

**Agilent Technologies**  
**E444xAU Option HY7**  
Installation Guide



# **Agilent Technologies E444xAU Option HY7**

## **Installation Guide Retrofit Kit for the PSA Instruments**

**Use this manual with the following products:**  
E4440A/E4443A/E4445A/E4446A/E4448A



**Agilent Technologies**

**Manufacturing Part Number: E4440-90601**

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<b>WARNING</b>	<b>Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.</b>
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<b>CAUTION</b>	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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## Definitions

- Specifications describe the performance of parameters covered by the product warranty (temperature – 0 to 55 °C, unless otherwise noted.)
- *Typical* describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- *Nominal* values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.



## Installing Options

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# Installing Options

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## Introduction

This manual incorporates the installation of the following similar instrument models E4440A, E4443A, E4445A, E4446A, E4448A with Option HY7.

When the Option IF Output HY7 is installed with Option H7L or HNQ, the 321.4 MHz IF Output must be jumpered (8120-5066) to the H7L IN, HNQ IN, or Option IF IN for any one of the options to function properly.

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## Description

The Agilent model numbers E4440AU, E4443AU, E4445AU, E4446AU and E4448AU are referred to as the E444xAU through out this document. Option HY7 is referred to as the Option IF Output.

The E444xAU Option IF Output is a retrofit kit that provides the components necessary to install a down converted IF Output connector to the rear panel of the PSA Performance Spectrum Analyzer. The Option IF Output can be installed with Options H7L and HNQ.

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## Verifying the Shipment

Check the items received in the following option specific Tables on the following pages to ensure that you have received all the items in your shipment. If there are any signs of damage that may have occurred during shipment, or any accessories appear to be damaged or missing, call your nearest Agilent Technologies sales or service office. See [“Contacting Agilent” on page 31](#) for more information.

**Table 1 E4440xAU Option HY7 Content List**

<b>Description</b>	<b>Agilent Part Number</b>	<b>Quantity</b>
Plug Hole .25D NYL	6960-0076	3
Plug Hole .5D NY	6960-0149	3
Wire Marker Clip 1 (brown)	7121-5601	4
Wire Marker Clip 2 (red)	7121-5602	2
Wire Marker Clip 4 (yellow)	7121-5604	4
Wire Marker Clip 5 (Green)	7121-5605	2
Wire Marker Clip 0 (black)	7121-5610	2
Option Label (HY7)	7121-8080	1
Label (HY7 IN)	7121-8080	1
Cable (W40)	8121-0704	1
Cable (W51 or W52)	8121-0705	1
Panel Rear Dress	E4440-00059	1
Cable AY (W41)	E4440-60395	1
PCA - 70 MHz output PSA	E4440-60401	1
Installation Guide	E4440-90601	1
Product Note	E4440-90600	1

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## Installation Procedure

### Removing the Feet, Handles and Covers

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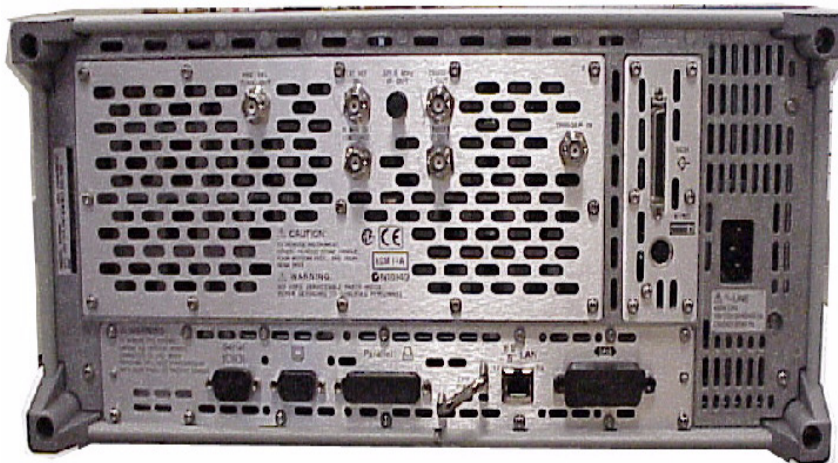
**NOTE** Keep all of the hardware (screws, nuts, etc.) for re-use when installing the assemblies.

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Follow the steps outlined below to install the Option IF Output retrofit kit.

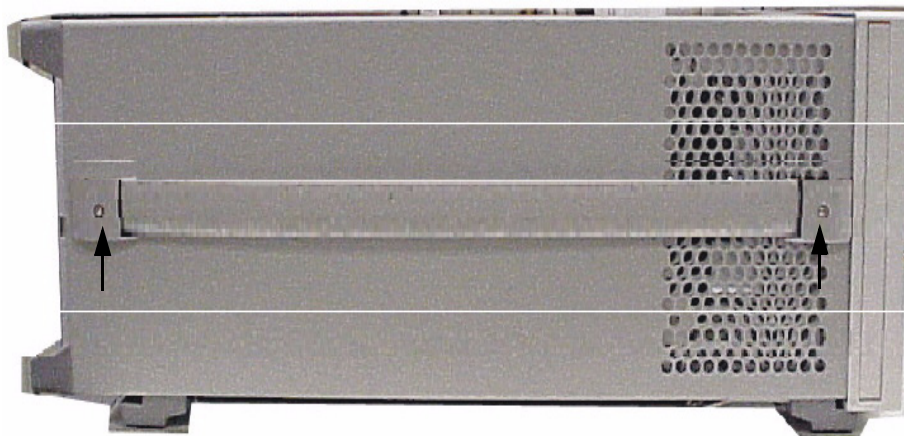
1. Remove the four rear panel feet on the PSA by using a #20 Torx driver. Refer to [Figure 1](#). Upon re-installation torque to 21 in-lb.

**Figure 1 Rear Panel Feet**



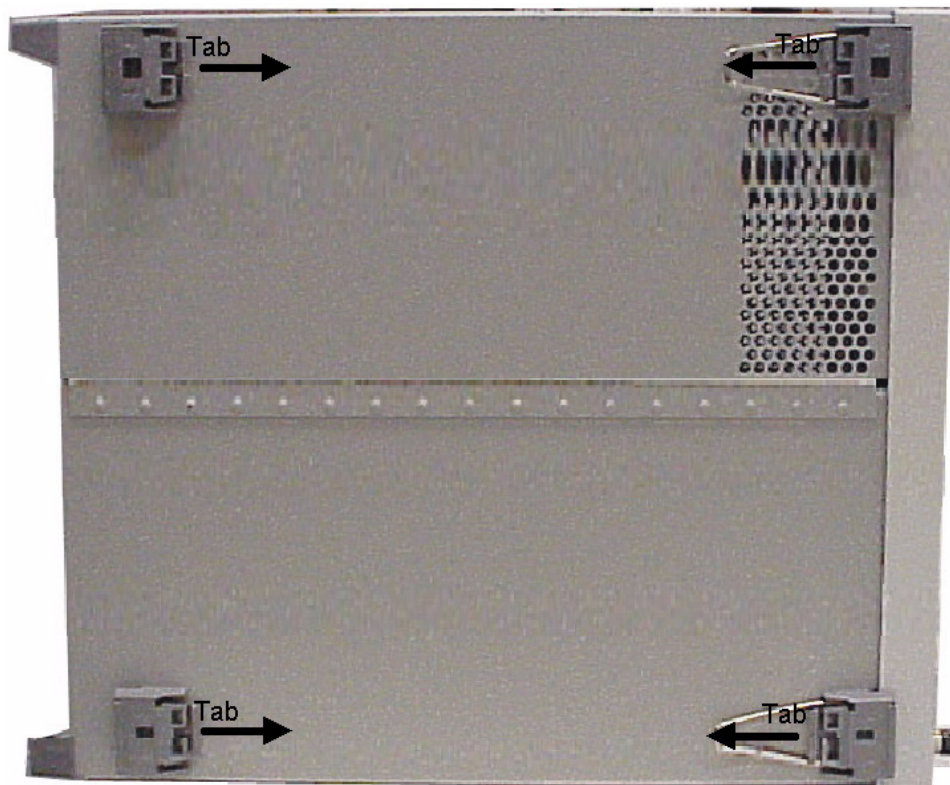
2. Remove the two side handles on the PSA by using a #20 Torx driver. Refer to [Figure 2](#). Upon re-installation torque to 21 in-lb.

**Figure 2 Side Handles**



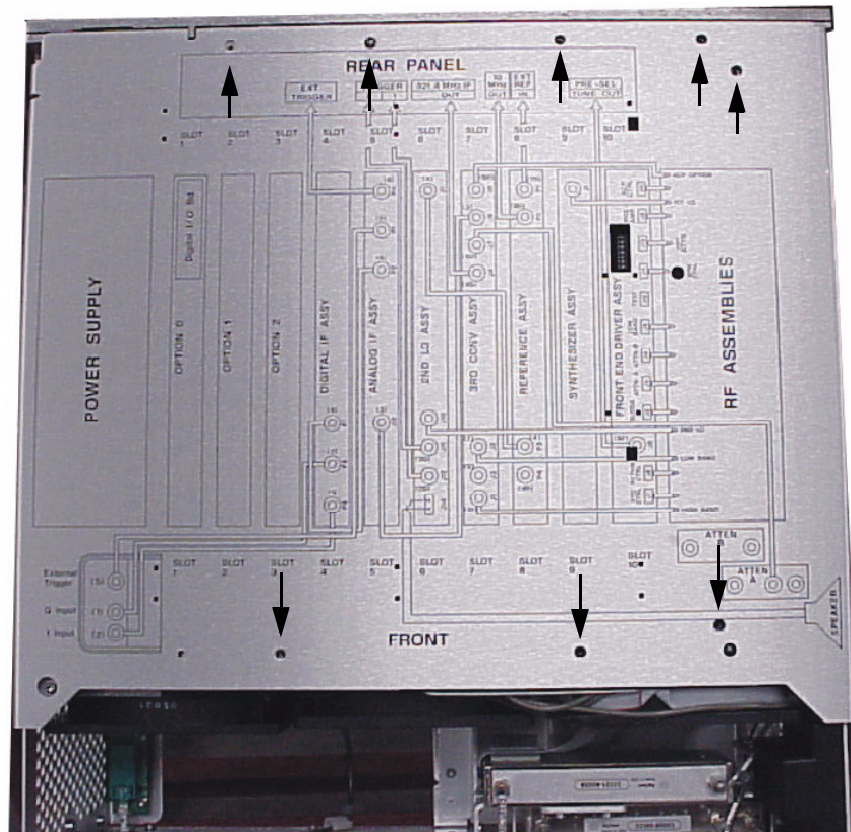
3. Remove the four feet from the bottom of the PSA instrument by pulling the tabs away from the instrument and sliding the feet toward the center of the instrument. Refer to [Figure 3](#).
4. Remove the outside cover by sliding it toward the rear of the instrument.

**Figure 3 Bottom Feet Orientation**



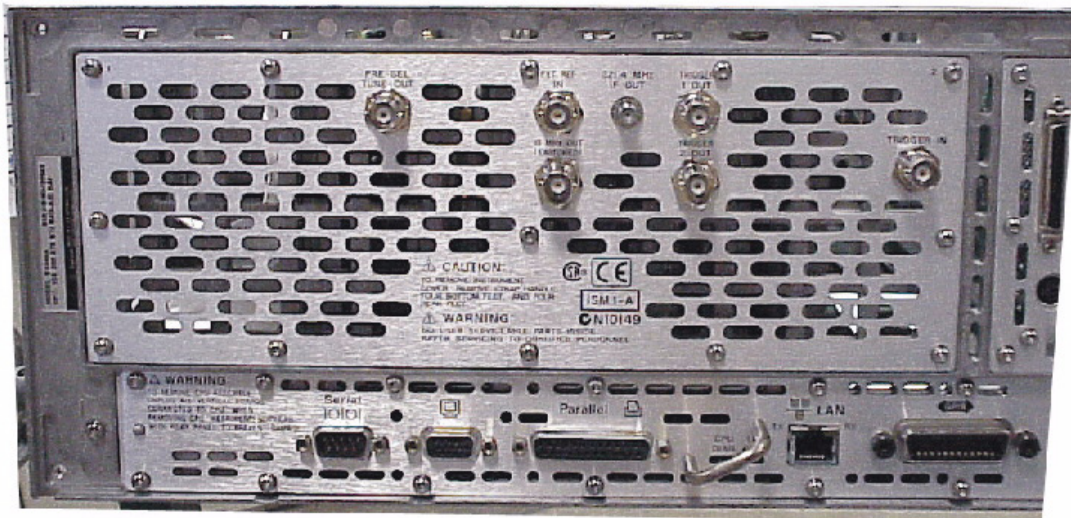
5. Remove the chassis cover using a #10 Torx driver. Refer to [Figure 4](#) for location of top screws. There are ten screws to remove from the “speaker” side of the chassis cover and two crews from the “power supply” side of the chassis cover. Place all hardware in a safe location for re-installation.

**Figure 4 Chassis Cover Screw Location**



6. Remove the rear panel plate by removing the following components. Refer to [Figure 5](#).
  - BNC (f) connectors nuts
  - SMA connector nut
  - thirteen rear plate screws
7. Carefully pull the rear panel plate away from the BNC and SMA connectors. Insure that the cables are labeled so that the BNC and SMA connectors are inserted into the correct holes when re-installing them on the new rear panel plate. Discard the old rear panel plate.

**Figure 5 Rear Panel Plate Connectors and Hardware**





## Instruments with H7L or HNQ

1. To create cable E4440-60412, install wire markers 7121-5605 (green 5) and 7121-5602 (red 2) to each end of cable 8121-0705. The wire marker will now read 52 (reference designator W52).
2. Add the yellow (4) and brown (1) wire marker clips to the new cable (E4440-60395). The wire marker will now read 41 (reference designator W41).
3. Assemble the rear panel plate (E4440-00059), cables (E4440-60412 and E4440-60395) and hole plug(s) as per the specific option configuration. See [Figure 6](#), [Figure 7](#) and [Figure 8](#).
4. Apply the label (8121-8080) to cover the “H70 IN” silk screen with “HY7 IN”.

**Figure 6 Rear Panel Plate with Option H7L**

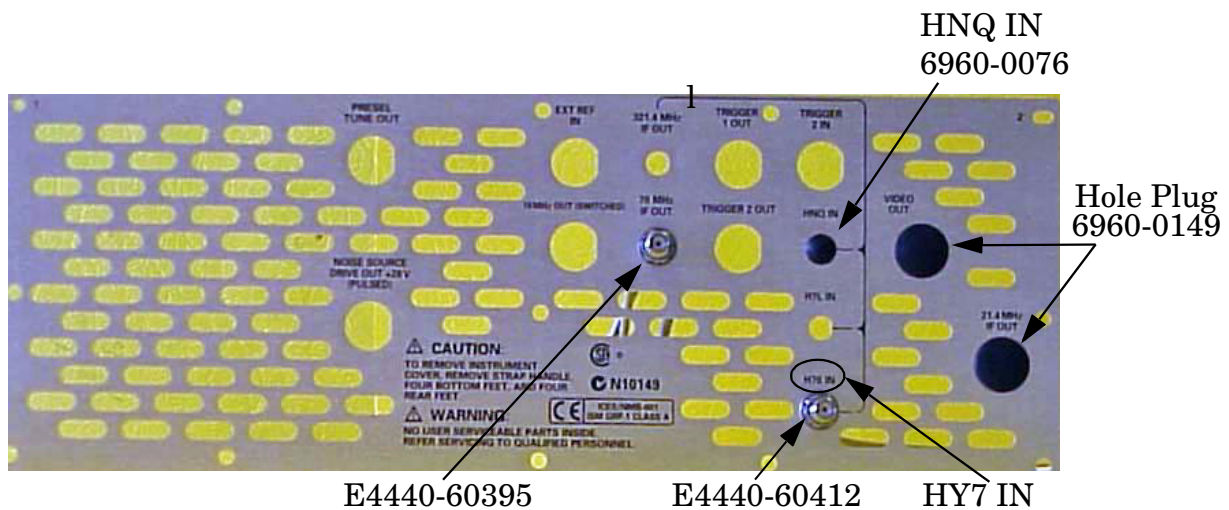


Figure 7 Rear Panel Plate with Option HNQ

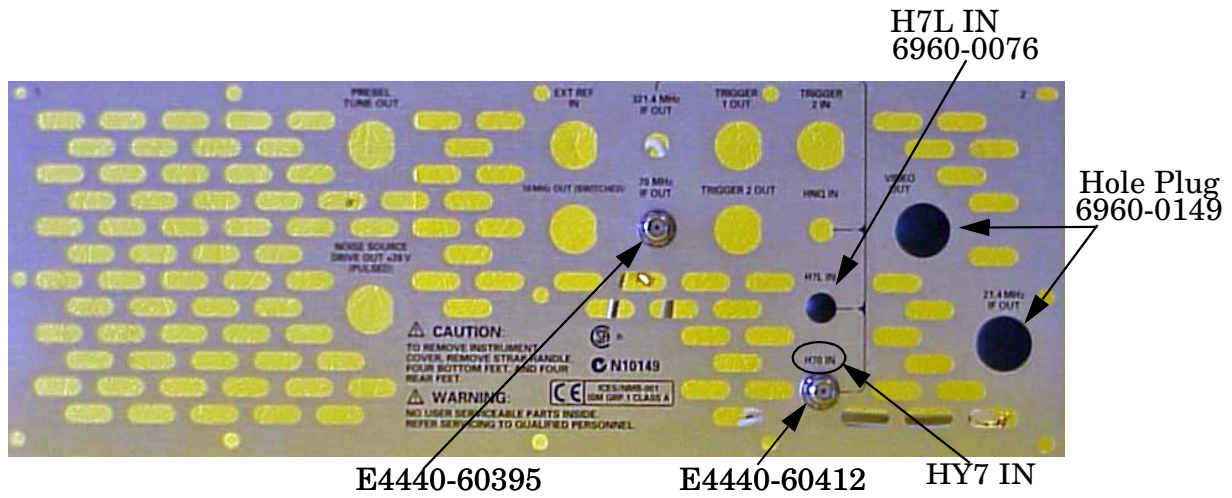
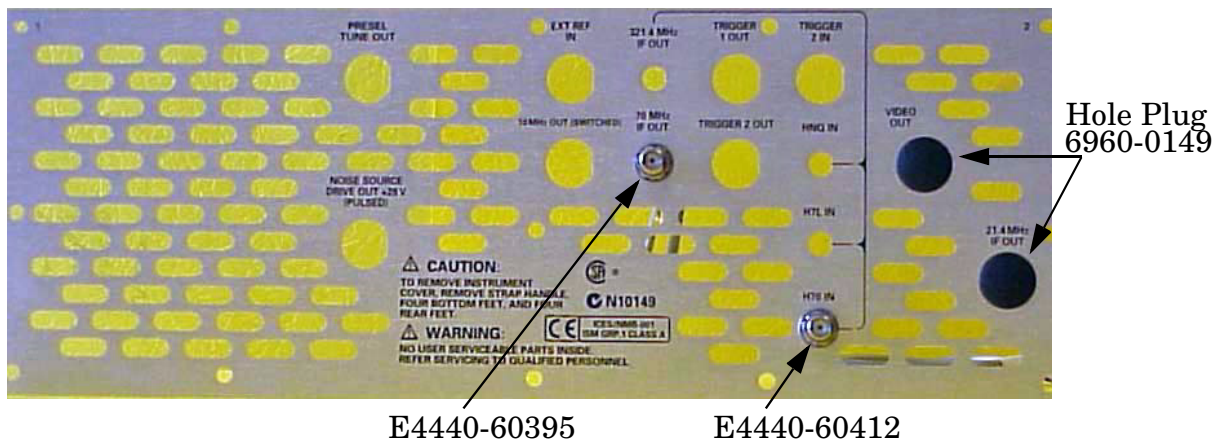


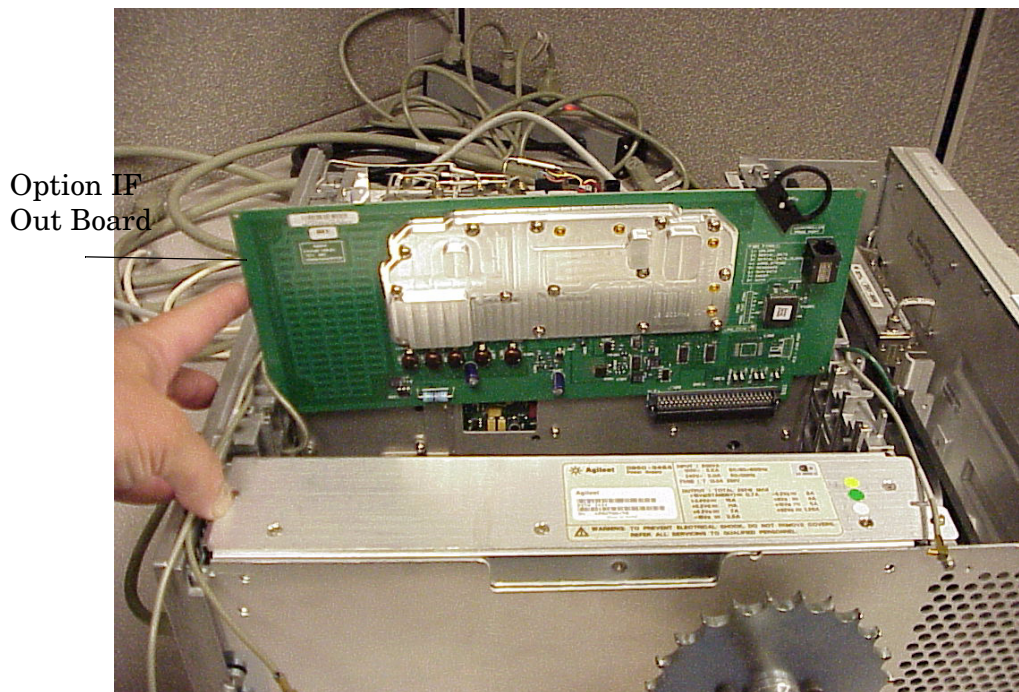
Figure 8 Rear Panel Plate with Option H7L and HNQ



## Installing the Rear Panel with H7L or HNQ

1. Connect the BNC and SMA connectors as labeled in Step 7 on Page 8 using the previously removed hardware. Carefully route the new cables (W41 and W52) through the rear frame, near Slot 2. (To be connected to the Option IF board later in this procedure). Refer to [Figure 12 on page 13](#).
2. Connect the new rear panel plate to the rear panel using the previously removed screws. Torque to 9 in-lb.
3. Partially insert the Option IF board into Option Slot 2. See [Figure 9](#).

**Figure 9 Option IF Board Insertion**



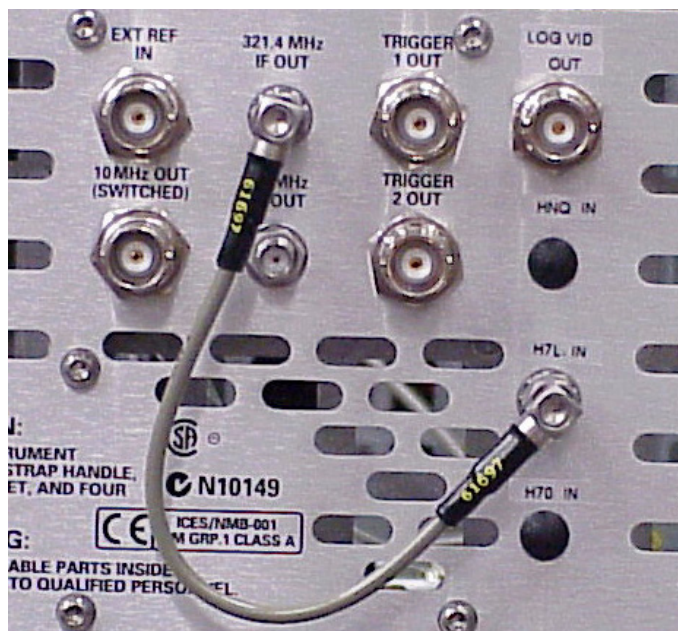
4. Carefully route the cables along the top of the rear frame and between the board extractors to insure that they will not be damaged when installing the chassis cover. Refer to [Figure 12 on page 13](#). Connect the cables as follows:
  - Connect the 321.4 MHz IF Input cable (E4440-60412) (W52) on the rear panel to the 321.4 MHz IF Input connector (J1) on the Option IF board. Refer to [Figure 11 on page 13](#).
  - Connect the Option IF Output cable (E4440-60395) (W41) on the rear panel to the Option IF Output connector (J2) on the Option IF board.
  - Connect the jumper cable (8120-5066). See [Figure 10](#).

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**NOTE** Jumper cable (8120-5066) is included on instruments with Option H7L or HNQ. Move the cable from the Option H7L IN or HNQ IN to the Option HY7 IF IN connector to function properly.

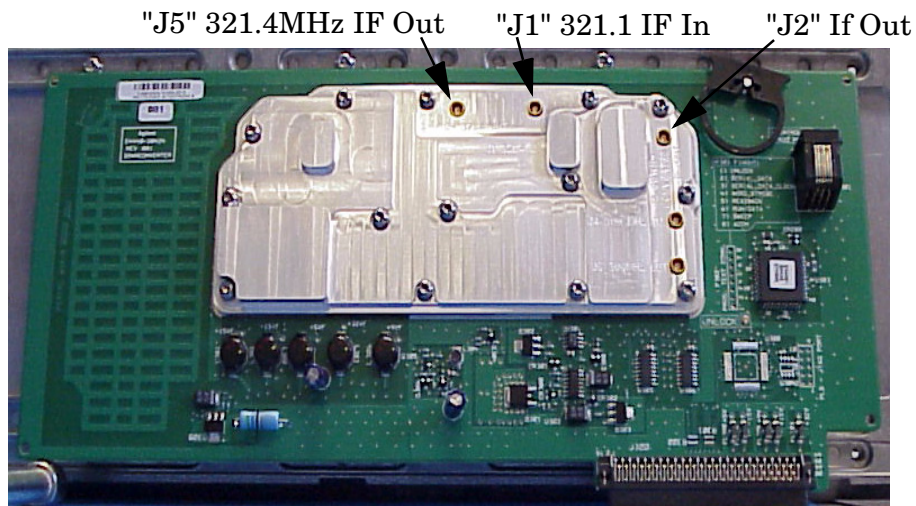
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**Figure 10 Jumper Cable (Option H7L)**

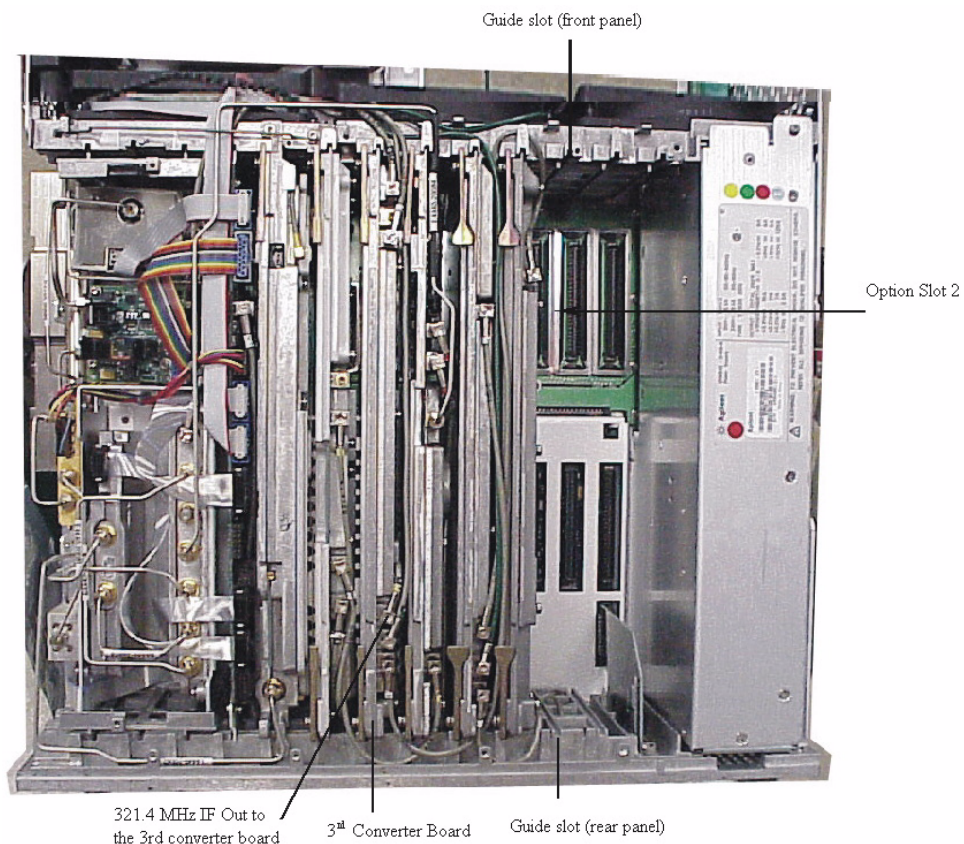


5. Completely insert the Option IF Output board into Slot 2.
6. Attach the “HY7” label (7121-8080) to the rear panel next to the existing list of options on the serial number label.
7. Install the chassis cover, instrument cover, side handles, bottom and rear feet in reverse order of the removal process described in the beginning of the procedure.
8. Install licence key to enable Option HY7. Refer to Option Upgrade Entitlement Certificate for option license procedure.

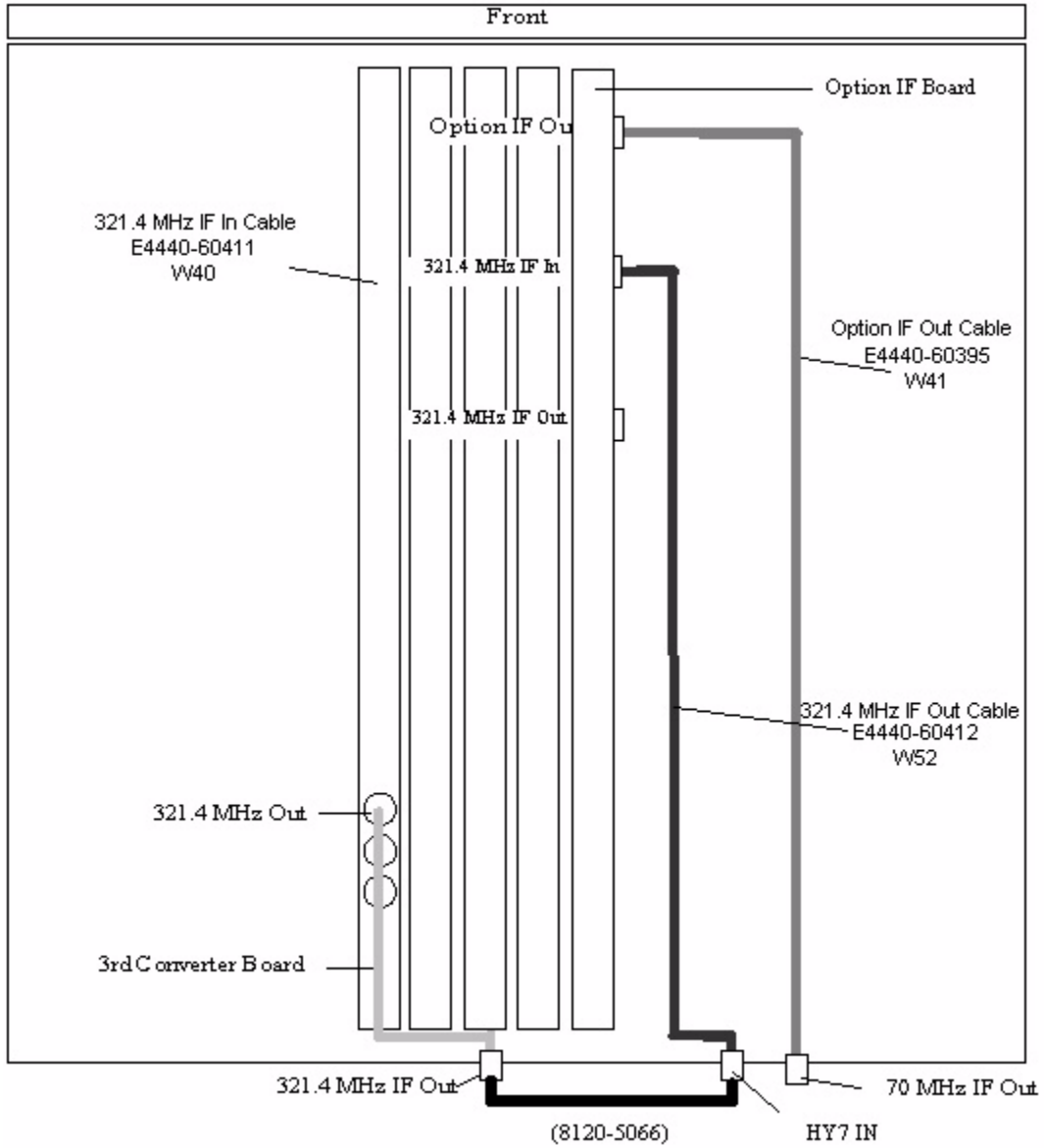
**Figure 11 Option IF Board Connector Layout**



**Figure 12 Top View of the PSA Instrument**



**Figure 13 Top View Cable Orientation with Option H7L or HNQ**

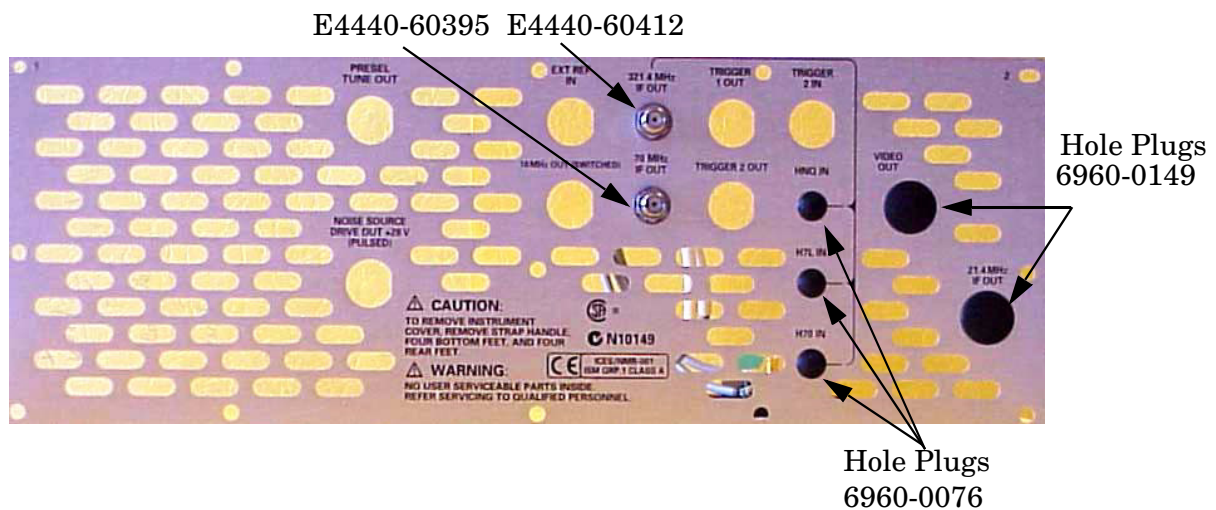


*This concludes the installation of the E444xAU Option into the PSA instrument.*

## Instruments without H7L or HNQ

1. To create cable E4440-60412, install wire markers 7121-5605 (green 5) and 7121-5601 (brown 1) to each end of cable 8121-0705. The wire marker will now read 52 (reference designator W51) on each end.
2. Add a yellow (4) and brown (1) marker clip to each end of the (E4440-90395) cable. The wire marker will now read 41 (reference designator W41).
3. Assemble the rear panel plate (E4440-00059), cables (E4440-60412 and E4440-60395) and hole plug(s) as per the specific option configuration. See [Figure 14](#).

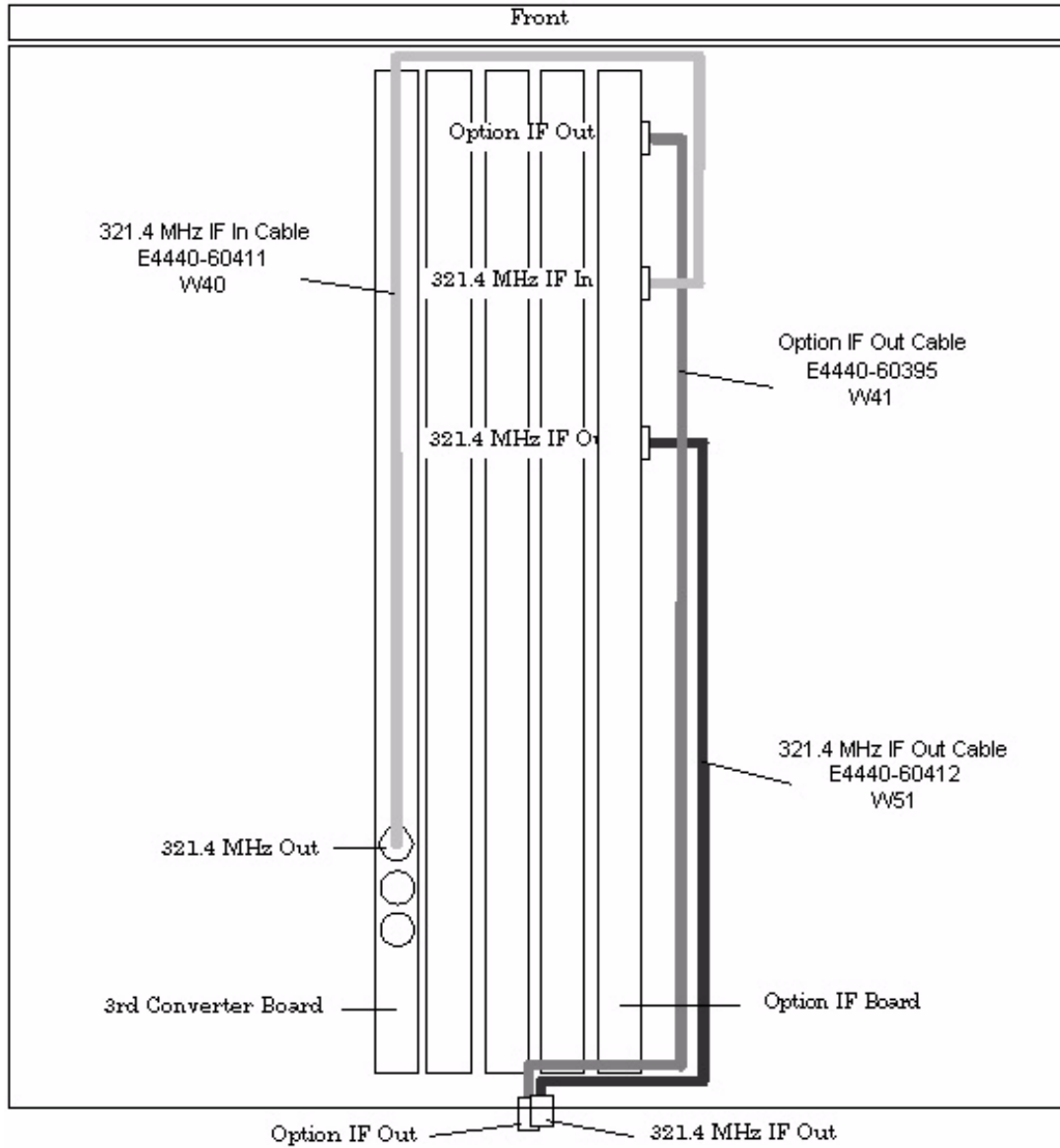
**Figure 14 Rear Panel Plate (without Option H7L or HNQ)**



4. Connect the BNC and SMA connectors as labeled in Step 7 on Page 8 using the previously removed hardware. Carefully route the new cables (W41 and W51) through the rear frame. (To be connected to the Option IF board later in this procedure). Refer to [Figure 12 on page 13](#).
5. Connect the new rear panel plate to the rear panel using the previously removed screws. Torque to 9 in-lb.
6. Carefully disconnect and remove the 321.4 MHz IF Out cable from the 3rd Converter board by gently pulling up using needle nose pliers. Refer to [Figure 12 on page 13](#) and [Figure 15 on page 17](#).
7. Partially insert the Option IF board (E4440-60401) into Option Slot 2. See [Figure 9 on page 11](#) and [Figure 12 on page 13](#). Ensure the Option IF board is installed with the edges in the grooves of the chassis.
8. To create cable E4440-60411, install wire markers 7121-5604 (yellow 4) and 7121-5610 (black 0) to each end of cable 8121-0704. The wire markers will now read 40 (reference designator W40) on each end.

9. Carefully route the cables along the top of the rear frame and between the board extractors to insure that they will not be damaged when installing the chassis cover. Refer to [Figure 12 on page 13](#). Connect the cables as follows:
  - Connect the new 321.4 MHz IF Output cable (E4440-60411) (W40) in the instrument from the 321.4 MHz Output connector on the 3rd Converter board to the 321.4 MHz IF Input (J5) on the Option IF board. Refer to [Figure 11 on page 13](#) and [Figure 15 on page 17](#).
  - Connect the 321.4 MHz IF Input cable (E4440-60412) (W51) on the rear panel to the 321.4 MHz IF Input connector (J1) on the Option IF board.
  - Connect the Option IF Output cable (E4440-60395) (W41) on the rear panel to the Option IF Output connector (J2) on the Option IF board.
10. Attach the “HY7” label (7121-8080) to the rear panel next to the existing list of options on the serial number label.
11. Install the chassis cover, instrument cover, side handles, bottom and rear feet in reverse order of the removal process described in the beginning of this procedure.
12. Install licence key to enable Option HY7. Refer to Option Upgrade Entitlement Certificate for option license procedure.



**Figure 15 Top View Cable Orientation without Option H7L or HNQ**

*This concludes the installation of the E444xAU Option into the PSA instrument.*

## Nominal Characteristics

Review the following table for the nominal characteristics of the 321.4 MHz and Option IF Output of the E444xAU with the new Option IF Output installed.

**Table 2 Nominal Characteristics for the 321.4 and Option IF Output**

Parameter	321.4 MHz IF Output	Option IF Output
Frequency	321.4 MHz	70 MHz
Conversion Gain <sup>1</sup>	+2 dB ( $\pm$ 2 dB)	+7 dB ( $\pm$ 2 dB)
IF Bandwidth		
Low Band < 3 GHz <sup>2</sup>	40 MHz	40 MHz
High Band $\geq$ 3 GHz <sup>3</sup>	30 to 60 MHz	30 to 60 MHz

1. Attenuator setting: 0 dB. In high band, the Preselector Center routine must be performed to achieve the conversion gain listed in the [Table 2](#). If applicable, when Option 1DS (100 kHz to 3 GHz Preamp) is ON, there will be a 28 to 30 dB of gain in the 70 MHz IF output on the rear panel of the PSA. With the Preamp ON, the Conversion Gain outlined in the Table will be approximately +32 dB of gain.
2. If your instrument is equipped with Option 123 or HN9, the IF Output Bandwidth will be nominally 80 MHz.
3. Dependent on tuned frequency since analyzer preselector filter bandwidth increases with increased tuned frequency. If analyzer includes Option 123 or HN8 preselector bypass, IF output bandwidth will be approximately 200 MHz with preselector bypass engaged.

While performing the “Align All” routine on the PSA, the Option IF Output will be corrupted due to the systems variable gain circuit stepping through the alignment routine.

The ripple correction in the flatness routine will be non-existent in the Option IF Output since the Option IF Output is ported to the rear panel before the IF signal is digitized and used for the flatness correction routine.

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**NOTE**            The 321.4 MHz IF Output is only effected if the Option IF Out is installed without Option H7L or HNQ.

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## Performance Tests and Adjustments

The tests outlined in this section are to verify the operation of the IF Output option and should be used in conjunction with the standard PSA manuals. This section also includes the equipment required.

Tests:

- “Equipment Required” on page 20.
- “Option IF Output Amplitude Test Procedure” on page 22.
- “321.4 MHz IF Out Amplitude Test Procedure” on page 24.
- “Measuring the Bandwidth of the IF Output” on page 25.
- “Repeat Steps 3 through 6 to measure the bandwidth of the Option IF Output.” on page 26.

## Equipment Required

Gather the equipment listed in the Tables below to verify the performance of the PSA amplitude at the Option IF Output on the rear panel.

**Table 3 Signal Source Equipment**

Description	Characteristics	Model
Synthesized Sweeper	Frequency: Must sweep 100 MHz around 1 GHz Amplitude: >0 dBm	83620B

**Table 4 Analyzer Equipment (test spectrum analyzer)**

Description	Characteristics	Model
Spectrum Analyzer	Upper Frequency Range: 2 GHz	8562E 8563E

**Table 5 Power Meter Equipment**

Description	Characteristics	Model
Power Meter	Absolute Accuracy: $\pm 0.5\%$ Resolution: 0.01 dB Reference Accuracy: 1.2% Power Reference Accuracy: $\pm 0.9\%$ Compatible with Agilent 8480 series power sensors dB relative mode	E4419B E4418A
Power Sensor	Frequency Range: 1 MHz to 4.0 GHz SWR at 50 MHz: $\leq 1.05$ 1 MHz to 4 GHz SWR: $\leq 1.22:1$ Type-N (m) 50 $\Omega$	8482A 8481A

**Table 6 Cables**

Description	Characteristics	Agilent Part Numbers
APC 3.5 (m)(m) 2 required	DC to 26.5 GHz Length: $\leq 92$ cm (36 in) Insertion Loss: $\sim 2$ dB	8120-4921
SMA	Low-loss, 1 m	5064-5458

**Table 7**      **50  $\Omega$  Adapters**

Description	Characteristics	Model Number/ Part Number
Adapter 3.5 (f) to 3.5 (f) (two required)	VSWR: $\leq 1.05:1$	83059B
BNC to dual banana		1251-0781
BNC Tee (f,m,f)		1250-0781
BNC (m) to SMA (f)	VSWR: $\leq 1.13:1$	1250-1700
BNC (f) to SMA (m)		1250-1200
Type-N (m) to 3.5 mm (m)	VSWR: $\leq 1.08:1$	1250-1743
Type-N (m) to APC 3.5 (f) two required	VSWR: $\leq 1.08:1$	1250-1744
Type-N (f) to APC 3.5 (f)	For the 83620B VSWR: $1.08:1$	1250-1745
APC 3.5 (m) to APC 3.5 (m) two required	VSWR: $\leq 1.12:1$	1250-1748
APC 3.5 (f) to APC 3.5 (f)	Connector saver for 83630B VSWR: $1.15:1$	1250-1749
Type-N (f) to APC 3.5 (m) two required	VSWR: $1.08:1$	1250-1750
Type-N (f) to N (f)	VSWR: $1.03:1 \leq 1.3$ GHz $\sim 1.15 \leq 18$ GHz	1250-1472
Type-N (m) to BNC (m)		1250-1473
Type-N (m) to N (m)	VSWR: $1.03:1 \leq 1.3$ GHz $\sim 1.15 \leq 18$ GHz	1250-1475
Type-N (m) to BNC (f)	VSWR: $\leq 1.03:1 \leq 1.3$ GHz $\sim 1.15 \leq 18$ GHz	1250-1476
Type-N (f) to BNC (m)	VSWR: $1.03:1 \leq 1.3$ GHz $\sim 1.15 \leq 18$ GHz	1250-1477

## Option IF Output Amplitude Test Procedure

This test verifies that the Option IF Output meets its amplitude accuracy specification. In this test, the source is connected to the RF Input and a spectrum analyzer is connected to the Option HY7 Output.

Follow the steps below to prepare for the amplitude verification of the Option IF Output on the rear of the PSA.

1. Preset the PSA DUT and all the test equipment.
2. Run **Align All Now** on the PSA. Press: **[System] < Alignments < Align All Now**.
3. Initialize the test equipment parameters as follows:

**Table 8 E444xA PSA Spectrum Analyzer Setup**

Parameter	Setting
Frequency: Center Span	1 GHz 0 Hz
Resolution Bandwidth	1 MHz
Attenuation	Need to choose 0 dB since this setting will determine what the IF out level is with respect to the input signal
Frequency Reference	Internal

**Table 9 Synthesized Sweeper Setup**

Parameter	Settings
Frequency	1 GHz
Function	CW or Sine
Level	-10 dBm

4. Zero and calibrate the power sensor.
5. Connect the power sensor/power meter to the end of the Type-N cable that is connected to the source. Use an N (f) to N (f) adapter between the power sensor and the cable.
6. Adjust the source amplitude for a power meter reading of -10 dBm.
7. Disconnect the power sensor from the cable and connect the cable to the PSA RF Input.

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**NOTE** If the PSA has Option BAB (APC 3.5 mm input connector) an APC 3.5 mm (f) to N (f) adapter is required between the PSA and the Type-N cable.

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8. Connect the PSA rear panel Option IF Output to the RF Input of the test spectrum analyzer. Use an SMA or APC 3.5 mm cable and appropriate adapters.
9. Initialize the test spectrum analyzer parameters as follows. Refer to [Table 10](#).

**Table 10 Option IF Output Measurement Settings**

Parameter	Option HY7
Center Frequency	70 MHz
Span	5 MHz
Res BW	1 MHz
Reference Level	0 dBm
Log Scale	5 dB/div.

10. Record the amplitude of the 70 MHz IF Output in the table below. The signal level should be  $-3 \text{ dBm} (\pm 2 \text{ dB})$ . This equates to a 7 dB gain between the RF input and the Option IF Output port.

**Table 11 Data Sheet Record**

Frequency	Expected Amplitude	Measured Amplitude
70 MHz	$-3 \text{ dBm} (\pm 2 \text{ dB})$	
321.4 MHz	$-8 \text{ dBm} (\pm 2 \text{ dB})$	

### 321.4 MHz IF Out Amplitude Test Procedure

1. Refer to the previous steps for the Option IF Output measurements, connect the PSA rear panel 321.4 MHz IF Out to the RF Input of the test spectrum analyzer. Use an SMA or APC 3.5 mm cable and appropriate adapters. Initialize the test spectrum analyzer parameters as follows to measure the 321.4 MHz IF Out on the rear panel of the PSA.

**Table 12 321.4 MHz Measurement Spectrum Analyzer Settings**

Parameter	Settings
Center Frequency	321.4 MHz
Span	5 MHz
Res BW	1 MHz
Reference Level	0 dBm
Log Scale	5 dB/div.

2. Record the amplitude of the 321.4 MHz Output. The signal level should be  $-8$  dBm ( $\pm 2$  dB). This equates to a 2 dB gain between the RF Input and the 321.4 MHz Output port.



## Measuring the Bandwidth of the IF Output

This test measures the PSA's IF Output (standard 321.4 MHz and IF Output option) amplitude response as a function of frequency (bandwidth). A signal is applied to the PSA at 950 MHz to 1050 MHz. The 321.4 MHz If Output is measured using a test spectrum analyzer.

1. While the spectrum analyzer is still connected to the 321.4 MHz IF Output connector on the rear panel of the PSA, configure the PSA and test equipment as follows:

**Table 13 E444xA PSA Spectrum Analyzer Setup**

Parameter	Setting
Frequency: Center Span	1 GHz 0 Hz
Resolution Bandwidth	1 MHz
Attenuation	Need to choose 0 dB since this setting will determine what the IF out level is with respect to the input signal
Frequency Reference	Internal

**Table 14 Bandwidth Measurement Spectrum Analyzer Setup**

Parameter	Settings
Center Frequency	321.4 MHz
Span	100 MHz
Res BW	3 MHz
Reference Level	0 dBm
Log Scale	5 dB/div.
Trace	MAX Hold

**Table 15 Synthesized Sweeper Setup**

Parameter	Settings
Frequency: Start Freq Stop Freq	950 MHz 1050 MHz
Function	CW or Sine
Level	-10 dBm

2. Press **[Trace]** < **Max Hold** and wait until the response of the 321.4 MHz Output is displayed on the test spectrum analyzer.
3. Press **[Peak Search]** on the spectrum analyzer to place a marker on the peak of the response.
4. Press **Marker Delta** on the test spectrum analyzer and adjust the delta marker down the skirt of the response to the 3 dB point.
5. Press **Marker Delta** again and adjust the marker to the other side of the peak response and down the other skirt until the marker amplitude reads 0 dB. (The marker delta frequency is the 3 dB bandwidth of the 321.4 MHz Output).
6. Refer to the “[Nominal Characteristics](#)” on page 18 to verify the results of your tests.
7. Connect the test spectrum analyzer to the 70 MHz IF Output port on the rear panel of the PSA.
8. Change the center frequency of the bandwidth measurement spectrum analyzer to 70 MHz
9. Press **[Trace]** < **clear write** < **max hold** and wait for the response of the 70 MHz IF Output to be displayed on the test spectrum analyzer.
10. Repeat Steps 3 through 6 to measure the bandwidth of the Option IF Output.

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**NOTE** If the flatness slopes on the IF Output, connect a 50 Ohm load to the 321.4 MHz IF Output port.

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*This concludes the Performance Verification of the E444xAU Option in the PSA instrument.*

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## Safety and Regulatory Information

### Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

### Before Applying Power

Verify that the product is configured to match the available main power source. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

### Shipping Instructions

You must always call the Agilent Technologies Instrument Support Center to initiate service before retuning your instrument to a service office. See [“Contacting Agilent” on page 31](#). Always transport or ship the instrument using the original packaging if possible. If not, comparable packaging must be used. Attach a complete description of the failure symptoms.

## Warnings

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<b>WARNING</b>	<b>The WARNING notice denotes a hazard. It calls attention to a procedure, practice, or the like, which if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.</b>
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Warnings applicable to this instrument are:

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<b>WARNING</b>	<b>If this instrument is not used as specified, the protection provided by the equipment could be impaired. This instrument must be used in a normal condition (in which all means for protection are intact) only.</b>
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<b>WARNING</b>	<b>For continued protection against fire hazard replace line fuse only with same type and rating:</b> <ul style="list-style-type: none"><li>• United States—F 3A/250V, Part Number 2110-0780</li><li>• Europe—F 3.15A/250V, Part Number 2110-0655</li></ul> <b>The use of other fuses or material is prohibited.</b>
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<b>WARNING</b>	<b>This is a Safety Class I product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted only into a socket outlet provided with a protective earth contact. Any interruption of the protective conductor, inside or outside the instrument, is likely to make the instrument dangerous. Intentional interruption is prohibited.</b>
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<b>WARNING</b>	<b>The power cord is connected to internal capacitors that may retain dangerous electrical charges for 5 seconds after disconnecting the plug from its power supply.</b>
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<b>WARNING</b>	<b>These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.</b>
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<b>WARNING</b>	<b>The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from all voltage sources while it is being opened.</b>
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<b>WARNING</b>	<b>This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 1010 and 664 respectively.</b>
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<b>WARNING</b>	<b>No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.</b>
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<b>WARNING</b>	<b>If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.</b>
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### **Cautions**

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<b>CAUTION</b>	The CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.
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Cautions applicable to this instrument are:

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<b>CAUTION</b>	Always use the three-prong ac power cord supplied with this instrument. Failure to ensure adequate earth grounding (by not using this cord) can cause instrument damage.
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<b>CAUTION</b>	This instrument has autoranging line voltage input; be sure the supply voltage is within the specified range.
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<b>CAUTION</b>	Ventilation Requirements: When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, forced convection must be used.
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## Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
	This symbol indicates the product meets the Australian Standards.
	This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).
	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.
	Safety Earth Ground. This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

## Contacting Agilent

By internet, phone, or fax, get assistance with all your test and measurement needs.

This information supersedes all prior HP contact information.			
<b>Online assistance:</b> <a href="http://www.agilent.com/find/assist">www.agilent.com/find/assist</a>			
<b>Americas</b>			
<b>Brazil</b> (tel) (+55) 11 3351 7012 (fax) (+55) 11 3351 7024	<b>Canada</b> (tel) +1 877 894 4414 (fax) +1 303 662 3369	<b>Mexico</b> (tel) 1 800 254 2440 (fax) 1 800 254 4222	<b>United States</b> (tel) 800 829 4444 (alt) (+1) 303 662 3998 (fax) 800 829 4433
<b>Asia Pacific and Japan</b>			
<b>Australia</b> (tel) 1 800 225 574 (fax) 1 800 681 776 (fax) 1 800 225 539	<b>China</b> (tel) 800 810 0508 (alt) 800 810 0510 (fax) 800 810 0507 (fax) 800 810 0362	<b>Hong Kong</b> (tel) 800 933 229 (fax) 800 900 701	<b>India</b> (tel) 1600 112 626 (fax) 1600 112 727 (fax) 1600 113 040
<b>Japan (Bench)</b> (tel) 0120 32 0119 (alt) (+81) 426 56 7799 (fax) 0120 01 2144	<b>Japan (On-Site)</b> (tel) 0120 802 363 (alt) (+81) 426 56 7498 (fax) (+81) 426 60 8953	<b>Singapore</b> (tel) 1 800 275 0880 (fax) (+65) 6755 1235 (fax) (+65) 6755 1214	<b>South Korea</b> (tel) 080 778 0011 (fax) 080 778 0013
<b>Taiwan</b> (tel) 0800 047 669 (fax) 0800 047 667 (fax) 886 3492 0779	<b>Thailand</b> (tel) 1 800 2758 5822 (alt) (+66) 2267 5913 (fax) 1 800 656 336	<b>Malaysia</b> (tel) 1800 880 399 (fax) 1800 801 054	
<b>Europe</b>			
<b>Austria</b> (tel) 0820 87 44 11* (fax) 0820 87 44 22	<b>Belgium</b> (tel) (+32) (0)2 404 9340 (alt) (+32) (0)2 404 9000 (fax) (+32) (0)2 404 9395	<b>Denmark</b> (tel) (+45) 7013 1515 (alt) (+45) 7013 7313 (fax) (+45) 7013 1555	<b>Finland</b> (tel) (+358) 10 855 2100 (fax) (+358) (0) 10 855 2923
<b>France</b> (tel) 0825 010 700* (alt) (+33) (0)1 6453 5623 (fax) 0825 010 701*	<b>Germany</b> (tel) 01805 24 6333* (alt) 01805 24 6330* (fax) 01805 24 6336*	<b>Ireland</b> (tel) (+353) (0)1 890 924 204 (alt) (+353) (0)1 890 924 206 (fax) (+353) (0)1 890 924 024	<b>Israel</b> (tel) (+972) 3 9288 500 (fax) (+972) 3 9288 501
<b>Italy</b> (tel) (+39) (0)2 9260 8484 (fax) (+39) (0)2 9544 1175	<b>Luxemburg</b> (tel) (+32) (0)2 404 9340 (alt) (+32) (0)2 404 9000 (fax) (+32) (0)2 404 9395	<b>Netherlands</b> (tel) (+31) (0)20 547 2111 (alt) (+31) (0)20 547 2000 (fax) (+31) (0)20 547 2190	<b>Russia</b> (tel) (+7) 095 797 3963 (alt) (+7) 095 797 3900 (fax) (+7) 095 797 3901
<b>Spain</b> (tel) (+34) 91 631 3300 (alt) (+34) 91 631 3000 (fax) (+34) 91 631 3301	<b>Sweden</b> (tel) 0200 88 22 55* (alt) (+46) (0)8 5064 8686 (fax) 020 120 2266*	<b>Switzerland (French)</b> (tel) 0800 80 5353 opt. 2* (alt) (+33) (0)1 6453 5623 (fax) (+41) (0)22 567 5313	<b>Switzerland (German)</b> (tel) 0800 80 5353 opt. 1* (alt) (+49) (0)7031 464 6333 (fax) (+41) (0)1 272 7373
<b>Switzerland (Italian)</b> (tel) 0800 80 5353 opt. 3* (alt) (+39) (0)2 9260 8484 (fax) (+41) (0)22 567 5314	<b>United Kingdom</b> (tel) (+44) (0)7004 666666 (alt) (+44) (0)7004 123123 (fax) (+44) (0)7004 444555		
(tel) = primary telephone number; (alt) = alternate telephone number; (fax) = FAX number; * = in country number 11/16/04			

