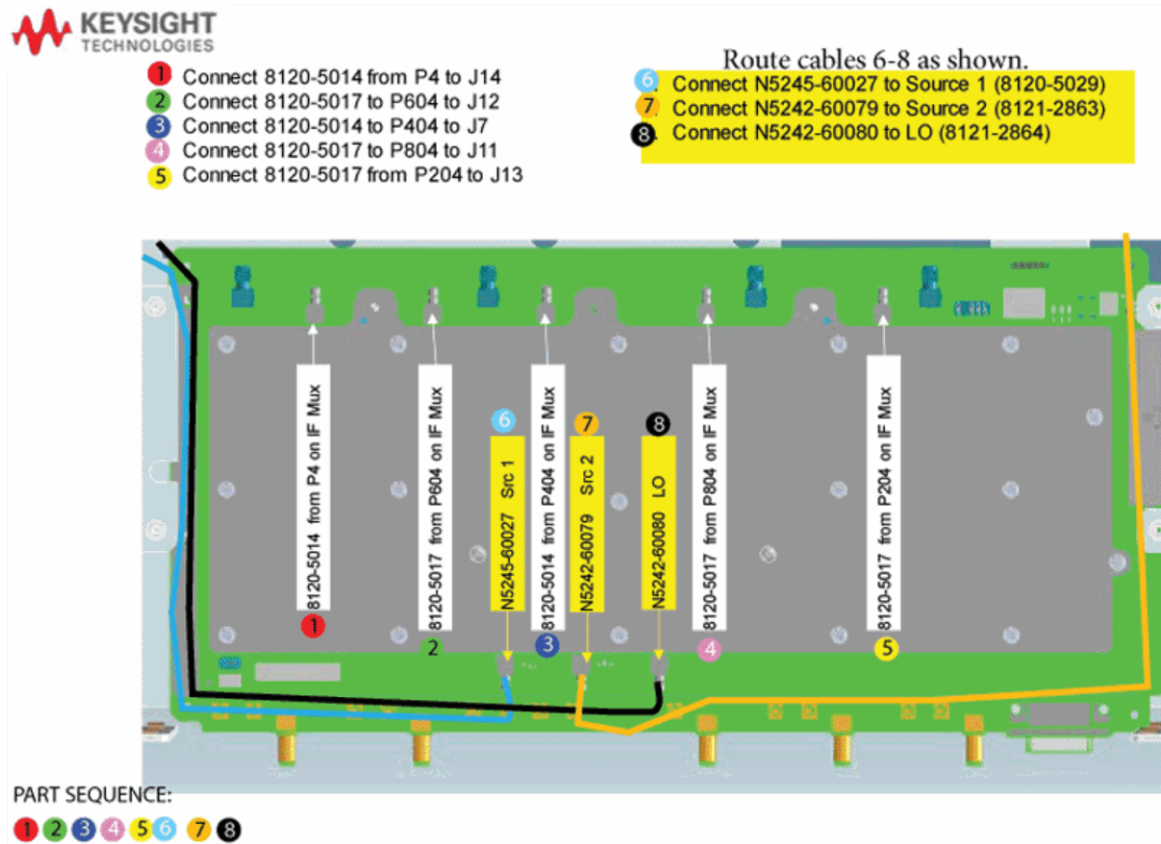
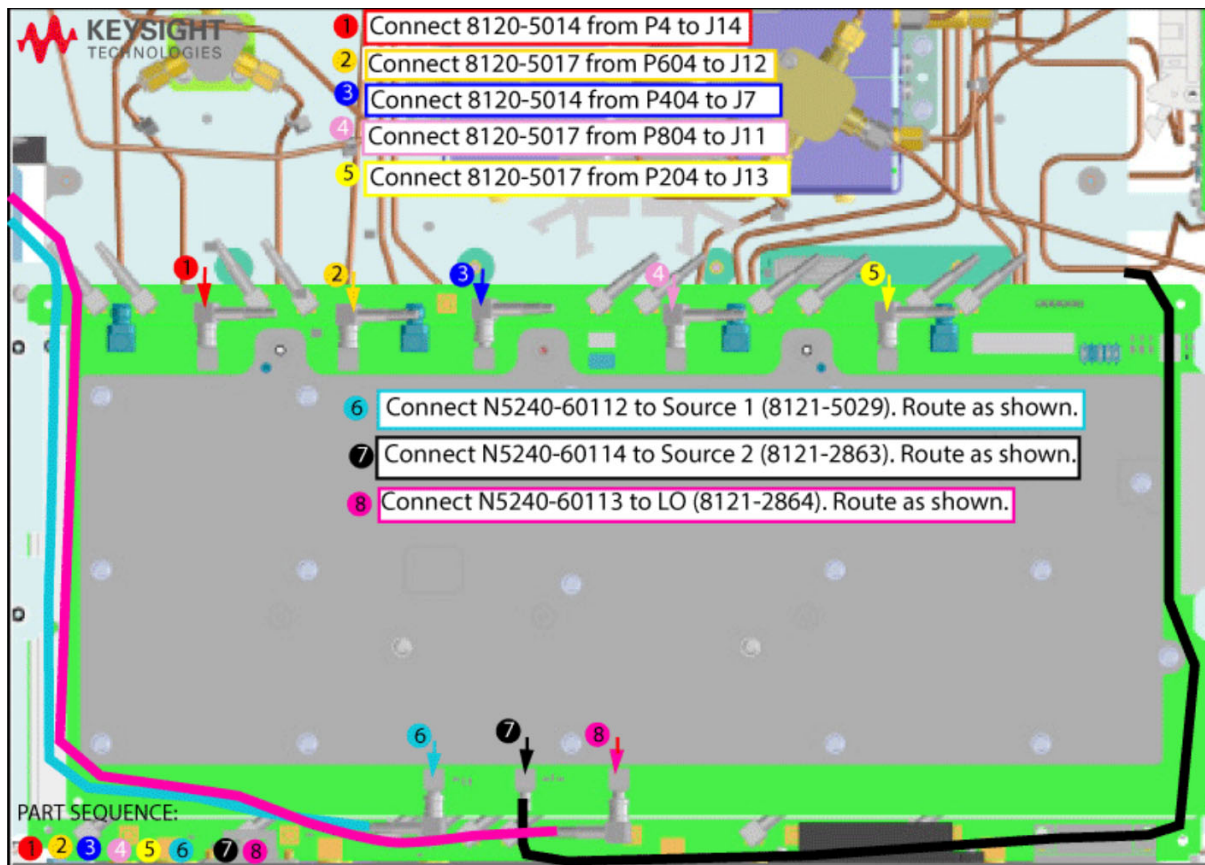


Figure 20

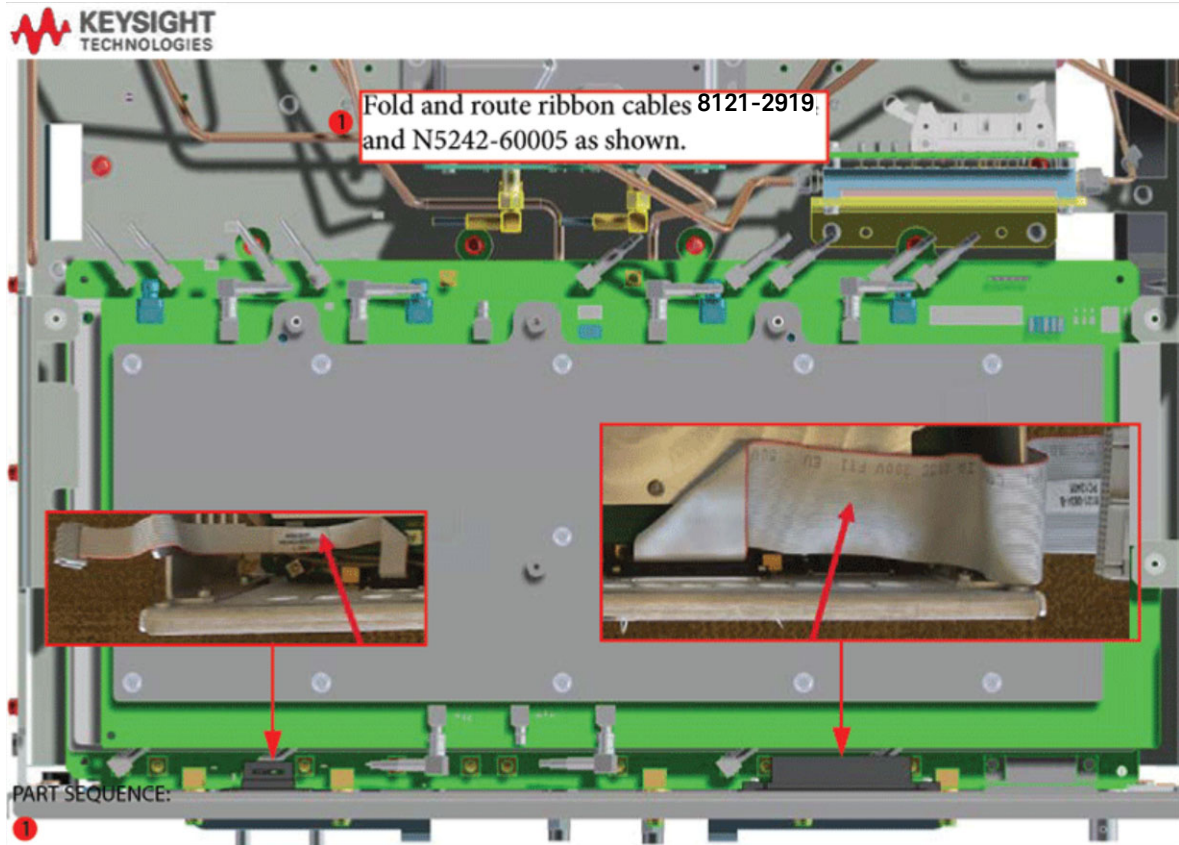
Version 7 Synthesizers: Connect the other ends of the IF gray cables and connect the Source 1, Source 2, and LO Source cables as shown (8120-5014 (x2), 8120-5017 (x3), N5240-60112, N5240-60113, and N5240-60114)



3. Fold and route Power I/O and Handler I/O cables. Refer to [Figure 21](#).

Figure 21

Reinstall and route the ribbon cables (8121-2919 and N5242-60005)



Step 19. Install the New Bias Tee Combiner's Semirigid Test Set Cables, Blue RF cables, and Install Cable Clamps Onto Ferrite Beads

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

To avoid damage when connecting and torquing the bias T combiner semirigid cables, always use a wrench to hold the bias T combiner connectors.

CAUTION

Unless otherwise specified, use a 5/16-in torque wrench set to 10 in-lbs on all cable connections (i.e., except for the cable ends that connect to the couplers, torque these to 8 in-lbs. Refer to [Figure 23 on page 45](#) and [Figure 24 on page 46](#)).

And, the front and rear panel bulkhead connectors use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

This step contains the following:

- [“Install the New Semirigid Test Set Cables” on page 41](#)
- [“Install New Blue Bias-Tee Combiner Cables and Clamps N5240-60097 Cables From the A71–A74 Bias Tees “RF-IN” to the A70 LFE Board “Port1” through “Port4” Connectors, and Cable Clamps Onto the Ferrite Beads” on page 50](#)

Install the New Semirigid Test Set Cables

Refer to [Figure 22 on page 44](#) through [Figure 33 on page 58](#) for this step of the procedure. Although only Option 423 is shown in the illustrations, Option 425 is similar in appearance. To see an image showing the location of these cables, click the appropriate Chapter 6 bookmark (e.g., “4-Port Configuration, Options 425/029 (S/N Prefixes <6021)” or “4-Port Configuration, Options 425/029 (S/N Prefixes ≥6021)”) in the PDF Service Guide¹. New parts are listed in [Table 1 on page 11](#).

1. Install the following new cables in the order listed:

NOTE

The reference designators in this step correspond to the figures [Figure 22 on page 44](#) through [Figure 24 on page 46](#). But, some of the previous steps are provided for your reference.

1. See [“Downloading the Online PNA-X Service Guide” on page 9](#).

Option 425:

Option 425 only – Connect the following, by referring to **Figure 23 on page 45** (See also **Figure 22 on page 44.**):

- ① – (Option 425 Only) W181 (N5245-20179) to front panel port 2 CPLR THRU to A74 port 2 bias combiner
- ② – W188 (N5245-20183) A36 port 2 test port coupler to A74 port 2 bias combiner
- ③ – W186 (N5245-20185) A35 port 4 test port coupler to A73 port 4 bias combiner
- ④ – W185 (N5245-20181) front panel port 4 CPLR THRU to A73 port 4 bias combiner

Option 425 only – Connect the following by referring to **Figure 24 on page 46** (See also **Figure 22 on page 44.**):

- ① – W182 (N5245-20182) A33 port 1 test port coupler to A71 port 1 bias combiner
- ② – W183 (N5245-20180) front panel port 3 CPLR THRU to A72 port 3 bias combiner
- ③ – (Option 425 only) W181 (N5245-20178) front panel port 1 CPLR THRU A71 port 1 bias combiner
- ④ – W184 (N5245-20184) A34 port 3 test port coupler to A72 port 3 bias combiner

Option 425 with 029:

Option 425 with 029 only – Connect the following by referring to **Figure 25 on page 47:**

- ① – (Option 425 with 029 Only) W190 (N5245-20188) A57 port 2 noise bypass switch to A74 port 2 bias combiner
- ② – W188 (N5245-20183) A36 port 2 test port coupler to A74 port 2 bias combiner
- ③ – W186 (N5245-20185) A35 port 4 test port coupler to A73 port 4 bias combiner
- ④ – W185 (N5245-20181) front panel port 4 CPLR THRU to A73 port 4 bias combiner

Option 425 with 029 only – Connect the following by referring to **Figure 26 on page 48**:

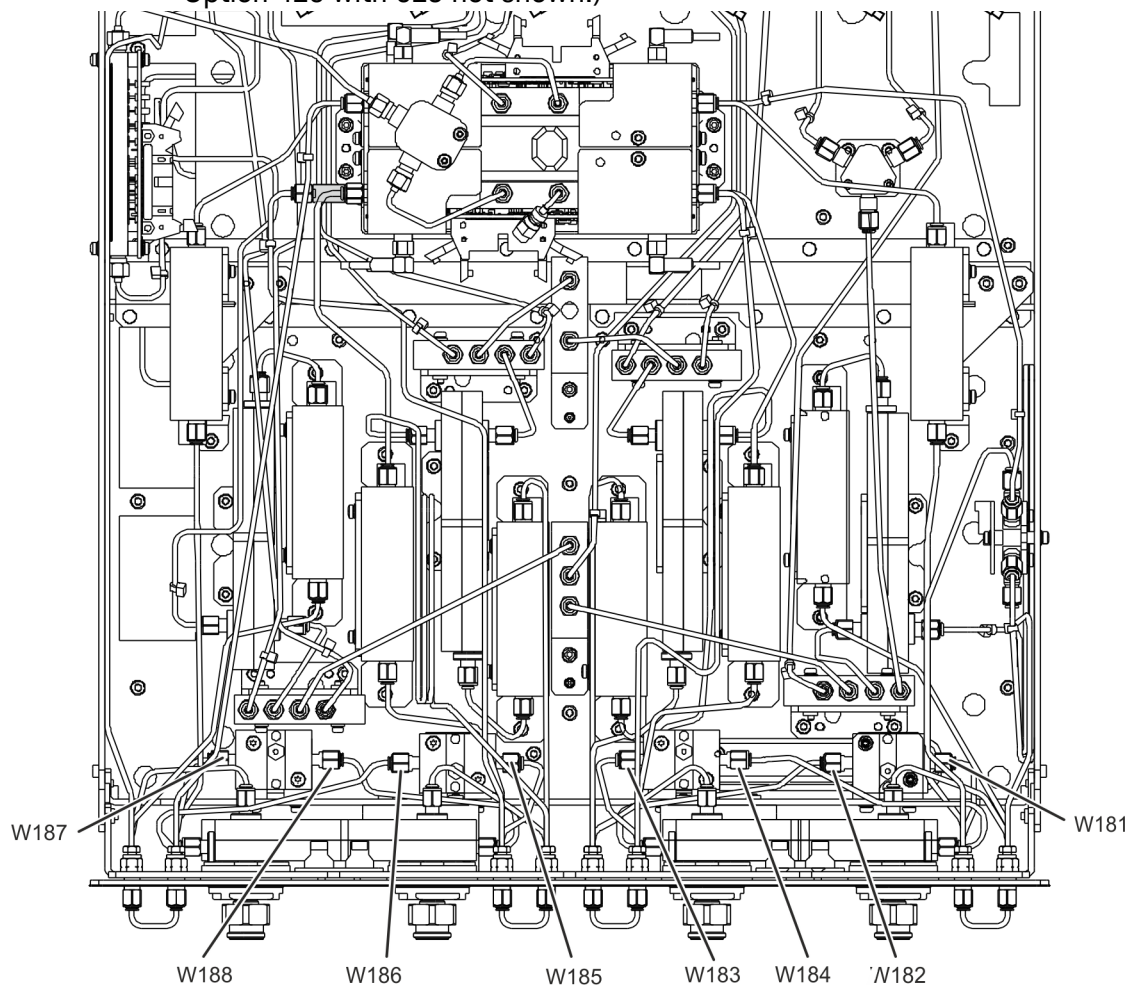
- ① – W183 (N5245-20180) A34 port 3 test port coupler to A72 port 3 bias combiner

Option 425 with 029 only – Connect the following by referring to **Figure 27 on page 49**:

- ① – W182 (N5245-20182) A33 port 1 test port coupler to A71 port 1 bias combiner
- ② – W184 (N5245-20184) A34 port 3 test port coupler to A72 port 3 bias combiner
- ③ – W189 (N5245-20189) A56 port 1 noise bypass switch to port 1 bias combiner

Figure 22

New Test Set Cable Installation (Option 423 Shown. Option 425 is similar. Option 425 with 029 not shown.)^{1, 2}



(Some parts removed for clarity.)

N5245_122_4PT_425-1_BTM

1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 "2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

Figure 23 Option 425 Only – New Test Set Cables Installation (N5245-20179, N5245-20181, N5245-20183, and N5245-20185)

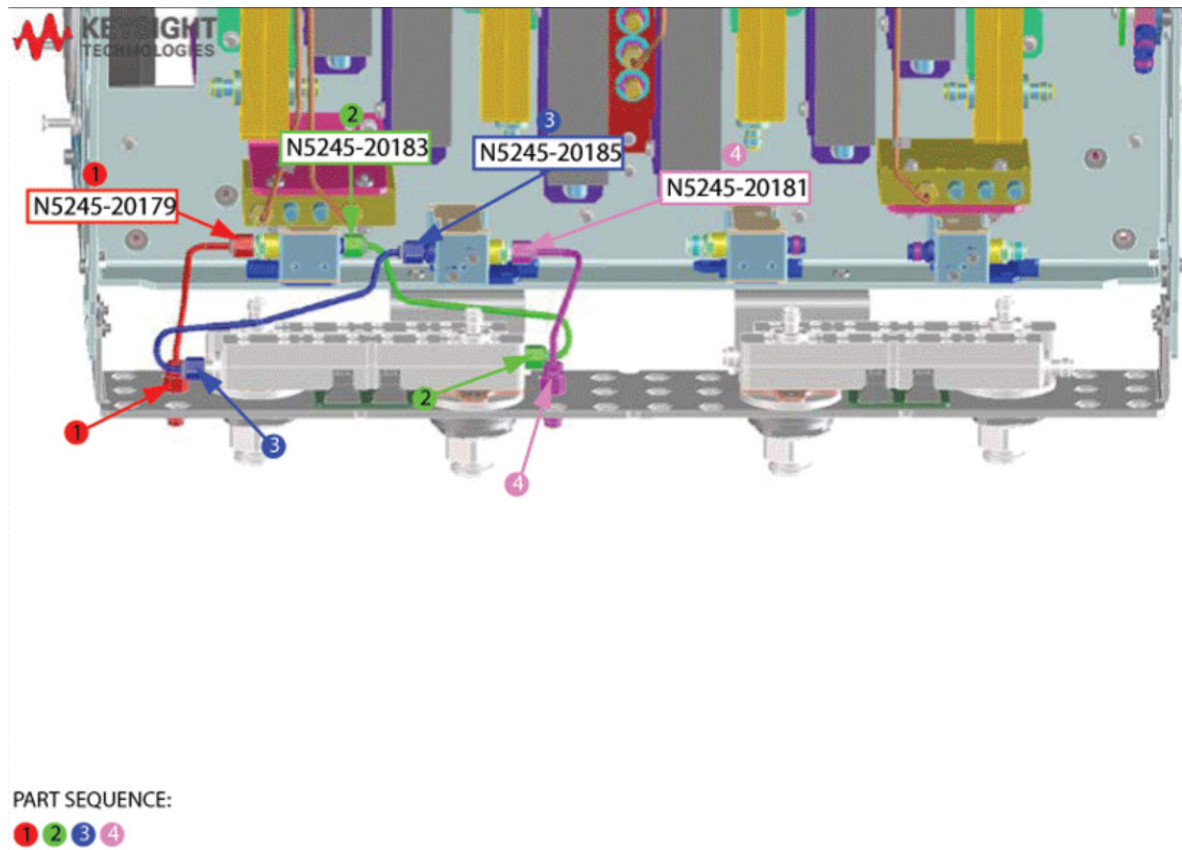


Figure 24

Option 425 only – New Test Set Cables Installation (N5245-20178, N5245-20180, N5245-20182, and N5245-20184)

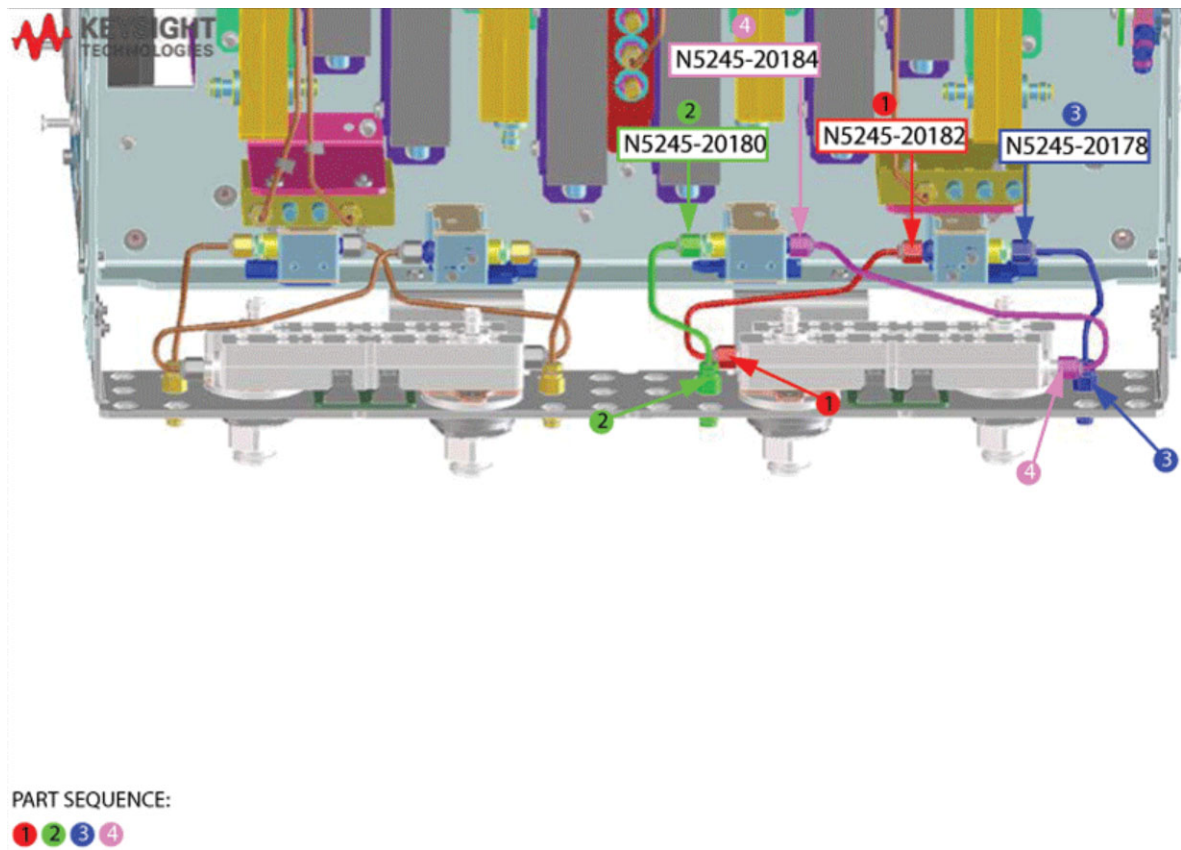


Figure 25 Option 425 with 029 Only – New Test Set Cables Installation (N5245-20188, N5245-20181, N5245-20183, and N5245-20185)

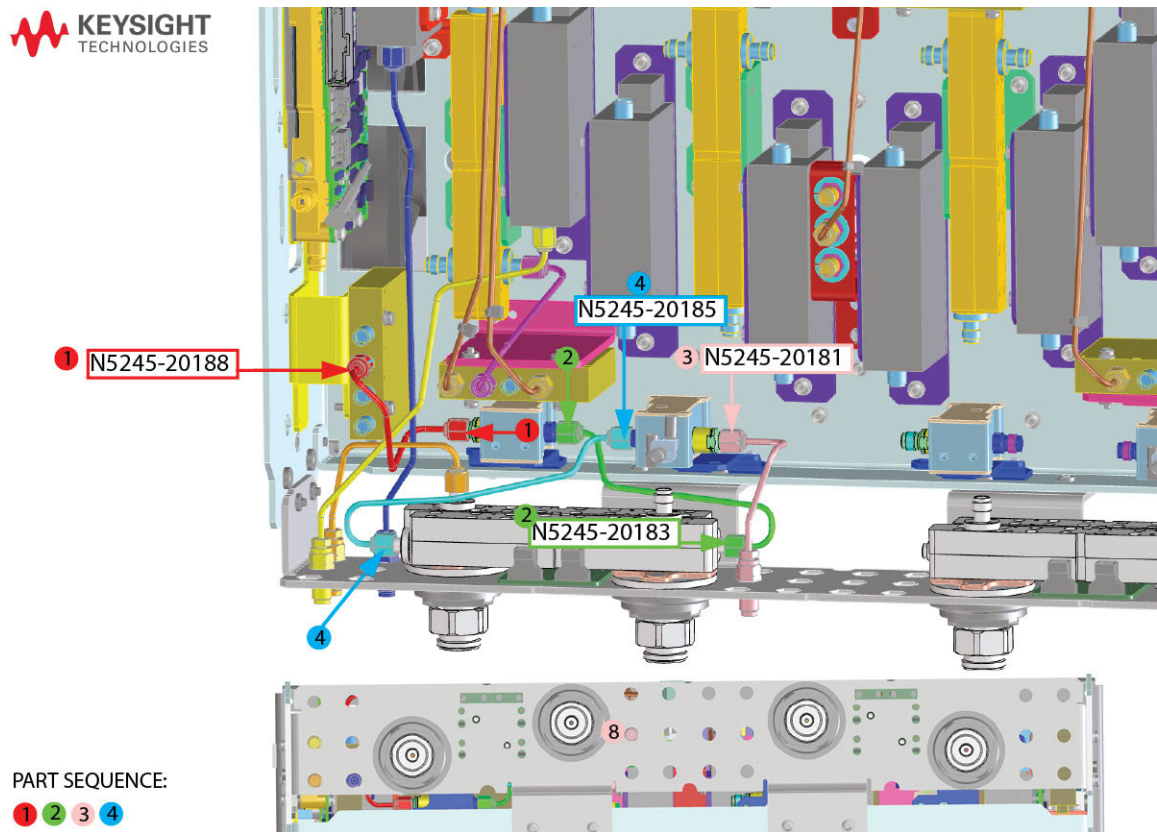


Figure 26 Option 425 with 029 Only – New Test Set Cables Installation (N5245-20180)

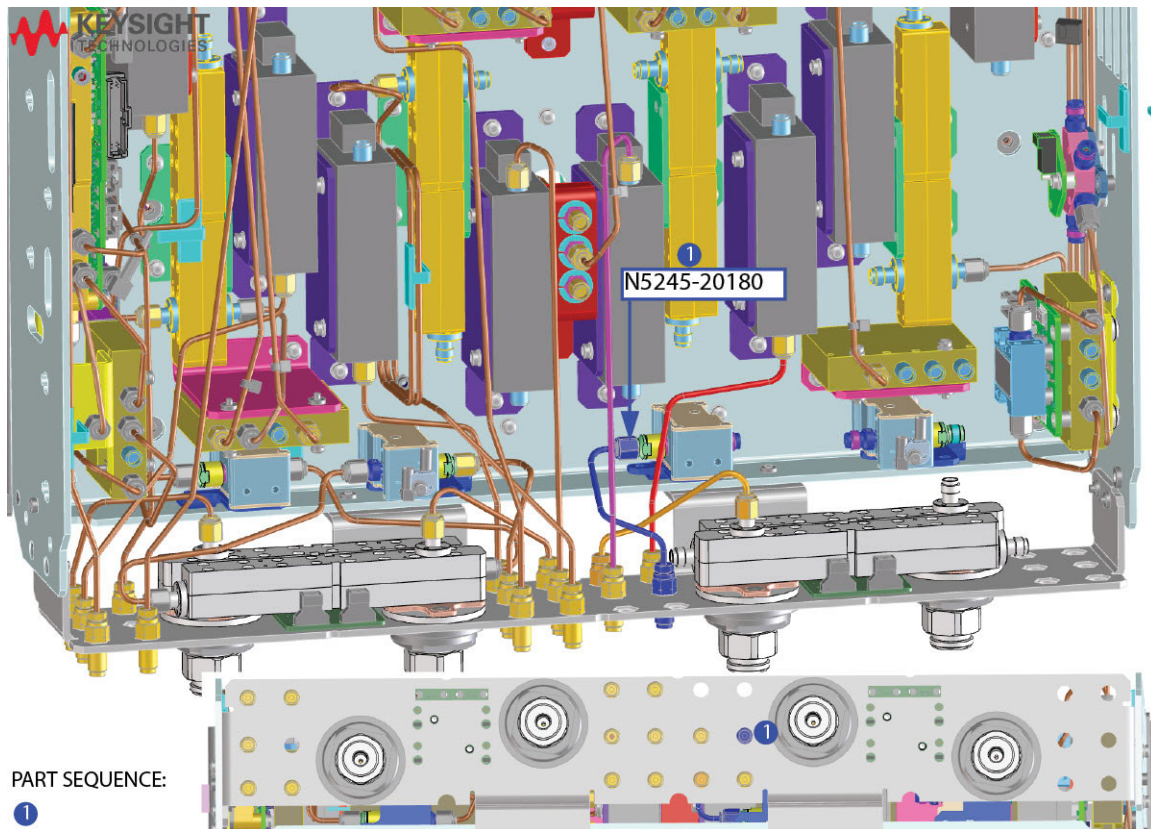
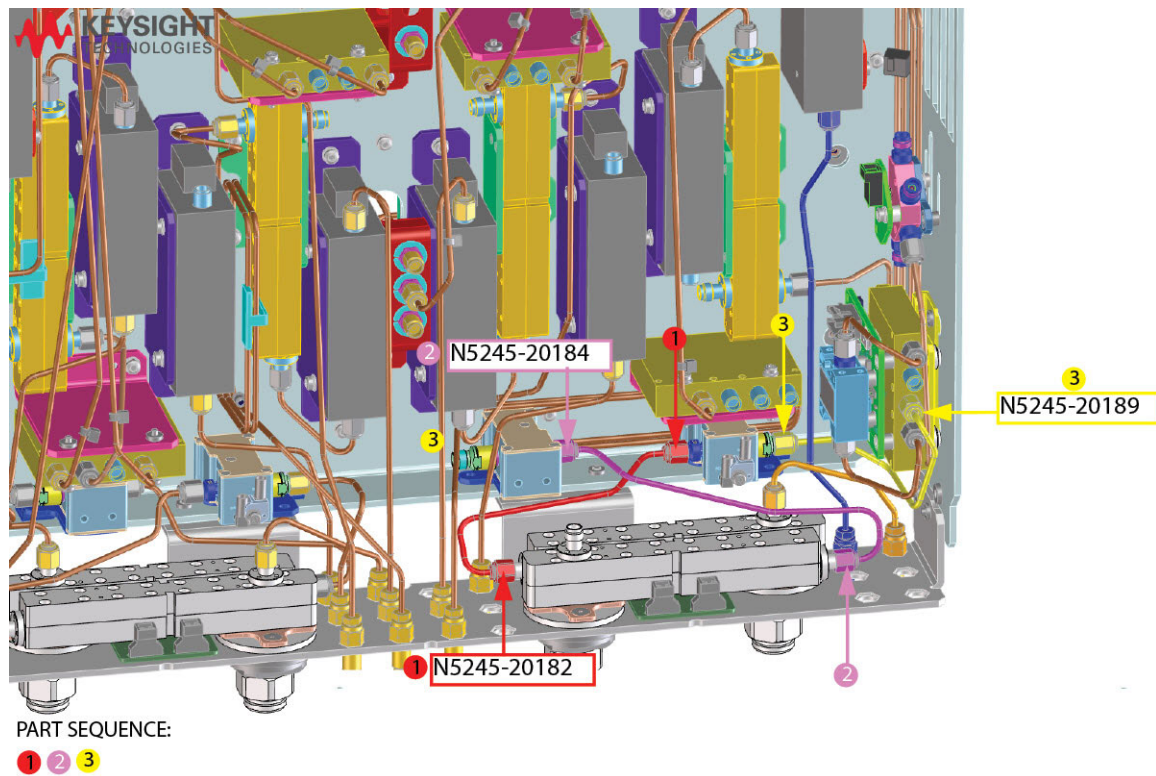


Figure 27 Option 425 with 029 Only – New Test Set Cables Installation (N5245-20182, N5245-20184, and N5245-20189)



Install New Blue Bias-Tee Combiner Cables and Clamps N5240-60097 Cables From the A71–A74 Bias Tees “RF-IN” to the A70 LFE Board “Port1” through “Port4” Connectors, and Cable Clamps Onto the Ferrite Beads

2. Connect new cables N5240-60097 (x2) from A72 and A74 bias tee combiners to the A70 LFE board connectors (items ① through ③). Torque to 10 in-lbs on the LFE board. Torque to 10 in-lbs. Refer to **Figure 28**.
 3. Connect new cables N5240-60097 (x2) from A71 and A73 bias tee combiners to the A70 LFE board connectors (items ① through ③). Torque to 10 in-lbs on the LFE board. Torque to 10 in-lbs. Refer to **Figure 29 on page 51**.
- Separate cables as much as possible
 - OK to cross
 - Not OK run parallel or next to each other
 - Do **not** tie wrap a semirigid cable

Figure 28

Connect N5240-60097 from A74 and N5240-60097 from A73 Bias Tee Combiners to A70 LFE Board (N5240-60097 (x2) and 1400-1391 (x2))

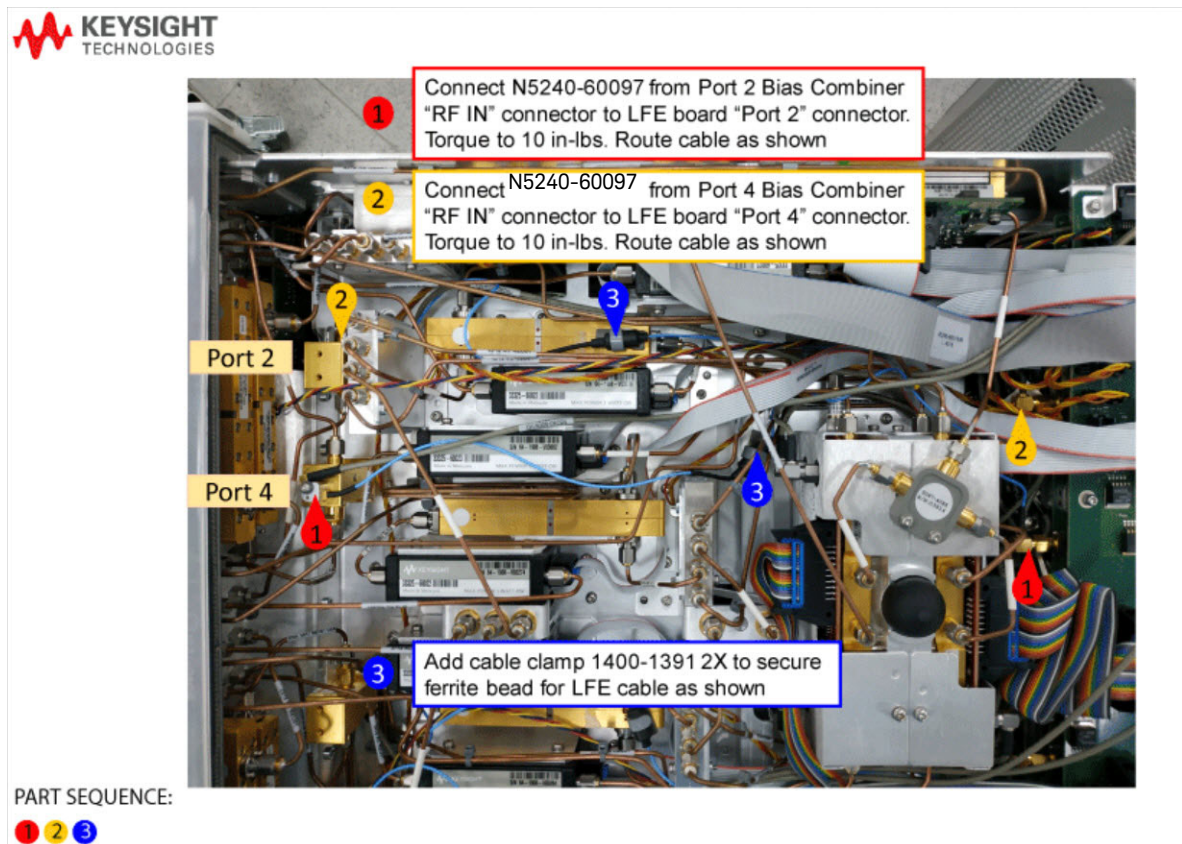
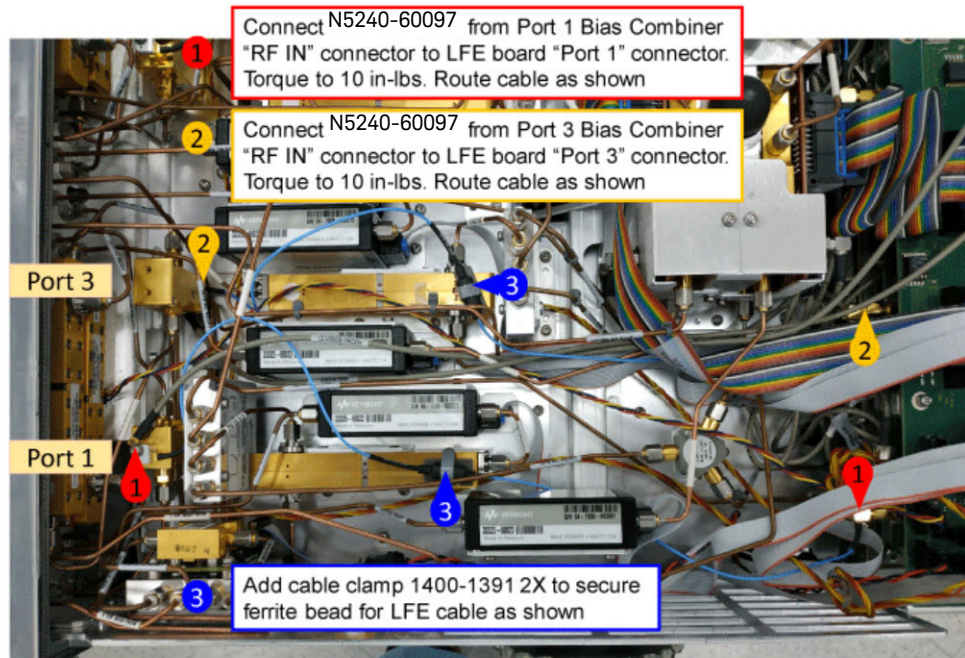


Figure 29

Connect N5240-60097 (x2) from Port 1 A71 and Port 3 A72 Bias Tee Combiners to "Port1" and "Port3" on A70 LFE Board (N5240-60097 (x2), and 1400-1391 (x2))



PART SEQUENCE:



Step 20. Reinstall the A23 Test Set Motherboard (TSMB)

For instructions, click the Chapter 7 bookmark “Removing and Replacing the A23 Test Set Motherboard” in the PDF Service Guide¹. Keep this Service Guide chapter available, because you will use it for reference in the next step.

You will install the rest of the ports 1 through 4 switch, receiver attenuator, and source attenuator cables to the test set motherboard in the next step. Proceed to **“Step 21. Install the A71 and 74 Bias-Tee Combiner’s Gray Low Frequency Extension (LFE) DC bias Cables and Route Cables.”**.

NOTE

IMPORTANT! Use the N5240-60089 ribbon cable from this kit in lieu of ribbon cable N5242-60004. Refer to **Table 1 on page 11**.

NOTE

STOP! Do not install the port 1 through 4 switch, receiver attenuator, and source attenuator cables to the test set motherboard J101 through J104 connectors until the next step. Refer to **“Step 21. Install the A71 and 74 Bias-Tee Combiner’s Gray Low Frequency Extension (LFE) DC bias Cables and Route Cables.”**

1. See **“Downloading the Online PNA-X Service Guide” on page 9**.

Step 21. Install the A71 and 74 Bias-Tee Combiner's Gray Low Frequency Extension (LFE) DC bias Cables and Route Cables

This step contains the following:

- “Install the A71–74 Bias-Tee Combiner's Gray Low Frequency Extension (LFE) DC bias Cables” on page 53
- “Route the bias T combiner cables” on page 54

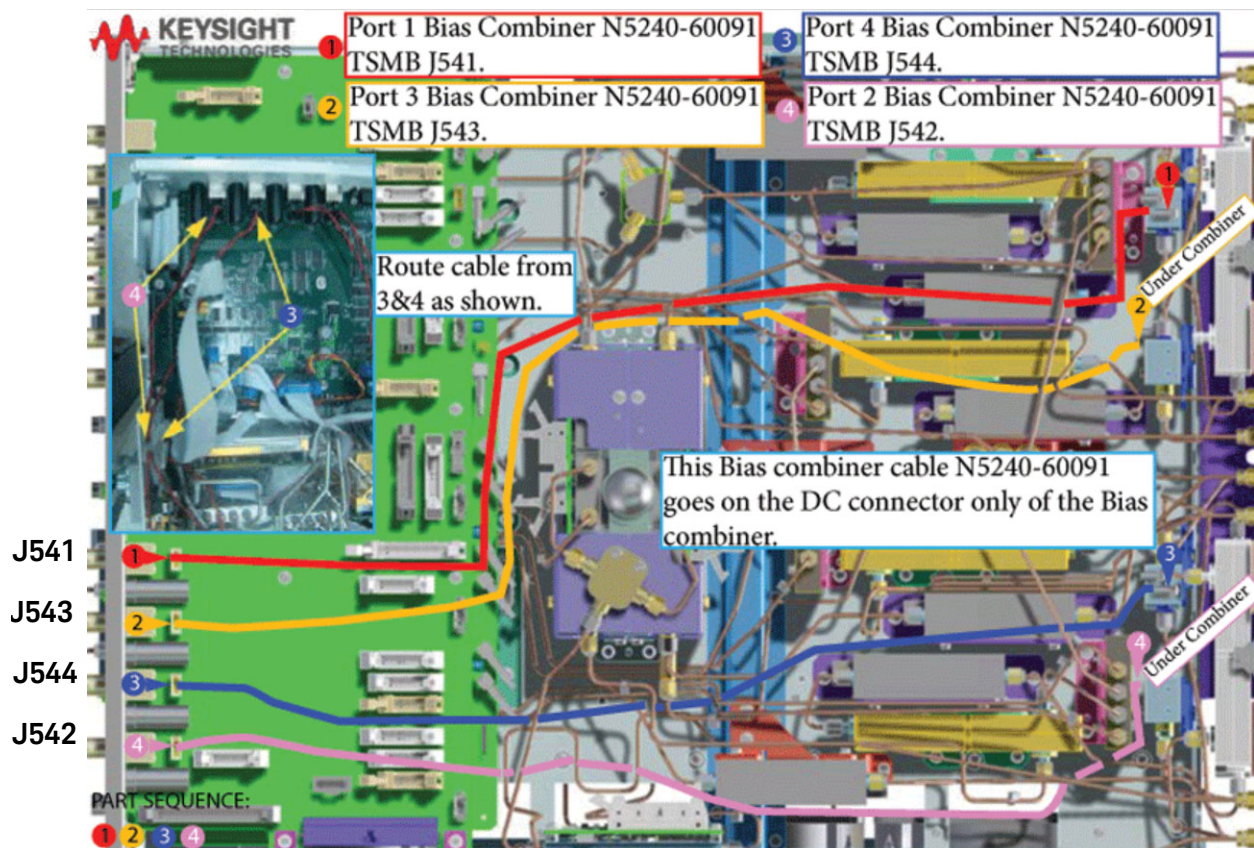
Install the A71–74 Bias-Tee Combiner's Gray Low Frequency Extension (LFE) DC bias Cables

1. Connect the N5291-60091 (x4) cables as shown in **Figure 30** (items ① through ④). Refer to **Figure 30** for the following steps.

NOTE

IMPORTANT! The N5240-60091 (x4) bias combiner cables only connect to the DC bias of the Bias Tee Combiner.

Figure 30 Connect the (x4) cables as shown (N5291-60091)^{1, 2}



Route the bias T combiner cables

2. Route bias cables as shown.

- Separate cables as much as possible.
- It is OK to cross the cables.
- Avoid running cables parallel or next to each other.
- Avoid tie wrapping to semirigid cables.

Refer to **Figure 30 on page 53**.

-
1. The A26 splitter (5067-4086) and N5245-20013, N5245-20022, N5245-20023, N545-20101, and N5245-20150 cables are only used with a legacy HMA26.5 p/n: 5087-7765. If you are unclear which HMA26.5 assembly your PNA-X has installed, refer to Chapter 7 Repairs and **Figure 1 on page 9** and for details on A26 splitter and cabling, refer to your option-model in Chapter 6 2-Port Configurations, Serial Number Prefix <6021" and "4-Port Configuration, Serial Number Prefix <6021".
 2. Attenuator 08490-60010 is shown in the figure, but is not included in this upgrade and not required with the A28 mixer brick (5087-7417).

Step 22. Install the Other End of the Bias-Tee Combiner Cables to the Source Synthesizer and LO Synthesizer Board Gray Cables

Refer to [Figure 31 on page 55](#) and [Figure 32 on page 56](#). New parts are listed in [Table 1 on page 11](#).

1. The analyzer should be positioned on its left side (fans facing upwards) as shown.
2. Then choose from the following:
 - **Version 6 Synthesizers:** Connect N5245-60027 (item ①), N5242-60079 (item ②), and N5242-60080 (item ③) flexible cables as indicated in [Figure 31 on page 55](#).
 - **Version 7 Synthesizers:** Connect N5240-60112 (item ①), N5240-60114 (item ②), and N5240-60113 (item ③) flexible cables as indicated in [Figure 32 on page 56](#).

Figure 31

Version 6 Synthesizers: New Test Set Cables Installation. Connect the other end of gray cables—Part 2 (N5245-60027, N5242-60079, and N5242-60080)

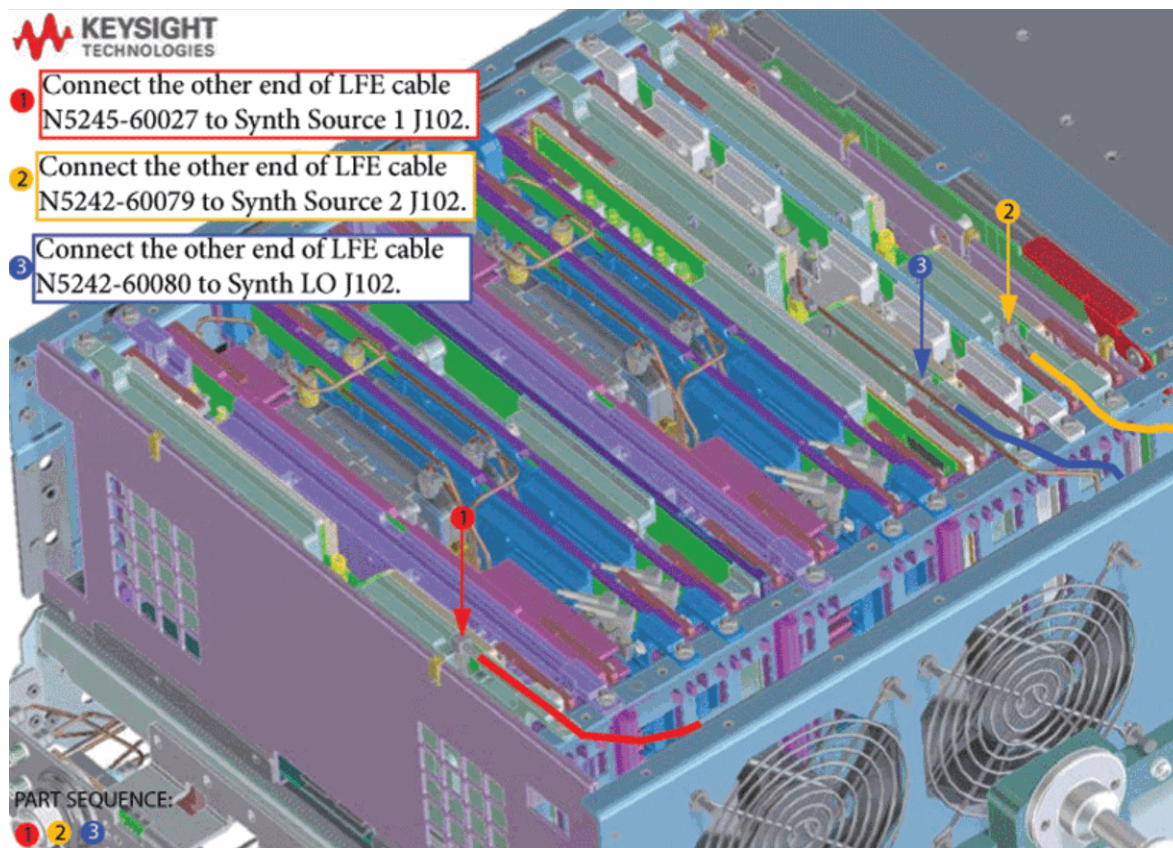
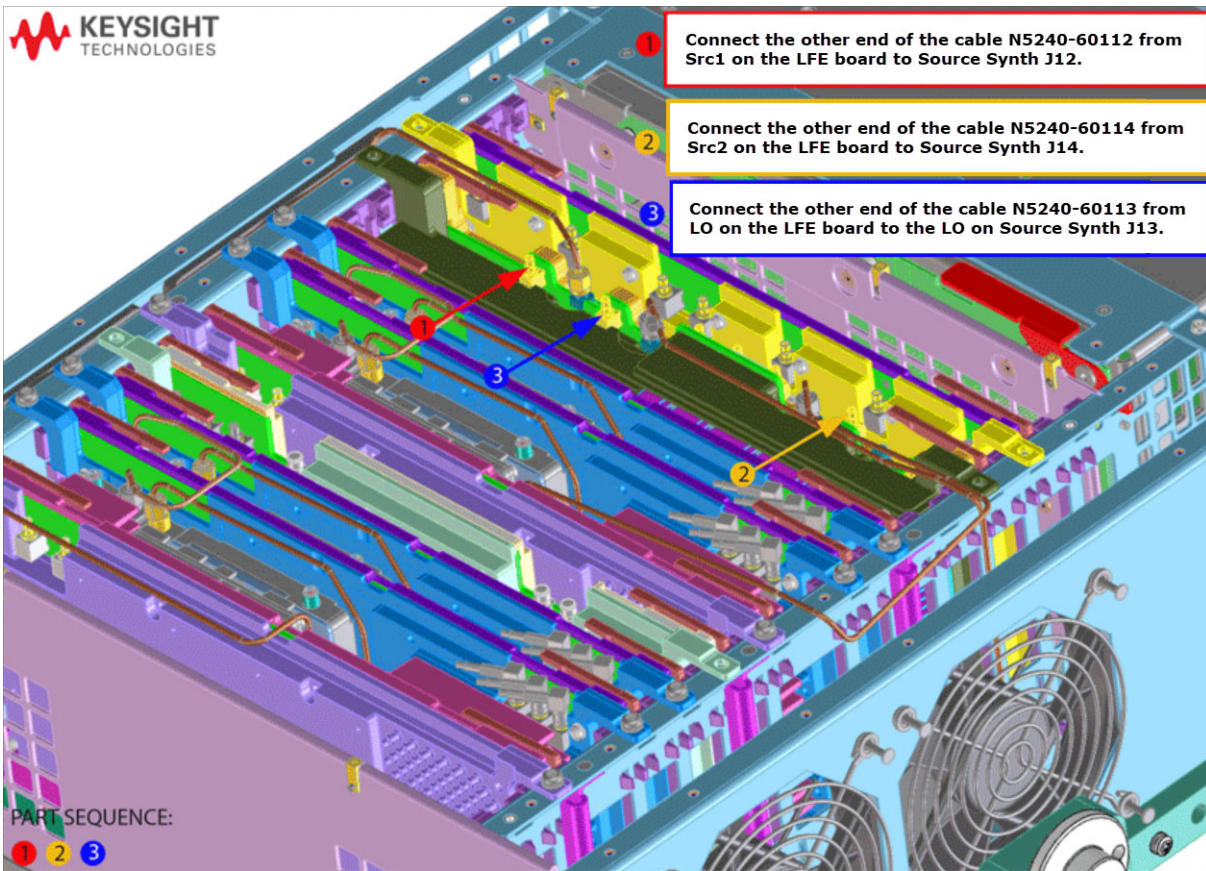


Figure 32

Version 7 Synthesizers: New Test Set Cables Installation. Connect the other end of gray cables—Part 2 (N5240-60112, N5240-60113, and N5240-60114)



Step 23. Remove the Old Lower Front Panel Overlay

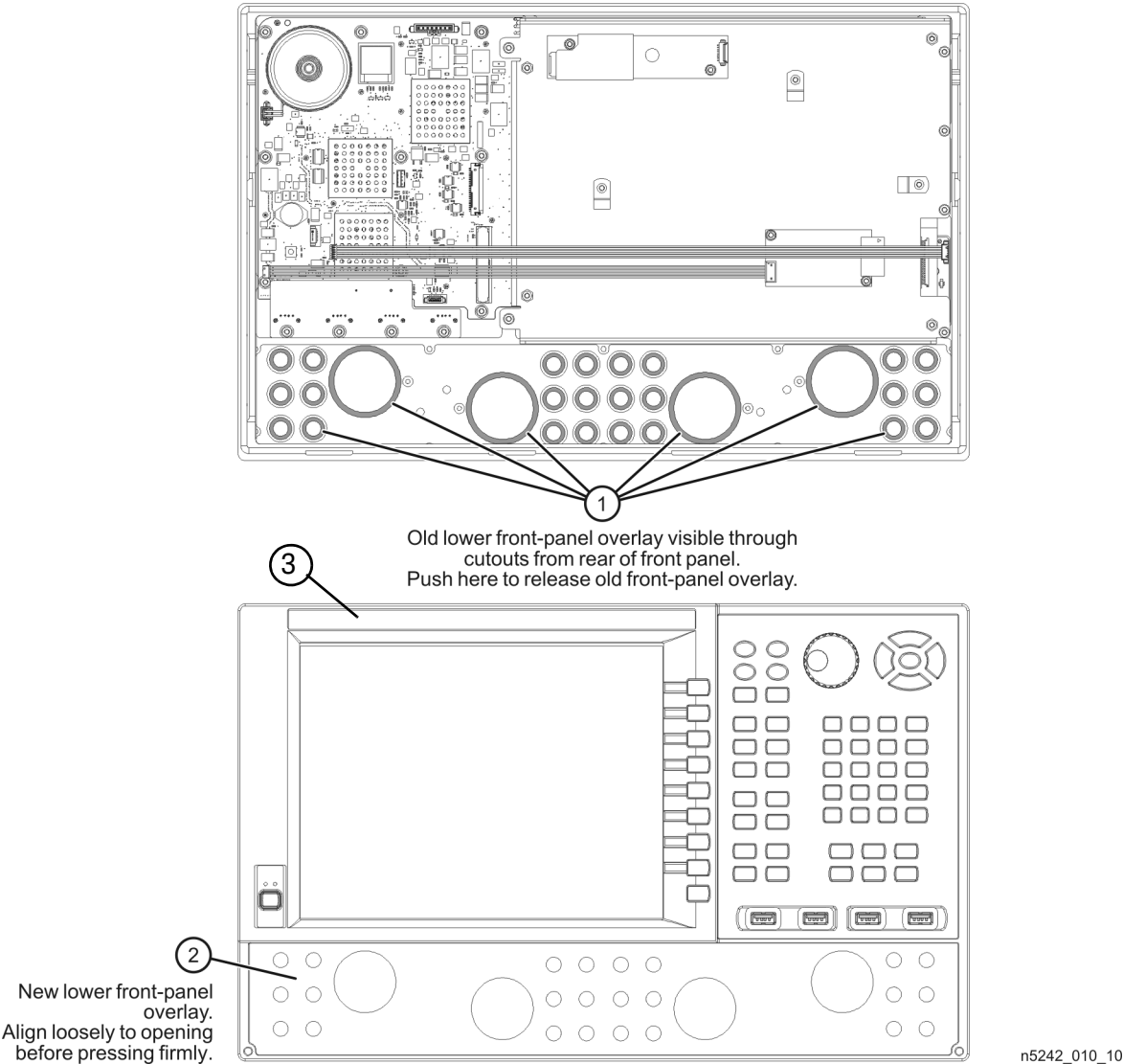
Refer to **Figure 33** for this step of the procedure. New parts are listed in **Table 1 on page 11**.

1. From the back side of the front panel, use a blunt object in the cutouts in the lower front dress panel to push on the old overlay (item ①) and separate it from the front dress panel.
2. From the front side of the front panel, pull off the overlay completely and discard it.
3. Remove the nameplate from the front panel (item ③).
4. Remove any adhesive remaining on the front panel.

NOTE

IMPORTANT! To avoid possible damage to the lower front panel overlay, do not attempt to attach the lower front panel label until **“Step 25. Install the New Lower Front Panel Overlay and Nameplate” on page 60**.

Figure 33 Lower Front Panel Overlay Replacement



Step 24. Reinstall the Front Panel Assembly

CAUTION

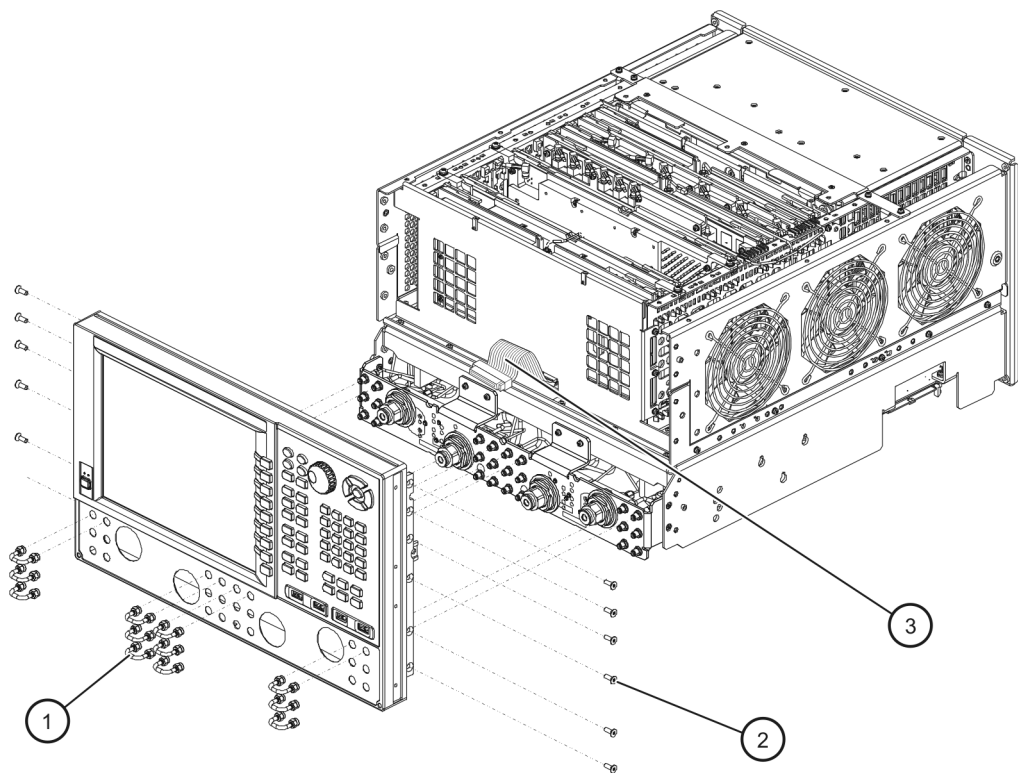
Before installing the front panel assembly onto the analyzer, lift and support the front of the analyzer chassis.

Refer to **Figure 34** for this step of the procedure. New parts are listed in **Table 1 on page 11**.

1. Reconnect the ribbon cable (item ③) to the A1 front panel interface board.
2. Slide the front panel over the front-panel connectors.
3. With a T-10 TORX driver, reinstall the 12 screws (item ②) in the sides of the frame.
 - Be sure to install the two new screws (0515-1946) in the front panel, next to test ports 3 and 4. Torque these screws to 9 in-lbs.

Figure 34

Front Panel Assembly Re-installation



n5242_010_02

Step 25. Install the New Lower Front Panel Overlay and Nameplate

Refer to **Figure 33 on page 58** for the lower overlay and to **Figure 34 on page 59** for the hex nuts installation for this step of the procedure. New parts are listed in **Table 1 on page 11**.

1. Remove the protective backing from the N5245-80037 new front panel overlay (Option 425) – (item ②).
2. Starting from either side, **loosely** place the overlay in the recess on the lower front panel, ensuring that it fits tightly against the edges of the recess.
3. Once the overlay is in place, press it firmly onto the frame to secure it.
4. Reinstall all of the semirigid jumpers (item ②) on the front-panel, and tighten each of the connectors using a 5/16-in torque wrench set to 10 in-lbs. Refer to **Figure 34 on page 59**.
5. Remove the protective backing and Install the nameplate (N5245-80036).

Step 26. DC Continuity Test the LFE Board and Test Ports

The DC continuity test verifies that the LFE board is installed correctly and does not have any opens or shorts in the DC path.

1. Using a DVM, connect one test probe to the center conductor of the RF port 1 (1 1.85 mm) on the front panel.
2. Connect the other test probe to the port 1 bias input (**BIAS 1 IN**) on the rear panel.
3. Verify the DVM measures $<10\Omega$.
4. Repeat these steps for each of the other test ports.

NOTE

If the DVM value is 0Ω or $>10\Omega$, then something is incorrectly installed or there is an open or short somewhere in the LFE board/cable path:

- Verify the gray cables installed in “**Step 19. Install the New Bias Tee Combiner’s Semirigid Test Set Cables, Blue RF cables, and Install Cable Clamps Onto Ferrite Beads**” on page 41 and “**Step 19. Install the New Bias Tee Combiner’s Semirigid Test Set Cables, Blue RF cables, and Install Cable Clamps Onto Ferrite Beads**” on page 41 are connected correctly and not open or shorted.
-

Step 27. Position the Cables and Wires to Prevent Pinching

On the top side of the PNA-X, carefully position the gray flex cables so they can't be pinched between the covers and the rails.

On the bottom side of the PNA-X, 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 28. Reinstall the Inner Cover

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

Step 29. Reinstall the Outer Cover

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

1. See ["Downloading the Online PNA-X Service Guide" on page 9](#).

Step 30. Remove Option 423 License

NOTE

If Option 423 is not loaded on your PNA, proceed to “**Step 31. Enable Option 425**” on page 63.

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must **not** be running.
- A keyboard and mouse must be connected to the network analyzer.

Option 423 License Removal Procedure

1. To start the Keysight License Manager, press **Start > Keysight License Manager > Keysight License Manager**. A Keysight License Manager dialog box will appear.
2. Right click the on the desired option and click **Delete**.
3. In the Keysight License Manager dialog box that appears, press or click **Yes** to confirm delete.
4. A message displays stating that the option removal was successful.

Step 31. Enable Option 425

Procedure Requirements

NOTE

For this step, you will need a USB flash drive.

A single license file may contain more than one feature.

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must **not** be running.
- A keyboard must be connected to the network analyzer.

Option Enable Procedure

1. Locate the email(s) from Keysight which contain license file attachments. These emails are the result of “**Step 1. Obtain a Keyword and Verify the Information**” on page 16.
2. Copy the license file(s) from the email(s) to a USB flash drive. More than one license file may be copied to the USB flash drive.

NOTE

A single license file may contain more than one feature.

3. Insert the USB flash drive to the PNA-X's USB drive slot. Within 5 seconds, the PNA-X should display a small “New licenses installed” message.

Else, load the license key file(s), manually move your license file(s) to C:\Program Files\Agilent\licensing. It may take Keysight License Manager an extra ~5 seconds to enable the licenses.

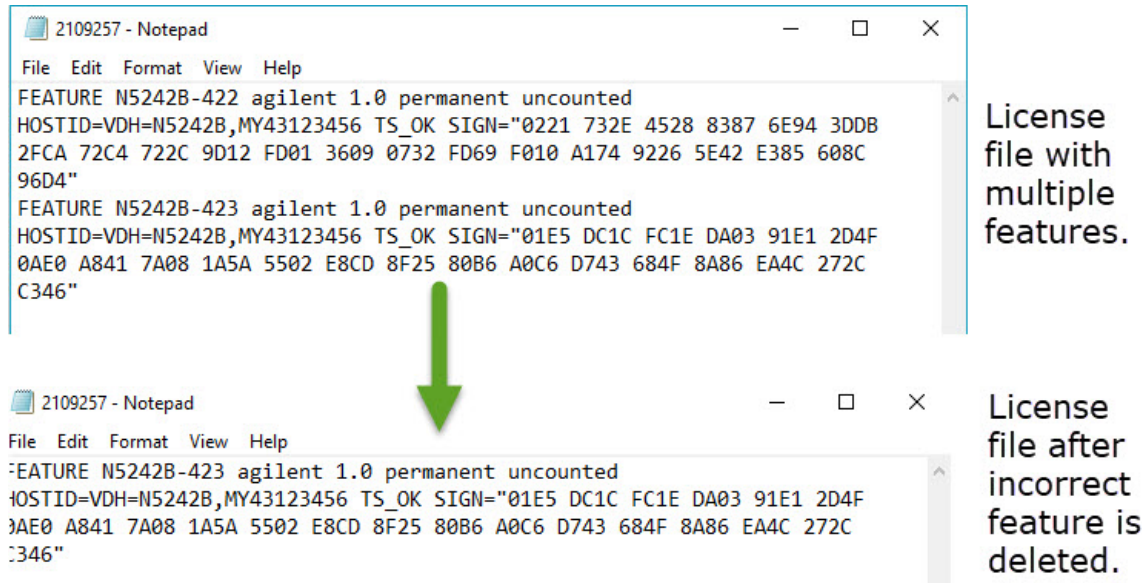
4. Verifying and editing the license file:

For these steps, refer to the example in **Figure 35 on page 64**.

- a. Verify your USB flash drive is connected to a PC.
- b. Open your license file using a text read/write program similar to Notepad.
- c. If you have more than one licensed feature, delete the feature that is **not** required for this upgrade. (e.g., in this case N5242B-423 is the correct upgrade. So, N5242B-422 is to be deleted from the text file.)

Figure 35 Editing a Keysight License File Using a Text Editor.

Note: This figure may not contain your specific features and is an example only. In this example N5242B-422 is the incorrect feature. N5242B-423 is the correct feature.



- d. Re-save the text license file to the root directory of your USB flash drive.
- e. Verify that only the single correctly edited text license file is in the root directory of your USB drive.
- f. Eject your USB flash drive and remove the USB flash drive from your PC.

5. Disconnect the USB flash drive from the PNA.

NOTE

Attempting to re-install a license file that is already installed may generate a "Corrupt Media" error message. Ignore this message.

6. On the analyzer, click or press to **open the KLM software from your PNA's Windows taskbar by pressing Start > More Programs > Keysight License Manager folder > Keysight License Manager** and verify the options are correct.

Step 32. Verify the PNA-X Analyzer Program is Running with the Correct Options

Verify that the Options Correct and are Enabled

Once the Network Analyzer program is again running:

1. Start the Network Analyzer program.
2. Once the Network Analyzer program is running:
 - Press **Help > About NA** and verify that Option 419 is listed in the PNA-X application.

NOTE

If the options have not been enabled, refer to “[Getting Assistance from Keysight](#)” on page 5.

3. After successful installation of all upgrades, some features require some adjustments to ensure the instrument meets its specified performance. Refer to the Adjustments (i.e., Diagnostic Tools, Utilities, and Adjustments) topic in the PNA Online Help:
<https://rfmw.em.keysight.com/wireless/helpfiles/N52xxB/help.htm>.

Step 33. Perform Post-Upgrade Adjustments and Calibration

Adjustments

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

NOTE

IMPORTANT!

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

-
- 10 MHz frequency reference adjustment
 - EE default adjustment: Synth LO only (Version 6 synthesizers), All Synthesizers (Version 7 synthesizers)
 - synthesizer bandwidth adjustment (This test is only required when the EE default adjustment is not sufficient)
 - Source Adjustment
 - IF Gain Adjustment
 - Receiver Characterization
 - Receiver Adjustment
 - LFE Receiver Adjustment
 - IF Response Adjustment (Options S93090xA/B, S93093A/B, or S93094A/B Only)
 - Noise Figure Adjustment (Option 029 with S93029A/B Only)

These adjustments are described in the PNA-X Service Guide and in the PNA on-line HELP. A list of equipment required to perform these adjustments is also found in the service guide.

To view this service guide information, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide¹.

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

1. See [“Downloading the Online PNA-X Service Guide” on page 9](#).

EEPROM Backup

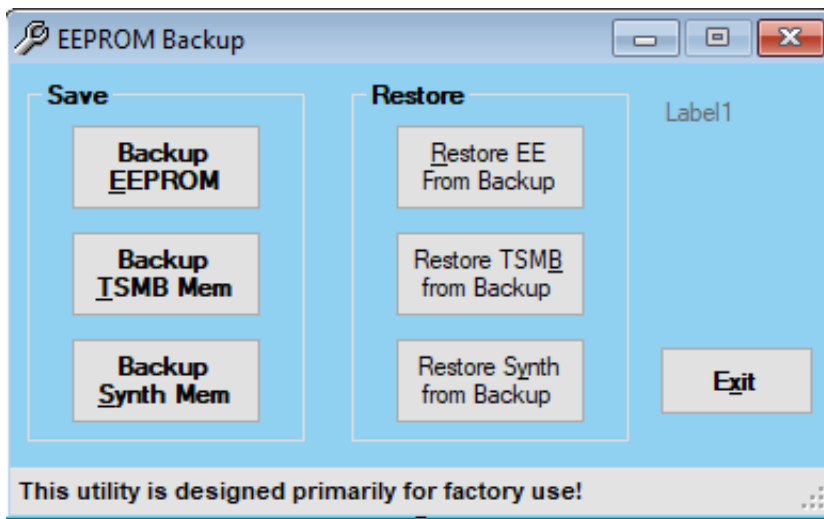
The analyzer uses arrays of correction constants to enable the analyzer to produce accurate, leveled source signals and receive clean test signals. These constants are stored in non-volatile EEPROM memory and in flash memory files.

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

To store the backup data, perform these steps:

- Navigate to the EEPROM Backup Utility, located at:
 - Windows 7 -- C:\Program Files (x86)\Keysight\Network Analyzer\Service\eebackup.exe
 - Windows 10 -- C:\Program Files\Keysight\Network Analyzer\Service\eebackup.exe
- Run the program.
- Click Backup EEPROM.
- Click Backup TSMB Mem.
- Click Backup Synth Mem. (Applies to Version 7 Synthesizers Only)
- Click Exit when the program has finished.

Figure 36 EEPROM Backup Menu



Operator's Check

Perform the Operator's Check to check the basic functionality of the analyzer. For instructions, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide¹.

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to **“Contacting Keysight” on page 5.**

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 34. Prepare the PNA-X 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.

Installation Note

A: Synthesizer Board Upgrade (N5240-60074 (with Tabs)/N5240-60076 (Without Tabs) Version F/G to Version H)

CAUTION

STOP!!! Please read all content before proceeding with this upgrade procedure. This is a complex procedure that requires Keysight support training, before beginning any repairs! If you have not been properly trained by Keysight support personnel, attempting to do this procedure could result in damage to the synthesizer board and or the instrument! See also “[Step 4. Inspect and \(If Necessary\) Remove the A4, A15, and A17 Synthesizer Boards, if They Are Not Version H](#)” on page 16.

If you do not have the following equipment, do not attempt to the process in the Appendix, because you may damage the board and or your instrument. Stop and return the instrument to Keysight for repair. Refer to “[Getting Assistance from Keysight](#)” on page 5.

This process requires the following:

- Training by Keysight support personnel to perform this upgrade
- RoHS compliant soldering materials and components
- Variable power soldering iron for surface-mount components
- 10x magnifier or greater
- Else, you may damage your synthesizer board and/or your instrument

This section is only required if the synthesizer boards N5240-60074/76 are not a version H or greater. If your synthesizer boards do not require this modification, skip this process and continue to the “[Step 5. Remove the Front Panel Assembly](#)” on page 18. After this section is completed, your synthesizer board will be a version H synthesizer board. Refer to [Figure 2 on page 5](#).

Table 1 **Parts List for Synthesizer Board Upgrade Kit Modification^a**

Part number		Description
0699-3947	1 k Ω Resistor	
0161-4279	22 μ F capacitor	

a. The factory will provide these items upon request.

Procedure

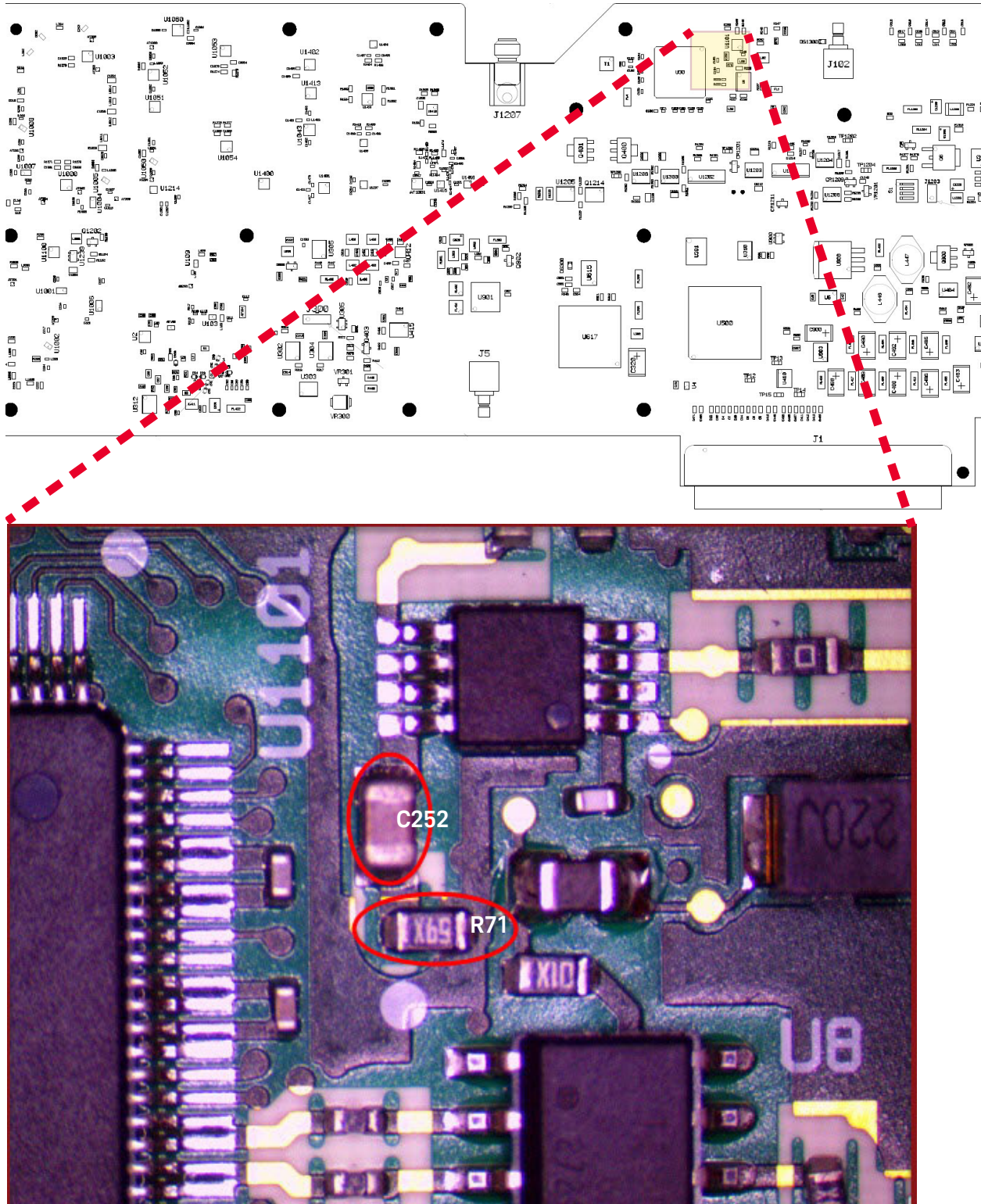
1. If you have already removed your synthesizer board, proceed to step 2.
Else, to remove your synthesizer board, refer to the Service Guide for your instrument that can be downloaded from www.keysight.com.
2. Remove resistor R71. Refer to **Figure 1 on page 3**.
3. Clean pads.
4. Replace with resistor 1 k Ω (0699-3947). Refer to **Figure 1 on page 3**.
5. Remove capacitor C252.
6. Clean pads.

Synthesizer Board Upgrade (N5240-60074 (with Tabs)/N5240-60076 (Without Tabs)
Version F/G to Version H)
Procedure

7. Replace with capacitor 22 μ F (0161-4279). Refer to **Figure 1** on page 3.

Figure 1

Remove old resistor and capacitor and replace with resistor 1 k Ω (0699-3947) and 22 μ F (0161-4279).



8. Re-assemble shield, screws, and torque:
 - M3 screws (0515-0372) to 9 in-lbs
 - M4 screws (0515-0669) to 21 in-lbs
9. Repeat steps 1 through 8 for all of the non-version H synthesizer boards.
10. Reinstall all upgraded version H synthesizer boards.
11. Power up the PNA-X and if necessary, start the PNA application.
12. Changing the EEPROM header data for your updated synthesizer board:
 - a. Press **Utility > System > Service > Utilities > View EEPROM Headers**.
 - b. In the **EEPROM Header Info** window that opens press **Edit**. Refer to **Figure 2 on page 5**.
 - c. In the window that opens: Enter the password (i.e., “tsunami”).
 - d. In the **Keysight PNA EEPROM Editor** window that opens: Scroll down to the **FW Revision:** box and select the “F” or “G” and replace by typing “H”. Refer to **Figure 3 on page 6**.
 - e. Press **Enter**. Refer to **Figure 3 on page 6**.
 - f. Press **Save Changes**. Refer to **Figure 3 on page 6**.
 - g. Repeat steps d through f for the other synthesizer boards requiring upgrade.
 - h. Press **Exit** to close the EEPROM Header Info window when you have completed updating all of the synthesizer boards and continue with **“Step 5. Remove the Front Panel Assembly.”**

Figure 2 EEPROM Header Info Window

EEPROM Header Info

Rev: A.03.01

Assembly

☒ LO Synthesizer

☐ TestSet Motherboard

☐ IF Mux

☐ Frequency Reference

☐ Src2 ABC

☐ Src2 Synth

☐ Src1 Synth

☐ Src1 ABC

☐ GPIB

☐ Noise Figure

☐ ABC_50_P1

☐ ABC_50_P2

☐ ABC_50_P3

☐ ABC_50_P4

☐ N/A

Board Name: Synthesizer Board

Edit

Edit Requires Password

Memory Type ID: 3

Hardware ID: 0

Serial Number: 00092

Firmware Rev: H

Board P/N: N524063074

Checksum: 22459

Vendor Code: 23

Date Code: 1742

Revision Code: 99

Options (hex): 0001

Spare (hex): FFFF

1

EE Num

Exit

Figure 3 EEPROM Editor Window

Keysight PNA EEPROM Editor - Use extreme caution!

Assembly

- ☒ LO Synthesizer
- ☐ TestSet Motherboard
- ☐ IF Mux
- ☐ Frequency Reference
- ☐ Src2 ABC
- ☐ Src2 Synth
- ☐ Src1 Synth
- ☐ Src1 ABC
- ☐ GPIB
- ☐ N/A
- ☐ N/A
- ☐ N/A
- ☐ N/A
- ☐ N/A
- ☐ N/A
- ☐ N/A

EE Header Information

	Header Contents
Serial Number	00027
Revision Code	99
FW Revision	H
Board Name	Synthesizer Board
Option Flags (h)	0001
Spare (h)	FFFF

EE Data Information
Descriptions may not be accurate!

	Data Description	Full Value	Byte 3	Byte 2	Byte 1	Byte 0
57616 - E110	Band 0 ALC Setting	0	0	0	0	0
57617 - E111	Band 1 ALC Setting	0	0	0	0	0
57618 - E112	Band 2 ALC Setting	154667233	9	56	8	225
57619 - E113	Band 3 ALC Setting	154667232	9	56	8	224
57620 - E114	Band 4 ALC Setting	154667232	9	56	8	224
57621 - E115	Band 5 ALC Setting	154667232	9	56	8	224
57622 - E116	Band 6 ALC Setting	154667229	9	56	8	221
57623 - E117	Band 7 ALC Setting	154667230	9	56	8	222
57624 - E118	Band 8 ALC Setting	154667185	9	56	8	177
57625 - E119	Band 9 ALC Setting	148441265	8	217	8	177
57626 - E11A	Band 10 ALC Setting	148703409	8	221	8	177
57627 - E11B	Band 11 ALC Setting	148441265	8	217	8	177
57628 - E11C	Band 12 ALC Setting	149096625	8	227	8	177
57629 - E11D	Band 13 ALC Setting	148441265	8	217	8	177
57630 - E11E	Band 14 ALC Setting	154011868	9	46	8	220
57631 - E11F	Band 15 ALC Setting	154667234	9	56	8	226
57632 - E120	Band 16 ALC Setting	155322601	9	66	8	233



This information is subject to change
without notice.

© Keysight Technologies 2009-2024

Edition 1, February 2024



N5245-90122

www.keysight.com