

Keysight Technologies

N9020A MXA Signal Analyzer

Option MTU, MultiTouch User Interface Upgrade Kit
Option MTP, MultiTouch User Interface Upgrade Kit
with PC6 CPU

Notices

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Option MTU and MTP, MultiTouch User Interface Upgrade Kits

Products Affected:	N9020A MXA Signal Analyzer
Serial Numbers:	All
To Be Performed By:	(X) Keysight Service Center (X) Personnel Qualified by Keysight () Customer
Estimated Installation Time:	2.5 Hours
Estimated Adjustment Time:	3.0 Hours
Estimated Verification Time:	4.0 Hours

Introduction

This installation note explains how to install the hardware and licenses to add the MultiTouch user interface to N9020A MXA signal analyzers.

This installation note supports two kits:

N9020AK-MTU - MultiTouch User Interface Upgrade

N9020AK-MTP - MultiTouch User Interface Upgrade with PC6 CPU

The N9020AK-MTU should only be installed on N9020As that already have the PC6 CPU. This kit includes a new SSD, to ensure that when a disk drive recovery is performed, the software version recovered will be new enough to recognize the MultiTouch front panel assembly.

The N9020AK-MTP should be installed on N9020As that do not have a PC6 CPU. A PC6 CPU is included in this kit, along with a new SSD.

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

N9020AK-MTU, MultiTouch User Interface 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
1	Vibration Mount	0460-2725
2	Trim, Side, 177.0 H	5041-9172
1	Plug, Dome, 0.312 in. diameter, black	6960-0076
1	Core Bracket, Top	N9020-00071
1	Core Bracket, Bottom	N9020-00072
1	Knob, RPG, Large	W1312-40017
1	Solid State Drive Replacement, WES7	-----
3	Screws, M3 x 0.5 (8mm long) pan head	0515-0372
9	Screws, M3 x 0.5 (8mm long) flat head	0515-2032
1	Overlay, BBIQ Top, MultiTouch, Light Color	N9020-80192
1	Overlay, BBIQ Bottom, MultiTouch, Light Color	N9020-80193
1	Nameplate, 3.6 GHz, MultiTouch, N9020A	N9020-80188
1	Nameplate, 8.4 GHz, MultiTouch, N9020A	N9020-80189
1	Nameplate, 13.6 GHz, MultiTouch, N9020A	N9020-80190
1	Nameplate, 26.5 GHz, MultiTouch, N9020A	N9020-80191
1	Overlay, Connector, Blank, quartz gray	N9020-80140
1	Overlay, Keypad, quartz gray	N9020-80165
1	Overlay, Keypad, no EXM port, quartz gray	N9020-80167
1	Entitlement Certificate	5964-5178
1	Entitlement Certificate Envelope	5967-7169
1	Installation Note	This note

N9020AK-MTP, MultiTouch User Interface with PC6 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
1	Vibration Mount	0460-2725
2	Trim, Side, 177.0 H	5041-9172
1	Plug, Dome, 0.312 in. diameter, black	6960-0076
1	Core Bracket, Top	N9020-00071
1	Core Bracket, Bottom	N9020-00072
1	Knob, RPG, Large	W1312-40017
1	CPU Module 2.6 GHz Quad Core 16 GB RAM, no HDD	W1312-60141
1	Tray Assembly, solid state drive, 160GB	W1312-60302
3	Screws, M3 x 0.5 (8mm long) pan head	0515-0372
9	Screws, M3 x 0.5 (8mm long) flat head	0515-2032
1	Overlay, BBIQ Top, MultiTouch, Light Color	N9020-80192
1	Overlay, BBIQ Bottom, MultiTouch, Light Color	N9020-80193
1	Nameplate, 3.6 GHz, MultiTouch, N9020A	N9020-80188
1	Nameplate, 8.4 GHz, MultiTouch, N9020A	N9020-80189
1	Nameplate, 13.6 GHz, MultiTouch, N9020A	N9020-80190
1	Nameplate, 26.5 GHz, MultiTouch, N9020A	N9020-80191
1	Overlay, Connector, Blank, quartz gray	N9020-80140
1	Overlay, Keypad, quartz gray	N9020-80165
1	Overlay, Keypad, no EXM port, quartz gray	N9020-80167
1	Entitlement Certificate	5964-5178
1	Entitlement Certificate Envelope	5967-7169
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.

N9020A-PC1 _____

N9020A-PC2 _____

N9020A-PC4 _____

N9020A-PC6 _____

N9020A-EXM _____

N9020A-BBA _____

4. Refer to the data in **step 2** above. If the Product Number is not N9020A, **do not proceed** with the installation of this kit. This kit is to be installed only on N9020A signal analyzers.
5. Refer to the data in **step 3** above. If upgrade product N9020A-MTU is being installed and the currently installed CPU is either N9020A-PC1, N9020A-PC2, or N9020A-PC4, **do not proceed** with the installation of this kit. This kit is to be installed only on N9020A signal analyzers with N9020A-PC6 CPUs.
6. Refer to the data in **step 3** above. If the upgrade product N9020A-MTP is being installed and the currently installed CPU is N9020A-PC6, **do not proceed** with the installation of this kit. This kit is to be installed only on N9020A signal analyzers with N9020A-PC1, N9020A-PC2, or N9020A-PC4 CPUs.
7. Refer to the data in **step 3** above. If either option N9020A-EXM or N9020A-BBA is installed, there will be additional steps required to remove and replace the front panel assembly.

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_N9020A_MY49100101"
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.

S/W Revision Less Than A.01.55

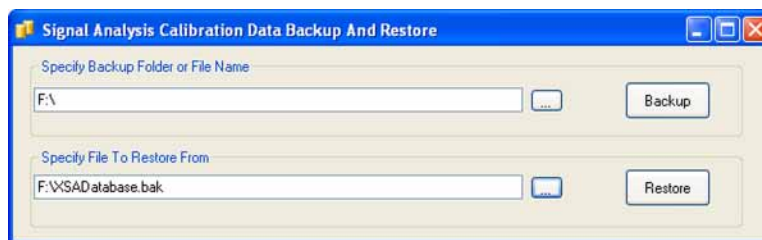
Instruments with a software version older than A.01.55 will first need to have the software updated to the latest version prior to being able to backup the instrument calibration data. See the **Software Updates** section of this document for instructions on updating the instrument software.

Once the software has been updated, use the calibration data backup procedure under the heading "**S/W Revision Greater Than A.02.00**".

S/W Revision Greater Than or Equal To A.01.55 and Less Than A.02.00

1. Close the instrument application software by pressing **File, Exit, Enter**.
2. Connect a USB mouse to one of the instrument USB ports.
3. Connect a USB memory device to another instrument USB port.
4. Using the mouse select **Start, My Computer** and navigate to the following folder:
C:\Program Files\Agilent\SignalAnalysis\Physics
5. Double-click on **BackupAndRestore.exe** and the window shown in **Figure 1** will appear.

Figure 1 Calibration Data Backup



6. Under the “Specify Backup Folder or File Name” use the mouse to select the “...” button to open the “Browse For Folder” dialog box.
7. Select the USB memory device and press **OK**.

NOTE

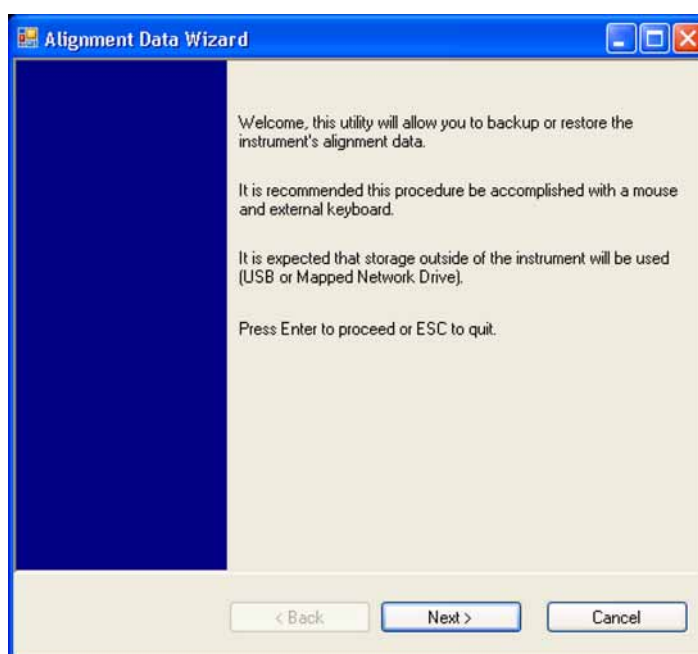
While you can use the “Make New Folder” button in the “Browse For Folder” dialog box to create a sub-folder on the USB memory device, and you can specify a filename in the “Specify Backup Folder or File Name” window, you can also just use the root directory on the drive and let the instrument select a default filename for you.

8. Select **“Backup”** and wait for confirmation that the calibration database has been backed up.
9. When the backup has completed close the Calibration Data Backup And Restore window. The file will be saved with a .bak file suffix.

S/W Revision Greater Than A.02.00

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 2** will appear.

Figure 2 Alignment Data Wizard



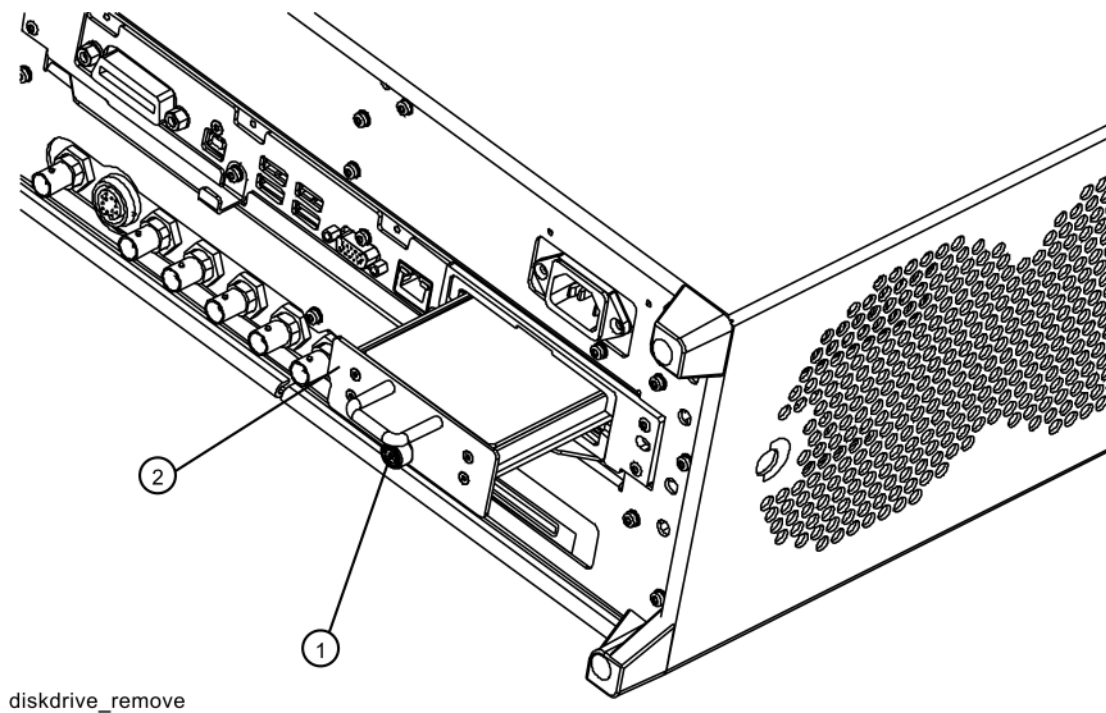
5. Follow the on-screen instruction to **Backup** the calibration data to the USB memory device.

Replacing Solid State Drive (SSD) - N9020A-MTU Upgrade Only

The steps in this section apply only to N9020A-MTU upgrades, where the solid state drive is replaced. If the N9020A-MTP upgrade is being performed, skip to " **Replacing CPU Assembly - N9020A-MTP Upgrade Only**".

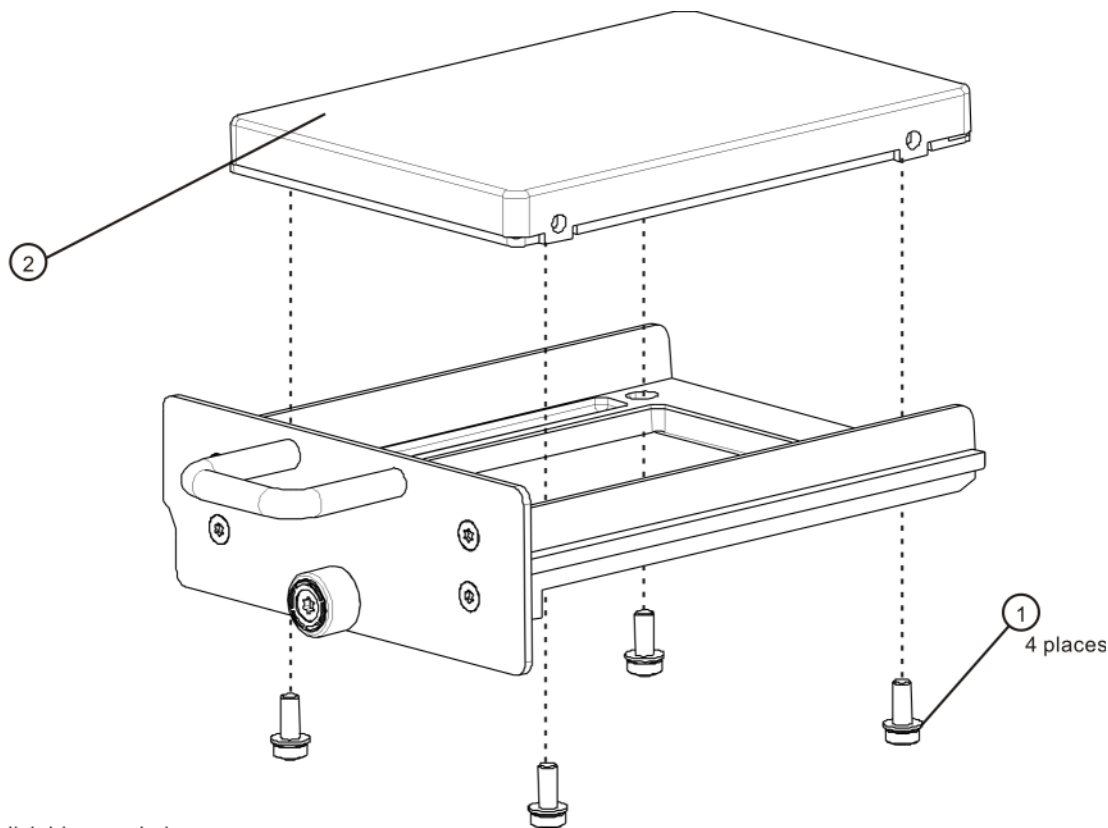
1. Turn off the instrument and remove the AC power cord.
2. Refer to **Figure 3**. Locate and remove the existing disk drive carrier assembly (2) from the instrument by loosening the rear panel screw (1).

Figure 3 Replacing the Disk Drive Carrier Assembly



3. Refer to **Figure 4**. Remove the 4 machine screws (1) from the disk drive carrier assembly that secure the drive (2).

Figure 4 Disk Drive Screws



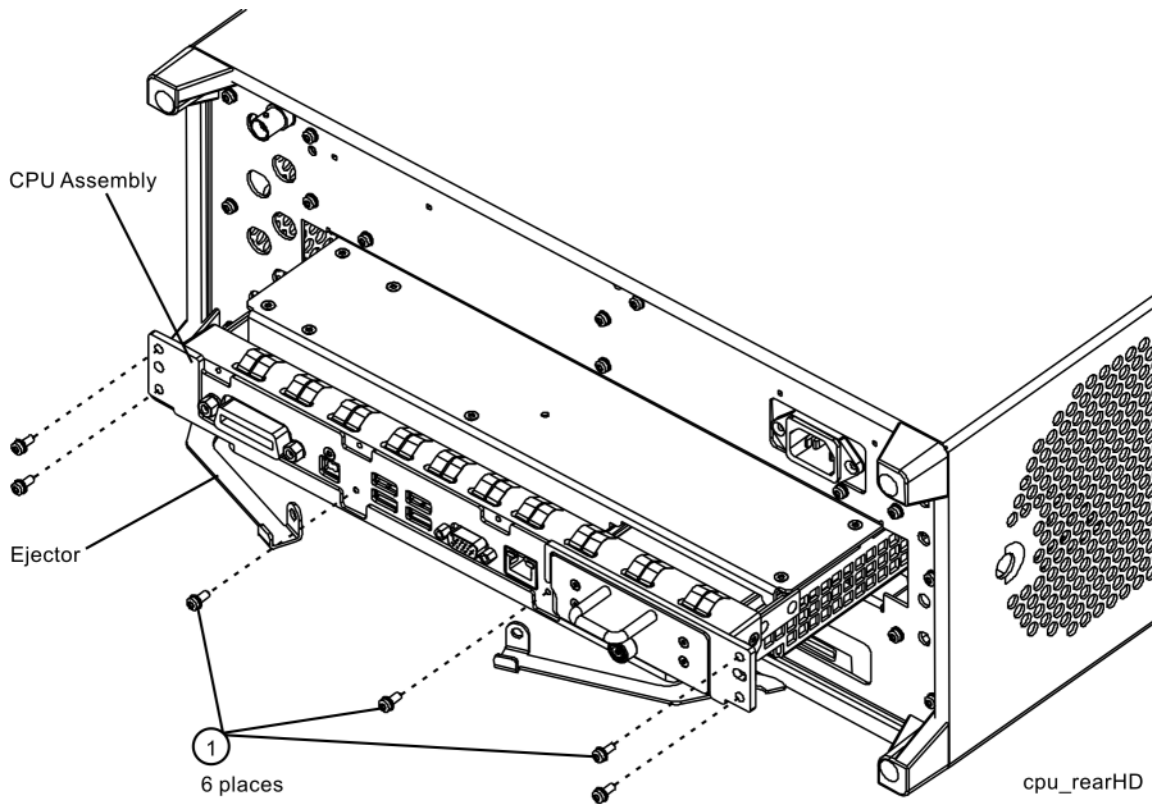
4. Remove the disk drive (2) from the carrier assembly.
5. Place the new disk drive included in the kit onto the carrier assembly and attach with the four machine screws (1). Torque to 9 in-lbs.
6. Refer to **Figure 3**. Replace the disk drive carrier assembly (2) into the instrument and tighten the screw to 9 in-lbs.

Replacing CPU Assembly - N9020A-MTP Upgrade Only

The steps in this section apply only to N9020A-MTP upgrades, where the CPU is replaced. If the N9020A-MTU upgrade is being performed, skip to "[Replacing Solid State Drive \(SSD\) - N9020A-MTU Upgrade Only](#)".

1. Turn off the instrument and remove the AC power cord.
2. Refer to [Figure 5](#). 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 5 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

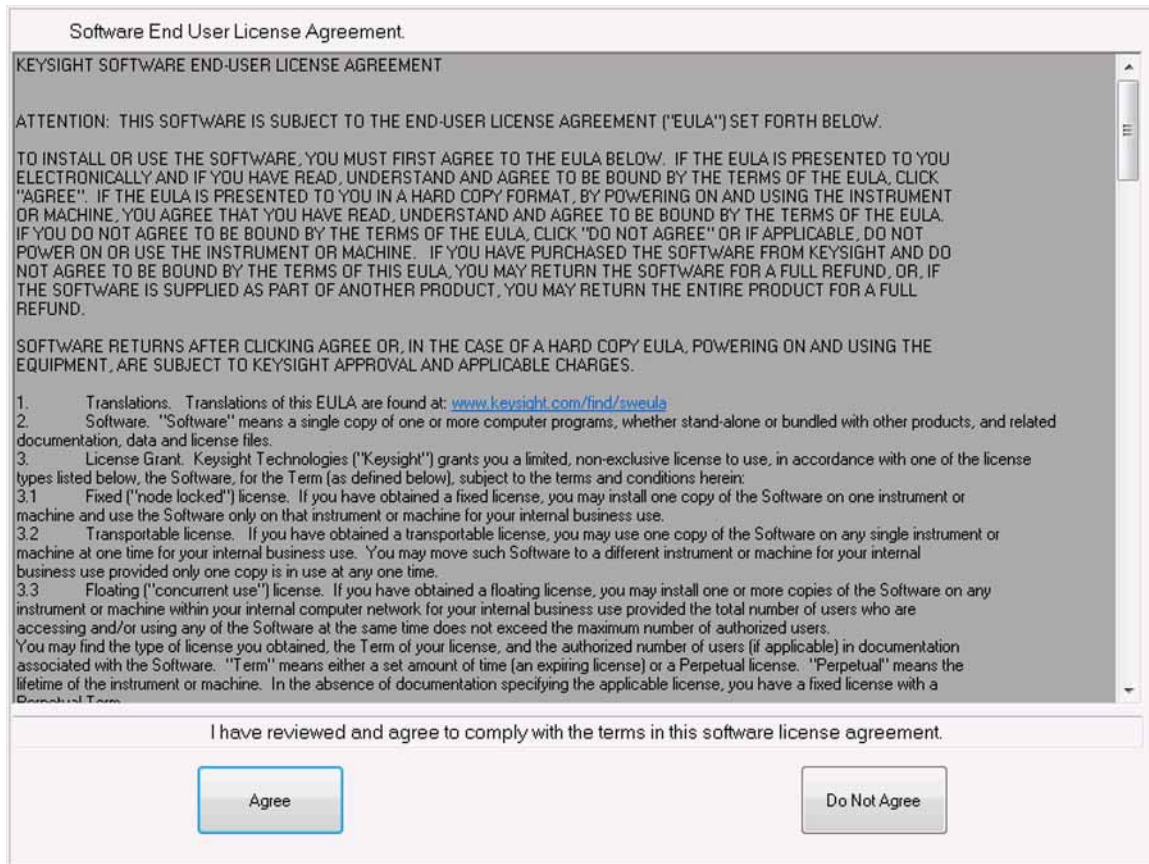
During the initial power-on process, the instrument may turn itself off and restart a number of times. This is normal and only happens during the initial installation process.

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 6** appears, providing information regarding the instrument software licensing.

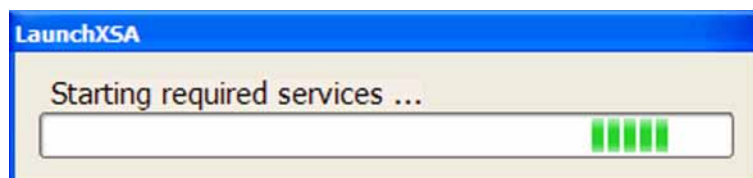
Figure 6 License Agreement Dialog Box

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

CAUTION

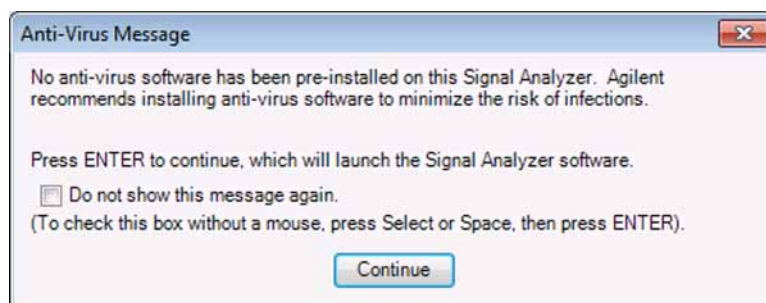
After launching the setup, do not turn off the instrument or remove power before the setup routine completes and the system restarts. Turning off the instrument may corrupt the system and the instrument software may need to be recovered.

5. After the instrument restarts, a status window as shown in **Figure 7** appears, providing information regarding the instrument software licensing.

Figure 7 Application Launch Status Window

6. The anti-virus notification as shown in **Figure 8** will then appear.

Figure 8 Anti-Virus Message

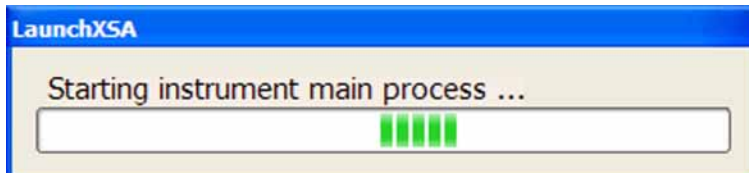


NOTE

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 9** will continue to appear while the instrument application software continues to load:

Figure 9 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 FPGA update program. If this program detects that there are assemblies that need to be updated it will update them to the correct version.

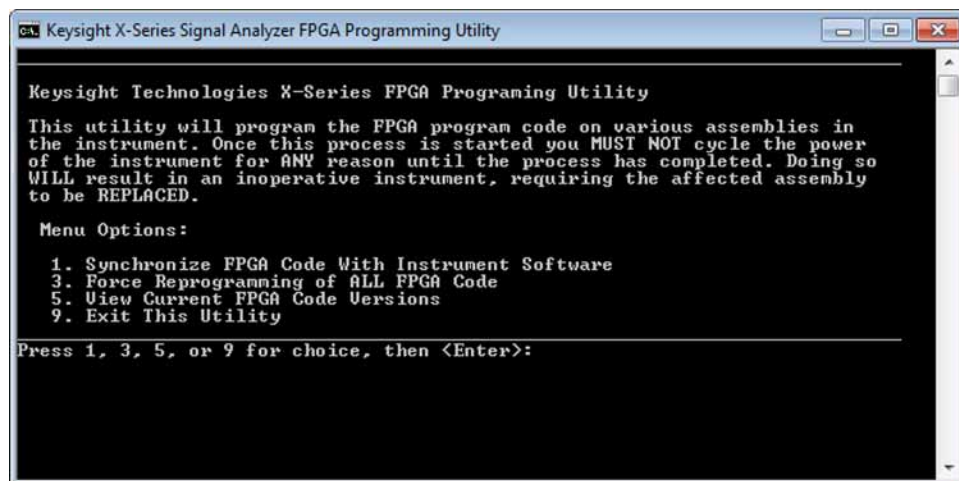
CAUTION

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 10** will appear.

Figure 10 FPGA Programming Utility



Option MTU and MTP, MultiTouch User Interface Upgrade Kits

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

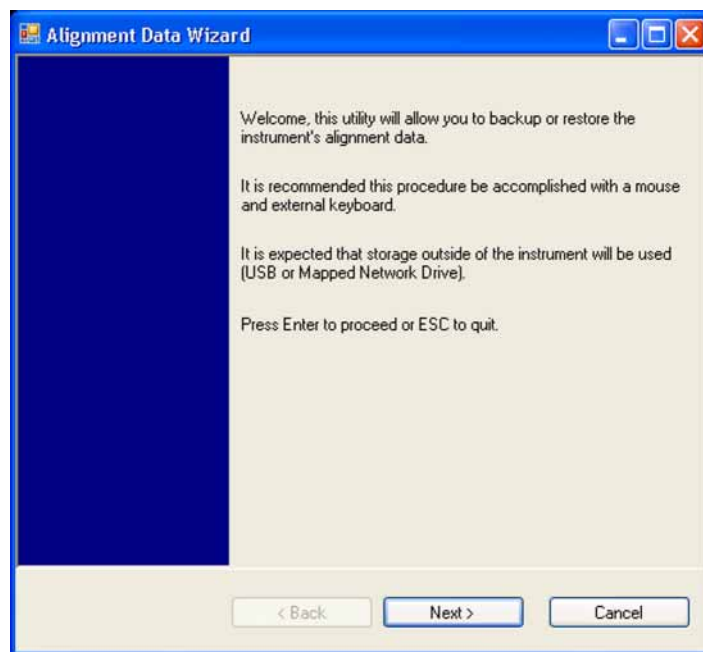
No matter how the instrument calibration data was backed up prior to this upgrade, any further backing up of the data will now be done through the instrument's Alignment Data Wizard.

Calibration Data Backup to SD Card

The PC6 processor assembly contains an internal SD card for the purpose of providing a location to back up the calibration data. After the PC6 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 11** will appear.

Figure 11 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 (5964-5178) 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.

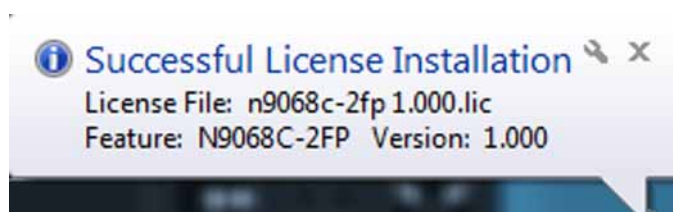
7. Connect the USB Storage Device to one of the analyzer's USB ports. Windows will detect the new hardware and may display the configuration menu shown in **Figure 12**. This menu may be configured according to your preferences.

Figure 12 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 13**. 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 13 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 29** to remove the outer case.

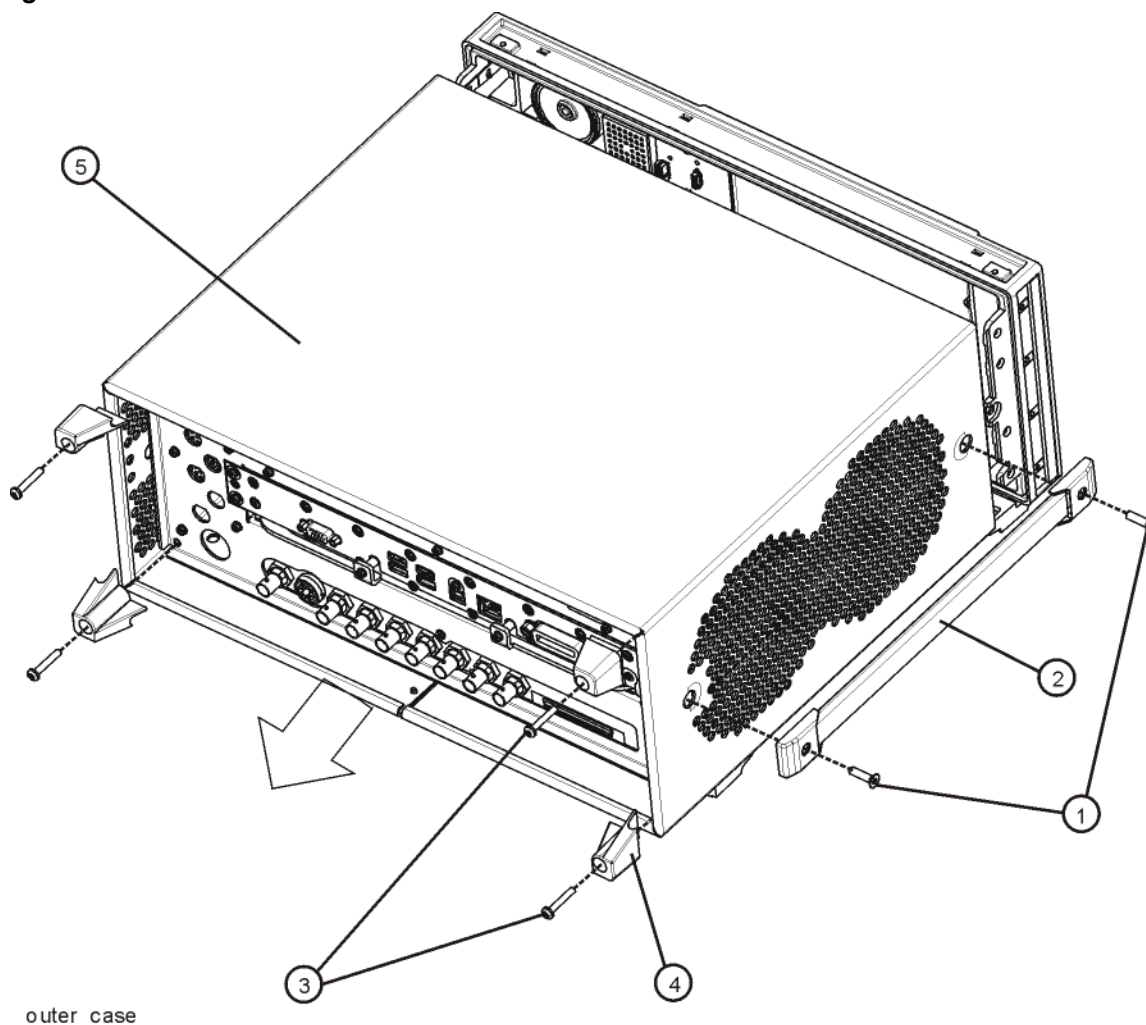
NOTE

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 14**. 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 14 Standard Instrument Outer Case Removal



5. Proceed to the **Front Frame Assembly Removal** section to remove the front frame.

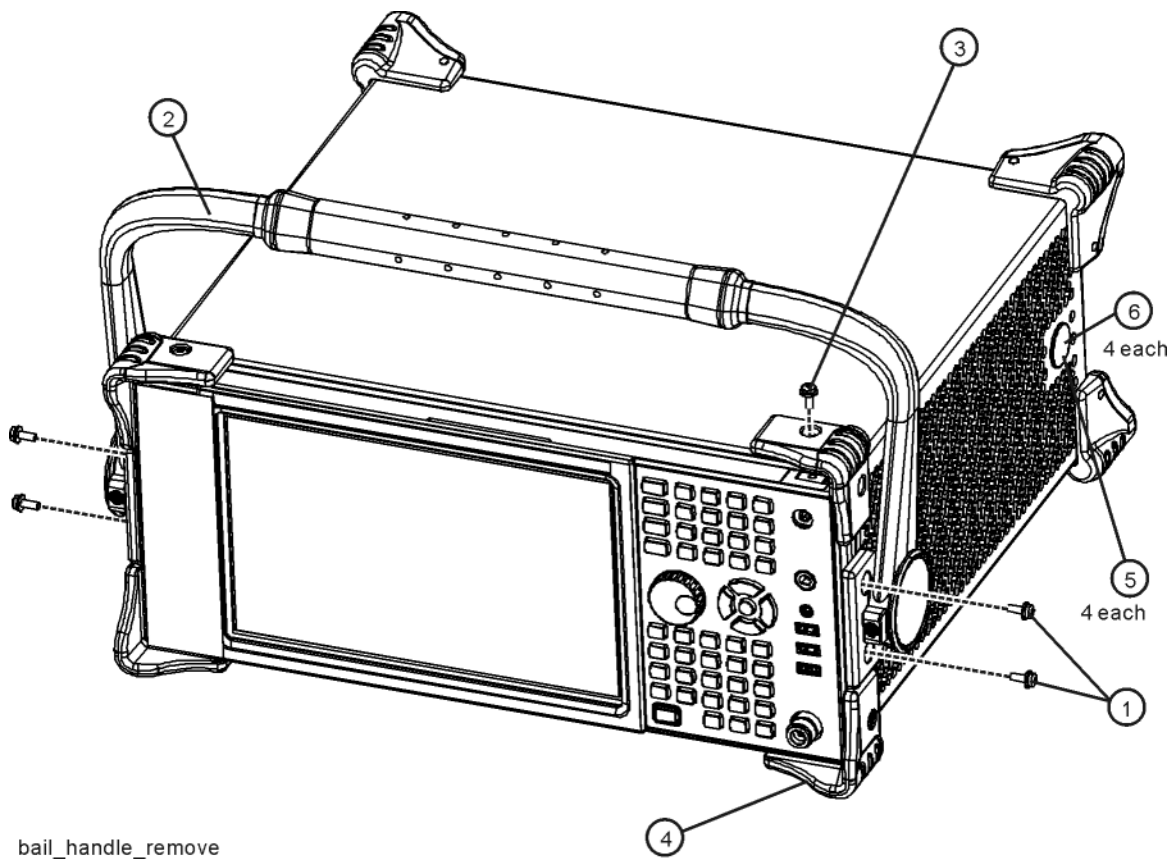
Portable Instrument (Option PRC)

NOTE

Make sure any adapters on the front panel are removed.

1. Disconnect the instrument from ac power.
2. Refer to **Figure 15**. Using the T-20 driver, remove the four screws (two on each side) (1) that hold the bail handle (2) to the front frame.

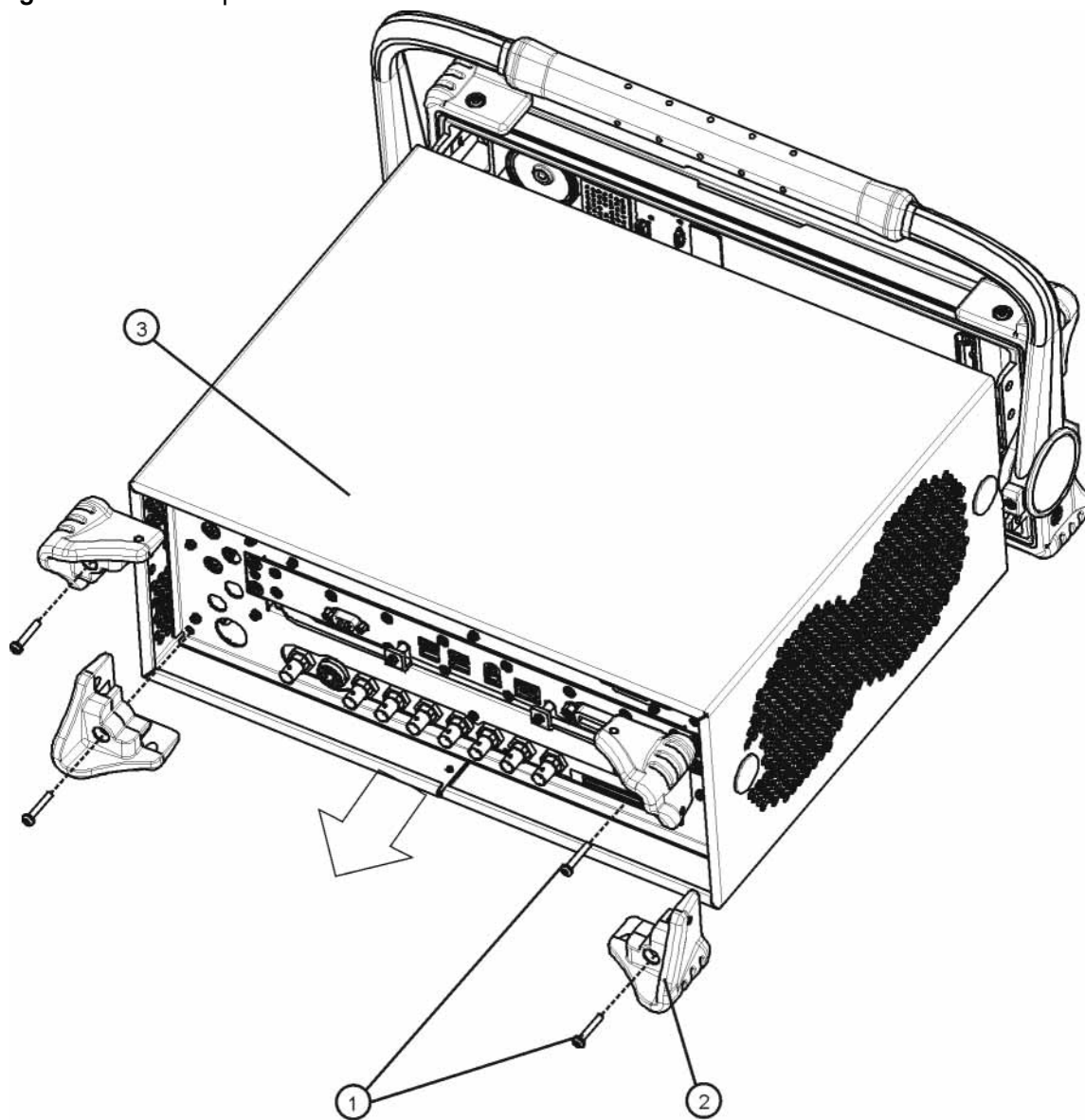
Figure 15 Bail Handle Removal



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 16**. 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 16 Option PRC Instrument Outer Case Removal

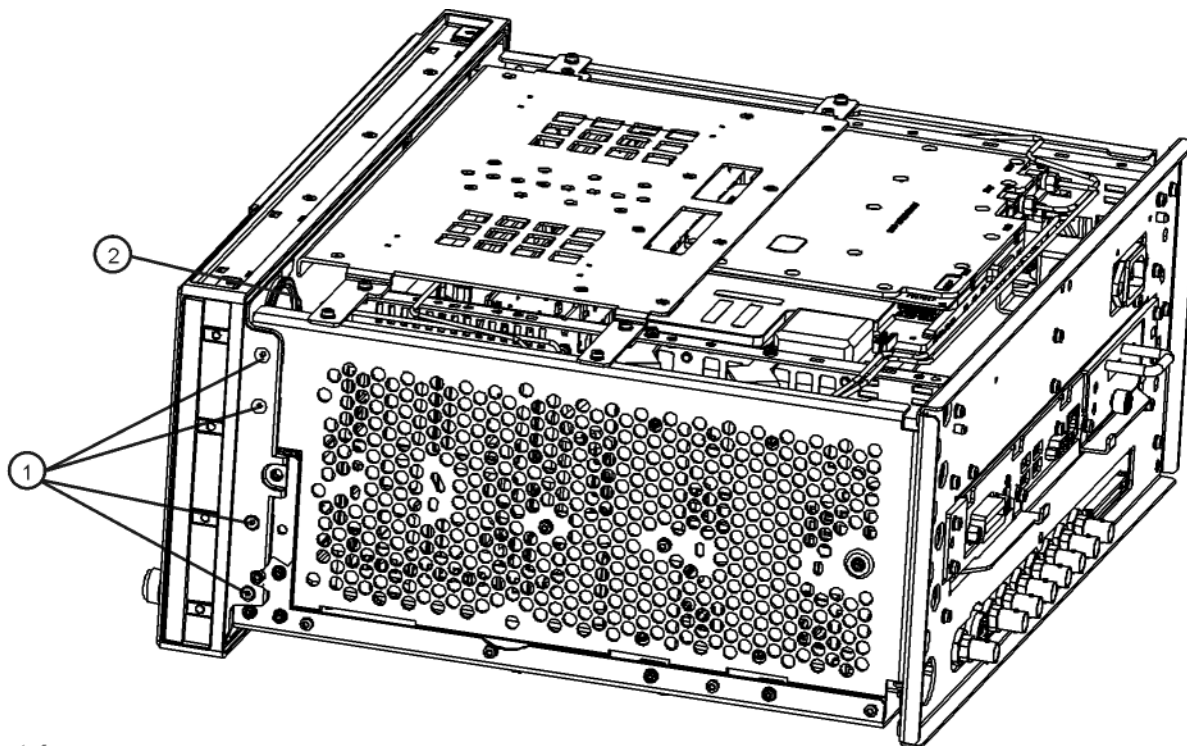


rear_bumper_remove

Front Frame Assembly Removal

1. If the MXA has Option EXM, External Mixer, use a ¼" open end wrench and 5/16" open end wrench to disconnect semi-rigid coax cable W27 from W28.
2. Refer to **Figure 17**. Using the T-10 driver, remove the eight screws (1), four on each side, to detach the front frame from the chassis.

Figure 17 Front Frame Removal



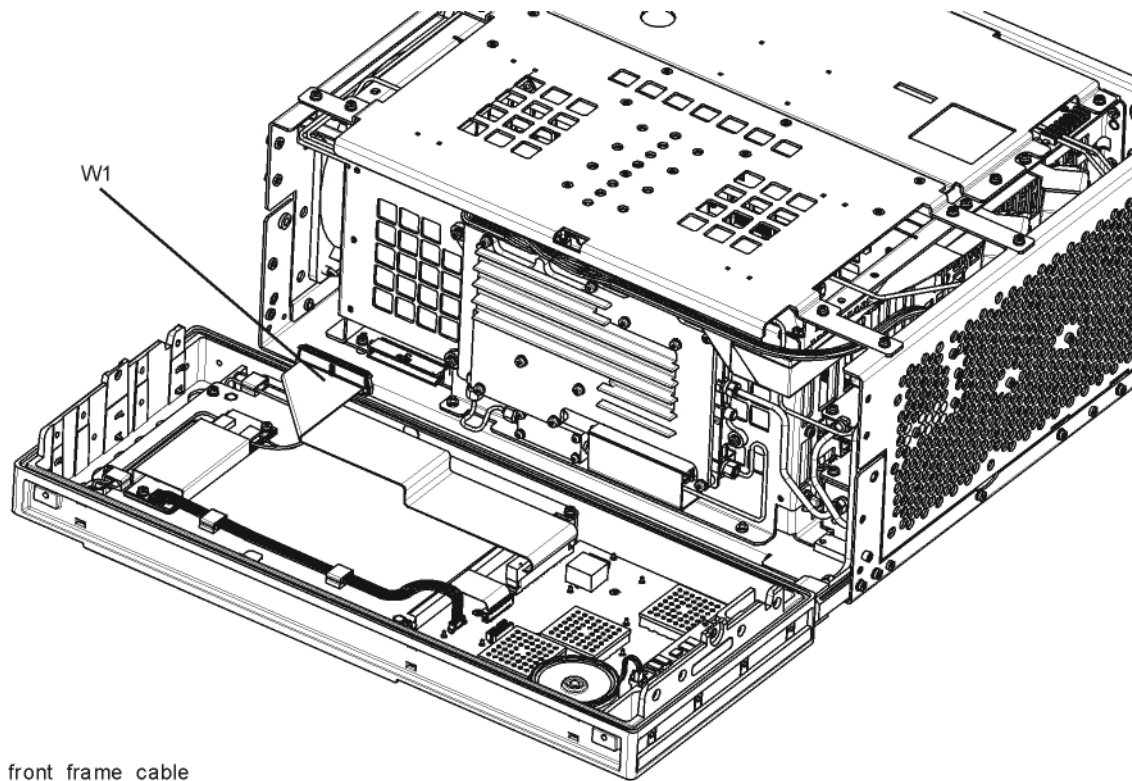
front_frame_new

3. Refer to **Figure 18**. 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 18 Front Panel Cable



4. If the instrument has Option BBA (BBIQ inputs), there will be an additional cable (W24) that will need to be removed. Use a ¼" nut driver or open end wrench to loosen and remove the screws securing W24 to the A18 BBIQ Interface Board. Remove the two 0515-0372 screws securing the core bracket to the display shield.
5. Pull the Front Frame Assembly carefully away from the chassis. Remove the ribbon cable W1 from the motherboard.

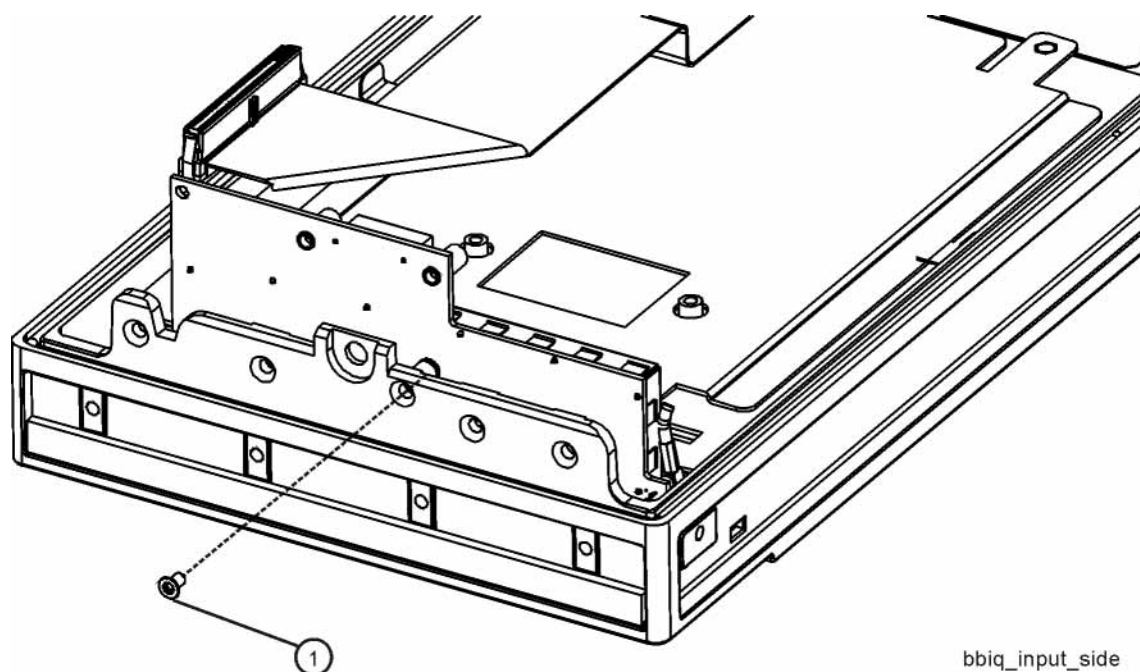
Removal of Option BBA Parts from Original Front Frame Assembly

NOTE

This procedure applies only to instruments with Option BBA, BBIQ Analog Inputs

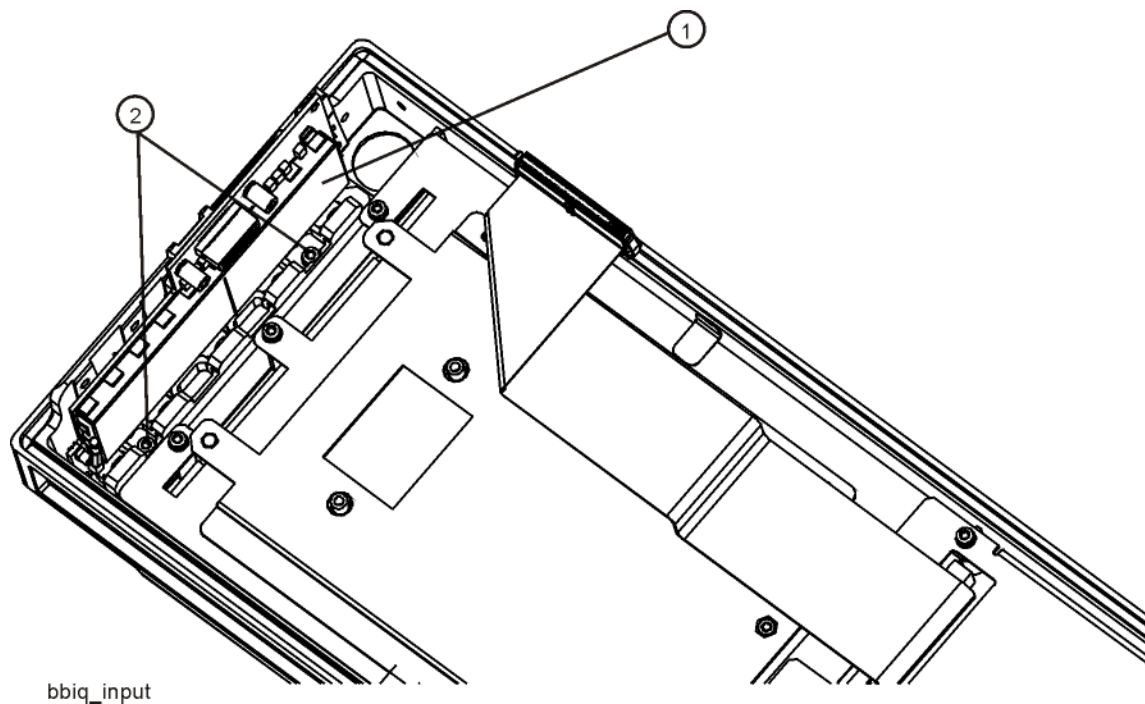
1. Refer to **Figure 19**. Remove the single 0515-1035 (1) screw that secures the BBIQ Interface Board to the side of the frame.

Figure 19 Remove BBIQ Interface Board Side Screw



2. Refer to **Figure 20**. Remove the two 0515-0372 screws (2) that secure the BBIQ Interface Board (1) to the front frame.

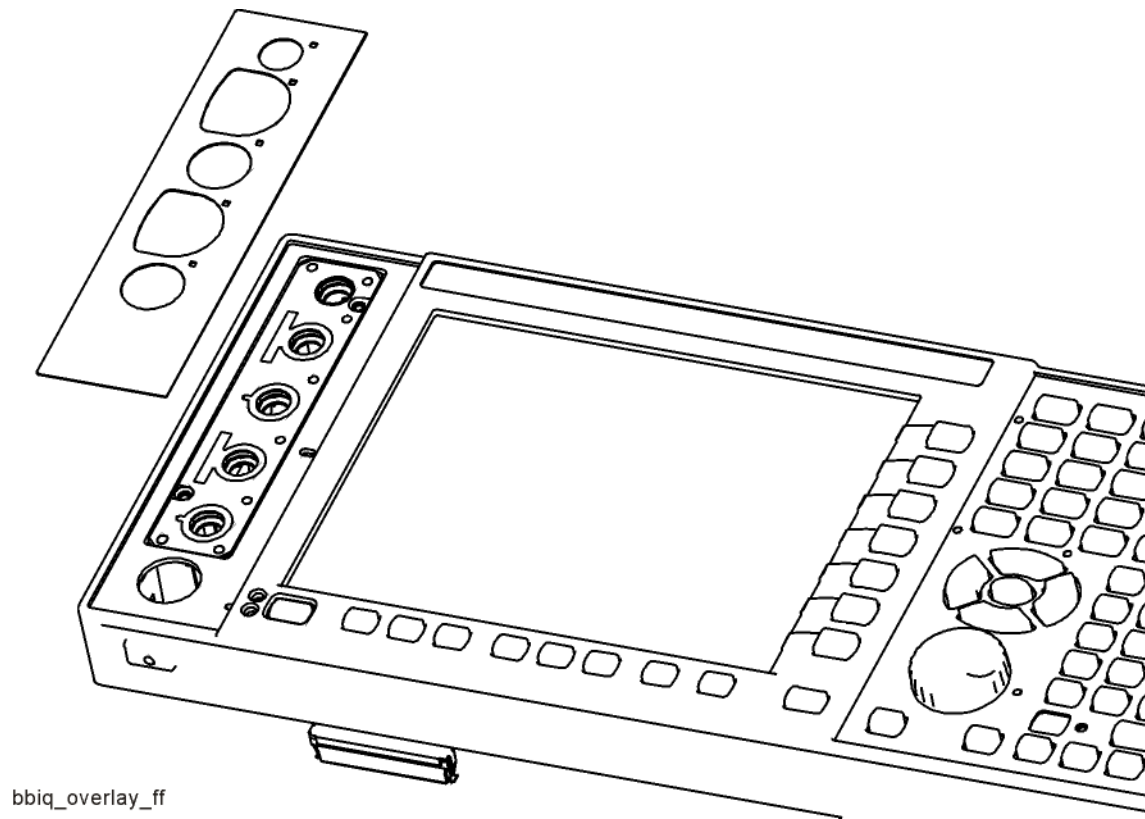
Figure 20 Remove BBIQ Interface Board



3. Remove the BBIQ Interface Board (1) by pulling the board out from behind the front frame. The BBIQ Interface board will be re-used.

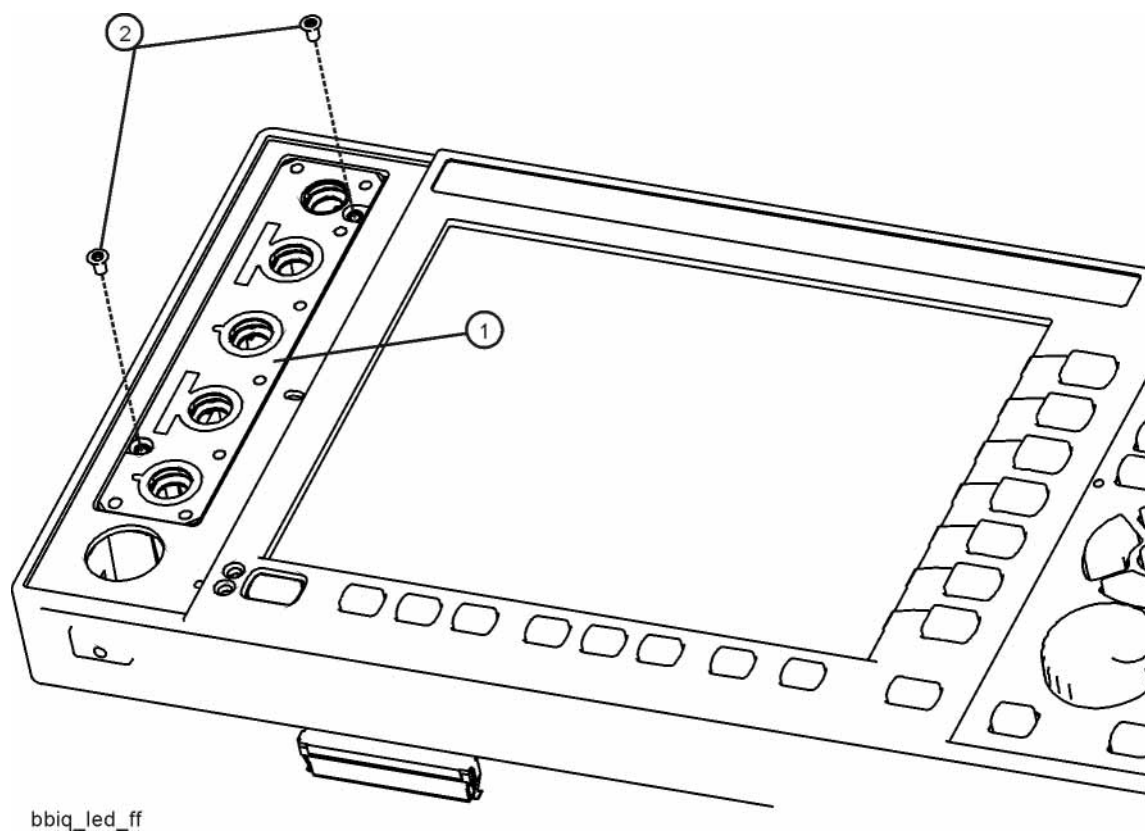
4. Refer to **Figure 21**. Peel off the top BBIQ overlay from the front frame assembly.

Figure 21 Remove BBIQ Top Overlay



5. Refer to **Figure 22**. Remove the LED board by removing the two 0515-1227 screws (2).
6. If the bottom BBIQ overlay did not peel off with the top overlay, peel off the bottom BBIQ overlay from the LED board. Remove any adhesive residue from the LED board. The LED board will be re-used, but the overlays will not be re-used.

Figure 22 LED Board Removal



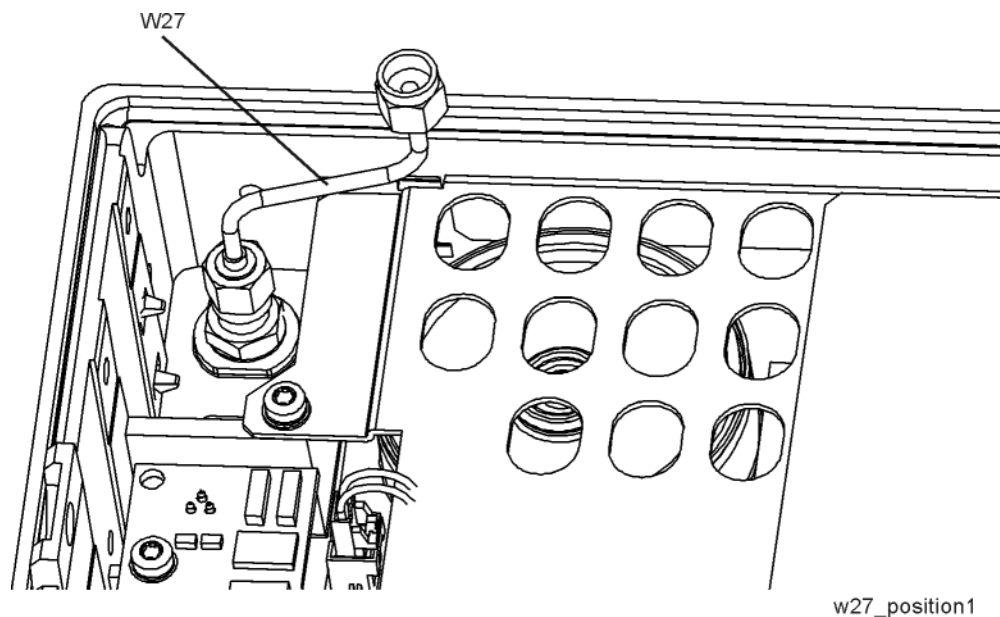
Removal of Option EXM, External Mixing Parts from Original Front Frame

NOTE

This procedure applies only to instruments with Option EXM, External Mixing

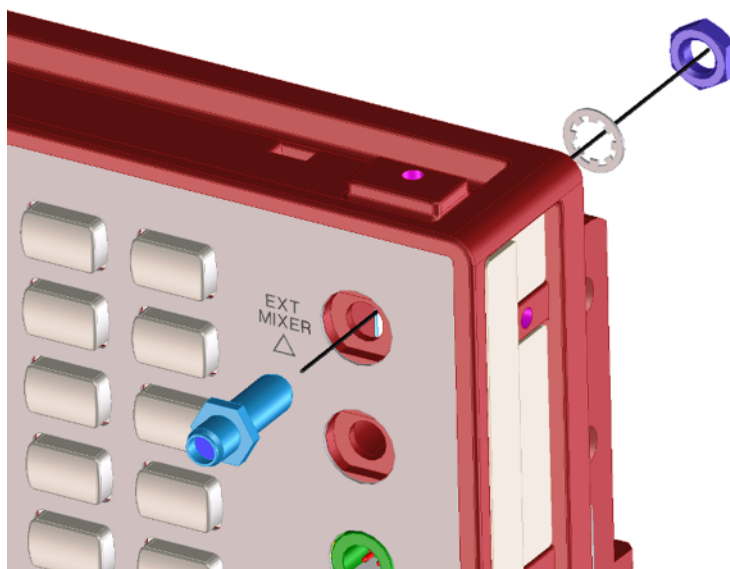
1. Refer to **Figure 23**. Disconnect semi-rigid coax cable W27 from the Ext Mixer connector using a 5/16 inch open-end wrench. W27 will be re-used.

Figure 23 Disconnect W27 from Ext Mixer Connector



2. Refer to **Figure 24**. Use a deep 5/16-inch socket wrench to loosen and remove the 1/4" hex nut (2950-0223) and 1/4" lock washer (2190-0067) on the inside of the front frame that is attaching the Ext Mixer connector to the front frame. The Ext Mixer connector, lock washer, and hex nut will be re-used.

Figure 24 Removing EXT MIXER Connector



Prepare New Front Frame Assembly

1. Locate the new Front Frame Assembly (N9020-60261) in the kit.
2. Choose the proper Keypad Overlay depending upon the serial number of the MXA signal analyzer:
 - a. If the serial number is $< \text{MY/SG/US52330000}$, choose Overlay, Keypad, No EXM port (N9020-80167).
 - b. If the serial number is $\geq \text{MY/SG/US52330000}$, choose Overlay, Keypad (N9020-80165).
3. Ensure that the front frame around the keypad is clean.
4. 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.
5. Locate the Knob (W1312-40017) in the kit. Push the knob onto the shaft of the RPG.
6. If the analyzer does not have Option BBA, BBIQ Analog Inputs, do the following:
 - a. Locate the Blank Connector Overlay (N9020-80140) in the kit.
 - b. Ensure that the front frame to the left of the display is clean.
 - c. Remove the backing from the Blank Connector Overlay and carefully apply it to the new Front Frame Assembly.

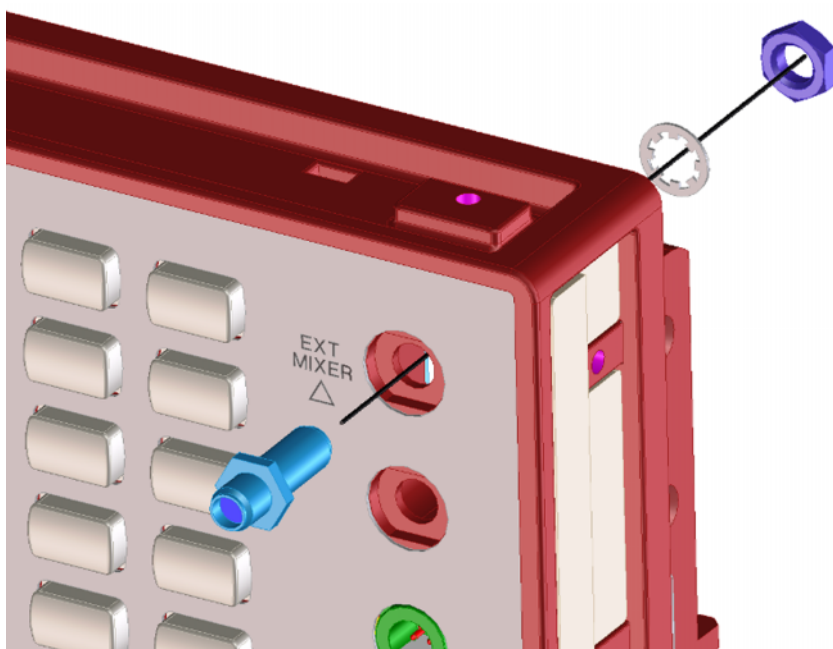
Add EXT MIXER Connector and Cable to Front Frame Assembly

NOTE

This procedure applies only to analyzers with Option EXM, External Mixer. Proceed to the next section if Option EXM is not installed.

1. Locate the SMA female to SMA female connector (1250-1666), ¼" lock washer (2190-0067), and ¼" hex nut (2950-0223) that were removed from the original front frame assembly.
2. Insert the SMA female to SMA female connector in the hole in the front frame assembly from the front of the assembly. The hex feature on the connector should engage with the recess in the front frame assembly. Refer to **Figure 25**. Secure the connector using the ¼" lock washer and ¼" hex nut from the rear. Torque to 21 inch-pounds.

Figure 25 Attaching SMA Female Connector



3. Locate the External Mixing, Front Panel semi-rigid coax assembly that was removed from the original front frame assembly. This is W27. Note that this cable is symmetrical; either end can be connected to the front-panel connector.

4. Connect one end of W27 to the SMA female connector as shown in **Figure 26**.
5. Orient W27 so that the cable slopes upward from the Ext Mixer connector at a 15 degree angle. The top of the connector should be approximately level with the top of the shield over the Front Panel Interface board. Refer to **Figure 27**. Torque the cable nut on the Ext Mixer connector to 10 inch-pounds.

Figure 26 Connecting W27 to Ext Mixer Connector

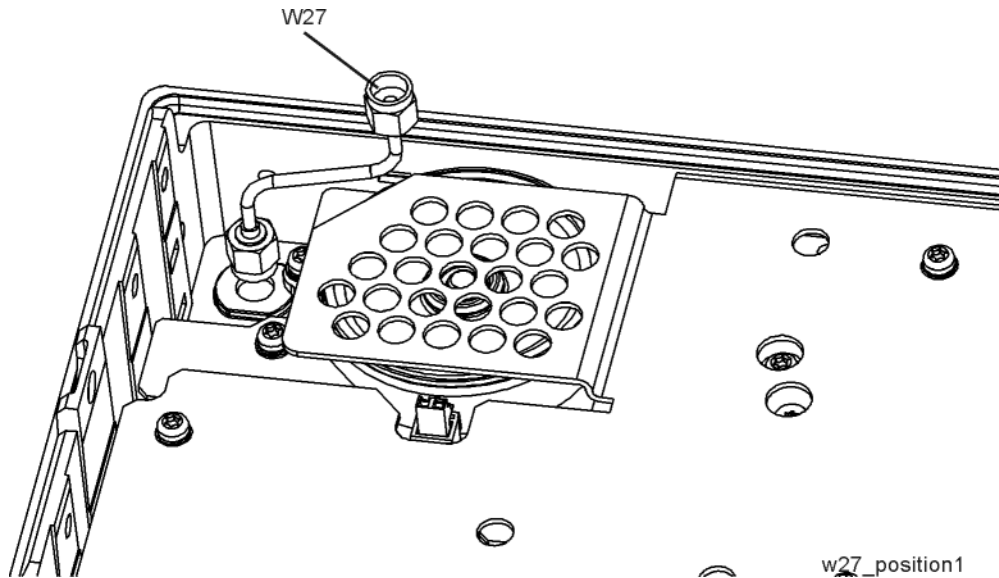
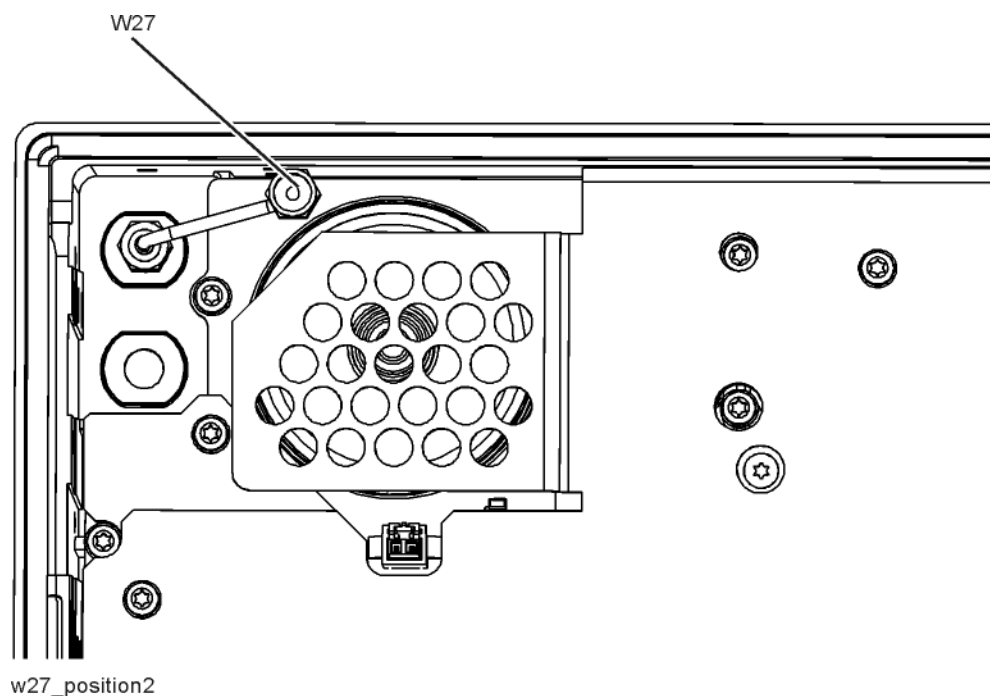


Figure 27 Proper Orientation of W27



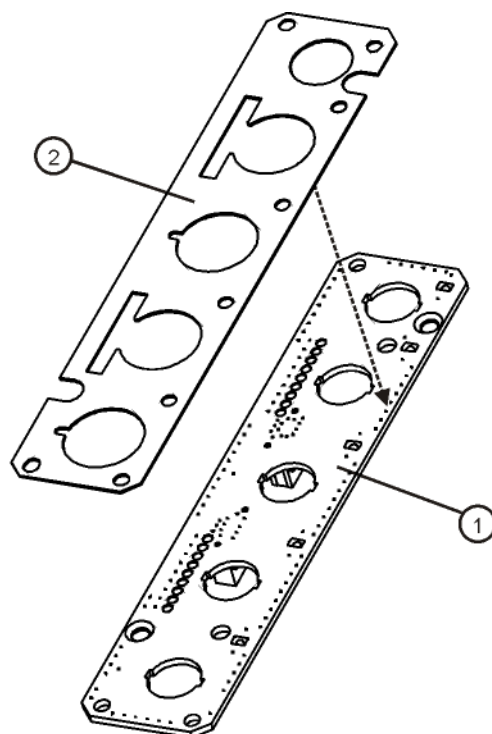
LED Board and Overlay Installation

NOTE

This procedure only applies to analyzers with Option BBA, BBIQ Analog Inputs. If the analyzer does not have Option BBA, proceed to the next section.

1. Remove the filter plate to the left of the display. The screws will be re-used, but the filler plate will not be re-used.
2. Refer to **Figure 28**. Locate the LED board (1) that was removed earlier and the **N9020-80193** LED board overlay (2) located in the kit.

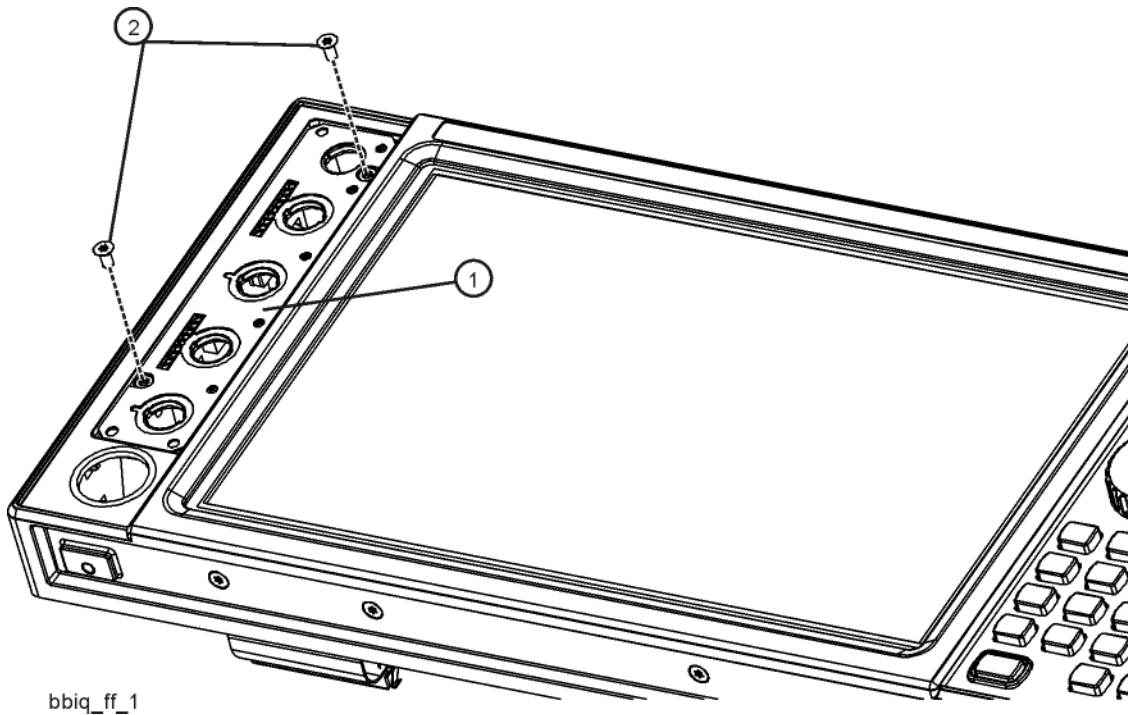
Figure 28 LED Board and Overlay



bbiq_overlay_led

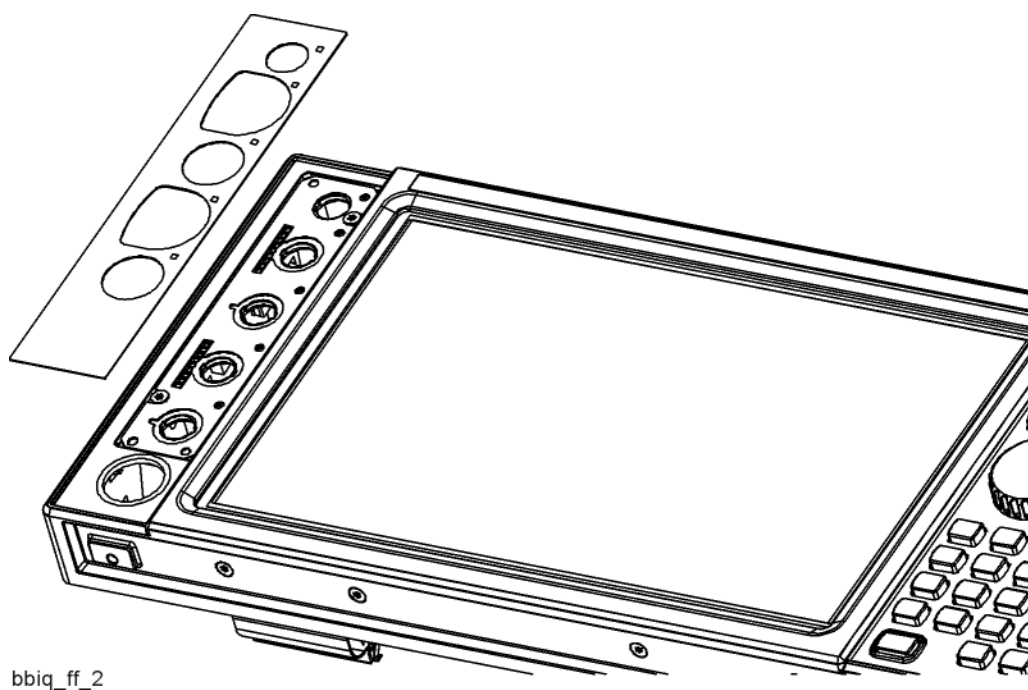
3. Refer to **Figure 28**. Line up the holes and carefully attach the **N9020-80193** overlay to the LED board.
4. Refer to **Figure 29**. Install the LED board with overlay attached (1) into the front frame.
5. Secure the LED board in two places using the 0515-1227 screws (2) removed earlier Torque to 9 in-lbs.

Figure 29 LED Board Installation



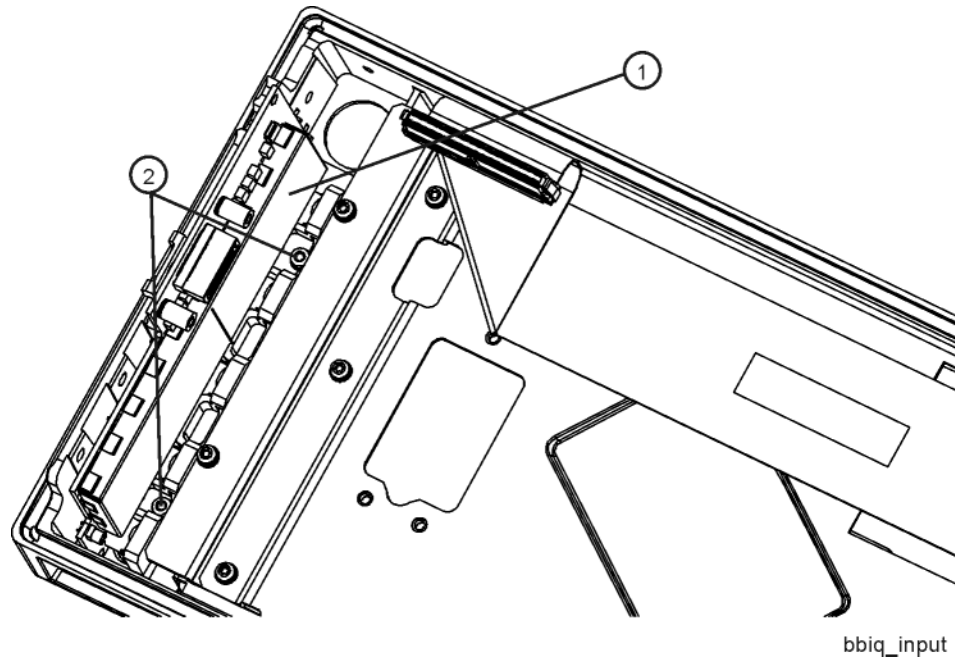
6. Refer to **Figure 30**. Line up and carefully attach the top overlay **N9020-80192** over the lower overlay.
7. Press firmly down over the entire surface area of the top overlay.

Figure 30 Overlay Alignment



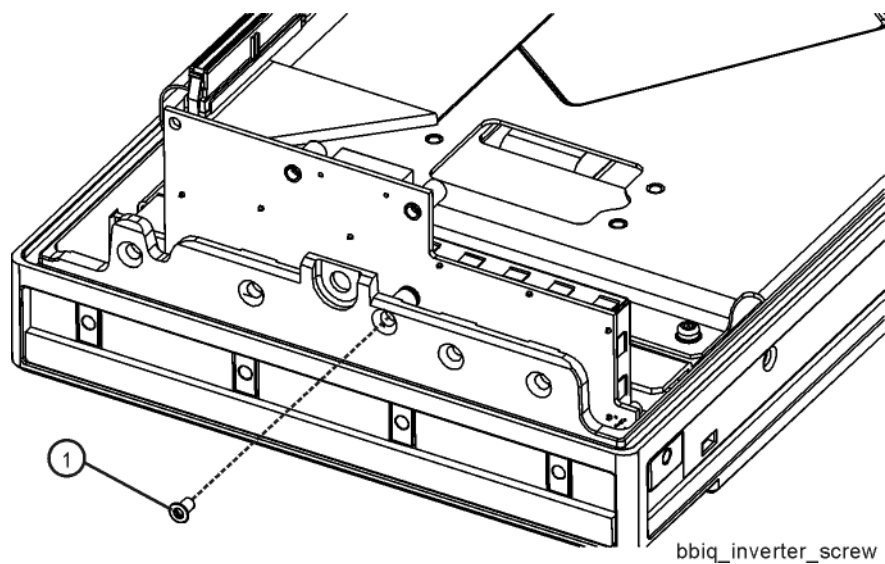
8. Refer to **Figure 31**. Install the BBIQ Interface Board that was removed from the original front frame assembly into the front frame passing the BNC connectors through the holes.
9. Secure the BBIQ Interface Board with two 0515-0372 screws (2) that were removed earlier. Torque to 9 in-lbs.

Figure 31 BBIQ Interface Board Installation



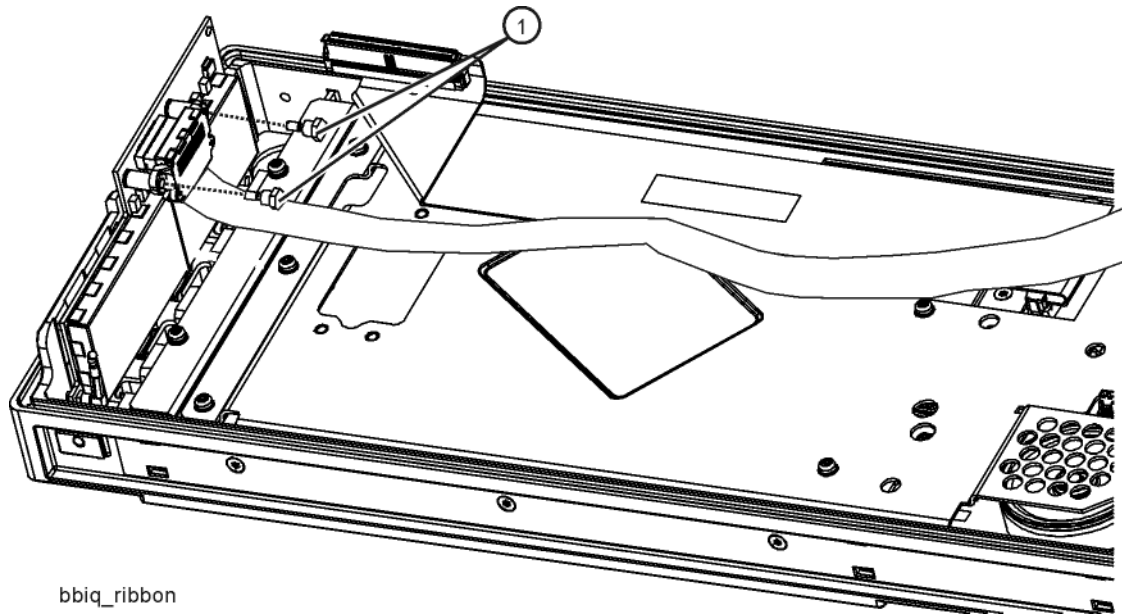
10. Refer to **Figure 32**. Secure the BBIQ Interface Board to the side of the front frame with a single 0515-2032 screw (1) removed earlier. Torque to 9 in-lbs.

Figure 32 BBIQ Interface Board Side Screw Installation



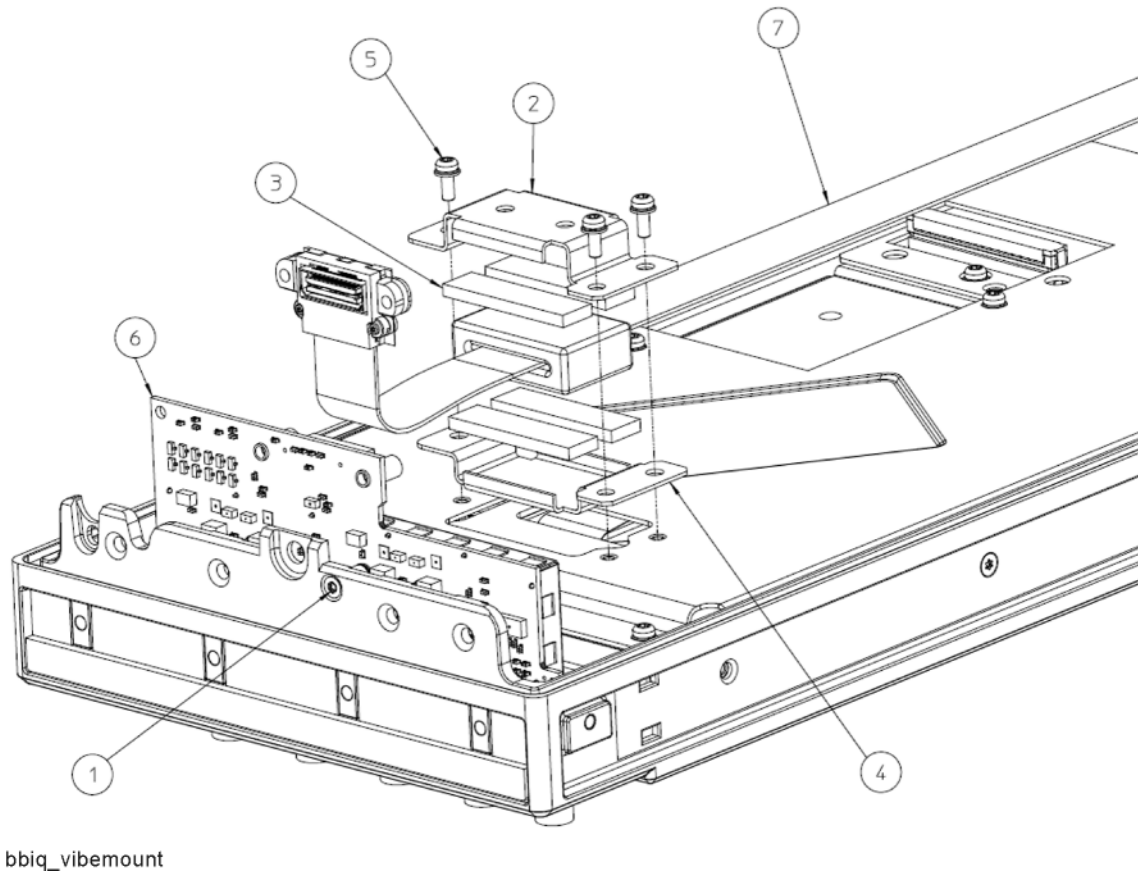
11. Refer to **Figure 33**. Connect the ribbon to the BBIQ Interface Board.
12. Install two N9020-20017 Hex screws (1) to secure the flex ribbon into the connector. Torque to 4 in-lbs with the ¼-inch socket.

Figure 33 Inverter Ribbon Cable Installation



- 13.** Refer to **Figure 34**. Cut the Vibration Mount **0460-2725** (3) supplied in the kit into four pieces with scissors or a knife to fit the Core Bracket, Top (2) **N9020-00071** and the Core Bracket, Bottom (4) **N9020-00072**.

Figure 34 Vibration Mount Installation

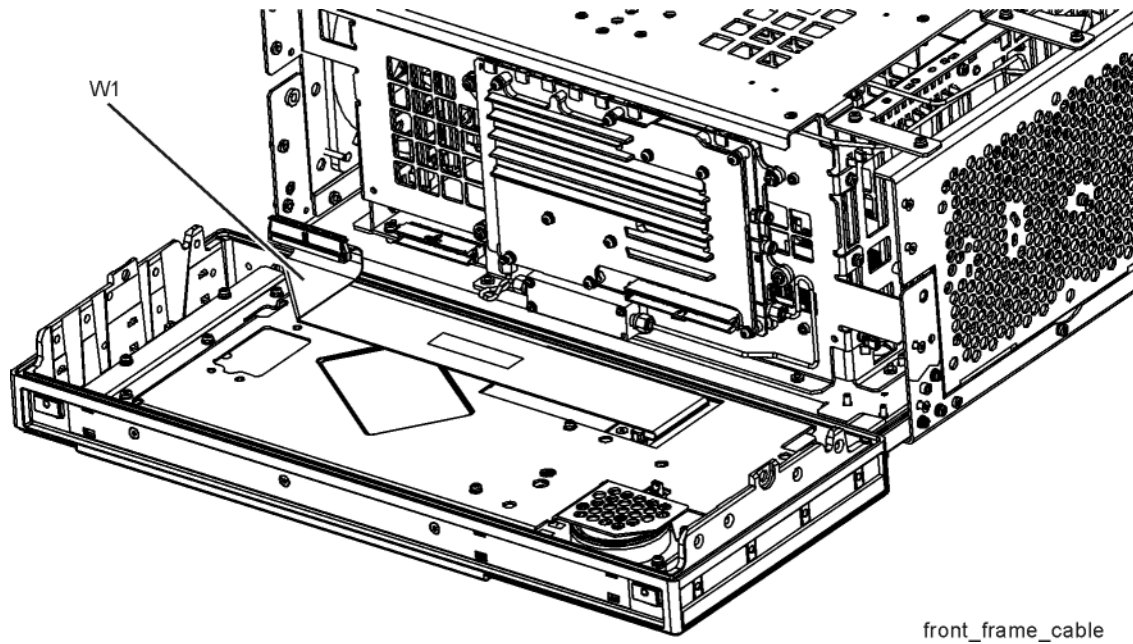


- 14.** Position the Core Bracket, Bottom with the vibration mount facing upward into the opening of the display shield.
- 15.** Position the ferrite core that is on the ribbon cable over the Core Bracket, Bottom.
- 16.** Position the Core Bracket, Top over the ferrite core. Secure with three 0515-0372 screws (5) included in the kit. Torque to 9 in-lbs.

New Front Frame Installation

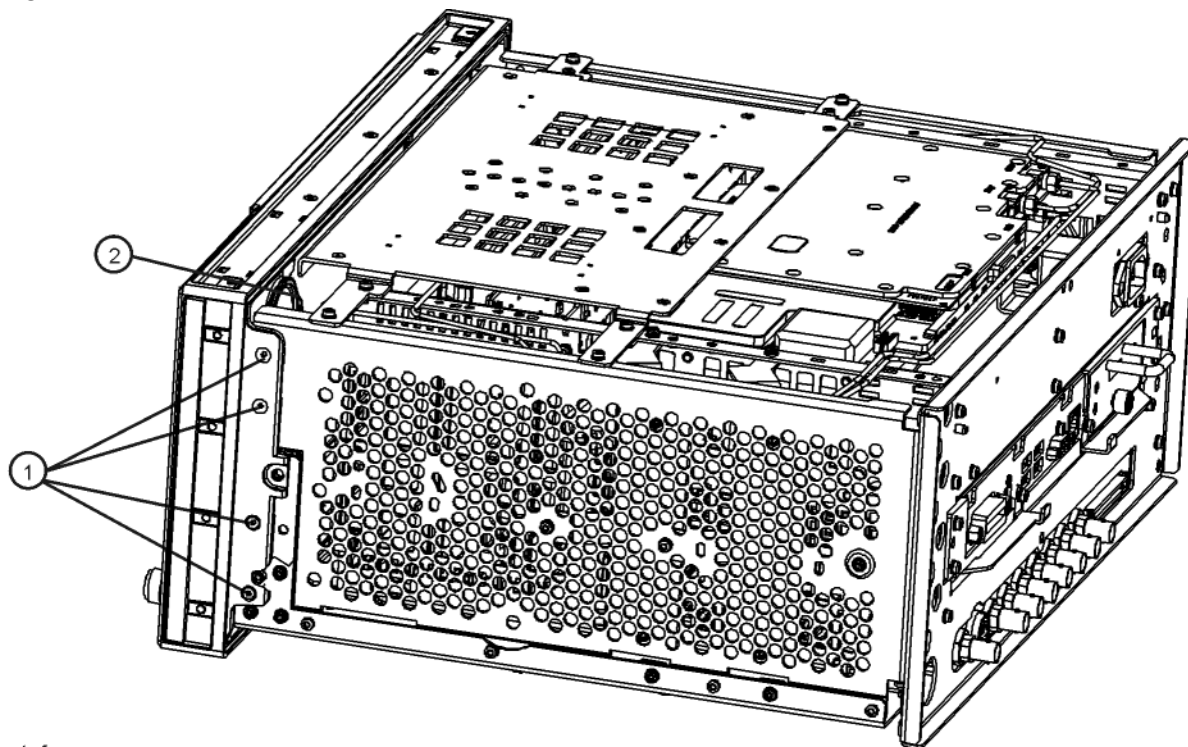
1. Refer to **Figure 35**. Reattach the ribbon cable W1. Ensure the locking tabs are engaged.
2. Carefully install the front panel assembly making sure that the ribbon cables are not pinched. Also, if Option BBA is installed, align the BBIQ Interface Board properly so the components do not become damaged by the fan bracket sheet metal.

Figure 35 Front Panel Cable



3. Refer to **Figure 36**. 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 36 Front Frame Installation



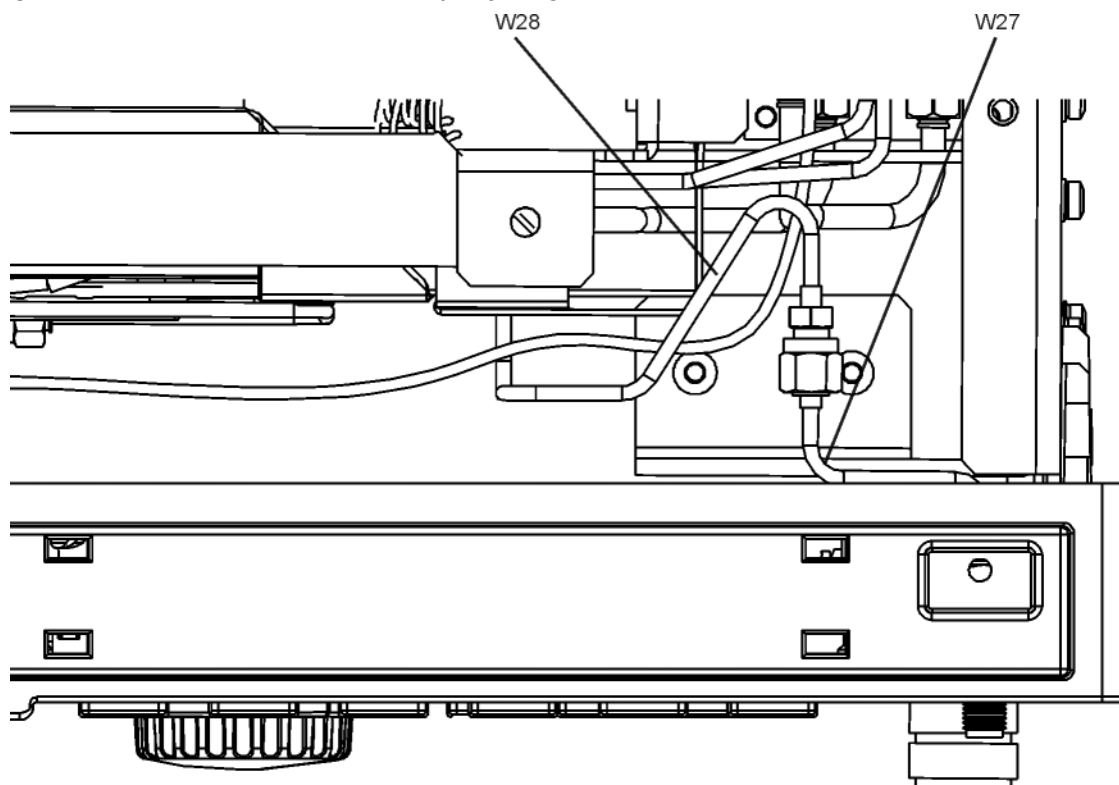
front_frame_new

4. If Option EXM, External Mixing, is not installed, skip steps 5 through 7.
5. Refer to **Figure 37**. When the front panel is installed, cables W27 and W28 typically do not align. This is OK since the cables are flexible.
6. Refer to **Figure 38**. Align and connect cables W27 and W28. Hand-tighten the nut.

Figure 37 W27 and W28 Before Alignment



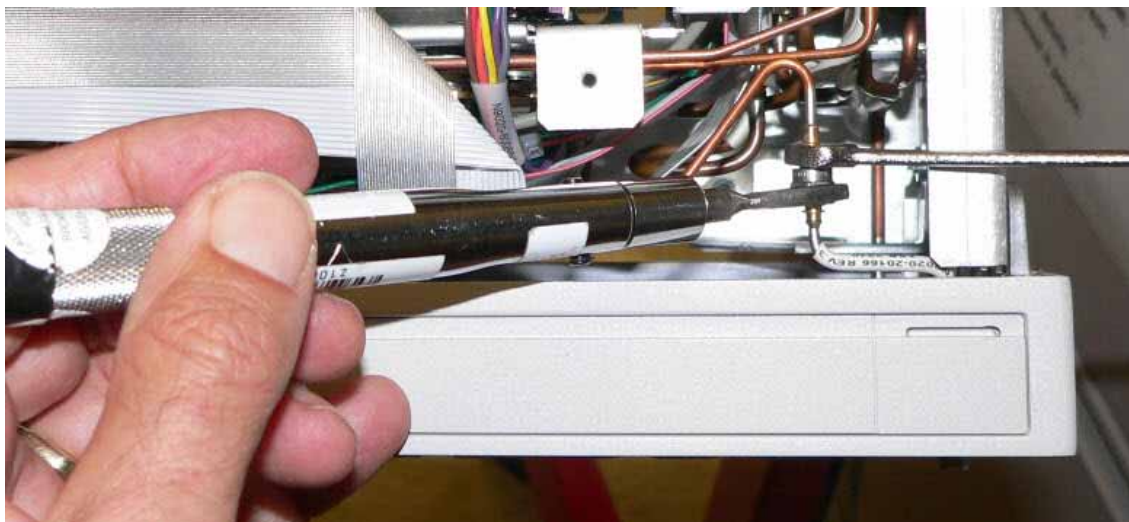
Figure 38 W27 and W28 Properly Aligned



w27_w28_align

7. Refer to **Figure 39**. Use a ¼" open-end wrench to prevent the SMA female connector on W28 from twisting. Use a 5/16" torque wrench to torque the nut on W27 to 10 inch-pounds.

Figure 39 Torque Cable W28 onto W27



8. If Option EXM, External Mixing, is not installed and the Keypad Overlay which accommodates Opt EXM (N9020-80165) is installed, locate the black hole plug (6960-0076) in the kit. Insert the hole plug in the EXT MIXER port opening in the upper right corner of the front panel.

Final Installation

Final Installation for Standard Instruments (Benchtop Configuration, [Figure 14](#))

1. Refer to [Figure 14](#). 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.
8. If the analyzer has Option EXM, External Mixer, locate the 50 Ω termination (1810-0118) that was removed earlier. Connect the 50 Ω termination to the EXT MIXER connector.

Final Installation for Portable Instruments (Option PRC, [Figure 15](#) and [Figure 16](#))

1. Refer to [Figure 16](#). 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 16](#). 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 15](#). 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 15](#). Replace the bail handle (2) (using the four screws (1)) to the Front Frame Assembly. Torque to 21 inch pounds.
7. If the analyzer has Option EXM, External Mixer, locate the 50 Ω termination (1810-0118) that was removed earlier. Connect the 50 Ω termination to the EXT MIXER connector.

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 N9020A-MTU, Multi-touch user interface, 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)

