

Keysight X-Series Signal Analyzers

N9094AK Option SSD Solid State Disk Drive Upgrade

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Installation Note

Part Number:
N9094-90002

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Solid State Disk Drive

Products Affected:	EXA N9010A MXA N9020A PXA N9030A MXE N9038A
Requirements:	
Option WXP (Windows XP FES)	Option PC2 or higher
Option W7X (WES7)	Option PC4 or higher
To Be Performed By:	(X) Keysight Service Center (X) Advanced User () User
Estimated Installation Time:	1.0 Hours
Estimated Adjustment and Verification Time:	0 Hours

This document provides detailed instructions for the installation and use of a solid state disk drive in an X-Series signal analyzer. Please be sure to read this entire document before attempting to put this solid state disk drive into use.

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Quantity	Description
1	Installation Note
1	Programmed Solid State Disk Drive Tray Assembly
1	Option Upgrade Entitlement Certificate ^a

a. not included for MXE or when Option WXP is ordered

Tools Required

- Torx Driver T-10
- USB Mouse
- USB Keyboard
- USB storage device with > 2 GB free memory

What you will find in this User's Guide

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Overview

This option provides a removable solid state disk drive for your X-Series Signal Analyzer. This option could have been purchased for one of the following reasons:

1. To upgrade the instrument operating system.
2. To upgrade an instrument from a standard hard disk drive to a solid state disk drive.
3. To provide an additional solid state disk drive for use when the original solid state drive must be left inside of a controlled secure environment.

While there may be other reasons to have purchased this solid state disk drive, this document will specifically cover the requirements needed for putting this drive into use for the reasons listed above.

Since this option was ordered as an upgrade only default factory calibration data will have been copied onto this drive at the factory. You will need to follow the procedure included in this document in order to copy the factory calibration data to it from the instrument that it will be used in.

The instrument model and serial numbers will not need to be transferred to the new disk drive, as the master copy of all of these is stored on the instrument A7 Midplane board assembly.

In most cases, the license keys stored on the Midplane board assembly will be automatically copied to the new disk drive when the instrument first boots up. However, this cannot always be guaranteed to occur. Therefore, the license keys will also be backed up from the original disk drive so they can later be restored to the new disk drive.

NOTE	Should an incorrect version of the X Series calibration file(s) be installed in an instrument, no error messages will be displayed. The instrument may however perform outside of the warranted specifications for that instrument. It is therefore extremely important to ensure that the instrument specific calibration data is properly copied onto this drive before the instrument is used for making any measurements.
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Disk Drive Interconnect Life Expectancy

If this upgrade has been ordered to use as an additional solid state disk drive for use when the original solid state drive must be left inside of a controlled secure environment you will want to be aware of the following information with regards to the life expectancy of the interconnect between the removable disk drive and the instrument.

The life expectancy of both the connector on the removable disk drive and the mating connector internal to the instrument is 1,500 cycles. If this is exceeded it is very likely that a failure will occur between these connections. Keysight highly recommends that this cycle limit not be exceeded to prevent an unwanted failure of the instrument.

Putting the Additional Disk Drive Into Service

As mentioned in the **Overview** section of this document this option could have been purchased for a number of different reasons. This section will outline what steps are required to properly configure the new solid state disk drive before putting it into use.

Before using this solid state disk drive upgrade in any instrument there are two areas of concern that will need to be addressed.

1. The solid state disk drive upgrade will have been shipped with the currently shipping version of the instrument software, which may very well be a different version from what is currently being used in the instrument for which it was purchased.

While an instrument may function properly with different software versions, the software stored on the different measurement boards within the instrument (FPGA code) may not be compatible with both versions. Also, the factory calibration data file used by the different instrument software versions could be incompatible.

2. The solid state disk drive upgrade will have been shipped with a default factory calibration data file. Before using this drive the instrument specific calibration data file will need to be copied to it.

Even if the instrument software version that the solid state disk drive upgrade was shipped with is the same as what is in the instrument the instrument specific factory calibration data will still need to be copied and transferred onto the new disk drive.

Depending on which reason this drive was purchased the instructions for putting it into service will vary. Please follow the appropriate instructions below for the reason that most closely fits why this particular drive was purchased.

When Ordered as an Operating System Upgrade

1. With the original disk drive still installed in the instrument, determine what version of the instrument software is currently installed on it. For instructions on how to verify the currently installed software version see the [Software Updates](#) section in this document for instructions. Record the currently installed software version below.

Instrument S/W Revision: _____

2. Backup the instrument factory calibration data to a USB storage device. See the [Calibration Data Backup and Restore](#) section in this document for instructions.
3. Backup the license keys to a USB storage device. See the [License Key Backup and Restore](#) section in this document for instructions.
4. If an option upgrade entitlement certificate was included with this upgrade, redeem and install the license. See the [Installing N9060B License Key](#) section in this document for instructions.
5. Replace the original instrument disk drive with the disk drive supplied with this kit. See the [Disk Drive Removal and Installation](#) section in this document for instructions.
6. Turn the instrument on with the new disk drive installed and see the [Initializing the Instrument Operating System](#) section in this document for instructions.
7. Ignore any hardware related error messages that might appear at this time, as they may be related to software version incompatibilities that will be resolved in the following steps of this procedure.
8. Restore the license keys that were previously backed up from the original processor assembly. See the [License Key Backup and Restore](#) section in this document for instructions.
9. Determine what version of the instrument software is currently installed on the new disk drive. Record the installed software version below.

Instrument S/W Revision: _____

10. Compare the instrument software revision as recorded in [step 9](#) to that which was recorded in [step 1](#).

If the instrument software versions are exactly the same skip to [step 11](#) in this procedure.

If the instrument software revision recorded in [step 9](#) is older than that which was recorded in [step 1](#) update the instrument software on the new disk drive to the latest version. See the [Software Updates](#) section of this document for instructions on how to obtain and install the latest instrument software revision.

If the instrument software revision recorded in [step 9](#) is newer than that which was recorded in [step 1](#) update the instrument FPGA code. See the [FPGA Code Update](#) section in this document for instructions on how this is done.

11. Restore the instrument factory calibration data that was previously backed up from the original disk drive. See the [Calibration Data Backup and Restore](#) section in this document for instructions.
12. The instrument is now ready for use.

When Ordered as an Upgrade from the Standard Hard Disk Drive

1. With the original hard disk drive still installed in the instrument, determine what version of the instrument software is currently installed on it. For instructions on how to verify the currently installed software version see the [Software Updates](#) section in this document for instructions. Record the currently installed software version below.

Instrument S/W Revision: _____

2. Backup the instrument factory calibration data to a USB storage device. See the [Calibration Data Backup and Restore](#) section in this document for instructions.
3. Backup the license keys to a USB storage device. See the [License Key Backup and Restore](#) section in this document for instructions.
4. If an option upgrade entitlement certificate was included with this upgrade, redeem and install the license. See the [Installing N9060B License Key](#) section in this document for instructions.
5. Replace the original instrument disk drive with the solid state disk drive supplied with this kit. See the [Disk Drive Removal and Installation](#) section in this document for instructions.
6. Turn the instrument on with the new solid state disk drive installed and see the [Initializing the Instrument Operating System](#) section in this document for instructions.
7. Ignore any hardware related error messages that might appear at this time, as they may be related to software version incompatibilities that will be resolved in the following steps of this procedure.
8. Restore the license keys that were previously backed up from the original processor assembly. See the [License Key Backup and Restore](#) section in this document for instructions.
9. Determine what version of the instrument software is currently installed on the new solid state disk drive. Record the installed software version below.

Instrument S/W Revision: _____

10. Compare the instrument software revision as recorded in [step 9](#) to that which was recorded in [step 1](#).

If the instrument software versions are exactly the same skip to [step 11](#) in this procedure.

If the instrument software revision recorded in [step 9](#) is older than that which was recorded in [step 1](#) update the instrument software on the new disk drive to the latest version. See the [Software Updates](#) section of this document for instructions on how to obtain and install the latest instrument software revision.

If the instrument software revision recorded in [step 9](#) is newer than that which was recorded in [step 1](#) update the instrument FPGA code. See the [FPGA Code Update](#) section in this document for instructions on how this is done.

11. Restore the instrument factory calibration data that was previously backed up from the original disk drive. See the [Calibration Data Backup and Restore](#) section in this document for instructions.
12. The instrument is now ready for use.

When Ordered as an Additional Disk Drive When an Instrument is Being Used In a Controlled Secure Environment

If the instrument that this solid state disk drive upgrade was purchased for has not yet been placed in the controlled secure environment follow the steps below under the heading **Before the Instrument Has Been Placed Into a Secure Environment** to properly configure the drive for use. If the instrument is already in the controlled secure environment follow the steps below under the heading **After the Instrument Has Already Been Placed in a Secure Environment**.

Before the Instrument Has Been Placed Into a Secure Environment

1. With the original disk drive still installed in the instrument, verify that the instrument software is the latest version. For instructions on how to verify the currently installed software version, as well as how to know what the latest version is, see the **Software Updates** section in this document for instructions.
2. If the instrument software is not the latest version update the instrument software to the latest version available. See the **Software Updates** section of this document for instructions.
3. Once the instrument software has been updated backup the instrument factory calibration data to a USB storage device. See the **Calibration Data Backup and Restore** section in this document for instructions.
4. Backup the license keys to a USB storage device. See the **License Key Backup and Restore** section in this document for instructions.
5. If an option upgrade entitlement certificate was included with this upgrade, redeem and install the license. See the **Installing N9060B License Key** section in this document for instructions.
6. Replace the original instrument disk drive with the additional disk drive supplied with this kit. See the **Disk Drive Removal and Installation** section in this document for instructions.
7. Turn the instrument on with the additional disk drive installed. See the **Initializing the Instrument Operating System** section in this document for instructions.
8. Restore the license keys that were previously backed up from the original processor assembly. See the **License Key Backup and Restore** section in this document for instructions.
9. Verify that the instrument software on the additional disk drive is the same version that is on the original disk drive.
10. If the instrument software on the additional disk drive is not the same as what is on the original disk drive update the instrument software on this drive to the latest version available as well. See the **Software Updates** section in this document for instructions.
11. Once the instrument software has been updated restore the instrument factory calibration data that was previously backed up from the original disk drive. See the **Calibration Data Backup and Restore** section in this document for instructions.
12. Write the instrument model number and serial number on the original disk drive and reinstall it in the instrument.
13. Write the instrument model and serial number on the additional disk drive and place it back in the static safe bag that it was shipped in and place it in a safe place until it is needed again.
14. The instrument is now ready for use.

After the Instrument Has Already Been Placed in a Secure Environment

If the instrument that this additional disk drive is intended to be used with is already inside of a controlled secure environment you will not be able to transfer the instrument specific factory calibration data to the additional disk drive. When the instrument is eventually removed from the controlled secure environment, with the original disk drive left inside the controlled secure environment, follow the procedure below to put the additional disk drive into service.

1. Install the additional disk drive into the instrument and power it on. See the **Initializing the Instrument Operating System** section in this document for instructions.
2. If an option upgrade entitlement certificate was included with this upgrade, redeem and install the license. See the **Installing N9060B License Key** section in this document for instructions.
3. Verify that the instrument software is the latest version. For instructions on how to verify the currently installed software version, as well as how to know what the latest version is, see the **Software Updates** section in this document for instructions.
4. Since the instrument specific factory calibration data file is not available to be copied onto this additional disk drive a complete instrument calibration, including all adjustments, will need to be performed.
5. When the instrument is to be placed back into the controlled secure environment backup the factory calibration data to a USB storage device. See the **Calibration Data Backup and Restore** section in this document for instructions.
6. Place a copy of the latest instrument software, as verified in **step 3** above, onto the same USB storage device.
7. Remove the additional disk drive from the instrument and write the instrument model and serial number on it for future identification. Place the additional disk drive back in the static safe bag that it was shipped in and place it in a safe place until it is needed again.
8. Return the instrument to the controlled secure environment along with the USB storage device.
9. Re-install the original disk drive into the instrument and turn it on.
10. Verify that the instrument software on the original disk drive is the same version that was just placed on the USB storage device.
11. If the instrument software on the original disk drive is not the same as what was just placed on the USB storage device update the instrument software on this drive using the software installed on the USB storage device. See the **Software Updates** section in this document for instructions.
12. Once the instrument software has been updated restore the new instrument factory calibration data from the previously backed up calibration data file on the USB storage device. See the **Calibration Data Backup and Restore** section in this document for instructions.
13. The instrument is now ready for use and the USB storage device can be properly disposed of if necessary.

Installing N9060B License Key

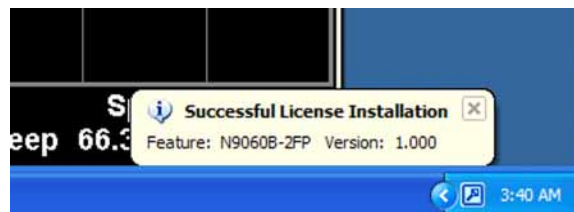
1. Locate the Option Upgrade Entitlement Certificate from the kit.
2. Redeem the Option Upgrade Entitlement Certificate by following the instructions on the Certificate.
3. After redeeming your Option Upgrade Entitlement Certificate you will receive an email with an attached License File.
4. Locate a 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 one of the instrument USB ports. The instrument will detect the new hardware and may display the configuration menu shown in **Figure 1**. Press ESC and this window will go away.

Figure 1 USB Storage Device Configuration Menu



7. The instrument 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 instrument

C:\Program Files\Agilent\licensing

Verify the Installation

1. Press **System, Show, System** to display a list of installed options.
2. Verify that the newly installed option number appears on the list.

Initializing the Instrument Operating System

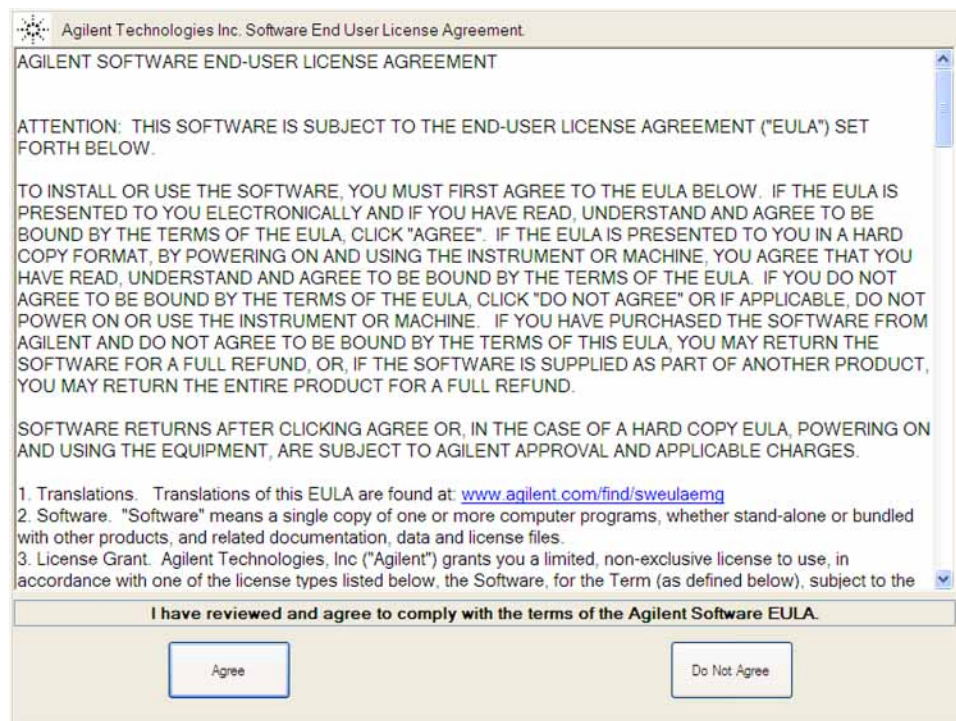
NOTE During the initial power-on process, the instrument may turn itself off and restart a number of times. This is normal and only happens during the initial installation process.

1. Connect a mouse to one of the instrument USB ports.

NOTE The instrument may require more than 5 minutes to power-on. This is affected by the operating system initial start-up requirements.

2. The Keysight Technologies screen appears followed by a screen that automatically loads the operating system.
3. The License Agreement dialog box as shown in **Figure 3** appears, providing information regarding the instrument software licensing.

Figure 3 License Agreement Dialog Box

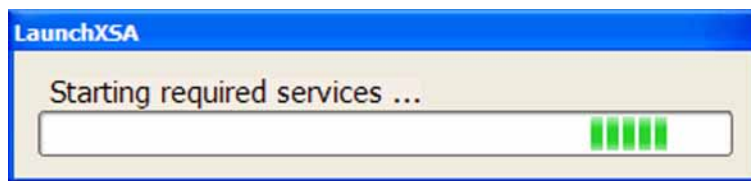


Select **Agree** to continue, or **Do Not Agree** to turn off the instrument before initializing the software.

CAUTION After launching the setup, do not turn off the instrument or remove power before the setup routine completes and the system restarts. Turning off the instrument may corrupt the system and the instrument software may need to be recovered.

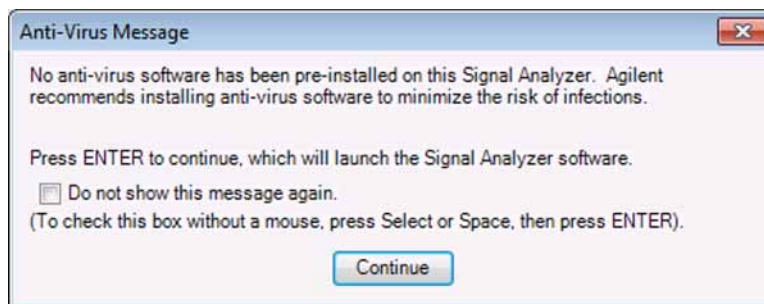
4. After the instrument restarts, a status window as shown in **Figure 4** appears while the instrument application software loads:

Figure 4 Application Launch Status Window



5. The anti-virus notification as shown in **Figure 5** will then appear.

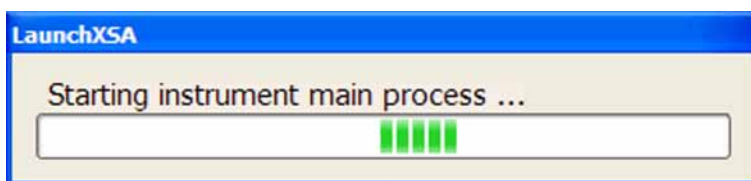
Figure 5 Anti-Virus Message



NOTE If you do not check the "Do not show this message again" check box, this message will be displayed each time the instrument is turned on. No application will start while this message is displayed. Before continuing, make sure that you carefully read the Anti-Virus message and determine what action is appropriate.

6. Select Continue.
7. Further status messages similar to **Figure 6** will continue to appear while the instrument application software continues to load:

Figure 6 Continued Application Launch Status Window



8. Once the instrument application software completes loading the instrument initialization will be completed. Continue with the next step for putting the new disk drive into service.

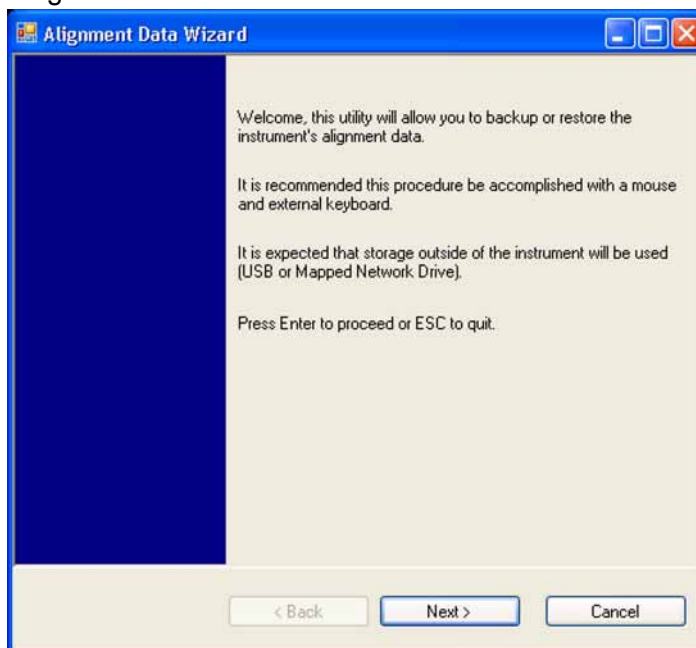
Calibration Data Backup and Restore

In order to maintain the same level of instrument performance and measurement accuracy with the new disk drive that it had with the original disk drive the instrument specific calibration data will need to be transferred to the new drive. The following procedures will outlined the steps required to do this.

Backup Calibration Data

1. With the instrument turned on and the signal analyzer application running as normal, connect a USB mouse to one of the available instrument USB ports.
2. Locate a USB storage device and insert it into one of the available instrument USB ports. (Perform a virus scan on this device before use)
3. On the front panel of the instrument press **System, Alignments, Backup or Restore Align Data...**
4. The Alignment Data Wizard window as shown in **Figure 7** will appear.

Figure 7 Alignment Data Wizard



5. Follow the on-screen instructions to Backup the calibration data to the USB storage device.

Restore Calibration Data

1. With the instrument turned on and the signal analyzer application running as normal, connect a USB mouse to one of the available instrument USB ports.
2. Connect the USB storage device that the calibration data was previously saved on to one of the available instrument USB ports.
3. On the front panel of the instrument press **System, Alignments, Backup or Restore Align Data...**
4. The Alignment Data Wizard window as shown in **Figure 7** will appear.
5. Follow the on-screen instruction to Restore the calibration data from the previously saved file on the USB storage device.

License Key Backup and Restore

In order for the instrument being upgraded to keep the same option configuration that it had prior to the upgrade, it is mandatory that the licenses be transferred from the original disk drive to the new disk drive. In most cases, these licenses will be automatically copied from the Midplane board assembly. However, there may be instances where the automatic copying process will not work. Therefore, the license keys will also be backed up for later restoration on the new disk drive.

License Key Backup

1. Locate a USB storage device. Perform a virus scan on this device before use.
2. Create a folder on the USB storage device with the folder name “Licenses” followed by the model number and serial number of the analyzer being upgraded. For example, “Licenses_N9020A_MY49100101”
3. Insert the USB storage device into one of the instruments USB ports.
4. Using a mouse, navigate to the folder C:\Program Files\Agilent\licensing.
5. Change the folder's properties so that hidden files can be viewed.
 - a. If the operating system is WinXP, click on Tools and select Folder Options. Select the View tab. In the Advanced Settings window, under Hidden files and folders, select "Show hidden files and folders".
 - b. If the operating system is Windows Embedded Standard 7 (WES7), click on Organize and select Folder and search options. Select the View tab. In the Advanced Settings window, under Hidden files and folders, select "Show hidden files and folders".
6. Copy the contents of the C:\Program Files\Agilent\licensing folder to the Licenses... folder created on the USB storage device.
 - a. To select all of the licenses in the folder, click on any of the licenses and then press Ctrl-A on the external keyboard.
 - b. To copy the selected files, press Ctrl-C.
 - c. Navigate to the “Licenses_...” folder on the USB storage device for the instrument being upgraded and press Ctrl-V to paste all the licenses into the folder.

License Key Restore

1. Insert the USB storage device containing the backed-up license key.
2. Navigate to the “Licenses_...” folder on the USB storage device that is for the instrument being upgraded.
3. Click on one of the licenses in the folder and press Ctrl-A to select all license key files.
4. Press Ctrl-C to copy all the selected license key files.
5. Navigate to the C:\Program Files\Agilent\licensing folder.
6. Press Ctrl-V to copy all the license key files to the ~\licensing folder.

7. As each license is installed, you will see a message saying “Successful License Installation” in the lower right corner of the instrument display.
8. If you see a “Feature Already Licensed” message for each of the licenses being restored in the lower right corner of the instrument display, this most likely indicates that the licenses had already been automatically copied from the Midplane board assembly and the License Key Restore process was not required.

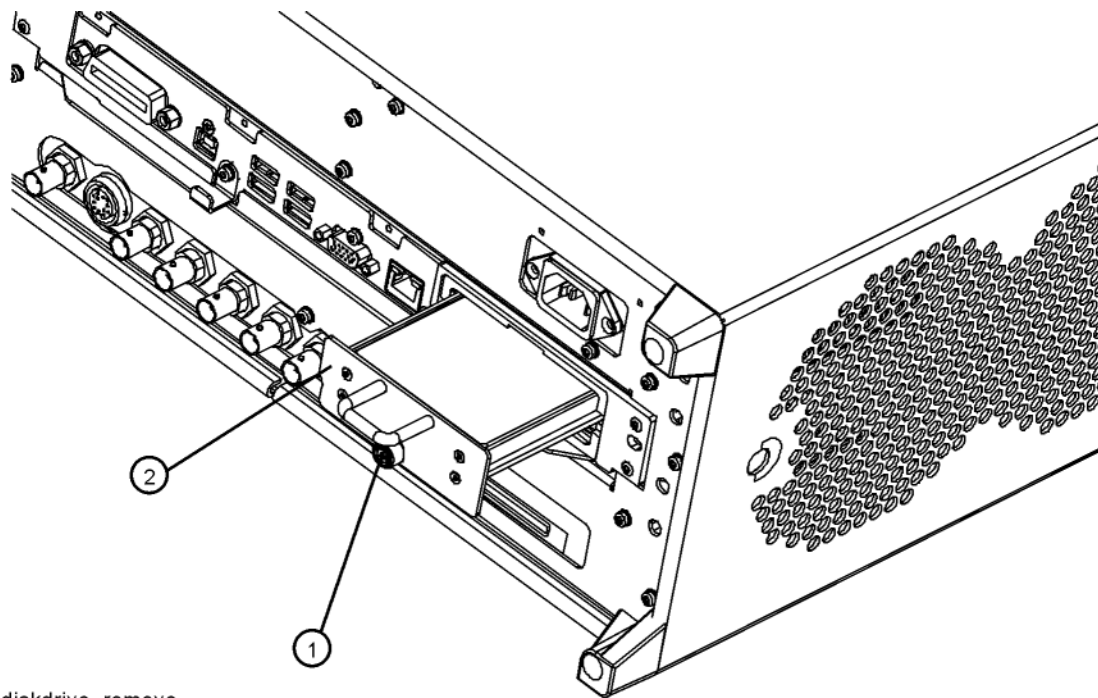
Disk Drive Removal and Installation

CAUTION

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to the documentation that pertains to your instrument for information about static-safe workstations and ordering static-safe accessories.

1. Turn the instrument off and remove the AC power cord.
2. Refer to **Figure 8**. Locate and remove the existing disk drive carrier assembly (2) from the instrument by loosening the rear panel screw (1).

Figure 8 Replacing the Disk Drive Carrier Assembly



diskdrive_remove

3. Replace the disk drive carrier assembly (2) into the instrument and tighten the screw (1) to 9 inch-pounds.

Software Updates

The currently installed instrument software version can be easily determined by pressing the following front panel keys:

System, Show, System

The software revision can be found on this screen as the:

Instrument S/W Revision

Updating the Instrument Software:

If an instrument software update is required, the latest revision of the X-Series signal analyzer software may be downloaded from:

http://www.keysight.com/find/xseries_software

FPGA Code Compatibility

One of the main reasons that the instrument application software must be the same version on all disk drives used in a particular instrument, in addition to factory calibration data compatibility issues, is that there is FPGA program code on multiple assemblies inside the instrument that must be compatible with the version of instrument software being used. The only way to ensure compatibility for all disk drives is to use the same instrument application software on all drives.

FPGA Code Update

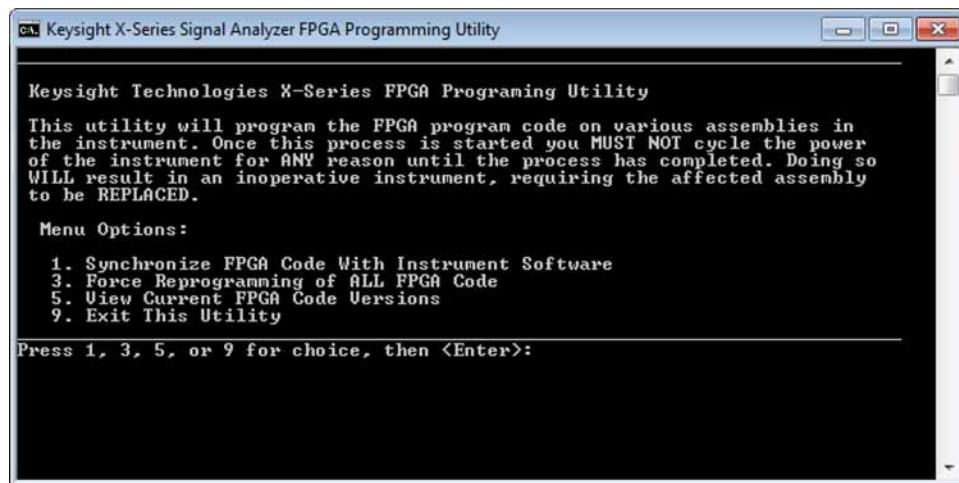
There is FPGA program code on many different assemblies inside of the instrument, and all of these must be a compatible version with the instrument software revision. In order to ensure that this requirement is met you need to either install the latest software version on all disk drives used with the instrument or run an FPGA update program. If this program detects that there are assemblies that need to be updated it will update them to the correct version.

CAUTION Once you start the FPGA programming process you **MUST NOT** interrupt the process for any reason. This would include turning the instrument off or unplugging the power cord to the instrument. Doing so will result in an inoperative instrument, requiring the affected assembly to be replaced.

Updating the Instrument FPGA Code

1. Connect a USB mouse and keyboard to available instrument USB ports.
2. Using the mouse, select Start, My Computer. Navigate to the following folder:
C:\Program Files\Agilent\SignalAnalysis\Physics
3. In this folder find and execute the file named:
FPGA_Prog.bat
4. The FPGA Programming Utility will start and a window as shown in **Figure 9** will appear.

Figure 9 FPGA Programming Utility



5. To program the FPGA code enter 1 and press Enter. You will need to confirm this selection by selecting 1 and Enter one more time.
6. The programming of the FPGA code could take a few minutes to complete. Once it has finished the instrument will reboot itself to use the new code.

Instrument Security Information

Information on the X-Series Signal Analyzer instrument security features and the instrument volatility can be found at:

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

Secure Usage Scenarios

The following information is meant to serve as a guideline when using the removable disk drive feature in an X-Series Signal Analyzer along with an additional disk drive option. How you choose to ultimately use this is up to you and your security requirements.

Removing an Instrument from a Secure Environment

If an instrument that is being used inside of a controlled secure environment needs to be removed for servicing, calibration, or any other non-secure use outside of the controlled secure environment perform the following procedure:

1. Remove the disk drive assembly from the instrument. See the Disk Drive Removal and Installation section of this document for removal instructions.
2. Verify that the disk drive is marked with the model and serial number of the instrument that it has been removed from and place it inside of a static safe bag and place in a safe place.
3. All potential user data has been removed from the instrument and it can now be removed from the secure environment.
4. Once the instrument has been removed from the secure environment install the additional disk drive with the model and serial number of the instrument recorded on it.
5. The instrument is now ready for either use outside of the secure environment or for servicing.

Returning an Instrument to a Secure Environment

When the instrument is returned from servicing, calibration, or any other non-secure use, perform the following procedure before returning it to a controlled secure environment:

1. Backup the instrument factory calibration data onto a USB storage device. See the Calibration Data Backup and Restore section of this guide for instructions.
2. Remove the disk drive assembly from the instrument. See the Disk Drive Removal and Installation section of this document for removal instructions.
3. Verify that the disk drive is marked with the model and serial number of the instrument that it has been removed from and place it inside of a static safe bag and place in a safe place.
4. Return the instrument to the controlled secure environment along with the USB storage device that the instrument specific factory calibration data was backed up to.

5. Install the original disk drive with the model and serial number of the instrument recorded on it and turn the instrument on.
6. Restore the instrument factory calibration data that was previously backed up onto the USB storage device. See the Calibration Data Backup and Restore section of this guide for instructions.
7. The instrument is now ready for use inside of the secure environment and the USB storage device can be properly disposed of if necessary.

Removing an Inoperative Instrument from a Secure Environment

Should the instrument fail for any reason while inside a controlled secure environment perform the following steps to safely remove the instrument:

1. Remove the disk drive assembly from the instrument. See the Disk Drive Removal and Installation section of this document for removal instructions.
2. Verify that the disk drive is marked with the model and serial number of the instrument that it has been removed from and place it inside of a static safe bag and place in a safe place.
3. All potential user data has been removed from the instrument and it can now be removed from the secure environment.
4. Once the instrument has been removed from the secure environment install the additional disk drive with the model and serial number of the instrument recorded on it.
5. If the instrument failure persists with the additional disk drive the instrument should be sent in for repair to an Keysight Authorized service facility, and the rest of this procedure can be skipped.
6. If the instrument will now function properly with the additional disk drive installed, the cause of the failure was most likely the original disk drive. The instrument can now be returned to the secure environment and the original disk drive will need to be disposed of according to the secure environment requirements. However, it is recommended that another additional disk drive be purchased to replace the defective drive before the instrument is returned to the secure environment. This will allow for the procedure of putting the new additional disk drive into service to be completed prior to returning the instrument to the secure environment.

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:

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

Solid State Disk Drive