Keysight Technologies
N9000A CXA Signal Analyzer

Option MTP, MultiTouch User Interface Upgrade Kit
with PC7 CPU

KEYSIGHT TECHNOLOGIES

Installation Note

Notices

Option MTP, MultiTouch User Interface Upgrade Kits

Products Affected:	N9000A CXA Signal Analyzer
Serial Numbers:	All
To Be Performed By:	(X) Keysight Service Center
	( ) Personnel Qualified by Keysight
	( ) Customer
Estimated Installation Time: Estimated Adjustment Time: Estimated Verification Time:	2.5 Hours 3.0 Hours 4.0 Hours

Introduction

This installation note explains how to install the hardware and licenses to add the MultiTouch user interface to N9000A CXA signal analyzers.

This installation note supports N9000AK-MTP – MultiTouch User Interface Upgrade with PC7 CPU

Part of the upgrade process is the license transformation process, which creates new licenses to replace those of the existing measurement applications. This is because older measurement application licenses whose model numbers end in the letters "A" or "B" (for example, N9071A or N9082B) will not work with the new MultiTouch user interface. The license transformation process will replace "A" and "B" licenses with their equivalent "C" license. For example, N9071A-2FP will be replaced with N9071C-2FP and N9082B-1FP will be replaced with N9082C-1FP.

IMPORTANT   Once this upgrade is performed, the analyzer will only recognize measurement applications whose model number ends in a "C". For example, the N9068C, Phase Noise measurement application or the N9071C GSM/EDGE measurement application.

If the current version of instrument software does not support one of the transformed licenses, the description as displayed in the Show System screen will include the phrase "Dormant License UI Conversion". For example, "N9064A Dormant License UI Conversion, VXA app".

NOTE   The hardware included in the kit may come in several boxes inside the shipping container

Option MTP, MultiTouch User Interface Upgrade Kits

N9000AK–MTP, MultiTouch User Interface with PC7 CPU Upgrade Kit Parts List

Quantity	Description	Keysight Part Number
1	Front Frame Assembly, MultiTouch, Light Color	N9020-60261
1	Trim Strip, Top, Benchtop, Light Color	N9020-40017
1	Trim Strip, Top, Opt PRC, Light Color	N9020-40019
2	Trim, Side, 177.0 H	5041-9172
2	Plug, Dome, 0.312 in. diameter, black	6960-0076
1	Knob, RPG, Large	W1312-40017
1	CPU Module 2.2 GHz Dual Core Celeron, 8 GB RAM	W1312-60211
1	Tray Assembly, solid state drive	Blank
9	Screws, M3 x 0.5 (8 mm long) flat head	0515-2032
1	Nameplate, 3 GHz, MultiTouch, N9000A	N9000-80047
1	Nameplate, 7.5 GHz, MultiTouch, N9000A	N9000-80048
1	Nameplate, 13.6 GHz, MultiTouch, N9000A	N9000-80049
1	Nameplate, 26.5 GHz, MultiTouch, N9000A	N9000-80050
1	Overlay, 75 ohm input, quartz gray	N9000-80052
1	Overlay, Keypad, quartz gray	N9000-80051
1	Overlay, Keypad, TG, quartz gray	N9000-80053
1	Overlay, Blank	N9000-80140
1	Entitlement Certificate	-----
1	Installation Note	This note

Tools Required

— T-10 TORX Driver

— *T-20 TORX Driver*

— 5/16-inch torque wrench

— Deep 5/16-inch socket wrench

— ¼-inch open-end wrench

— Scissors or knife

— Diagonal cutters

— Microsoft Windows based personal computer with internet access and USB port

— USB storage device with > 2 GB free memory

Initial Instrument Functionality Check

Power on the instrument and allow the instrument to boot up. Run an alignment and display the measurement screen. (The instrument will probably display a spectrum analyzer screen and you will see the instrument sweeping.)

There should be no alignment failures. If there are failures, investigate and fix the problem before continuing.

WARNING	Before you disassemble the instrument, turn the power switch to Standby. After the instrument has completely shut down, unplug the instrument. Failure to unplug the instrument can result in personal injury.

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.

Installation Procedure

Analyzer Information

1. Connect a power cord to the analyzer and turn on the analyzer.

2. After the analyzer has completed turning on, press **System**, **Show**, **System**. Make note of the following information from the Show System screen:

   Product Number: _____
   Serial Number: _____
   Instrument S/W Revision: _____

3. Check for the presence of one of the following options listed below in the Show System screen. Put a check mark or "X" after the option listed below that appears in the Show System screen.

   N9000A-PC1_____
   N9000A-PC2_____
   N9000A-PC3_____
   N9000A-PC4_____
   N9000A-PC5_____
   N9000A-PC6_____
   N9000A-PC7_____

4. Refer to the data in step 2 above. If the Product Number is not N9000A, **do not proceed** with the installation of this kit. This kit is to be installed only on N9000A signal analyzers.

5. Refer to the data in step 3 above. If the upgrade product N9000A-MTP is being installed and the currently installed CPU is N9000A-PC6 or N9000A-PC7, **do not proceed** with the installation of this kit. This kit is to be installed only on N9000A signal analyzers with N9000A-PC1, N9000A-PC2, N9000A-PC3, N9000A-PC4, or N9000A-PC5 CPUs.

License Key Backup

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.

1. Connect a mouse and external keyboard to the analyzer using the rear panel USB ports.

2. Locate a USB storage device. Perform a virus scan on this device before use.

3. 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_N9000A_MY50060101"

4. Insert the USB storage device into one of the analyzer's USB ports.

5. Using the mouse, navigate to the folder C:\Program Files\Agilent\licensing.

6. 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".

7. 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.
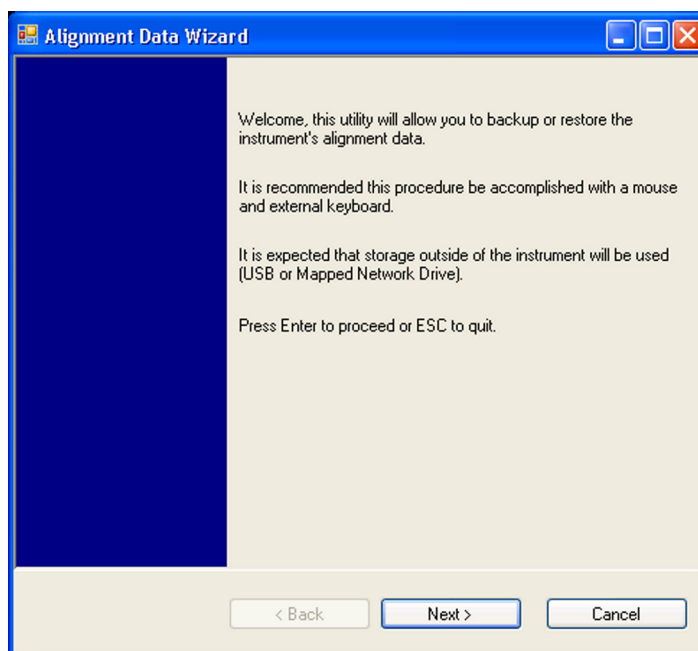
Backup Calibration Data

There are three different backup procedures that might need to be followed. Which backup procedure to be run will depend on the software version that currently exists in the instrument being upgraded.

To determine which calibration data backup procedure needs to be run compare the current instrument software version that was recorded in the Analyzer Information section step 2 of this document and follow the steps outlined below for that version.

1. With the instrument turned on and the signal analyzer application running as normal, connect a USB mouse to one of the 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...**. Click on **OK**. The signal analyzer application will close and the Alignment Data Wizard will start. This might take a few minutes.

4. The Alignment Data Wizard window as shown in Figure 1 will appear.

   Figure 1   Alignment Data Wizard

5. Follow the on-screen instruction to **Backup** the calibration data to the USB memory device.

Replacing CPU Assembly

The steps in this section apply only to N9000A-MTP upgrades, where the CPU is replaced.

1. Turn off the instrument and remove the AC power cord.

2. Refer to Figure 2. Remove the existing CPU assembly from the instrument by removing the 6 rear panel screws **(1)**. The CPU assembly can be removed from the chassis by using the two ejectors to pull it straight out the back.

Figure 2   CPU Assembly Removal
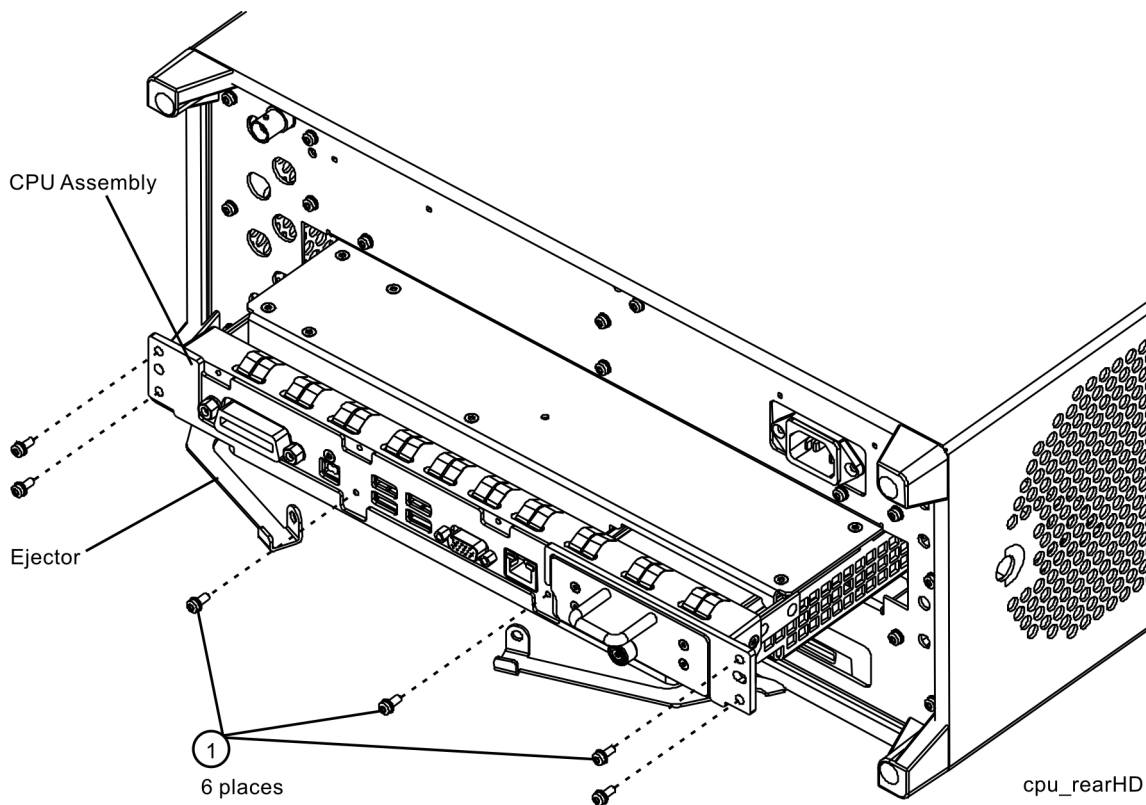
3. With the ejectors pulled out, slide the new CPU assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors. Gently secure the CPU assembly to the instrument with the ejectors.

4. Replace the six screws **(1)** that attach the CPU assembly to the chassis. Torque to 9 inch-pounds.

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 power cord and turn on the analyzer.

2. 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.

3. The Keysight Technologies screen appears followed by a screen that automatically loads the operating system.

4. The License Agreement dialog box as shown in Figure 3 appears, providing information regarding the instrument software licensing.

Figure 3　　　　　License Agreement Dialog Box
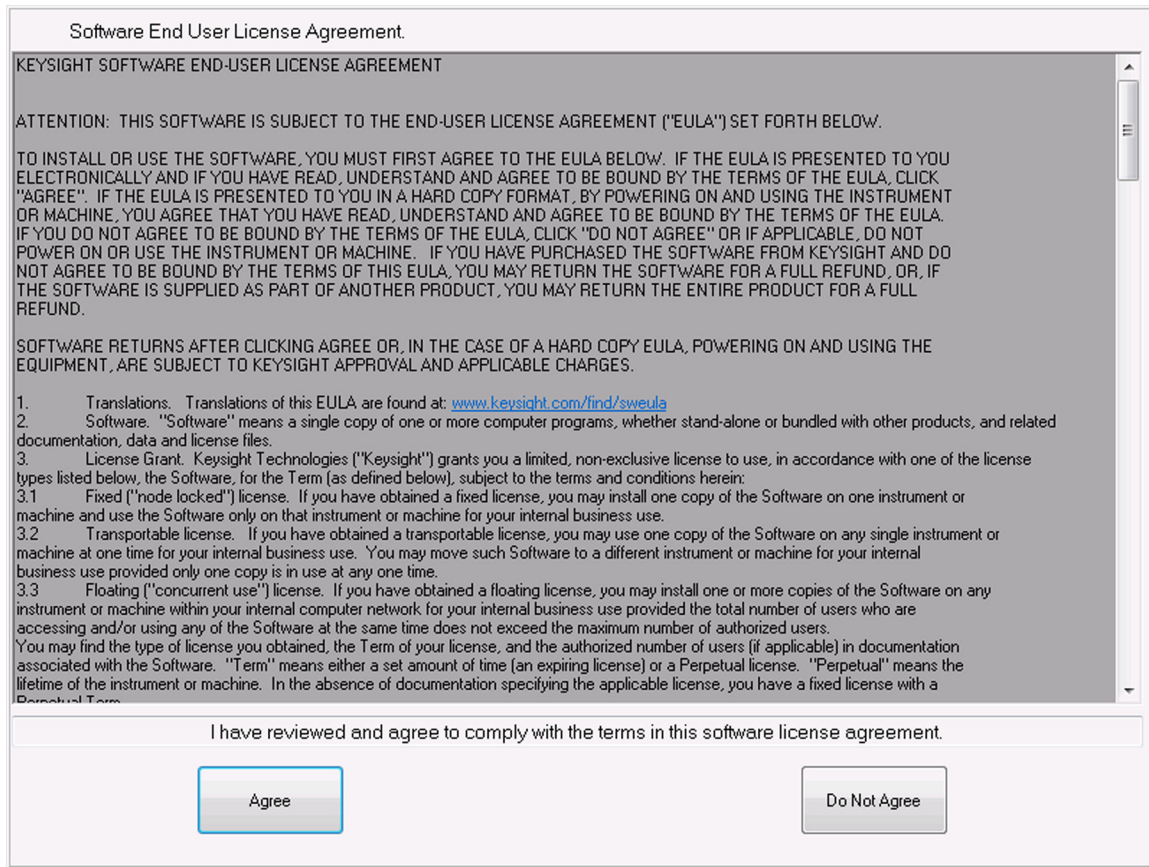
Select **Agree** to continue, or **Do Not Agree** to turn off the instrument before initializing the software.

<table>
<tr><td>**CAUTION**</td><td>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.</td></tr>
</table>

5. After the instrument restarts, a status window as shown in Figure 4 appears, providing information regarding the instrument software licensing.

Figure 4　　　　　Application Launch Status Window

Option MTP, MultiTouch User Interface Upgrade Kits
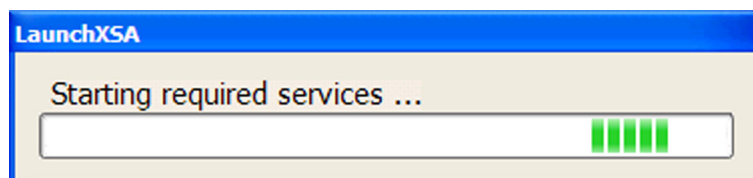
6. The anti-virus notification as shown in Figure 5 will then appear.

Figure 5   Anti-Virus Message
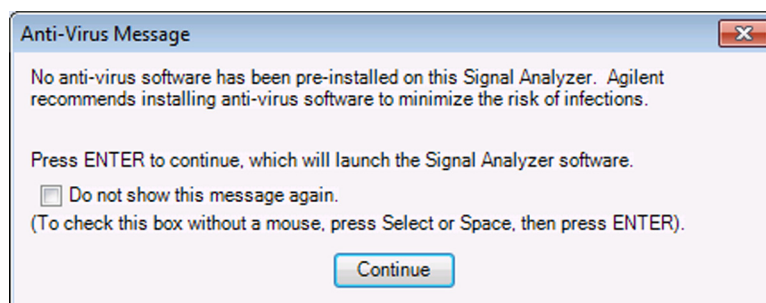
> **NOTE**
>
> If you do not check the "Do not show this message again" check box, this message will be displayed each time the instrument is turned on. No application will start while this message is displayed. Before continuing, make sure that you carefully read the Anti-Virus message and determine what action is appropriate.

7. Select Continue.

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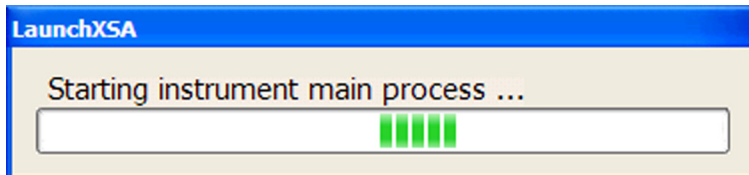
9. Once the instrument application software completes loading the instrument initialization will be completed. Continue with the next section for putting the new disk drive or CPU into service.

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.

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:

1. Compare the currently-installed software version with the original software version noted in step 2 of the Analyzer Information procedure earlier in this note.

2. If the original software version noted in step 2 of the Analyzer Information procedure is newer than the currently-installed software version, 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 Update

If the instrument software was updated in the previous section, it is not necessary to also do the FPGA Code Update; this update is performed as part of the instrument software update.

If the instrument software was not updated, continue with the procedure below.

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 FGPA 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 7 will appear.

Figure 7   FPGA Programming Utility
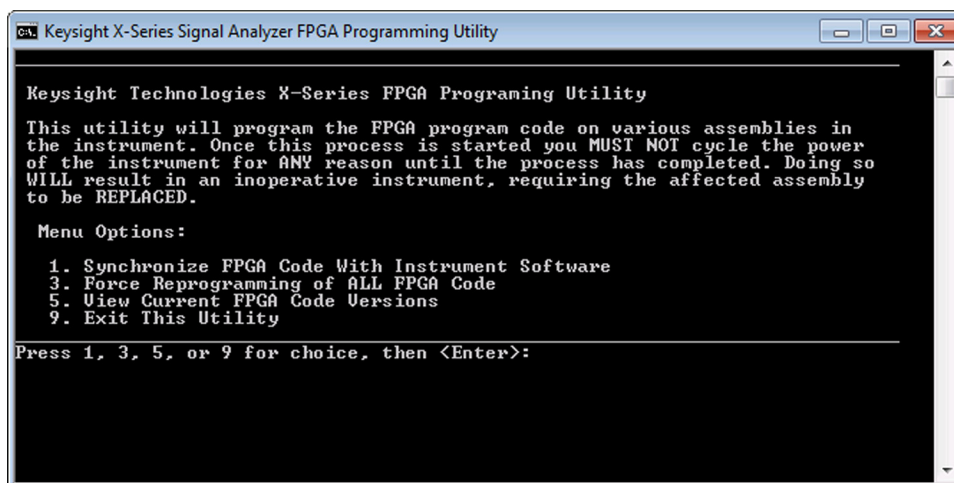
5. To program the FPGA code enter **1** and press **Enter**. You will need to confirm this selection by selecting **1** and **Enter** one more time.

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.

Data Restore

1. With the instrument turned on and the signal analyzer application running as normal, connect a USB mouse to one of the instrument USB ports.

2. Connect the USB memory device that was earlier used to backup the instrument calibration data to one of the instrument USB ports.

3. Press **System**, **Alignments**, **Backup or Restore Align Data**.

4. The Alignment Data Wizard window as shown in Figure 1 will appear.

5. Follow the on-screen instruction to **Restore** the calibration data from the USB memory device.

   No matter how the instrument calibration data was backed up prior to this upgrade, any further backing up of the data will now be done through the instrument's Alignment Data Wizard.

Calibration Data Backup to SD Card

The PC7 processor assembly contains an internal SD card for the purpose of providing a location to back up the calibration data. After the PC7 assembly is installed and the calibration data from the previously installed processor assembly has been restored, another backup should be performed, this time to the SD card.

1. Remove any USB memory devices from the instrument.

2. With the instrument turned on and the signal analyzer application running as normal, press **System**, **Alignments**, **Backup or Restore Align Data**.

3. The Alignment Data Wizard window as shown in Figure 8 will appear.

Figure 8   Alignment Data Wizard
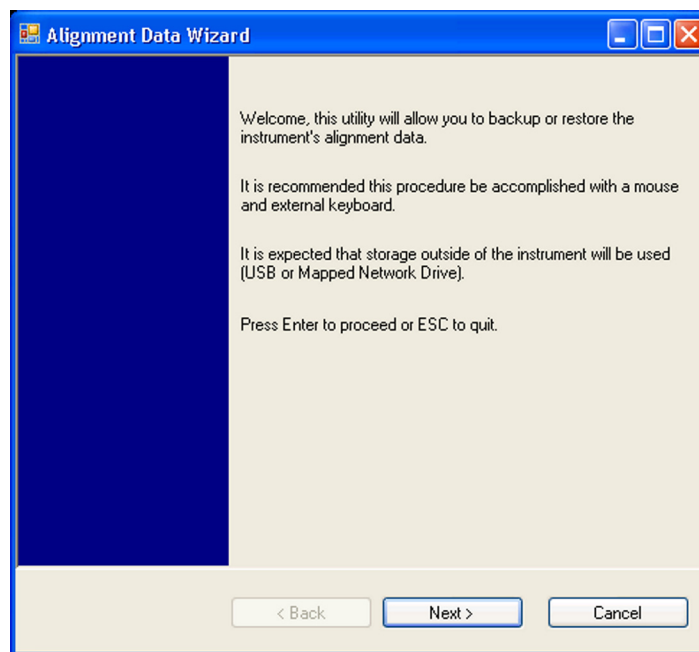
4. Follow the on-screen instructions to backup the calibration data to the internal SD card, which will appear as the F: drive. The file will be saved with a .bak file suffix.

5. After the backup has been completed, the signal analyzer application will be restarted.

Redeeming Entitlement Certificate and Deleting Migrated Licenses

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 two e-mails.

   a. The first will list all of the measurement application (along with some, but perhaps not all other licensed options) to which the analyzer is entitled and will indicate for each item listed whether or not there is an associated migration product. If a migration product exists, a license for the associated measurement application will be included in the next e-mail. For example, if the analyzer is entitled to a N9068A-2FP license, the migration product will be N9068CL-2FP.

   b. The second e-mail will be the traditional license redemption e-mail, which will list the migration products and will include a license file that contains all of the appropriate licenses for the analyzer.

4. Before installing the new licenses, you should delete all of the currently-installed licenses for which migration products exist. This will help to make room for the new licenses (the analyzer has a 100-license limit). To delete the currently installed licenses for which migration products exist, proceed as follows:

   a. With a keyboard and mouse connected to the USB ports of the analyzer, close the XSA application.

   b. Click on Start, All Programs, Keysight License Manager, Keysight License Manager. This will launch the Keysight License Manager which will list all currently-installed licenses.

   c. Refer to the first e-mail you received. Look for entries indicating a migration product exists, such as:

   "Order 3571234, product N9082BL-1FP, has migration product N9082C-1FP. The license will be in a following email."

   d. Using the mouse and the Ctrl key on the keyboard, select all entries in the Keysight License Manager (KLM) that contain the model number of the ordered product (in the example above, this would be N9082B. We can ignore the "L" which might follow the "A" or "B").

   NOTE: You will not be able to delete the licenses for N9060A-2FP or N9060B-2FP. This is OK; these two licenses can exist in addition to the N9060C-2FP license that will be installed.

   e. Right-click and select Delete. Verify that the items selected are correct and, if they are, press Yes.

   f. Repeat steps c through e for all other products listed in the first e-mail that contain migration products.

5. Locate a USB storage device. Perform a virus scan on this device before use.

6. Save the License File that was attached to the second e-mail to the root directory of the USB Storage Device.

7. Connect the USB Storage Device to one of the analyzer's USB ports. Windows will detect the new hardware and may display the configuration menu shown in Figure 9. This menu may be configured according to your preferences.

Figure 9   USB Storage Device Configuration Menu

8. 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 similar to the one shown in Figure 10. Since the license file contains multiple licenses, multiple "Successful License Installation" messages will appear. Wait until all licenses have been consumed before removing the USB Storage Device.

Figure 10   Successful License Installation
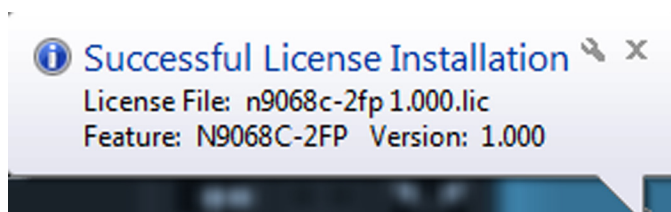
Verify the License Installation

1. In Keysight License Manager, click on View and select Refresh (localhost). This will refresh the list of licenses installed.

2. Verify that licenses for the products listed in the second e-mail appear in the Product/Feature column.

Analyzer Disassembly

CAUTION	If the instrument is placed on its face during any of the following procedures, be sure to use a soft surface or soft cloth to avoid damage to the front panel, keys, or input connector.

|	
NOTE	If the analyzer has Option PRC, Portable Configuration, refer to the "Portable Instrument (Option PRC)" section on page 23 to remove the outer case.

NOTE	Make sure any adapters on the front panel are removed.

Standard Instrument (Benchtop Configuration)

1. Disconnect the instrument from ac power.

2. Refer to Figure 11. Using the T‑20 driver, remove the four screws (two on each side) **(1)** that attach the handle strap **(2)** on each side of the instrument.

3. Using the T‑20 driver, remove the four screws (including washers) **(3)** that hold the rear feet **(4)** in place.

4. Pull the instrument cover **(5)** off towards the rear of the instrument.

Figure 11   Standard Instrument Outer Case Removal

outer_case
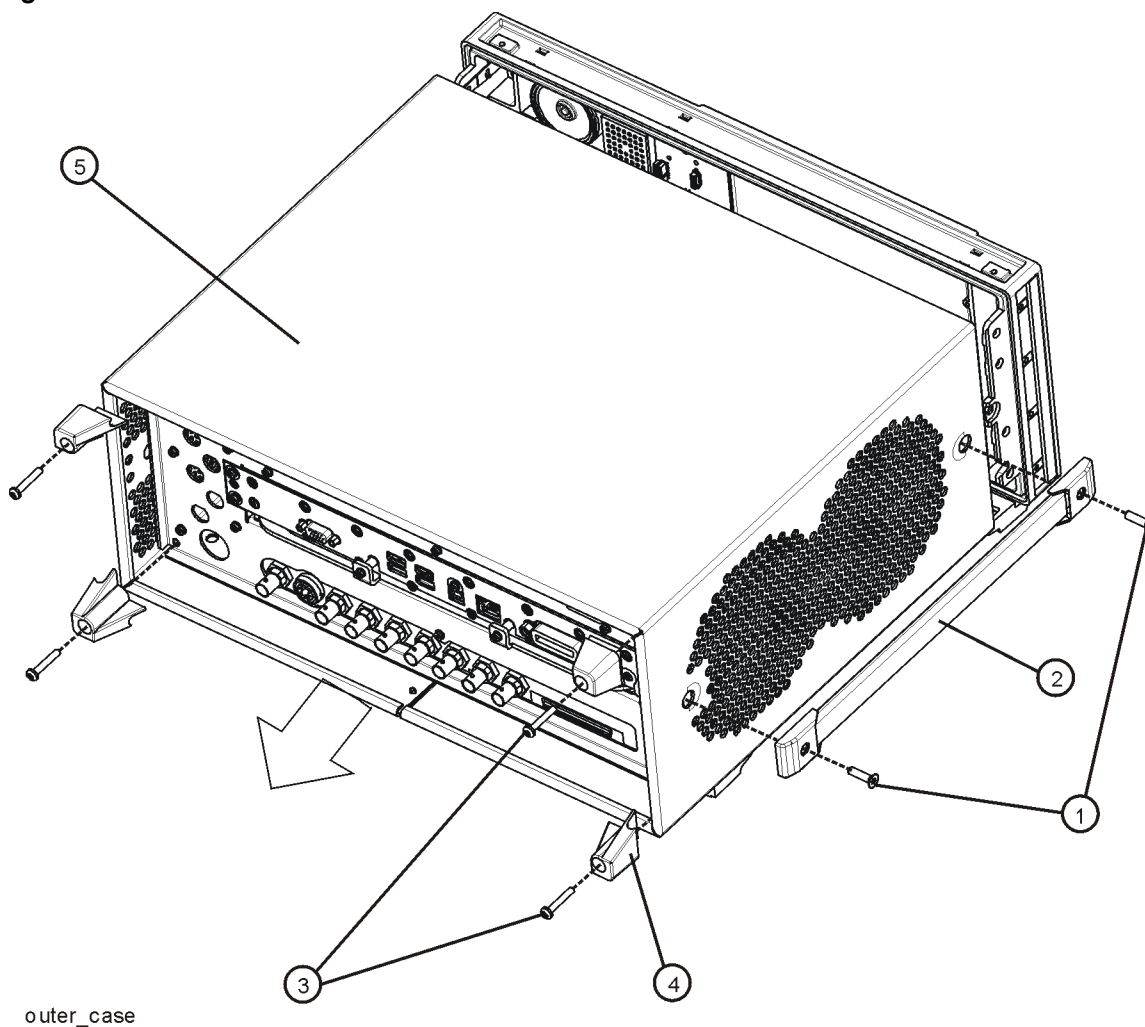
5. Proceed to the Front Frame Assembly Removal section to remove the front frame.
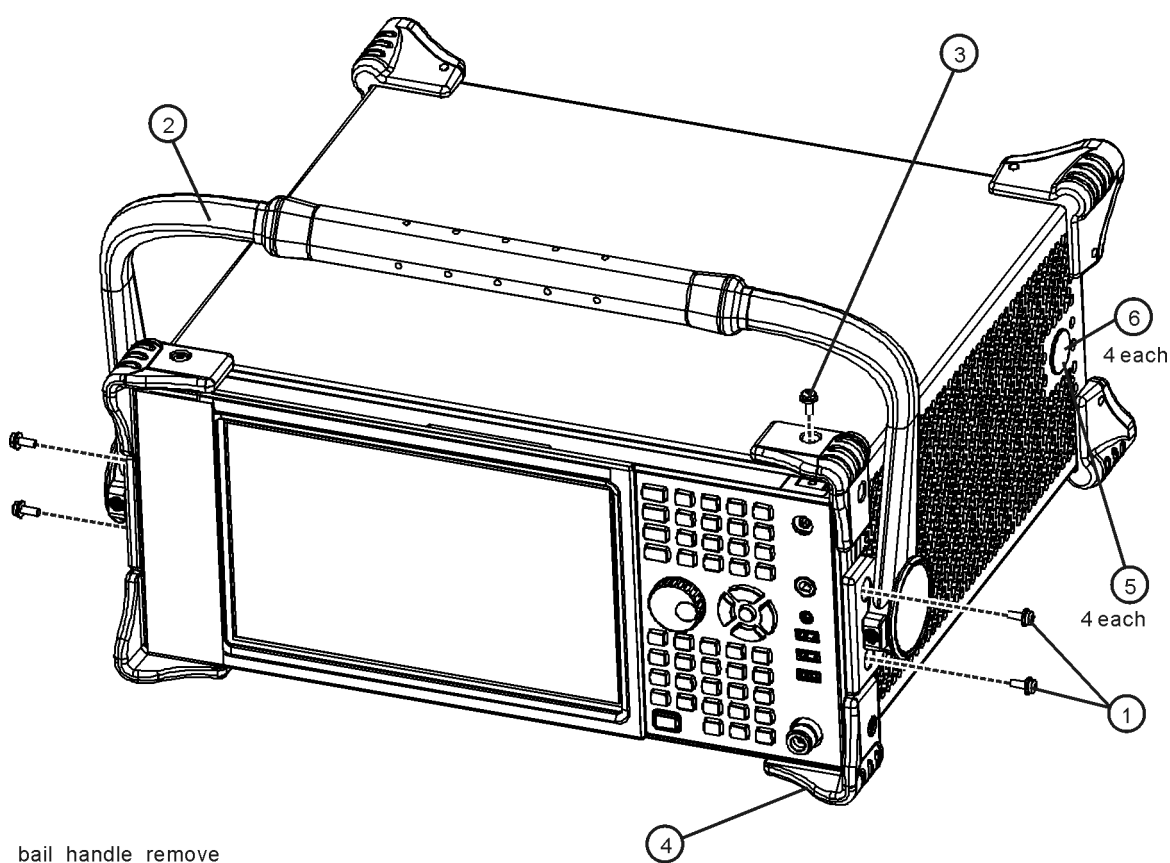
Portable Instrument (Option PRC)

NOTE Make sure any adapters on the front panel are removed.

1. Disconnect the instrument from ac power.

2. Refer to Figure 12. Using the T-20 driver, remove the four screws (two on each side) **(1)** that hold the bail handle **(2)** to the front frame.

    Figure 12   Bail Handle Removal

bail_handle_remove

3. Using the T-20 driver, remove the screws **(3)** which secure the four front bumpers **(4)** to the front frame assembly. These screws and bumpers will be re-installed on the new front frame assembly.

4. Using the T-20 driver, remove the four screws (two on each side) **(6)** that hold the strap handle plugs **(5)** in place.

5. Refer to Figure 13. Using the T-20 driver, remove the four screws including washers **(1)** that hold the rear bumpers **(2)** in place.

6. Pull the instrument cover **(3)** off towards the rear of the instrument.

Figure 13   Option PRC Instrument Outer Case Removal
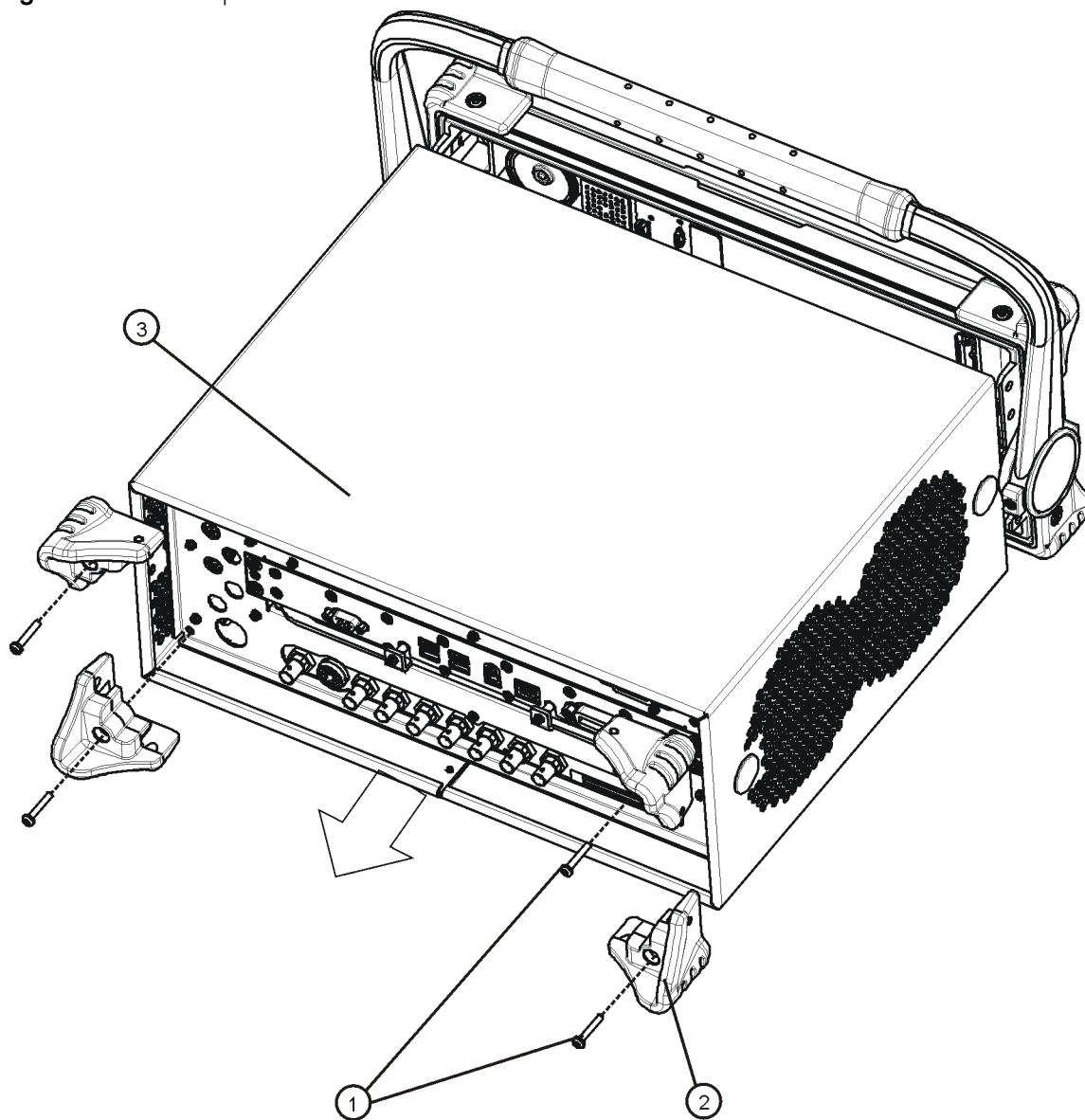
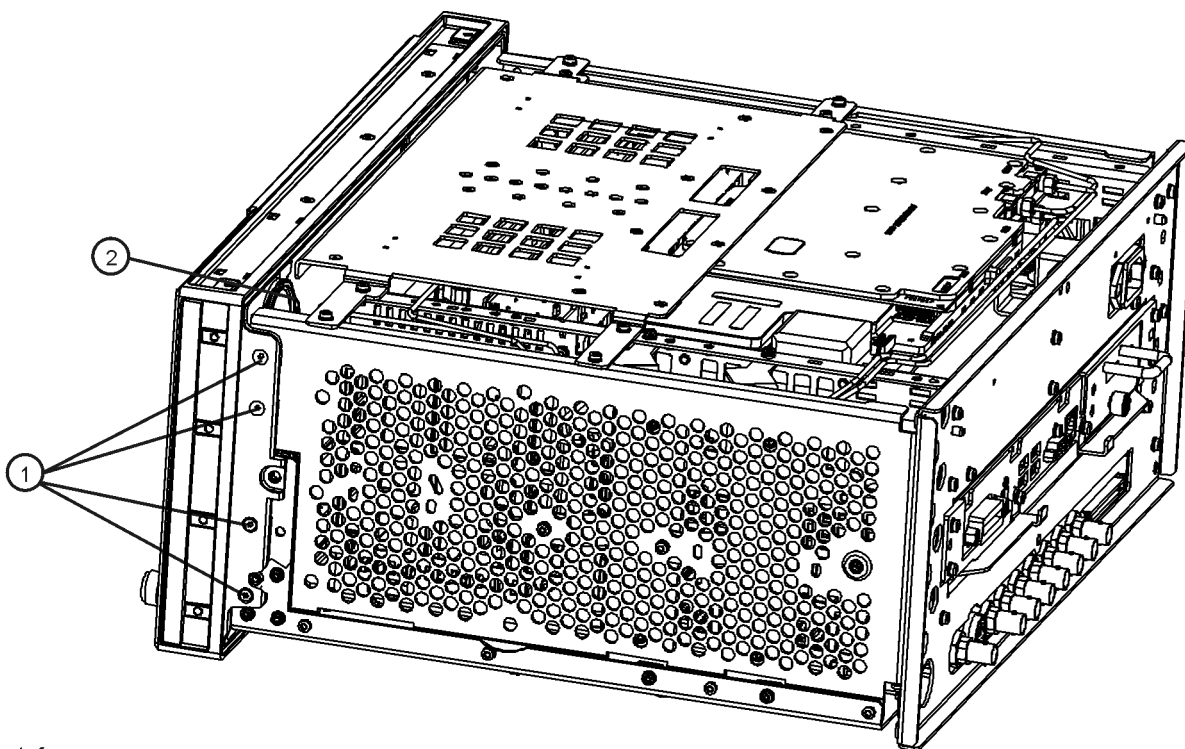rear_bumper_remove

Front Frame Assembly Removal

1. Refer to Figure 14. Using the T-10 driver, remove the eight screws **(1)**, four on each side, to detach the front frame from the chassis.
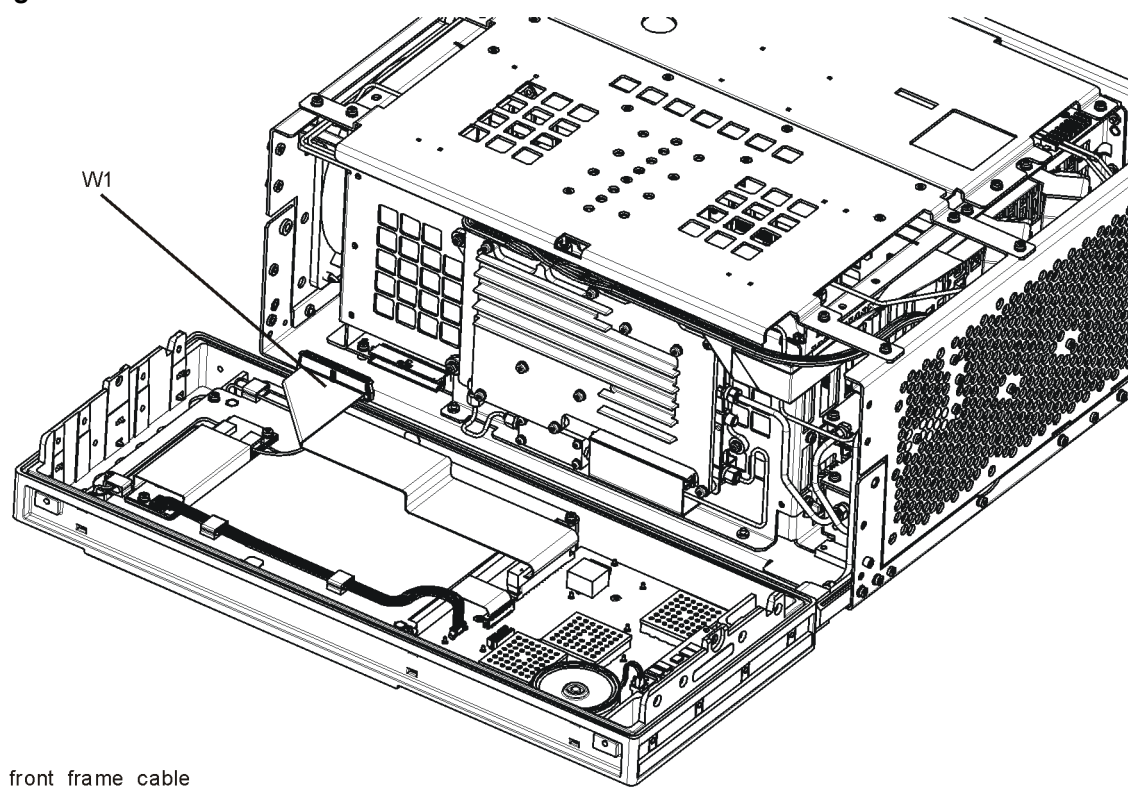
Figure 14   Front Frame Removal

front_frame_new

2. Refer to Figure 15. Pull the front frame carefully away from the chassis. Remove the ribbon cable W1 from the A8 Motherboard.

NOTE	W1 may have locking springs on each side. Depress the spring on each side of the connector to remove from the motherboard.

Figure 15   Front Panel Cable

W1

front_frame_cable

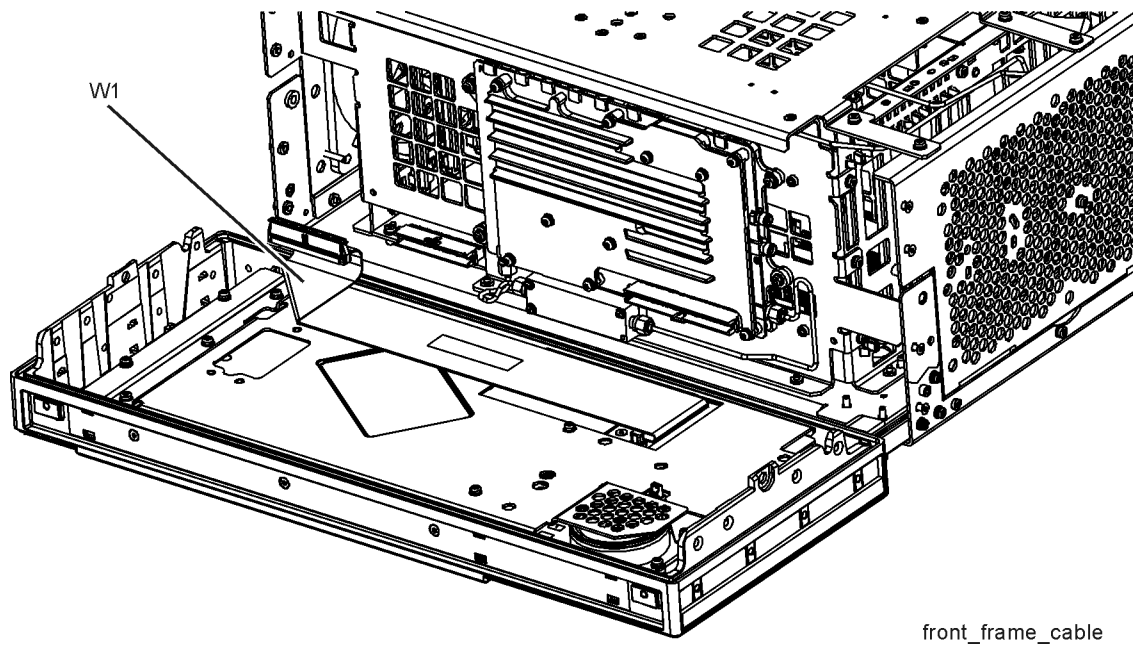**3.** Pull the Front Frame Assembly carefully away from the chassis. Remove the ribbon cable W1 from the motherboard.

Prepare New Front Frame Assembly

1. Locate the new Front Frame Assembly (N9020-60261) in the kit.

2. Ensure that the front frame around the keypad is clean.

3. Remove the backing from the Keypad Overlay and carefully apply it to the new Front Frame Assembly. Press down on the Keypad Overlay to ensure good adhesion to the Front Frame Assembly.

4. Locate the Knob (W1312-40017) in the kit. Push the knob onto the shaft of the RPG.

5. Locate the 75 ohm input Overlay and TG Connector Overlay (N9000-80052, N9000-80053) in the kit.

6. Remove the backing from the 75 ohm input Overlay and TG Connector Overlay and carefully apply it to the new Front Frame Assembly.

7. Ensure that the front frame to the left of the display is clean.

8. Remove the backing from the blank Overlay and carefully apply it to the new Front Frame Assembly.
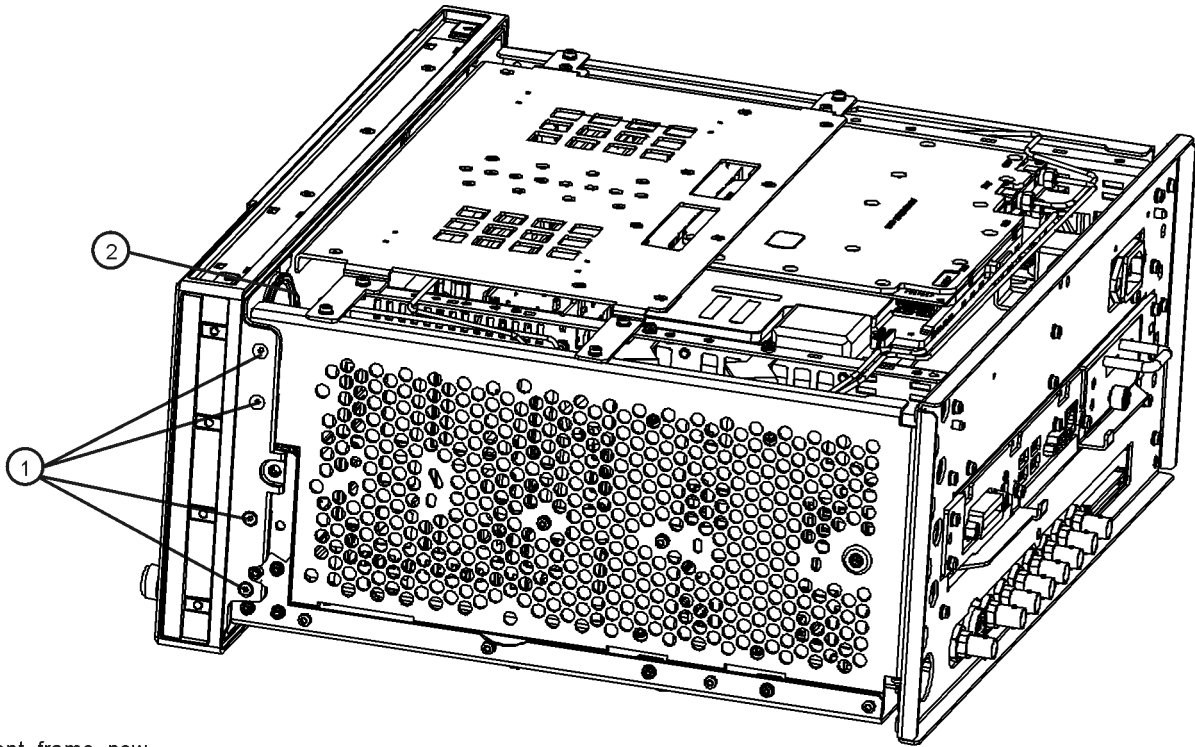
New Front Frame Installation

1. Refer to Figure 16. Reattach the ribbon cable W1. Ensure the locking tabs are engaged.

2. Carefully install the front panel assembly making sure that the ribbon cables are not pinched.

Figure 16 Front Panel Cable

front_frame_cable

3. Refer to Figure 17. Carefully position the Front Frame Assembly onto the chassis. Ensure no cables are crushed. Secure with the eight screws (0515-2032) **(1)** included in the kit, four on each side of the chassis. Torque to 9 inch pounds.

Figure 17   Front Frame Installation

front_frame_new

Final Installation

Final Installation for Standard Instruments
(Benchtop Configuration, Figure 11)

1. Refer to Figure 11. Carefully slide the instrument cover back onto the instrument from the rear of the analyzer, making sure not to damage any internal cables. The seam on the cover should be on the bottom of the instrument. Be sure the cover seats into the gasket groove in the Front Frame Assembly.

2. Replace the four rear feet **(4)** to the rear of the instrument using the four screws **(3)**. Torque to 21 inch pounds.

3. Replace the strap handles **(2)** on both sides of the instrument using the four screws **(1)**. Torque to 21 inch pounds.

4. Locate the Top Trim Strip, Benchtop (N9020-40017) in the kit. Attach the Top Trim Strip to the top of the Front Frame Assembly.

5. Locate the two Side Trim Strips (5041-9172) in the kit. Remove the backing and apply one Side Trim Strip to each side of the Front Frame Assembly.

6. Replace the four instrument bottom feet.

7. Replace the four key locks to the bottom feet.

Final Installation for Portable Instruments
(Option PRC, Figure 12 and Figure 13)

1. Refer to Figure 13. Carefully slide the instrument cover back onto the instrument from the rear of the analyzer, making sure not to damage any internal cables. The seam on the cover should be on the bottom of the instrument. Be sure the cover seats into the gasket groove in the Front Frame Assembly.

2. Refer to Figure 13. Replace the four rear bumpers **(2)** to the rear of the instrument using the four screws **(1)**. Torque to 21 inch pounds.

3. Refer to Figure 12. Replace the four hole plugs **(5)** to both sides of the instrument.

4. Locate the Top Trim Strip, Opt PRC (N9020-40019) in the kit. Attach the Top Trim Strip to the top of the Front Frame Assembly.

5. Using the screws (1) removed earlier, secure the four front bumpers (4) to the front frame assembly. Torque to 21 inch pounds.

6. Refer to Figure 12. Replace the bail handle **(2)** (using the four screws **(1)**) to the Front Frame Assembly. Torque to 21 inch pounds.

Verify Hardware Installation

1. Verify the spectrum analyzer application loads and sweeps as expected.

2. Press **System**, **Show Hardware** on the analyzer and verify that Option N9000A-MTP, Multi-touch user interface with processor, is installed.

Adjustments, and Performance Verification

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

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

| NOTE | The X-Series Signal Analyzer Calibration Files are located on the disk drive. Therefore, replacement of the disk drive will invalidate the current instrument calibration if the original calibration file has not been backed-up and restored. However, a full calibration is required to assure that the instrument meets all specifications. Arrangements regarding the level of calibration must be made between the end user and the calibration provider |

Adjustments Required

All (if the Calibration data file could not be backed-up and restored).
None (if the Calibration data file was backed-up and restored).

Performance Testing Required

All (if the Calibration data file could not be backed-up and restored).
None (if the Calibration data file was backed-up and restored).

A full calibration is required to assure the instrument meets all specifications

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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