

Keysight X-Series Signal Analyzers Instrument Security Option, Additional CPU/HD

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Installation Note

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Secure CPU/HD Assembly Replacement Kit

Products Affected:	EXA N9010A MXA N9020A
Serial Numbers:	All
To Be Performed By:	(X) Agilent Service Center (X) Personnel Qualified by Agilent (X) Customer
Estimated Installation Time:	0.5 Hours
Estimated Adjustment and Verification Time:	6 Hours
Additional Tasks:	0.5 Hours

Tools Required

- Torx Driver T-10

Contacting Agilent Sales and Service Offices

Assistance with test and measurements needs and information on finding a local Agilent office is available on the Internet at:

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

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

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

Purpose of this document

This document describes instrument security features and the steps to declassify an instrument through memory removal. For additional information, please go to:

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

NOTE Be sure that all information stored by the user (such as traces, status, etc.) in the instrument that needs to be saved is properly backed up before attempting to clear any of the instrument memory. Agilent Technologies cannot be held responsible for any lost files or data resulting from the clearing of memory. Be sure to read this document entirely before proceeding with any file deletion or memory clearing.

Terms and Definitions

- Clearing* Clearing is the process of eradicating the data on media before reusing the media so that the data can no longer be retrieved using the standard interfaces on the instrument. Clearing is typically used when the instrument is to remain in an environment with an acceptable level of protection.
- Sanitization* Sanitization is the process of removing or eradicating stored data so that the data cannot be recovered using any known technology. Instrument sanitization is typically required when an instrument is moved from a controlled area to a non-controlled area such as when it is returned to the factory for calibration (the instrument is declassified). Agilent memory sanitization procedures are designed for customers who need to meet the requirements specified by the U.S. Defense Security Service (DSS). These requirements are outlined in the “Clearing and Sanitization Matrix” issued by the Cognizant Security Agency (CSA) and referenced in National Industrial Security Program Operating Manual (NISPOM) DoD 5220.22M ISL 01L-1 section 8-301.
- Security erase* Security erase is a term that is used to refer to either the clearing or sanitization features of Agilent instruments.
- Instrument declassification* A term that refers to procedures that must be undertaken before an instrument can be removed from a controlled area such as is the case when the instrument is returned for calibration. Declassification procedures will include memory sanitization and or memory removal. Agilent declassification procedures are designed to meet the requirements specified by the DSS NISPOM security document (DoD 5220.22M chapter 8).

Overview

The X-Series Option CPU can be ordered in two ways:

Option ordered with instrument purchase, N9010A-CPU or N9020A-CPU

Receive an additional CPU/Hard Drive assembly with matched data to the instrument that can be installed inside the instrument when the instrument is removed from a controlled area.

Upgrade Option ordered (without matching instrument data), N9010AK-CPU or N9020AK-CPU

Receive a separate CPU/Hard Drive assembly that can be updated to be a matched duplicate of the currently installed CPU and hard drive assembly in the instrument.

A detailed explanation of the various memory locations in the CPU and hard drive assembly can be found in [“Memory usage” on page 17](#). Specifically, all user data and secure information will be stored on the hard drive that resides in the CPU assembly.

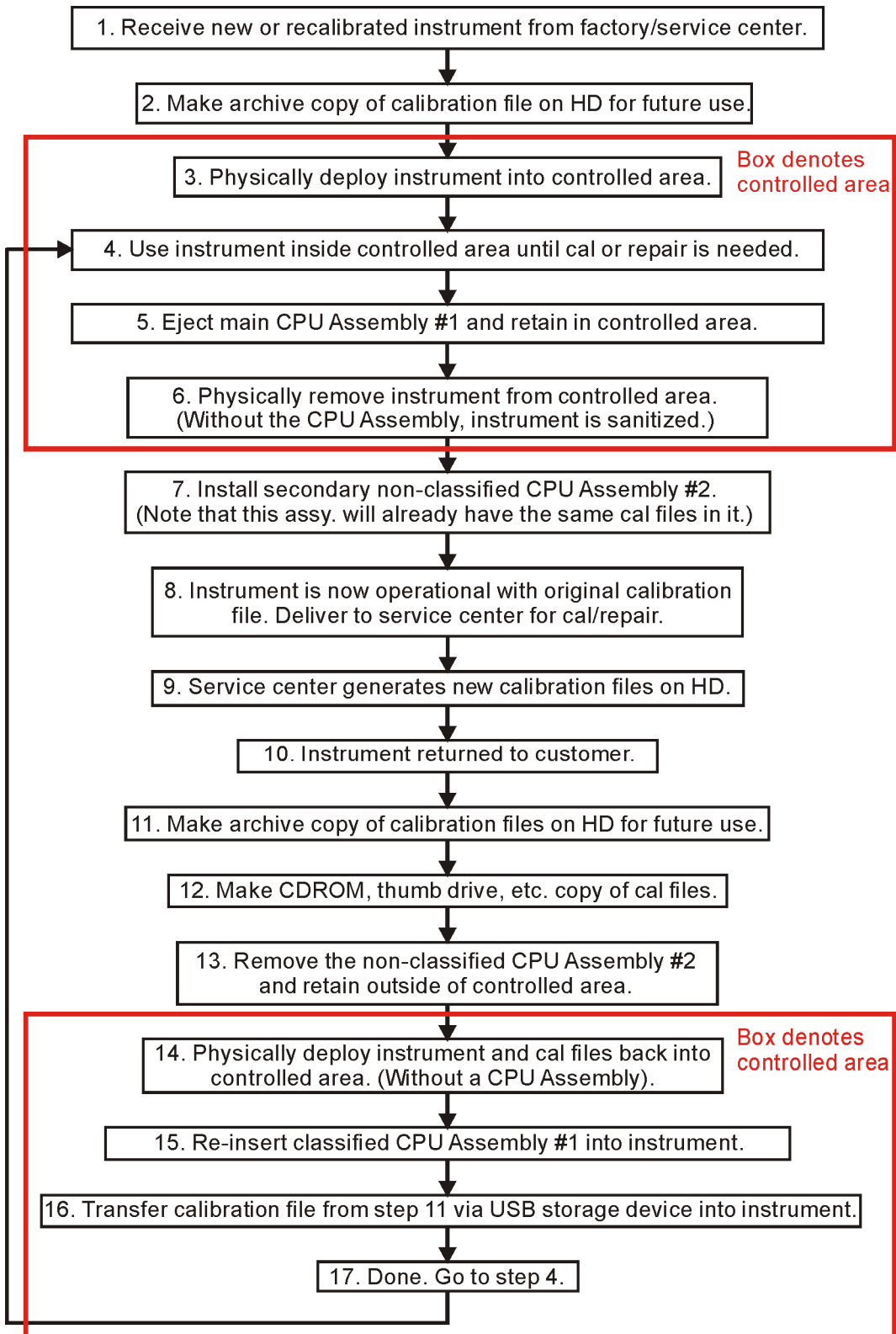
The instrument serial number, model number, and installed license keys for a specific instrument are stored on the Midplane pc board assembly. This assembly is separate from the CPU assembly. This data is not affected by replacing the CPU/Hard Drive assembly. What is affected is the unique calibration file that is specific to each serial number instrument. This data is stored on the E: drive of the HD.

WARNING

Should an incorrect version of the X-Series calibration file(s) be installed in an instrument, no error messages will be displayed. The instrument will however perform outside the warranted specifications for that instrument. It is therefore extremely important to ensure that the additional CPU assembly has the serial number of the instrument associated with that CPU clearly marked on the assembly. This task has been completed at the factory if the CPU Option has been ordered at the time of purchase of the instrument. Also, the unique calibration data has been copied and placed on the additional CPU assembly. If the CPU Option has been ordered as an upgrade, the customer needs to copy the calibration files and mark the associated serial number onto the additional CPU/Hard Drive assembly).

Figure 1

Instrument Sanitization Process (using a secondary CPU assembly)



Maintaining the CPU Option

The CPU Option is specified to be removed and replaced in the instrument a maximum of 250 cycles. If this is exceeded it is very likely that a failure will occur between the connection of the CPU assembly and Midplane assembly. Agilent highly recommends that this cycle limit not be exceeded to prevent an unwanted failure of the instrument.

During the life of the instrument it is possible that the software of the currently installed CPU assembly could be dated and no longer match the revision of software that is installed in the additional CPU assembly. This could be an issue because of two reasons:

1. The FPGA code on hardware assemblies could be updated during the software update process.
2. The calibration file structures may have changed.

It is therefore important to ensure that the original CPU/HD remain synchronized with the additional CPU/HD. To do this, determine the revision of software installed in the instrument before removing the assembly from the instrument. This can be done by pressing the **SYSTEM, Show, System** keys and writing down the current firmware revision. Install the replacement assembly. If the versions are significantly different the instrument software application may not run causing a “Hardware Error” message. Close the software application and update the instrument software to the revision that is currently installed in the secure (original) CPU assembly and this should correct the issue. Updating the instrument software is described in the [“X-Series Instrument Software Update Instructions” on page 11](#).

Ordering the CPU Option with the Instrument

The Option CPU, when ordered at the time of purchase of the instrument, will ship with the following information installed on the additional HD.

1. The current shipping instrument software that is installed in the instrument.
2. A copy of the calibration file that exists in the instrument’s CPU assembly.

This CPU assembly can reside out of the instrument in a non-secure area. When the secure CPU assembly needs to be removed from the controlled area, the CPU assembly of the secure instrument needs to be removed from the instrument and should remain in the controlled area. After the instrument is removed from the controlled area, then the additional CPU can be installed back in the instrument. If the instrument software application has not been upgraded in the instrument while it was located in the controlled area, the instrument will now be a mirror image of the instrument that was shipped from the factory. If this is not the case, see [“X-Series Instrument Software Update Instructions” on page 11](#) of this installation note.

Please see [“CPU Assembly Replacement Procedure” on page 14](#) for details on removing and replacing the CPU assembly.

Ordering the CPU Option as an Upgrade

The CPU Option, when ordered as an upgrade, will be shipped with the current shipping version of instrument software installed on the HD. The calibration files will contain *default* calibration data.

If the instrument is currently in a controlled area, continue with the steps outlined next. If the instrument has not been placed in a controlled area yet, continue with the section titled [“Before placing the Instrument in a Controlled Area”](#) below.

If the Instrument is Currently in a Controlled Area

1. While the instrument is located inside a controlled area, remove the CPU assembly. Retain this in the controlled area.
2. Remove the instrument from the controlled area. Install the second CPU assembly. Refer to [“Powering On the Instrument”](#) on page 15. The instrument now requires a new complete calibration.
3. When the instrument is returned from calibration, follow the procedure in [“Returning the Instrument to a Controlled Area”](#) on page 10.

Before placing the Instrument in a Controlled Area

1. Update the instrument software version to the current version. Please see the [“X-Series Instrument Software Update Instructions”](#) on page 11 of this installation note.
2. Copy the instrument calibration file to a blank USB storage device (supplied). This is explained in [“Calibration File Backup”](#) on page 13.
3. Replace the instrument’s CPU assembly with the additional CPU Option that was ordered. Refer to [“Powering On the Instrument”](#) on page 15.
4. Update the instrument software version to the current version. Please see the [“X-Series Instrument Software Update Instructions”](#) on page 11 of this installation note.
5. Restore the calibration file to the E:\ drive.
6. Remove this CPU from the instrument. This is the additional CPU assembly that is now the mirror image including calibration file of the original CPU assembly.
7. Mark the instrument serial number and model number on the blank label of the additional CPU and retain this CPU outside the controlled area.
8. Mark the instrument serial number and model number on the CPU assembly that will be placed inside the instrument. This will prevent confusion if multiple CPU assemblies are used in a single controlled area. This is now the secure CPU.
9. Install the secure CPU in the instrument.
10. The instrument is now able to enter the controlled area.

Removing the Instrument from a Controlled Area

1. Remove the CPU by following the instructions in the [“CPU Assembly Replacement Procedure”](#) on page 14.
2. Verify that the instrument serial number and model number is noted on the assembly and matches the instrument serial number on the rear panel of the instrument.
3. The instrument is now secure and can be removed from the controlled area without the CPU assembly.

Returning the Instrument to a Controlled Area

When the instrument is returned from either repair or calibration or non-secure work area, it is necessary to copy the new calibration data from the non-secure CPU. This data can be copied onto a USB storage device. Once this is complete, the CPU can be removed and the instrument can be taken into the controlled area with a memory device. At this time, the calibration data can be copied onto the E:\ drive of the secure CPU and the instrument will meet all published specifications.

Before returning the instrument to the controlled area, perform the following steps:

1. Copy the calibration data to a USB storage device. This is explained in [“Calibration File Backup”](#) on page 13.
2. Remove the CPU Assembly.
3. Return the instrument and USB storage device to the controlled area.
4. Install the secure CPU while inside the controlled area.
5. Copy the calibration data onto the E:\ drive of the secure CPU.
6. Dispose of the USB storage device if required.

What to do in event the CPU assembly fails inside a controlled area

Should the CPU assembly fail while the instrument is located inside a controlled area, perform the following steps:

1. Remove the CPU assembly. Retain this in the controlled area.
2. Remove the instrument from the controlled area. Install the second CPU assembly.
3. Copy the calibration file to a USB storage device. Keep this device outside of the controlled area.
4. Return the instrument to the controlled area.
5. Order a replacement CPU Option.
6. When the instrument is declassified and out of the controlled area, install the new CPU assembly and copy the calibration file onto the HD.

X-Series Instrument Software Update Instructions

The purpose of this procedure is to outline the instrument software update procedure from the current revision to a later revision. This will also potentially update installed measurement applications such as Phase Noise. This update does not upgrade the 89601A VSA measurement application.

To determine what revision of instrument software is currently installed in an EXA or MXA Signal Analyzer press **System, Show, System** and look for the “Firmware Revision.”

NOTE	This will only update the instrument software that currently resides on the C: drive of the instrument. It will not update the recovery partition. Because of this, if the recovery process is performed on an instrument it will revert back to the instrument software revision of software that was originally installed in the instrument when it was shipped from the factory.
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Requirements

In order to use this update procedure the following requirements must be met:

- Instrument must already be working properly with revision A.01.03 software or later
- Must have a USB keyboard and mouse to perform tasks required to install the update
- Must have the ability to login to the instrument as the administrator
- Must have the ability to transfer a large (> 100 MB) file to the instrument being updated

File Downloads

To download the required files:

Download the latest revision of the instrument software by going to:

www.agilent.com/find/exa_software (N9010A)

www.agilent.com/find/mxa_software (N9020A)

Download the file

If you do not have the ability to download these files directly to the D: drive of the Signal Analyzer being updated, store these files on a USB storage device for transfer to the instrument. (The total file size is approximately 100 MBytes)

Update Procedure

While the default user of the instrument does have permissions to install some software, it does not have the required permissions to uninstall or install the instrument software. Because of this the entire process outlined below must be run as the instrument Administrator.

Software Install

If it isn't already running, turn the instrument on
Connect a USB keyboard and mouse to the instrument. Log out of the default user (Instrument) by selecting **Start, Log Off, Log Off**.

At the login prompt enter:

User name: Administrator

Password: agilent4u

If the administrator password has been changed you will need to obtain this new password from the system administrator.

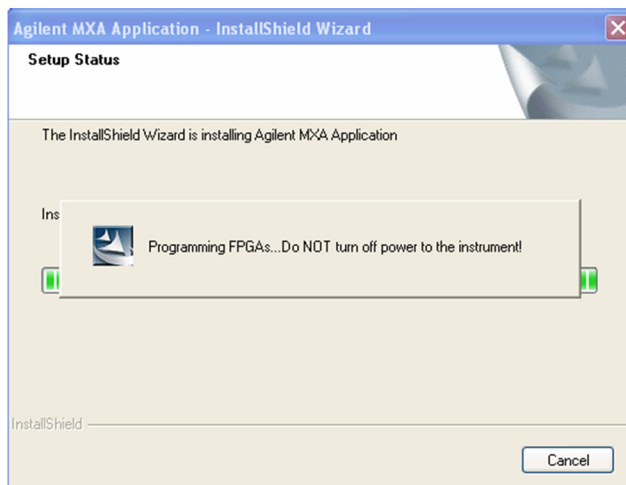
If you have not already done so, transfer the downloaded installation file to the instrument being updated.

Install the updated revision of the instrument software by executing the file that you downloaded and transferred to the instrument.

Follow the on-screen prompts to begin the installation.

WARNING **If you see the message shown in [Figure 2](#) be sure to do as it says and DO NOT turn off the instrument power at this time for ANY reason. If this process is interrupted the instrument will most likely need to be sent back to the an Agilent Service Center for servicing before it will be usable again.**

Figure 2 **(Using MXA as an example)**



If you see the pop-up message shown in [Figure 3](#) select “Unblock” to continue.

Figure 3



When the installation has finished select “Yes, I want to restart my computer now” and then “Finish”.

The instrument should restart and will be running the newly installed version of the instrument software.

Calibration File Backup

Backing up the calibration file before changing the CPU assembly is highly recommended. To do this you will need to connect a USB mouse and follow the steps below:

- a. Right click on the Start Menu
- b. Left Click “Explore”
- c. Navigate to the E:\ drive (Calibration E:)
- d. Click on the E:\ drive
- e. Double click on the “AlignDataStorage” folder
- f. Save the “CurrentDataSet.xml” file onto a USB storage device.

Once the new CPU assembly is installed, copy the “Current DataSet.xml” file from the USB storage device to the “AlignDataStorage” folder on the E:\ drive

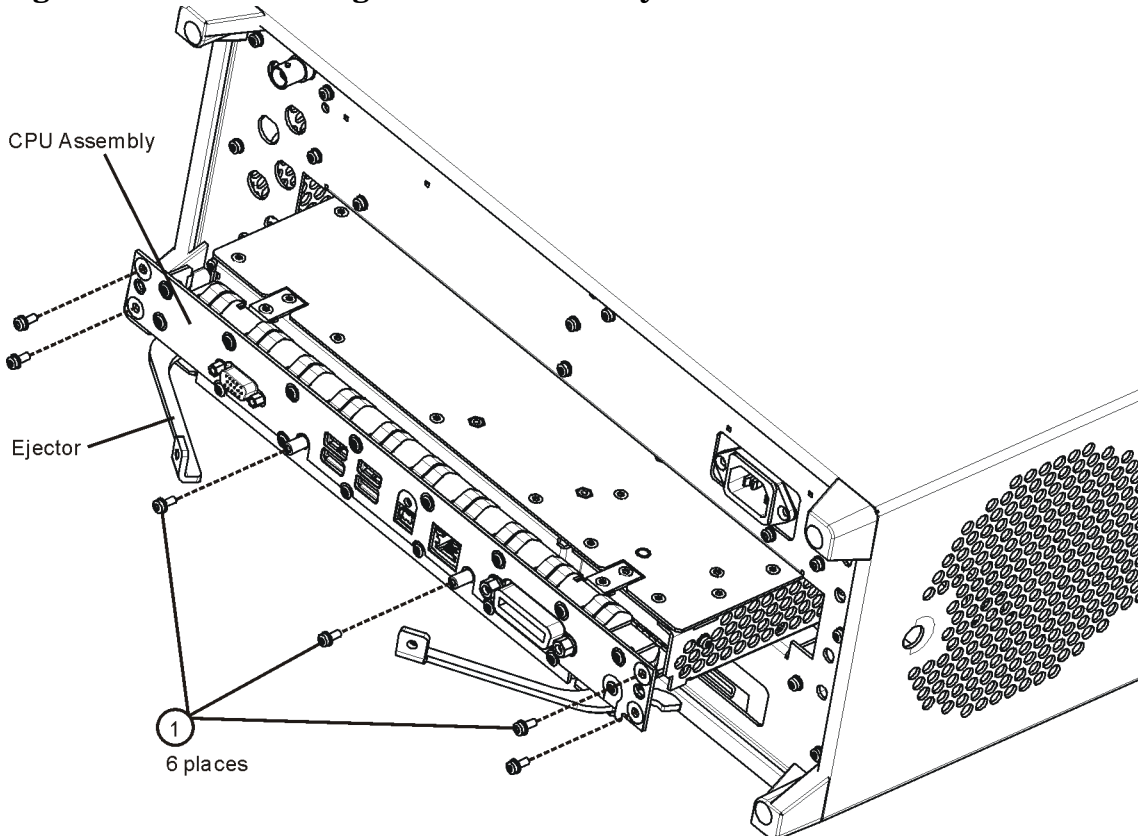
CPU Assembly Replacement Procedure

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.

Removal

1. Refer to [Figure 4](#). Locate and remove the existing CPU assembly from the instrument by removing the 6 rear panel screws (1) (part number 0515-0372, M3 X 0.5, 8 mm long). The CPU assembly can be removed from the chassis by pulling straight out the back. Use the two ejectors to pull the CPU assembly out from the chassis.

Figure 4 Removing the CPU Assembly



Replacement

1. Slide the CPU assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the midplane assembly. Secure the board with the ejectors.
2. Refer to [Figure 4](#). Replace the six screws (1) that attach the CPU assembly to the chassis. Torque to 9 inch-pounds.

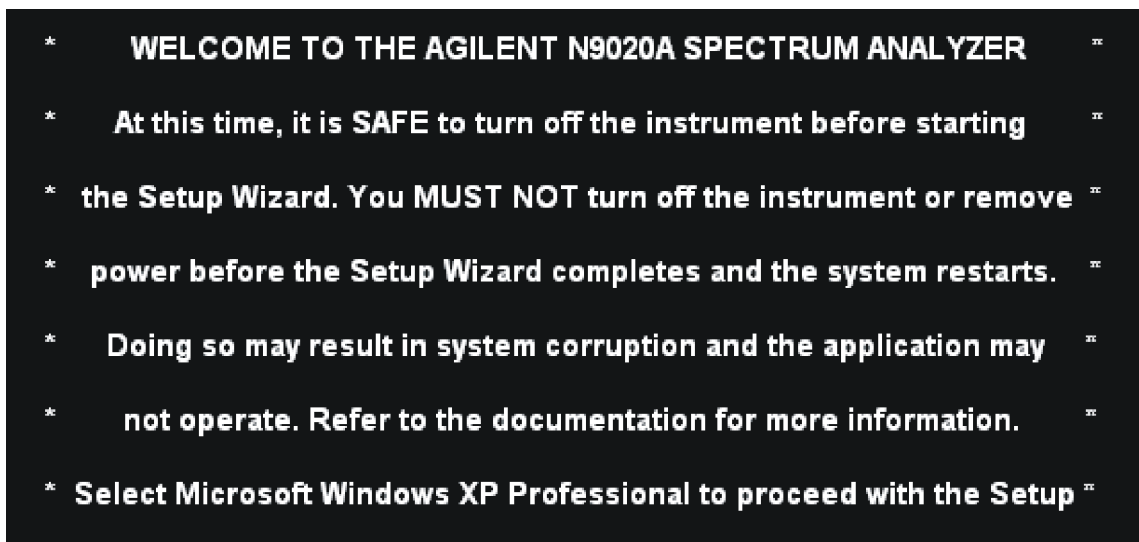
Powering On the Instrument

1. Position the instrument so that you have easy access to the power cord and plug it in.
2. Press the power switch (located in the lower left-hand corner of the analyzer's front panel) to turn the analyzer on.

Accepting the End-User License Agreement (EULA) Screen

NOTE	A warning about accepting the Microsoft End-User License agreement will be displayed since the analyzer Hard Disk Drive has been replaced. The Microsoft End-User License agreement must be accepted the first time you see it so that adjustments and verification tests can be performed. At the end of this procedure the instrument recovery will reset the instrument to the factory Out-of-the-Box state.
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Figure 5 Agilent Welcome Screen (using MXA as an example)



The License Agreement screen asks you to accept the terms of the End-User License Agreement for Windows XP. You must accept this agreement to continue the Windows XP installation and configuration. If you do not accept this agreement, the instrument shuts down and the next time you turn it on the Windows XP Setup Wizard starts from the beginning again.

If you have connected a USB mouse, position the cursor appropriately and use the left mouse button to navigate the License Agreement screen.

If you do not have a mouse available to navigate the screen, then use the instrument front panel keys as follows:

1. Use the **Up** and **Down** arrow keys to select “Microsoft Windows XP Professional”. Press **Enter**. It may take up to 10 minutes for Windows to initialize.
2. Press **Enter** to move to the License Agreement screen.

3. Press the **Tab** key to select the License Agreement text box.
4. Press the **Tab** key again. This accesses “I don't accept this agreement.” You need to press the **Up** arrow to select “I accept this agreement.”
5. Press **Tab**, **Tab** then **Enter** to finish this screen and move to the Date and Time Settings screen.

Setting System Date and Time

The Date and Time Settings screen is used to set the appropriate date, time and time zone. These settings will be configured later by the end user.

1. Press **Enter** to finish this screen and continue the Windows XP Setup Wizard.
2. Wait for the Windows XP Setup Wizard to complete. The instrument will restart itself twice.

Utilities, Adjustments, and Performance Verification Tests

Adjustments and performance verification testing requires the use of the calibration software. The latest software information and downloads are available at:

<http://www.agilent.com/find/calibrationsoftware>

NOTE

X-Series Signal Analyzer Calibration Files are located on the Hard Disk Drive. Therefore, replacement of the Hard Disk Drive will invalidate the current instrument calibration. **A full calibration is required to assure that the instrument meets all specifications.** However, if the Calibration file was backed up and restored to the E:\drive then no calibration is required.

Arrangements regarding the level of calibration must be made between the end user and the calibration provider.

Adjustments Required

All (if the Calibration file on the E:\ drive could *not* be backed up.)

None (if the Calibration file *was* backed up and restored to the E:\ drive.)

Memory usage

Products Covered by this Document

Model: N9010A
N9020A

Product Name: EXA Signal Analyzer
MXA Signal Analyzer

This document shows a summary of the instrument's memory. For additional information, please go to:
<http://www.agilent.com/find/security>

Instrument Non-Volatile Memory

This section contains information on the types of non-volatile memory available in your instrument. It explains the size of memory, how it is used, its location, and the sanitization procedure.

Table 1 Summary of Instrument Non-Volatile Memory

Memory Type and Size	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose/Contents	Data Input Method	Location in Instrument and Remarks	Sanitization Procedure
Main Memory (Hard Disc Drive) 40 Gbyte	Yes	Yes	Contains Operating System, Instrument Software, Factory Calibration Data, recovery image, user instrument states, user data files, user trace data and any user installed software.	Programmed before installed, or by factory/service center calibration software, or by software upgrade installation. Also via instrument software operations and by user.	A4 Processor Assy. Contains user data.	NONE
CPU BIOS (CMOS NVRAM) 256 byte (battery backed).	No	Yes	Contains default BIOS settings to use when booting the A4 Processor Assembly.	Programmed by factory and settings can be toggled by user.	A4 Processor Assy. Battery backed to maintain calendar time. Contains no user data.	NONE
License Storage Memory (EEPROM) 512 kbit	No	Yes	Contains instrument serial number and license keys for instrument applications. Also contains date of last service center calibration.	Programmed before installed, or by factory/service center calibration software, or by software upgrade installation.	A7 Midplane Assy. Contains no user data.	NONE

Table 1 **Summary of Instrument Non-Volatile Memory**

Config & Cal Memory (EEPROM) 8 kbit (1024 x 8)	No	Yes	Header EEPROM used to identify the assembly and store factory calibration data.	Programmed before installed, or by factory/service center calibration software.	A14 LO Synthesizer Assy. Contains no user data.	NONE
Config Memory (EEPROM) 8 Mbit	No	Yes	Contains measurement and control instrument software which is preloaded into Field Programmable Gate Arrays (FPGA) during instrument power-up.	Programmed before installed, or by factory/service center calibration software.	A14 LO Synthesizer Assy. Contains no user data.	NONE
Config & Cal Memory (EEPROM) 8 kbit (1024 x 8)	No	Yes	Header EEPROM used to identify the assembly and store factory calibration data.	Programmed before installed, or by factory/service center calibration software.	A13 Front End Control Assy. Contains no user data.	NONE
Config Memory (Flash) 2 Mbit	No	Yes	Contains measurement and control instrument software which is preloaded into FPGA during instrument power-up. Primarily YTF, attenuator, and front end switch control.	Programmed before installed, or by factory/service center calibration software.	A13 Front End Control Assy. Contains no user data.	NONE
Config & Cal Memory (EEPROM) 8 kbit (1024 x 8)	No	Yes	Header EEPROM used to identify the assembly and store factory calibration data.	Programmed before installed, or by factory/service center calibration software.	A2 Analog IF Assy. Contains no user data.	NONE
Control Logic Memory (CPLD) 1600 gates	No	Yes	Contains information to optimize filter performance.	Programmed before installed, or by factory/service center calibration software.	A2 Analog IF Assy. Contains no user data.	NONE
Config & Cal Memory (EEPROM) 8 kbit (1024 x 8)	No	Yes	Header EEPROM used to identify the assembly and store factory calibration data.	Programmed before installed, or by factory/service center calibration software.	A3 Digital IF Assy. Contains no user data.	NONE

Table 1 Summary of Instrument Non-Volatile Memory

Config Memory (Flash) 8 Mbit	No	Yes	Contains measurement and control instrument software which is preloaded into FPGA during instrument power-up.	Programmed before installed, or by factory/service center calibration software.	A3 Digital IF Assy. Contains no user data.	NONE
Control Logic Memory (CPLD) 6400 gates	No	Yes	Contains measurement information to optimize digital filtering.	Programmed before installed, or by factory/service center calibration software.	A3 Digital IF Assy. Contains no user data.	NONE
Serial Presence Detect Memory (EEPROM) 2 Mbit	No	Yes	Used on commercial SDRAM Module. Contains module identification information.	Programmed by IC vendor only.	A3 Digital IF Assy. Contains no user data.	NONE
Config & Cal Memory (EEPROM) 8 kbit (1024 x 8)	No	Yes	Header EEPROM used to identify the assembly and store factory calibration data.	Programmed before installed, or by factory/service center calibration software.	A16 Reference Assy. Contains no user data.	NONE
FPGA Config Memory (EEPROM) 2 Mbit	No	Yes	Contains measurement and control instrument software which is preloaded into FPGA during instrument power-up.	Programmed before installed, or by factory/service center calibration software.	A16 Reference Assy. Contains no user data.	NONE
Digital Potentiometer (EEPROM) 112 bits (14 Bytes)	No	Yes	Contains default data to preset digital potentiometers during power-up.	Programmed before installed, or by factory/service center calibration software.	A16 Reference Assy. Contains no user data.	NONE

Table 1 Summary of Instrument Non-Volatile Memory

Front Panel EEPROM 64K bits	No	Yes	Contains program code for running front-panel microcontroller. Operates front-panel LED's and transmits key presses to processor.	Programmed before installed, or by factory/service center calibration software.	A1A2 Front Panel Interface Board. Contains no user data.	NONE
Front Panel CPLD 800 gates	No	Yes	Contains fixed digital logic associated with front-panel keyboard button operation and LED's.	Programmed before installed at the factory only.	A1A2 Front Panel Interface Board. Contains no user data.	NONE
EDID Memory (EEPROM) 2 kbits	No	Yes	Extended Display Identification Data is a standard data format that contains basic information about a monitor and its capabilities, including vendor information, maximum image size, color characteristics, factory pre-set timings, frequency range limits, and character strings for the monitor name and serial number.	Programmed before installed.	A1A2 Front Panel Interface Board. Contains no user data.	NONE

Instrument Volatile Memory

The X-Series Signal Analyzer also contains volatile memories. The volatile memories are not battery-backed. They do not retain any information when AC power is removed. Removing power from these memories meets the memory sanitization requirement in the “Clearing and Sanitization Matrix” referenced in DoD 5220.22M 1SL 01L-1 section 8-301 as current on 06/27/2005.

Table 2 Summary of Instrument Volatile Memory

Memory Type and Size	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose/Contents	Data Input Method	Location in Instrument and Remarks	Sanitization Procedure
Processor SDRAM Memory, 1GByte	Yes	No	Main dynamic RAM memory for Wintel processor. Contains working copies of Operating System, Instrument FW/personalities, calibration data, and measurement data.	Programmed before installed or by factory/service center calibration procedure sw or by firmware upgrade installation sw. Also programmed via firmware operations and by the user.	Processor Assy. Contains user data. This memory is not battery-backed or connected to standby power.	Turn off instrument power.
SDRAM 256 MByte	Yes	No	Contains measurement data from data acquisition system.	Programmed by firmware. Not accessible by user.	Digital IF Assy. Contains raw measurement data. This memory is not battery-backed or connected to standby power.	Turn off instrument power.

