

# Installation Note

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## Agilent PSA Series Spectrum Analyzers Option 1DS Preamplifier Retrofit Kit



**Agilent Technologies**

Part Number E4440-90566 Supersedes: E4440-90125  
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E4440-90566

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## Preamplifier Installation Kit

Products Affected:	PSA E4440A PSA E4443A PSA E4445A PSA E4446A PSA E4448A
Serial Numbers:	US00000000/US99999999 MY00000000/MY99999999
To Be Performed By:	<input checked="" type="checkbox"/> Agilent Service Center <input checked="" type="checkbox"/> Personnel Qualified by Agilent <input type="checkbox"/> Customer
Estimated Installation Time:	1 Hour
Estimated Adjustment and Verification Time:	3 Hours

### Introduction

This retrofit kit provides all parts and instructions for retrofitting the 100 kHz to 3 GHz preamplifier option 1DS into the PSA series analyzers. The option is licensed for one instrument model number/serial number combination. The kit will only function on the instrument it was ordered for.

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#### NOTE

The instrument must be re-adjusted and the performance tested to ensure that the instrument meets specifications following the hardware installation. All adjustments are automated, and are included in the PSA Series Performance Verification and Adjustment Software.

This software is not included in this kit. If you do not have this software, order Option 0BW, PSA Service Documentation and Performance Tests and Adjustment Software through your local Agilent Technologies Sales and Service Office.

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#### NOTE

The instrument firmware revision must be A.01.09 or greater to allow installation of the license keyword. It is recommended that the firmware be updated to the latest revision. See [http://www.agilent.com/find/psa\\_firmware](http://www.agilent.com/find/psa_firmware) for the latest firmware.

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## Preamplifier Installation Kit

### Contents

Item	Quantity	Description	Agilent Part Number
1	1	Option Upgrade Entitlement Certificate	---
2	1	A22 Preamplifier	E4440-60015
3	1	W48, cable, semi-rigid, Preamp output to Low pass filter (for E4440A, E4443A, E4445A)	E4440-20072
4	1	W48, cable, semi-rigid, Preamp output to low pass filter (for E4446A, E4448A)	E4446-20038
5	1	W49, Cable ribbon, Preamp control	E4440-60073
6	1	W50, cable, semi-rigid, Low band output to Preamp input	E4440-20079
7	2	Screws - 3.0 x 8mm, T-10 Torx pan head	0515-0372
8	1	Installation Note	This note

### Tools Required

- T-20 Torx driver
- T-10 Torx driver
- 5/16-inch open end wrench
- 7/16-inch open end wrench

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## Installation Procedure

1. Perform the following procedures in order:
  - a. Remove the instrument outer case.
  - b. Remove the instrument top brace.
  - c. Install the Option 1DS preamplifier.
  - d. Install the instrument top brace and outer case.
  - e. Install the option designator key.
  - f. Perform the adjustments and performance tests.

For assistance at any time during this procedure, get in touch with your nearest Agilent Technologies Sales and Service Office. To find your local Agilent office access the following URL or call the following telephone number:

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

1-800-452-4844 (8am-8pm EST)

### Remove the Outer Case

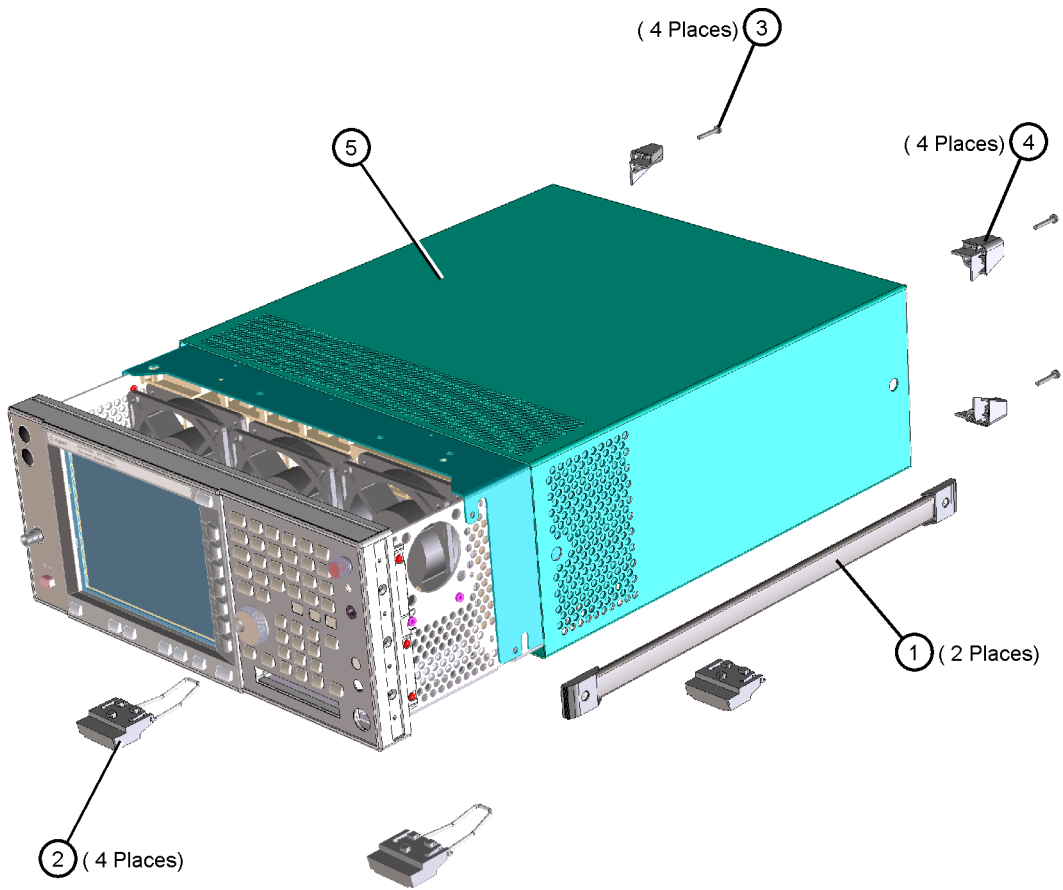
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<b>CAUTION</b>	If the instrument is placed on its face during any of the following procedures, be sure to use a soft surface or soft cloth to avoid damage to the front panel, keys, or input connector.
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1. Disconnect the instrument from ac power.
2. Refer to Figure 1. Remove the two handles on the sides of the instrument as shown. Use the T-20 driver to loosen the screws that attach each handle (1). Remove the handles.
3. Remove the four bottom feet (2). Lift up on the tabs on the feet, and slide the feet in the direction indicated by the arrows.
4. Remove the four screws (3) that hold the rear feet (4) in place.
5. Pull the instrument cover (5) off toward the rear of the instrument.

**Figure 1 Instrument Outer Case Removal**

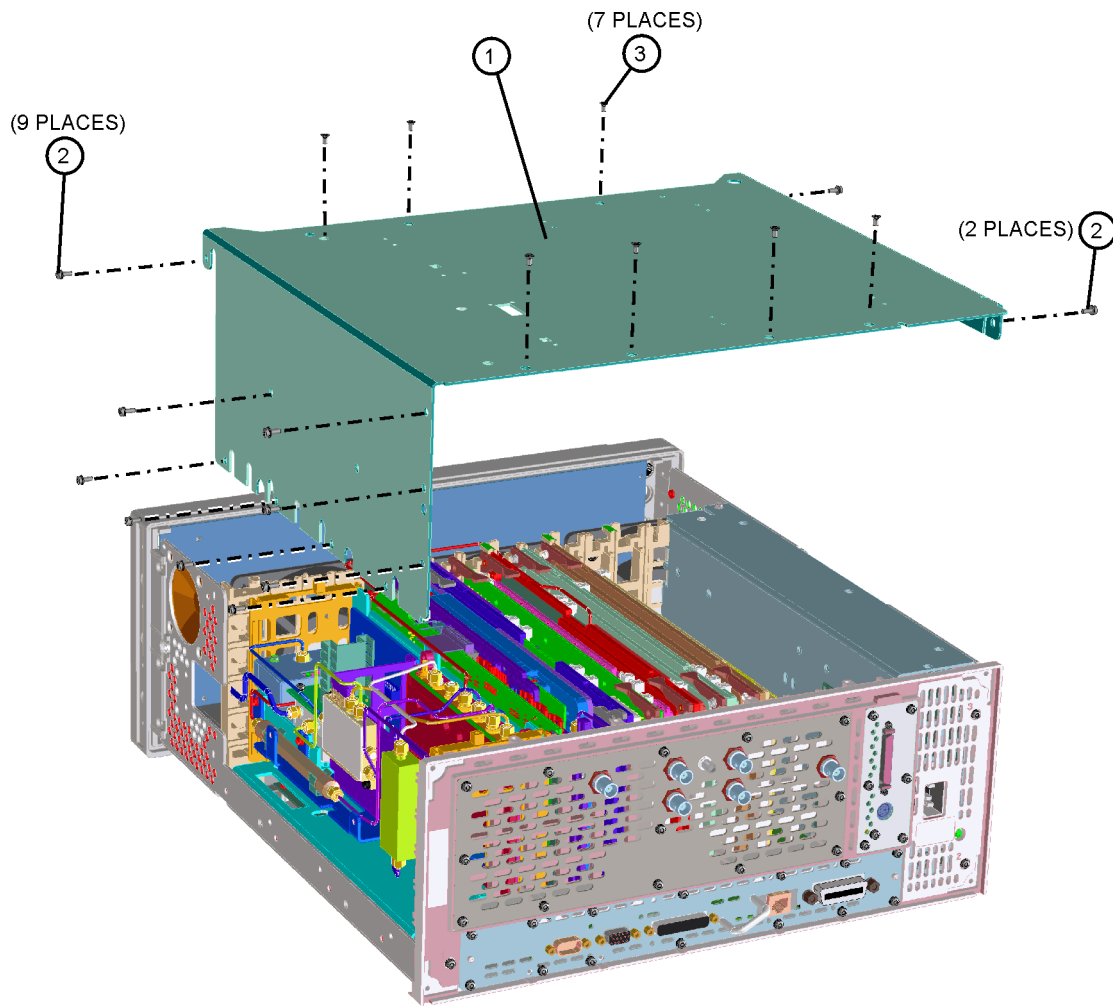


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## Remove the Top Brace

1. Refer to Figure 2. Use the T-10 driver to remove the top screws (3) (one screw is under the security label), and the side screws (2) attaching the top brace (1) to the deck.
2. Remove the top brace from the deck.

**Figure 2**      **Top Brace Removal**

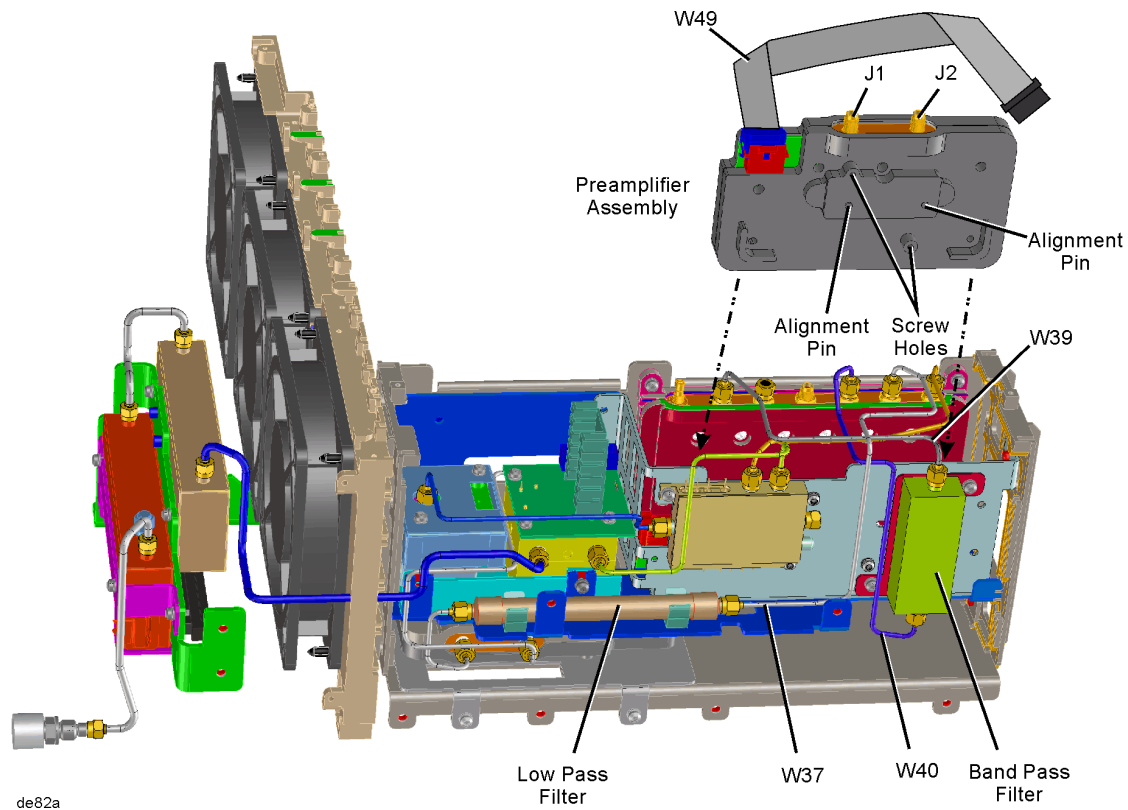


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## Install the Option 1DS Preamplifier (E4440A, E4443A, E4445A)

1. Locate the RF section on the right side of the instrument. Figure 3 shows cable locations and the preamplifier mounting orientation.

**Figure 3**      **Remove the Cables**



2. Locate and remove cable W39 (low band assembly J4 to band pass filter), using the 5/16-inch wrench. This cable will be replaced later. It is removed to allow the preamplifier assembly to be installed.
3. Locate and remove cable W40 (low band assembly J3 to band pass filter). This cable will be replaced later. It is removed to allow the preamplifier assembly to be installed.

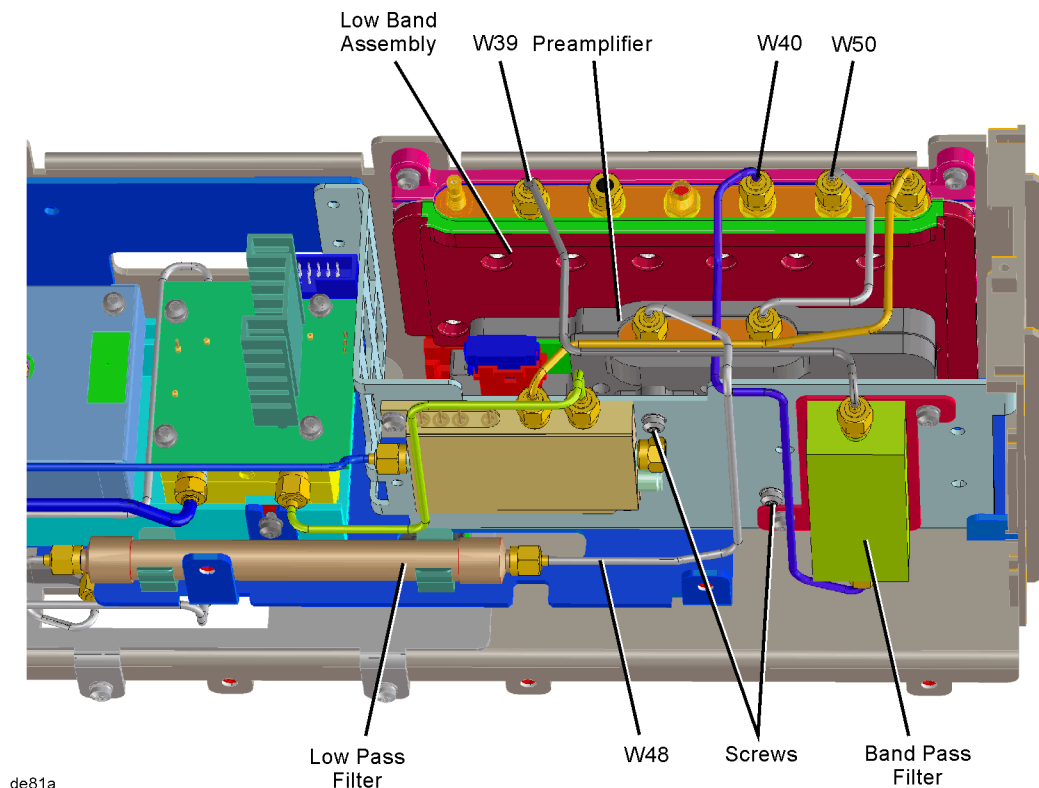


**CAUTION**

In the following step 4, use a 7/16-inch wrench on one of the wrench flats at the ends of the filter to prevent the filter body from rotating when removing the cable. Cables can be damaged if the low pass filter is allowed to rotate when loosening or tightening the cable connector.

4. Locate and remove cable W37 (low band assembly J1 to low pass filter). Discard this cable, since it will be replaced by another cable.
5. See Figure 4. Install the preamplifier with the ribbon cable connector pointing toward the front of the analyzer. Two alignment pins on the preamplifier case mate with screw holes on the RF chassis. Align the two threaded screw holes on the preamplifier case with the holes in the RF chassis. Use a T-10 Torx driver to secure the preamplifier with the two screws contained in the kit. Torque to 101 Ncm (9 in-lb).

**Figure 4**      **Install the Preamplifier**



6. Connect one end of ribbon cable W49, contained in the kit, to the ribbon cable header on the preamplifier. Connect the other end of the ribbon cable to J9 “preamp” on the Front End Driver assembly. Route the ribbon cable so it lays flat against the preamplifier casting. When the semi-rigid cables are replaced, all semi-rigid cables will be installed over the ribbon cable to hold it in place.

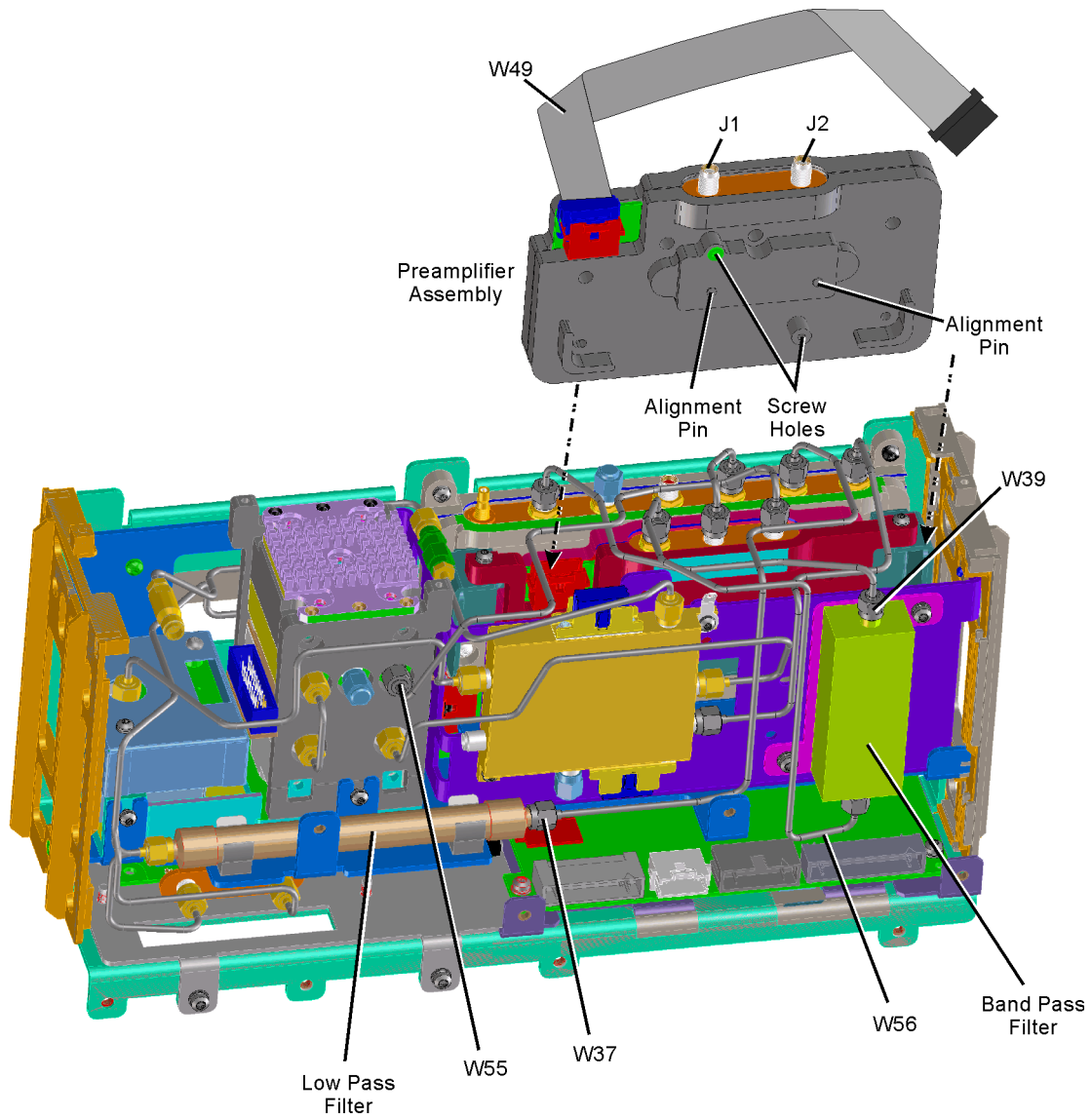
## Installation Procedure

7. Locate the E4440-20079 semi-rigid cable from the kit. This cable is reference designator W50 as shown in Figure 4. Make sure the cable orientation is correct since the cable can be installed the wrong way, resulting in cable routing problems. Connect the cable between preamplifier J2 and low band assembly J1 (RF IN). Make sure this semi-rigid cable is installed over the ribbon cable installed in the previous step (step 6). Torque to 112 Ncm (10 in-lb).
8. The remaining semi-rigid cable in the kit is the E4440-20072, having reference designator W48. Connect this cable between the low pass filter and J1 on the preamp. Torque to 112 Ncm (10 in-lb).
9. Reconnect cable W39 (E4440-20081) between low band assembly J4 and the top of the band pass filter. Torque to 112 Ncm (10 in-lb).
10. Reconnect cable W40 (E4440-20080) between low band assembly J3 and the bottom of the band pass filter. Torque to 112 Ncm (10 in-lb).
11. Continue with the “Replace the Top Brace and Outer Case” procedure on page 15 to replace the instrument top brace and outer case.

## Install the Option 1DS Preamplifier (E4446A, E4448A)

1. Locate the RF section on the right side of the instrument. Figure 5 shows cable locations and the preamplifier mounting orientation.

**Figure 5**      **Remove the Cables**



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## Installation Procedure

2. Locate and remove cable W55 (SBTX to FIFA rear connector), E4446-20045. This cable will be replaced later. It is removed to allow the preamplifier assembly to be installed.
3. Locate and remove cable W56 (FIFA front connector to Band Pass filter), E4446-20046. This cable will be replaced later.

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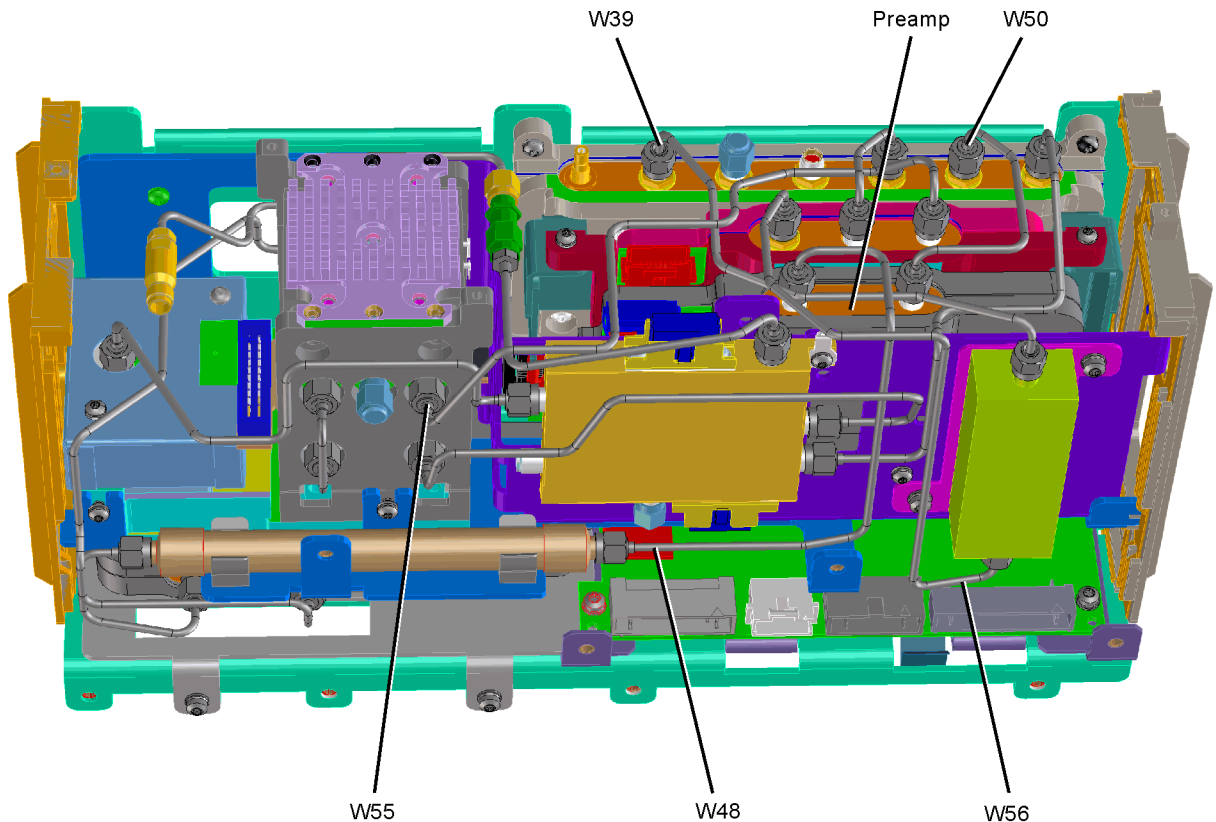
**CAUTION**

In the following step 4, use a 7/16-inch wrench on one of the wrench flats at the ends of the filter to prevent the filter body from rotating when removing the cable. Cables can be damaged if the low pass filter is allowed to rotate when loosening or tightening the cable connector.

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4. Locate and remove cable W37 (low band assembly J1 to low pass filter), E4446-20037. Discard this cable, since it will be replaced by another cable.
5. Locate and remove cable W39 (low band assembly J4 to band pass filter), E4446-20058, using the 5/16-inch wrench. This cable will be replaced later. It is removed to allow the preamplifier assembly to be installed.
6. See Figure 6. Install the preamplifier with the ribbon cable connector pointing toward the front of the analyzer. Two alignment pins on the preamplifier case mate with screw holes on the RF chassis. Align the two threaded screw holes on the preamplifier case with the holes in the RF chassis. Use a T-10 Torx driver to secure the preamplifier with the two screws contained in the kit. Torque to 101 Ncm (9 in-lb).

**Figure 6**      **Install the Preamplifier**



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7. Connect one end of ribbon cable W49, contained in the kit, to the ribbon cable header on the preamplifier. Connect the other end of the ribbon cable to J9 “preamp” on the Front End Driver assembly. Route the ribbon cable so it lays flat against the preamplifier casting. When the semi-rigid cables are replaced, all semi-rigid cables will be installed over the ribbon cable to hold it in place.
8. Locate the E4440-20079 semi-rigid cable from the kit. This cable is reference designator W50 as shown in Figure 6. Make sure the cable orientation is correct since the cable can be installed the wrong way, resulting in cable routing problems. Connect the cable between preamplifier J2 and low band assembly J1 (RF IN). Make sure this semi-rigid cable is installed over the ribbon cable installed in the previous step (step 7). Torque to 112 Ncm (10 in-lb).

## Installation Procedure

9. Reconnect W39 (Low band assembly J4 to Band Pass filter), E4440-20081. Torque to 112 Ncm (10 in-lb).
10. Locate the E4446-20038 semi-rigid cable from the kit. This cable is reference designator W48. Connect this cable between the Low pass filter and J1 on the Preamp. Torque to 112 Ncm (10 in-lb).
11. Reconnect cable W56 (FIFA front connector to Band Pass filter), E4446-20046. Torque to 112 Ncm (10 in-lb).
12. Reconnect cable W55 (SBTX to FIFA rear connector), E4446-20045. Torque to 112 Ncm (10 in-lb).
13. Continue with the “Replace the Top Brace and Outer Case” procedure on page 15 to replace the instrument top brace and outer case.

## Replace the Top Brace and Outer Case

1. Refer to Figure 2.
2. Carefully position the top brace on the deck. The alignment pin at the center of the web/fan assembly must mate with the alignment hole on the top brace. Make sure that no coaxial cables will get pinched underneath the brace.
3. Use the T-10 driver to replace and tighten the top screws first; then replace the side screws. Torque to 101 Ncm (9 in-lb).
4. Refer to Figure 1.
5. Slide the instrument cover back onto the deck from the rear. The seam on the cover should be on the bottom. Be sure the cover seats into the gasket groove in the front frame.
6. Replace the four rear feet onto the rear of the instrument. Torque to 236 Ncm (21 in-lb).
7. Use the T-20 driver to replace the handles. Torque to 236 Ncm (21 in-lb).
8. Replace the four bottom feet by pressing them into the holes in the case and sliding them in the opposite direction of the arrows until they click into place. Note that the feet at the front have the tilt stands.

## Turn the Instrument On

Plug in the instrument and apply power. The auto align will run, and it will fail because the instrument cannot recognize the preamplifier since it is not licensed yet. Continue with the next procedure to install the option designator and license keyword for the preamplifier.

## Obtain a License Key and Activate the Option

The entitlement certificate supplied in this kit allows you to obtain a license key from our Agilent website so you can enable this upgrade option. Once you have retrieved the license key, you can begin the process of activating the option.

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**NOTE** Option designator 1DS and the license keyword must be entered into instrument memory before the preamplifier will function in the instrument.

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1. On the instrument front panel press: **System, More**, until the **Licensing** softkey is visible. Press **Licensing** and **Option**. This will activate the alpha editor menu. Use the alpha editor and the front panel numerical keypad to enter the upper-case option designator 1DS. Enter the letters using the alpha editor and the numeric keypad to enter the numbers. Press the **Enter** key. Note that 1DS now appears on the **Option** key.
2. Press **License Key**. The license key number is a hexadecimal number that will require the entry of both letters and numbers. Use the alpha editor and the front panel numerical keypad to enter the license key number. Your entry will appear in the active function area of the display. If you make a typing error, use the backspace key to correct the error. Check the license key number you entered. Press **Enter, Activate License**.
3. Cycle instrument power and allow the instrument to perform the auto align routine. Press **System, More, Show System** and verify that 1DS appears in the option field.

## Perform Adjustments and Performance Tests

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**NOTE** This procedure requires the use of software included in Option 0BW, PSA Service Guide and Performance Tests and Adjustment Software. This option is available through your local Agilent Technologies Sales and Service Office.

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1. Load the PSA Series Performance Tests and Adjustment Software on your PC.
2. Perform the Frequency Response adjustment. This adjustment will take about two hours to perform.
3. Agilent recommends that all performance tests be performed since the calibration label was broken and the preamplifier added to the signal path.
4. The Option 1DS installation is now complete.

For assistance, contact your nearest Agilent Technologies Sales and Service Office. To find your local Agilent office access the following URL or call the following telephone number:

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

1-800-452-4844 (8am-8pm EST)