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# Keysight X-Series Signal Analyzers

Option SF3

Security Feature, Secure RAM Boot

# Notices

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## Option SF3, Security Feature, Secure RAM Boot

Products Affected:	CXA N9000B EXA N9010B MXA N9020B MXA N9021B PXA N9030B PXA N9032B UXA N9040B UXA N9041B UXA N9042B MXE N9038B PXE N9048B NFA N8973B NFA N8974B NFA N8975B NFA N8976B
Serial Numbers:	All
To Be Performed By:	(X) Keysight Service Center (X) Personnel Qualified by Keysight (X) Customer
Estimated Installation Time:	1.0 Hours
Estimated Adjustment and Verification Time:	0 Hours

## Introduction

This installation note explains how to install Option SF3 on an X-Series analyzer. Option SF3, Secure RAM Boot, is a license key-enabled security feature that addresses the requirements of security-conscious users that require running X-Series signal analyzers in volatile memory. This option enables the instrument to boot the Operating System (Windows) into volatile memory, ensuring that, after a power cycle, all information from the previous boot is lost.

Installing Option SF3 makes the following changes to the instrument's operating environment:

- Modifies aspects of the Windows Operating System, specifically, it enables the Unified Write Filter.
- Installs a Keysight Secure Ram Boot Configuration utility to monitor and control the Unified Write Filter Windows feature.

**NOTE**

The instrument may take longer to perform its auto alignments when Secure RAM Boot is enabled. This is a result of not being able to store the data from previous executions of the alignments on the disk drive and then later recall the data.

**NOTE**

When Secure RAM Boot is enabled, the saving of measurement results and user configurations will not be retained upon a reboot.

## Operating System Changes

Installing the Option SF3 enables the Windows Feature Unified Write Filter. Unified Write Filter (UWF) is a Windows feature that enables the Operating System to allocate System Memory (RAM) for a file system overlay. This overlay is temporary, and any changes made to the system are discarded upon reboot, effectively "locking down" the system to a known state. This feature can be enabled and disabled with a reboot allowing the system to retain permanent changes such as instrument software upgrades, Windows updates, and hardware alignments.

When Unified Write Filter is enabled memory is allocated for actions that interact with the system disk. Virtual Memory is also disabled so there are very limited memory resources for the Operating System and measurement software.

Note that one effect of enabling Secure RAM Boot is a reduction of the available memory space for preloading applications at power-on.

This option requires Windows 10, or later, operating system, and is not supported by Windows XP or Windows 7. Also, the instrument software version must be  $\geq$  A.37.02.

The option is licensed for one instrument model number/serial number combination. The license file that is downloaded from the web will only install on the designated instrument.

### NOTE

1. The signal analyzer being upgraded with this option must have software version A.37.02 or newer.

To verify that the current version meets this requirement, press **System, Show, System** and look for the "Instrument S/W Revision".

The latest revision of the X-Series Signal Analyzers software may be downloaded from [http://www.keysight.com/find/xseries\\_software](http://www.keysight.com/find/xseries_software).

If a software update is required, perform the software update BEFORE following the procedure in this document for redeeming and installing the option upgrade license key.

2. This option is licensed for one instrument model/serial number combination. The license key will only install on the designated instrument.

3. Windows 10, or later, operating system is required.

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## Contents

Quantity	Description	Part Number
1	Installation Note	This note
1	Option Upgrade Entitlement Certificate	----

## Tools Required

- Personal computer with internet access and USB port
- USB storage device with  $>3$ GB free memory

## Installation Procedure

### Confirm Operating System and Instrument Software Version

1. On the analyzer, press **System** (gear icon) and then **Show System**.
2. Make note of the product number (e.g. N9020B), instrument software revision (e.g. A.37.03) and the computer system (e.g. Windows 10).
3. If the product number is not one of those listed on [page 3](#) of this installation note, do not proceed with this upgrade; this upgrade is only valid for those products listed on [page 3](#).
4. If the computer system is Windows 7, do not proceed with this upgrade; this upgrade can only be installed on analyzers with Windows 10 or later.
5. If the instrument software revision is earlier than A.37.02, upgrade the instrument software version to the latest version for your model number. The latest version of the X-Series Signal Analyzer software may be downloaded from [https://www.keysight.com/find/xseries\\_software](https://www.keysight.com/find/xseries_software).

Option SF3, Security Feature, Secure RAM Boot

## License Installation Procedure over USB

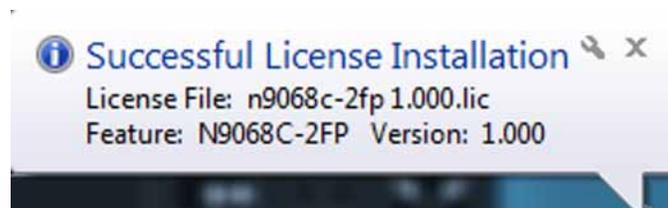
1. Locate the Option Upgrade Entitlement Certificate from the kit.
2. Redeem the Option Upgrade Entitlement Certificate by following the instructions on the Certificate.
3. After redeeming your Option Upgrade Entitlement Certificate you will receive an email with an attached License File.
4. Locate a USB storage device. Perform a virus scan on this device before use.
5. Save the License File to the root directory of the USB Storage Device.
6. Connect the USB Storage Device to the signal analyzer USB port. Windows will detect the new hardware and may display the configuration menu shown in **Figure 1**. This menu may be configured according to your preferences.

**Figure 1** USB Storage Device Configuration Menu



7. The signal analyzer will automatically consume the License File. (This may take a few minutes) When the License File is consumed the Keysight License Manager will display a “Successful License Installation” message as shown in **Figure 2**.

**Figure 2** Successful License Installation



## Alternate Installation Procedure

The License File can be manually installed over USB or LAN by placing the license file in the following folder on the signal analyzer

C:\Program Files\Agilent\licensing

## Verify the Installation and Instrument Software Version

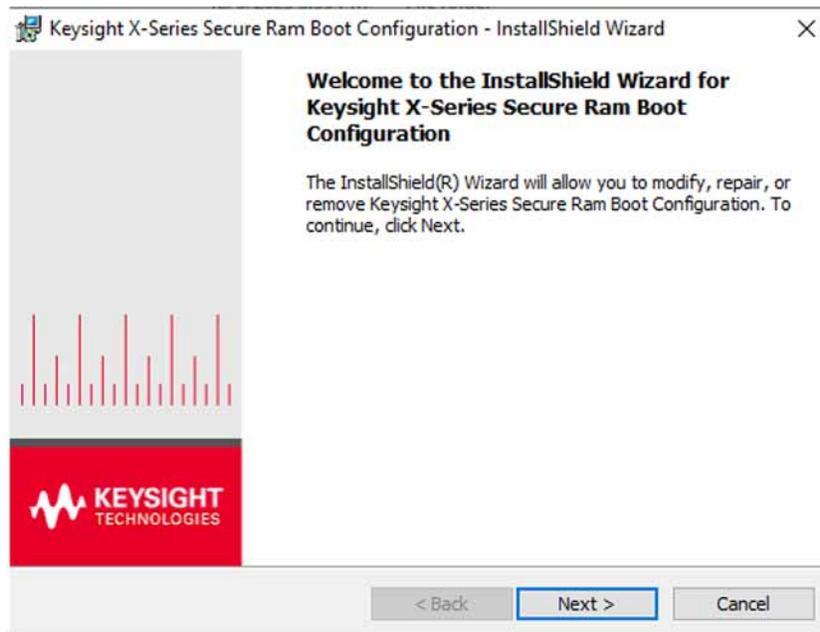
1. Cycle power on the signal analyzer and wait until the analyzer boots to the measurement application screen.
2. Press **System, Show System** to display a list of installed options.
3. Verify that the installed option list contains N90xxB-SF3.
4. Verify that the "Instrument S/W Revision" meets the requirements outlined in the note on [page 4](#) of this document.
5. Proceed with Initializing Option SF3, Secure RAM Boot.

## Initializing Secure RAM Boot

1. Connect a USB keyboard and mouse to the instrument.
2. In the XSA application, press **System** (gear icon) and select **Preload / Unload Modes**.
3. Click **Preload: Deselect All**. This will deselect all modes other than the essential mode for the analyzer (for example, Spectrum Analyzer mode for an N9020B MXA or EMI Receiver mode for an N9038B MXE).
4. Press the "X" in the upper right corner and the new Application Configuration will be saved.
5. Close the XSA application by pressing the **System** (gear icon) and **Exit Program**.
6. Press **Ctrl, Alt, Delete** on the keyboard.
7. Select **Sign Out**.
8. At the login screen enter:  
User name: administrator  
Default Password: Keysight4u!
9. Press **Enter**.
10. Navigate to C:\Program Files\Agilent\SignalAnalysis\Infrastructure.
11. Scroll down to locate XsaSecureRamBootInstaller.exe.
12. Double click on **XsaSecureRamBootInstaller.exe**.

Option SF3, Security Feature, Secure RAM Boot

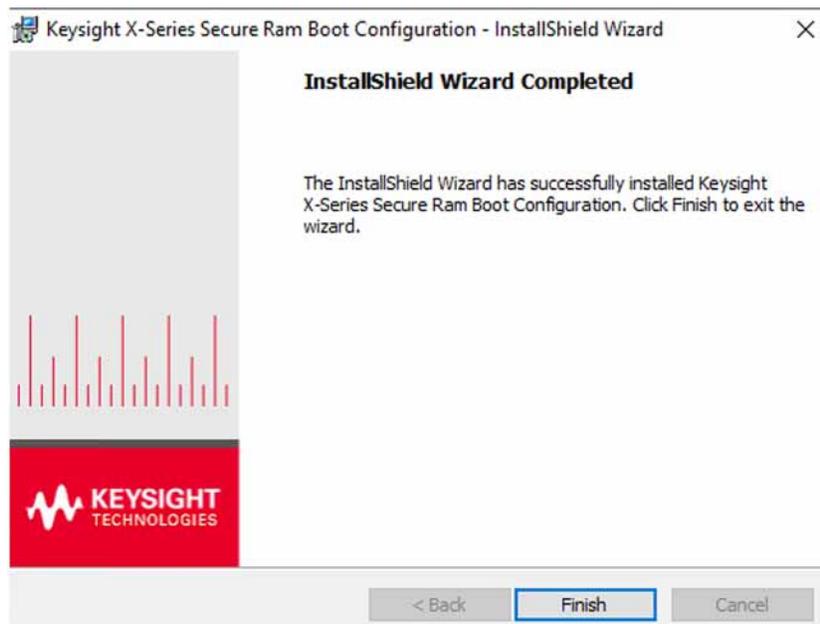
13. When you see the following dialog, click **Next**:



14. You will then be prompted to accept the terms of the End-User License Agreement. Click “**I accept the terms of the license agreement**” and click **Next**.

15. Click **Install**. Installation will take only about 10 seconds.

16. When the InstallShield Wizard Completed dialog appears, click **Finish**.



17. Cycle power on the analyzer.

18. After the analyzer boots up, close the XSA application.

19. Press **Ctrl, Alt, Delete** on the keyboard.

20. Select **Sign Out**.

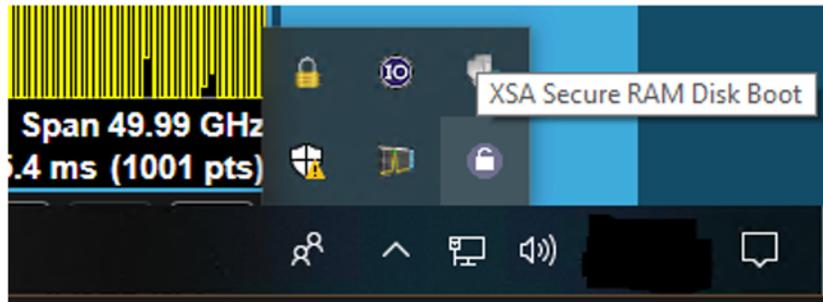
21. At the login screen enter:

User name: Administrator

Default Password: Keysight4u!

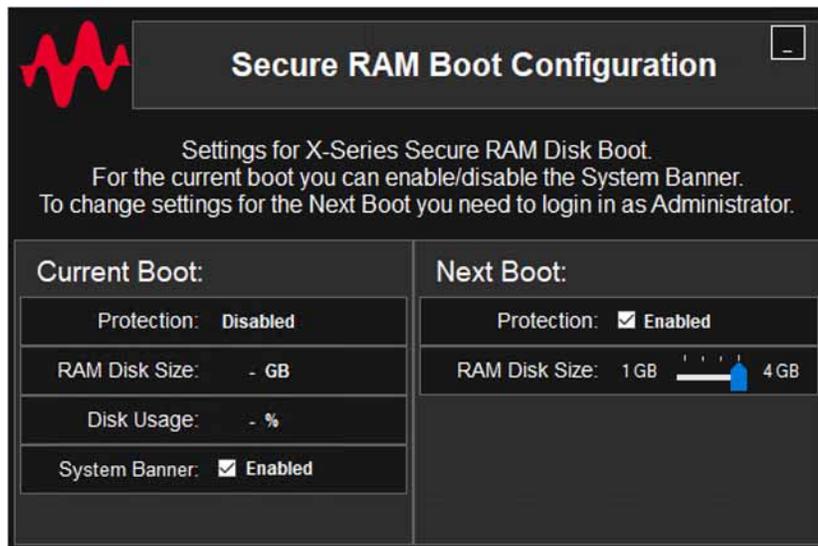
22. Press **Enter**.

23. After the Secure RAM Boot banner is displayed, open the Keysight Secure RAM Boot Configuration Dialog by clicking on the white lock icon in the system tray.



24. In the Next Boot pane, check the Protection Enabled box to enable Secure RAM Boot.

25. In the Current Boot pane, check the System Banner Enabled box.



26. Minimize the Keysight Secure RAM Boot Configuration Dialog.

27. Cycle power on the instrument.

## Description of Option SF3

Option SF3, Secure RAM Boot, is a license key-enabled security feature that addresses the requirements of security-conscious users that require running X-Series signal analyzers in volatile memory. This option enables the instrument to boot the Operating System (Windows) into volatile memory, ensuring that, after a power cycle, all information from the previous boot is lost.

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Note that one effect of enabling Secure RAM Boot is a reduction of the available memory space for preloading applications at power-on.

## Keysight Secure RAM Boot Configuration

The Keysight Secure RAM Boot Configuration is a utility to monitor and manage the Unified Write Filter. Keysight Secure RAM Boot Configuration is setup through the installer "XsaSecureRamBootInstaller.exe" located at:

C:\Program Files\Agilent\SignalAnalysis\Infrastructure\XsaSecureRamBootInstaller.exe"

This Utility has 4 main components:

- 1. Keysight Secure RAM Boot Configuration Dialog**
- 2. Secure RAM Boot System Banner**
- 3. Keysight X-Series Secure RAM Boot Service**

#### 4. System RAM Disk Usage Warnings

##### Keysight Secure RAM Boot Configuration Dialog

Refer to **Figure 3**. This dialog is used to monitor and control the UWF filter settings. On the left side it has information about the current boot settings and allows you to disable the System Banner for the current user. On the right side there is information about the next boot and can be used to enable/disable the protection after a reboot and set the size of the RAM disk (if enabled) during the next boot. The RAM disk size can only be set when the protection is disabled. Controlling the protection settings for the next boot can only be done by the Administrator user.

This dialog can be minimized by the minimized button on the top right of the dialog. When the dialog is minimized or after logon the dialog can be opened by selecting the white lock icon in the Windows System Tray as shown in **Figure 4**.

Figure 3 Keysight Secure RAM Boot Configuration Dialog

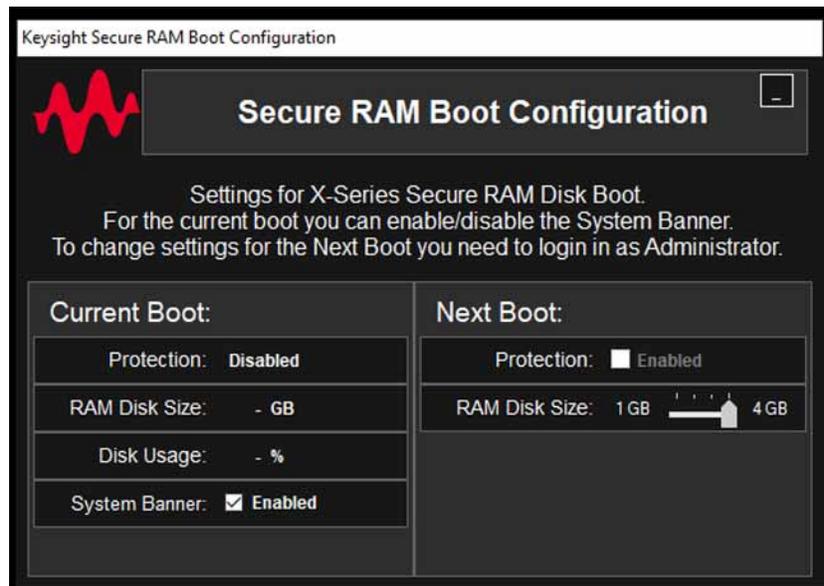


Figure 4 Keysight Minimized Dialog in System Tray



Option SF3, Security Feature, Secure RAM Boot

## Secure RAM Boot System Banner

The System Banner is an opaque banner that runs on top of the operating system to indicate the status of the Secure RAM Boot during the current operation. It is red when the protection is disabled and green when the protection is enabled. This banner can be moved by clicking and dragging the banner.

Figure 5 System RAM Boot Banner - Disabled



Figure 6 System RAM Boot Banner - Enabled



## Keysight X-Series Secure RAM Boot Service

The Keysight X-Series Secure RAM Boot Service is used to monitor the disk utilization of the RAM disk. This service is used to warn if the disk becomes too full.

## System RAM Disk Usage Warnings

The System Disk Usage warnings are pop-ups that occur when the RAM disk utilization reaches preset levels. The first warning occurs when the RAM disk is 50% full. The second and final occurs when the RAM disk is 75% full.

These warnings are expected when there is a lot of disk usage. If it occurs frequently, you can increase the RAM disk size by using the Keysight Secure RAM Boot Configuration Dialog, but this will limit available memory.

Figure 7 System RAM Disk 50% Full Warning

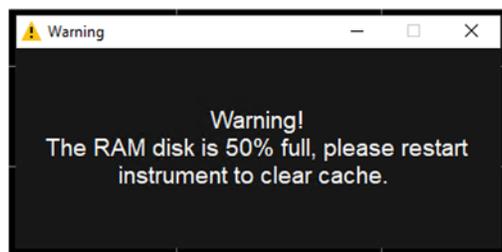
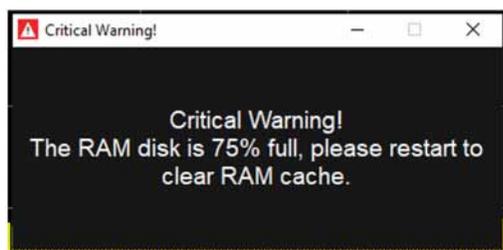


Figure 8 System RAM Disk 75% Full Warning



For additional information on Option SF3, go to

<https://www.keysight.com/find/security>

and enter the instrument model number.

Option SF3 is located in the Special Options section.

## Servicing, Upgrading, and Maintaining an X-Series Analyzer with Option SF3

Because Option SF3, when Enabled, does not allow data to be stored to the disk drive, there are several instances where it will be necessary to disable Option SF3 before performing these tasks.

For example:

1. Installing Windows OS updates.
2. Backing up and restoring calibration files.
3. Installing or removing any application programs.
4. Upgrading the instrument software version.
5. Performing a system recovery.
6. Performing alignments using the TME or ETMS calibration software application.
7. Performing advanced alignments such as the following:
  - Characterize Preselector
  - Characterize Reference Clock
  - Characterize Noise Floor
  - TDS
8. Troubleshooting alignment issues.

If you need to perform any of these tasks, you should first disable Secure RAM Boot by doing the following:

1. Close the XSA application.
2. Log off from the Instrument user.
3. Log in as Administrator (default password is Keysight4u!).
4. Open the Keysight Secure RAM Boot Configuration Dialog by clicking on the white lock icon in the system tray.
5. In the Next Boot pane, uncheck the Protection box to disable Secure RAM Boot.
6. Minimize the Keysight Secure RAM Boot Configuration Dialog.
7. Cycle power on the instrument.

After performing the task, re-enable Secure RAM Boot as follows:

1. Close the XSA application.
2. Log off from the Instrument user.
3. Log in as Administrator (default password is Keysight4u!).
4. Open the Keysight Secure RAM Boot Configuration Dialog by clicking on the white lock icon in the system tray.
5. In the Next Boot pane, check the Protection box to enable Secure RAM Boot.

- 6. Minimize the Keysight Secure RAM Boot Configuration Dialog.**
- 7. Cycle power on the instrument.**

Option SF3, Security Feature, Secure RAM Boot

## Utilities, Adjustments, and Performance Verification Tests

### **Utilities Required**

None

### **Adjustments Required**

None

### **Performance Testing Required**

None

For assistance, contact your nearest Keysight Technologies Sales and Service Office. To find your local

Keysight office access the following URL, or if in the United States, call the following telephone number:

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

1-800-829-4444 (8 am - 8 pm ET, Monday - Friday)



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