
Keysight 2-Port/4-Port N524xA to N524xB and N5264A to N5264B Model PNA-X Upgrade Kit - Installation Guide

This manual provides documentation for the following models: N524xA and N5264A

To Upgrade 2-Port/4-Port “A” models to 2-Port/4-Port “B” models

N5241AU-690 /N5241AU-691 (For N5241B),

N5242AU-690 /N5242AU-691 (For N5242B),

N5244AU-690 /N5244AU-691 (For N5244B),

N5245AU-690 /N5245AU-691 (For N5245B),

N5247AU-690 /N5247AU-691 (For

N5247B), N5249AU-690 /N5249AU-691 (For N5249B),

and

N5264AU-690 /N5264AU-691 (For N5264B)

Upgrade Kit Numbers: N5242-60117 /N5242-60129,

N5245-60116 /N5245-60134, N5247-60114 /

N5247-60119, N5264-60102 /N5264-60103

This is the Installation Note for the PNA-X N524xA Series Microwave Network Analyzers and N5264A Microwave Receiver.

Notices

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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.

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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 this Upgrade

This upgrade converts your N52xxA microwave network analyzer or N5264A microwave receiver to an equivalent N52xxB or N5264B running the Windows 10 operating system. This is done by removing the existing front panel assembly, outer covers, and installing a new front panel assembly, SSDA, and outer covers.

As part of this upgrade, there are other assemblies that need to be verified, because the boards must be of a certain type to be compatible with the B model upgrade. Refer to **“Initial Instrument Inspection” on page 22.**

After installation of this upgrade, your analyzer will be a “B” model rather than an “A” model.

Option 690 is for N52xxA models which already contain the version 7 CPU.
Option 691 is for N52xxA models which need the CPU upgraded to the latest version.

Refer to **“Overview of the Installation Procedure” on page 27.**

CAUTION

STOP! This repair must be done at a service center or self-maintainer!
Refer to **“Getting Assistance from Keysight” on page 6.**

NOTE

IMPORTANT! As part of the upgrade, the service center needs a copy of the customer’s Keysight License files that were sent to them from Keysight. Refer to **“License Key File Redemption” on page 7.**

NOTE

IMPORTANT! N5244/5A PNAs with H29 cannot upgrade to N5244/5B.

NOTE

Included in the contents of this kit is a Software Entitlement Certificate with instructions on how to redeem it. Do NOT attempt to redeem this certificate until you have read **“License Key File Redemption” on page 7.**

NOTE

For additional information on using the Keysight Software Manager and redeeming a Software Entitlement Certificate, refer to <https://www.keysight.com/us/en/assets/9018-04534/installation-guides/9018-04534.pdf> (N5242-90024).

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 US**.

Getting Prepared

License Key File Redemption

NOTE

IMPORTANT! As part of the upgrade, the service center needs to request a the customer's Keysight License files from Keysight. Refer to **"License Key File Redemption" on page 7.**

NOTE

IMPORTANT! Also, you will need to contact the Keysight factory support node to request multiple license key files. Refer to **"Obtain Multiple License Key Files" on page 9.**

NOTE

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

NOTE

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

To upgrade model(s), you must request an Option 690/691 license key file 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

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

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

The following Keysight Software Manager (KSM) procedure has been added—but is abbreviated—for users that are familiar with the KSM process and has steps that are specific to the A model to B model upgrade (Option 690/691).

1. Enter your login and password or setup a login as required.
2. In the Keysight License Manager welcome window, click **You can add a new certificate**.
3. In the “Keysight Software Manager: Add Certificate” window that opens, in the “Enter your certificate information” section, refer to your Software License Certificate that you received with your upgrade kit and enter the following:
 - Order Number
 - Certificate Number
4. Click **Continue** (to return to the Keysight Software Manager welcome screen).
5. If there are multiple “A” model PNAs that are being upgraded to a “B” model, repeat steps 3 and 4.
Else, continue to next step.
6. In the Keysight Software Manager welcome screen, click “You can request new licenses”.
7. In the “Keysight Software Manager: Request Licenses” window that opens, in the “Select the host to assign licenses to” section, click the **Click to add or select a host** drop-down.
8. Click **Add a new License Notifier Host ID host...**
9. In the **License Notifier Host ID:** box that is displayed, enter your instrument’s model and serial number, separated by only a comma—no spaces). Example:
 - **New License Host Notifier Host ID host:** N5242A,MY12345678
 - The Model number suffix should **always** be “A” (i.e., NOT “AS”, and NOT “B”)
10. In the **Select the licenses to assign** section, scroll down until you see a Option 690 or Option 691 upgrade with your instrument’s “A” and “B” model values— similar to this *example*—and then click the box to select:
 - N5247AU-690 Upgrade N5247A to N5247B

NOTE

IMPORTANT: To avoid the loss of an option license, ensure that you only have a single Option 690/691 upgrade checked.

11. Click **Assign Licenses**
12. In the “Assigned licenses:” section that opens, listing all of the License Notifier Host IDs and associated instrument information, verify the following:

- **License Notifier Host ID:** contains the correct “B” model and serial number
- the associated **N52xxAU-690 Upgrade** or **N52xxAU-691 Upgrade** lists the correct “A” model to “B” model

If any of the information listed in the “Assigned licenses:” section is incorrect, click **Remove** next to the incorrect License Notifier Host ID: or **N52xxAU-690** or **N52xxAU-691 Upgrade** to remove them from the “Assigned Licenses” list.

- 13.** If there are multiple “A” model PNAs that are being upgraded to a “B” model, repeat steps **7** through **12**.

Else, continue to next step.

- 14.** Once you have verified the License Notifier Host ID & **N52xxAU-690** or **N52xxAU-691 Upgrade** Option models are correct, click **Continue** > (an email is sent to you with an Option 690 or Option 691 license file for each specific License Notifier Host ID’d PNA).

- 15.** Keysight will promptly email your license key file(s) to your profile’s email address.

Obtain Multiple License Key Files

All of the licenses in your instrument need to be converted to a new format for your “B” model instrument. Contact Keysight Technologies factory support early in your upgrade process to receive your licenses in a timely manner. See **“Getting Assistance from Keysight” on page 6**.

You will need to provide Keysight with the following information:

- model number
- serial number
- email address of the technician performing this upgrade (i.e., to send the license key files)

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 **“Description of this Upgrade” on page 5**.

Downloading the Online PNA Service Guide

To view the 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., N5232B) and click **Search**.
3. Click **Support** > **Keysight Product Support**.
4. In the **Search Support** area type your instrument's model number (e.g., N2245B).
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 of your instrument's Service Guide on www.keysight.com¹.

ESD Equipment Required for the Installation

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

1. See ["Downloading the Online PNA Service Guide"](#) on page 10.

Tools Required for the Installation

Description	Qty
T-10 TORX driver - set to 9 in-lbs (1.02 N.m)	1
T-20 TORX driver - set to 21 in-lbs (2.38 N.m)	1
5/16-in (8 mm) nutsetter or open end torque wrench - set to 10 in-lbs (1.13 N.m)	1
5/16-in (8 mm) nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1
9 mm nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1
1/4-in (6 mm) open end wrench	1

CAUTION

Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel bulkhead connectors. On these, use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

About Installing the Upgrade

Products affected	All N524xA microwave network analyzers and all N5264A microwave receivers
Installation to be performed by	Keysight service center, personnel qualified by Keysight, or customer
Estimated installation time	4 hours
Estimated adjustment time	1.5 hours
Estimated full instrument calibration time	4.5 to 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 **“Description of this Upgrade” on page 5**.

CAUTION

There are two CPU version part numbers listed in the upgrade kit tables below.

- W1312-60211 is the legacy version 7 CPU that some units have already installed. It is NOT being replaced and it is NOT included in Option 690 upgrade kit.
- W1312-60563 is current Version 9 CPU for Windows 10 upgrades in the N523xAU-691 upgrade kits. This CPU is included in the Option 691 upgrade kit.

Please verify your CPU version and your upgrade kit part number before you begin this procedure.

NOTE

This section applies to multiple models and upgrade kits. Please refer to the model and upgrade kit for your instrument's upgrade.

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.

Table 1

Contents of Upgrade Kit N5242-60117/N5242-60129 for N5241AU-690/691 (N5241B), N5242AU-690/691 (N5242B), and N5249AU-690/691 (N5249B)

Qty	Description	Part Number
1	Installation Note (this document)	N5242-90023
1	Software Entitlement Certificate	5964-5145
2	Front handle	5023-3074
4	Rear foot	5041-7903
4	Bottom foot	5041-7906
2	Trim strip, side, phantom gray	5041-7908
1	Caution label	5190-1799
1	Win 10 IoT Ent 2019 LTSC MultiLang ESD OEI EPKEA Value	9010-0350
1	China RoHS Addendum	9320-6722
1	Front frame – (assembly)	N5240-60071
4	Machine screw, M4.0 x 25 pan head (To attach rear feet to chassis.)	0515-1619

Table 1

Contents of Upgrade Kit N5242-60117/N5242-60129 for N5241AU-690/691 (N5241B), N5242AU-690/691 (N5242B), and N5249AU-690/691 (N5249B)

Qty	Description	Part Number
14	Machine screw, M3.0 x 10 mm flat head (To attach lower dress panel overlay frame to chassis).	0515-1946
12	Machine screw, M4.0 x 10 flat head (To attach front frame to chassis.)	0515-2044
1	Cable Assembly–Flat Ribbon 230 mm LG - Handler I/O cable (LFE)	8121-2919
1	Solid-state drive assembly (SSDA) – Option 690 only	N5242-60135 ¹
	Solid-state drive assembly (SSDA) – Option 691 only	N5242-60137 ²
1	Lower front panel overlay, 2-port (N5241/2/9B Options 201/219)	N5222-80010
	Lower front panel overlay, 2-port (N5241/2/9B Option 224)	N5242-80024
	Lower front panel overlay, 4-port (N5241/2/9B Option 401/419 /423)	N5222-80013
	Lower front panel overlay, 2-port (N5241/2/9B Option 219 with Option 029)	N5242-80026
	Lower front panel overlay, 2-port (N5241/2/9B Option 224 with Option 029)	N5242-80027
	Lower front panel overlay, 4-port (N5241/2/9B Option 419/423 with Option 029)	N5242-80028
	Lower front panel overlay, 2-port (N5241/2/9B Option 217)	N5242-80029
	Lower front panel overlay, 2-port (N5241/2/9B Option 222)	N5242-80030
	Lower front panel overlay, 4-port (N5241/2/9B Option 417 or 422)	N5242-80031
	Lower front panel overlay, 2-port (N5241/2/9B Option 217 with Option 029)	N5242-80032
	Lower front panel overlay, 2-port (N5241/2/9B Option 222 with Option 029)	N5242-80033
	Lower front panel overlay, 4-port (N5241/2/9B Option 417/422 with Option 029)	N5242-80034
1	Nameplate, N5241B	N5241-80002
	Nameplate, N5242B	N5242-80022
	Nameplate, N5249B	N5249-80003
1	Lower Dress Panel, 2-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00010
	Lower Dress Panel, 4-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00009
1	Rear panel, power supply	N5240-00012
1	Cable, assembly 60C 30 AWG 60F 60F	N5240-60090
1	Label, KCC	N5240-80041
2	Guard, jumper cables, side–2-Port & 4-Port	N5242-00048
1	Outer cover	N5242-00047

Table 1

Contents of Upgrade Kit N5242-60117/N5242-60129 for N5241AU-690/691 (N5241B), N5242AU-690/691 (N5242B), and N5249AU-690/691 (N5249B)

Qty	Description	Part Number
1	Guard, jumper cables, center-4-Port	N5242-00049
1	Front impact cover	N9040-40007
1	Rear impact cover	N9040-40008
2	Strap handle assembly	N5242-60076
4	Key lock (for bottom foot)	5021-2840
1	Version 9 CPU kit (Option 691 only)	W1312-60563
Not Included - (For Reference Only) - External Hardware and Miscellaneous Parts, All Options		
4	Machine screw M5.0 x 18, flat head (To attach strap handle.)	0515-0710
4	Hole plug (When analyzer is rack mounted.)	N9020-40007
1	Test set, subpanel (2-port) ³ - N5241/2/9B only	N5221-00006
1	Test set, subpanel (4-port) ³ - N5241/2/9B only	N5221-00007
1	Wire assy, LED PCA ³ - N5241/2/9B only	N5242-60009
1	Synthesizer board (With tabs for s/n 5200 and above)	N5240-60074
	Synthesizer board (Without tabs for s/n's below 5200)	N5240-60076
1	Synthesizer board kit (Without tabs for s/n's below 5200) – Qty is 3 boards	N5242-60168
1	DSP (SPAM) version 5 board	N5240-60077
1	DSP (SPAM) cable (2-port only)	N5247-60023
	DSP (SPAM) cable (2-port only)	N5247-60024
	DSP (SPAM) cable (All)	N5242-60014
1	IF Multiplexer board	N5240-60062
n/a	Version 7 CPU – is already installed on some instruments. It can be upgraded to Windows 10 OS using SSDA N5242-60135, but this legacy CPU is not part of the Option 690 upgrade kit. This p/n is included for your reference only.	W1312-60211 ¹

1. Version 7 SSDA for use only with the version 7 CPU. The version 7 CPU is not part of the Option 690 upgrade kit, but is required to use N5242-60135 Windows 10 OS SSDA. If an instrument has an older CPU than version 7 W1312-60211, the customer must order Option 691 to upgrade to a B model.
2. Version 9 SSDA for use only with the Version 9 CPU. The Version 9 CPU is included in the Option 691 upgrade kit.
3. If it is necessary to replace these parts, Keysight will replace these parts at no cost to the customer.

Description of this Upgrade
Items Included in the Upgrade Kit

Table 2 **Contents of Upgrade Kit N5245-60116/N5245-60134 for N5244AU-690/691 (N5244B) and N5245AU-690/691 (N5245B)**

Qty	Description	Part Number
1	Installation Note (this document)	N5242-90023
1	Software Entitlement Certificate	5964-5145
2	Front handle	5023-3074
4	Rear foot	5041-7903
4	Bottom foot	5041-7906
2	Trim strip, side, phantom gray	5041-7908
1	Caution label	5190-1799
1	Win 10 IoT Ent 2019 LTSC MultiLang ESD OEI EPKEA Value	9010-0350
1	China RoHS Addendum	9320-6722
1	Front frame – (assembly)	N5240-60071
4	Machine screw, M4.0 x 25 pan head (To attach rear feet to chassis.)	0515-1619
14	Machine screw, M3.0 x 10 mm flat head (To attach lower dress panel overlay frame to chassis).	0515-1946
12	Machine screw, M4.0 x 12 flat head (To attach front frame to chassis.)	0515-2044
1	Cable Assembly–Flat Ribbon 230 mm LG - Handler I/O cable (LFE)	8121-2919
1	Solid-state drive assembly (SSDA) – Option 690 only	N5242-60135 ¹
	Solid-state drive assembly (SSDA) – Option 691 only	N5242-60137 ²
1	Lower front panel overlay, 2-port (N5244/5B Options 201/219)	N5242-80023
	Lower front panel overlay, 2-port (N5244/5B Option 224)	N5245-80027
	Lower front panel overlay, 4-port (N5244/5B Option 401/419 /423)	N5242-80025
	Lower front panel overlay, 2-port (N5244/5B Option 222)	N5245-80028
	Lower front panel overlay, 2-port (N5244/5B Option 224 with Option 029)	N5245-80029
	Lower front panel overlay, 4-port (N5244/5B Option 423 with Option 029)	N5245-80030
	Lower front panel overlay, 2-port (N5244/5B Option 217)	N5242-80029
	Lower front panel overlay, 4-port (N5244/5B Option 417/422)	N5242-80031
	Lower front panel overlay, 2-port (N5244/5B Option 222 with Options 029)	N5245-80033
	Lower front panel overlay, 4-port (N5244/5B Option 417/422 with Options 029)	N5245-80031
1	Nameplate, N5244B	N5244-80002
	Nameplate, N5245B	N5245-80026

Table 2 **Contents of Upgrade Kit N5245-60116/N5245-60134 for N5244AU-690/691 (N5244B) and N5245AU-690/691 (N5245B)**

Qty	Description	Part Number
1	Lower Dress Panel, 2-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00010
	Lower Dress Panel, 4-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00009
1	Rear panel, power supply	N5240-00012
1	Cable, assembly 60C 30 AWG 60F 60F	N5240-60090
1	Label, KCC	n5240-80041
1	Outer cover	N5245-00035
2	Guard, jumper cables, side—2-Port & 4-Port	N5242-00048
1	Guard, jumper cables, center—4-Port	N5242-00049
1	Front impact cover	N9040-40007
1	Rear impact cover	N9040-40008
2	Strap handle assembly	N5247-60030
4	Key lock (for bottom foot)	5021-2840
1	Version 9 CPU kit (Option 691 only)	W1312-60563
Not Included - (For Reference Only) - External Hardware and Miscellaneous Parts, All Options		
4	Machine screw M5.0 x 18, flat head (To attach strap handle.)	0515-0710
4	Hole plug (When analyzer is rack mounted.)	N9020-40007
1	Synthesizer board (With tabs for s/n 5200 and above)	N5240-60074
	Synthesizer board (Without tabs for s/n's below 5200)	N5240-60076
1	Synthesizer board kit (Without tabs for s/n's below 5200) – Qty is 3 boards	N5242-60168
1	DSP (SPAM) version 5 board	N5240-60077
1	DSP (SPAM) cable (2-port only)	N5247-60023
	DSP (SPAM) cable (2-port only)	N5247-60024
	DSP (SPAM) cable (All)	N5242-60014
1	IF Multiplexer board	N5240-60062
1	Test set, subpanel (2-port) ³ - N5244/45B only	N5224-00004
	Test set, subpanel (4-port) ³ - N5244/45B only	N5224-00005
1	Wire assy, LED PCA ³ - N5244/45B only	N5225-60001

Table 2 **Contents of Upgrade Kit N5245-60116/N5245-60134 for N5244AU-690/691 (N5244B) and N5245AU-690/691 (N5245B)**

Qty	Description	Part Number
n/a	Version 7 CPU – is already installed on some instruments. It can be upgraded to Windows 10 OS using SSDA N5242-60135, but the legacy CPU is not part of the Option 690 upgrade kit. This p/n is included for reference only.	W1312-60211 ¹

1. Version 7 SSDA for use only with the version 7 CPU. The version 7 CPU is not part of the Option 690 upgrade kit, but is required to use N5242-60135 Windows 10 OS SSDA. If an instrument has an older CPU than version 7 W1312-60211, the customer must order Option 691 to upgrade to a B model.
2. Version 9 SSDA for use only with the Version 9 CPU. The Version 9 CPU is included in the Option 691 upgrade kit.
3. If it is necessary to replace these parts, Keysight will replace these parts at no cost to the customer.

Description of this Upgrade
Items Included in the Upgrade Kit

Table 3 **Contents of Upgrade Kit N5247-60114/N5247-60119 for N5247AU-690/691 (N5247B))**

Qty	Description	Part Number
1	Installation Note (this document)	N5242-90023
1	Software Entitlement Certificate	5964-5145
1	Front frame – (assembly)	N5240-60071
4	Machine screw, M4.0 x 25 pan head (To attach rear feet to chassis.)	0515-1619
14	Machine screw, M3.0 x 10 mm flat head (To attach lower dress panel overlay frame to chassis).	0515-1946
12	Machine screw, M4.0 x 12 flat head (To attach front frame to chassis.)	0515-2044
1	Win 10 IoT Ent 2019 LTSC MultiLang ESD OEI EPKEA Value	9010-0350
1	China RoHS Addendum	9320-6722
1	Solid-state drive assembly (SSDA) – Option 690 only	N5242-60135 ¹
	Solid-state drive assembly (SSDA) – Option 691 only	N5242-60137 ²
2	Front handle	5023-3074
4	Rear foot	5041-7903
4	Bottom foot	5041-7906
2	Trim strip, filler (For analyzers without handles.)	5041-7908
1	Two person Caution label	5190-1799
1	Cable Assembly–Flat Ribbon 230 mm LG - Handler I/O cable (LFE)	8121-2919
1	Lower front panel overlay, 2-port (N5247B Options 201 or 219)	N5247-80020
	Lower front panel overlay, 2-port (N5247B Option 224)	N5247-80018
	Lower front panel overlay, 4-port (N5247B Option 401 or 419)	N5247-80021
	Lower front panel overlay, 2-port (N5247B Option 423)	N5247-80019
	Lower front panel overlay, 2-port (N5247B Option 224 with Option 029)	N5247-80022
	Lower front panel overlay, 4-port (N5247B Option 423 with Option 029)	N5247-80023
1	Nameplate, N5247B	N5247-80017
1	Lower Dress Panel, 2-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00010
	Lower Dress Panel, 4-Port (ALL PNA models). Goes on, before lower front panel overlay. Attach with 0515-1946 subpanel screws.	N5240-00009
1	Rear panel, power supply	N5240-00012
1	Cable, assembly 60C 30 AWG 60F 60F	N5240-60090

Table 3 **Contents of Upgrade Kit N5247-60114/N5247-60119 for N5247AU-690/691 (N5247B))**

Qty	Description	Part Number
1	Label, KCC	N5240-80041
1	Outer cover	N5245-00035
2	Guard, jumper cables, side-2-Port & 4-Port	N5242-00048
1	Guard, jumper cables, center-4-Port	N5242-00049
1	Guard, jumper cables, center-4-Port	N5247-00024
1	Front impact cover	N9040-40007
1	Rear impact cover	N9040-40008
2	Strap handle assembly	N5247-60030
1	Guard, dual rear jumper cable cover	N5247-00027
4	Key lock (for bottom foot)	5021-2840
1	Version 9 CPU kit (Option 691 only)	W1312-60563
Not Included - (For Reference Only) - External Hardware and Miscellaneous Parts, All Options		
4	Machine screw M5.0 x 18, flat head (To attach strap handle.)	0515-0710
4	Hole plug (When analyzer is rack mounted.)	N9020-40007
1	Synthesizer board (With tabs for s/n 5200 and above)	N5240-60074
1	Synthesizer board (Without tabs for s/n's below 5200)	N5240-60076
1	Synthesizer board kit (Without tabs for s/n's below 5200) – Qty is 3 boards	N5242-60168
1	DSP (SPAM) version 5 board	N5240-60077
1	DSP (SPAM) cable (2-port only)	N5247-60023
	DSP (SPAM) cable (2-port only)	N5247-60024
	DSP (SPAM) cable (All)	N5242-60014
1	IF Multiplexer board	N5240-60062
n/a	Version 7 CPU – is already installed on some instruments. It can be upgraded to Windows 10 OS using SSDA N5242-60135, but the legacy CPU is not part of the Option 690 upgrade kit. This p/n is included for reference only.	W1312-60211 ¹

1. Version 7 SSDA for use only with the version 7 CPU. The version 7 CPU is not part of the Option 690 upgrade kit, but is required to use N5242-60135 Windows 10 OS SSDA. If an instrument has an older CPU than version 7 W1312-60211, the customer must order Option 691 to upgrade to a B model.
2. Version 9 SSDA for use only with the Version 9 CPU. The Version 9 CPU is included in the Option 691 upgrade kit.

Description of this Upgrade
Items Included in the Upgrade Kit

Table 4 **Contents of Upgrade Kit N5264-60102/N5264-60103 for N5264AU-690/691 (N5264B)**

Qty	Description	Part Number
1	Installation Note (this document)	N5242-90023
1	Software Entitlement Certificate	5964-5145
1	Front frame – (assembly)	N5240-60071
4	Machine screw, M4.0 x 25 pan head (To attach rear feet to chassis.)	0515-1619
10	Machine screw, M3.0 x 10 mm flat head (To attach lower dress panel overlay frame to chassis).	0515-1946
12	Machine screw, M4.0 x 12 flat head (To attach front frame to chassis.)	0515-2044
1	Win 10 IoT Ent 2019 LTSC MultiLang ESD OEI EPKEA Value	9010-0350
1	China RoHS Addendum	9320-6722
1	Solid-state drive assembly (SSDA) – Option 690 only	N5242-60135 ¹
	Solid-state drive assembly (SSDA) – Option 691 only	N5242-60137 ²
2	Front handle	5023-3074
4	Rear foot	5041-7903
4	Bottom foot	5041-7906
2	Trim strip, filler (For analyzers without handles.)	5041-7908
1	Caution label	5190-1799
1	Cable assembly - flat ribbon 040C 40F/36 230mm-LG	8121-2919
1	Lower front panel overlay, N5264B	N5264-80005
1	Nameplate, N5264B	N5264-80004
1	Lower Dress Panel, attach with 0515-1946 subpanel screws.	N5264-00005
1	Rear panel, power supply	N5240-00012
1	Cable, assembly 60C 30 AWG 60F 60F	N5240-60090
1	Outer cover	N5242-00047
1	Front impact cover	N9040-40007
1	Rear impact cover	N9040-40008
2	Strap handle assembly	N5242-60076
4	Key lock (for bottom foot)	5021-2840
1	Version 9 CPU kit (Option 691 only)	W1312-60563
Not Included - (For Reference Only) - External Hardware and Miscellaneous Parts, All Options		

Description of this Upgrade
Items Included in the Upgrade Kit

Table 4 **Contents of Upgrade Kit N5264-60102/N5264-60103 for N5264AU-690/691 (N5264B)**

Qty	Description	Part Number
1	Machine screw M5.0 x 18, flat head (To attach strap handle.)	0515-0710
1	Hole plug (When analyzer is rack mounted.)	N9020-40007
n/a	Version 7 CPU – is already installed on some instruments. It can be upgraded to Windows 10 OS using SSDA N5242-60135, but the legacy CPU is not part of the Option 690 upgrade kit. This p/n is included for reference only.	W1312-60211 ¹

1. Version 7 SSDA for use only with the version 7 CPU. The version 7 CPU is not part of the Option 690 upgrade kit, but is required to use N5242-60135 Windows 10 OS SSDA. If an instrument has an older CPU than version 7 W1312-60211, the customer must order Option 691 to upgrade to a B model.
2. Version 9 SSDA for use only with the Version 9 CPU. The Version 9 CPU is included in the Option 691 upgrade kit.

Initial Instrument Inspection

CAUTION

STOP! This repair must be done at a service center! Refer to [“Getting Assistance from Keysight” on page 6](#).

This section and all steps must be completed before proceeding to the following sections or customer data may be lost or instrument repair delayed!

CAUTION

STOP!

Any return to factory (RTF) that will have CPU, Midplane, Motherboard, Front Panel, or Front Panel Ribbon replaced will need to have it's event log cleared after the hardware replacements are complete.

Older System motherboards with serial numbers <N5247-63002-23-1945-00002 need to be reworked to remove L1, per [Appendix C: “Motherboard Clearing the Event Log and Modification to Replace L1,” on page 77](#). If you have an older system board, call Keysight Support to verify, if your instrument has previously been upgraded. Refer to [“Getting Assistance from Keysight” on page 6](#).

Before beginning this System Motherboard rework, refer to step 4, in [“Verifying the Board Assemblies” on page 25](#).

CAUTION

STOP!

If you ordered Option 690, your instrument requires a Version 7 CPU W1312-60211 to be able to use the Windows 10 Operating System SSDA N5242-60135. A version 7 CPU is not included with Option 690. If an instrument has an older CPU, then the customer must order Option 691 that includes a Version 9 CPU, refer to [Table 1 on page 12](#), [Table 2 on page 15](#), [Table 2 on page 15](#), [Table 3 on page 18](#), [Table 4 on page 20](#) and to [“Contacting Keysight” on page 6](#).

The purpose of this section is to verify where the instrument should begin the model conversion process. This section verifies that the instrument has all of the required board assemblies for a B model upgrade.

If your instrument does not have all of the required board assemblies, contact the customer, to provide a quote on parts and labor. Upon customer approval, order up all of the new upgrade kits and boards, before the “B” model upgrade can be completed.

Refer to [Table 5 on page 23](#) and then to [“Verifying the Board Assemblies” on page 25](#).

Table 5 Overview of Assembly Requirements for B Model Upgrade

Assembly ¹	Part Number	Serial Number for PNAs that start using these boards (PNAs with these serial prefixes do not need to be upgraded)	Can be ordered using the part number, or:
SPAM 5	N5240-60078 For 2-port PNAs, also order x1 N5247-60023 and x1 N5247-60024	MY/US5200 and above	N8989A-SP5
IF Multiplexer, version B	N5240-60062	MY/US5540 and above	N889A-MX2
Synthesizers, versions E, F, or G	N5240-60076 (single board) or N5242-60168 (3 board kit)	MY/US5120 and above	N8989A-SR6
<div>NOTE</div> 2-port PNAs without option 224 need two synthesizer boards. 4-port PNAs or 2-port option 224 PNAs need three synthesizer boards.			
Test Set Motherboard – N5241/2/9A & N5264A only	N5245-60163	MY/US4940 and above	----
Test Set Motherboard – N5244/5A only²	N5245-60157	MY/US5240 and above	----
System Motherboard ^{3, 4, 5} (See Critical Footnote)	N5247-60002	N5247-63002-23-1945-00002 and above	----
Noise receiver board ⁶ (Option 029 only) – (See critical footnote)	N5245-60124 (5201 and above) N5245-60125 (5150 and below)	MY/US5540 and above	----- -----

1. Critical Footnote:
Any return to factory (RTF) that will have CPU, Midplane, Motherboard, Front Panel, or Front Panel Ribbon replaced will need to have it's event log cleared after the hardware replacements are complete.
2. All of the N5247A PNA-X's already have a N5245-60157 test set motherboard installed.
3. Critical Footnote:
Older System motherboards with serial numbers <N5247-63002-23-1945-00002 need to be reworked to remove L1, per Appendix C, "**Motherboard Clearing the Event Log and Modification to Replace L1**" on **page C-77**. If you have an older system board, call Keysight Support to verify, if your instrument has previously been upgraded. Refer to "**Getting Assistance from Keysight**" on **page 6**.
4. This is a system motherboard serial number break.
5. The system motherboards that require the L1 rework are only installed in the PNA/PNA-X instruments (i.e., N5224/25/27/44/45/47A).

Description of this Upgrade

Initial Instrument Inspection

6. Critical Footnote:

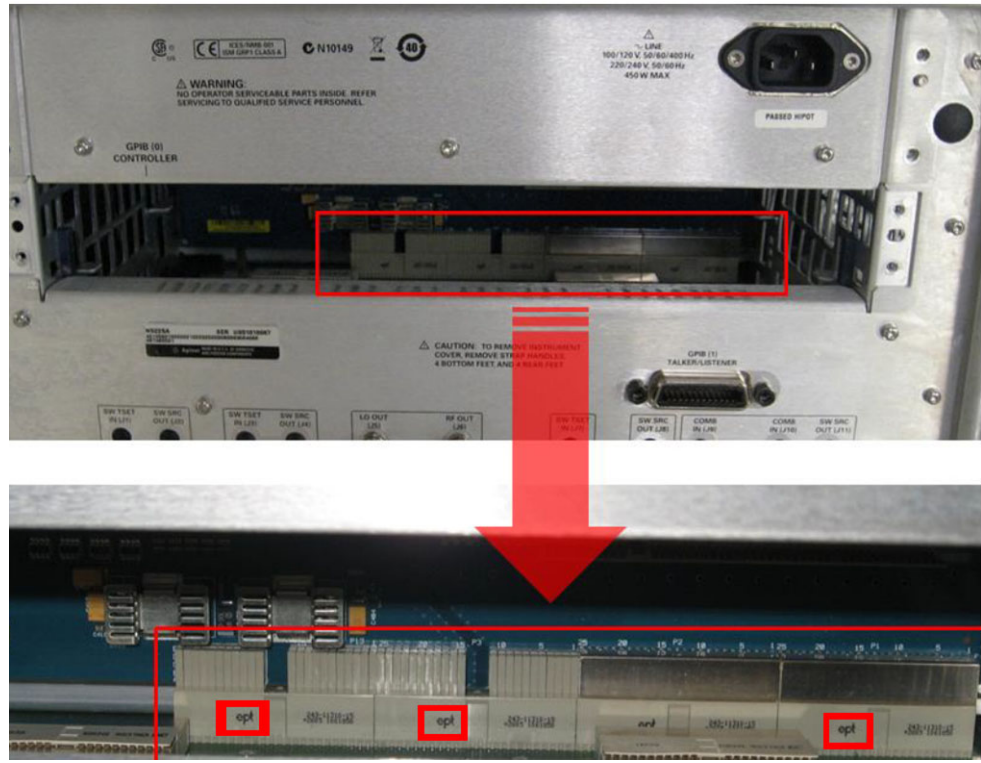
The older N5242-60098 noise receiver board for the N5241A/42A currently works in the N5241B/42B. However, the functionality is not thoroughly tested anymore when we release new firmware. There may come a time when the new firmware does not work with this older board, and the only option will be to upgrade the board. Upgrading now to the N5245-60124 board will proactively prevent any future firmware incompatibility. If the PNA serial number is below US/MY5200xxxx, upgrade to the N5245-60124 board by ordering the N5245-60125 kit. This provides the N5245-60124 and a replacement shield to allow the board to fit in the older chassis. Upgrading from the N5242-60098 to the N5245-60124 board also requires the W141 and W143 cables to be replaced. Order one each of cables N5242-20322 and N5242-20323.

Verifying the Board Assemblies

NOTE

IMPORTANT!

EPT labeled motherboards need to be replaced prior to proceeding with the upgrade (i.e., See image this note). Learn more, refer to the following Service Notes: N5221A-02A, N5222A-02A, N5224A-01A, N5225A-02A, N5227A01A, N5241A-03A, N5242A-07A, N5244A-03, N5245A-04A, and N5247A-02A.



The following board assemblies need to be verified and installed during the upgrade:

1. Press **Help > About NA...**
2. In the About Network Analyzer window that opens, make a note of the following:
 - System CPU Version
 - The system CPU must be a version 7 or greater. Option 690 is for PNAs that already have the version 7 CPU installed, you must have a W1312-60211 version 7 CPU installed, to use the N5242-60135 Win 10 OS SSDA. If a PNA has an older CPU version that needs to be replaced, the customer

will need to order the Option 691 kit, which includes a Version 9 or greater CPU. Please contact Keysight if you need to order Option 691.

- DSP Version

- The DSP (SPAM) board must be version 5 or greater. The SPAM V boards are not included in this kit. Please contact Keysight if you need to replace the SPAM boards and order N5240-60077 SPAM V and N5242-60014 (W61) IF cable. If you have a 2-Port instrument, you will also need to order one each of cable numbers: N5247-60023 and N5247-60024.

3. Press **Utility > System > Service > Diagnostics > EEPROM Headers**

- Verify the LO Synth, Src1 Synth, and Src2 Synth boards part number is either “N524063074” or “N524263150”. The synthesizer boards are not included in this kit. Please contact Keysight if you need to replace the synthesizer boards and order N5240-60076.
 - **Option 029 only:** Verify the “N524563124” noise receiver board EEPROM header revision reads: “B”. If the EEPROM reads “A”, edit the EEPROM to read “B”.
4. If your system motherboard is <**N5247-63002-23-1945-00002** and your board has not been already reworked by the factory, then you must perform the L1 modification, per **Appendix C: “Motherboard Clearing the Event Log and Modification to Replace L1,” on page 77**. If you suspect that you have an older system board, call Keysight Support to verify, if your instrument has previously been upgraded. Refer to **“Getting Assistance from Keysight” on page 6**.

CAUTION

IMPORTANT!

If you need to rework your system motherboard, do not reassemble your instrument until reviewing/completing step 5 below and the following step in the **“Overview of the Installation Procedure” on page 27**:

If applicable:

- **“Instruments with Windows 7 Operating System (Windows 7 OS) only:” on page 27)**

Refer to the Service Guide for your model instrument and to “Removing and Replacing the A14 System Motherboard” in “Chapter 7 Repair and Replacement Procedures.”

5. Remove the instrument outer covers and if necessary the power supply, to verify the Midplane Board’s part number reads: “W1312-63376”. Refer to the Service Guide on www.keysight.com for removing the power supply.

Then choose from the following:

- If the midplane board's part number reads W1312-63002, it needs to be replaced. Contact Keysight to order a new W1312-60376 midplane board. Refer to [“Getting Assistance from Keysight” on page 6](#).
 - If the midplane board's part number reads W1312-63095, it needs to be modified. Refer to [“Step 12. Inspect or Modify Midplane Board \(W1312-63095 to a W1312-63376\)” on page 41](#).
6. **N5244/5/A models (ONLY):** If the subpanels need to be changed, the LED boards need to be rotated 180 degrees and the LED cables replaced (refer to [“Step 10. Inspect and If Required, Replace Front Subpanel” on page 39](#)). Regardless, ensure that LED boards are installed correctly and the LED cables (N5225-60001 (x2)) are the correct part numbers. Refer to [“Step 11. If Required, Rotate the LED Boards and Replace the LED Bias Cables \(N5244/5A Only\)” on page 40](#) and to the Service Guide’s “Removing and Replacing the Front Panel LED Boards” on www.keysight.com. If not, these parts should be ordered and replaced at no cost to the customer. Refer to [Table 2 on page 15](#).
7. If your instrument has the minimum criteria mentioned above, or you have received the required parts you need, proceed to [“Step 1. Copy All Unique Files to an External Disk Drive” on page 30](#).

Overview of the Installation Procedure

CAUTION

Windows XP OS only: Before installing the new SSDA (N5242-60135 (for Version 7 CPU) or N5242-60137 (for Version 9 CPU)) with Windows 10 OS (i.e., Option 690 or Option 691 upgrade kit), the service center’s SSDA with firmware \geq A.10.40.00 must be loaded and initialized in the instrument. This initializes the instrument to a known stable state.

CAUTION

This section assumes you have completed the [“Initial Instrument Inspection”](#) section and verified, that all of the board assemblies meet the requirements for this A to B model upgrade. If not, refer to the [“Initial Instrument Inspection” on page 22](#).

All instruments:

[“Step 1. Copy All Unique Files to an External Disk Drive” on page 30](#)

Instruments with Windows 7 Operating System (Windows 7 OS) only:

[“Step 2. Update Windows 7 OS Instruments with A.10.40 or above” on page 31](#)

“Step 3. Verify Windows 7 OS with New A.10.40.00 Firmware or Greater” on page 32

All instruments:

“Step 4. Remove the outer covers” on page 33[

“Step 5. Remove the Power Supply Cover” on page 34

Instruments with Windows XP Operating System (Windows XP OS) only:

“Step 6. Install the Version 7 CPU W1312-60211 and SSDA N5242-60133 *Service Center* Assembly with A.10.40 Firmware or Greater” on page 35

All instruments:

“Step 7. Install the *New* Power Supply Cover” on page 36

“Step 8. Power Up Your Instrument and Allow Windows 7 to Stabilize” on page 37

“Step 9. Remove the Front Panel Assembly” on page 37

“Step 10. Inspect and If Required, Replace Front Subpanel” on page 39

N5241/2/4/5/9A Only:

“Step 11. If Required, Rotate the LED Boards and Replace the LED Bias Cables (N5244/5A Only)” on page 40

All instruments:

“Step 12. Inspect or Modify Midplane Board (W1312-63095 to a W1312-63376)” on page 41

“Step 13. Install the Dress Panel on the New Front Panel Assembly” on page 43

“Step 14. Install the New Overlays on the New Front Panel Assembly” on page 44

“Step 15. Install the New Front Panel Assembly and the Lower Overlay” on page 45

“Step 16. Install New version SPAM V, Synth, IF Multiplexer, Noise Figure Receiver, and Test Set Mother boards (If Necessary)” on page 49

“Step 17. Install the New Handler I/O Cable” on page 50

“Step 18. Install the *NEW* N5242-60135 Solid-State Disk Drive Assembly (SSDA) from the Option 690 Upgrade Kit OR Install the *NEW* Version 9 CPU W1312-60563 and *NEW* N5242-60137 Solid-State Disk Drive Assembly (SSDA) from the Option 691 Upgrade Kit” on page 52

“Step 19. Reboot the Instrument” on page 53

- “Step 20. Install the Dual Cable Rear Guard (N5247B Only)” on page 55
- “Step 21. Reinstall the Outer Covers” on page 56
- “Step 22. Install Option N52xxAU-690 or N52xxAU-691” on page 57
- “Step 23. Changing your PNA’s Computer Name from an A model to a B model” on page 59
- “Step 24. Install and Verify Multiple License Files” on page 60
- “Step 25. Verify the PNA Analyzer Program is Running with the Correct Options” on page 61
- “Step 26. Copy the Unique Files Back to the Analyzer’s SSD” on page 62
- “Step 27. Motherboard Event Log Clearing” on page 62
- “Step 28. Perform Post-Upgrade Adjustments and Calibration” on page 63
- “Step 29. Prepare the PNA for the User” on page 65

Step 1. Copy All Unique Files to an External Disk Drive

CAUTION

This section assumes you have completed the “Initial Instrument Inspection” section and verified, that all of the board assemblies meet the requirements for this A to B model upgrade. If not, refer to the “Initial Instrument Inspection” on page 22.

If you still need to modify your system motherboard and some of the other subsequent steps in the “Initial Instrument Inspection” on page 22, first, complete the copying of all unique files to an external drive as indicated in this step and then return to complete the “Initial Instrument Inspection” on page 22.

NOTE

You may skip this step, if you plan to retain the installed SSD for future access. (i.e., To connect your old SSD as a secondary drive, a USB to data or USB to SATA converter cable is required and these are available commercially).

The hard disk drive (HDD/SSD) in your analyzer will be replaced as part of this upgrade. Therefore, it is necessary that all unique and personal files stored on the HDD/SSD be saved to an external disk drive for re-installation later on the new SSD.

This procedure is written assuming a USB flash memory drive is used, although any external disk drive will suffice.

1. Connect the power cord to the analyzer and turn ON the power.
2. Insert a USB flash memory drive into a USB port.
3. Open Windows Explorer.
4. Copy all of your files that you want to transfer to the USB drive:
 - If an instrument has a SSD with Windows XP: if the user has loaded unique calibration kit information, navigate to C:\Program Files\Keysight\Network Analyzer and copy USER_CALKITFILE to a USB flash memory drive. Also copy any personal user files that you wish to preserve.
 - If an instrument's has a SSDA with Windows 7 OS: for more information on the N8984A SSD, refer to the *Windows 7 Operating System Upgrade Kit Installation Note*, available online at <https://www.keysight.com/us/en/assets/9018-04311/installation-guides/9018-04311.pdf> (N8984-90001).

Obsolete. Reference only.

- If you are installing an SSDA for Windows 10: for more information on the N8985A SSD, refer to the *Windows 10 Operating System Upgrade Kit Installation Note*, available online at <https://www.keysight.com/us/en/assets/9018-04733/installation-guides/9018-04733.pdf> (N8985-90001).
5. Remove the USB drive from the USB port.
 6. Exit Windows Explorer.

Step 2. Update Windows 7 OS Instruments with A.10.40 or above

NOTE

Skip this step, if your PNA is already running firmware A.10.40 or above.

1. If the PNA is running, click **File > Exit**
2. Go to <https://www.keysight.com/my/en/lib/software-detail/instrument-firmware-software/n52xxb-pna-series-network-analyzer-firmware.html> and download the latest PNA firmware.
3. Click on the firmware to be downloaded.
4. Save the program to disk (hard drive of your PC or to your PNA).
5. If necessary, transfer the file from your PC to your PNA using LAN, CD, or USB Pen drive.
6. Double-click the file on the PNA. Follow the prompts to complete the firmware installation.
7. If the PNA application does not start up automatically, double-click the network analyzer icon on the desktop.

NOTE

If you have problems with updating the PNA's firmware, refer to [“Getting Assistance from Keysight” on page 6](#).

Step 3. Verify Windows 7 OS with New A.10.40.00 Firmware or Greater

NOTE

Skip this step, if your PNA is already running firmware A.10.40 or above.

1. After the new firmware is installed, verify the firmware operates without errors.
2. After the instrument powers up, on the toolbar click or press **Help > About NA** to verify the firmware has been updated to A.10.40.00 or greater.
3. Power down your instrument.

NOTE

If you have problems with updating the PNA's firmware, refer to [“Getting Assistance from Keysight” on page 6](#).

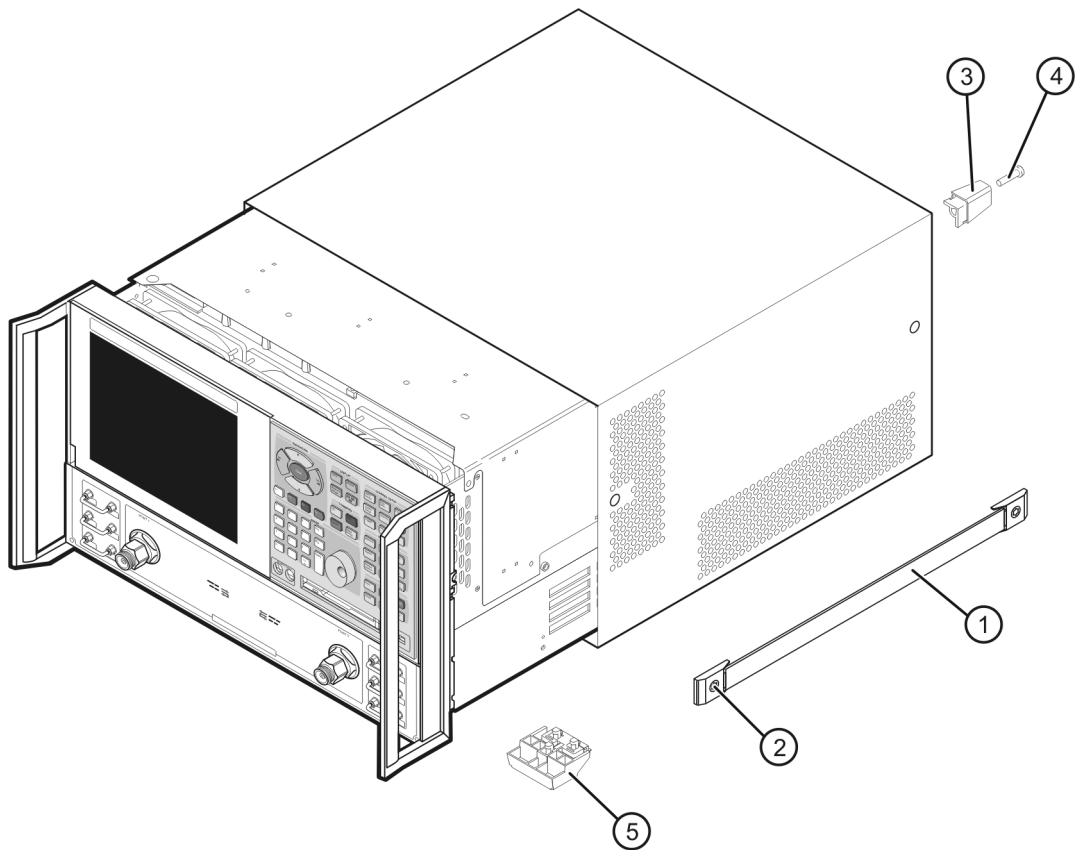
Step 4. Remove the outer covers

Remove the Outer Cover

1. Turn OFF the analyzer and disconnect the power cord.
2. With a T-20 TORX driver, remove the strap handles (item ①) by loosening the screw (item ②) on each end of each handle.
3. With a T-20 TORX driver, remove the four rear panel feet (item ③) by removing the center screws (item ④).
4. Slide the four bottom feet (item ⑤) off the cover.
5. Slide the cover off of the frame.

Figure 1

Outer Cover Removal (Instruments Vary—Example Only)



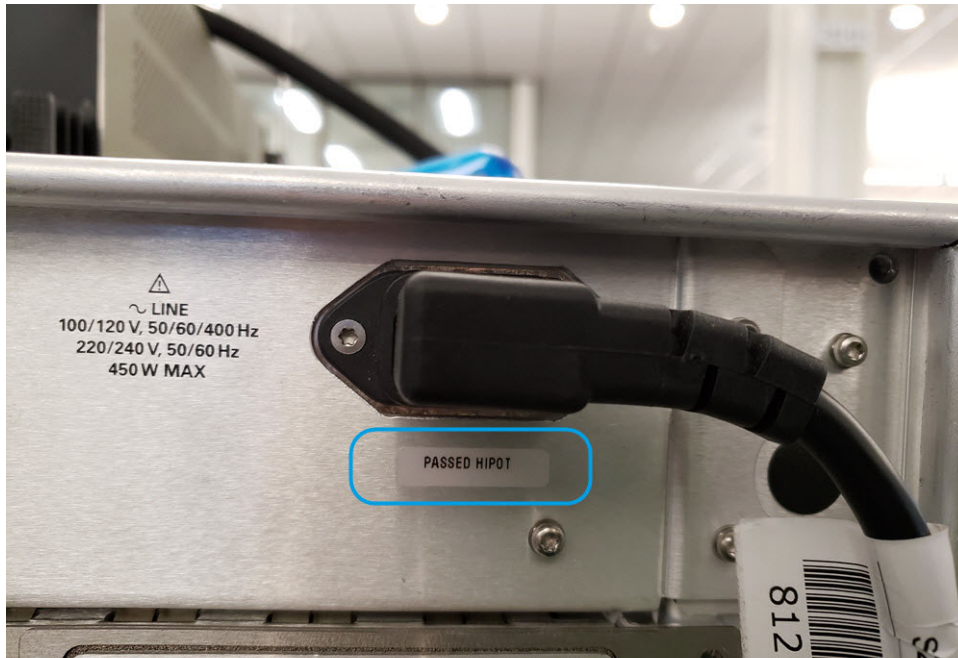
n5230_90027_003

Step 5. Remove the Power Supply Cover

1. On the rear panel, remove the screws (x7) and the power supply cover. Save the 0515-0372 (x7) screws for reuse.
2. If you do **not** have a new Hi-Pot label, then you need to peel off the old Hi-Pot sticker and save for reuse.

Figure 2

Hi-Pot Sticker on the Power Supply Cover



Step 6. Install the Version 7 CPU W1312-60211 and SSDA N5242-60133 *Service Center* Assembly with A.10.40 Firmware or Greater

CAUTION

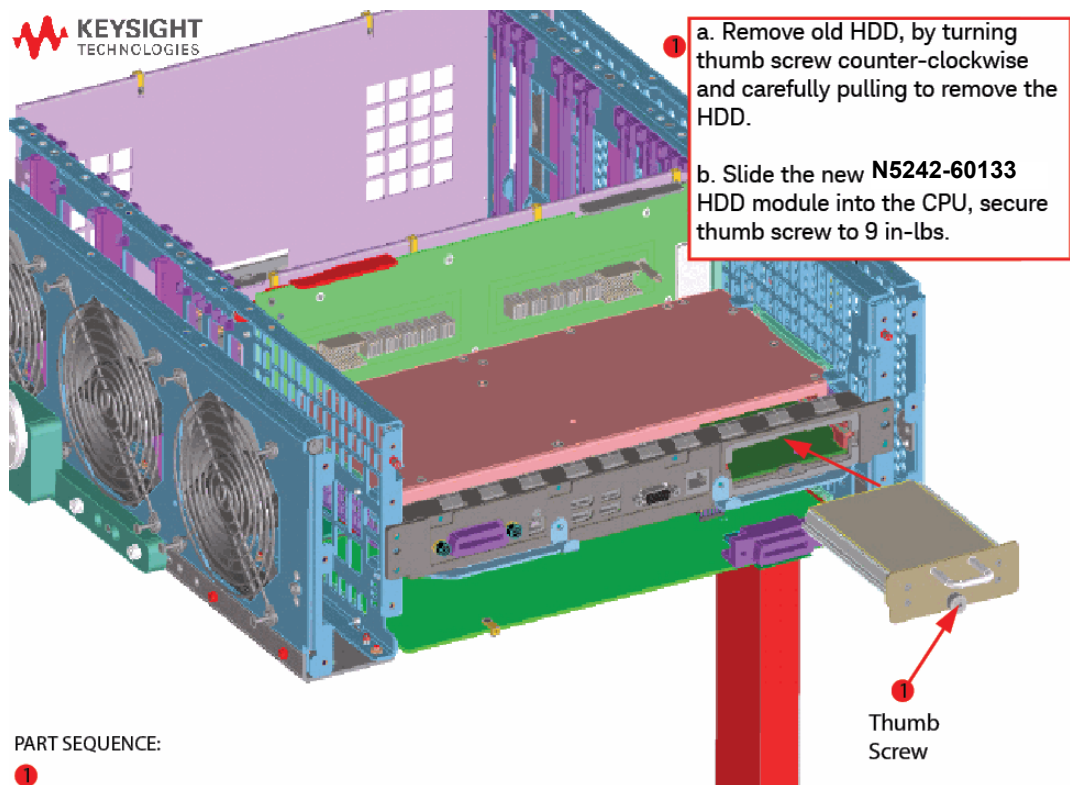
IMPORTANT!

If your instrument already has a version 7 CPU W1312-60211 and the Windows 7 OS has been updated to A.10.40 then skip this step to **“Step 7. Install the *New* Power Supply Cover” on page 36.**

If a instrument currently has Windows XP OS: Install the *service center's* version 7 CPU (W1312-60211) and Windows 7 OS SSDA (N5242-60133) into the analyzer by referring to **Figure 3 on page 35** and to your instrument's Service Guide's Chapter 7 “Repair and Replacement Procedures” on www.keysight.com.

Figure 3

Service Center's Solid-State Disk Drive Assembly (SSDA) with A.10.40 or above (N5242-60135/N5242-60137 Win 10 OS SSDA installation is similar)



Step 7. Install the *New* Power Supply Cover

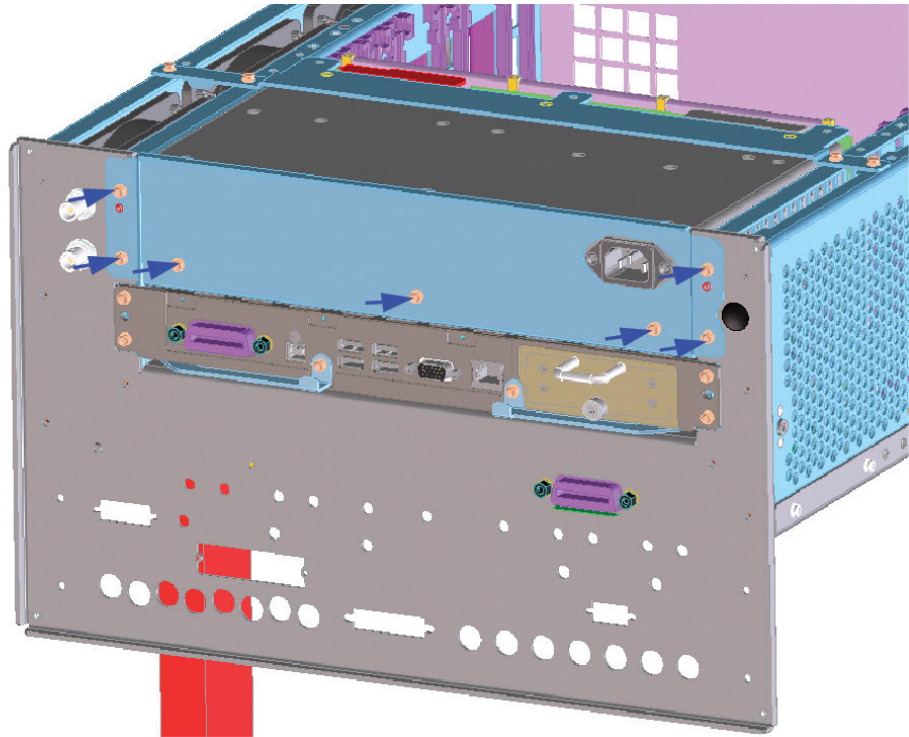
Refer to **Figure 4** and **Figure 5** for this step.

1. Install the new power supply cover by reusing the 0515-0372 (x7) screws.
2. Install the KCC label (N5240-80041) as shown.

Figure 4

Install the Power Supply Cover (N5240-00012) with reused screws (x7)

1
Install Power supply Rear
Panel Bracket N5240-
00012, Secure with screws
0515-0372 X7. Torque to 9
in-lbs.

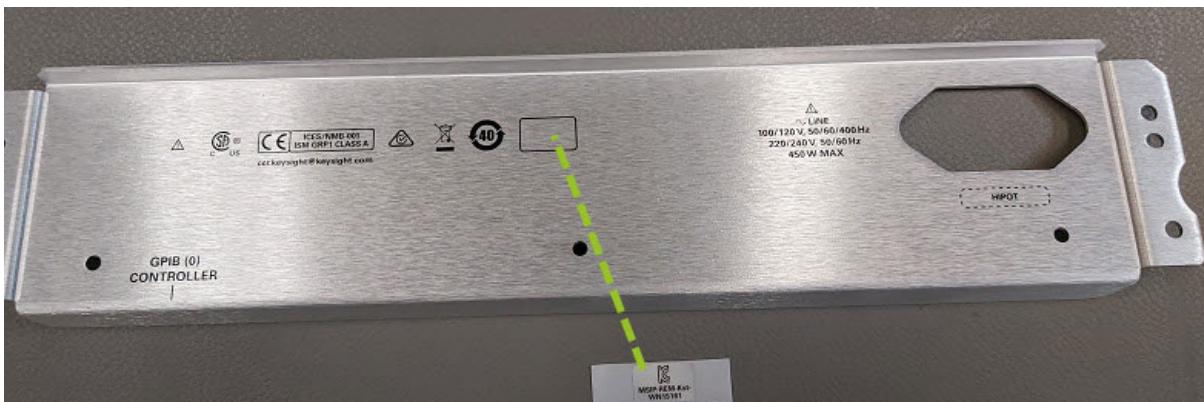


PART SEQUENCE:

1

Figure 5

Install the KCC label (N5240-80041)



Step 8. Power Up Your Instrument and Allow Windows 7 to Stabilize

NOTE

If the PNA's serial number is 4742 or below, the display and touchscreen may not initially work. This is normal. This issue will be fixed when the new front panel is installed.

If the front panel display blanking occurs, to verify your PNA boots up and stabilizes, connect a PC monitor to the rear video output connector and verify the PNA's behavior.

1. Power up your instrument, allow to a couple of minutes for Windows 7 OS to stabilize and verify that there are no errors.
2. Power down your instrument.

Step 9. Remove the Front Panel Assembly

CAUTION

IMPORTANT! If you have already removed the instrument's front panel assembly, because of a System Motherboard L1 modification, skip to **"Step 10. Inspect and If Required, Replace Front Subpanel" on page 39.**

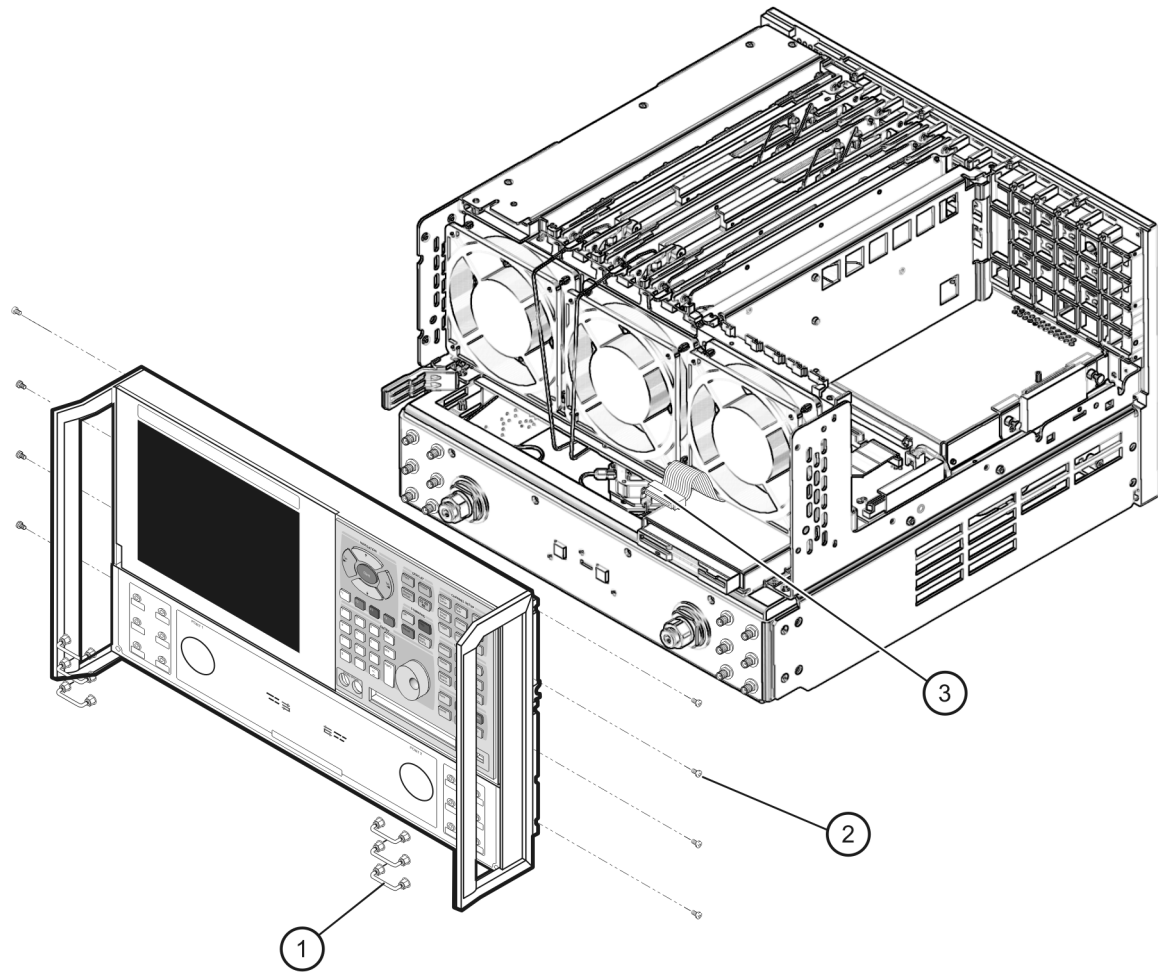
1. With a 5/16-inch wrench, remove all semi-rigid jumpers (item ①) from the front panel. s
2. With a T-10 TORX driver, remove the eight 0515-0244 screws (item ②) from the sides of the frame. Retain these screws for later use.

CAUTION

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

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

Figure 5-6 Front Panel Assembly Removal (Instruments Vary—Example Only— Shown)



n5230_90027_005

Step 10. Inspect and If Required, Replace Front Subpanel

NOTE

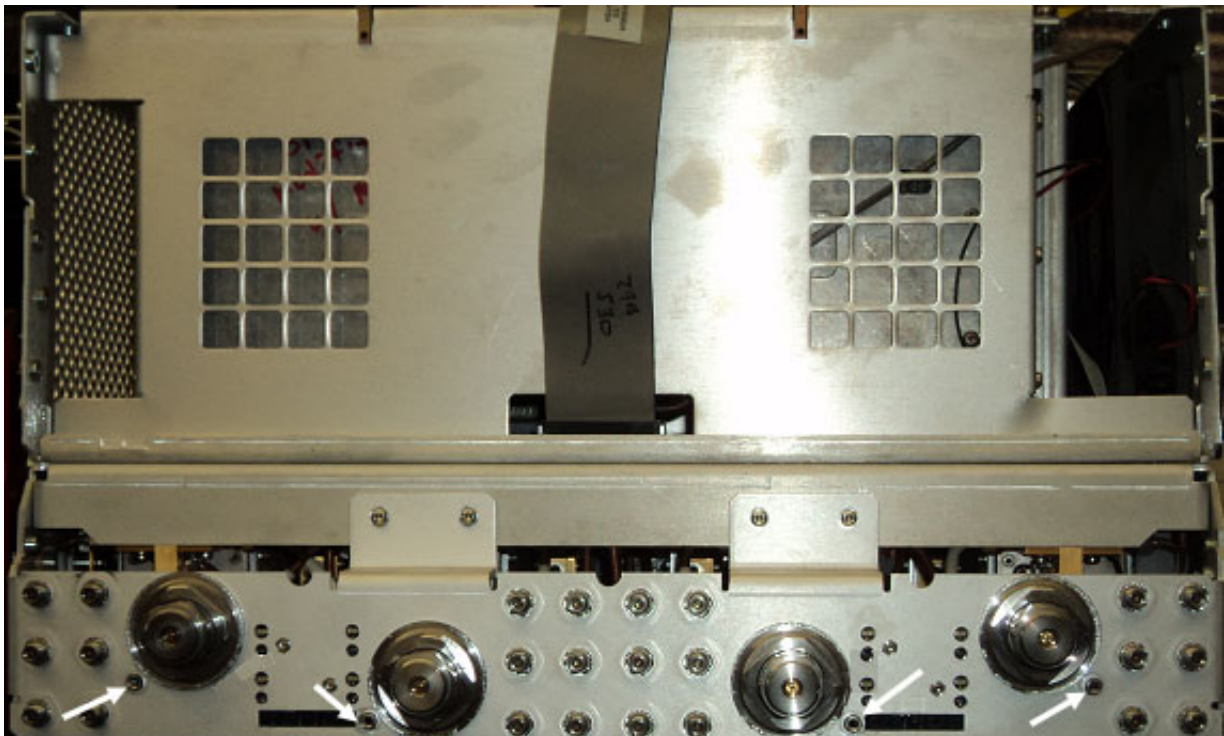
IMPORTANT! If your front panel has the screw holes shown in **Figure 6** on **page 39**, skip this step.

STOP! If you have a N5244/5A and it is necessary to replace the front subpanel, you will also need to rotate the LED boards and replace the bias cables. Refer to **“Step 11. If Required, Rotate the LED Boards and Replace the LED Bias Cables (N5244/5A Only)”** on page 40.

This section is only required, if the front subpanel is missing the four screw holes as shown in **Figure 6**. If you need to order a subpanel, refer to **“Getting Assistance from Keysight”** on page 6.

If your subpanel is missing the four screw holes indicated in **Figure 6**, then you need to replace the subpanel. Contact Keysight to order a new subpanel and refer to the Service Guide for your instrument that can be downloaded from www.keysight.com.

Figure 6 Verifying the front subpanel screw holes



Step 11. If Required, Rotate the LED Boards and Replace the LED Bias Cables (N5244/5A Only)

NOTE

IMPORTANT! If the PNA is a N5244A/45A and it was necessary to replace the front subpanel, you will also need to rotate the LED boards 180 degrees and replace the bias cables. This rework is done at no cost to the customer. Refer to [Table 2 on page 15](#) and to [“Getting Assistance from Keysight” on page 6](#).

Refer to the Service Guide’s “Removing and Replacing the Front Panel LED Boards” on www.keysight.com¹. If not, these boards should be ordered and replaced at no cost to the customer. Refer to [Table 2 on page 15](#).

1. When installing the new subpanels, remove and reinstall the LED boards after rotating them 180 degrees.
2. Replace the old LED board bias cables with the new cables (N5225-60001 (x2)).

1. See [“Downloading the Online PNA Service Guide” on page 10](#).

Step 12. Inspect or Modify Midplane Board (W1312-63095 to a W1312-63376)

CAUTION

If your instrument already has the correct W1312-63376 midplane board, skip to **“Step 13. Install the Dress Panel on the New Front Panel Assembly” on page 43.**

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 midplane board and or the instrument! See also **Appendix A: “Midplane Board Upgrade (W1312-63095 to a W1312-63376),” on page 67.**

If you do not have the following equipment, do not attempt to do the process in the Appendix, because you may damage the board or your instrument. Call the factory.

This process requires the following:

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

This section is only required if the Midplane board is not a W1312-63376 part number. If your midplane board does not require this modification, skip this process and continue to the next step. After this section is completed, your midplane board will be a W1312-63376 midplane board. Refer to **Figure 7 on page 42.**

Description of this Upgrade

Step 12. Inspect or Modify Midplane Board (W1312-63095 to a W1312-63376)

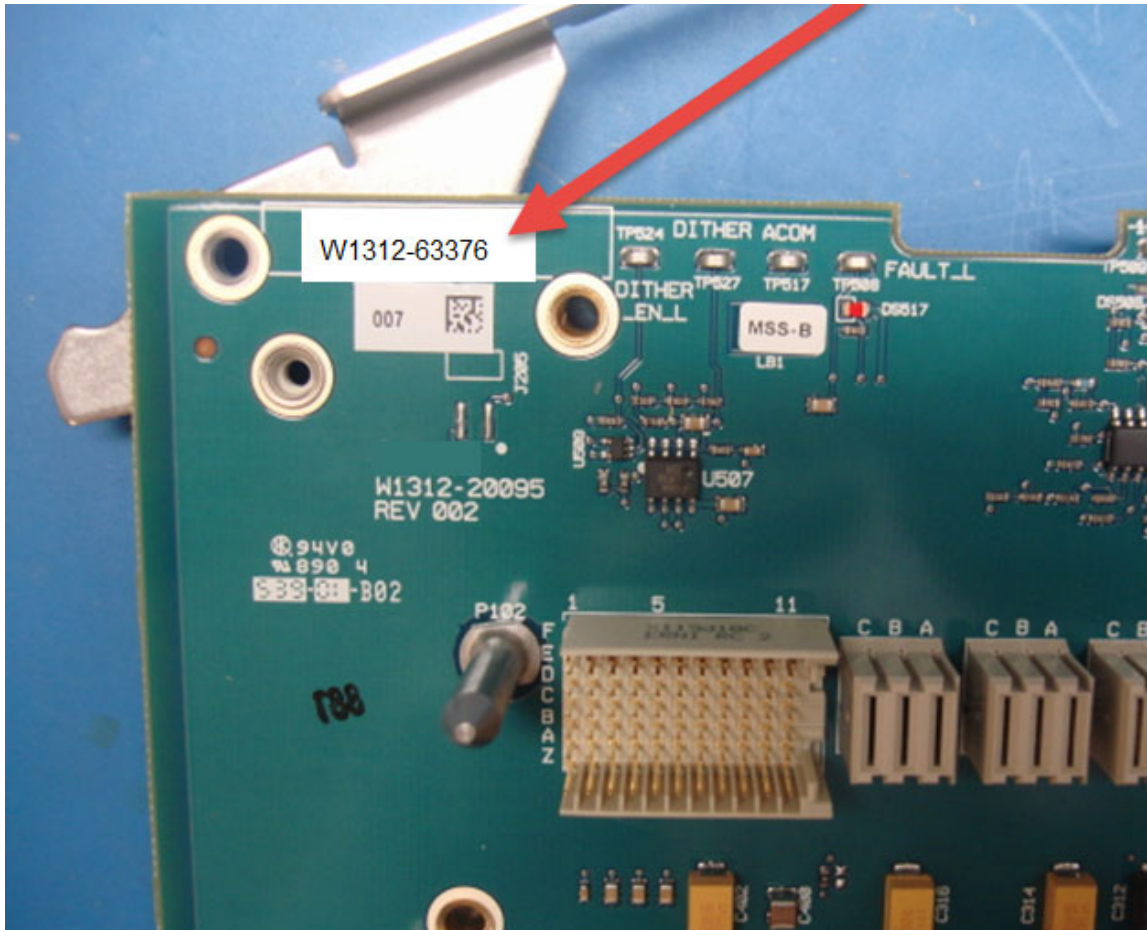
Verify that the sticker has the “W1312-633762 part number. Refer to **Figure 7**.

If not, and you have read and understand the Caution on page **41**, then refer to **Appendix A: “Midplane Board Upgrade (W1312-63095 to a W1312-63376),”** on page **67**.

If you need to remove your midplane board to verify the part number, refer to the Service Guide for your instrument that can be downloaded from www.keysight.com.

Figure 7

Verifying the midplane board number part number is: W1312-63376—Top Side View

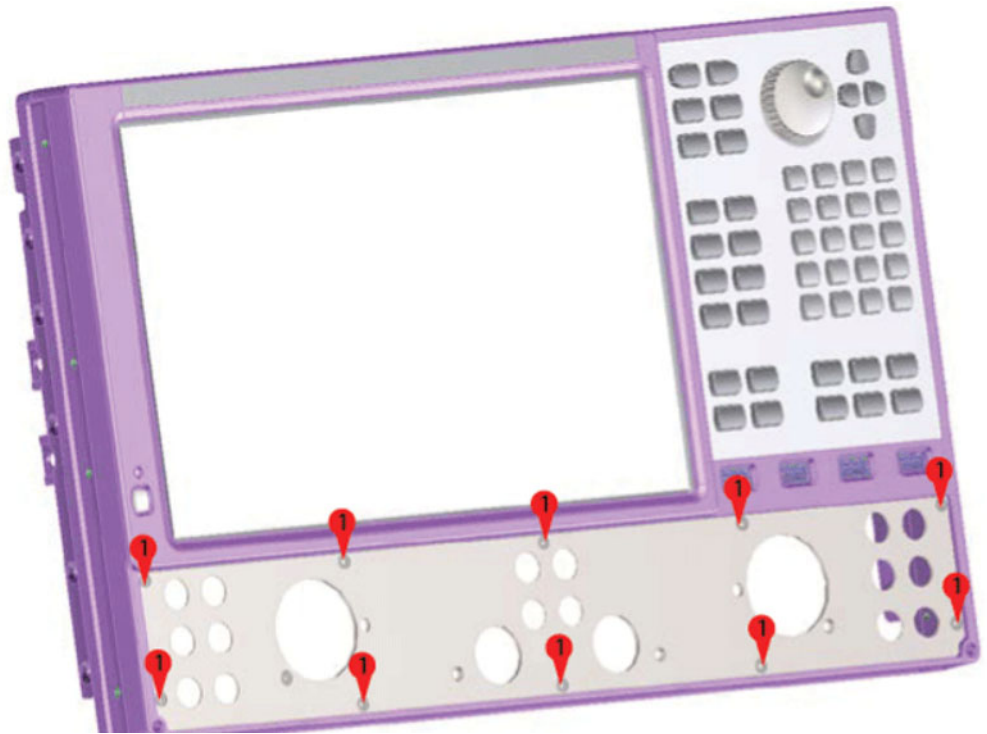


Step 13. Install the Dress Panel on the New Front Panel Assembly

Install the new lower dress panel onto the new front panel using the 10 flat head screws (0515-1946) provided.

Figure 8

Front Dress Panel Installation



Step 14. Install the New Overlays on the New Front Panel Assembly

CAUTION

IMPORTANT! To avoid possible damage to the lower front panel overlay (label), do not attempt to attach the lower front panel label until **“Step 15. Install the New Front Panel Assembly and the Lower Overlay” on page 45, step 7.**

There should also be a nameplate overlay included with the kit that matches your new analyzer; the same number as the old one except it will be a “B” model. There are multiple overlays provided in the kit; be sure that you use the proper one for your analyzer. If there is not an overlay that matches your analyzer, contact Keysight. Refer to **“Getting Assistance from Keysight” on page 6** of this installation note. Refer to **Figure 11 on page 47.**

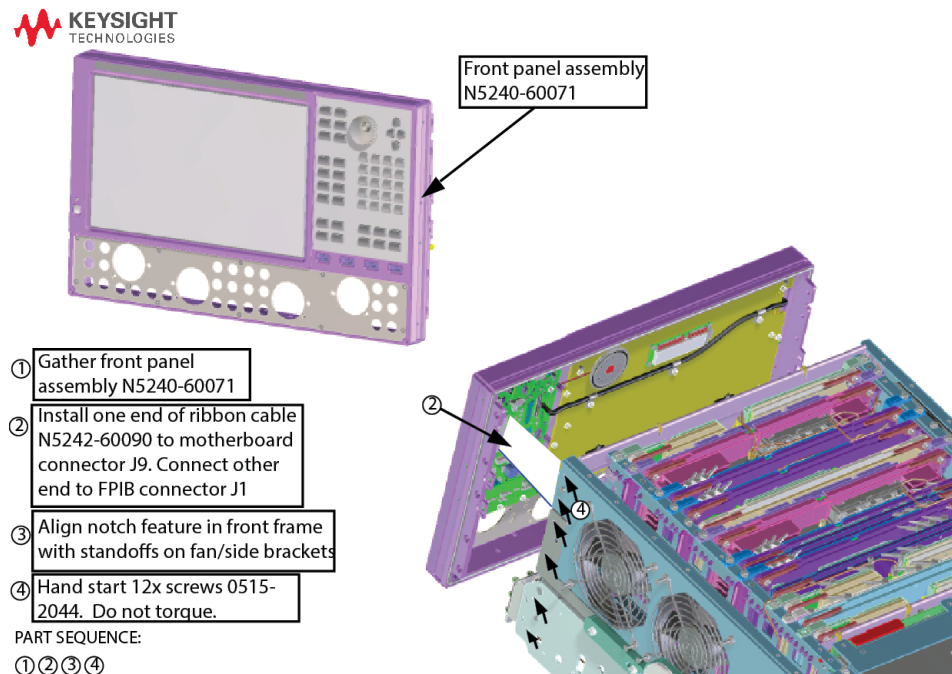
Step 15. Install the New Front Panel Assembly and the Lower Overlay

CAUTION

Before installing the front panel assembly onto the analyzer, place the analyzer right side up and lift and support the front of the analyzer chassis.

1. Reconnect the ribbon cable (item ②) to the A1 front panel interface board. Refer to [Figure 9](#).
2. Slide the front panel over the test port connectors. Ensure that the ribbon cable (item ②) connectors are seated.

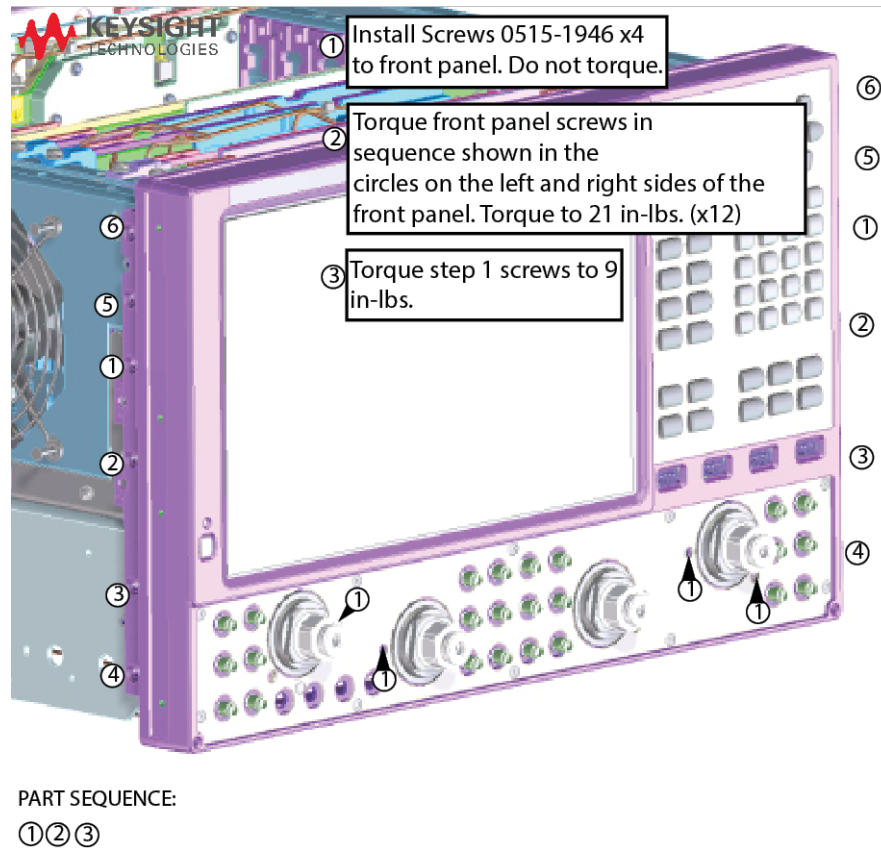
Figure 9 New Front Panel Assembly Installation



3. Hand start the twelve 0515-2044 screws (item ②) in the sides of the frame. Use new screws from the kit and those retained earlier. Do not torque. Refer to [Figure 9 on page 45](#) and [Figure 10](#).
4. Install 0515-1946 (x4) screws (item ①) into lower front panel. Do not torque. Refer to [Figure 10](#).

Figure 10

New Front Panel Assembly Torque Screws

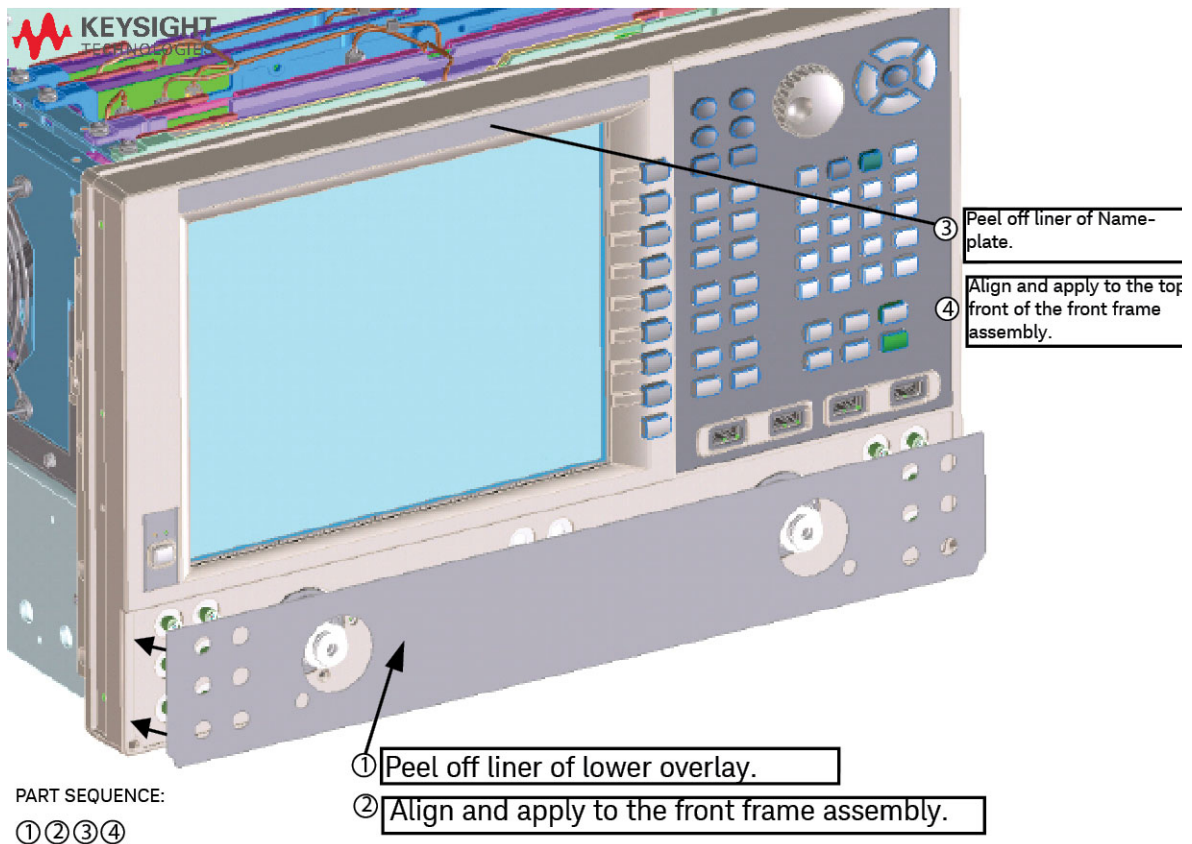


5. Torque the twelve 0515-2044 screws in the order shown in [Figure 9 on page 45](#).
6. Torque the two 0515-1946 (x4) screws (2-port) or four 0515-1946 screws (4-port) to 9 in-lbs. 4-port is shown, refer to [Figure 10](#).

7. Install each of the overlays as follows (refer to **Figure 11**):

- Remove the protective backing to expose the adhesive.
- Carefully align the overlay to its location and gently position it.
- Once the overlay is properly positioned, press it firmly into place.

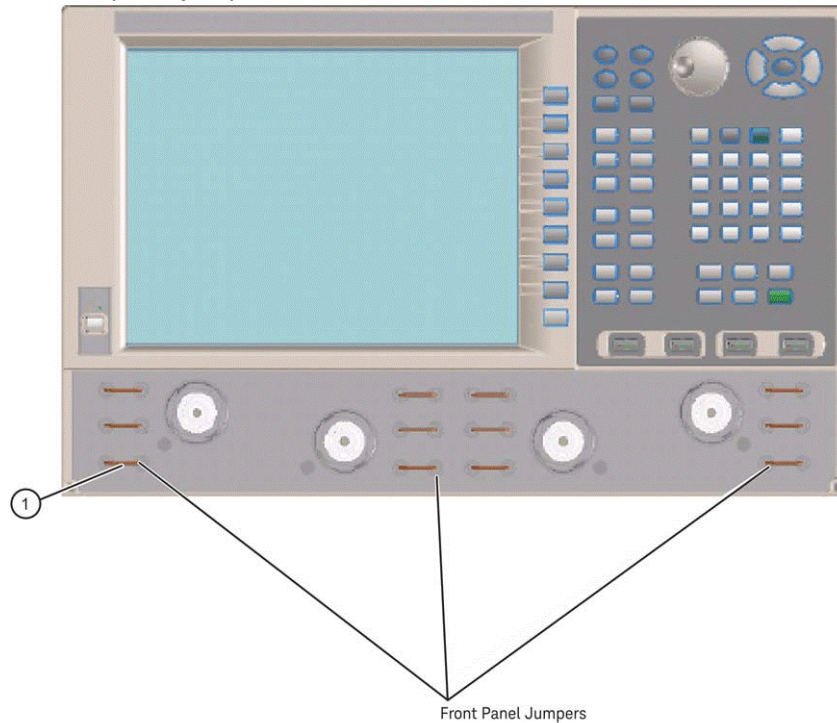
Figure 11 Front Panel Overlays Installation



8. If equipped with front panel jumpers, reinstall the semi-rigid jumpers (Figure 12) on the front panel using a 5/16 inch torque wrench set to 8 in-lbs (N5247B only) and 10 in-lbs (N5241/2/4/5/9B).
9. If available, install the jumper covers (not shown).

Figure 12

Install front panel jumpers



Step 16. Install New version SPAM V, Synth, IF Multiplexer, Noise Figure Receiver, and Test Set Mother boards (If Necessary)

A) Install the new SPAM V Boards

If your PNA already has the SPAM V boards, skip to next step.

Install the new SPAM V boards by referring to your Service Guide on www.keysight.com.

B) Install the new Synthesizer Boards

If your PNA already has the correct synthesizer boards, skip to next step.

Install the new synthesizer boards by referring to your Service Guide on www.keysight.com.

C) Install the new IF Multiplexer Board

If your PNA already has the correct IF multiplexer board, skip to next step.

Install the new IF multiplexer board by referring to your Service Guide on www.keysight.com.

D) Install the new Test Set Motherboard

If your PNA already has the correct test set motherboard (N5241/4/9A & N5264A: "N524563163"; N5244/5/7A: "N524563157") skip to next step.

If **not**, install the new test set motherboard by referring to your Service Guide on www.keysight.com.

E) Install the new Noise Figure Receiver Board (N5241A/42A Option 029 only)

If an old N5242-60098 Noise Receiver board is being replaced by a new N5245-60124 board, install it by referring to your Service Guide on www.keysight.com. If your PNA already has the correct Noise Figure Receiver board, skip to next step.

NOTE

IMPORTANT! The new Noise Figure Receiver board, also requires cables W141 (N5242-20322) and W143 (N5242-20323) to be ordered and installed. See also, [Table 5 on page 23](#) and to ["Getting Assistance from Keysight" on page 6](#).

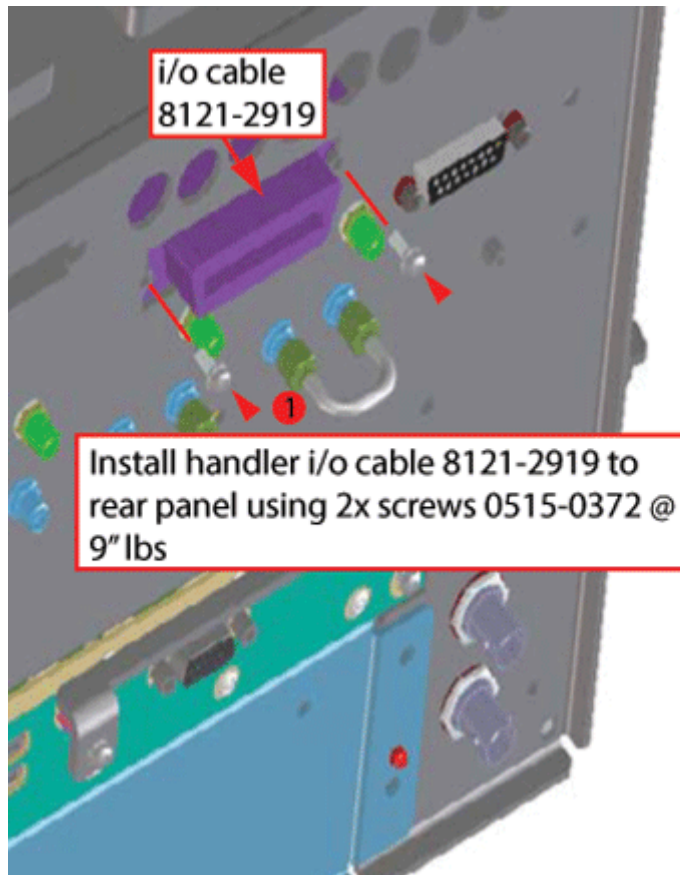
Step 17. Install the New Handler I/O Cable

Refer to your instrument Service Guide's section "Remove and Replace the A19 Test Set Motherboard" on www.keysight.com.

1. Remove the A19 TSMB and be careful to mark all of the cables before removal (i.e., If your TSMB needs to be replaced—if it is **not** N5241/4/9A & N5264A: "N524563163"; N5244/5/7A: "N524563157"), discard this older board).
2. Remove the old handler I/O cable and discard, it will not be reused.
3. Install the new I/O cable (8121-2919) using (x2) 0515-0372 screws. Torque to 9 lb-ins.
4. Reinstall the A19 TSMB by reversing the procedure in the Service Guide's "Remove and Replace the A19 Test Set Motherboard" section.

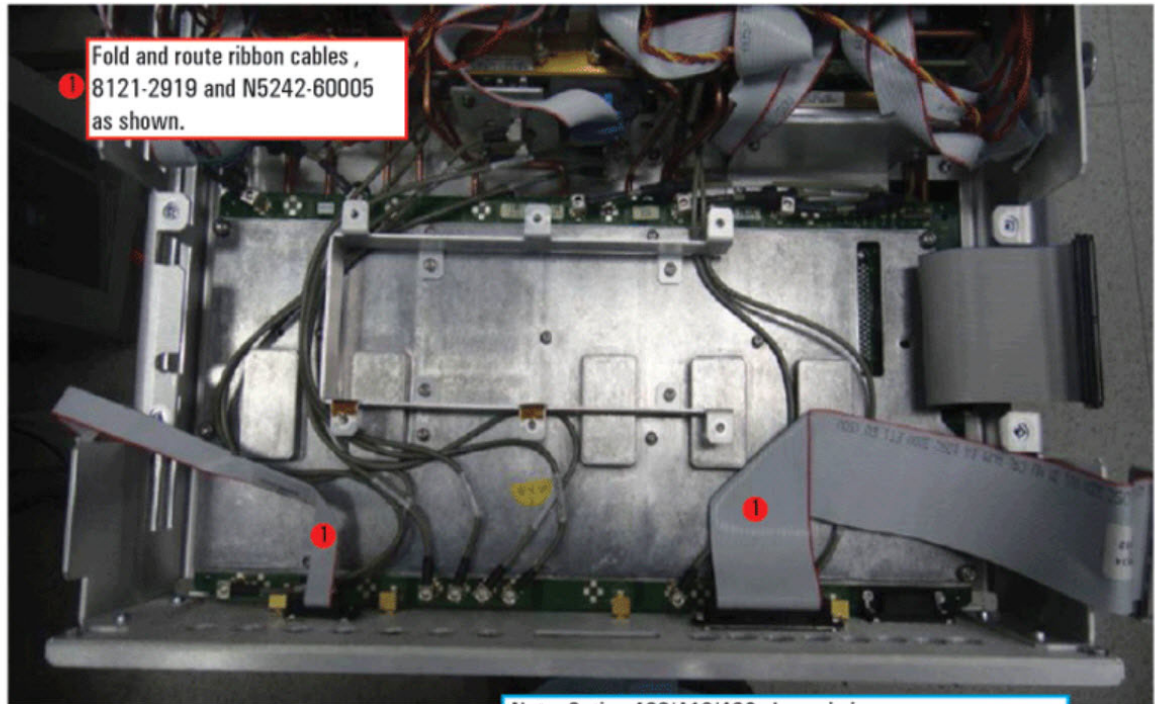
Figure 13

Install the Handler I/O Cable (8121-2919 and 0515-0372 (x2))



Description of this Upgrade
Step 17. Install the New Handler I/O Cable

Figure 14 Fold the Handler I/O Cable (8121-2919 and N5242-60005)



PART SEQUENCE:

1

Note: Option 400/419/423 shown in image.
This may not match the current option mix being built

Description of this Upgrade

Step 18. Install the *NEW* N5242-60135 Solid-State Disk Drive Assembly (SSDA) from the Option 690 Upgrade Kit OR Install the *NEW* Version 9 CPU W1312-60563 and *NEW* N5242-60137 Solid-State Disk Drive Assembly (SSDA) from the Option 691

Step 18. Install the *NEW* N5242-60135 Solid-State Disk Drive Assembly (SSDA) from the Option 690 Upgrade Kit OR Install the *NEW* Version 9 CPU W1312-60563 and *NEW* N5242-60137 Solid-State Disk Drive Assembly (SSDA) from the Option 691 Upgrade Kit

If a instrument currently has successfully booted up a Version 7 CPU (N5242-60211) and Windows 7 with A.10.40 or greater SSDA (N5242-60133): then choose from one of the following:

- **If a instrument has a version 7 CPU (W1312-60211) installed, BUT you are Installing Option 690 Windows 10 OS SSDA:** Install the Windows 10 OS SSDA (N5242-60135) into the analyzer by referring to your instrument's Service Guide's Chapter 7 "Repair and Replacement Procedures" on www.keysight.com.
 - **If a instrument is installing Option 691 Version 9 CPU (W1312-60563) AND Win 10 OS SSDA (N5242-60137):** Install the new CPU and SSDA by referring to your instrument's Service Guide's Chapter 7 "Repair and Replacement Procedures" on www.keysight.com.
1. Install the new SSDA in the analyzer by reversing the Hard Disk Drive Removal procedure in the Service Guide for your model. Refer to **Figure 3 on page 35** and to your instrument's Service Guide on www.keysight.com.
 2. Install the Win 10 sticker (9010-0350) to the rear-panel side of the SSD tray.

Step 19. Reboot the Instrument

CAUTION

IMPORTANT! If you have not installed your Version 7 CPU (W1312-60211)¹ or and Windows 10 OS SSDA (N5242-60135) or your Option 691 Version 9 CPU (W1312-60563) with Windows 10 OS SSDA (N5242-60137), refer back to **“Step 6. Install the Version 7 CPU W1312-60211 and SSDA N5242-60133 *Service Center* Assembly with A.10.40 Firmware or Greater” on page 35.**

1. The system CPU must be a version 7 or greater. Option 690 is for PNA's that already have the version 7 CPU installed, you must have a W1312-60211 version 7 CPU installed, to use the N5242-60135 Win 10 OS SSDA. If a PNA has an older CPU version that needs to be replaced, the customer will need to order the Option 691 kit, which includes a Version 9 or greater CPU. Refer to **Table 1 on page 12, Table 2 on page 15, Table 3 on page 18, Table 4 on page 20** and **“Contacting Keysight” on page 6.**

NOTE

When you power up your instrument there will be many errors, because your instrument does not have any licenses installed. This is as expected and will be corrected in later steps.

IMPORTANT! The “B” firmware automatically updates the CPU BIOS. When the drive that comes with the upgrade kit is first booted, it is as expected that the PNA display is blurry for 10 to 15 seconds, then go blank and reset to a normal screen view.

If your display remains blurry beyond ~15 seconds, the PNA BIOS needs to be manually set to 24-bit. (i.e., this display blurriness is indicated by a lavender background and screen text that is difficult to read.) Refer to **Appendix B: “Manually Setting the PNA Display to 24-Bit”.**

This section contains the power up process for all of the following:

- **Option 690 and Option 691 upgrades:**
 - **Option 690 instruments** that *already* had a version 7 CPU (W1312-60211) installed, but have a newly installed Windows 10 OS SSDA (N5242-60135).
 - **Option 691 upgraded instruments** with a Version 9 CPU and Windows 10 OS SSDA (N5242-60137).
- 1. Power up the instrument and allow it to run for a couple of minutes to stabilize.
- 2. Verify the instrument has the correct “A” model number and serial number using the embedded Keysight Licensing Manager (KLM) tool on your analyzer: Press **Start > All Programs > Keysight Licensing Manager > Keysight Licensing Manager.**

This verifies the instrument is working correctly, so the licenses can be loaded. Refer to **“Obtain Multiple License Key Files” on page 9.**

3. If the instrument stabilizes and has the correct “A” model number and serial number, continue to the next step.

Else, if the unit still has initialization errors which look like problems that cannot be resolved, contact the Keysight Technologies, because the model and serial number need to be updated via the Keysight network. Refer to [“Getting Assistance from Keysight” on page 6](#).

If your display remains blurry, refer to [Appendix B: “Manually Setting the PNA Display to 24-Bit”](#).

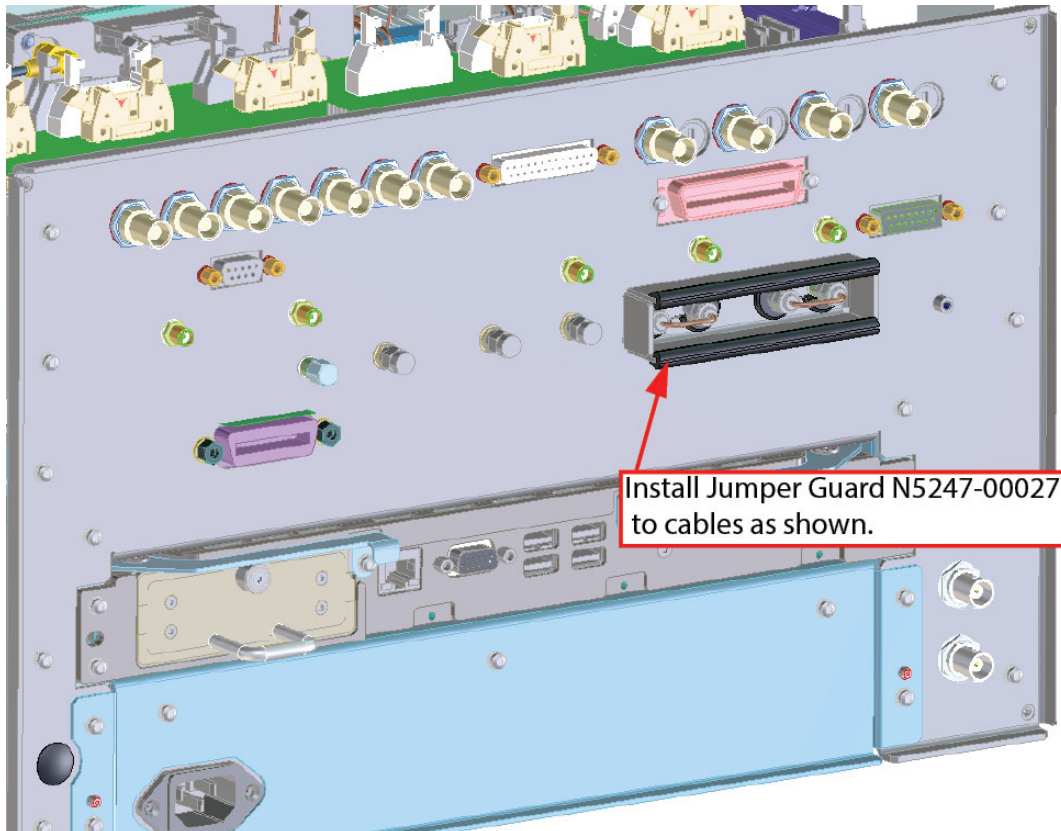
NOTE

If the PNA does not have the correct “A” model number or serial number, it means that somewhere in the process the instrument was initialized with the incorrect model number or serial number. For these cases, connect the PNA to the LAN and contact to the support team for assistance. Refer to [“Getting Assistance from Keysight” on page 6](#).

Step 20. Install the Dual Cable Rear Guard (N5247B Only)

Install the dual cable rear guard (N5247-00027) over the two semi-rigid cables on the rear panel of the instrument.

Figure 15 Install the Dual Cable Rear Guard (N5247-00027)



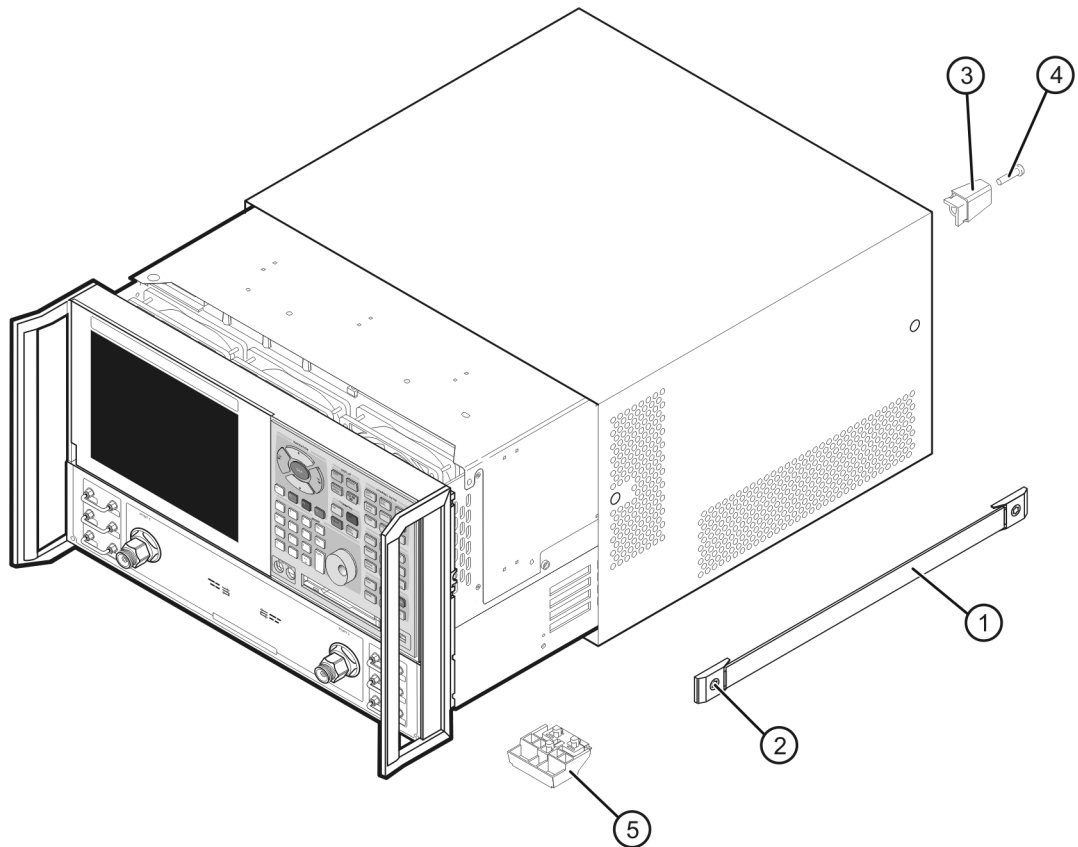
Step 21. Reinstall the Outer Covers

Reinstall the Outer Cover

1. Slide the cover onto the frame.
2. Using a T-20 TORX driver, install the four rear panel feet (item ③) by installing the center screws (item ④).
3. Slide the four bottom feet (item ⑤) onto the cover.
4. Using a T-20 TORX driver, install the strap handles (item ①) by tightening the screws (item ②) on both ends.

Figure 16

Outer Cover Reinstallation



n5230_90027_003

Step 22. Install Option N52xxAU-690 or N52xxAU-691

After completing this process your instrument will be a “B” model Network Analyzer.

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- Obtain a license key file for installation of this upgrade by following the instructions on the supplied Software Entitlement Certificate. Refer to **“License Key File Redemption” on page 7.**
- The Network Analyzer program must **not** be running.
- A keyboard must be connected to the network analyzer.
- On your computer, copy the downloaded license key file to a USB memory device.

Option Enable Procedure

1. Verify your PNA is powered up.
2. Insert the USB memory device into your PNA’s USB drive slot.
3. Within ~5 seconds the PNA should display a small “New Licenses Installed” message.

Open a Windows Explorer window(s) and manually move your license file to C:\Program Files\Agilent\licensing. It may take Keysight License Manager an extra ~30 seconds to enable the license and automatically power down your PNA.

Successful License Installation is displayed on the bottom of the window.

NOTE

If your PNA does not automatically reboot, contact Keysight Technologies. See **“Getting Assistance from Keysight” on page 6.**

4. If the license file installed and the PNA rebooted as expected, remove your USB memory device.

Option Verification Procedure

NOTE

When you power up your instrument there will be many errors, because your instrument does not have any licenses installed. This is as expected and will be corrected in later in this procedure.

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

1. 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**.
2. If the model number, serial number and computer name (hostname) are correct, continue to **"Step 24. Install and Verify Multiple License Files" on page 60**.
3. If the model number, serial number are not correct, contact Keysight. Refer to **"Getting Assistance from Keysight" on page 6**.
4. If the computer name (hostname) is incorrect, proceed to **"Step 23. Changing your PNA's Computer Name from an A model to a B model" on page 59**.

NOTE

IMPORTANT! For PNAs that are still A models, proceed to **"Step 23. Changing your PNA's Computer Name from an A model to a B model" on page 59**.

If the PNA does not have the correct "B" model number and or serial number, it means that somewhere in the process the instrument was initialized with the incorrect model number or serial number. For these cases, connect the PNA to the LAN. Refer to **"Getting Assistance from Keysight" on page 6**.

Step 23. Changing your PNA's Computer Name from an A model to a B model

If the PNA does not have a B model after the upgrade, it is necessary to run the **ChangeHostname** program to change the PNA from an A model to a B model.

1. Open a Windows Explorer window and navigate to:

`C:\Keysight\PNA\tools\ChangeHostName`

2. Right click on the **ChangeHostname file and click:
Run as administrator**

The program automatically runs and terminates in ~two seconds (i.e., without any user interaction).

3. To verify:

On the toolbar click **Help > About NA...**

And, verify that the hostname has the correct B model number.

Step 24. Install and Verify Multiple License Files

After completing this process all of your license files should be loaded into your instrument.

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- Obtain your multiple license key files by following contacting Keysight Technologies. Refer to [“Obtain Multiple License Key Files” on page 9](#) and [“Getting Assistance from Keysight” on page 6](#).
- The Network Analyzer program must **not** be running.
- A keyboard must be connected to the network analyzer.
- Use a USB memory device to download your license key file(s) to the top level on a USB memory device (i.e., do not move the files to a folder).

Option Enable Procedure

1. Verify your PNA is powered up.
2. Locate the email(s) from Keysight which contain license file attachments. These emails are the result of [“License Key File Redemption” on page 7](#).
3. 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 licenses for more than one feature.

-
4. Connect the USB flash drive to the PNA.

Within 5 seconds, the PNA should display a small “New licenses installed” message.

If your license did not load automatically via USB memory device, open a Windows Explorer window(s) and manually move your license file to C:\Program Files\Agilent\licensing. It may take Keysight License Manager an extra ~5 seconds to enable the license and automatically power down your PNA.

Successful License Installation is displayed on the bottom of the window.

5. Shut down the PNA application and restart.

Optional: Cycle power on the instrument to activate the newly installed option upgrade(s). (Press the power button once to power down the instrument.)

NOTE

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

6. Disconnect the USB flash drive from the PNA.

Step 25. Verify the PNA Analyzer Program is Running with the Correct Options

NOTE

If the options have been enabled, skip to “**Step 26. Copy the Unique Files Back to the Analyzer’s SSD**” on page 62.

Verify the Option Numbers

Verify that the Options are Enabled

Once the Network Analyzer program is again running:

1. 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.
2. Press **OK**.
3. After successful installation of all upgrades, some features require some adjustments to ensure the instrument meets its specified performance. Refer to the following Web site:
<http://mktwww.srs.is.keysight.com/field/service/network/pna/>.

NOTE

If the options have not been enabled, refer to “**Getting Assistance from Keysight**” on page 6.

Step 26. Copy the Unique Files Back to the Analyzer's SSD

The files that were previously saved onto a USB flash memory drive must now be installed onto the new SSD.

- For a list of possible files (and their directory paths), refer to one of these installation notes:
 - Windows 7
<https://www.keysight.com/us/en/assets/9018-04311/installation-guides/9018-04311.pdf>
 - Windows 10
<https://www.keysight.com/us/en/assets/9018-04733/installation-guides/9018-04733.pdf>
- 1. Connect the power cord to the analyzer and turn ON the power.
- 2. Insert the USB flash memory drive into a USB port.
- 3. Open Windows Explorer.
- 4. Navigate to:
 - Data and state files storage: D:\
 - Support files: c:\programdata\Keysight\network analyzer
- 5. After all files have been copied, remove the USB flash memory drive from the USB port.
- 6. Exit Windows Explorer.

Step 27. Motherboard Event Log Clearing

Perform the clearing the event Log step described in [Appendix , “2. Clearing the Event Log and Verifying the Motherboard Modification Removed the USB Errors \(2152\).”](#)

Step 28. 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 (Only, if the synthesizer board is changed)
 - synthesizer Bandwidth adjustment (Only, if the synthesizer board is changed)
 - source adjustment
 - IF gain adjustment
 - receiver adjustment
 - receiver characterization
 - IF response adjustment (Option S93090xA/B, S93092A/B, S93093A/B, or S93094A/B Only)
 - Noise Adjustment (Option 029 with S93029A 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 guide¹.

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

Else, all adjustments must be run per the instrument's Service Guide on www.keysight.com.

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.

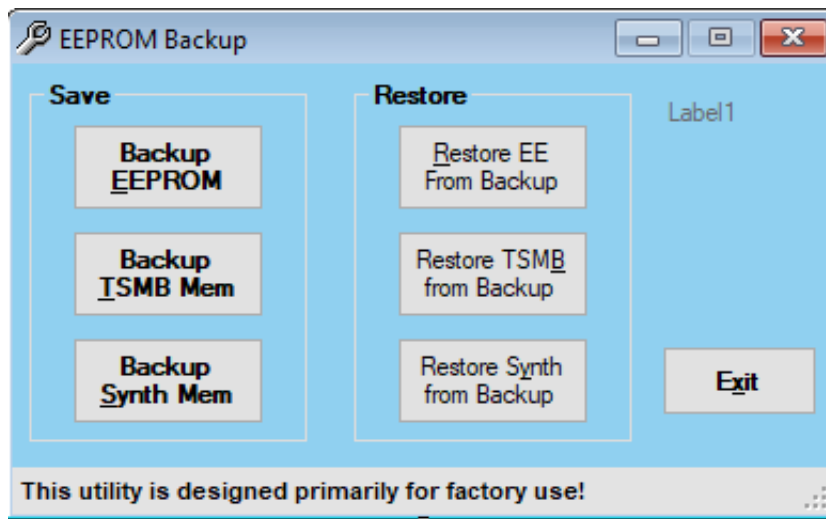
1. See [“Downloading the Online PNA Service Guide” on page 10](#).

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 17 EEPROM Backup Menu



Operator's Check

Perform the Operator's Check to check the basic functionality of the analyzer. For instructions, refer to the "Tests & Adjustments" chapter of the Service Guide.

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to **"Getting Assistance from 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 N7840A performance test software or the instrument's embedded performance tests. Refer to the analyzer's service guide for information on the performance test software.

Step 29. 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. Install labels included in kit as required (e.g., KCC, two person Caution).**
- 5. Clean the analyzer, as needed, using a damp cloth.**

Description of this Upgrade
Step 29. Prepare the PNA for the User

Installation Note

A: Midplane Board Upgrade (W1312-63095 to a W1312-63376)

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 midplane board and or the instrument! See also **“Step 12. Inspect or Modify Midplane Board (W1312-63095 to a W1312-63376)” on page 41.**

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”.**

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 midplane board and or your instrument

This section is only required if the Midplane board is not a W1312-63376 part number. If your midplane board does not require this modification, skip this process and continue to the **“Step 13. Install the Dress Panel on the New Front Panel Assembly” on page 43.** After this section is completed, your midplane board will be a W1312-63376 midplane board. Refer to **Figure A-6 on page 74.**

Table A-1 Parts List for Midplane Board Upgrade Kit Modification^a

Part number	Description
0699-1429	Resistor U403–383 ohm (attach to pin 5)
216-2632GR005 –ND ^b	32 AWG wire (Operating temperature 300C) – (0.5 inch)
5184-4489	Label-Brady blank label
0470-0954	Loctite 495

a. The factory will provide these items upon request.

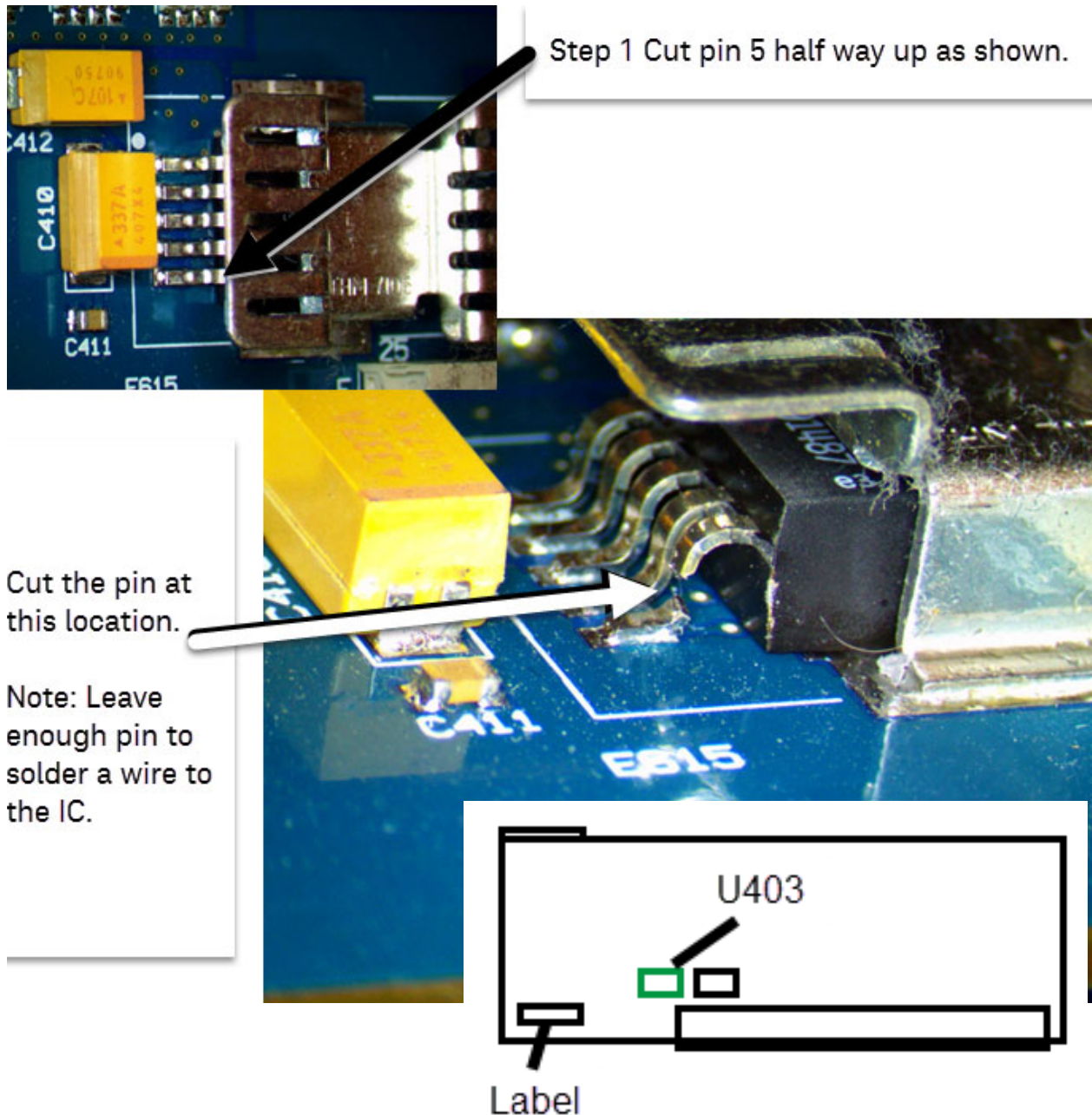
b. This spool of 32 AWG 100' (30.5m) wire part number can be ordered from Digi-Key here:

<https://www.digikey.com/en/products/detail/alpha-wire/2632-GR005/15194125>.

Procedure

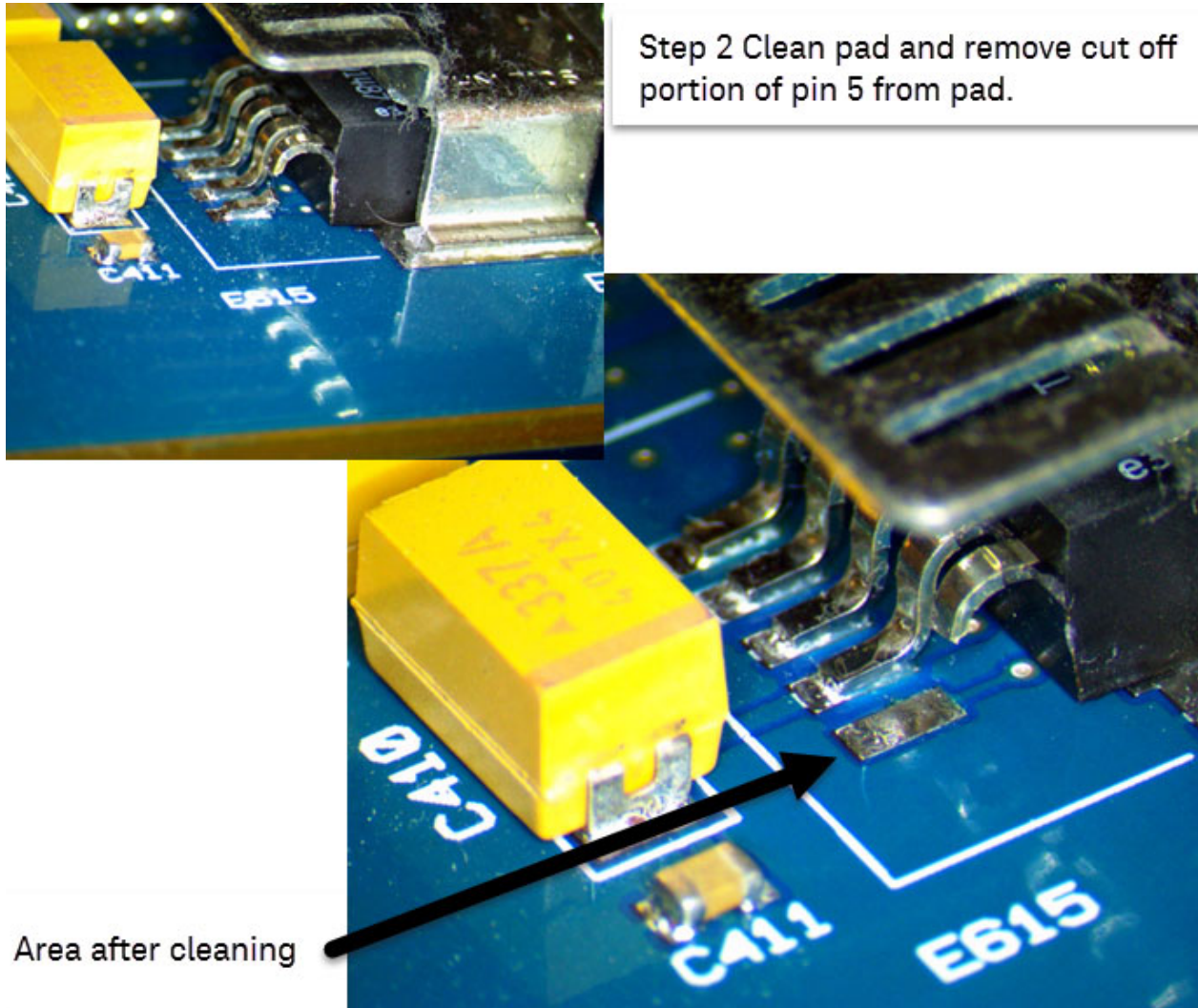
1. To remove your midplane board, refer to the Service Guide for your instrument that can be downloaded from www.keysight.com.
2. Cut pin 5 on U403, so that half of the lead is left near on the IC. Refer to [Figure A-1](#).

Figure A-1 Step 1 Cut pin 5 half way up as shown—Top Side View



3. Clean pad and remove cut off portion of U403–pin 5 from the pad. Refer to **Figure A-2**.

Figure A-2 Cleaning the pad for pin 5—Top Side View



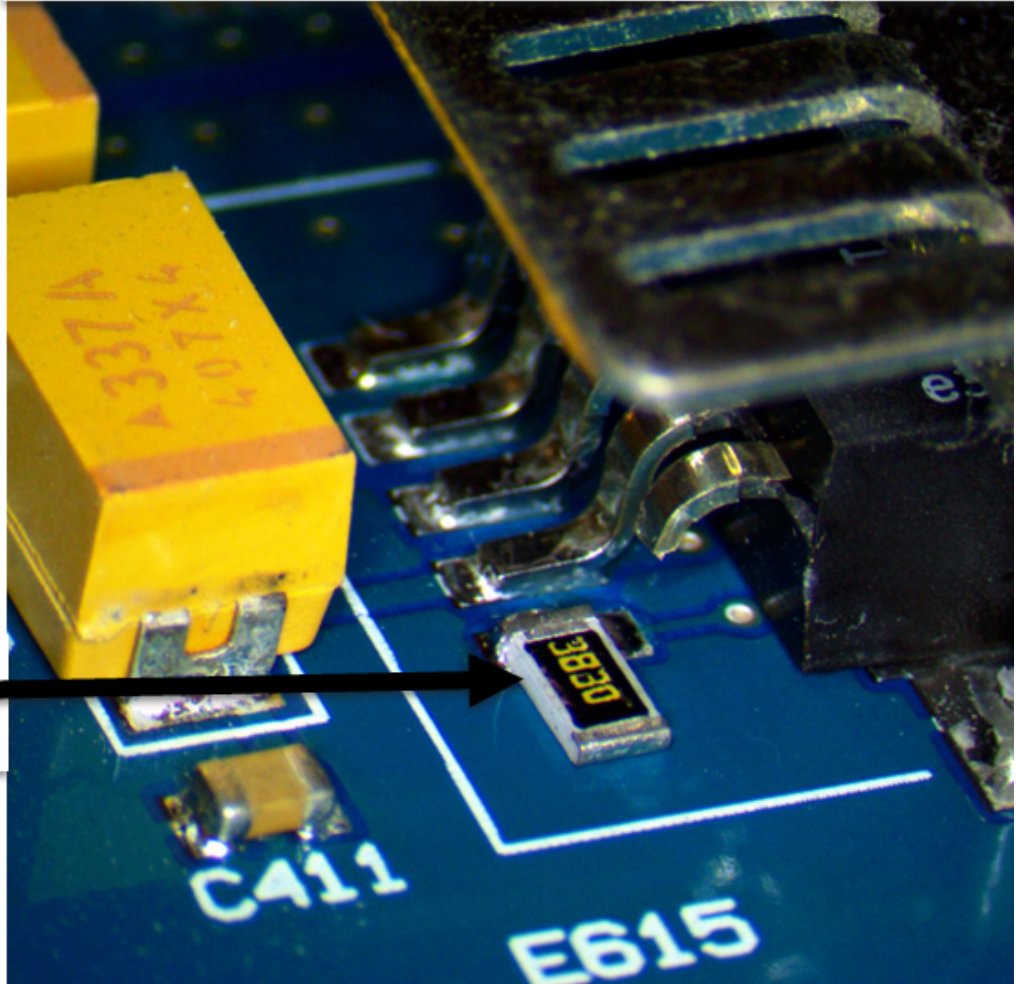
4. Add 383 ohm resistor as shown. Refer to [Figure A-3](#).

Figure A-3

Add 383 ohm resistor

Step 3 Add 383 ohm resistor as shown.

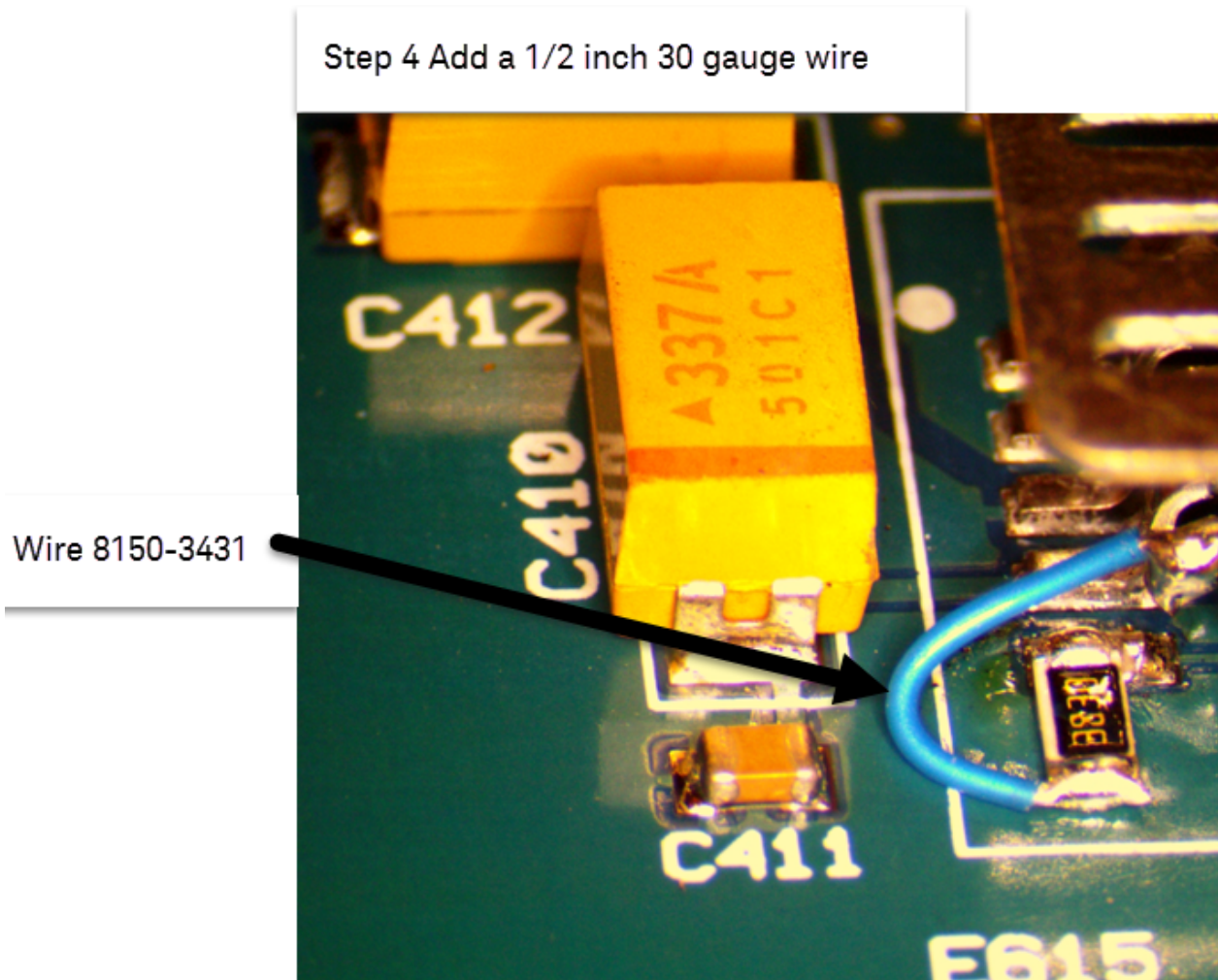
383 ohm
0699-1429



5. Add a 1/2 inch 32 gauge wire. Refer to **Figure A-4**.

Figure A-4

Add a 1/2 inch 32 gauge wire—Top Side View



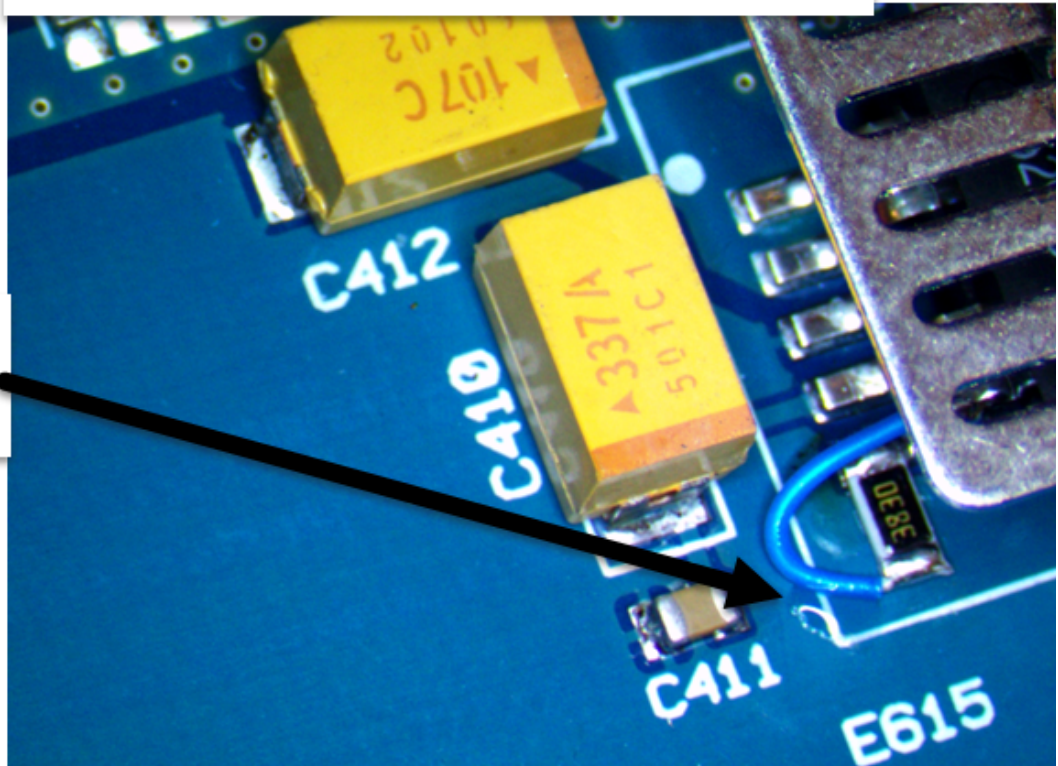
6. Add glue as shown to hold the wire in place. Refer to [Figure A-5 on page 73](#).

Figure A-5

Add glue as shown to hold the wire in place—Top Side View

Step 5 Add glue as shown to hold the wire in place.

Loctite 545
0470-0954



7. Add the W1312-63376 sticker. Verify that the sticker does not interfere with the PCA screw holes. Refer to **Figure A-6**.

Figure A-6 Adding sticker to new board number W1312-63376—Top Side View



8. Re-install the midplane board per the Service Guide for your instrument that can be downloaded from www.keysight.com.

Installation Note

B: Manually Setting the PNA Display to 24-Bit

This section is only required if, after installing the new SSD that comes with this upgrade kit (refer to **“Step 18. Install the *NEW* N5242-60135 Solid-State Disk Drive Assembly (SSDA) from the Option 690 Upgrade Kit OR Install the *NEW* Version 9 CPU W1312-60563 and *NEW* N5242-60137 Solid-State Disk Drive Assembly (SSDA) from the Option 691 Upgrade Kit” on page 52**), your PNA reboots and does not automatically adjust the display to 24-bit. If your PNA does not have a blurry display, skip this process and continue to the **“Step 21. Reinstall the Outer Covers” on page 56**.

Procedure

In this procedure, you will need to navigate through the PNA's BIOS menu, even though you are unable to clearly read the menus.

1. During the bootup of your PNA: Press **F7** on bootup until the BIOS screen opens.
2. In the window that opens, the top row of the screen will have various menu selections: **Main, Advanced, Chipset, Boot, Security, and Save&Exit**.
Use the arrow keys to move the selection from Main over to **Chipset**, then press **Enter**.
3. In the window that opens, the first of three rows should be have white text which says **Graphics Configuration**. With this row highlighted, press **Enter**.
4. In the window that opens, use the down arrow to move the selected text to the bottom row: **LCD Control**. Press **Enter**.
5. In the window that opens, use the down arrow to move the selected text to the bottom row: **Panel Color Depth**. Press **Enter**.
6. At this point, a small blue box with two items pops up. The top one is “18 bit”, the bottom one is **“24 bit”**. Select this bottom one and press **Enter**.
7. Now press **F10** (to Save & Exit).

Manually Setting the PNA Display to 24-Bit Procedure

C: Motherboard Clearing the Event Log and Modification to Replace L1

CAUTION

STOP!

Any return to factory (RTF) that will have CPU, Midplane, Motherboard, Front Panel, or Front Panel Ribbon replaced will need to have its event log cleared after the hardware replacements are complete.

Older System motherboards with serial numbers <N5247-63002-23-1945-00002 need to be reworked to remove L1, per [Appendix C: “Motherboard Clearing the Event Log and Modification to Replace L1.”](#) If you have an older system board, call Keysight Support to verify, if your instrument has previously been upgraded. Refer to [“Getting Assistance from Keysight”](#) on page 6.

Refer to [Table 5, “Overview of Assembly Requirements for B Model Upgrade,”](#) and [Appendix C: “Motherboard Clearing the Event Log and Modification to Replace L1.”](#)

NOTE

IMPORTANT!

Any return to factory (RTF) that has its CPU, Midplane, Motherboard, Front Panel, or Front Panel Ribbon replaced, will need to have its event log cleared after the hardware replacements are complete.

This section is required to modify the following motherboard p/n's: N5230-63133, N5242-63151, and N5247-63002. This modification is required to avoid USB 2152 errors, which indicates intermittent USB connections in the instrument. Refer to [Table A-1, “Models and Motherboards for L1 N5240-60111 Jumper Wire Modification.”](#)

Table A-1 Models and Motherboards for L1 N5240-60111 Jumper Wire Modification

Model Number	System Motherboard p/n
N5239A/B, N5231A/B, N5232A/B, N5234A/B, N5235A/B	N5230-60133
N5249A/B, N5241A/B, N5242A/B, N5264A/B, N5221A/B, N5222A/B	N5242-60151

Table A-1 Models and Motherboards for L1 N5240-60111 Jumper Wire Modification

N5244A/B, N5245A/B, N5247A/B, N5224A/B, N5247-60002
N5225A/B, N5227A/B

Table A-2 Tools for N5240-60111 Jumper Wire Modification

Description	Part Number
Jumper wire	N5240-60111
Solder (Lead free)	--
Soldering iron	--
Surface mount iron and tips (Optional, but recommended)	--

Procedures

This section contains the following:

- “1. System Motherboard Modification”
- “2. Clearing the Event Log and Verifying the Motherboard Modification Removed the USB Errors (2152)”
- “3. After Completing Event Log Check Instructions”

NOTE

IMPORTANT!

When DONE with the three procedures in this section, return to “Step 6. Install the Version 7 CPU W1312-60211 and SSDA N5242-60133 *Service Center* Assembly with A.10.40 Firmware or Greater” on page 35.

1. System Motherboard Modification

These procedure assumes you have disassembled the instrument and have removed the system motherboard from the chassis.

This procedure shows how to remove L1 and to replace it with some green wires connecting the motherboard traces.

1. Locate L1 on the motherboard. Refer to [Figure A-1 on page 79](#).
2. Remove L1 using a surface mount soldering iron and appropriate tip or use two soldering irons. Refer to [Figure A-2 on page 79](#).
3. Clean motherboard traces. Refer to [Figure A-2 on page 79](#).
4. Prepare green wire (x3). Refer to [Figure A-3 on page 80](#).
5. Solder green wire x3 to L1 traces. Refer to [Figure A-4 on page 81](#).

6. Mark motherboard as shown with black dot. Refer to [Figure A-5 on page 81](#).

Figure A-1 Locate L1 on System Motherboard

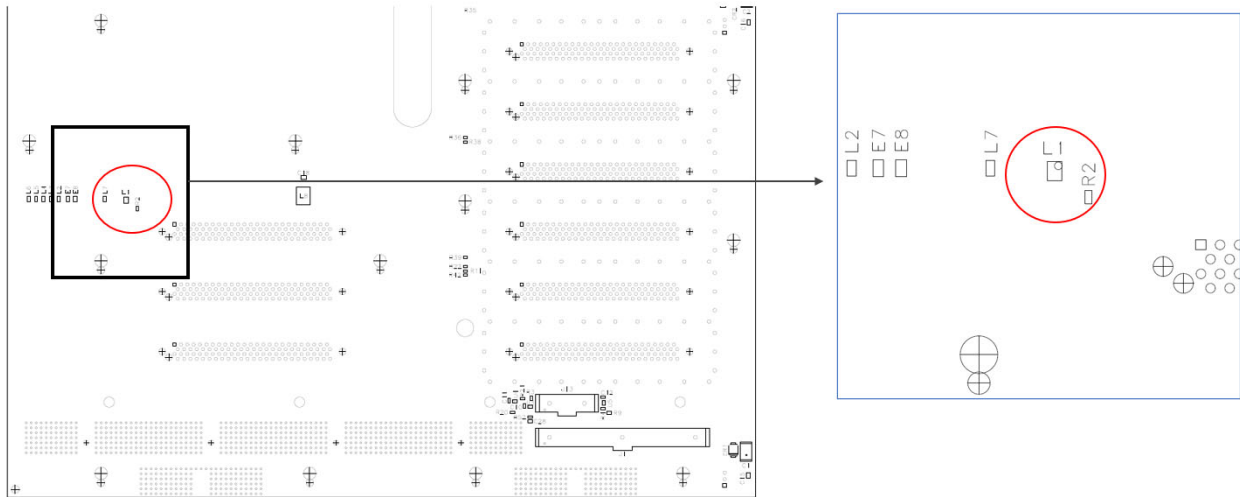
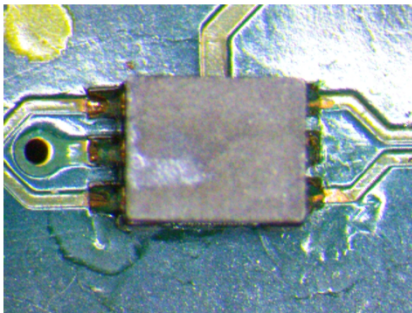


Figure A-2 Remove L1 and Clean Traces

- L1 is a 6 pin part with no ground pin on the belly
- It can be removed by using two soldering irons on either side of the part



Remove L1 and clean area →

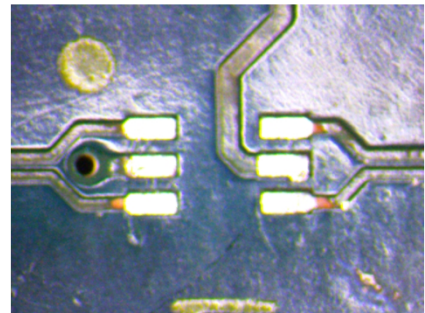
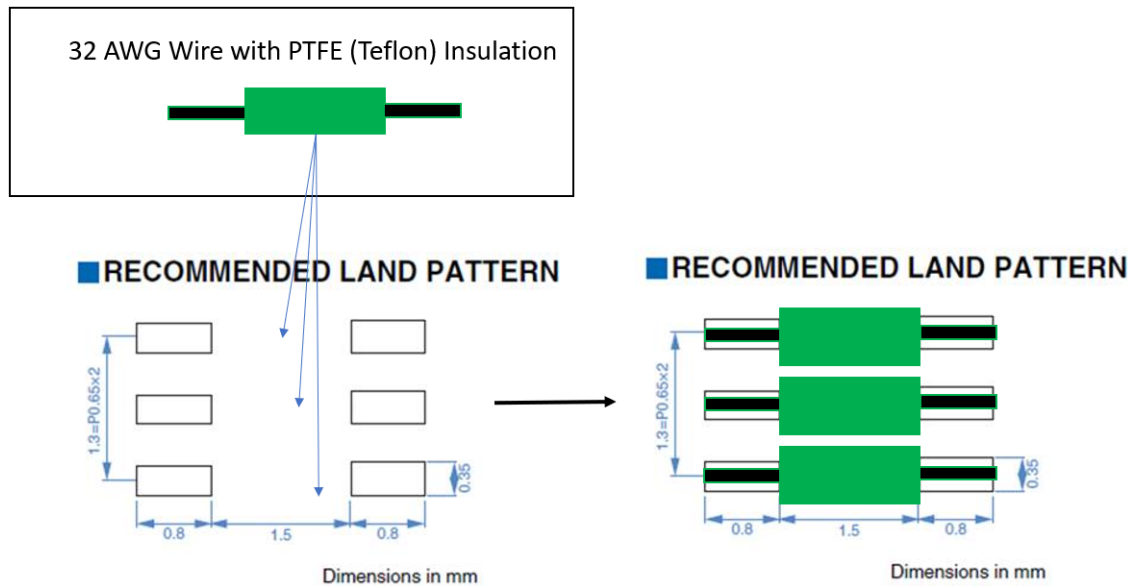


Figure A-3 Prepare Green Wire (x3)



- Wire (N5240-60111) will come in with slight curve
- Insulation will not be centered



Push insulation to center
and straighten as needed

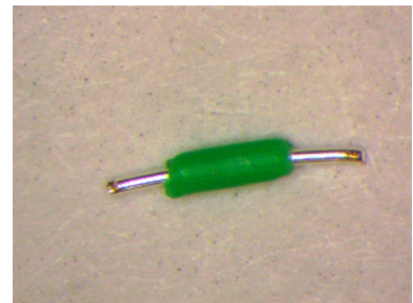


Figure A-4 Solder Green Wires (x3) to Motherboard

- Start with the wire near the dot (this is the most important wire as it crosses over a ground trace).
- It is easier to pre-tin the pad before placing the wire onto it.
- The wire gets hot rapidly so one side can come loose while soldering the other.

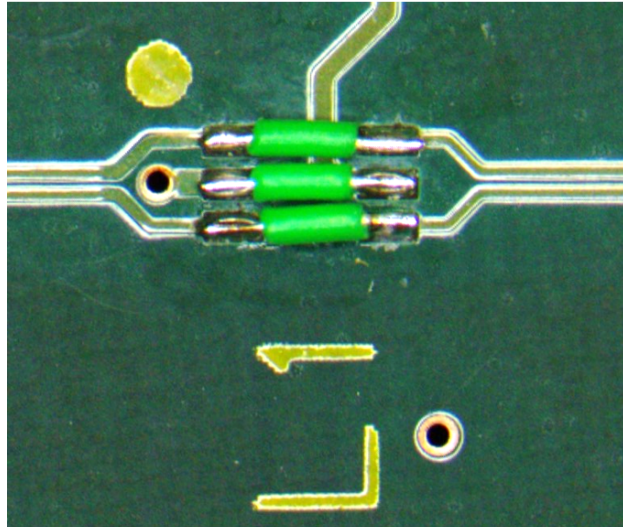


Figure A-5 Mark the Motherboard Serial Number Label With a Black Dot

- Place a small black circle to the left of the serial number to show that L1 has been removed
- Make a note on the assembly document that this L1 has been removed **"L1 Removed"**

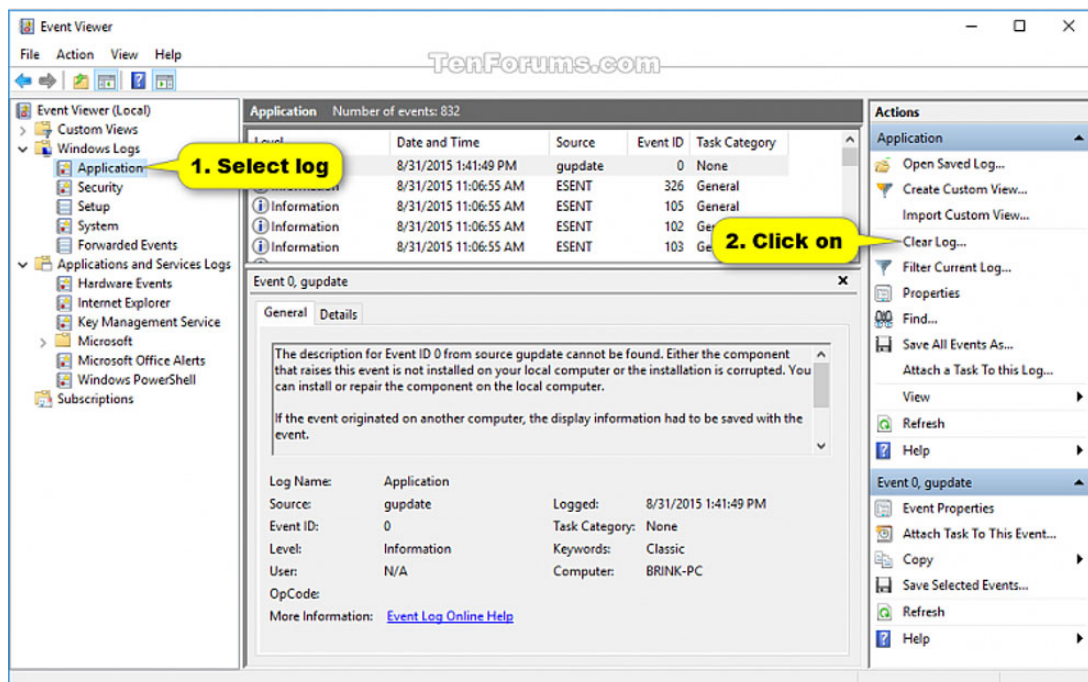


2. Clearing the Event Log and Verifying the Motherboard Modification Removed the USB Errors (2152)

This section clears the event logs and runs a *.bat (CheckEventID.bat) file to verify the motherboard repairs are correct. In this procedure, you will need to navigate through the PNA's **Event Viewer** menu, even though you may not be able to clearly read the menus.

1. Press the **Win + R** keys to open the **Run** dialog box.
2. Type eventvwr.msc into **Run**, and then click/tap on **OK** to open the **Event Viewer** window.
3. Select a log (ex. **Application**) that you want to clear in the left pane of the Event Viewer, and click/tap on **Clear Log...** in the far right **Actions** pane. (i.e., see screenshot in **Figure A-6, "Using the Event Viewer to Clear an Event Log,"**).

Figure A-6 Using the Event Viewer to Clear an Event Log



4. Using the Windows **Run** window, used in step 1, the *.bat file (CheckEventID.bat) can be run to verify that there are no 2152 error events (i.e., this takes ~three seconds to run).

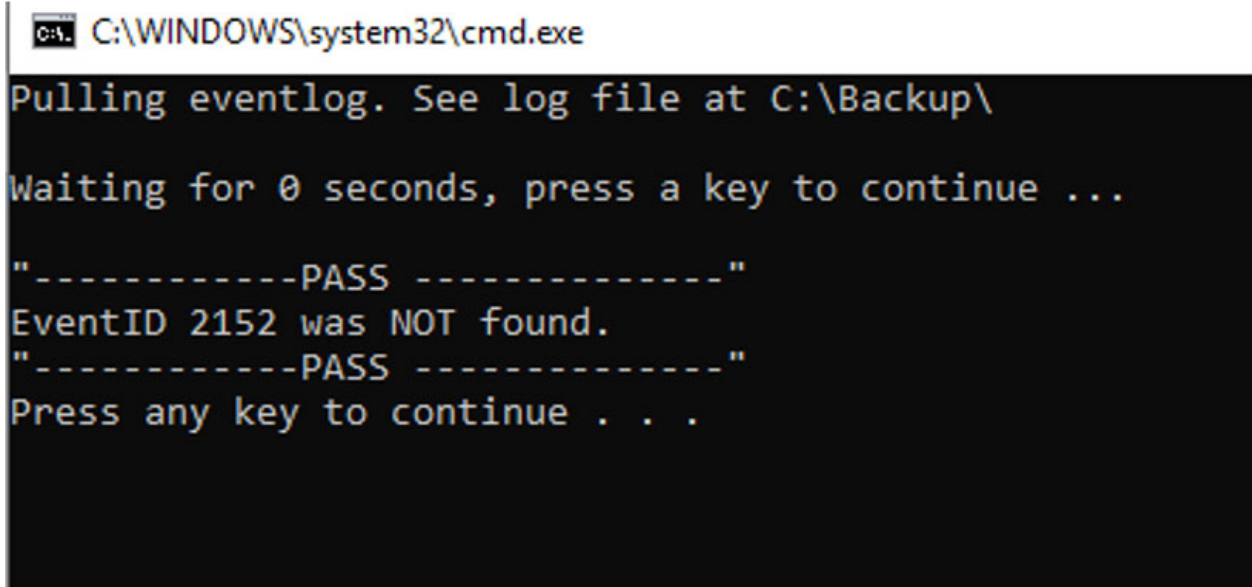
For a CheckEventID.bat results example, refer to [Figure A-7 on page 83](#).

CAUTION

STOP!

If the instrument fails the event log clearing procedure in this section by displaying an “EventID 2152” (USB error), older System motherboards with serial numbers <N5247-63002-23-1945-00002 need to be reworked to remove L1, per “[1. System Motherboard Modification](#)” on [page 78](#) in this Appendix. If you have an older system board, call Keysight Support to verify, if your instrument has previously been upgraded. Refer to “[Getting Assistance from Keysight](#)” on [page 6](#).

Figure A-7 CheckEventID.bat to Verify Instrument USB Drives are Error Free



```
C:\WINDOWS\system32\cmd.exe
Pulling eventlog. See log file at C:\Backup\
Waiting for 0 seconds, press a key to continue ...

"-----PASS -----"
EventID 2152 was NOT found.
"-----PASS -----"
Press any key to continue . . .
```

3. After Completing Event Log Check Instructions

After completing this procedure:

- If your instrument passed Event Log check, refer to “[Step 28. Perform Post-Upgrade Adjustments and Calibration](#)” on [page 63](#).
- If your instrument **FAILED** the Event log check (i.e., EventID 2125 detected) and you had to complete the system motherboard modification (“[1. System Motherboard Modification](#)” on [page 78](#)), then refer to the Service Guide for your model to reassemble your instrument.

Motherboard Clearing the Event Log and Modification to Replace L1 Procedures

- a. After re-assembly and associated checks in the Service Guide, when your instrument powers up successfully, complete **“2. Clearing the Event Log and Verifying the Motherboard Modification Removed the USB Errors (2152)” on page 82.**
- b. If your instrument passed Event Log check, refer to **“Step 28. Perform Post-Upgrade Adjustments and Calibration” on page 63.**

