

Keysight Technologies MXA Signal Analyzer

Option HLE, 10/25 MHz to 85 MHz Analysis
Bandwidth Upgrade, Opt 508, 513, 526
Serial Prefix < MY/SG/US5233

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Option HLE, 10/25 MHz to 85 MHz Analysis Bandwidth Upgrade Serial Prefix < MY/SG/US5233

Products Affected:	N9020A, MXA Signal Analyzer
Serial Numbers:	< MY52330000 < SG52330000 < US52330000
Options:	B40, MPB
To Be Performed By:	(X) Keysight Service Center (X) Personnel Qualified by Keysight () Customer
Estimated Installation Time:	4.0 Hours
Estimated Adjustment Time:	3.5 Hours
Estimated Verification Time:	4.0 Hours

Introduction

This installation note explains how to install the hardware and provides guidelines for adjustment and verification for Option HLE, 10/25 MHz to 85 MHz Analysis Bandwidth Upgrade for microwave MXA signal analyzers (frequency range options 508, 513, and 526) with serial number prefixes < MY/SG/US5233. A similar kit, Option HLD, is available for RF MXA signal analyzers (frequency range option 503) with serial number prefixes < MY/SG/US5233.

This kit also installs Option MPB, Microwave Preselector Bypass. This option is required for wide bandwidth measurements at frequencies > 3.6 GHz.

There are also license-key-enabled upgrades to allow the analysis bandwidths provided by this kit to be further extended to 125 MHz or 160 MHz. These kits are N9020AK-BU4 (85 MHz to 125 MHz upgrade) and N9020AK-BU5 (85 MHz to 160 MHz upgrade). The N9020AK-BU4 or N9020AK-BU5 kits can also be installed at the same time as the N9020AK-HLE kit.

Software and test equipment is required for making adjustments and for performance verification testing. Information on how to obtain this software can be found at:

www.keysight.com/find/calibrationsoftware

NOTE

Instrument software revision A.13.15 or later is required to install this upgrade.

NOTE

The instrument must be readjusted and the performance tested to assure the instrument meets specifications following the hardware installation. The X-Series Performance Verification and Adjustment Software must be used. All adjustments are automated. This software is included in the N7814A, Keysight X-Series Signal Analyzer Calibration Application software.

Installation Kit Parts List

Quantity	Description	Keysight Part Number
1	Power Supply, AC/DC Switching 350W 12-Output	0950-5012
1	A2 Enhanced Analog IF Assembly	N9020-60290
1	A3 40 MHz Digital IF Assembly	N9020-60016
1	A15 Front End Controller w/ IF MUX	N9020-60172
1	A25 Wideband Analog IF	N9020-60044
1	A26 Wideband Digital IF	N9020-60257
1	A16 MXA Reference Assembly	N9020-60200
1	Rear Panel Replacement Kit, MXA Prefix \geq MY/SG/US5233	N9020-60149
1	Opt HLD/HLE Cable Kit with Wire Markers (includes cables W36 through W56, listed below)	N9020-60205 (not order-able)
1	Cable Assembly, A2 to A3 (W2)	N9020-60046
1	Cable Assembly, YTF (W22)	N9020-60059
1	Bracket, PS Bypass Switch 1	E4410-00104
1	Reference Support Bracket	E4410-00108
1	Bracket, PS Bypass Switch 2	E4410-00110
1	Cable Assembly, SW1 - SW2 (W31)	E4410-20161
1	Cable Assembly, Switch 2 - YIG Tuned Filter (W32)	E4410-20163
1	Cable Assembly, Switch 1 - RF Assembly (W34)	E4410-20164
1	Cable Assembly, YIG Tuned Filter - Switch 1 (W33)	E4410-20165
1	Cable Assembly, Switch Control (W30)	E4410-60159
1	Cable Assembly, RF Semi-Rigid (A13W1)	E6607-21178
1	Cable Assembly, RF Semi-Rigid (A13W2)	E6607-21179
1	Spacer, Filter Mounting Adapter	E6607-25005
1	Bracket, Low Band Switch	N9020-00023
1	Bracket, RF Side	N9020-00031
1	Cable Assembly, 2nd LO, LO Synth (W6)	N9020-20033
1	Cable Assembly, Ref, Front End (W5)	N9020-20064
1	Cable Assembly, Ref, Attenuator A (W19)	N9020-20065
1	Cable Assembly, A11J2 to A13J2 (W3)	N9020-20101
1	Cable Assembly, J1 to A9 Input (W10)	N9020-20141
1	Cable Assembly, A10 Output to A11J1 (W9)	N9020-20153
1	Cable RF Switch 1 - Switch 2 (W35)	N9020-20210
2	Coaxial Switch (SW1 and SW2)	N1810-60069
1	Microwave Filter Bandpass 5175 MHz Max SMA (A13A1)	0955-2176
1	Coaxial Fixed Attenuator, DC to 26.5 GHz, Opt 006 Pb Free (AT1)	08493-60026
1	Cable Assembly, Flat Flexible 80-conductor 3-in-LG (W57)	8121-1854
1	Cable Assembly, Coaxial 530 mm LG (W37)	8121-1401 ^a with ends labeled '900' and '100'
1	Cable Assembly, Coaxial 530 mm LG (W51)	8121-1401 ^a with ends labeled '301' and '718'

Option HLE, 10/25 MHz to 85 MHz Analysis Bandwidth Upgrade Serial Prefix < MY/SG/US5233

Quantity	Description	Keysight Part Number
1	Cable Assembly, Coaxial 240 mm LG (W36)	8121-1862 ^a with ends labeled '902' and '7'
1	Cable Assembly, Coaxial 525 mm LG (W39)	8121-2028 ^a with one end labeled '1100'
1	Cable Assembly, Coaxial 380 mm LG (W52)	8121-2288 ^a with ends labeled '102' and '15'
1	Cable Assembly, Coaxial 380 mm LG (W54)	8121-2288 ^a with ends labeled '716' and '14'
1	Cable Assembly, Coaxial 480 mm LG (W55)	8121-2290 ^a with ends labeled '805' and '17'
1	Cable Assembly, Coaxial 710 mm LG (W56)	8121-2291 ^a with ends labeled '806' and '726'
1	Cable Assembly, Coaxial 570 mm LG (W53)	8121-2292 ^a with ends labeled '901' and '101'
1	Cable Assembly, Coaxial 280 mm LG (W41)	8120-8868 ^a with ends labeled '601' and '19'
5	Screw, M3 x 0.5 (8 mm long)	0515-0372
4	Screw, M2 x 0.4 (6 mm long)	0515-0658
3	Screw, M2 x 0.4 (14 mm long)	0515-0661
6	Screw, M3 x 0.5 (6 mm long), flathead	0515-1227
4	Screw, M2.5 x 0.45 (20 mm long)	0515-1992
15	Cable Tie	1400-0249
1	Coaxial Cable Clip	5041-9690
1	Entitlement Certificate	5964-5178
1	Entitlement Certificate Envelope	5967-7169
1	Installation Note	This note

a. This cable is included in the Option HLD/HLE Cable Kit with Wire Markers,
p/n **N9020-60205 (not order-able)**

Tools Required

- T-10 TORX Driver
- T-20 TORX Driver
- 5/16-inch torque wrench
- 9/16-inch nut driver
- 1/4-inch socket on 4-pound torque wrench
- Scissors or knife
- Diagonal cutters
- Keysight Calibration and Adjustment Software, N7814A (revision E.11.00 or later)
- Test equipment and computer supported by the X-Series Performance Tests and Adjustment Software
- MXA Signal Analyzer Service Guide. This manual is available as:
 - N9020A Option 0BW or p/n N9020-90218
- Microsoft Windows based personal computer with internet access and USB port
- USB storage device with >2GB 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 the options listed below in the Show System screen. Put a check mark or "X" after each option listed below that appears in the Show System menu.

N9020A-B40 _____

N9020A-CR3 _____

N9020A-CRP _____

N9020A-DP2 _____

N9020A-MPB _____

N9020A-BBA _____

N9020A-508 _____

N9020A-513 _____

N9020A-526 _____

4. On the analyzer, press **System, Show, Hardware**. Note the Part #, Matl Rev, Rev, OF Rev, and Hw Id of the Front End Controller and Front End in the table below.

Assembly Name	Part #	Matl Rev	Rev	OF Rev	Hw Id
Front End Controller					
Front End					

5. 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.
6. Refer to the data in **step 2** above. If the Serial Number prefix (the first six characters of the serial number) is not earlier than MY5233, SG5233, or US5233 **do not proceed** with the installation of this kit. This kit is to be installed only on N9020A signal analyzers with earlier serial numbers.
7. Refer to the data in **step 3** above. If option N9020A-508, N9020A-513, or N9020A-526 is not present, **do not proceed** with the installation of this kit. This kit is only for MXA signal analyzers with one of these frequency range options. Another kit is available to upgrade MXA signal analyzers with frequency range option N9020A-503.

8. Refer to the data in **step 3** above. If option N9020A-BBA is present, **do not proceed** with the installation of this kit. MXA signal analyzers with Option BBA do not have sufficient room to install the two additional boards required for analysis bandwidths of 85 MHz and wider.
9. Refer to the data in **step 3** above. If option N9020A-B40, N9020A-MPB, and/or N9020A-DP2 is already present, **do not proceed** with the installation of this kit. Much of the hardware included in this kit is already installed. A different kit is available for this situation.
Refer to www.keysight.com/find/mxa_upgrades.
10. Refer to the data in **step 4** above. If the Front End has a Hw Id of 70, it already has the 150 MHz wide 1st IF bandpass filter and you do not need to perform the Replace A13A1 Bandpass Filter procedure.
11. Refer to the data in **step 3** above. If the analyzer has N9020A-CR3 and/or N9020A-CRP installed, verify that it also has a Front End Controller with Hw Id of either 41 or 75. If the Front End Controller has a Hw Id of 41 or 75, you do not need to perform the Replace Front End Controller procedure.
12. Refer to the data in **step 2** above. If the analyzer serial number prefix is \geq MY5051, SG5051, or US5051, you do not need to perform the Replace Low Band Switch Bracket procedure.

Update Instrument Software

Updating the instrument software and installing the necessary licenses before installing the new hardware will help ensure that the hardware installation was successful.

NOTE

The minimum instrument software version is A.13.15.

Go to the following website and determine whether or not the analyzer has the latest instrument software already installed:

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

If the analyzer does not have the latest instrument software already installed, download and install the latest version.

Licensing the New Options

NOTE

If N9020AK-BU4, Analysis Bandwidth Upgrade, 85 MHz to 125 MHz, N9020AK-BU5, Analysis Bandwidth Upgrade, 85 MHz to 160 MHz will also be installed, the licenses provided by these kits should be installed at this time.

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 an email with an attached License File.
4. Locate a USB storage device. Perform a virus scan on this device before use.
5. Save the License File to the root directory of the USB Storage Device.
6. Connect the USB Storage Device to one of the analyzer's USB ports. Connect a mouse to another USB port. Windows will detect the new hardware and may display the configuration menu shown in **Figure 1**. This menu may be configured according to your preferences.

Figure 1 USB Storage Device Configuration Menu



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



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 14](#) to remove the outer case.

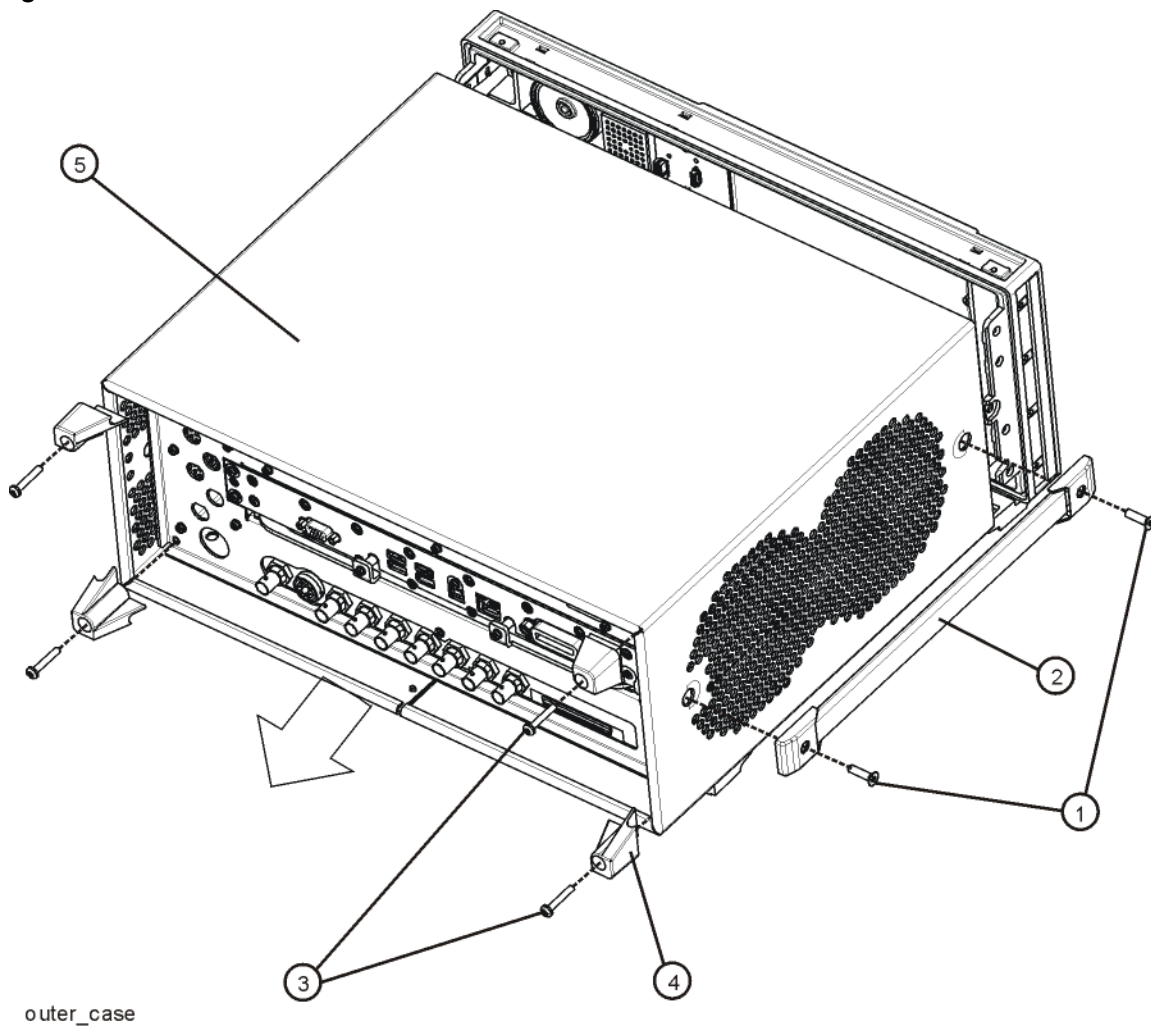
NOTE

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 3](#). 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 3 Standard Instrument Outer Case Removal



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

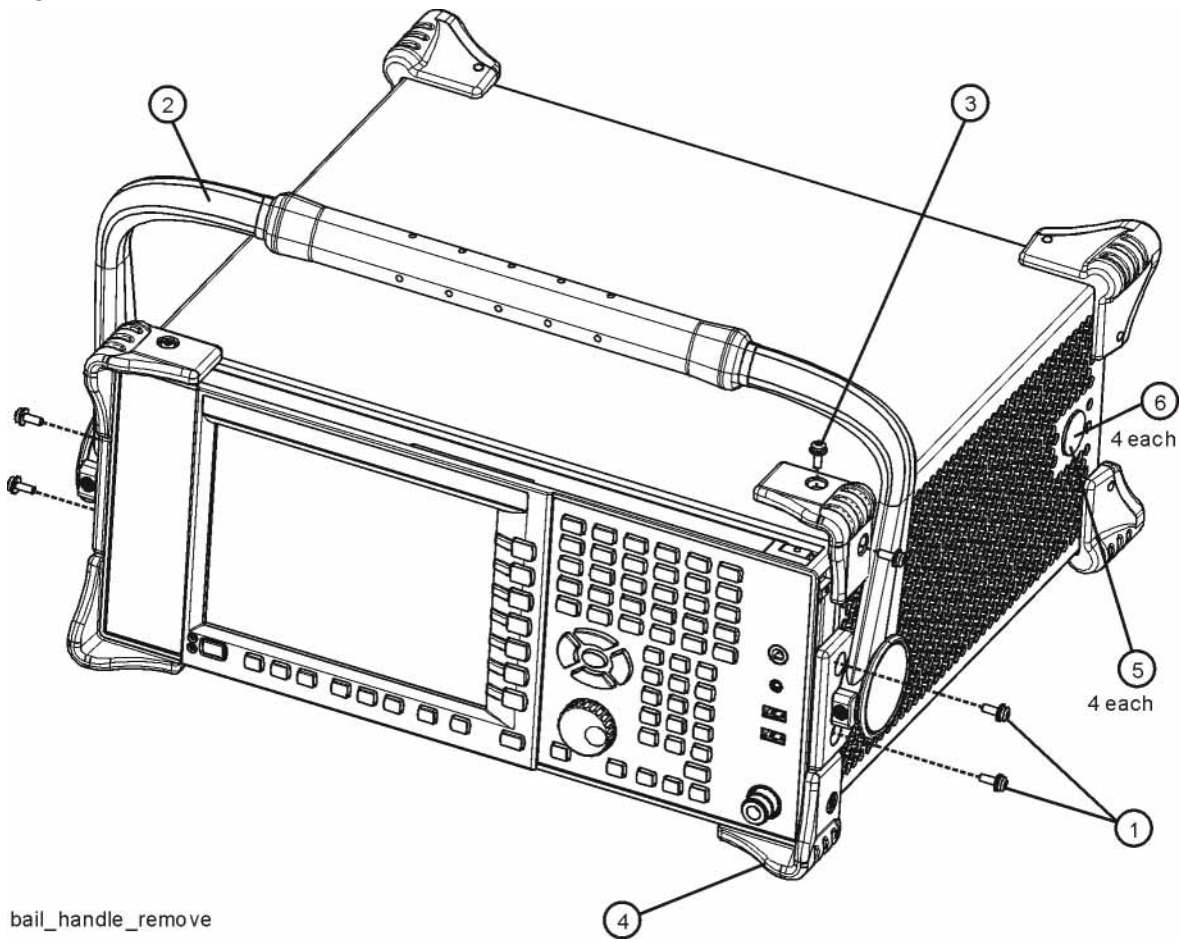
Portable Instrument (Option PRC)

NOTE

Make sure any adapters on the front panel are removed.

1. Disconnect the instrument from ac power.
2. Refer to **Figure 4**. Using the T-20 driver, remove the four screws (two on each side) (1) that hold the bail handle (2) to the front frame.

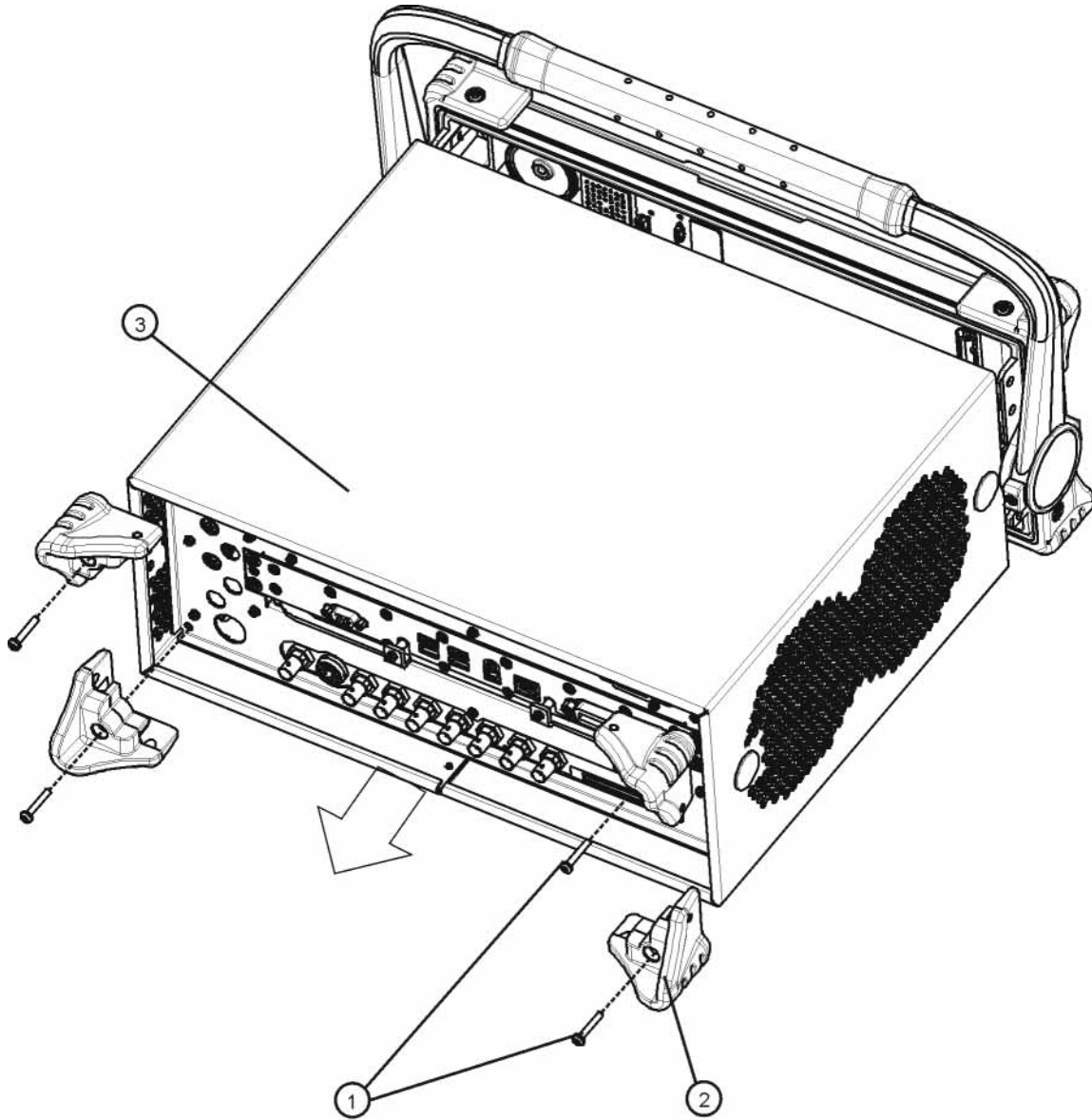
Figure 4 Bail Handle Removal



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

4. Refer to **Figure 5**. Using the T-20 driver, remove the four screws including washers (1) that hold the rear bumpers (2) in place.
5. Pull the instrument cover (3) off towards the rear of the instrument.

Figure 5 Option PRC Instrument Outer Case Removal

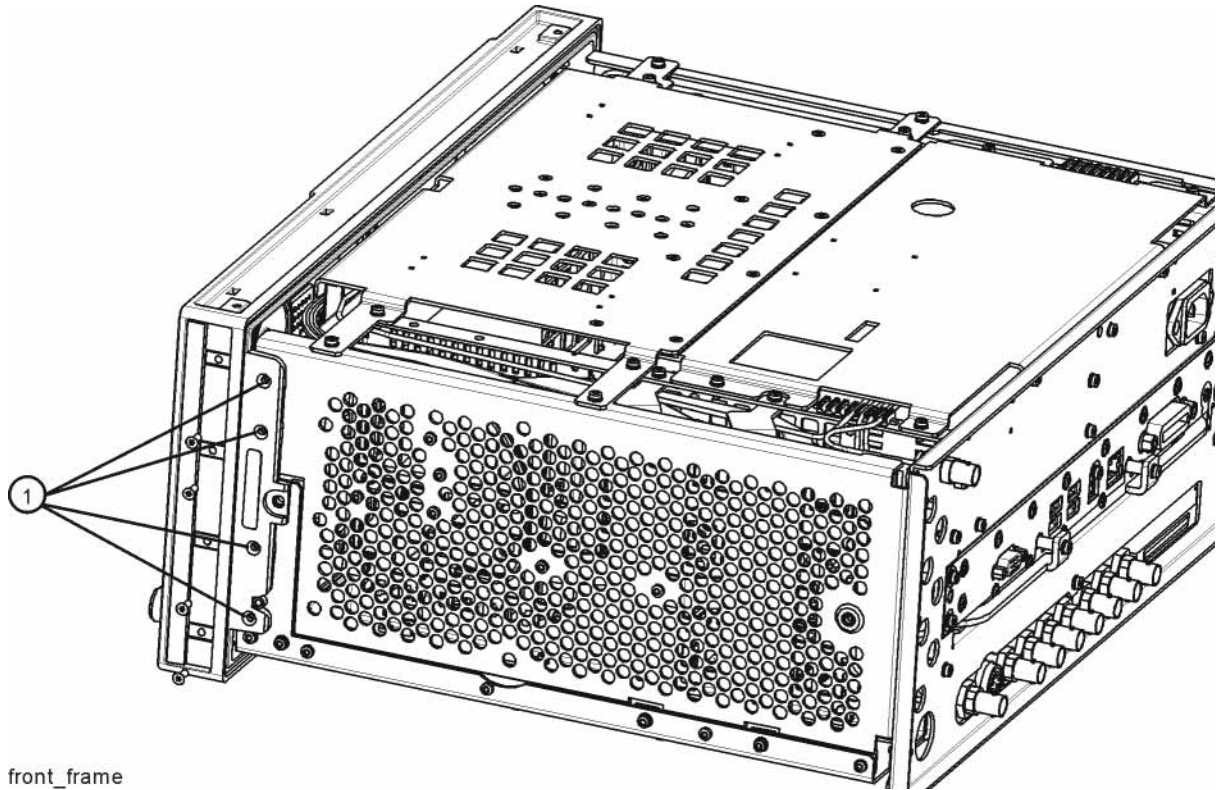


rear_bumper_remove

Front Frame Assembly Removal

1. Refer to **Figure 6**. Using the T-10 driver, remove the eight screws (1), four on each side, to detach the front frame from the chassis.

Figure 6 Front Frame Removal

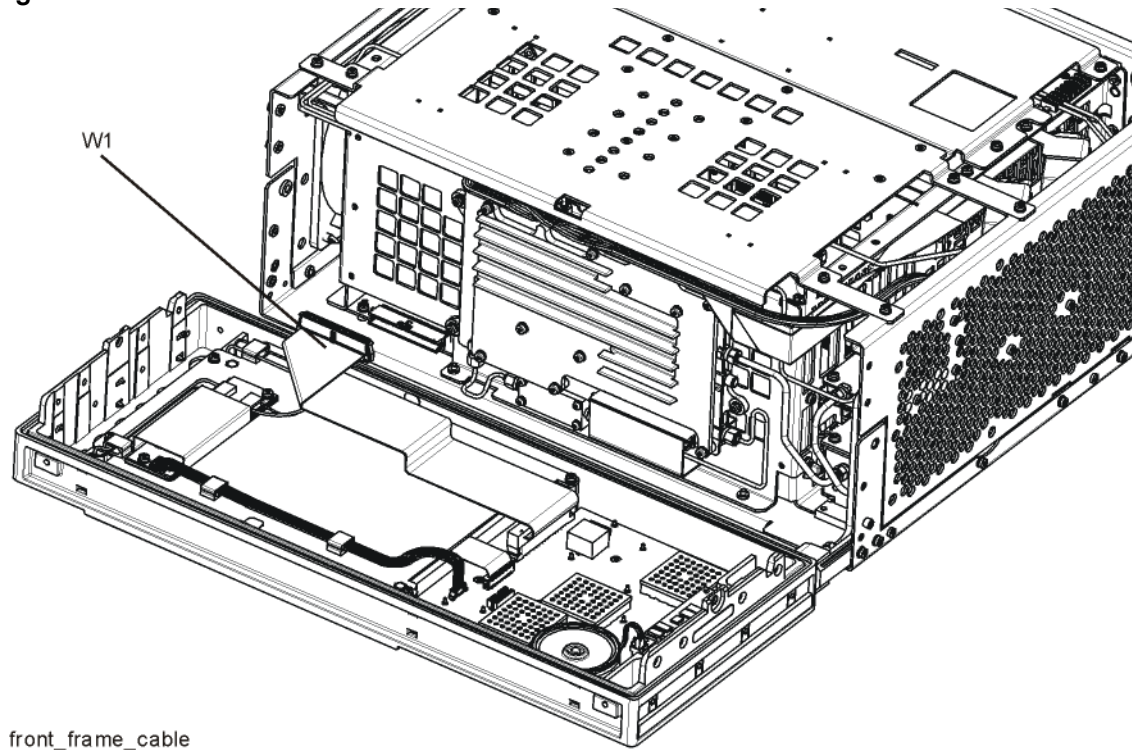


2. Refer to **Figure 7**. Pull the front frame carefully away from the chassis. Remove the ribbon cable W1 from the A8 Motherboard.

NOTE

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

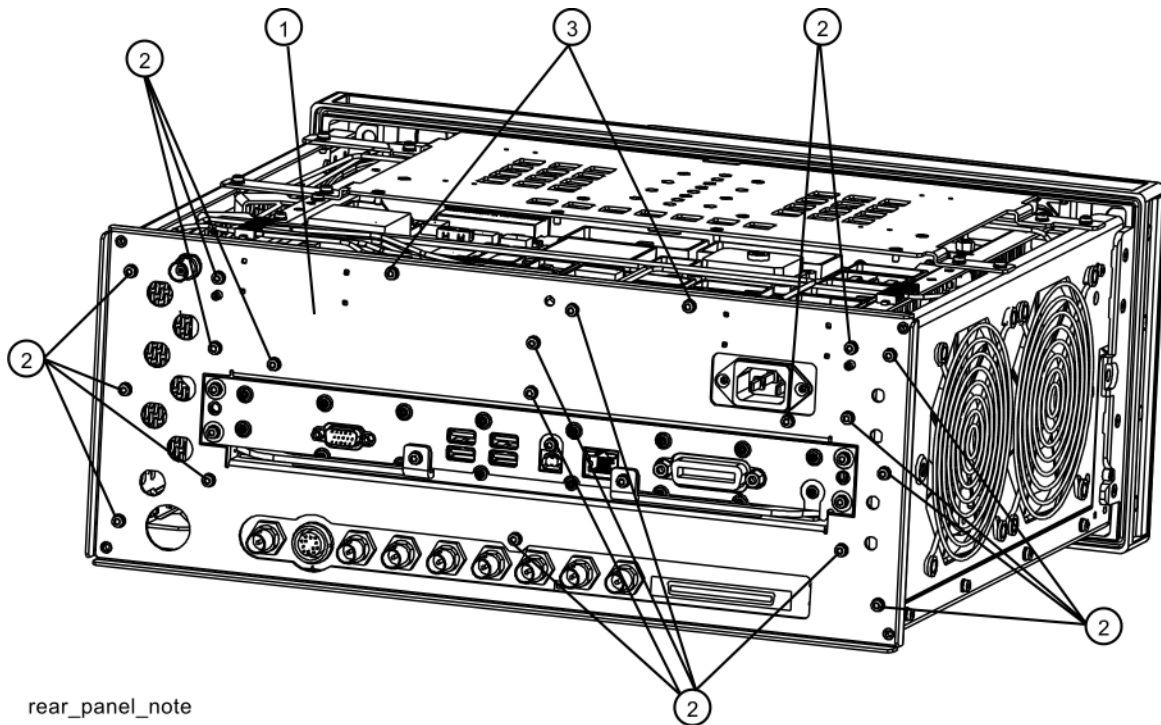
Figure 7 Front Panel Cable



Rear Panel Removal

1. Refer to **Figure 8**. Using the T-10 driver, remove the twenty screws (2) and (3) attaching the rear panel (1) to the chassis. The rear panel can now be removed.
2. Use a 9/16-inch socket wrench to remove the nut securing the EXT REF IN connector from the rear panel.

Figure 8 Rear Panel Removal

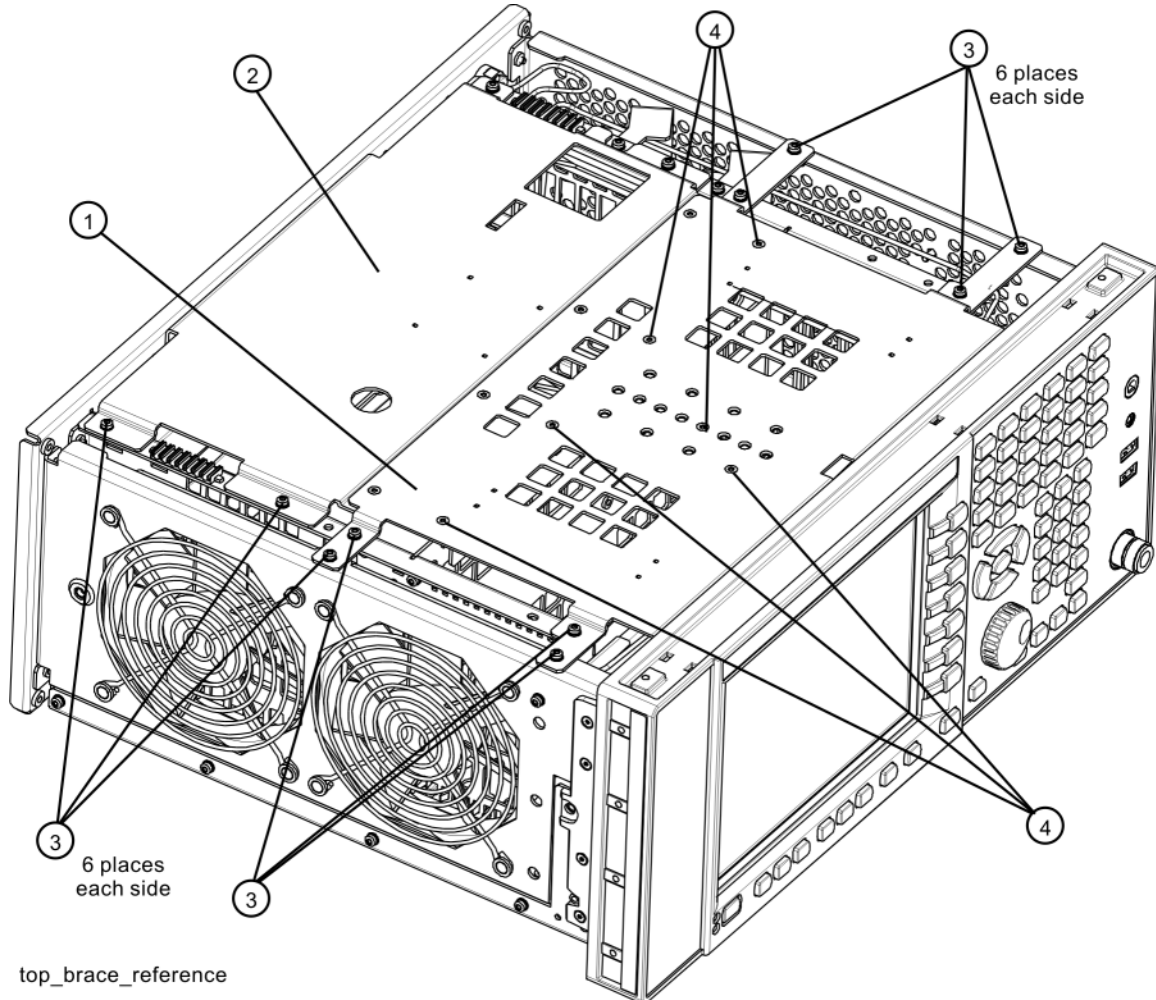


3. Instruments with Option CR3 or CRP will have an additional cable W39 that is attached to the rear panel. Remove W39 using either a 5/16" nut driver or a 5/16" open-end wrench.
4. The rear panel can now be removed.

Top Brace and Reference Bracket

1. Refer to **Figure 9**. To remove the top brace (1) and reference bracket (2), use the T-10 driver to remove the twelve panhead screws (3) (0515-0372), six on each side, attaching the braces to the chassis. Also remove the six flathead screws (4) (0515-1227) attaching the top brace to the boards.

Figure 9 Top Brace and Reference Bracket Removal

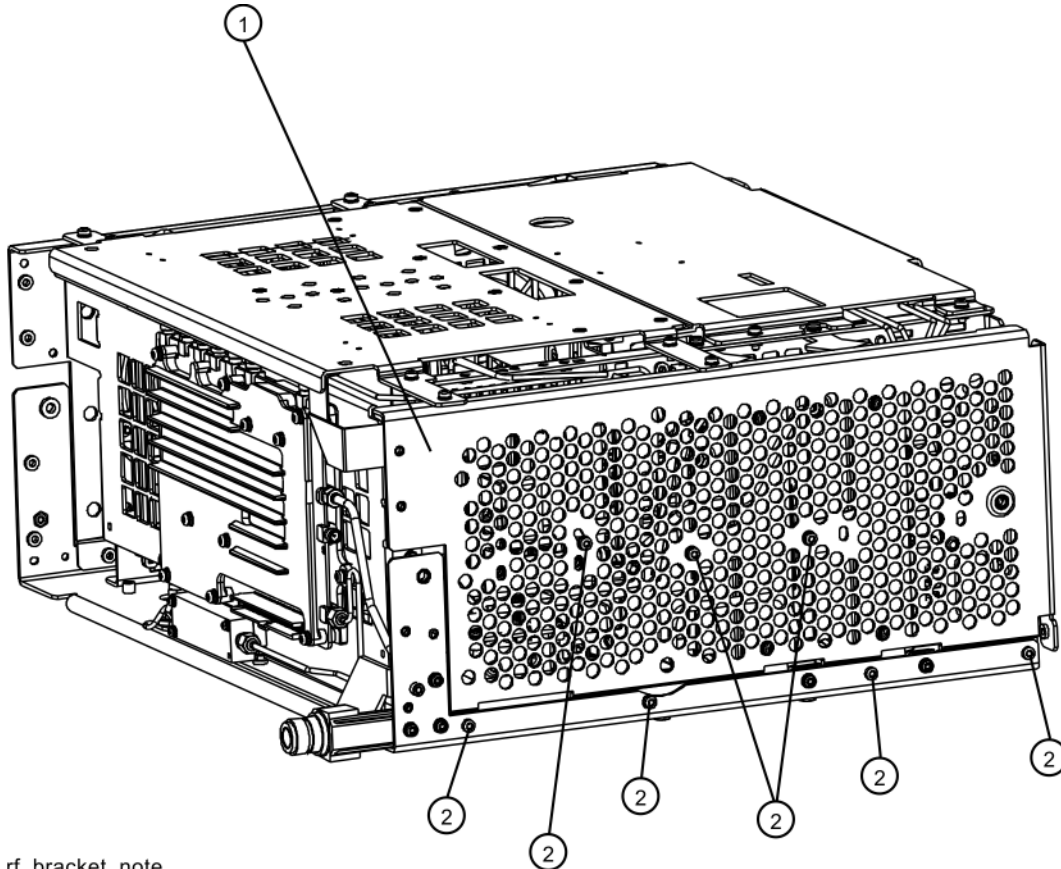


2. Remove the four flat head screws securing the reference bracket to the top brace. The top brace will be reinstalled later, but the reference bracket will not be reused.

RF Bracket Removal

1. Refer to **Figure 10**. Remove the RF bracket (1) by removing the remaining seven screws (2) using the T-10 driver.

Figure 10 RF Bracket Removal

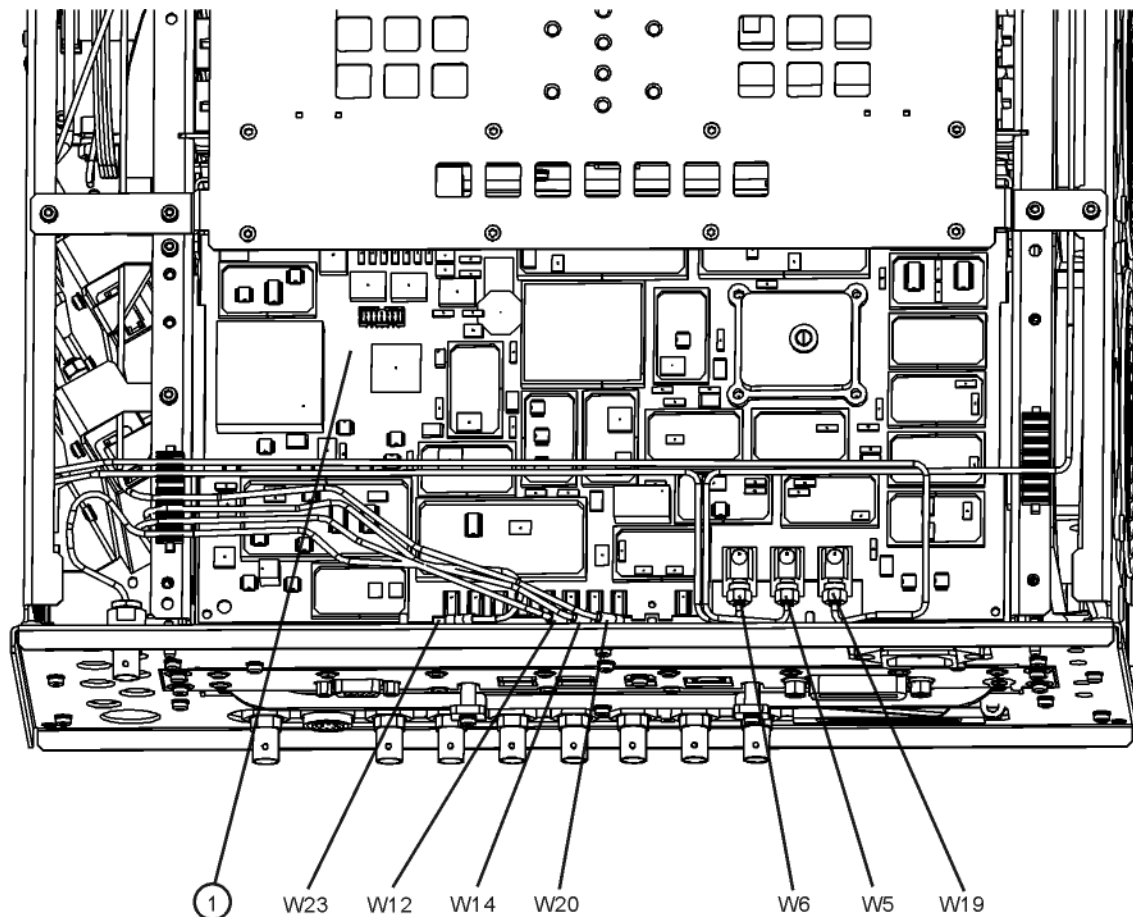


rf_bracket_note

Replace A16 Reference and A6 Power Supply Assemblies

1. Refer to **Figure 11**. Remove the cable ties securing the flexible coax cables and semi-rigid cables to each other above the A16 Reference Assembly.
2. Using a 5/16-inch wrench, disconnect each end of semi-rigid coax cables W5, W6, and W19. These cables will not be re-used.
3. Disconnect flexible coax cables W12, W14, W20, and W23 from the A16 Reference Assembly (1).
4. Remove the reference assembly from the chassis by leveraging up on the ejector and pulling the board out on the other side.

Figure 11 Reference Board Cables, Instruments without Option B40, MPB, or DP2



reference_cables

5. Refer to **Figure 12** and **Figure 13**. Remove the six screws (1) attaching the CPU assembly to the chassis.
6. Remove the CPU assembly from the chassis by pulling straight out the back. Use the two ejectors to pull the CPU assembly out from the chassis.

Figure 12 Current CPU Assembly - Rear Panel View

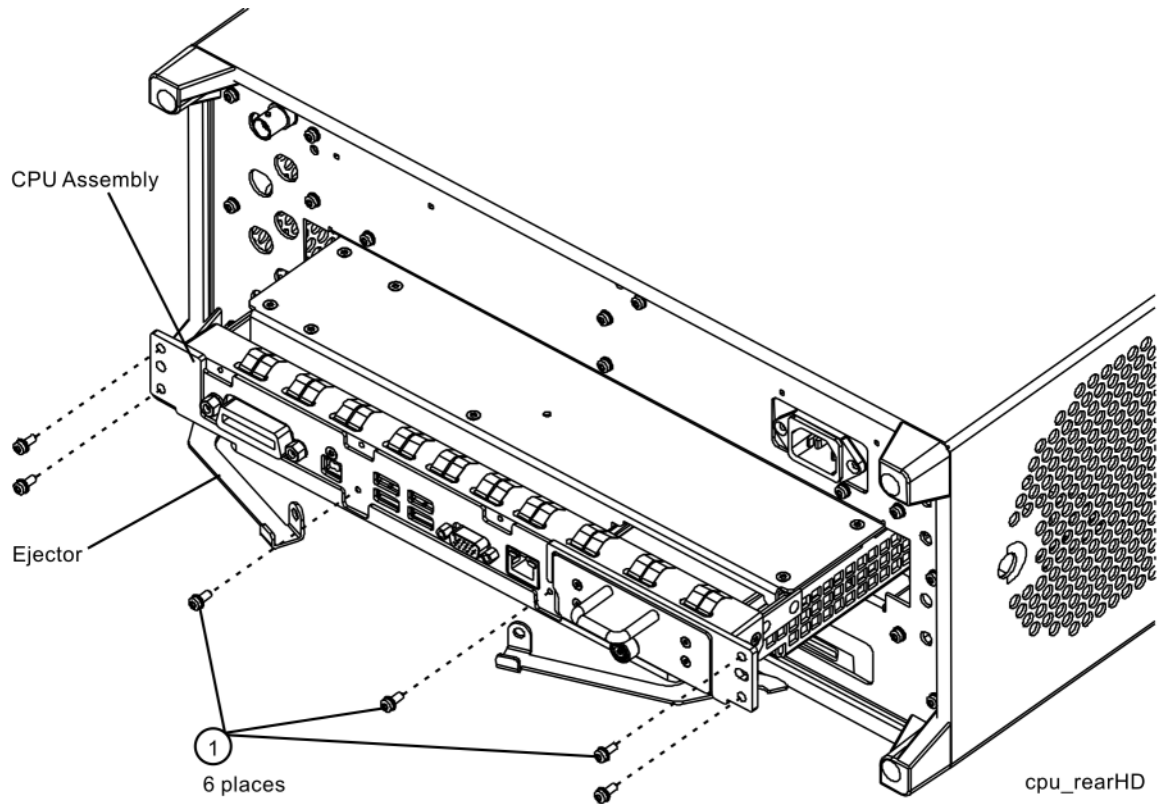
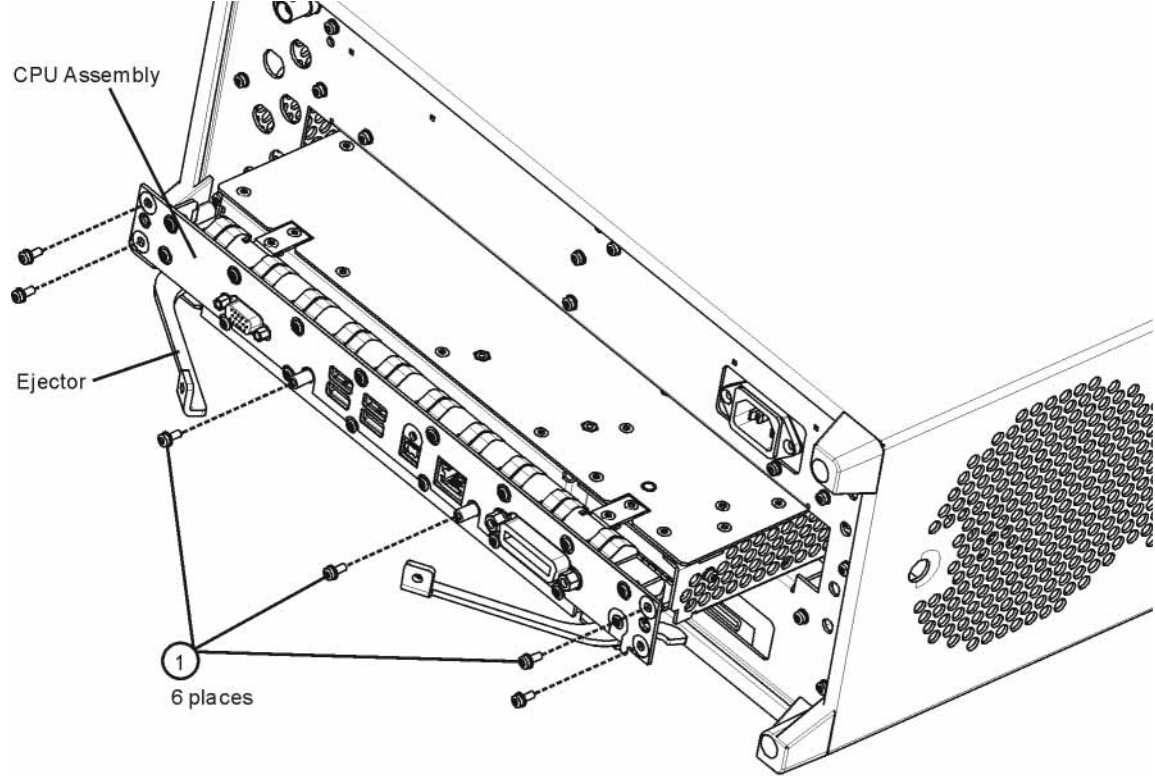
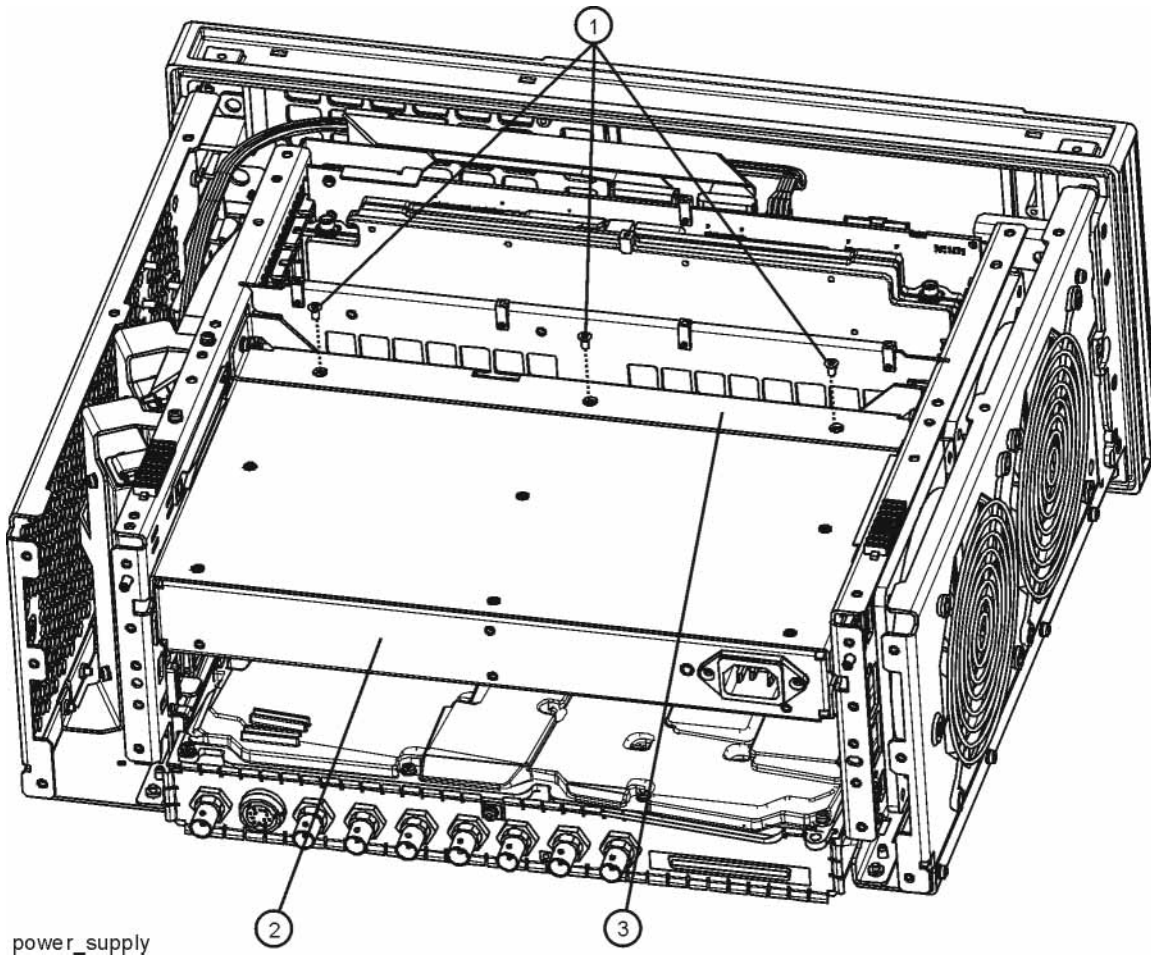


Figure 13 Old CPU Assembly - Rear Panel View



7. Refer to **Figure 14**. Remove the three screws (1) attaching the power supply (2) to the power supply bracket (3). Keep these screws; they will be used later.

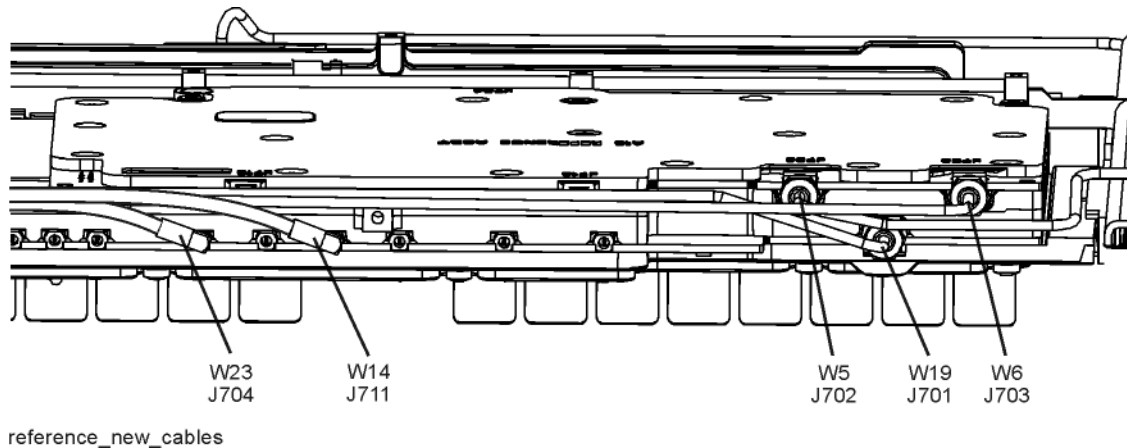
Figure 14 Power Supply Assembly Removal



8. Remove the power supply assembly from the chassis by pulling straight out the back.
9. Locate the new A6 Power Supply assembly, **0950-5012**, in the kit. Slide the power supply assembly into the slot at the rear of the instrument push on assembly to mate the connectors to the Midplane assembly.
10. Refer to **Figure 14**. Replace the three screw (1) through the power supply bracket (3) and into the power supply (2). Torque to 9 inch-pounds.
11. Refer to **Figure 12** and **Figure 13**. Slide the CPU assembly into the slot at the rear of the instrument and use the ejectors to push on the assembly to mate the connectors to the Midplane assembly. Secure the board with the ejectors.
12. Replace the six screws (1) that attach the CPU assembly to the chassis. Torque to 9 inch-pounds.

13. Locate the new A16 Reference assembly, **N9020-60200**, in the kit. Slide the reference assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the Midplane assembly. Secure with the ejector.
14. Refer to **Figure 15**. Locate semi-rigid coax cable **N9020-20064** (W5) in the kit. Connect this cable between A16J702 on the A16 Reference Assembly and A13J1 on the A13 Front End Assembly. Torque to 10 inch-pounds.

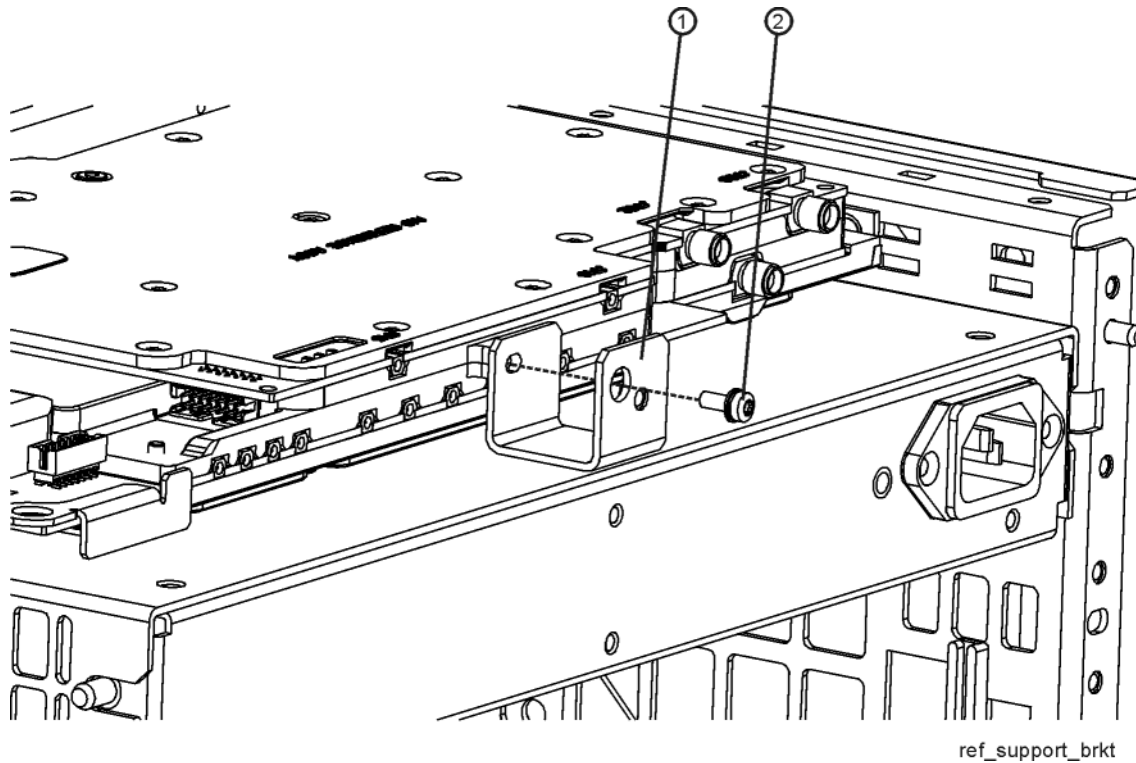
Figure 15 Reference Board Cables - Options B85, B1A, B1X, B40, MPB, DP2



15. Locate semi-rigid coax cable **N9020-20033** (W6) in the kit. Connect this cable between A16J703 on the A16 Reference Assembly and A14J200 on the A14 LO Synthesizer Assembly. Torque to 10 inch-pounds.
16. Locate semi-rigid coax cable **N9020-20065** (W19) in the kit. Connect this cable between A16J701 on the A16 Reference Assembly and Port 2 of A9 Input Attenuator A. Torque to 10 inch-pounds.
17. Reconnect flexible coax cable W14 to A16J711 on the A16 Reference Assembly.
18. Reconnect flexible coax cable W23 to A16J704 on the A16 Reference Assembly.
19. Reconnect flexible coax cable W20 to A16J705 on the A16 Reference Assembly.

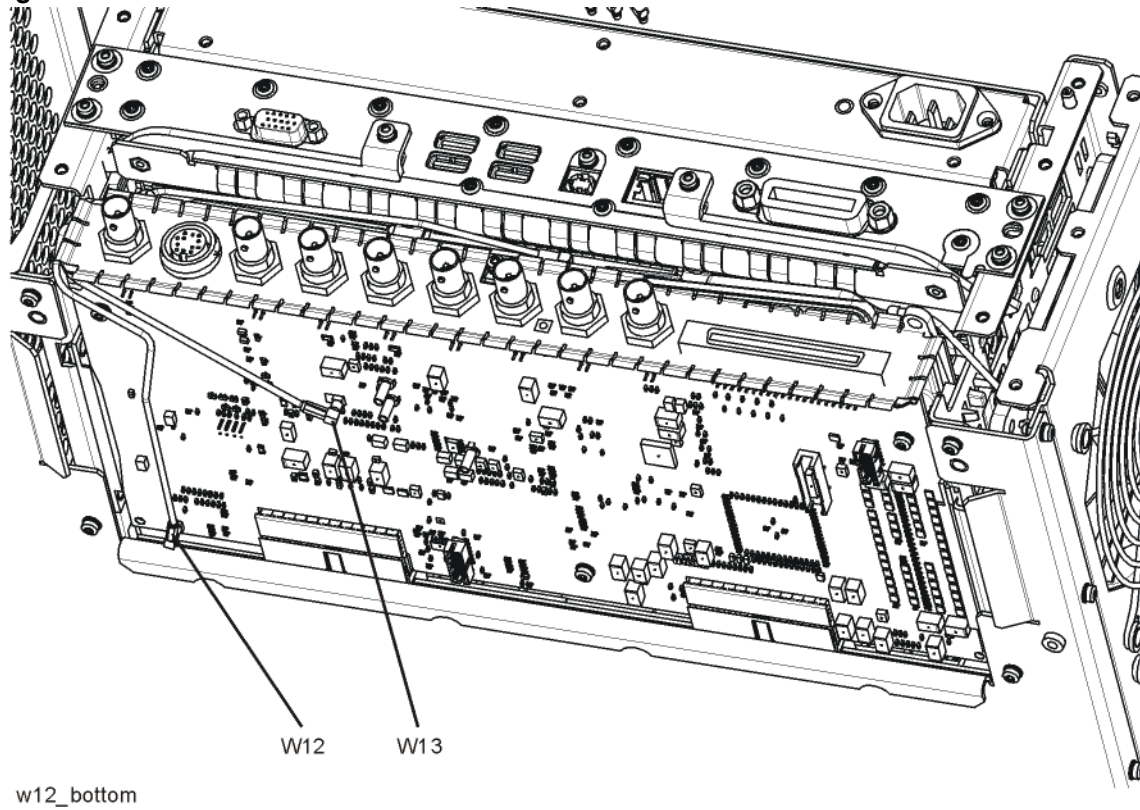
20. Refer to **Figure 16**. Locate the reference support bracket, **E4410-00108** and 0515-0372 screw in the kit. Secure the reference support bracket to the A16 Reference assembly as shown. Torque to 9 inch-pounds. The original reference bracket will not be reused.

Figure 16 Install Reference Support Bracket



21. Refer to **Figure 17**. Remove cable W13 connecting A3 Digital IF J15 to A2 Analog IF J601. This cable will not be reused.

Figure 17 W12 and W13 Removal



22. Disconnect cable W12 from A3 Digital IF J14. The other end of W12 was disconnected earlier from the A16 Reference. Remove the cable; it will not be reused.
23. Remove cable W15 connecting A2 Analog IF J100 to A13 Front End J7. This cable will not be reused.

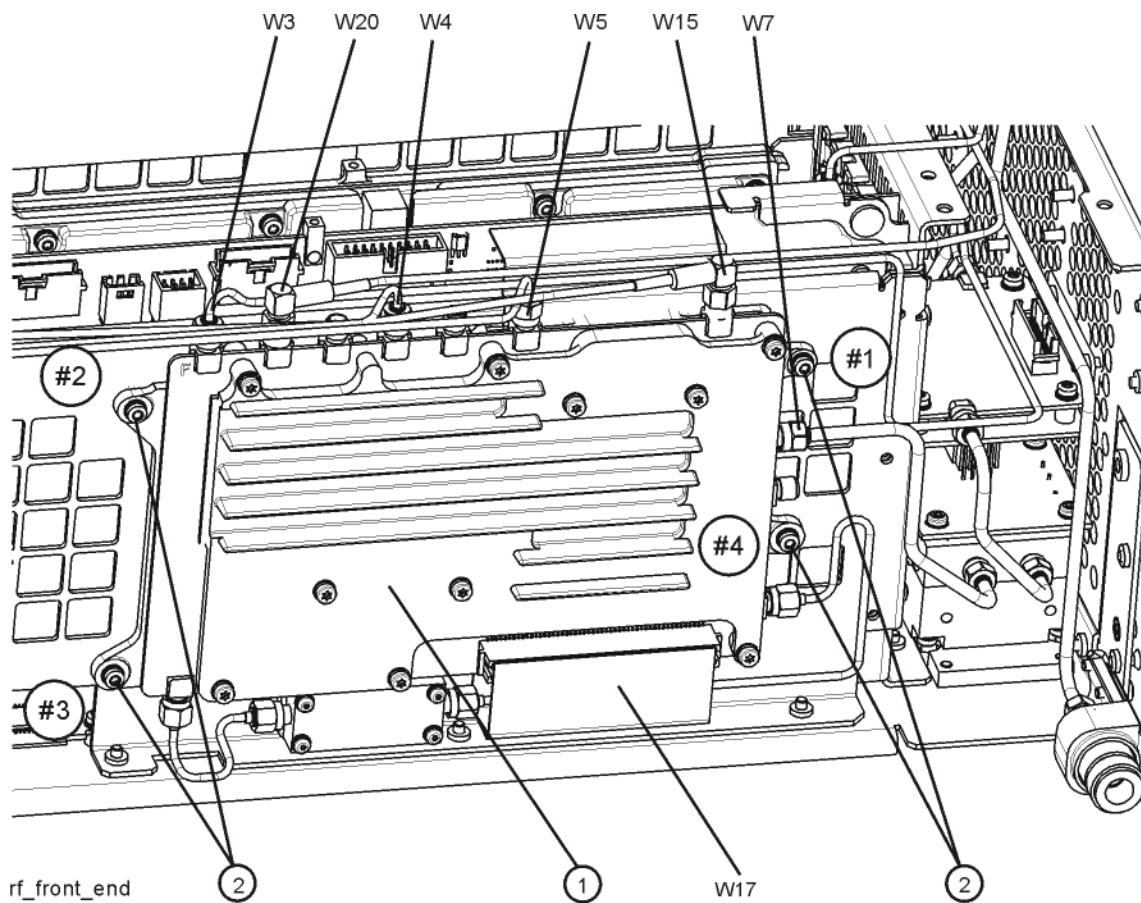
Replacing A13A1 Bandpass Filter

NOTE

Refer to Analyzer Information at the beginning of the Installation Procedure. Do not perform this procedure if the Front End has a Hw Id of 70.

1. Cut the cable ties securing the flexible coax cables and wire harnesses to the semi-rigid coax cables above the A13 RF Front End Assembly.
2. Refer to **Figure 18**. Using the 5/16 inch wrench, remove the cables W3, W4, W5, W7, and W20 attached to the RF Front End Assembly (1).
3. Disconnect the ribbon cable W17 from the Front End Control Assembly.
4. Remove the four screws (2) using the T-10 driver. The RF Front End Assembly can now be removed from the chassis.

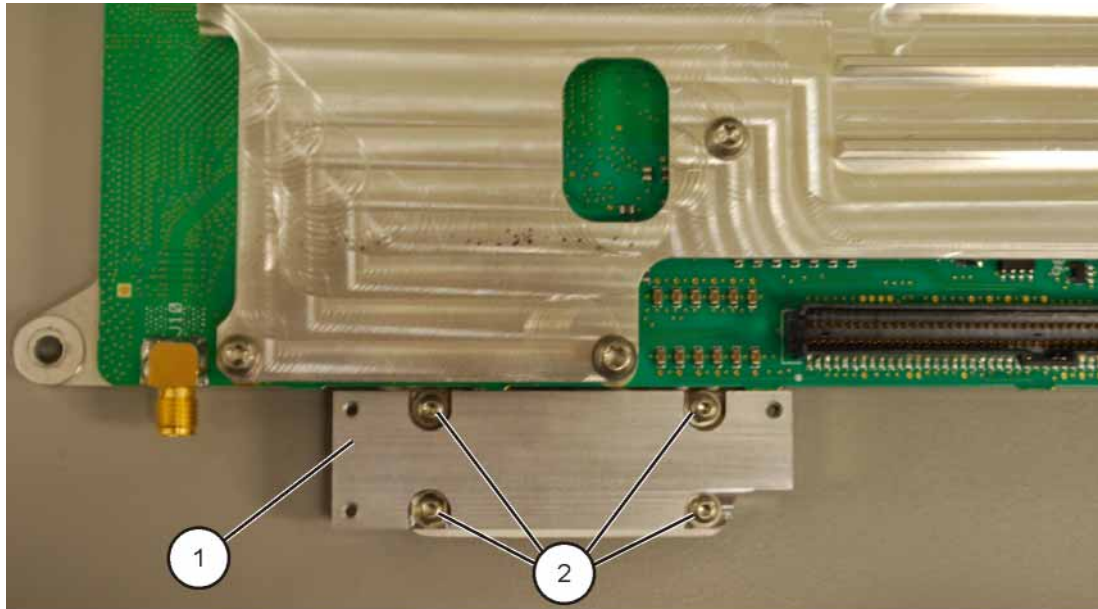
Figure 18 RF Front End Assembly Removal



5. Using the T-6 driver, remove the four screws (3) securing the A13A1 bandpass filter (4) to the A13 Front End Assembly. Discard these screws.

6. Disconnect ribbon cable W17 from A13J12.
7. Disconnect A13W1 (5) and A13W2 (6) from A13 Front End Assembly and remove the combination of A13W1, A13W2, and A13A1 as a unit. This unit will be used as a guide to assemble the new A13W1 and A13W2 to the new A13A1.
8. Refer to **Figure 19**. Locate the spacer, **E6607-25005**, in the kit. Install the spacer (1) where the old A13A1 bandpass filter was located. Secure with four 0515-0658 screws (2) and torque to 3 inch-pounds using the T-6 driver.

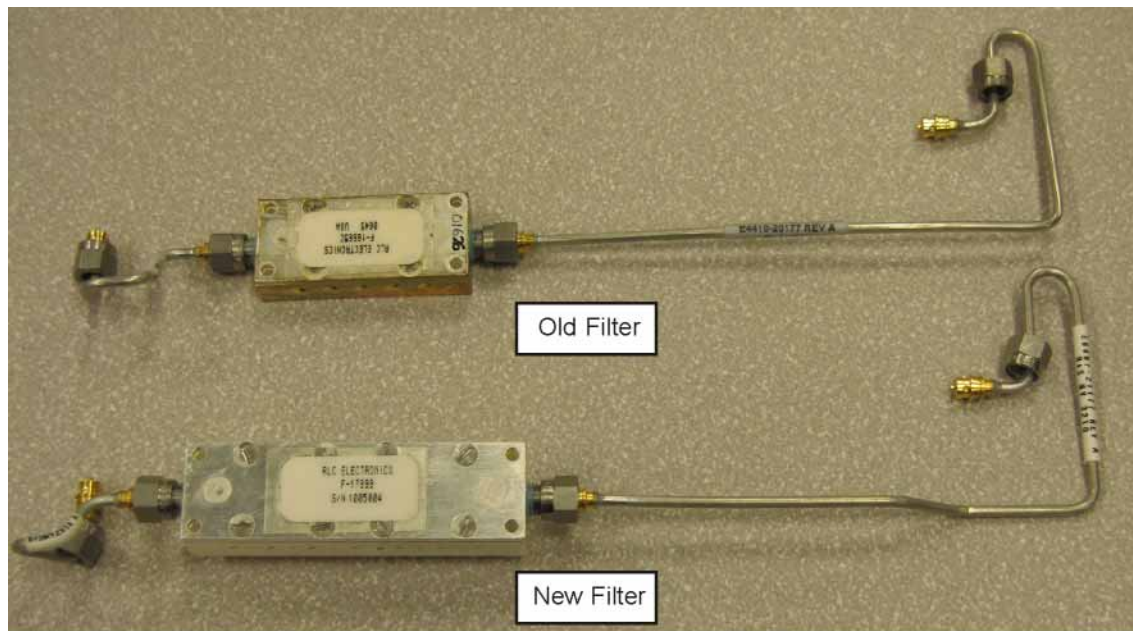
Figure 19 Install Spacer



spacer

9. In the kit, locate the new A13W1 (E6607-21178) and A13W2 (E6607-21179) semi-rigid coax cables and the new A13A1 (0955-2176) bandpass filter.
10. Refer to **Figure 20**. Position the A13A1 on the table with the SMA connectors to the left and right. Using the old A13A1/A13W1/A13W2 assembly as a guide, connect the new A13W1 (E6607-21178) to the left SMA connector of the new A13A1. Connect the new A13W2 (E6607-21179) to the right SMA connector of the new A13A1.

Figure 20 Connect Cables to New A13A1 Bandpass Filter

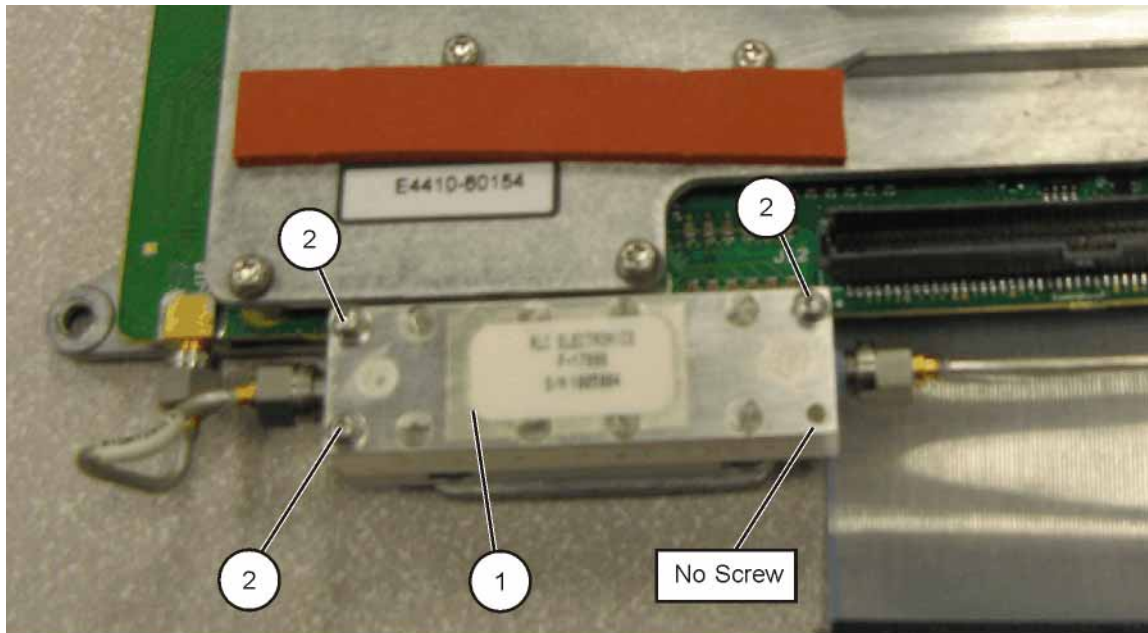


old_new_filter

11. Position the new A13W1 and A13W2 cables as necessary so that their unconnected ends align with the unconnected ends of the old A13W1 and A13W2 cables. Tighten the connectors at A13A1 until they are just finger tight.

12. Refer to **Figure 21**. Position the new A13A1 (1) on the spacer such that the holes in the A13A1 housing align with the holes in the spacer. Screws in only three of the four holes in the A13A1 housing will be used to secure A13A1 to the spacer. No screw will be used in the hole in the lower right corner of A13A1. Secure A13A1 (1) to the spacer using three 0515-0661 screws (2) and torque to 3 inch-pounds using the T-6 driver.

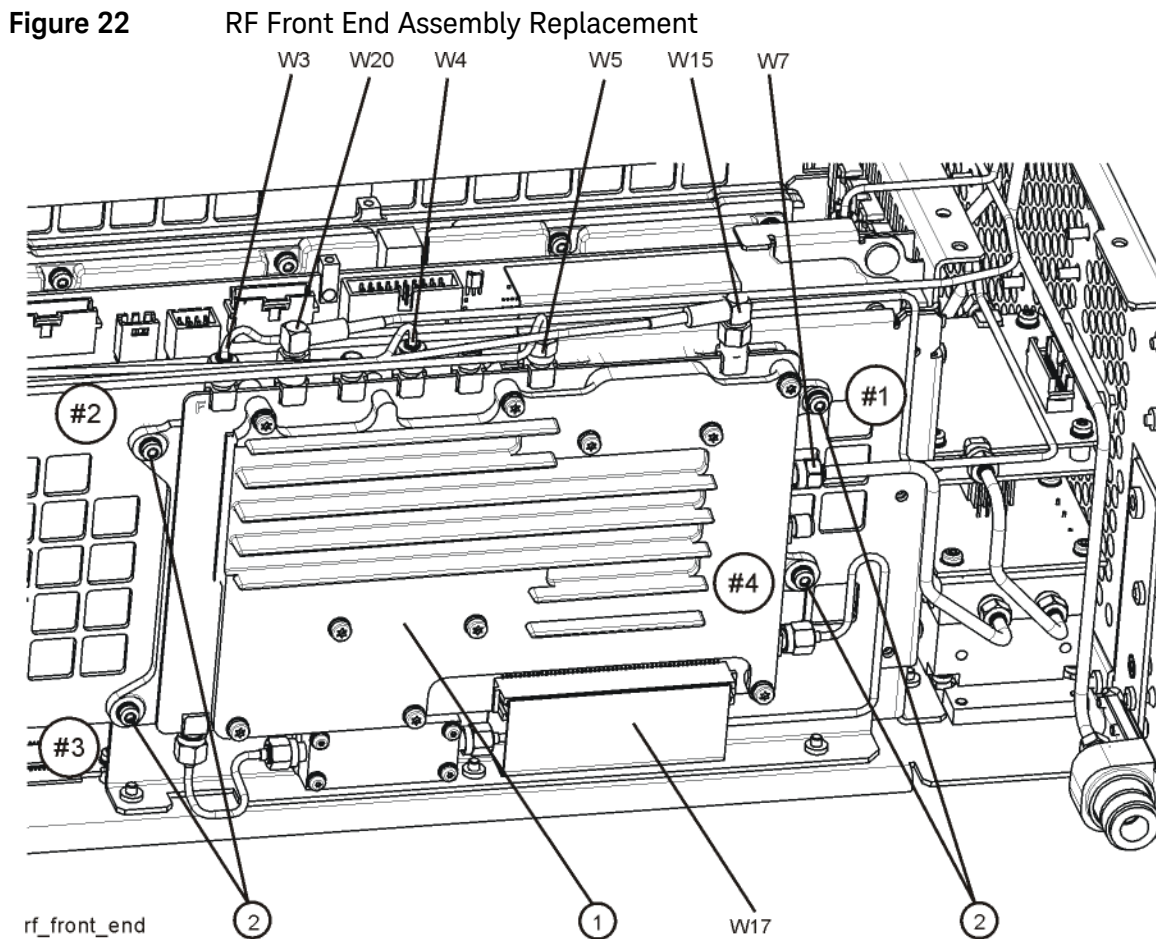
Figure 21 Mount New A13A1 Bandpass Filter



newfilter

13. Connect A13W1 to A13J10 and torque to 10 inch-pounds.
14. Connect A13W2 to A13J11 and torque to 10 inch-pounds.
15. Torque the SMA connectors on A13A1 to 10 inch-pounds.
16. Reconnect ribbon cable W17 to A13J12.

17. Refer to **Figure 22**. Place the RF Front End Assembly into the chassis. Replace the four screws (2). Using the T-10 driver, torque to 9 inch-pounds in the sequence shown, starting with #1.



18. Reattach the cables W4, W5, and W20 to the RF Front End Assembly (1). Torque the semi-rigid cables to 10 inch-pounds. W3 should not be reattached; this cable will be replaced with a new cable later in the process.

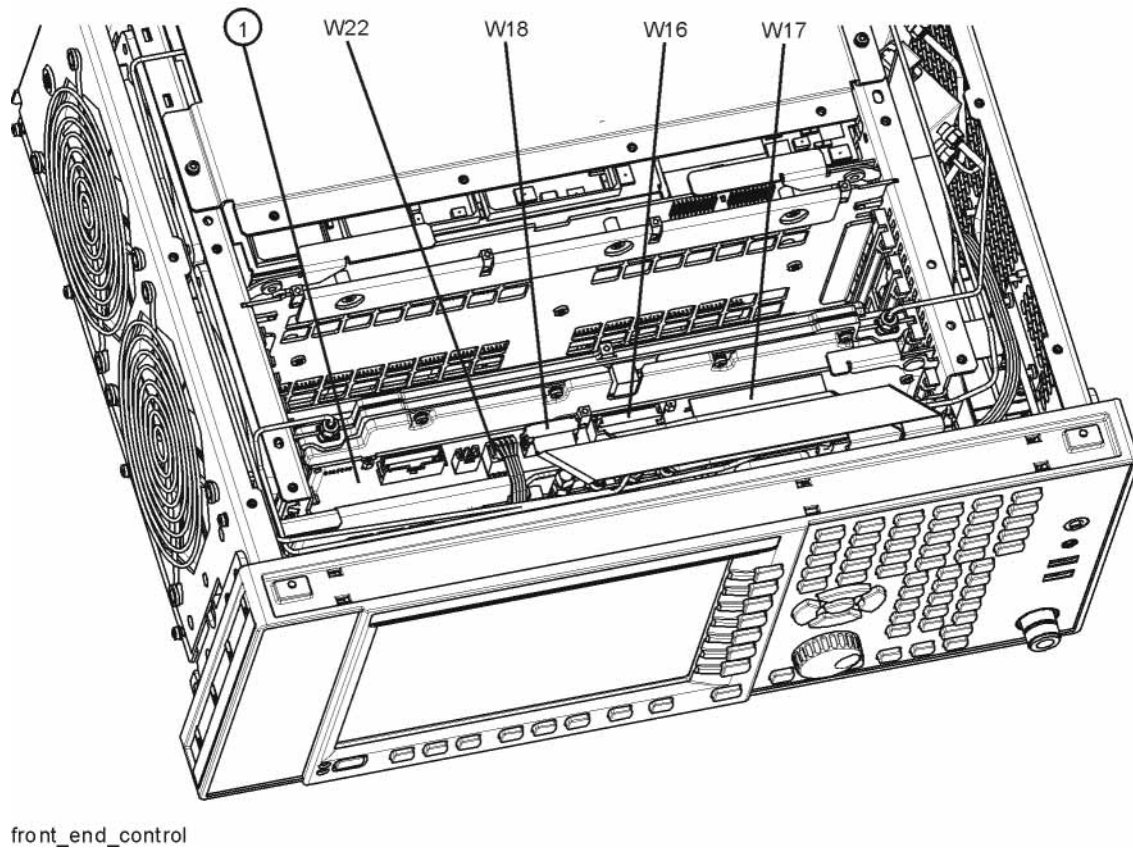
Replace Front End Control Assembly

NOTE

Refer to Analyzer Information at the beginning of the Installation Procedure. Do not perform this procedure if the Front End Controller has a Hw Id of 41 or 75.

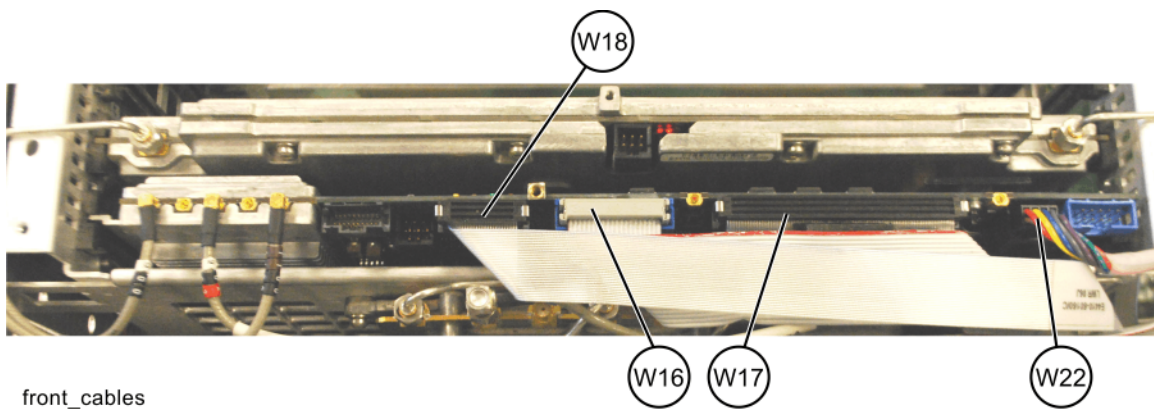
1. Refer to **Figure 23**. Remove the ribbon cables W16, W17, and W18 and the wire harness W22 from the Front End Control assembly (1).
2. The Front End Control assembly can now be unplugged from the motherboard by leveraging up on the ejector and lifting the board up on the other side.

Figure 23 Front End Control Assembly Removal



3. Refer to **Figure 24**. Install the Enhanced Front End Control assembly included in this kit into slot 6 in the chassis securing with the ejector.
4. Reattach the ribbon cables W16, W17, and W18 to the Front End Control assembly (1).
5. If the A15 Front End Control that was removed had Hw Id of 8, replace the existing W22 wire harness with the new W22 (N9020-60059) included in the kit. Connect W22 between J300 on the Front End Control and the A12 YTF Preselector.

Figure 24 Enhanced Front End Control Assembly Installation



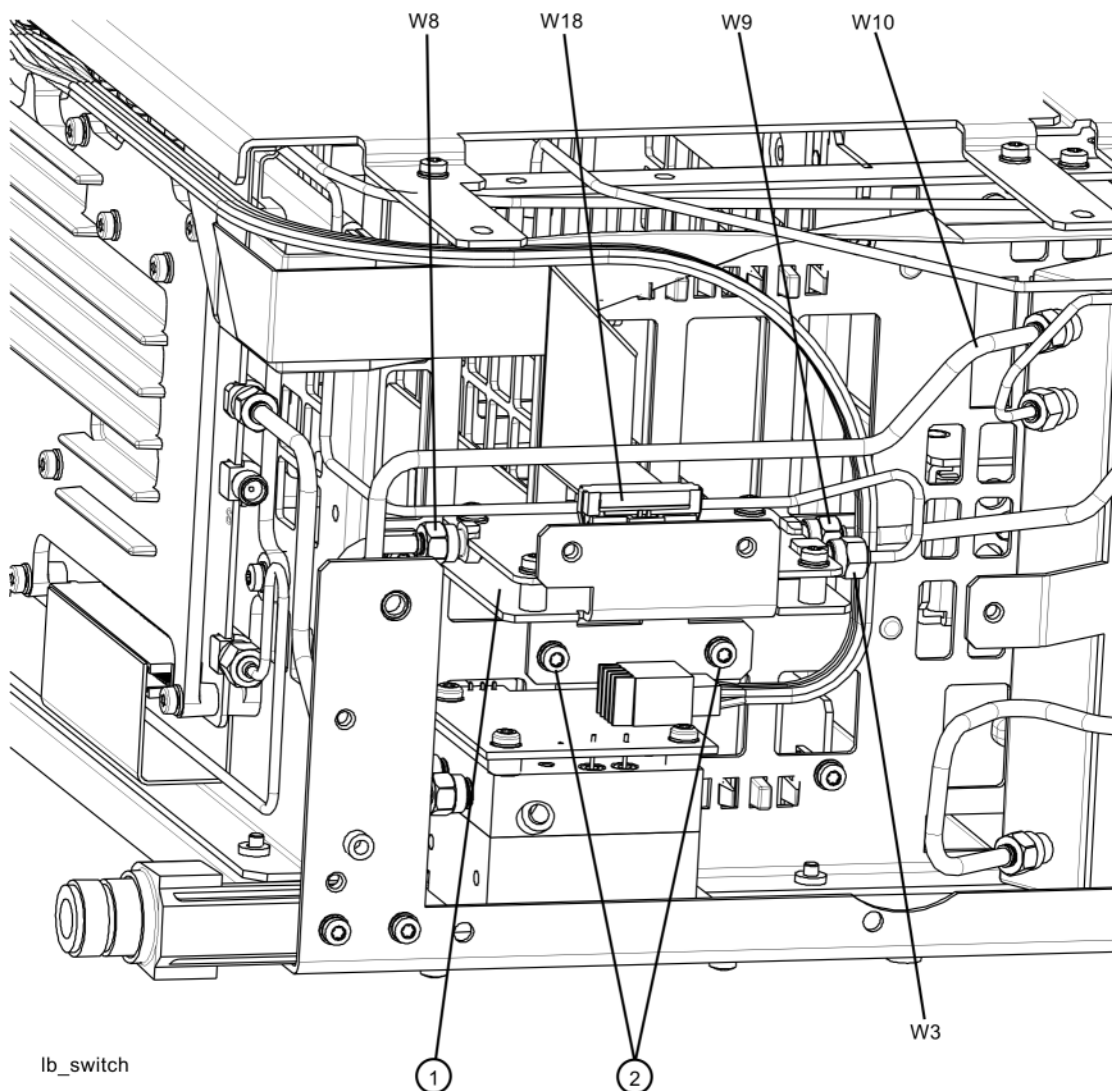
Replace Low Band Switch Bracket

NOTE

Refer to the “Analyzer Information” at the beginning of the Installation Procedure. Do not perform this procedure if the serial prefix is \geq MY5051, SG5051, or US5051.

1. Refer to **Figure 25**. Remove the ribbon cable W18.

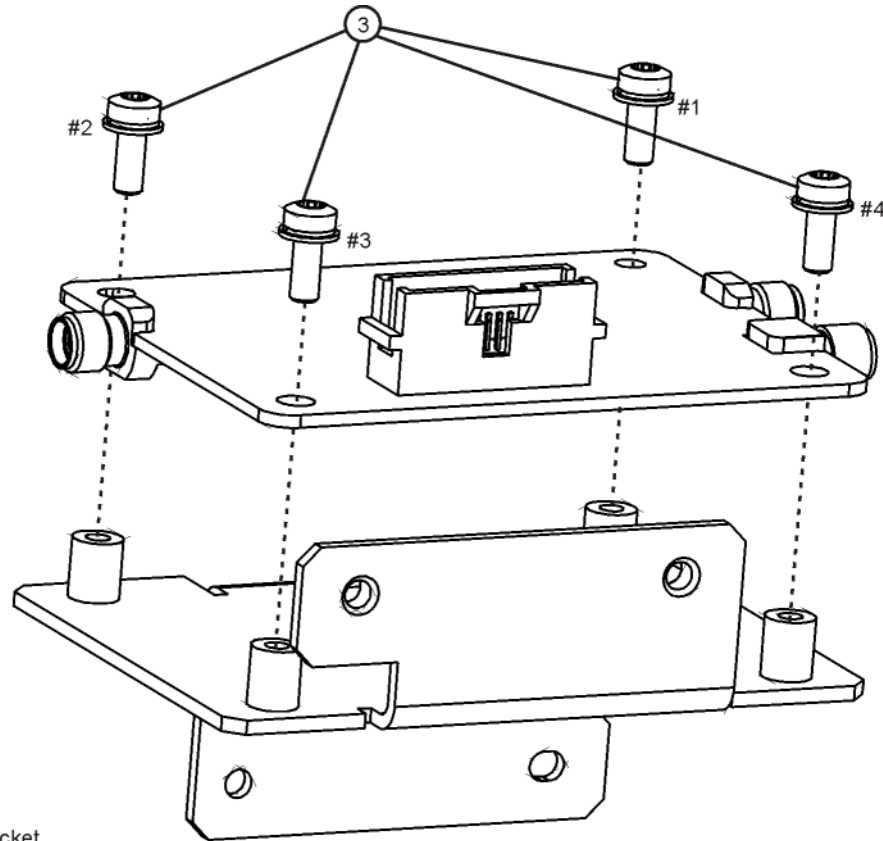
Figure 25 Low Band Switch Removal



2. Remove the semi-rigid cables W3, W8, W9, and W10 using the 5/16 inch wrench. These cables will not be used when the Low Band Switch is re-installed.
3. Remove the two screws (2) using the T-10 driver. The low band switch (1) can now be removed from the chassis.

4. Refer to **Figure 26**. To separate the switch from the bracket, remove the four screws (3) using the T-10 driver.

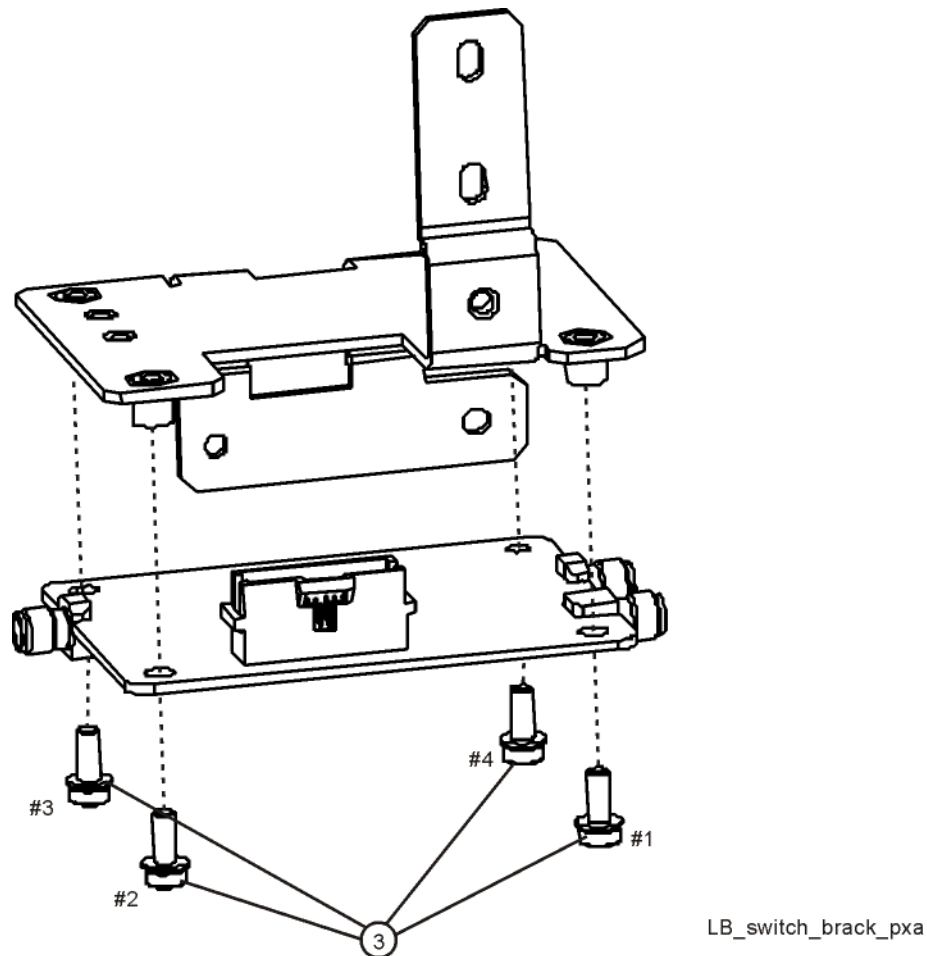
Figure 26 Low Band Switch and Bracket Disassembly



lb_switch_bracket

5. Refer to **Figure 27**. Place the switch onto the new low band switch bracket (**N9020-00023**) included in this kit and replace the four screws (3) (0515-0372). Note how the low band switch mounts beneath the new low band switch bracket. Torque to 9 inch-pounds in the sequence shown, starting with #1.

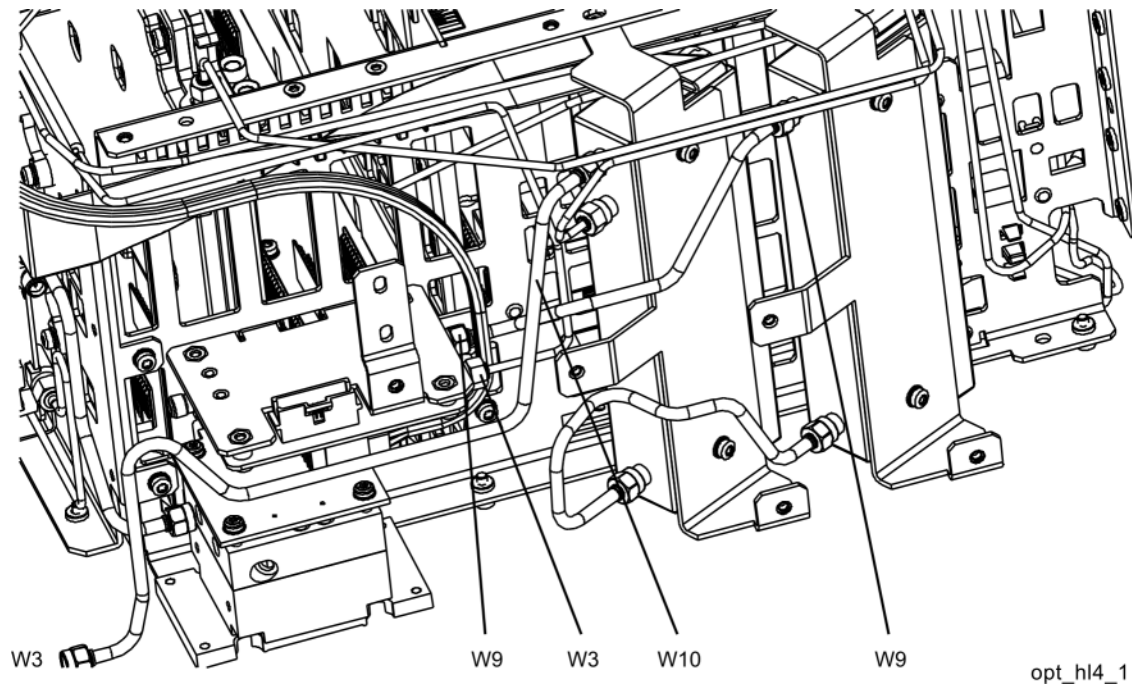
Figure 27 Low Band Switch and Bracket Replacement



6. Place the switch/bracket into place into the chassis and replace the two screws (0515-0372). Torque to 9 inch-pounds starting with the screw closest to the front of the instrument.

7. Refer to **Figure 28**. Locate the new W9 (**N9020-20153**) semi-rigid coax cable in the kit. Install W9 between the output of the A10 Input Attenuator and A11J1. Torque to 10 inch-pounds.

Figure 28 Installing New Coax Cables

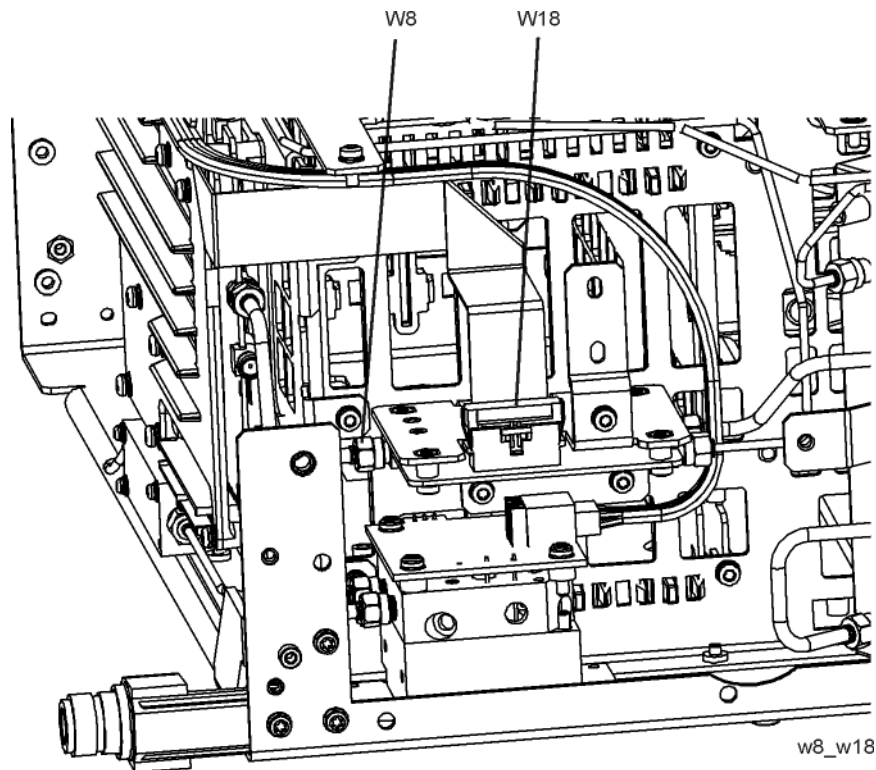


8. Locate the new W3 (**N9020-20101**) semi-rigid coax cable in the kit. Install W3 between the J2 of the A13 Front End Assembly and J2 of the A11 Low Band Switch. Torque to 10 inch-pounds.
9. Locate the new W10 (**N9020-20141**) semi-rigid coax cable in the kit. Install W10 between the Type N input connector and the input of the A9 Input Attenuator. Torque to 10 inch-pounds.

Installing Microwave Preselector Bypass Switches

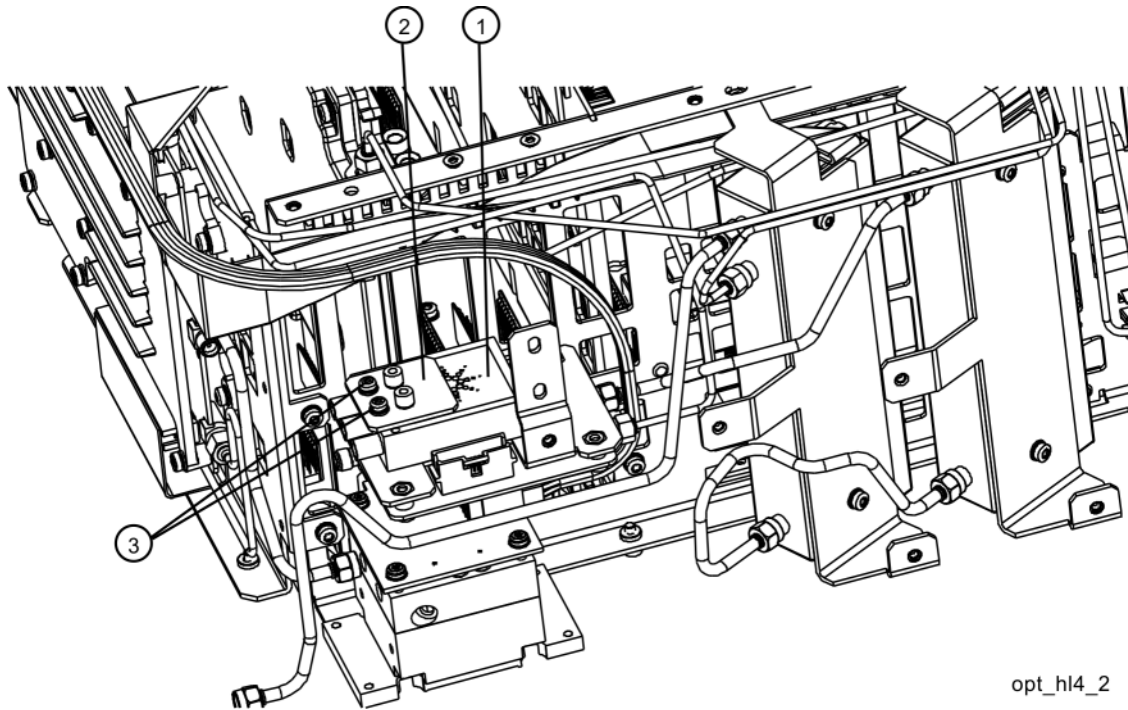
1. Refer to **Figure 29**. If the Replace Low Band Switch Bracket procedure was not performed, remove the ribbon cable, W18 and semi-rigid cable W8 using a 5/16 inch wrench. W8 will not be reused.

Figure 29 W8 and W18 Removal



2. Refer to **Figure 30**. Locate one of the two coaxial switches (N1810-60069) (1) and the PS Bypass Switch 1 Bracket (E4410-00104) (2) in the kit.

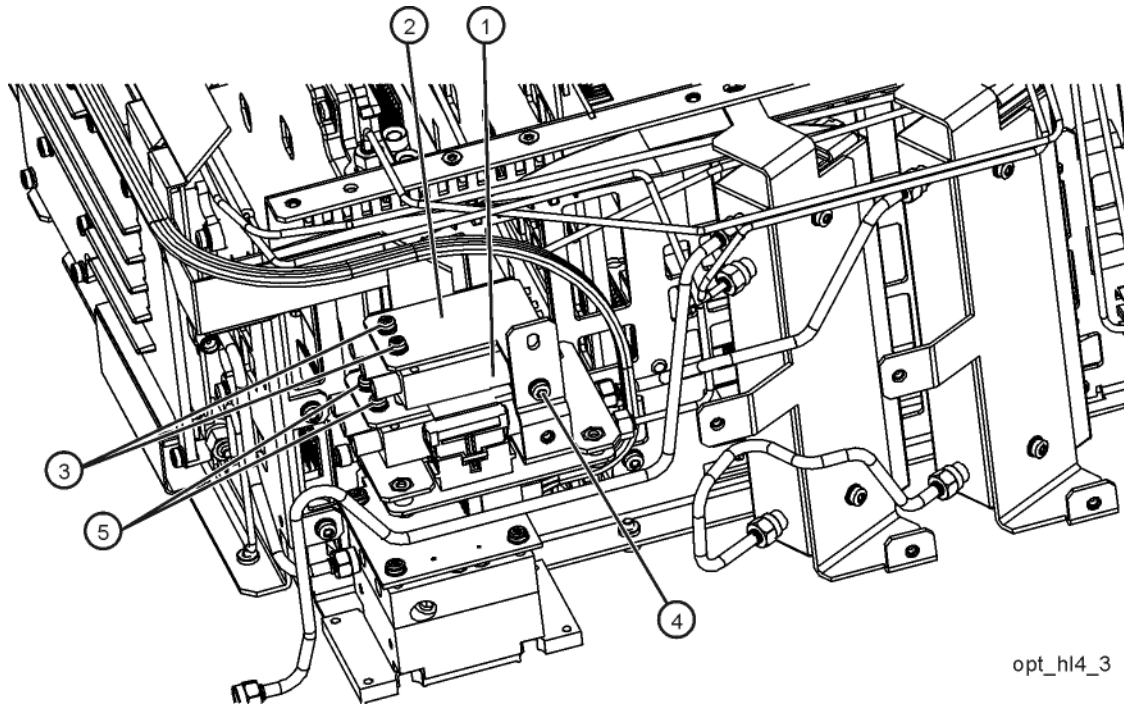
Figure 30 Switch 1 Placement



3. Mount the switch with the Keysight label facing up.
4. Attach the bracket and switch to the low band switch bracket using two 0515-1992 screws (3) included in the kit using the T-8 driver. Do not torque the screws at this time.

5. Refer to **Figure 31**. Locate the other coaxial switch (N1810-60069) (1) and the PS Bypass Switch 2 Bracket (E4410-00110) (2) in the kit.

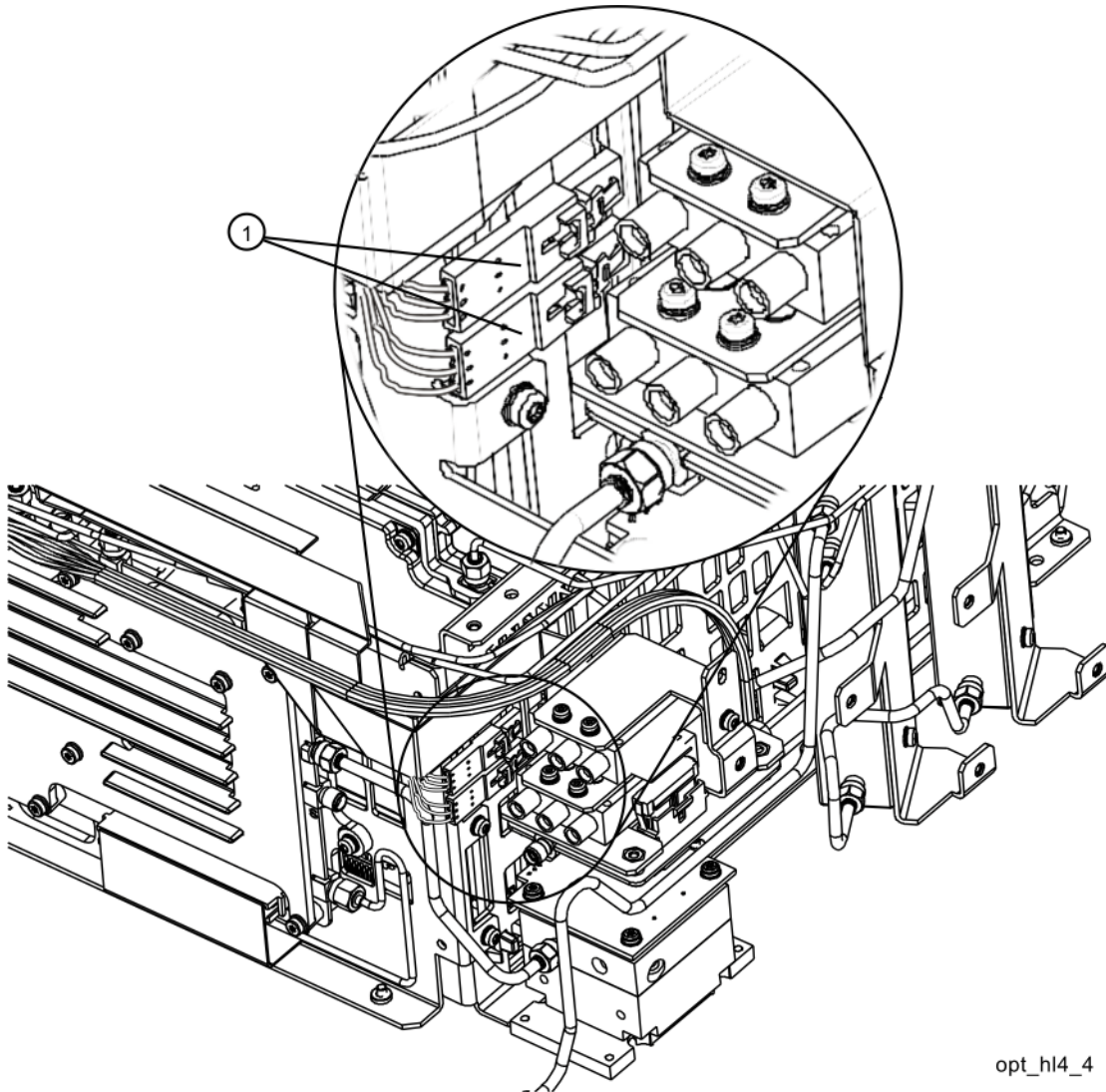
Figure 31 Switch 2 Placement



6. Place the second switch/bracket assembly (1)/(2) on the bracket previously installed. Assure Keysight label on switch is facing up. To attach use the two screws (3) (0515-1992) included in the kit using the T-8 driver.
7. Secure the bracket to the Low Band Switch bracket with a single screw (4) (0515-0372) included in the kit using the T-10 driver. Do not torque.
8. Align switches so they are parallel with the side of the instrument then torque the four screws (3) securing the switches to the brackets to 6 inch-pounds using the T-8 driver. Torque the screw (4) that secures the switch brackets together to 9 inch-pounds using the T-10 driver.

9. Locate the switch control cable harness (E4410-60159) in the kit.
10. Refer to **Figure 32**. Connect the end of the switch control harness with only one connector to J801 on the A15 Enhanced Front End Control Assembly.

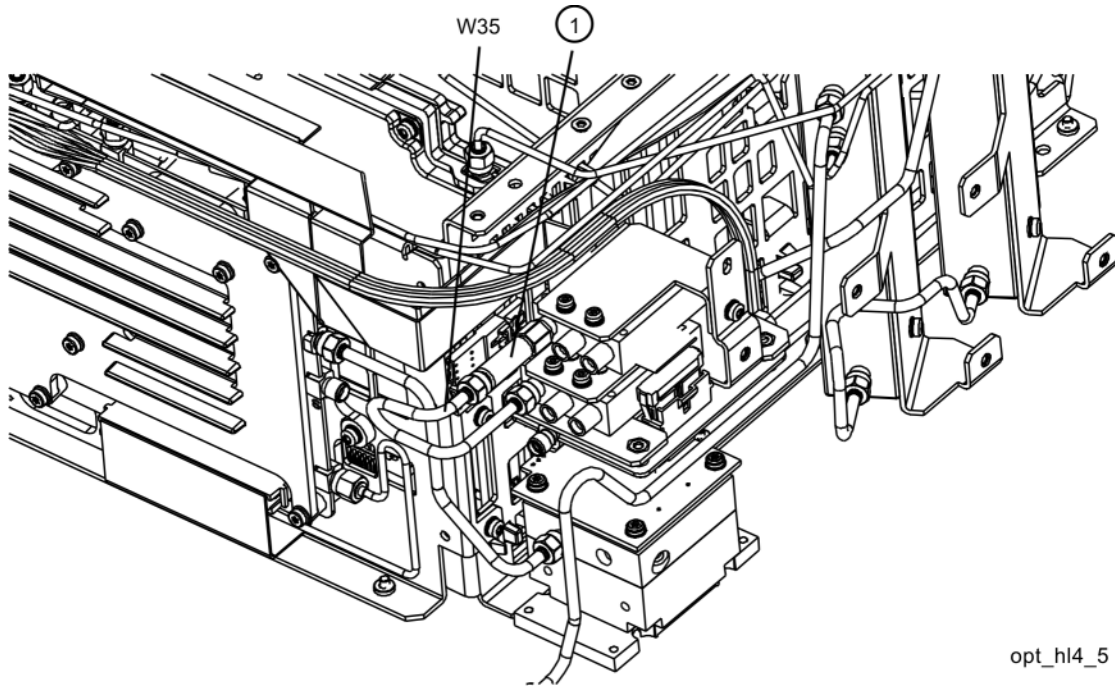
Figure 32 Wire Harness Routing



11. Connect the remaining two wire harness connectors (1) to the switches. Once connected, position the connections along side the switches.
12. Connect ribbon cable W18 to J4 of the A11 Low Band Switch.

13. Refer to **Figure 33**. Attach the coaxial fixed attenuator (1) included in the kit to Switch 2 port 1. Torque to 10 inch-lbs.

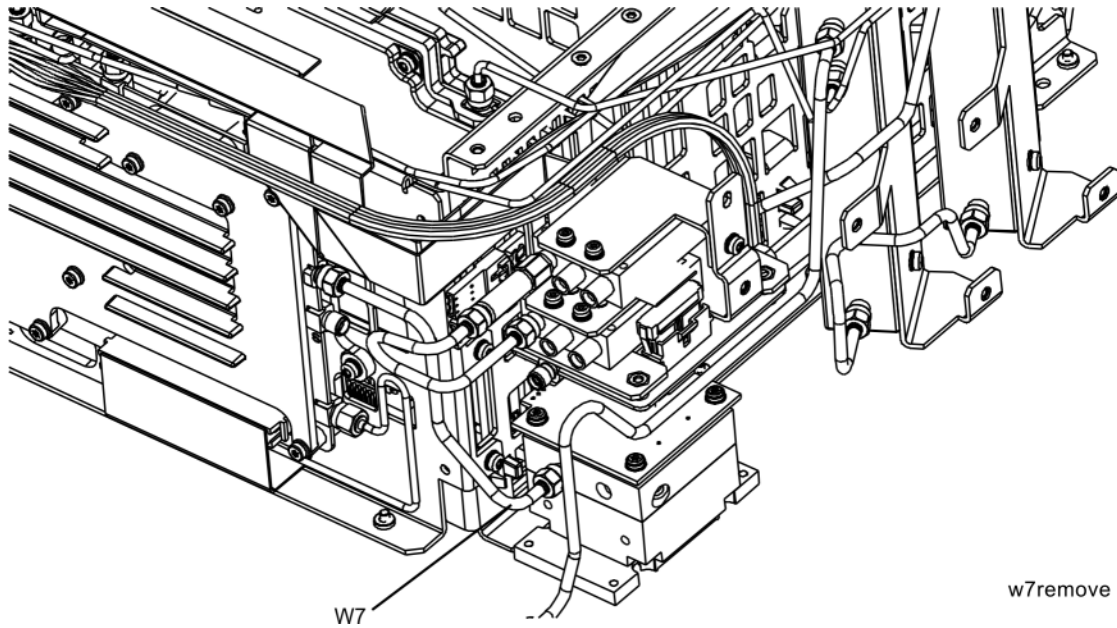
Figure 33 Attenuator Installation



14. Locate W35 semi-rigid coax cable (**N9020-20210**) in the kit. Connect the cable between the coaxial fixed attenuator (1) and port 1 of Switch 1 (the lower switch). Torque to 10 inch-pounds.

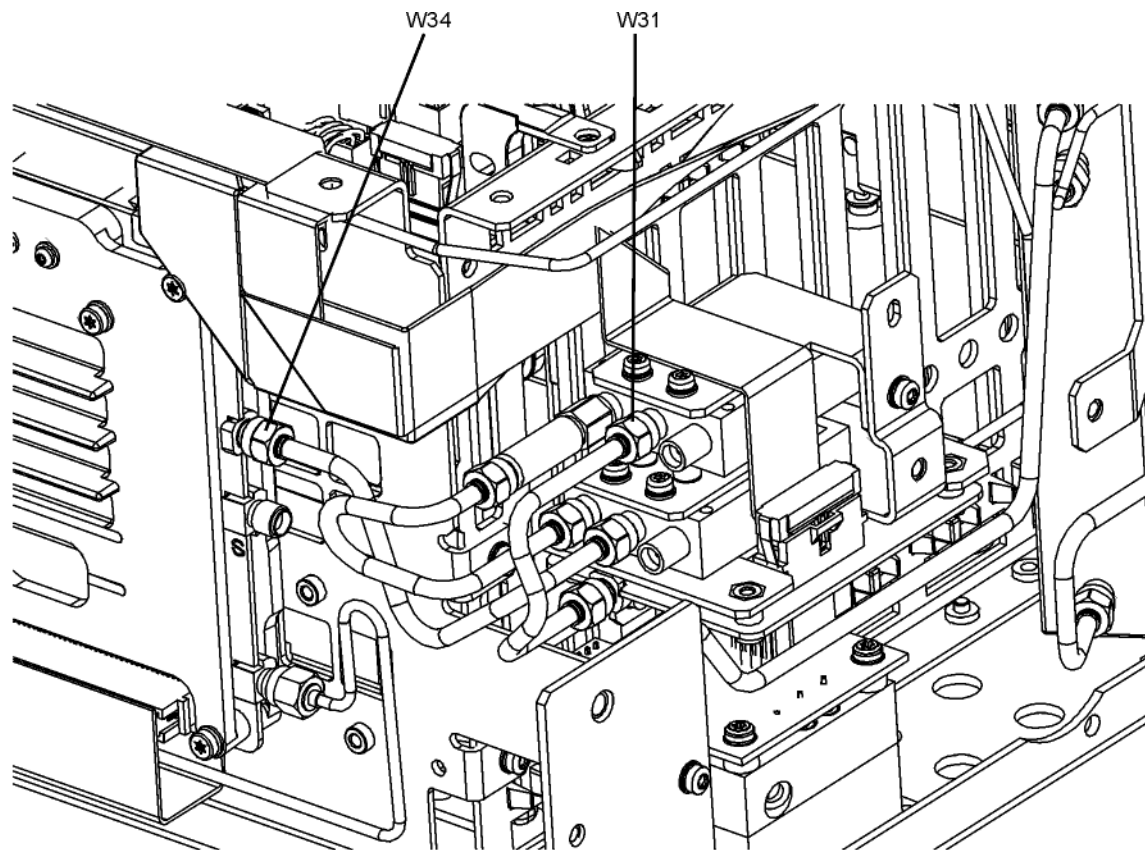
15. Refer to **Figure 34**. Remove semi-rigid coax cable W7 between the output of the A12 YTF preselector and the J9 of the A13 Front End Assembly.

Figure 34 Remove W7



16. Refer to **Figure 35**. Locate W34 semi-rigid coax cable (**E4410-20164**) in the kit. Connect the cable between the center port of Switch 1 (the lower switch) and J9 of the A13 Front End Assembly. Torque to 10 inch-pounds.
17. Locate W31 semi-rigid coax cable (**E4410-20161**) in the kit. Connect the cable between the center port of Switch 2 (the upper switch) and J3 of the A11 Low Band Switch. Torque to 10 inch-pounds.

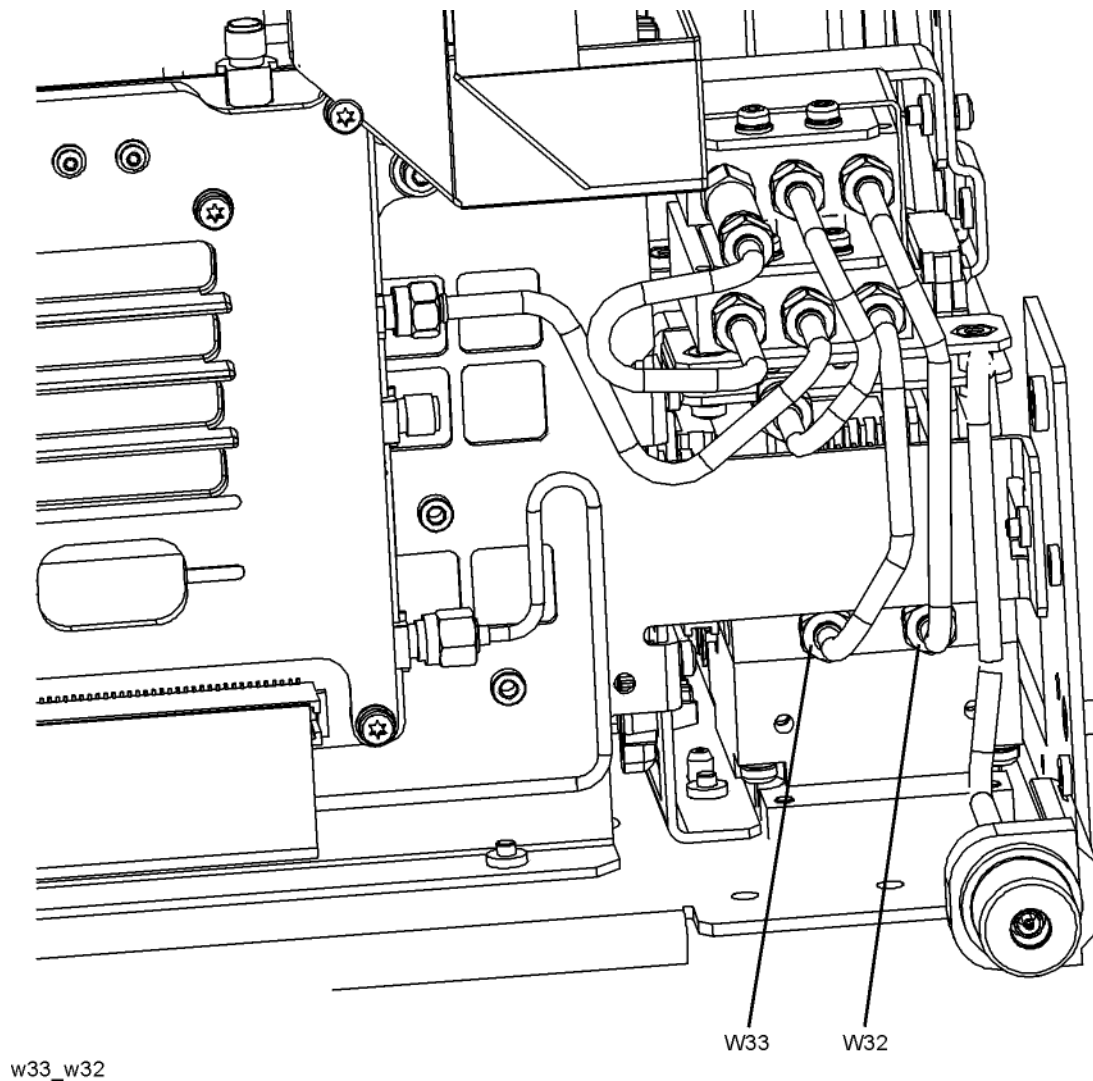
Figure 35 Install W34 and W31



w34_w31

18. Refer to **Figure 36**. Locate W33 semi-rigid coax cable (**E4410-20165**) in the kit. Connect the cable between port 2 of Switch 1 (the lower switch) and the output of the A12 YTF Preselector. Torque the cable at the A12 end first to 10 inch-pounds and then torque the cable at the Switch 1 end to 10 inch-pounds.
19. Locate W32 semi-rigid coax cable (**E4410-20163**) in the kit. Connect the cable between port 2 of Switch 2 (the upper switch) and the input of the A12 YTF Preselector. Torque the cable at the A12 end first to 10 inch-pounds and then torque the cable at the Switch 2 end to 10 inch-pounds.

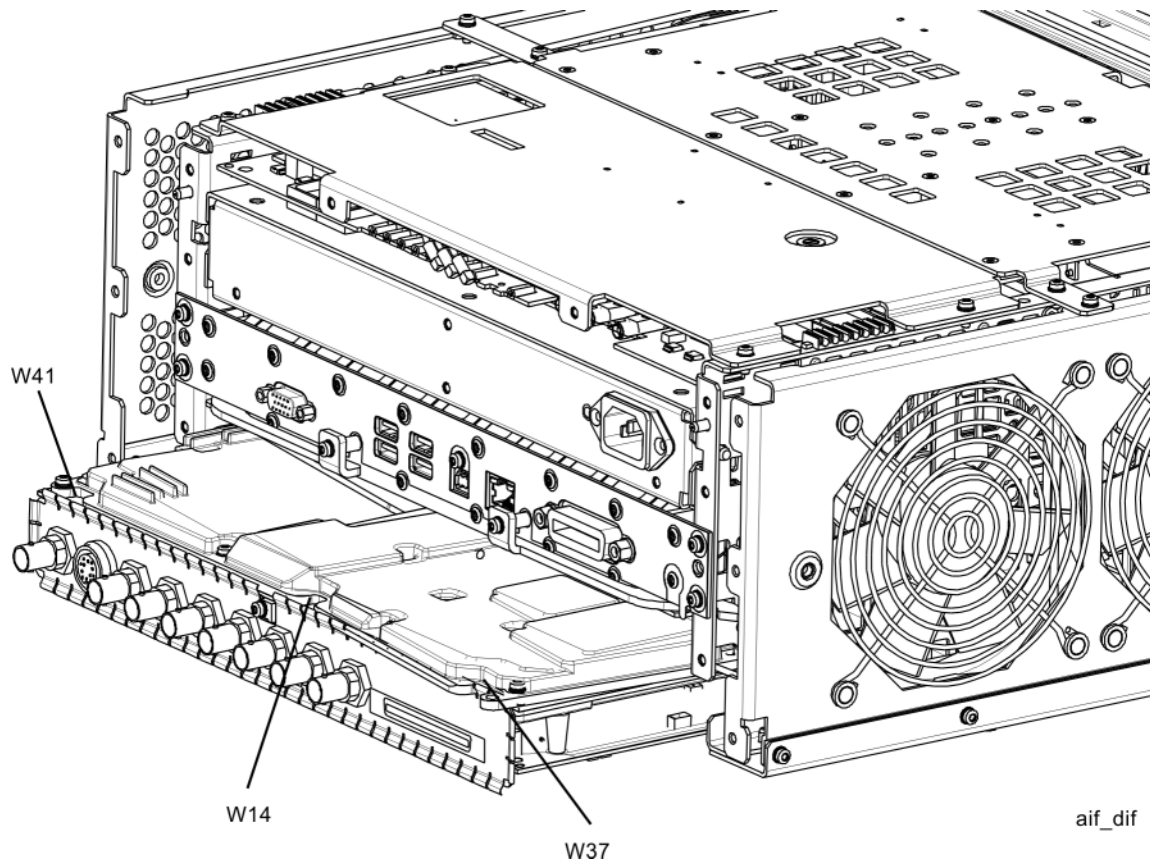
Figure 36 Install W33 and W32



Replace A2 Analog IF and A3 Digital IF Assemblies

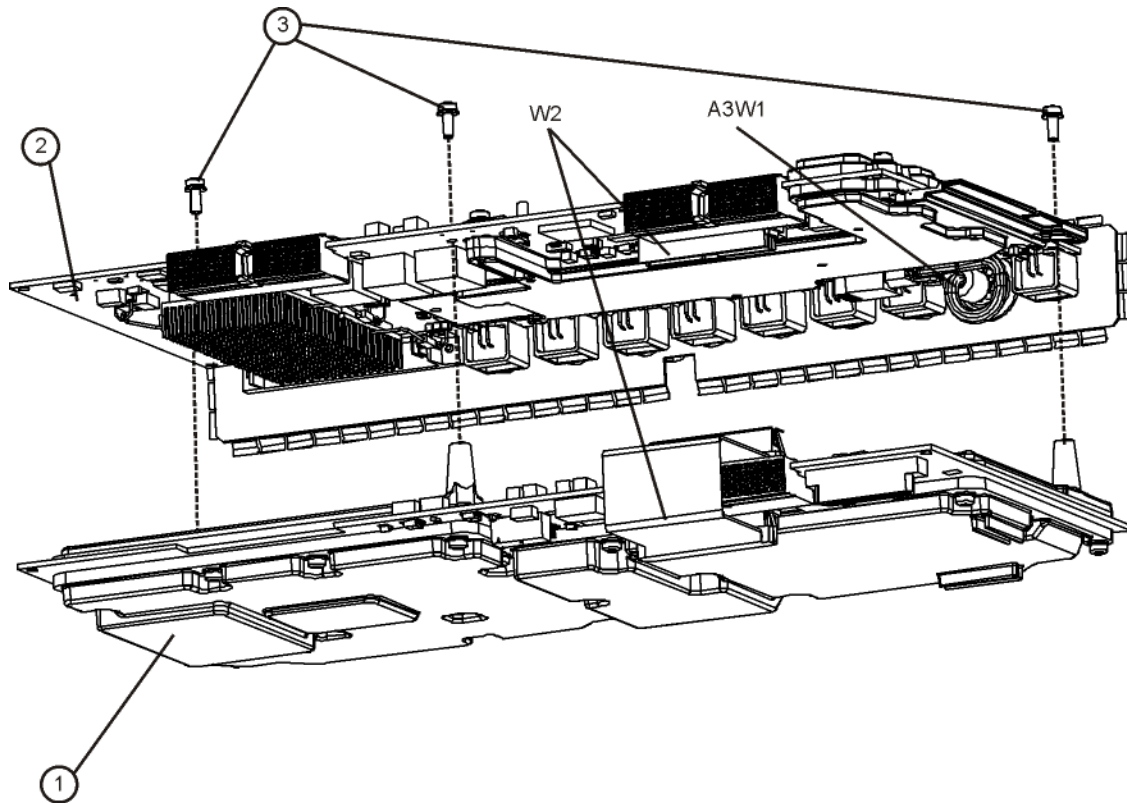
1. Refer to **Figure 37**. Pull the AIF/DIF assembly part way out of the chassis. Disconnect cable W14 from the AIF assembly.

Figure 37 AIF/DIF Assembly Removal



2. Remove the AIF/DIF assembly from the chassis by pulling straight out the back.
3. Locate the A2 Enhanced Analog IF (N9020-60290) and A3 40 MHz Digital IF (N9020-60016) assemblies in the kit. Locate the W2 Cable Assembly, A2 to A3 (N9020-60046) in the kit.
4. Refer to **Figure 38**. Connect the W2 ribbon cable to J20 on the DIF (2).

Figure 38 AIF/DIF Pairing



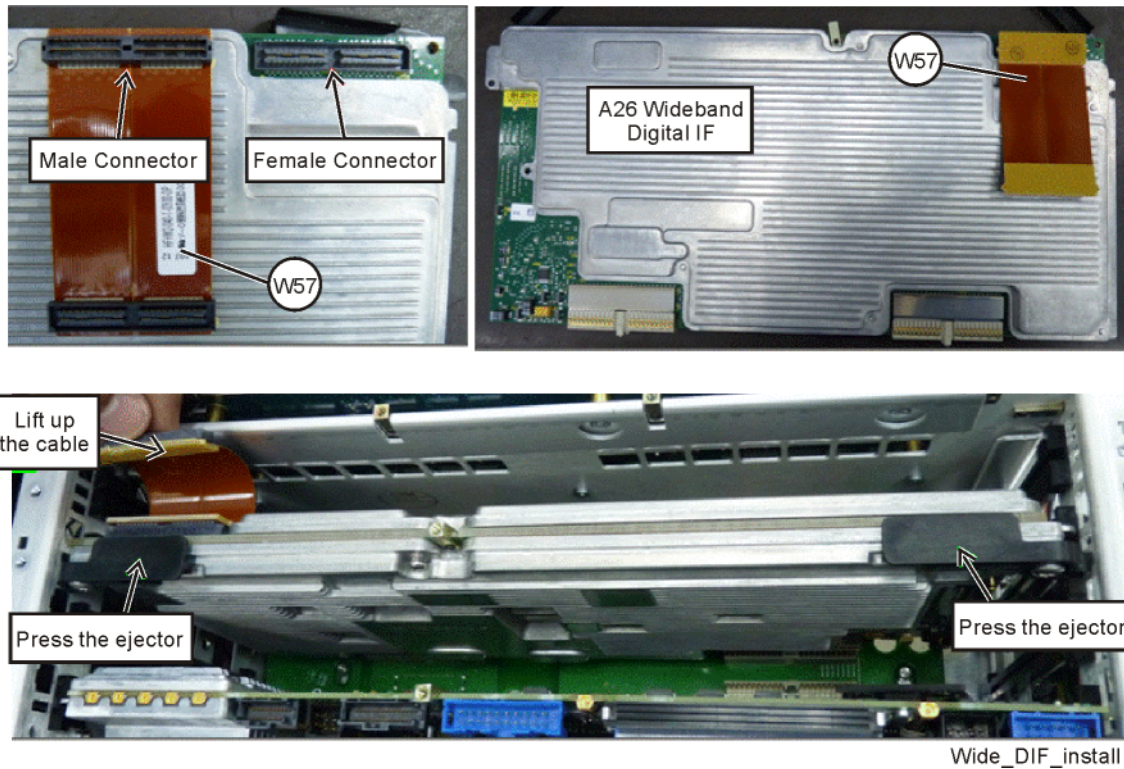
aif_dif_separate

5. To pair the AIF and DIF together, set the DIF (2) in position over the AIF (1). Attach the AIF to the DIF with three screws (3) (0515-0372) included in the kit. Torque to 9 inch-pounds, starting with the middle screw.
6. Connect the ribbon cable W2 to J820 on the AIF (1).
7. Refer to [Figure 37](#). Slide the AIF/DIF assembly partially into the slot at the rear of the instrument. Do not seat the assembly fully at this time.
8. Refer to [Figure 37](#). Reconnect cable W14 to A2J300 on the A2 Analog IF assembly.
9. Push on the AIF/DIF assembly to mate the connectors to the motherboard assembly.

Installing WBIF Boards and Cables

1. Refer to **Figure 39**. Locate ribbon cable **8121-1854** (W57) and the A26 Wideband Digital IF in the kit. Connect W57 to the ribbon cable connector on the A26 Wideband Digital IF.
2. Install the A26 Wideband Digital IF into slot 4 by pressing the ejector. Lift the free end of the ribbon cable up as shown in **Figure 39**.

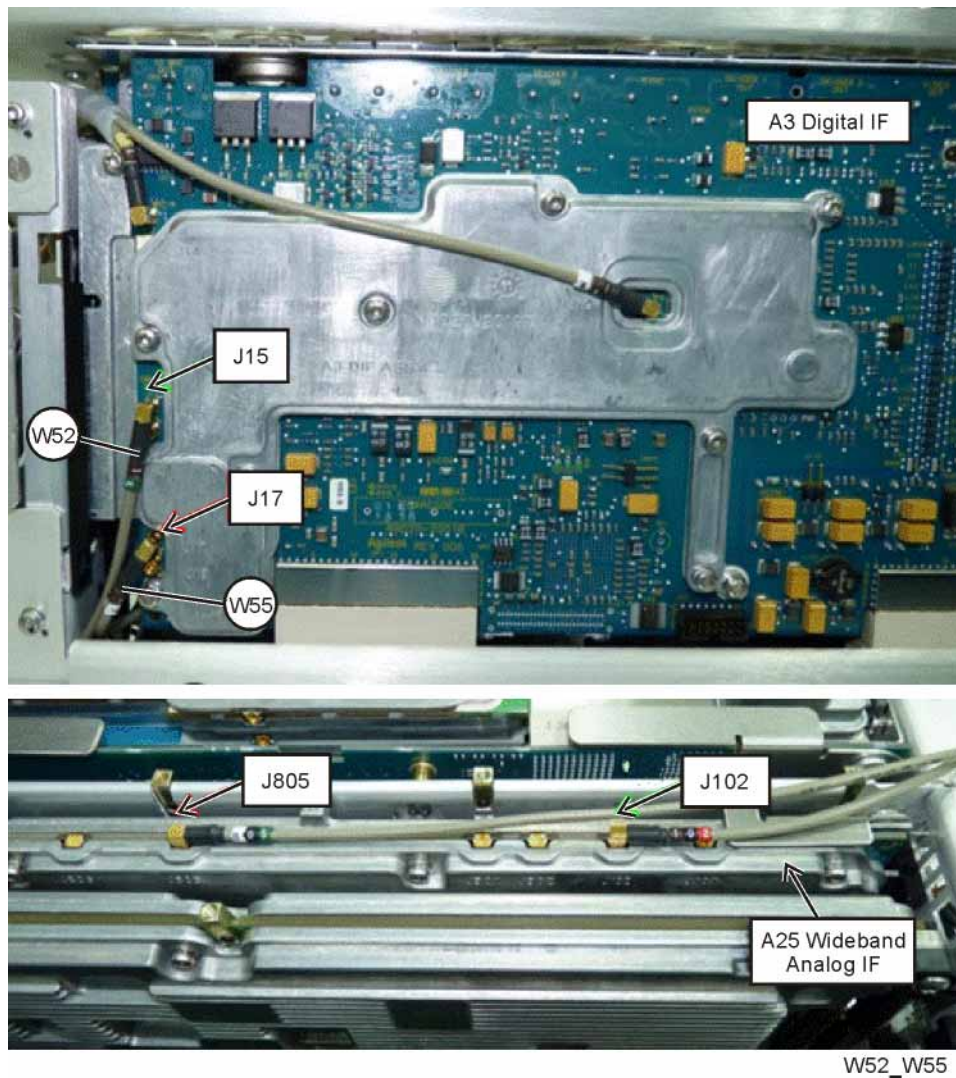
Figure 39 Installing A26 Wideband Digital IF



3. Locate A25 Wideband Analog IF in the kit. Insert A25 loosely into slot 3. Do not seat A25 completely in the slot.
4. Lift A25 up slightly and connect ribbon cable W57 to the ribbon cable connector on A25.
5. Use the ejectors to fully seat the A25 Wideband Analog IF into slot 3.

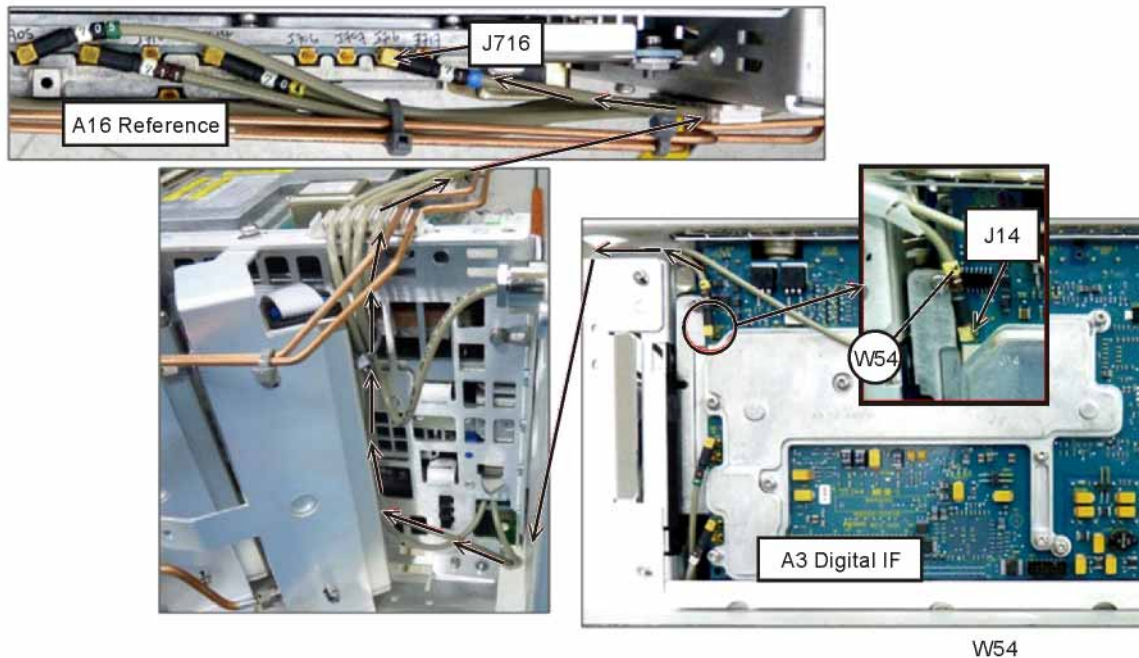
6. Refer to **Figure 40**. Locate W55 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2290 and will have ends labeled “805” and “17”. Connect the end labeled “17” to A3J17 on the A3 DIF Assembly. Route the cable through cutout in the right side chassis near A10 Attenuator B and connect the other end to A25J805 on the A25 Wideband Analog IF Assembly.
7. Locate W52 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2288 and will have ends labeled “102” and “15”. Connect the end labeled “15” to A3J15 on the A3 DIF Assembly. Route the cable through cutout in the right side chassis near A10 Attenuator B and connect the other end to A25J102 on the A25 Wideband Analog IF Assembly.

Figure 40 Connecting Cables W55 and W52



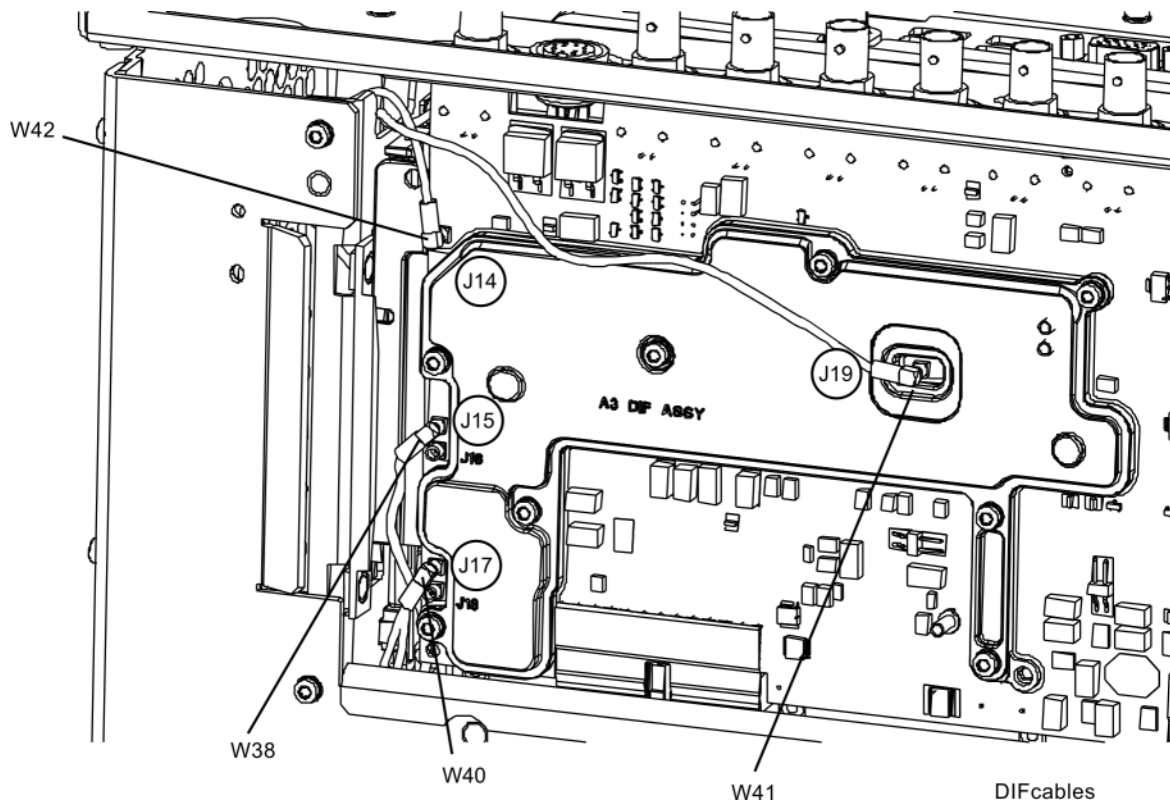
8. Refer to **Figure 41**. Locate W54 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2288 and will have ends labeled “716” and “14”. Connect the end labeled “14” to A3J14 on the A3 Digital IF Assembly. Route the cable from the DIF board through the cutout in the right side chassis and connect the other end to A16J716 on the A16 Reference Assembly.

Figure 41 Connecting Cable W54



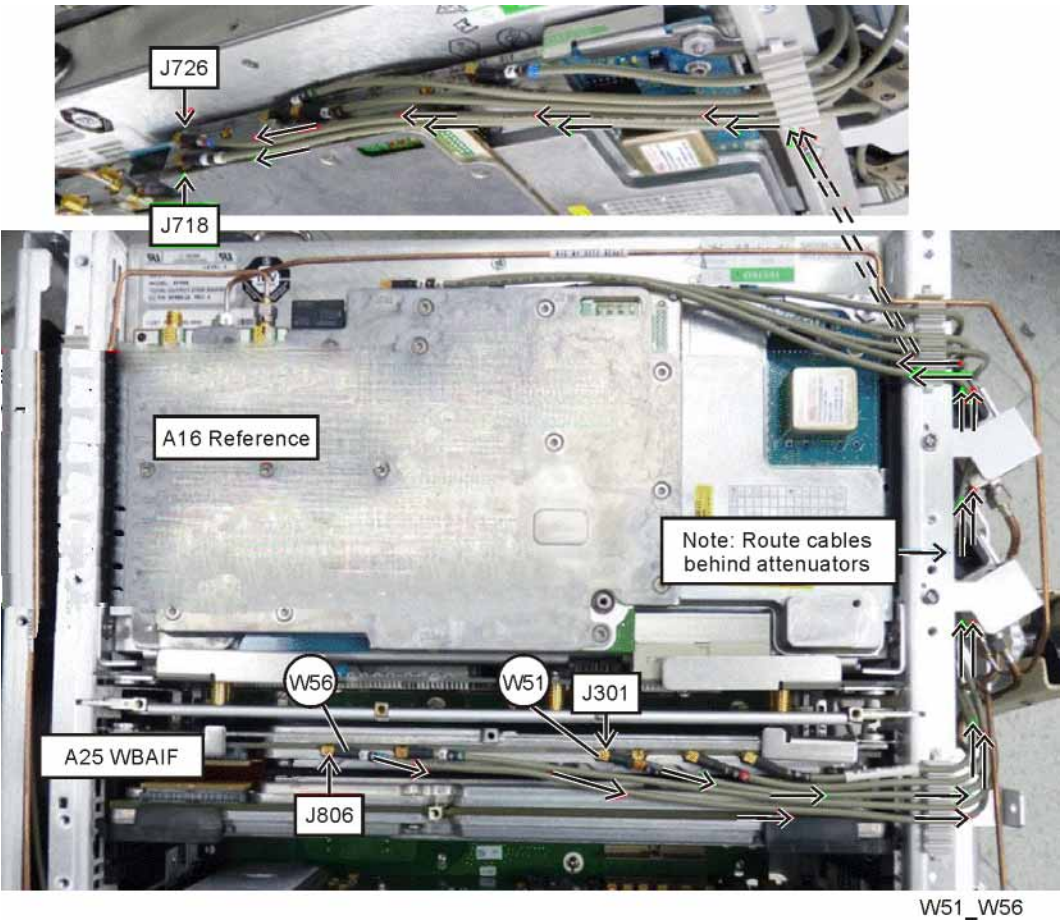
9. Refer to **Figure 37** and **Figure 42**. Locate W41 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-8868 and will have ends labeled “601” and “19”. Connect the end labeled “19” to A3J19 on the A3 Digital IF Assembly. Route the cable to the right side of the instrument and up to the A2 Analog IF Assembly. Connect the cable to A2J601 with the cable routed behind the screw head near A2J601.

Figure 42 DIF Cables



10. Refer to **Figure 37**. Locate W37 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-1401 and will have ends labeled "900" and "100". Connect the end labeled "900" to A15J900 on the A15 EFEC Assembly. Route the cable along the left side of the instrument above the fans. Route the cable down behind the rear of the second (rearmost) fan. Connect the cable to A2J100 on the A2 Analog IF Assembly.
11. Refer to **Figure 43**. Locate W56 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2291 and will have ends labeled "806" and "726". Connect the end labeled "806" to A25J806 on the A25 Wideband Analog IF Assembly. Route the cable along the right side chassis behind attenuators A9 and A10 and connect the other end to A16J726 on the A16 Reference Assembly.
12. Locate W51 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-1401 and will have ends labeled "301" and "718". Connect the end labeled "301" to A25J301 on the A25 Wideband Analog IF Assembly. Route the cable along the right side chassis behind attenuators A9 and A10 and connect the other end to A16J718 on the A16 Reference Assembly.

Figure 43 Connecting Cables W56 and W51

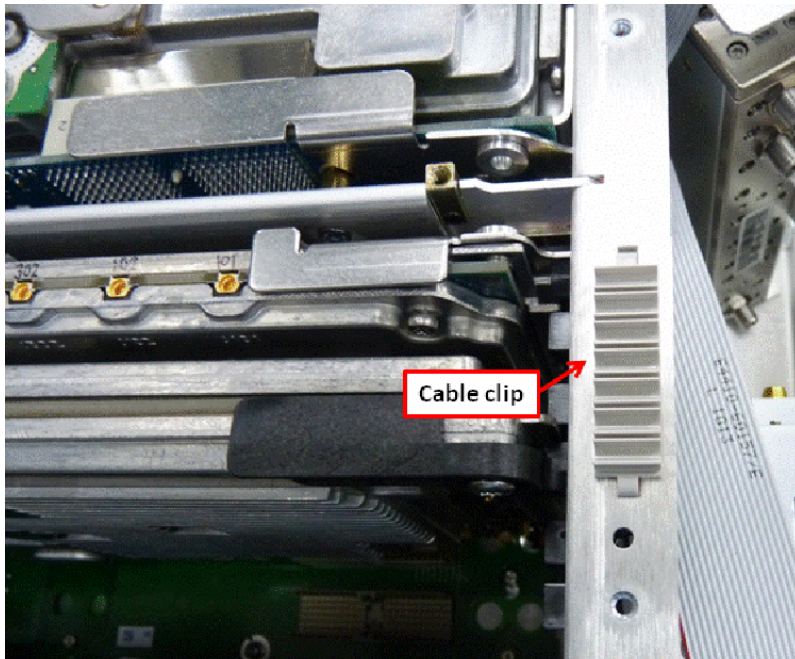


- 13.** Locate W53 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2292 and will have ends labeled “901” and “101”. Connect the end labeled “901” to A15J901 on the A15 Enhanced Front End Control Assembly. Route the cable along the right side chassis and connect the other end to A25J101 on the A25 Wideband Analog IF Assembly.
- 14.** Locate W36 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-1862 and will have ends labeled “902” and “7”. Connect the end labeled “902” to A15J902 on the A15 Enhanced Front End Control Assembly. Connect the other end to A13J7 on the A13 Front End Assembly. Torque the connector on A13J7 to 10 inch-pounds.
- 15.** Locate W39 in the Opt HLD/HLE Cable Kit. This cable will have part number 8121-2028 and will have one end labeled “1100”. Connect the end labeled “1100” to A15J1100 on the A15 Enhanced Front End Controller Assembly. Route the cable along the left side of the chassis above the fans toward the rear panel. The other end of the connector will be secured to the rear panel later.

Dressing Cables

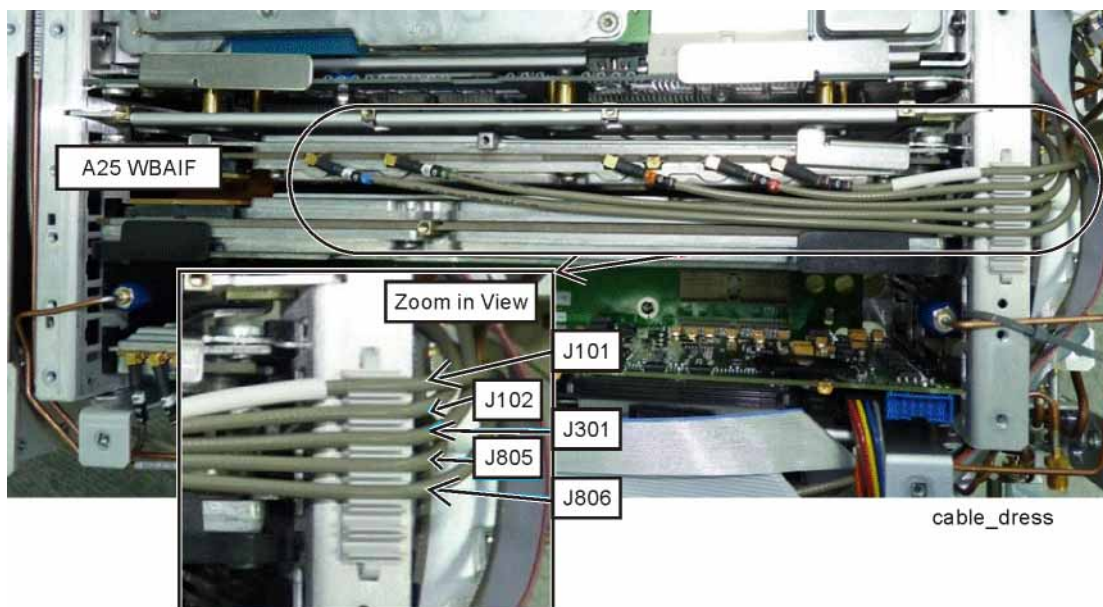
1. Locate the coax cable clip (5041-9690), in the kit.
2. Secure the coax cable clip in the right chassis side as shown in **Figure 44**.

Figure 44 Installing Coax Cable Clip



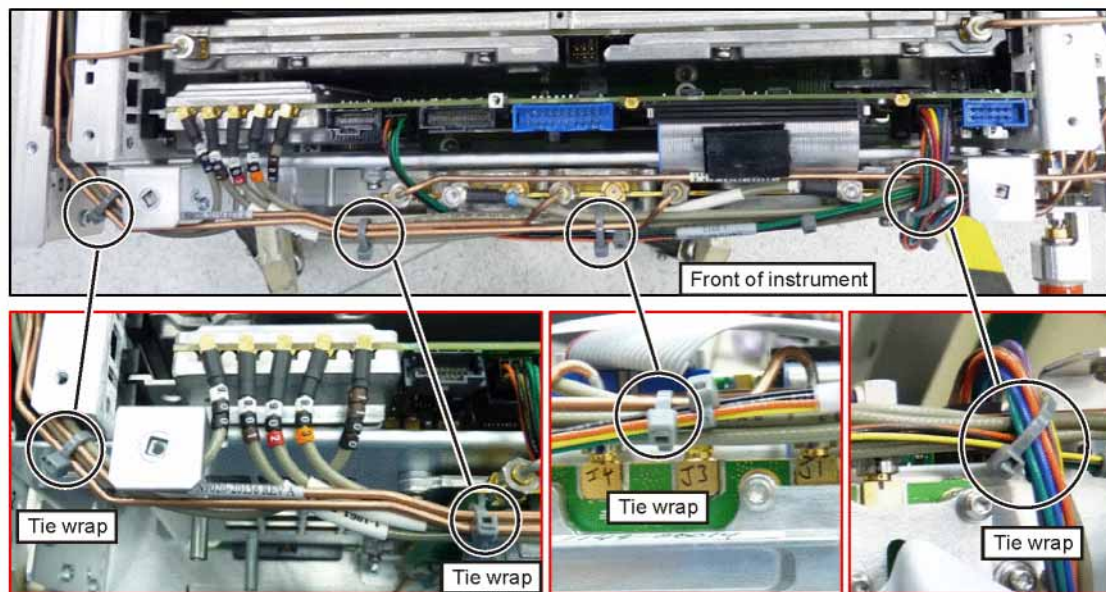
3. Refer to **Figure 45**. Dress the coaxial cables neatly and snap into the cable clip with the correct sequence as shown.

Figure 45 Dressing Cables to A25 Wideband Analog IF



4. Refer to **Figure 46**. Dress the coaxial cables and semi-rigid cables neatly and tie together using cable ties (1400-0249) at the locations indicated.

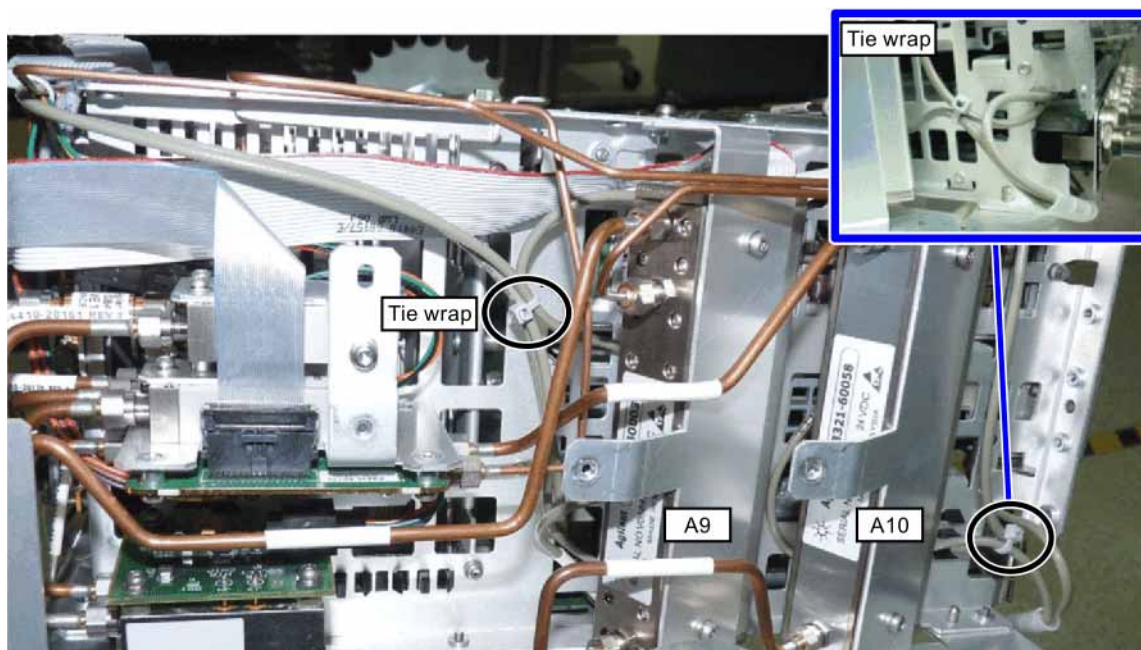
Figure 46 Adding Cable Ties near A13 and A15 Assemblies



tie_wraps_A13_A15

5. Refer to **Figure 47**. Dress the coaxial cables and semi-rigid cables neatly and tie together using cable ties (1400-0249) at the locations indicated.

Figure 47 Adding Cable Ties near A9 and A10 Assemblies



6. Refer to **Figure 48**. Install the semi-rigid coaxial cables cable clip as shown. Note that the rear-most semi-rigid cable, W6, should not be in cable clip, but the semi-rigid cable next to it, W19, should be in the rear-most position of the cable clip. Use two cable ties (1400-0249), one to the left of the cable clip and one to the right of the cable clip, to secure W6 and W19 together. Do not tighten these cable ties too tight to avoid bending the cables.
7. Install the flexible coaxial cable in the cable clip as shown.
8. Dress the coaxial cables and semi-rigid cables neatly and tie together using cable ties (1400-0249) at the locations indicated. Attach two cable ties around the bundle of gray cables.

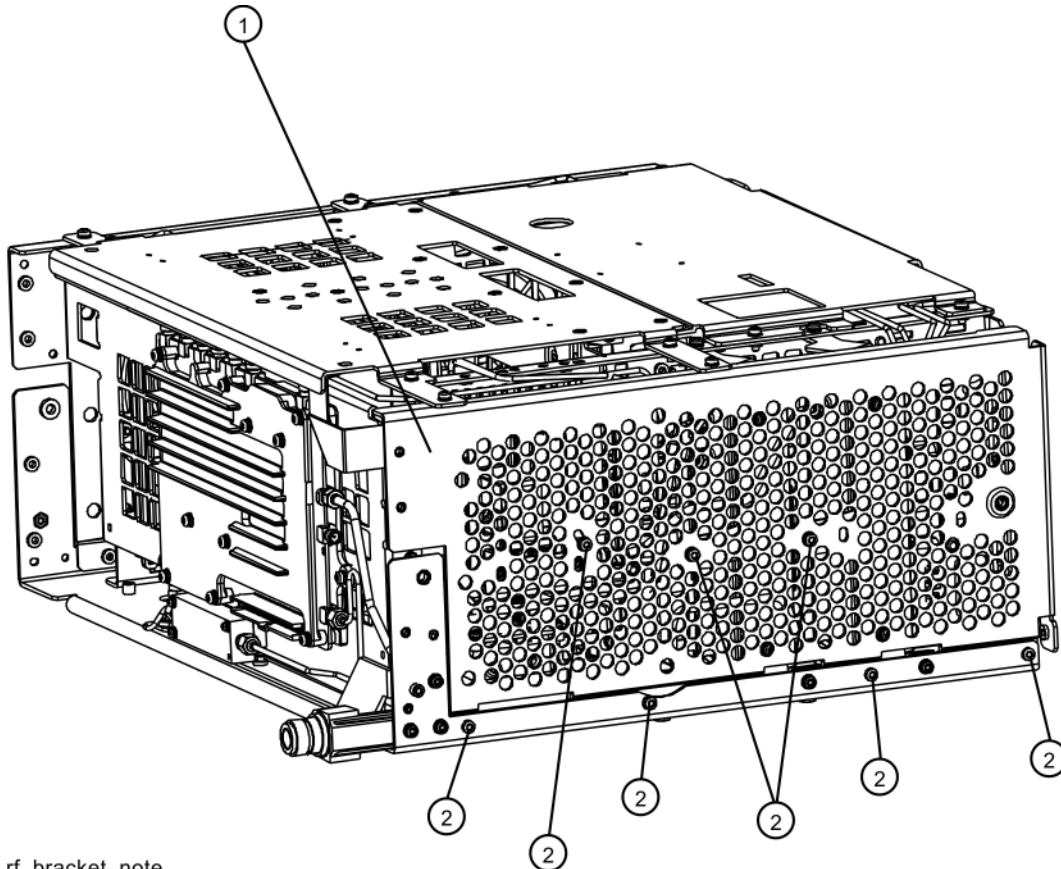
Figure 48 Dressing Cables to A16 Reference



Reassembly

1. Refer to **Figure 49**. Locate the RF bracket **N9020-00031** in the kit. Install this bracket (1) onto the chassis using seven screws (2). Torque to 9 inch-pounds.

Figure 49 RF Bracket Replacement

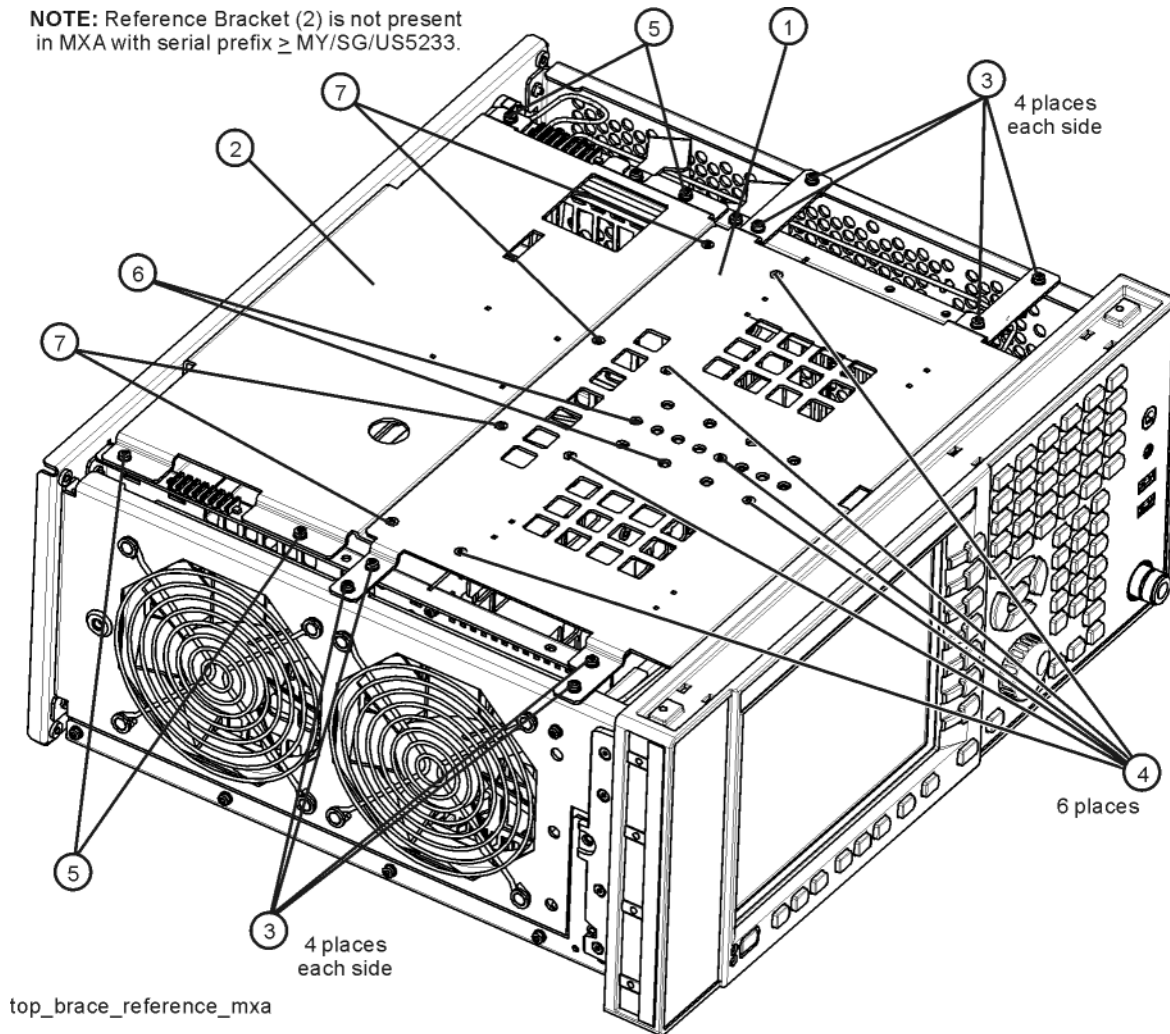


rf_bracket_note

2. Refer to **Figure 50**. To replace the top brace (1), place it in the correct position and attach the appropriate screws. The kit includes six additional 0515-1227 flathead screws (6), (7) to secure the top brace to the A25, A26, and A16 assemblies. Torque to 9 inch-pounds.

Figure 50 Top Brace Replacement

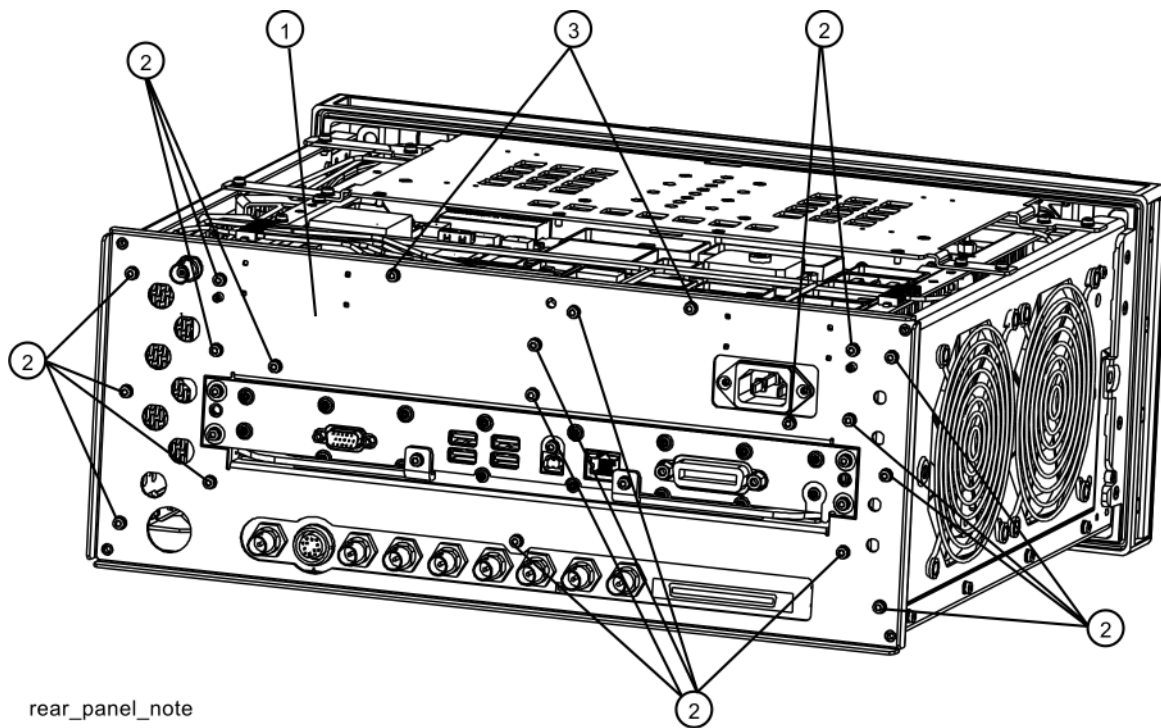
NOTE: Reference Bracket (2) is not present in MXA with serial prefix \geq MY/SG/US5233.



3. Locate the rear panel replacement kit, **N9020-60149**, included in the kit. Use the rear panel from this kit in the following steps.
4. Remove the hole plug from the AUX IF OUT hole.
5. Attach the W23 External Reference cable to the rear panel and secure with a lock washer (2190-0102) and nut (0590-2332). Torque to 21 inch-pounds using a 9/16" nut driver.
6. Attach the W39 Aux IF Out cable to the rear panel and secure with the lock washer and nut that came with the cable. Torque to 9 inch-pounds with a 5/16" nut driver.

7. Refer to **Figure 51**. Place the rear panel (1) into position in the chassis. Replace the screws (2) to attach the rear panel to the chassis. Torque to 9 inch-pounds.

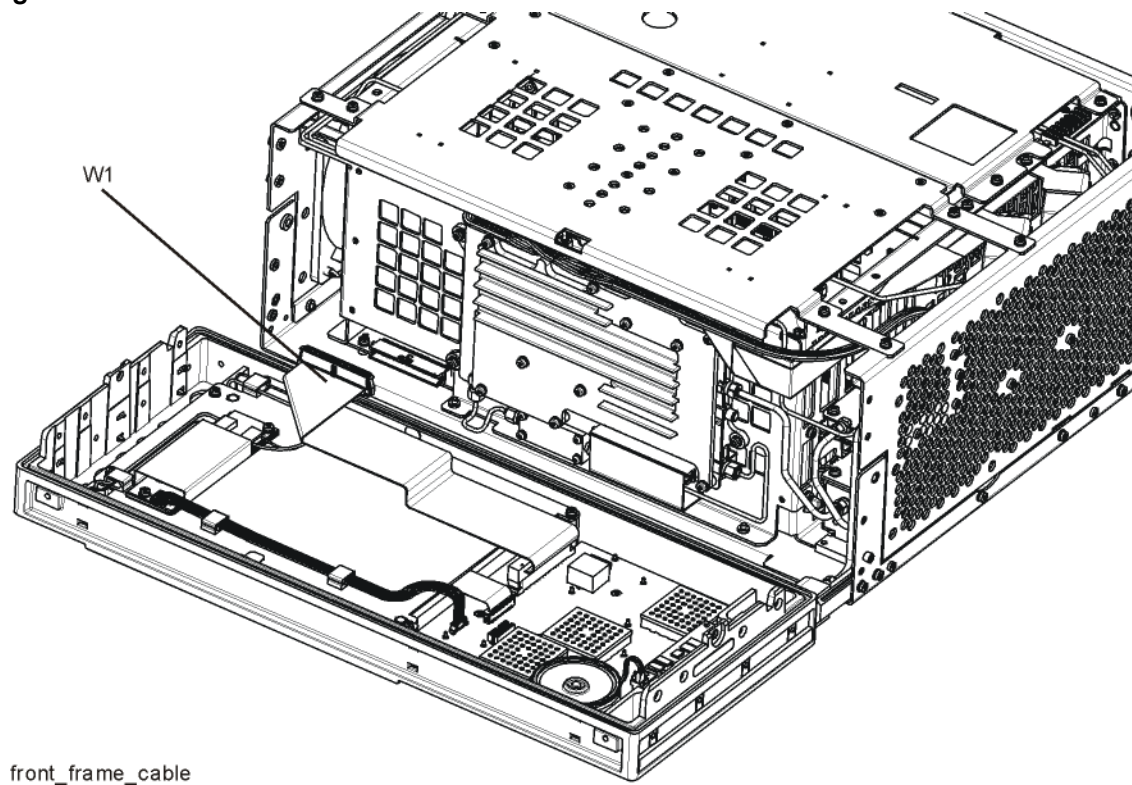
Figure 51 Rear Panel Replacement



rear_panel_note

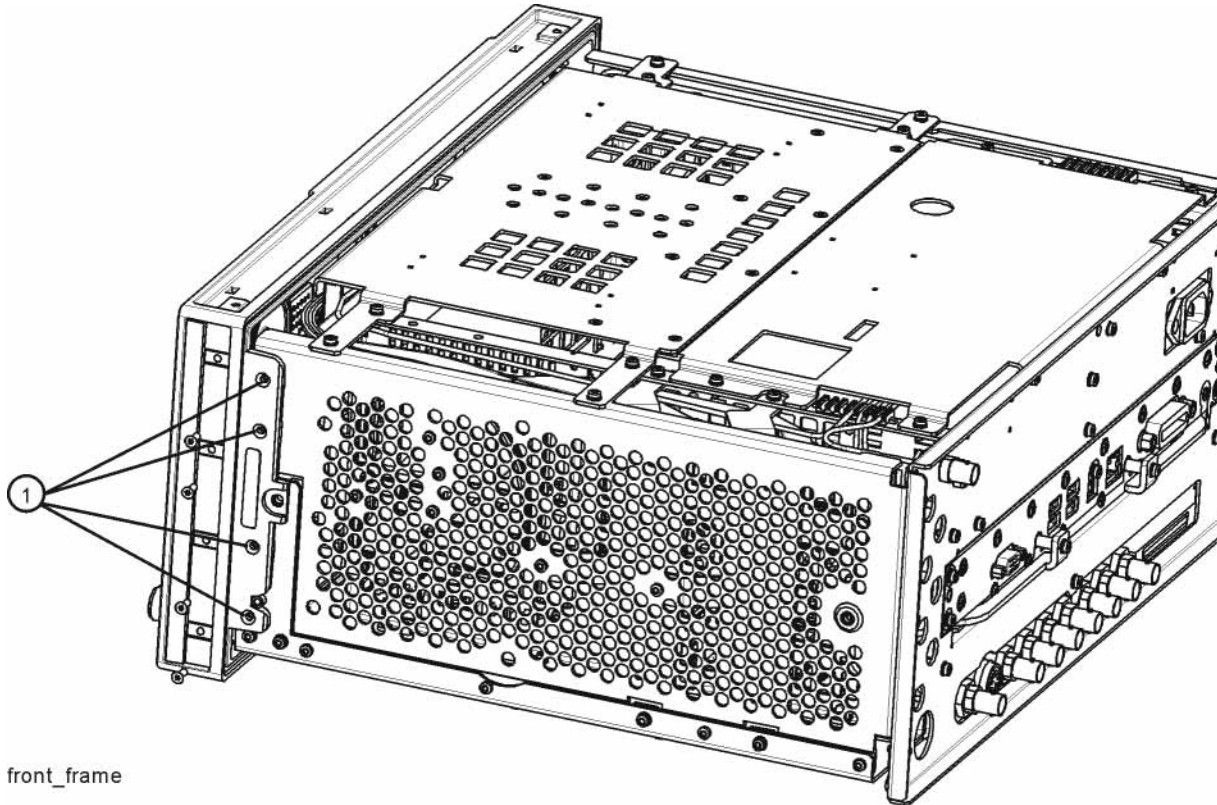
8. Refer to **Figure 52**. Reattach the ribbon cable W1.

Figure 52 Front Panel Cable



9. Refer to **Figure 53**. Carefully position the Front Frame Assembly onto the chassis. Ensure no cables are crushed. Replace the eight screws (1), four on each side of the chassis. Torque to 9 inch-pounds.

Figure 53 Front Frame Replacement



Final Installation for Standard Instruments (Benchtop Configuration)

1. Refer to **Figure 3**. 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. Replace the four instrument bottom feet.
5. Replace the four key locks to the bottom feet.

Final Installation for Portable Instruments (Option PRC)

1. Refer to **Figure 5**. 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 5**. 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 4**. Replace the four hole plugs (5) to both sides of the instrument.
4. Refer to **Figure 4**. Replace the bail handle (2) (using the four screws (1)) to the Front Frame Assembly. Torque to 21 inch-pounds.

Power Up and New Hardware Wizard

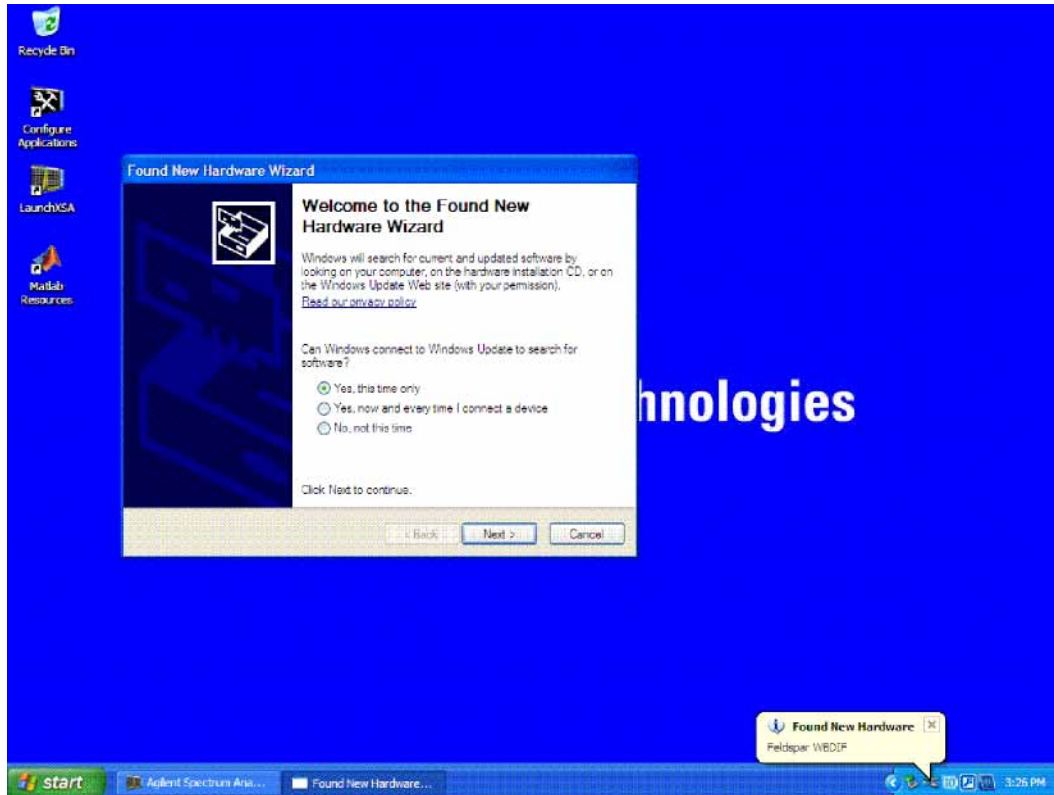
1. Connect a keyboard and mouse to the instrument.
2. Power on the instrument.
3. During the boot up process you may notice that the “Found New Hardware” bubble appears in the lower right screen, and a “Found New Hardware” message window appears for a short period, and then is covered by the analyzer splash screen.
4. After the instrument is completely booted, press the front panel File key, select Exit, and click OK to view the desktop and see the “Found New Hardware” window shown in **Figure 54**.

Figure 54



5. Enter administrator as the user name, and agilent4u as the password. Select OK.
6. The screen in **Figure 55** appears. Select Yes, This time only. Click Next.

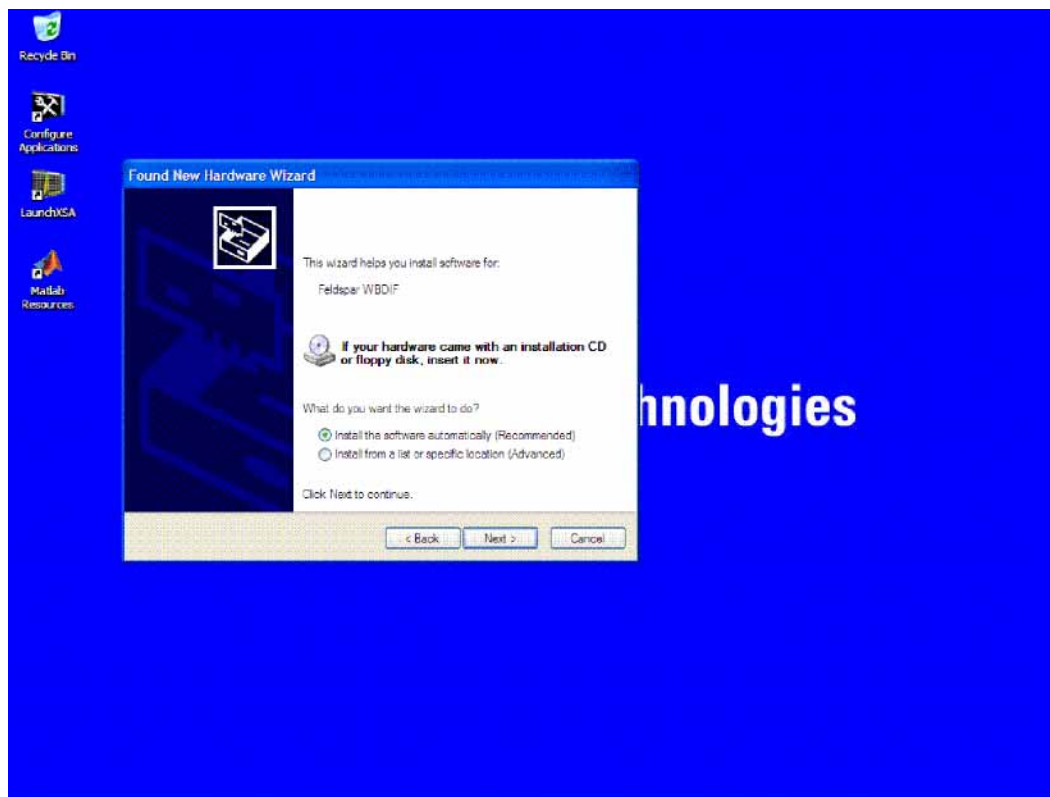
Figure 55



Installation Procedure

7. The screen in **Figure 56** appears. Ensure “Install the software automatically” is selected and click Next.

Figure 56



8. The wizard will install the required software. Once you see the “Completing the Found New Hardware Wizard” screen appear, click Finish.

Update the instrument Software

NOTE

Instrument software revision A.13.15 or later required.

1. Loading the latest instrument software is required to assure all FPGAs and drivers located on both the newly installed hardware and on the base instrument are synchronized. Therefore, even if the instrument contains the latest revision of software, you must reinstall the software to assure proper operation.

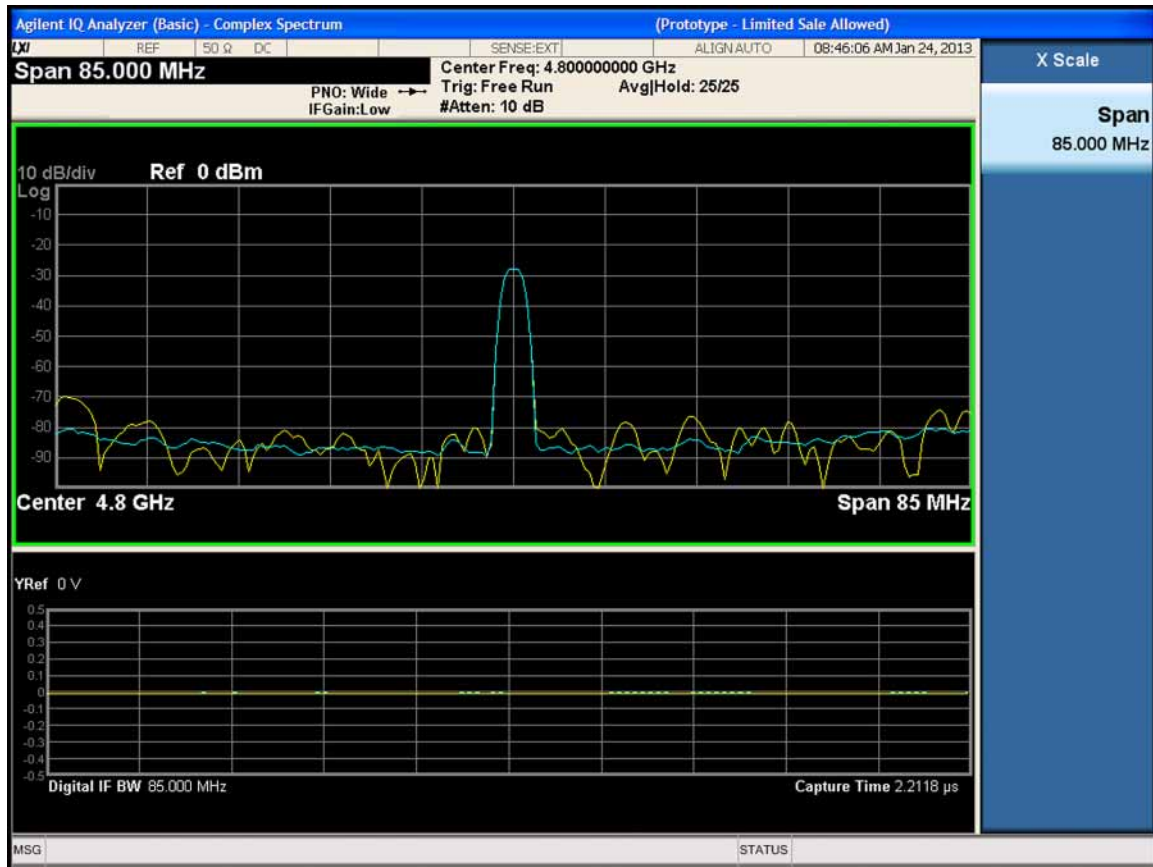
The latest revision of software may be downloaded from:

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

Verify the Option

1. Turn the analyzer on and verify no errors are reported at power up through the power-on alignment of the analyzer.
2. Press **Mode, IQ Analyzer (Basic)**.
3. Press **Mode Setup, IF Path, 85 MHz** (or **125 MHz**, or **160 MHz**, if available).
4. Verify that there are also softkeys present labeled **10 MHz**, **25 MHz**, and **40 MHz**.
5. Press **Frequency, Center, 4.8 GHz**.
6. Press **Input/Output, RF Calibrator, 4.8 GHz**.
7. Press **Span, 85 MHz**.
8. The analyzer should display a signal in the center of the screen with an amplitude of approximately -28 dBm (see [Figure 57](#)).
9. Press **AMPTD Y Scale, More 1 of 2, uW Path Control**.
10. Verify that softkeys appear labeled "**Standard Path**" and "**uW Preselector Bypass**".
11. Press **uW Preselector Bypass**. If the path was previously set to **Standard Path**, you should hear a click.
12. Press **Standard Path**. If the path was previously set to **uW Preselector Bypass** path, you should hear a click.

Figure 57 4.8 GHz Signal



Perform Preselector Characterization

1. Press **System, Alignments, More, Advanced**.
2. Press **Characterize Preselector, Enter**. The characterization will take several minutes.
3. Wait until the analyzer resumes sweeping.

Utilities, Adjustments, and Performance Verification Tests

Calibration software and specified test equipment is required to perform the adjustments and can be used to automate the performance verification testing.

Obtain Keysight X-Series Signal Analyzer Calibration Application SW, N7814A TME Calibration Application, version E.11.00 or later. Information on how to obtain this software can be found at:

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

The following tests are required to assure the installation was performed correctly. The instrument may not have been in spec before the upgrade was begun. Performing only these tests does not guarantee that the analyzer meets all specifications.

Utilities Required

— None

Adjustments Required

Adjustment Name
Perform all adjustments

Performance Tests Required

Verification Test Name
Perform all performance tests

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

The end user must ultimately determine whether they want a full calibration to be performed. If a full calibration is required, arrangements regarding the level of the calibration must be made between the end user and the calibration provider.

End of installation.

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 (8am-8pm ET Monday -Friday)

