
Keysight Add Configurable Test Set Upgrade Kit For Version 6 Synthesizers

To Upgrade PNA N5227A/B
Option 400 to Option 401

Upgrade Kit Order Number:
N5227AU-401 and N5227BU-401

Kit Number: N5227-60104

This is Installation Note is for upgrading the N5227A/B Microwave Network Analyzers from Option 400 to Option 401.

Notices

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CAUTION

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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**.



Description of the Upgrade

NOTE

Some of the assembly drawings in this document may be different from your instrument, but the process is similar for both an “A” model and “B” model instruments.

This upgrade adds the following items to your N5227A/B Option 400 network analyzer:

- reference mixer switch
- bulkhead connectors for test set front plate
- front panel jumpers
- front panel jumpers cable guards
- front panel overlay replacement
- new cables

After installation of this upgrade, your analyzer will be an N5227A/B Option 401.

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 6.**

Getting Assistance from Keysight

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

Contacting Keysight

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

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

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

NOTE

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

If You Have Problems With the Upgrade Kit Contents

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

Keysight () link.

Getting Prepared

CAUTION

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

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

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

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

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

License Key Redemption

NOTE

The only difference between an A model license key redemption and a B model is that the A model uses a 12-character license key and the B model uses a license key file.

NOTE

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

If you are unfamiliar with the licensing process:

- For A models: Refer to <https://www.keysight.com/us/en/assets/9018-03565/installation-guides/9018-03565.pdf> (N5225-90110).
 - For B models: Refer to the <https://www.keysight.com/us/en/assets/9018-04534/installation-guides/9018-04534.pdf> (N5242-90024).
-

NOTE

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

To enable the option product, you must request license key(s) (A models) or license key files(s) (B models) from the Keysight Software Manager:
<http://www.keysight.com/find/softwaremanager>.

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

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

(Instrument information is available in the network analyzer - on the toolbar, click Help, then click About Network Analyzer.)

 - Model number
 - Serial number
- **A models ONLY:** From the online Keysight HostID utility

Part of the OEC procedure to obtain the 12-digit license key online requires you to provide the HostID number of the PNA. This HostID number is NOT the one currently shown on the PNA. To determine your new HostID, Keysight personnel should use the new model number with the utility at go to

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

— Host ID

Using the information just gathered, you must request license key(s) for your A model or for your B models, a license key file(s) from the Keysight Software Manager: <http://www.keysight.com/find/softwaremanager>.

You will need to provide an email address, Keysight will promptly email your A model license key(s) or a for a B model, license key file(s) attachment message. Refer to **“License Key Redemption” on page 8**.

Verify the License Contents

Refer to the license message you received from Keysight:

If the model number, serial number, or option number do not match those on the license message you received from Keysight, you will not be able to install the license key file. If this is the case, contact Keysight for assistance. Refer to **“Getting Assistance from Keysight” on page 6**.

Downloading the Online PNA Service Guide

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

1. Go to www.keysight.com.
2. In the **Search** box, enter the model number of the analyzer (e.g., 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
9 mm nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1	N/A

CAUTION

Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel bulkhead connectors. On these, use a 5/16 inch nutsetter or open end torque wrench set to 21 in-lb.

About Installing the Upgrade

Products affected	N5227A/B Option 400
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	2 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 6**.

Table 1 Contents of Upgrade Kit N5227-60104

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5227-90104
--	Software Entitlement Certificate (provided separately)	1	9030-0000
--	China RoHS Addendum	1	9320-6722
A37	Reference mixer switch	1	5087-7759
--	Bracket (for A37 reference mixer switch)	1	N5245-00024
--	Machine screw, M3 x 8, pan head (to attach bracket to reference mixer switch; to attach reference mixer switch assembly to deck)	5	0515-0372
--	Cable clamp	12	1400-1334
--	Cable tie	5	1400-0249
--	Cable guard- center - 4 Port - “A” Models	1	N5242-00030
--	Cable guard- center - 4 Port - “B” Models	1	N5242-00049
--	Cable guard - side - 2 Port - “A” Models	2	N5242-00029
--	Cable guard - side - 2 Port - “B” Models	2	N5242-00048
--	Bulkhead connector, 1.85 mm, 50-ohm for test set front plate	24	1250-4747 ^a
--	Lock washer for bulkhead connector	24	1250-3310
--	Nut for bulkhead connector	24	1250-3516
--	Front panel overlay – “A” Models	1	N5227-80014
--	Front panel overlay – “B” Models	1	N5227-80027
W12	RF cable, A60 port 1 70 GHz doubler to W11	1	N5247-20059
W16	RF cable, A61 port 3 70 GHz doubler to W15	1	N5247-20060
W20	RF cable, A62 port 4 70 GHz doubler to W19	1	N5247-20015
W27	RF cable, A60 port 1 70 GHz doubler to A29 port 1 receiver coupler	1	N5247-20074
W28	RF cable, A61 port 3 70 GHz doubler to A30 port 3 receiver coupler	1	N5247-20052

1. In addition to the upgrade kit, the shipment includes an Software Entitlement Certificate. Refer to **“License Key Redemption” on page 8** for important information about this certificate.

Items Included in the Upgrade Kit

Table 1 **Contents of Upgrade Kit N5227-60104**

Ref Desig.	Description	Qty	Part Number
W29	RF cable, A62 port 4 70 GHz doubler to A31 port 4 receiver coupler	1	N5247-20074
W30	RF cable, A63 port 2 70 GHz doubler to A32 port 2 receiver coupler	1	N5247-20052
W31	RF cable, A29 port 1 receiver coupler to front-panel port 1 SOURCE OUT	1	N5247-20037
W32	RF cable, Port 1 CPLR THRU to A33 port 1 coupler	1	N5247-20016
W33	RF cable, A29 port 1 receiver coupler to A37 reference mixer switch	1	N5247-20078
W34	RF cable, A33 port 1 coupler to front-panel port 1 CPLR ARM	1	N5247-20082
W35	RF cable, A30 port 3 receiver coupler to front-panel port 3 SOURCE OUT	1	N5247-20023
W36	RF cable, Port 3 CPLR THRU to A34 port 3 coupler	1	N5247-20006
W37	RF cable, A30 port 3 receiver coupler to front-panel REF 3 SOURCE OUT	1	N5247-20077
W38	RF cable, A34 port 3 coupler to front-panel port 3 CPLR ARM	1	N5247-20007
W39	RF cable, A31 port 4 receiver coupler to front-panel port 4 SOURCE OUT	1	N5247-20035
W40	RF cable, Port 4 CPLR THRU to A35 port 4 coupler	1	N5247-20017
W41	RF cable, A31 port 4 receiver coupler to front-panel REF 4 SOURCE OUT	1	N5247-20075
W42	RF cable, A35 port 4 coupler to front-panel port 4 CPLR ARM	1	N5247-20026
W43	RF cable, A32 port 2 receiver coupler to front-panel port 2 SOURCE OUT	1	N5247-20036
W44	RF cable, Port 2 CPLR THRU to A36 port 2 coupler	1	N5247-20018
W45	RF cable, A32 port 2 receiver coupler to front-panel REF 2 SOURCE OUT	1	N5247-20076
W46	RF cable, A36 port 2 coupler to front-panel port 2 CPLR ARM	1	N5247-20019
W47	RF cable, Port 1 RCVR A IN to A27 mixer brick (A)	1	N5247-20053
W48	RF cable, Port 3 RCVR C IN to A28 mixer brick (C)	1	N5247-20063
W49	RF cable, Port 4 RCVR D IN to A28 mixer brick (D)	1	N5247-20073
W50	RF cable, Port 2 RCVR B IN to A27 mixer brick (B)	1	N5247-20054
W51	RF cable, A37 reference mixer switch to front-panel REF 1 SOURCE OUT	1	N5247-20011
W52	RF cable, REF 1 RCVR R1 IN to A37 reference mixer switch	1	N5247-20012
W53	RF cable, A37 reference mixer switch to A27 mixer brick (R1)	1	N5247-20048
W54	RF cable, REF 3 RCVR R3 IN to A28 mixer brick (R3)	1	N5247-20062
W55	RF cable, REF 4 RCVR R4 IN to 3 dB pad on A28 mixer brick (R4)	1	N5247-20067
W56	RF cable, REF 2 RCVR R2 IN to A27 mixer brick (R2)	1	N5247-20055
W60	RF cable, Front panel jumper	12	N5247-20107

Table 1 Contents of Upgrade Kit N5227-60104

Ref Desig.	Description	Qty	Part Number
--	Wire harness, A23 test set motherboard J554 to A37 reference mixer switch	1	8121-0966
a. This upgrade kit may contain either a bulkhead adapter part number 5065-4673 or 1250-4747.			
<div><div>NOTE</div><div>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.</div></div>			

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. Install Bulkhead Connector Hardware on Test Set Front Plate Assembly."
- "Step 5. Remove Some Existing Cables."
- "Step 6. Remove 3 dB Pad from A27 Mixer Brick (1)."
- "Step 7. Remove Receiver Coupler Assemblies from Large Brackets Underneath."
- "Step 8. Remove Brackets That Were Beneath Receiver Coupler Assemblies."
- "Step 9. Reinstall Receiver Coupler Assemblies To Test Set Deck."
- "Step 10. Assemble A37 Reference Mixer Switch Assembly."
- "Step 11. Install A37 Reference Mixer Switch Assembly."
- "Step 12. Install Cables."
- "Step 13. Remove Old Lower Front Panel Overlay."
- "Step 14. Reinstall Front Panel Assembly."
- "Step 15. Install New Lower Front Panel Overlay."
- "Step 16. Install Front Panel Jumpers."
- "Step 17. Position the Cables and Wires to Prevent Pinching."
- "Step 18. Reinstall the Outer Cover."
- "Step 19. Remove Option 400 License."
- "Step 19. Enable Options 401."
- "Step 20. Perform Post-Upgrade Adjustments and Calibration."
- "Step 21. Prepare the PNA for the User."

Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Software Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to **“License Key Redemption” on page 8**.

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

Once the license key (A models) or license key file (B models) has been received and the information verified, you can proceed with the installation at **“Step 2. Remove the Outer Cover” on page 15**.

NOTE

If the model number, serial number, or option number do not match those on your license key (A models) or license key file (B models), you will not be able to install the option. If this is the case, contact Keysight for assistance before beginning the installation of this upgrade. Refer to **“Contacting Keysight” on page 6**.

Step 2. Remove the Outer Cover

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

Step 3. Remove the Front Panel Assembly

For instructions, click the Chapter 7 bookmark “Removing and Replacing the Front Panel Assembly” in the PDF Service Guide¹.

Step 4. Install Bulkhead Connector Hardware on Test Set Front Plate Assembly

Install 24 bulkhead connectors (5065-4673), along with lock washers (1250-3310) and nuts (1250-3516) to the test set front plate along with washers and nuts (hardware equipped with connector). Torque all nuts to 21 in.-lbs. Refer to **Figure 9 on page 29** to see the location of the bulkhead connectors.

Step 5. Remove Some Existing Cables

CAUTION

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

NOTE

When removing a cable, also remove the plastic cable clamp, if present. It is normal for some of the cable clamp's adhesive to remain.

1. Place the analyzer bottom-side up on a flat surface.
2. Remove the following cables. To see an image showing the location of these cables, click the Chapter 6 bookmark "Bottom RF Cables, Standard 4-Port Configuration, Option 400 (S/N Prefixes <6021)" in the PDF Service Guide¹.

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

- W30 (N5227-20045) A63 port 2 70 GHz doubler to A32 port 2 receiver coupler
- W20 (N5227-20043) A62 port 4 70 GHz doubler to W19
- W27 (N5227-20044) A60 port 1 70 GHz doubler to A29 port 1 receiver coupler
- W28 (N5227-20045) A61 port 3 70 GHz doubler to A30 port 3 receiver coupler
- W16 (N5227-20042) A61 port 3 70 GHz doubler to W15
- W12 (N5227-20041) A60 port 1 70 GHz doubler to W11
- W29 (N5227-20044) A62 port 4 70 GHz doubler to A31 port 4 receiver coupler
- W133(N5227-20017) A31 port 4 receiver coupler to A35 port 4 coupler
- W134(N5227-20018) A32 port 2 receiver coupler to A36 port 2 coupler
- W132(N5227-20016) A30 port 3 receiver coupler to A34 port 3 coupler
- W131(N5227-20015) A29 port 1 receiver coupler to A33 port 1 coupler
- W136 (N5227-20014) A34 port 3 coupler to A28 mixer brick (C)
- W135 (N5227-20011) A33 port 1 coupler to A27 mixer brick (A)
- W127 (N5227-20002) A29 port 1 receiver coupler to 3 dB pad on A27 mixer brick (R1)
- W137 (N5227-20013) A35 port 4 coupler to A28 mixer brick (D)
- W130 (N5227-20001) A32 port 2 receiver coupler to A27 mixer brick (R2)
- W138 (N5227-20012) A36 port 2 coupler to A27 mixer brick (B)

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

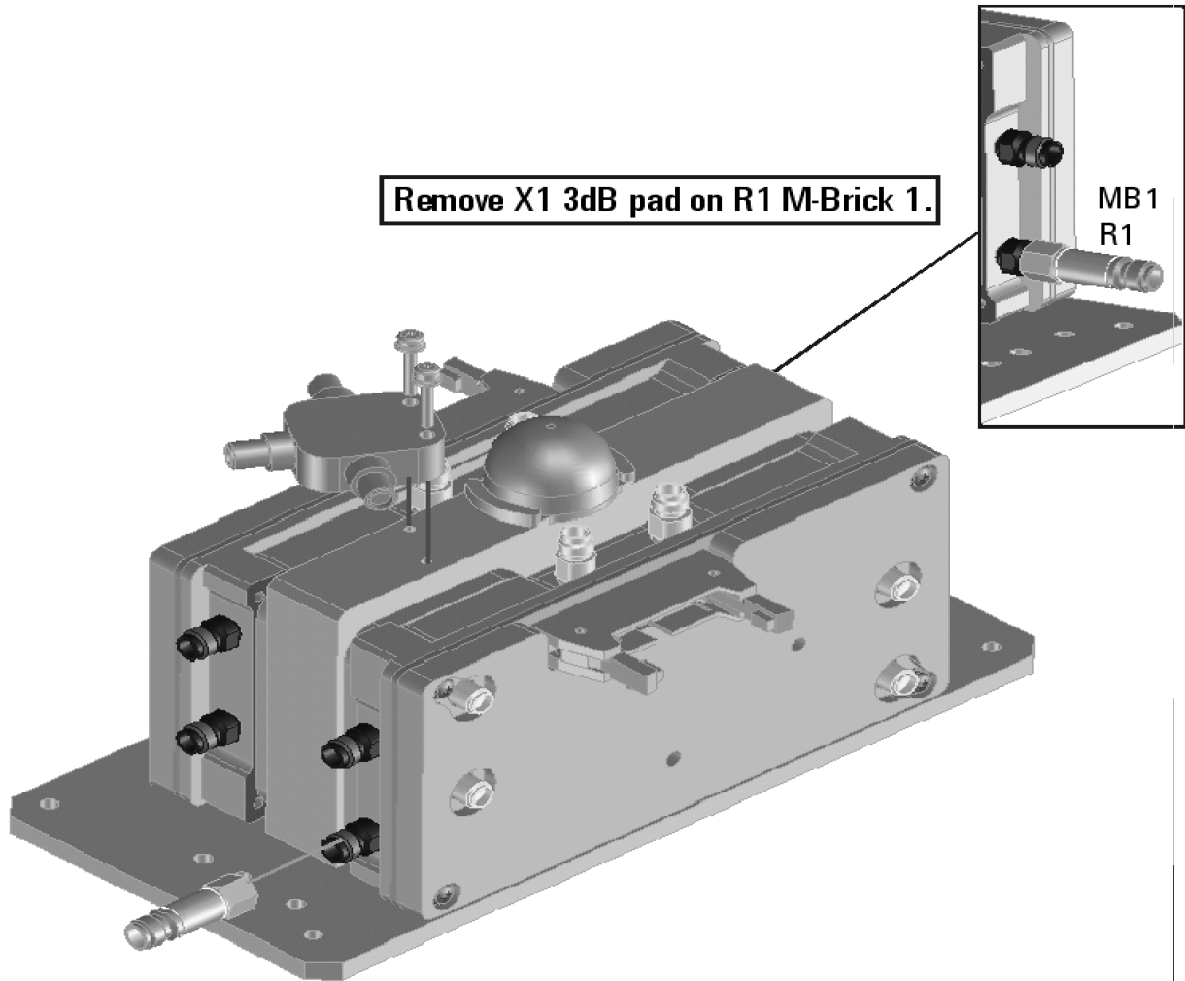
Installation Procedure for the Upgrade

- W128 (N5227-20009) A30 port 3 receiver coupler to A28 mixer brick (R3)
- W129 (N5227-20010) AA31 port 4 receiver coupler to 3 dB pad on A28 mixer brick (R4)

Step 6. Remove 3 dB Pad from A27 Mixer Brick (1)

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

Figure 1 Location of 3 dB Pad to be Removed

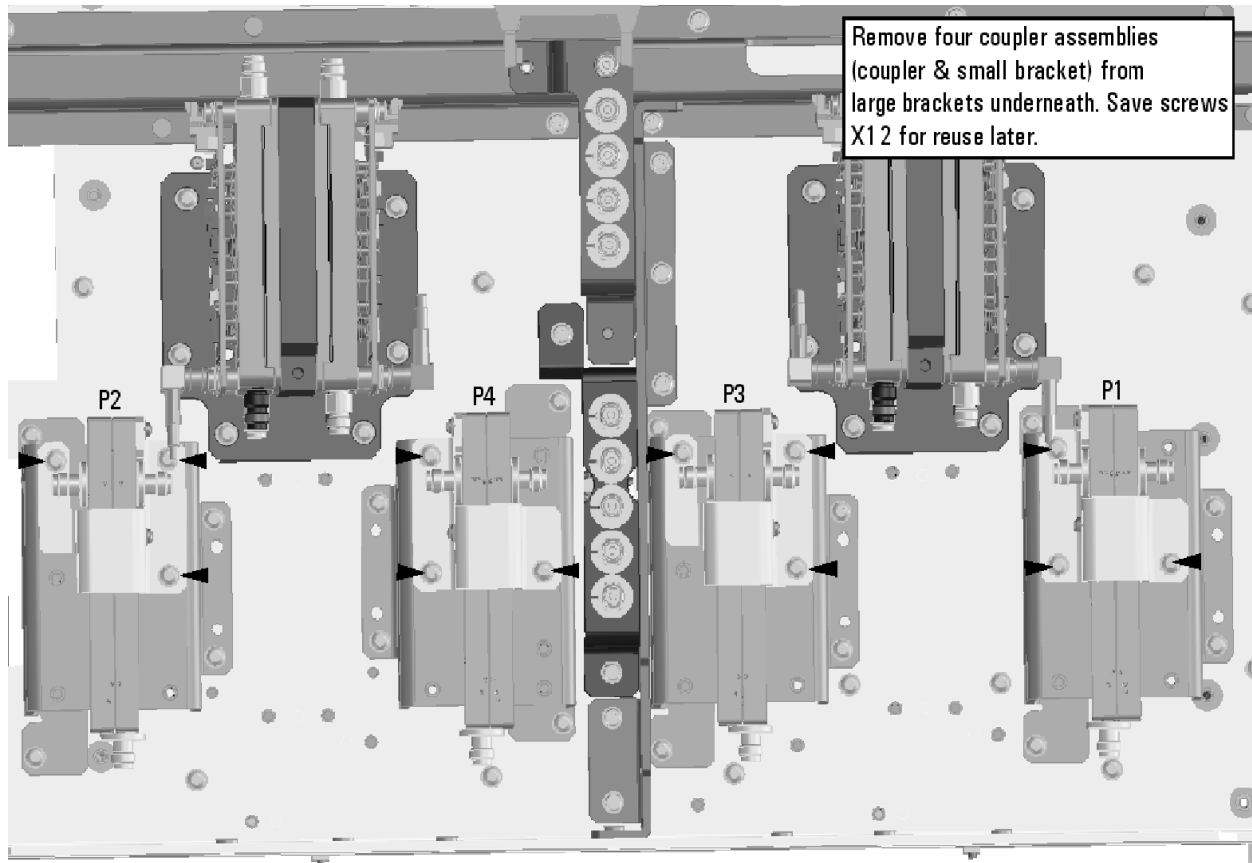


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Step 7. Remove Receiver Coupler Assemblies from Large Brackets Underneath

Refer to **Figure 2** for this step of the procedure.

Figure 2 Location of Receiver Couplers to be Removed

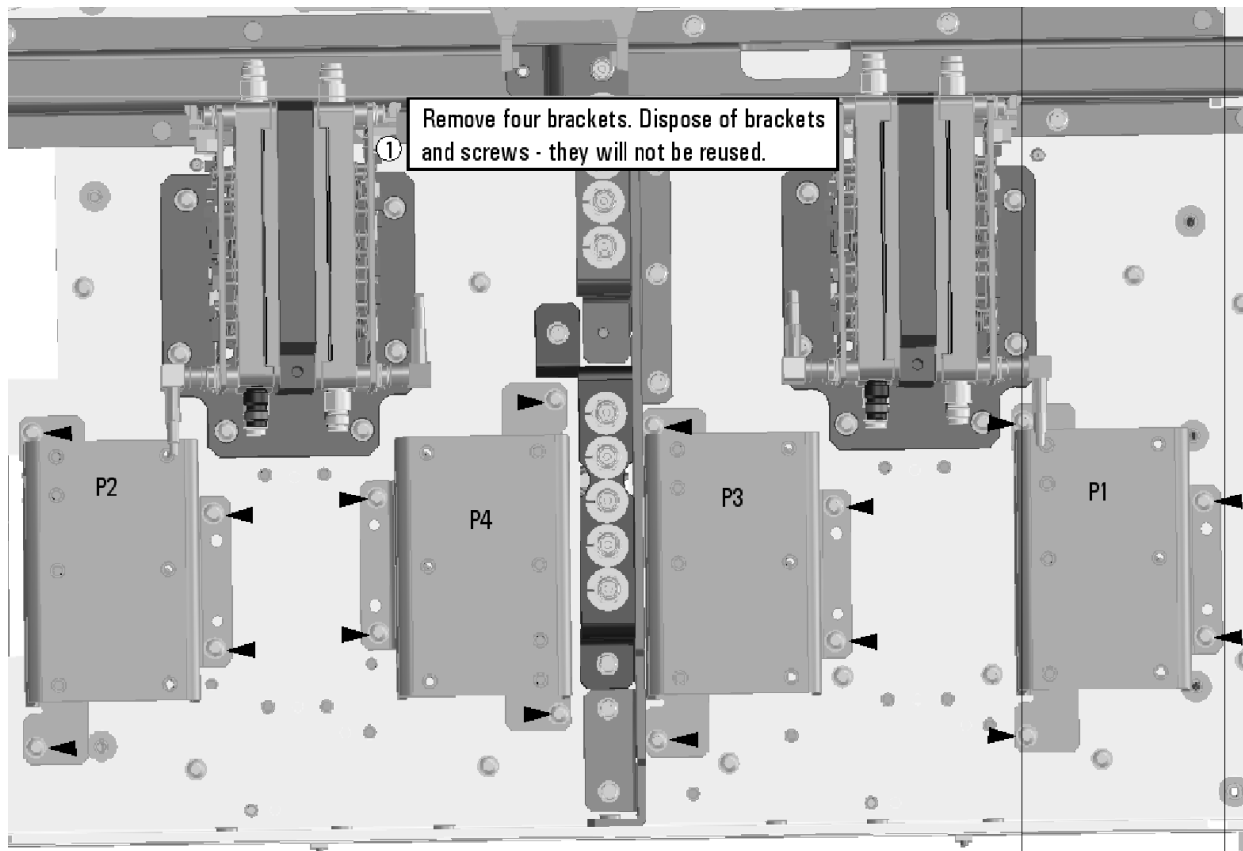


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Step 8. Remove Brackets That Were Beneath Receiver Coupler Assemblies

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

Figure 3 Location of Brackets to be Removed

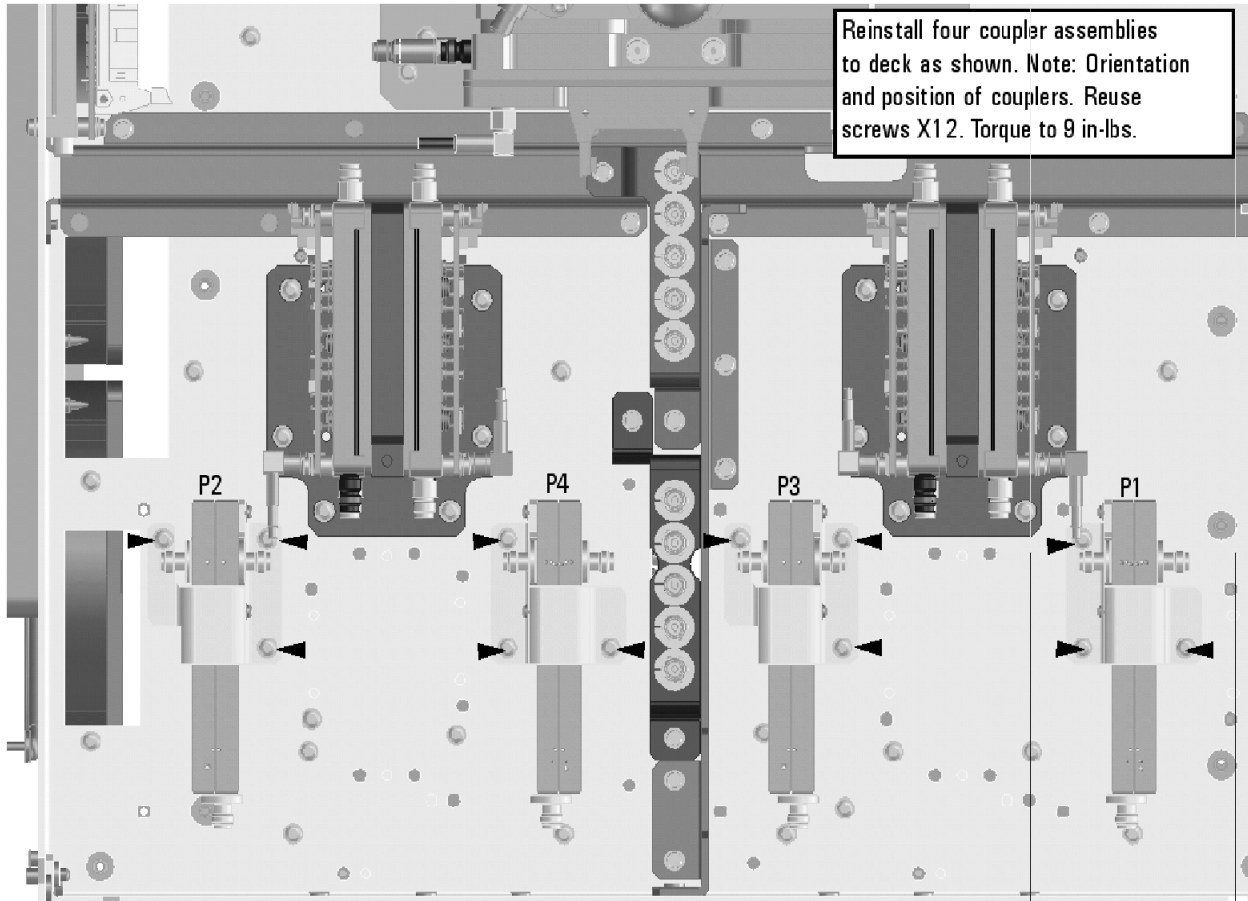


N5227_104_09

Step 9. Reinstall Receiver Coupler Assemblies To Test Set Deck

Refer to **Figure 4** for this step of the procedure.

Figure 4 Receiver Coupler Assemblies Re-installation



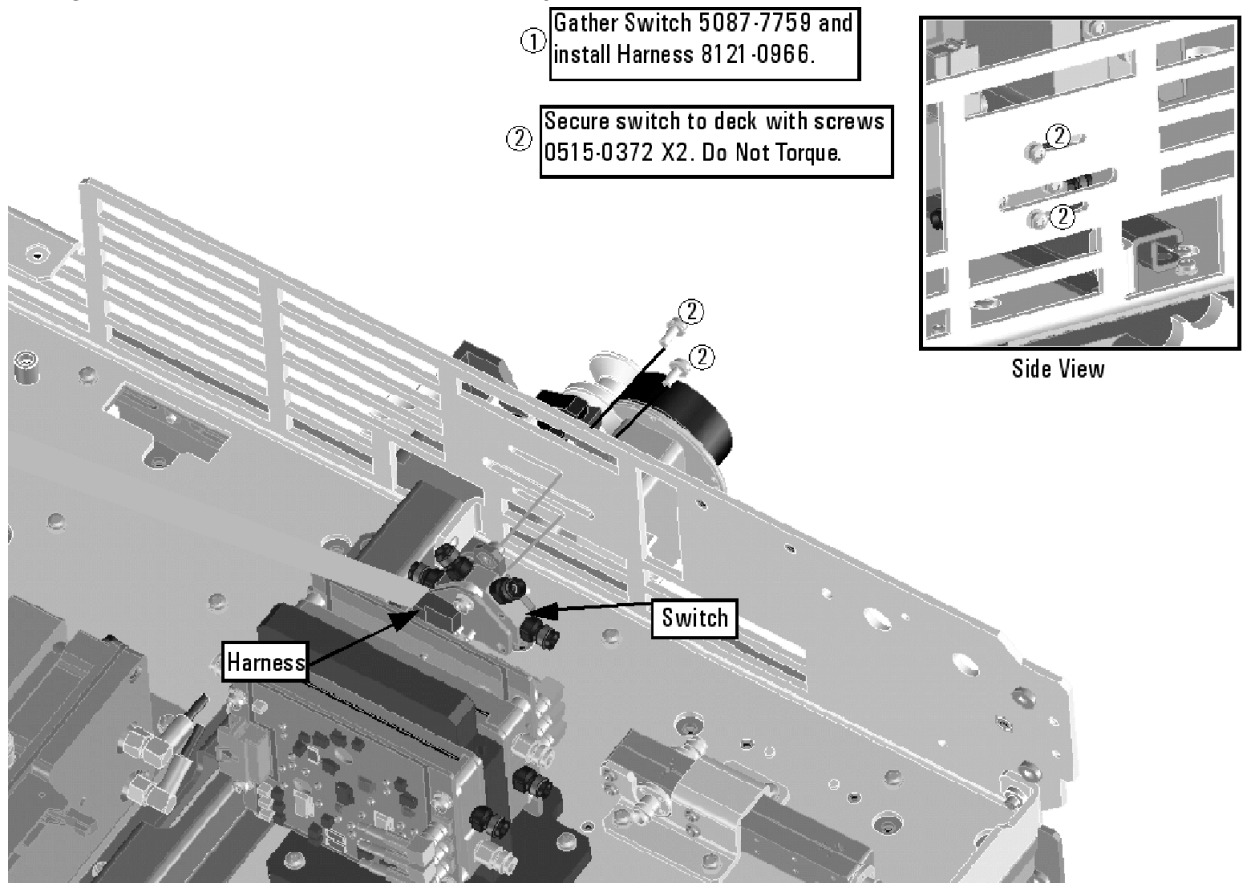
Step 10. Assemble A37 Reference Mixer Switch Assembly

Assemble the N5245-00024 bracket to the 5087-7759 Reference Mixer Switch using two 0515-0372 screws. Torque the screws to 9 in-lbs. New parts are listed in **Table 1 on page 11**. Use a T-10 TORX driver to tighten all screws to 9 in-lbs.

Step 11. Install A37 Reference Mixer Switch Assembly

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

Figure 5 Mixer Switch Assembly Installation (0515-0372, 5087-7759, 8021-0966)



N5227_104_03

Step 12. Install 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 semi-rigid cables. Some flexing of the cables may be necessary but do not over-bend them.

Install Semi-rigid Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks “Bottom RF Cables, 4-Port Configuration, Option 401” in the PDF Service Guide¹. New parts are listed in **Table 1 on page 11**.

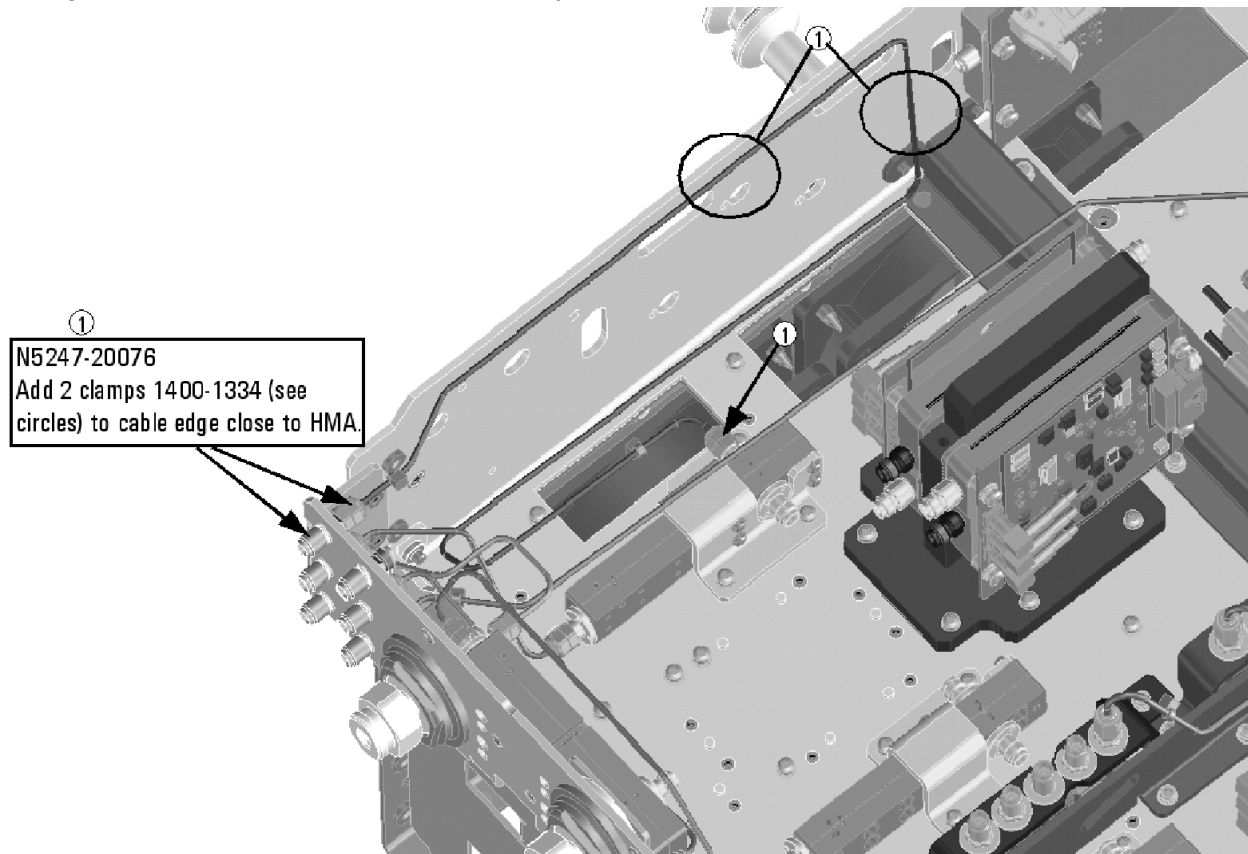
Install the following cables in the order listed.

- W50 (N5247-20054) Port 2 RCVR B IN to A27 mixer brick (B)
- W44 (N5247-20018) Port 2 CPLR THRU to A36 port 2 coupler
- W46 (N5247-20019) A36 port 2 coupler to front-panel port 2 CPLR ARM
- W43 (N5247-20036) A32 port 2 receiver coupler to front-panel port 2 SOURCE OUT
- W40 (N5247-20017) Port 4 CPLR THRU to A35 port 4 coupler
- W45 (N5247-20076) A32 port 2 receiver coupler to front-panel REF 2 SOURCE OUT

* As shown in **Figure 6 on page 23**, install two cable clamps (part number 1400-1334) to secure W45 (part number N5247-20076).

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

Figure 6 Location of Cable Clamps to Secure W45 (1400-1334, N5247-20076)

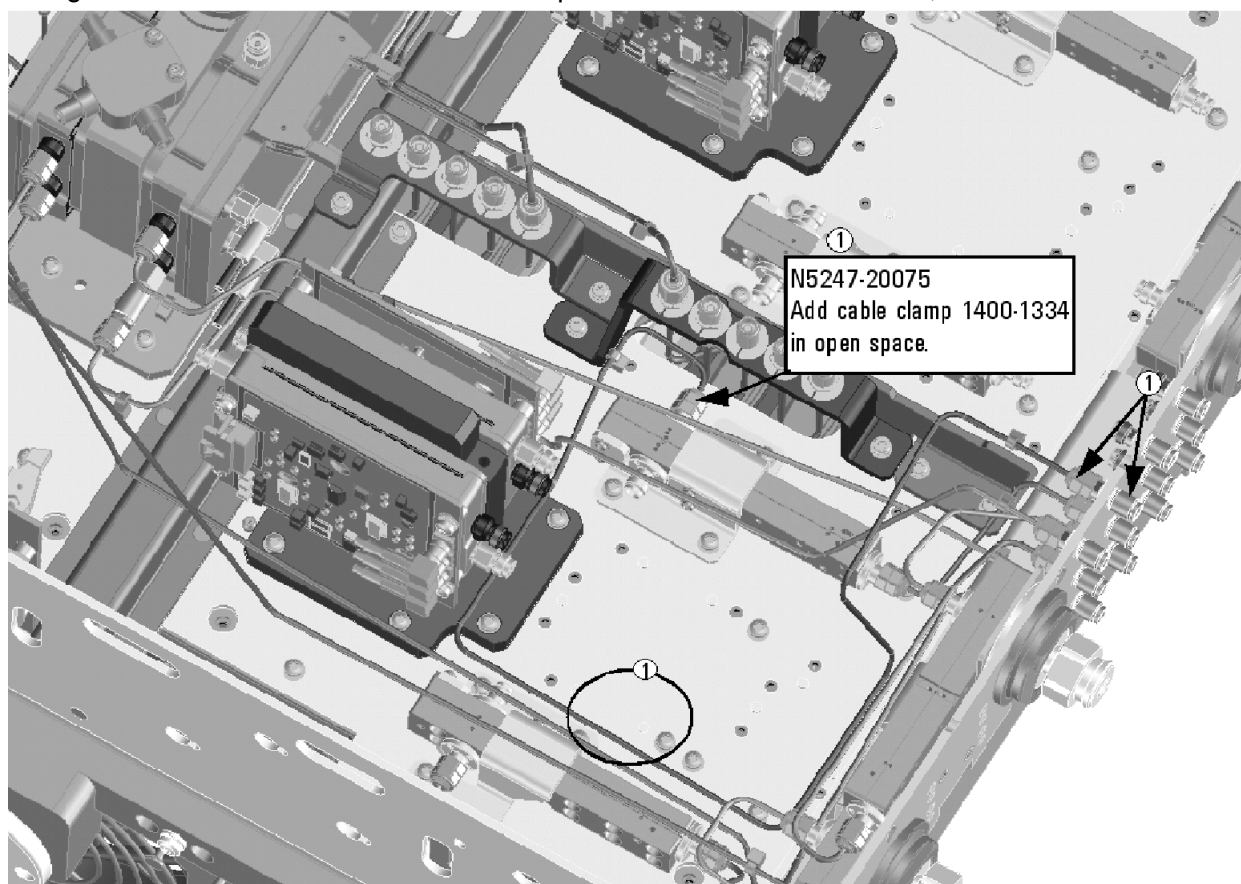


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- W56 (N5247-20055) REF 2 RCVR R2 IN to A27 mixer brick (R2)
- W55 (N5247-20067) REF 4 RCVR R4 IN to 3 dB pad on A28 mixer brick (R4)
- W49 (N5247-20073) Port 4 RCVR D IN to A28 mixer brick (D)
- W42 (N5247-20026) A35 port 4 coupler to front-panel port 4 CPLR ARM
- W39 (N5247-20035) A31 port 4 receiver coupler to front-panel port 4 SOURCE OUT
- W41 (N5247-20075) A31 port 4 receiver coupler to front-panel REF 4 SOURCE OUT

* As shown in **Figure 6-1 on page 24**, install cable clamp (part number 1400-1334) to secure W41 (part number N5247-20075).

Figure 6-1 Location of Cable Clamp to Secure W41 (1400-1334, N5247-20075)

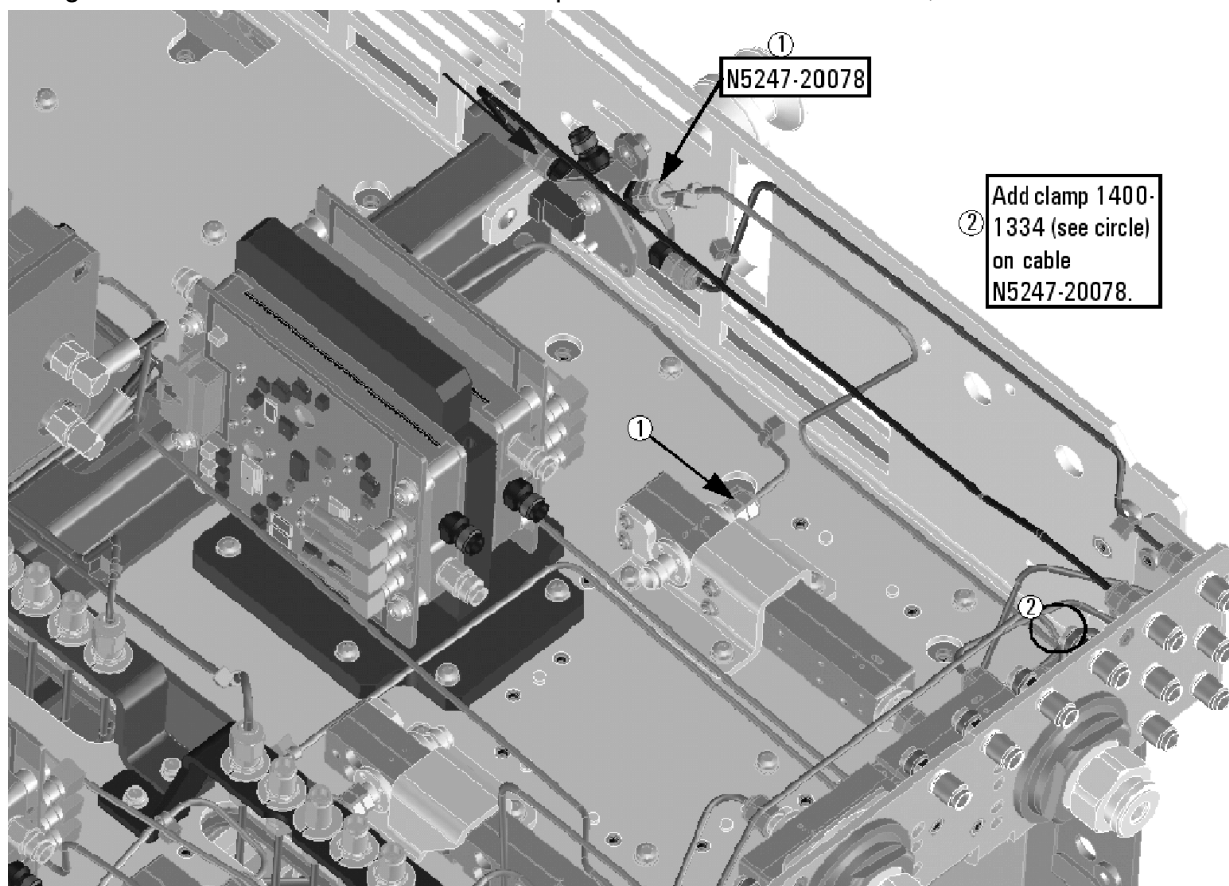


N5227_104_01

- W37 (N5247-20077) A30 port 3 receiver coupler to front-panel REF 3 SOURCE OUT
- W48 (N5247-20063) Port 3 RCVR C IN to A28 mixer brick (C)
- W38 (N5247-20007) A34 port 3 coupler to front-panel port 3 CPLR ARM
- W35 (N5247-20023) A30 port 3 receiver coupler to front-panel port 3 SOURCE OUT
- W32 (N5247-20016) Port 1 CPLR THRU to A33 port 1 coupler
- W36 (N5247-20006) Port 3 CPLR THRU to A34 port 3 coupler
- W51 (N5247-20011) A37 reference mixer switch to front-panel REF 1 SOURCE OUT
- W33 (N5247-20078) A29 port 1 receiver coupler to A37 reference mixer switch

* As shown in **Figure 7 on page 25**, install three cable clamps (part number 1400-1334) to secure W33 (part number N5247-20078).

Figure 7 Location of Cable Clamp to Secure W33 (1400-1334, N5247-20078)

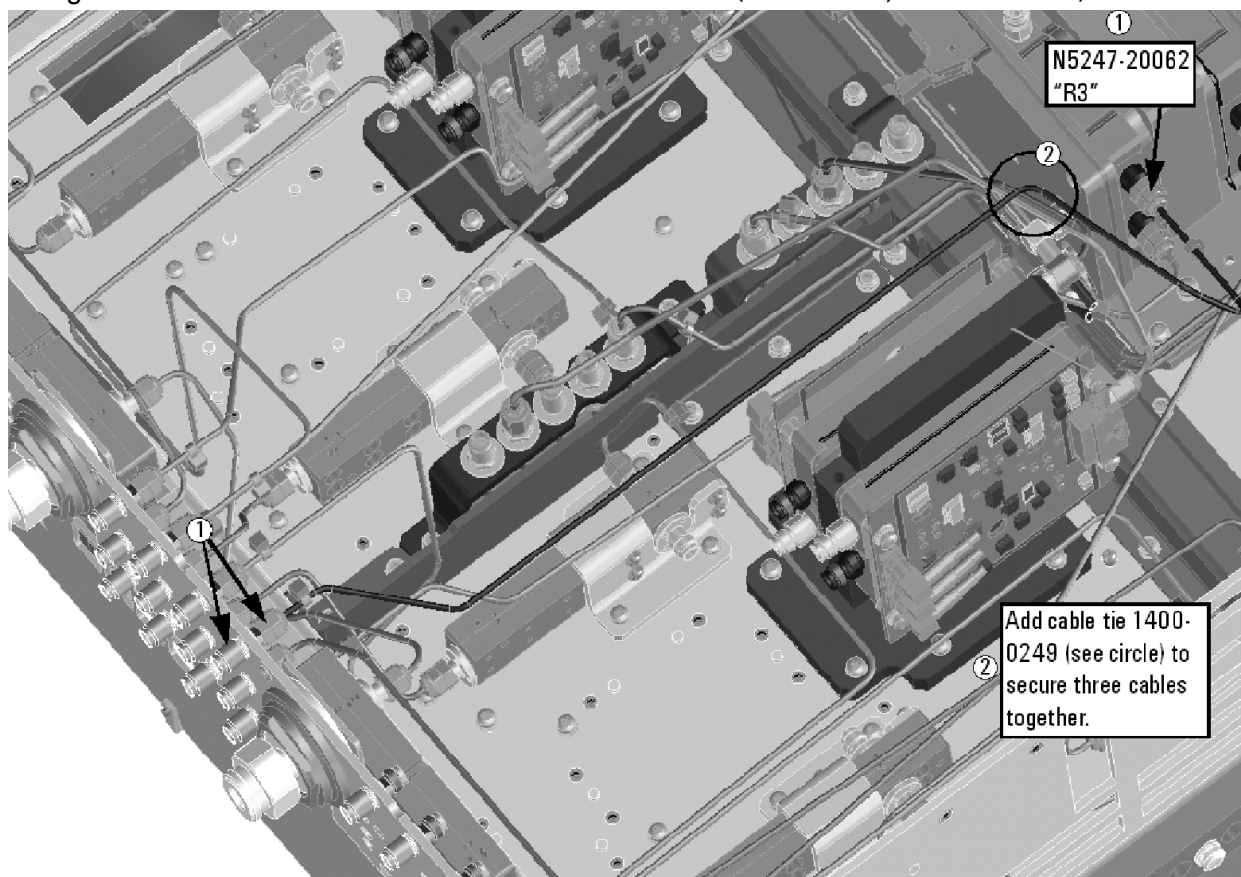


N5227_104_06

- W52 (N5247-20012) REF 1 RCVR R1 IN to A37 reference mixer switch
- W47 (N5247-20053) Port 1 RCVR A IN to A27 mixer brick (A)
- W34 (N5247-20082) A33 port 1 coupler to front-panel port 1 CPLR ARM
- W31 (N5247-20037) A29 port 1 receiver coupler to front-panel port 1 SOURCE OUT
- W53 (N5247-20048) A37 reference mixer switch to A27 mixer brick (R1)
- W54 (N5247-20062) REF 3 RCVR R3 IN to A28 mixer brick (R3)

* As shown in **Figure 8 on page 26**, install a cable tie (part number 1400-0249) to secure W54 (part number N5247-20062).

Figure 8 Location of Cable Tie to Secure W54 (1400-0249, N5247-20082)



N5227_104_07

- W29 (N5247-20074) A62 port 4 70 GHz doubler to A31 port 4 receiver coupler
- W28 (N5247-20052) A61 port 3 70 GHz doubler to A30 port 3 receiver coupler
- W16 (N5247-20060) A61 port 3 70 GHz doubler to W15
- W12 (N5247-20059) A60 port 1 70 GHz doubler to W11
- W27 (N5247-20074) A60 port 1 70 GHz doubler to A29 port 1 receiver coupler
- W20 (N5247-20015) A62 port 4 70 GHz doubler to W19
- W30 (N5247-20052) A63 port 2 70 GHz doubler to A32 port 2 receiver coupler

Install Wire Harnesses

To see an image showing the location of this wire harness, click the Chapter 6 bookmarks “Bottom Ribbon Cables and Wire Harnesses, 4-Port, Option 401” in the PDF Service Guide¹. New parts are listed in **Table 1 on page 11**.

If not already done, connect these wire harnesses:

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

Step 13. Remove Old Lower Front Panel Overlay

Refer to **Figure 8-1** 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 any adhesive remaining on the front panel.

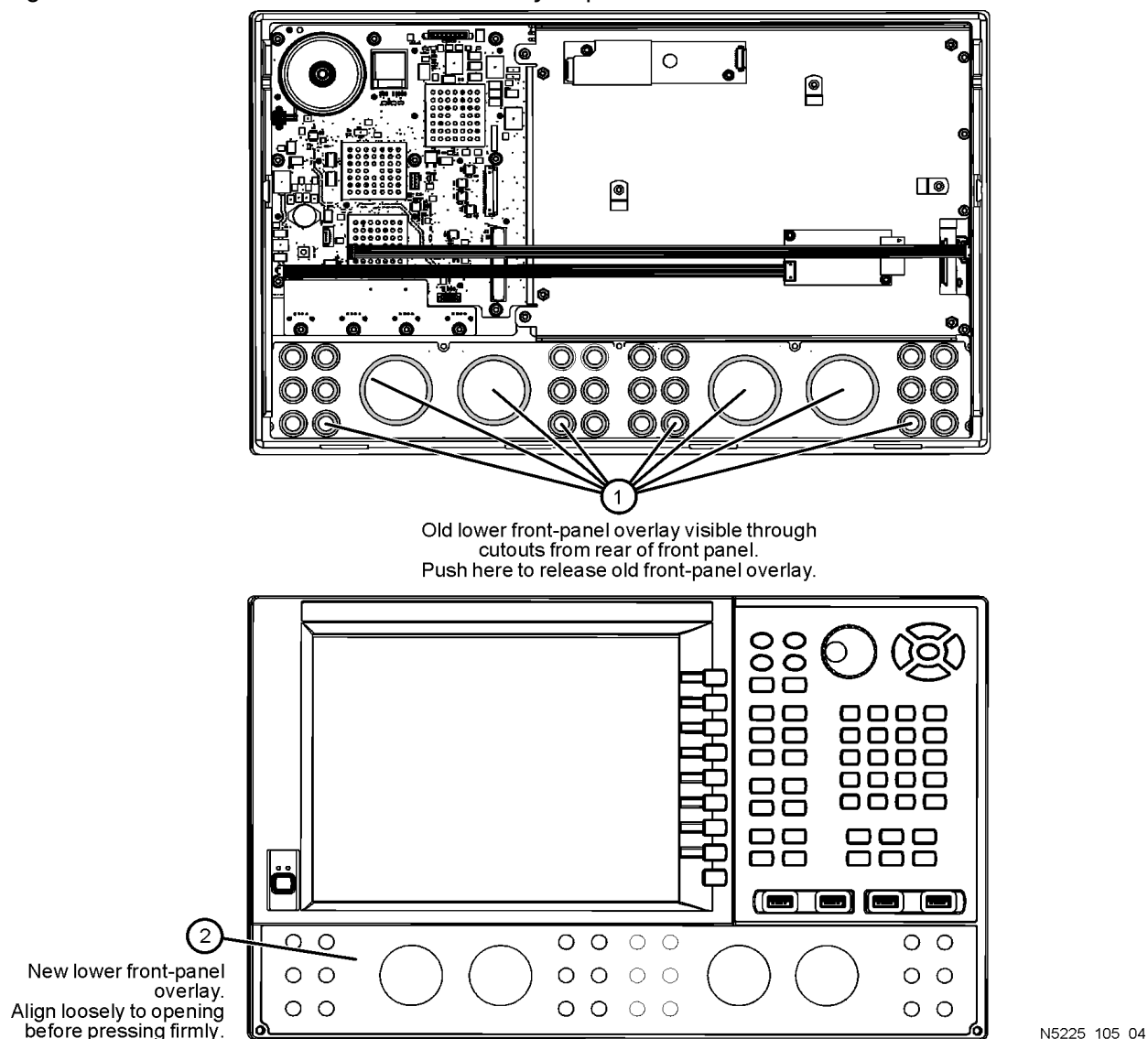
NOTE

IMPORTANT! To avoid possible damage to the lower front panel overlay, do not attempt to attach the lower front panel label until **“Step 15. Install New Lower Front Panel Overlay” on page 29**.

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

Figure 8-1

Lower Front Panel Overlay Replacement



Step 14. Reinstall Front Panel Assembly

For instructions on reinstalling the front panel assembly, click the Chapter 7 bookmark "Removing and Replacing the Front Panel Assembly" in the PDF Service Guide¹.

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

Step 15. Install New Lower Front Panel Overlay

Refer to **Figure 8-1 on page 28** for this step of the procedure. New parts are listed in **Table 1 on page 11**.

1. Remove the protective backing from the new front panel overlay, N5227-80005 for “A” models and N5227-90020 for “B” models (item ①).
2. Starting from either side, **loosely** place the overlay in the recess on the lower front panel, ensuring that it fits tightly against the edges of the recess.
3. Once the overlay is in place, press it firmly onto the frame to secure it.
4. Be sure to install the two new screws (0515-1946) in the front panel, next to test ports 3 and 4. Torque these screws to 9 in-lbs.

Step 16. Install Front Panel Jumpers

As shown in **Figure 9**, install 12 front panel jumper cables (reference designator W60; part number N5247-20107).

Figure 9 Front Panel Jumper Cables Installation



① Install 12x jumper cables N5247-20107 and torque to 10" lbs

Step 17. Position the Cables and Wires to Prevent Pinching

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

On the bottom side of the PNA, carefully fold or push down the ribbon cables and wires so they can't be pinched between the hardware and the outer cover. Ribbon cables and wires must never be positioned on top of hardware.

Step 18. Reinstall the Outer Cover

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

Step 19. Enable Options 401

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.

For "A" models, refer to **"Option Enable Procedure for "A" Model Instruments" on page 30.**

For "B" models refer to **"Option Enable Procedure for "B" Model Instruments" on page 31.**

Option Enable Procedure for "A" Model Instruments

1. To start the option enable utility, press UTILITY **System**, then **Service**, then **Option Enable**. An option enable dialog box will appear.
2. Click the arrow in the Select Desired Option box. A list of available options will appear.
3. In the Select Desired Option list, click 401 - Configurable Test Set.
4. Using the keyboard, enter the license key in the box provided. The license key is printed on the license message you received from Keysight. Enter this key exactly as it is printed on the message.
5. Click Enable.
6. Click Yes in answer to the displayed question in the Restart Analyzer? box.
7. When the installation is complete, click Exit.

"A" Model Option Verification Procedure

Once the analyzer has restarted and the Network Analyzer program is again running:

1. On the analyzer's **Help** menu, click **About Network Analyzer**.
2. Verify that "401" is listed after "Options:" in the display. Click **OK**.

Option Enable Procedure for "B" Model Instruments

NOTE

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

A single license file may contain more than one feature.

1. Locate the email(s) from Keysight which contain license file attachments. These emails are a result of Step 3 on "[License Key Redemption](#)" on [page 8](#).
2. Copy the license file(s) from the email(s) to the root directory of the USB flash drive.
More than one license file may be copied to the USB flash drive.

NOTE

A license file may contain more than one feature.

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

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

NOTE

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

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

"B" Model Option Verification Procedure

NOTE

If the option(s) have not been enabled or if your older options have not been removed, contact Keysight Technologies. Refer to “[Getting Assistance from Keysight](#)” on page 6.

Once the Network Analyzer program is again running:

1. Start the Network Analyzer program.
2. Once the Network Analyzer program is running:
 - Press **Help > About NA** and verify that Option 401 is listed in the PNA application.
3. After successful installation of all upgrades, some features require some adjustments to ensure the instrument meets its specified performance. Refer to the Adjustments (i.e., Diagnostic Tools, Utilities, and Adjustments) topic in the PNA Online Help:
<https://rfmw.em.keysight.com/wireless/helpfiles/N52xxB/help.htm>.

Step 20. 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)
- synthesizer bandwidth adjustment (only if EE default adjustment is insufficient)
- source adjustment
- IF gain adjustment
- receiver characterization
- receiver adjustment
- IF Response adjustment (For A model: Options 090, 093, or 094 Only. For B models: Options S93090xA/B, S93093A/B, or S93094A/B Only.)

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

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

EEPROM Backup

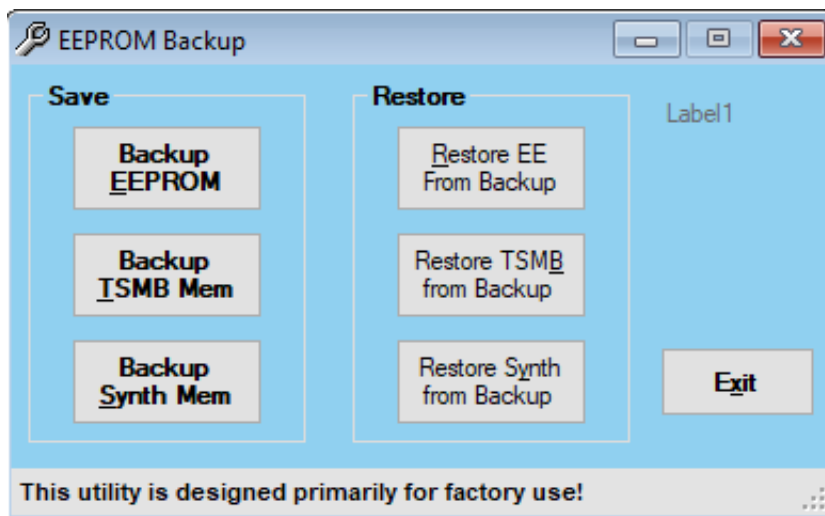
The analyzer uses arrays of correction constants to enable the analyzer to produce accurate, leveled source signals and receive clean test signals. These constants are stored in non-volatile EEPROM memory and in flash memory files.

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 10 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 6**.

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 21. 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.

