

# Keysight Extended Frequency Range Upgrade Kit

To Upgrade PNA N5224A/B to N5225A/B Upgrade  
Kit Order Number: N5224AU-650 or N5224BU-650  
Keysight Kit Number: N5225-60109

# Notices

© Keysight Technologies, Inc.  
2011-2020

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

## Trademark Acknowledgments

## Manual Part Number

N5225-90109

## Edition

Edition 2, May 2020

Printed in USA/Malaysia

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

## Warranty

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

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

## Technology Licenses

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

## U.S. Government Rights

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

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

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

The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional

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

## Safety Notices

### CAUTION

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

### WARNING

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

Keysight Extended Frequency Range Upgrade Kit  
Upgrade Kit Order Number: N5224AU-650  
Installation Note

## Description of the Upgrade

This upgrade extends the frequency range of the PNA model N5224A/B from 43.5 GHz up to 50 GHz. After installation of this upgrade, the PNA will be an N5225A or N5225B.

## 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](http://www.keysight.com) and the **Contact Keysight** link.

## Getting Prepared

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

- A license key - refer to **“License Key Redemption”** below.
- A PDF copy or a paper copy of the PNA Service Guide - refer to **“Downloading the Online PNA Service Guide”** below.
- Enough time - refer to **“About Installing the Upgrade” on page 6.**
- Test equipment for the post-upgrade adjustments and full instrument calibration. To view the equipment list, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

### License Key Redemption

#### NOTE

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

---

#### NOTE

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

If you are unfamiliar with the licensing process, refer to the <http://literature.cdn.keysight.com/litweb/pdf/N5242-90024.pdf>.

---

#### NOTE

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

---

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

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

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

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

---

1. See **“Downloading the Online PNA Service Guide” on page 5.**

## Getting Prepared

- Model number
- Serial number
- Host ID (A models only)
- **A models ONLY:** From the online Keysight HostID utility  
Part of the OEC procedure to obtain the 12-digit license key online requires you to provide the HostID number of the PNA. This HostID number is NOT the one currently shown on the PNA. To find your new HostID, go to <http://www.na.support.keysight.com/pna/upgrades.html> and, using the HostID utility, enter the PNA serial number and your new, upgraded PNA-X model number - N5241A, N5242A, or N5245A.
  - Host ID

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

You will need to provide an email address, Keysight will promptly email your A model license key(s) or a for a B model, license key file(s) as a message attachment. Refer to **“License Key Redemption” on page 4**.

## Downloading the Online PNA Service Guide

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

1. Go to [www.keysight.com](http://www.keysight.com).
2. In the Search box, enter the model number of the analyzer (Ex: N5224B) and click **Search**.
3. Click **Technical Support > Manuals**.
4. Click **Service Manual**.
5. Click the service guide title to download the PDF file.
6. When the PDF of the Service Guide is displayed, scroll through the Contents section bookmarks to locate the information needed.

## Items Included in the Upgrade Kit

### About Installing the Upgrade

Products affected	All N5224A/B microwave network analyzers
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	5 minutes
Estimated verification time	5 minutes
Estimated adjustment time	2 hours
Estimated full instrument calibration time	4.5 hours

### Items Included in the Upgrade Kit

Check the contents of your kit against the following list. If any part is missing or damaged, contact Keysight Technologies. Refer to **“Getting Assistance from Keysight” on page 3**.

**Table 1** Contents of Upgrade Kit

Qty	Description	Part Number
1	Installation Note (this document)	N5225-90109
1	Option Entitlement Certificate	5964-5145
1	Nameplate, N5225A (50 GHz)	N5225-80001
1	Nameplate, N5225A (50 GHz)	N5225-80004

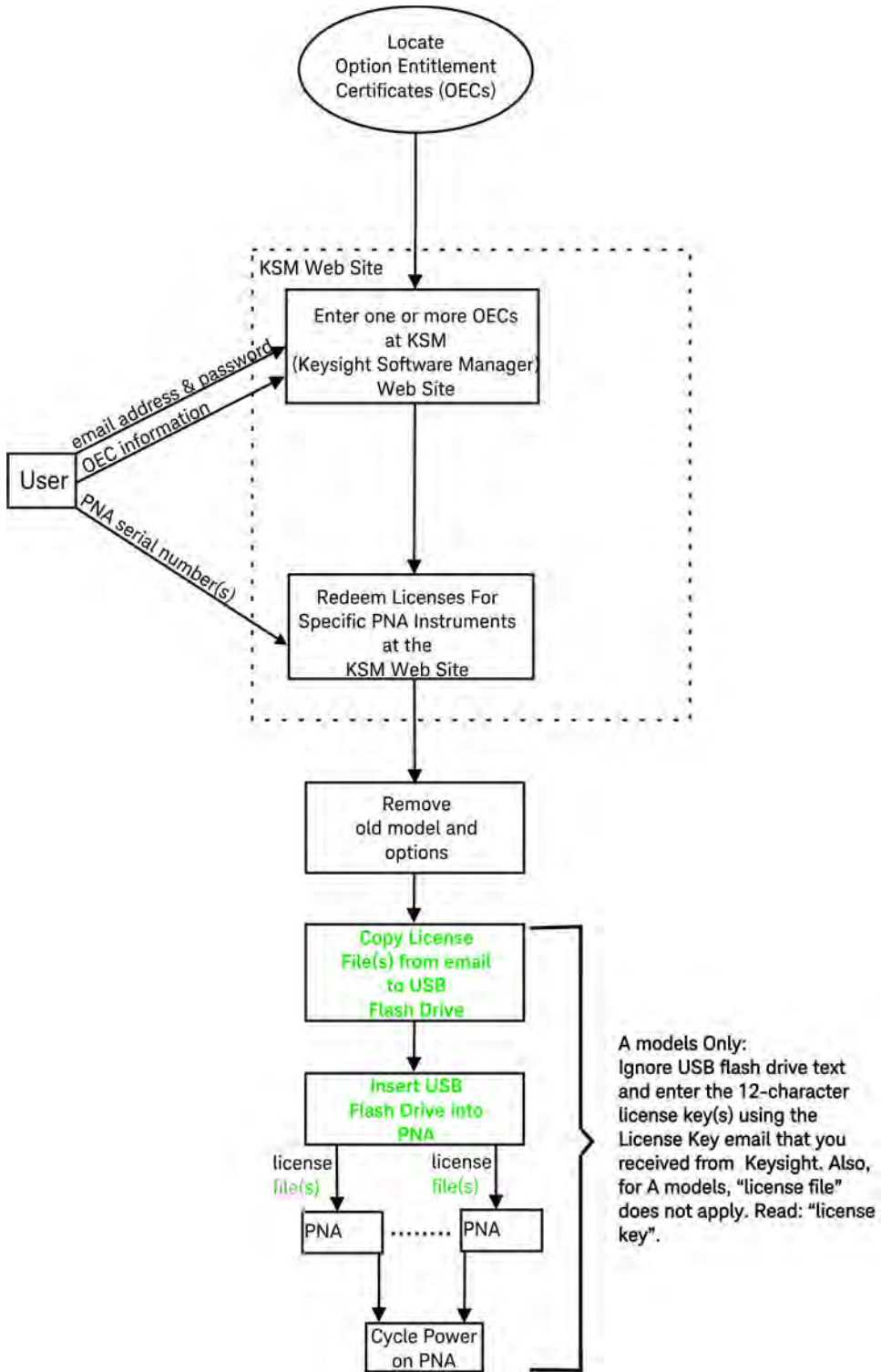
### Installation Procedure for the Upgrade

#### Installation Requirements

- The network analyzer must be in proper working condition prior to installing this option. Any necessary repairs must be made before proceeding with this installation.
- This installation does not require removal of the analyzer’s protective outer covers.
- The analyzer must be powered up and operating to perform this installation. The network analyzer program must be running.
- This installation requires that a keyboard and a mouse be connected to the network analyzer.

Figure 2

An overview of this process, is described in these instructions, is shown below (B model shown. For exceptions, see **Step 5. A models Only**—same figure).



## Overview of the Installation Procedure

**“Step 1. Verify the Option, Serial, and New Model Numbers” on page 8**

**“Step 2. Erase Old Adjustment Data” on page 9**

**“Step 3. Enter the New Model Number” on page 9**

**“Step 4. Verify that the New Model Number Is Enabled” on page 11**

**“Step 5. Replace the Nameplate” on page 11**

**“Step 6. Perform Post-Upgrade Adjustments and Calibration” on page 13**

### Step 1. Verify the Option, Serial, and New Model Numbers

This step contains the following sections:

- **““A” Model Verifying the Upgrade Information” on page 8**
- **““B” Model Verifying the Upgrade Information” on page 8**
- **“All models–If the Instrument Numbers Do Not Match the License File” on page 8**

#### **"A" Model Verifying the Upgrade Information**

Refer to the license message you received from Keysight:

- Verify that the analyzer's option number (650), serial number, and upgraded model number (N5225A) match those on the license message you received from Keysight.
- Note the 12-digit license key for later use.

#### **"B" Model Verifying the Upgrade Information**

Refer to the message—with the license files—you received from Keysight:

- Verify that the analyzer's option number (650), serial number, and upgraded model number (N5225B) match those on the license message you received from Keysight.

#### **All models–If the Instrument Numbers Do Not Match the License File**

If the model number, serial number, or option number do not match those on the license file message you received from Keysight, you will not be able to install the option. If this is the case, contact Keysight for assistance. Refer to **“Getting Assistance from Keysight” on page 3.**



## Step 2. Erase Old Adjustment Data

### NOTE

The PNA-X contains adjustment data for the original frequency range only. Performance above this range is not calibrated and may cause errors to be displayed. More adjustment data is required for the expanded frequency span. Erasing and recreating the adjustment data allows the larger data set to be stored congruently.

---

On your PNA being upgraded:

1. Power up your PNA.
2. If open, close the PNA application.
3. Open up **Windows Explorer**.
4. Open the directory location for your instrument:  
**A Models:**  
C:\Program Files (x86)\Agilent\Network Analyzer\Service  
**B Models:**  
C:\Program Files (x86)\Keysight\Network Analyzer\Service
5. Double-click or press to open the `CalFileSystemConverter.exe` file.
6. In the "Cal File System Converter" window: Click or press the **Erase Cal File System** button.
7. Click or press: **Close**
8. Double-click or press to Open the PNA application.

## Step 3. Enter the New Model Number

This step contains the following sections:

- ["Model Enable Procedure for "A" Model Instruments" on page 9](#)
- ["Model Enable Procedure for "B" Model Instruments" on page 10](#)

### Model Enable Procedure for "A" Model Instruments

1. Click **System > Service > Option Enable**.
2. Click **Repair**.
3. Click the **Check if model shown is incorrect** check box.
4. Click **Begin Repair**.

5. In the drop down list that appears, select your new, upgraded PNA model number – N5225A.
6. Using the keyboard, enter the 12-digit license key in the box provided. The license key is printed on the license message you received from Keysight. Enter this key *exactly* as it is printed on the message.
7. Click **Change Model**.
8. Click **Yes** in answer to the displayed question in the **Restart Analyzer?** box.
9. When the installation is complete, click **Exit**.

**NOTE**

Previously installed software options require new license keys. Contact Keysight to receive these keys.

---

### Model Enable Procedure for "B" Model Instruments

**NOTE**

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

---

1. Locate the email(s) from Keysight which contain license file attachments. These emails are a result of "**License Key Redemption**" on page 4.
2. Copy the license file(s) from the email(s) to the **root** directory of the USB flash drive. More than one license file may be copied to the USB flash drive.

**NOTE**

A single license file may contain licenses for more than one instrument.

---

3. Insert the USB flash drive into the PNA's USB drive slot.
4. 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. If the license file installed and the PNA rebooted as expected, remove the USB flash drive from the PNA.

**NOTE**

Previously installed software options require new license keys. Contact Keysight to receive these keys.

---

#### Step 4. Verify that the New Model Number Is Enabled

Once the analyzer has restarted and the network analyzer program is again running:

1. On the toolbar, click **Help**, then click **About Network Analyzer**.
2. Verify that the new model number you enabled is shown in the display. Click **OK**.

Refer to the license message you received from Keysight:

- Verify that the analyzer’s model and serial numbers match those on the license message you received from Keysight.

**NOTE**

If the new model number has not been enabled, contact Keysight Technologies. Refer to [“Getting Assistance from Keysight” on page 3](#).

---

#### Step 5. Replace the Nameplate

##### Remove the Old Nameplate

1. Using a sharp object such as a knife blade, lift one end of the old nameplate. Be careful not to scratch the front-panel painted surface.
2. Using your fingers, pull the nameplate completely off of the front panel and discard it.
3. If any adhesive remains on the front panel surface, it can be removed by rubbing it with your finger. Do not use a sharp object to remove this adhesive. If necessary, the surface can be cleaned with isopropyl alcohol.

**Install the New Nameplate**

1. Remove the protective backing from the new nameplate to expose the adhesive. Avoid touching the adhesive with your fingers as this may affect its ability to adhere to the front panel surface.
2. **Loosely** align the new nameplate over the recess in the front panel and apply lightly.
3. Once the nameplate is properly aligned, press it firmly onto the surface to secure it.

## Step 6. Perform Post-Upgrade Adjustments and Calibration

### Adjustments

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

- source adjustment
- IF gain adjustment
- receiver characterization
- receiver adjustment
- IF Response adjustment (For A models: Options 090, 092, 093, or 094 Only. For B models: Options S93090xA, S93093A, or S93094A Only.)

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

To view this service guide information, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

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

### Operator’s Check

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

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to **“Contacting Keysight” on page 3**.

### Calibration

Although the analyzer functions, its performance relative to its specifications has not been verified. It is recommended that a full instrument calibration be performed using the analyzer’s internal performance test software. To view information on the performance test software, click the Chapter 3 bookmark “Tests and Adjustments” in the PDF Service Guide<sup>1</sup>.

---

1. See **“Downloading the Online PNA Service Guide” on page 5**.

## Installation Procedure for the Upgrade



This information is subject to change  
without notice.

© Keysight Technologies 2007-2020

Edition 2, May 2020



N5225-90109

[www.keysight.com](http://www.keysight.com)