

Agilent Technologies
E444xA Option H7L
User's Guide Supplement

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User's Guide Supplement

Use this manual with the following documents:

PSA Series Spectrum Analyzers User's and Programmer's Reference Guide

PSA Spectrum Analyzers Specifications Guide



Manufacturing Part Number: E4440-90551

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, 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.

WARNING

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Contents

Overview	
Description	4
Rear Panel Connectors	5
Making Test Set-up Instrument Connections	6
Test Set-up Procedures	7
Specifications	9
Replaceable Parts	10
Service	11
Introduction	11
Cleaning Instructions	11
Shipping Instructions	11
Before Applying Power	11
Safety, and Regulatory Information	12
Warnings	12
Cautions	13
Instrument Markings	14
Contacting Agilent	15

Contents

Description

The Agilent Technologies E444xA Option H7L provides a video output signal whose voltage is proportional to the Log of the PSA's RF input power. The output signal level is provided on a rear-panel BNC connector and has an amplitude output range of 0 VDC to 2.7 VDC, with a nominal slope of 25 to 30 mV/dB. The video output signal is derived from a special log-video detector that receives its input directly from the spectrum analyzer's 321.4 MHz IF. The full 40 MHz of the PSA's IF bandwidth is utilized by Option H7L to ensure best signal rise time characteristics.

The video output from Option H7L is not affected by video or resolution bandwidth settings of the spectrum analyzer.

Option H7L is primarily intended for demodulation of pulse RF signals; however, it can be used for many other applications where a video output signal is required from a spectrum analyzer. In these applications Option H7L can provide a fast rise time video signal to an oscilloscope for RF pulse analysis. Pulse parameters such as: rise time, fall time, pulse width, pulse repetition interval, and duty cycle can be measured. Once the video output of Option H7L has been characterized, as described in [“Test Set-up Procedures” on page 7](#) of this “User's Guide”, Option H7L can be used as a frequency selective peak power meter. In this application the user must first determine the logging slope of Option H7L's output, at the desired RF frequency. Once the slope is known the user can set up an oscilloscope with a vertical deflection factor of ten times the logging slope. With this accomplished the user can drive the PSA spectrum analyzer with a CW RF input signal of a specified value (typically -10dBm) and adjust the DC offset control on the oscilloscope to establish a reference level. With these steps completed the PSA with Option H7L and oscilloscope combination are calibrated for power measurements with a scale factor on the oscilloscope of 10 dB/division.

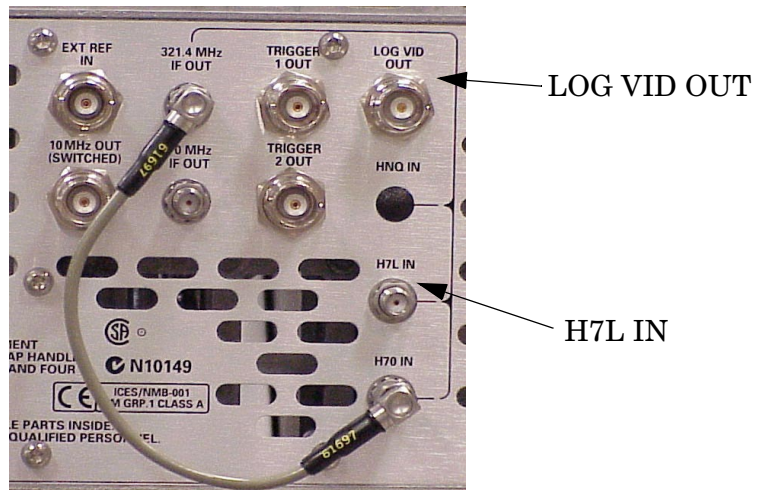
For most applications the best performance from the PSA equipped with Option H7L can be obtained with the PSA's span set to zero and the instrument in single-sweep mode. In this configuration the PSA will not attempt to re-center its YIG preselector during sweep retrace, which can produce undesirable artifacts in the video signal. However, the video signal in a configuration other than that described above may be perfectly useful. The end user will be required to make the final decision.

Rear Panel Connectors

The rear panel of the PSA has two new connectors with the addition of Option H7L. The connectors are labeled “H7L IN” and “LOG VID OUT.” Connect the SMA cable (8120-5066) from the 321.4 MHz IF OUT to H7L IN. Refer to [Figure 1](#) for a detailed location of the new Log Video connectors.

The 321.4 MHz OUT provides the signal to generate the Log Video Output for Option H7L.

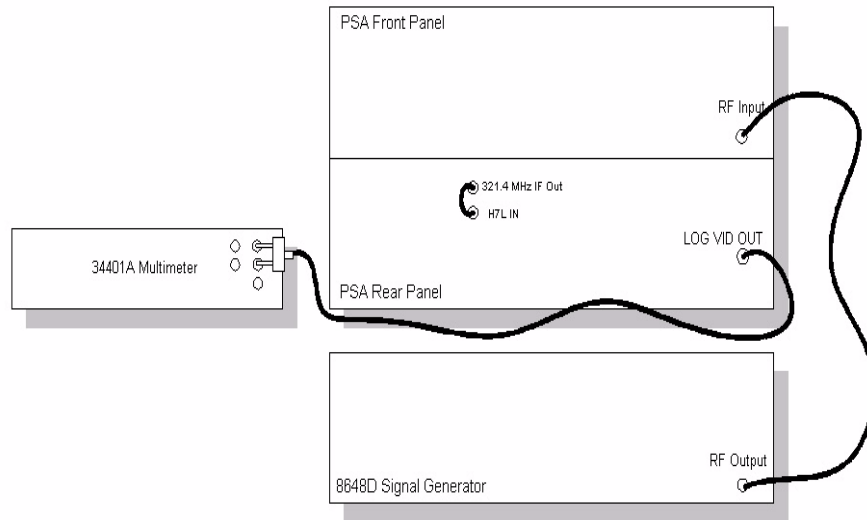
Figure 1 PSA Rear Panel with Log Video Output Connectors



Making Test Set-up Instrument Connections

To characterize the video output of Option H7L, connect the PSA spectrum analyzer to the RF signal generator and digital voltmeter, as shown in [Figure 2](#) and to [Table 1](#).

Figure 2 Test Set-up Diagram



NOTE The input to the digital voltmeter should be terminated with a 100 Ω load when performing the test procedure. In the absence of a 100 Ω load, a 50 Ω load may be an acceptable substitution.

Table 1 Material and Equipment Used

Description	Agilent Part Number	Qty
BNC Cable	8120-2582	2
BNC (f) to Type-N (m) adapter	1250-0780	2
Banana Plug w/ BNC	1251-2277	1
8648D Signal Generator or equivalent	n/a	1
34401A Multimeter or equivalent	n/a	1

Test Set-up Procedures

NOTE

The following test set-up procedure uses one RF Input frequency into the PSA, however any frequency up to 26.5 GHz may be used.

1. Hook up all the equipment as outlined in the previous section. Turn equipment on and allow to warm up for the specified period of time outlined in the operating and service manual of the respective equipment.
2. Set the 8648D Signal Generator to the following conditions:
[Frequency] > [321.4] > [MHz]
[Amplitude] > [-10] > [dBm]
3. Set the PSA with Option H7L to the following conditions:
[Frequency] > [321.4] > [MHz]
[Span] > [0 span]
[Attenuation] > [0] > [dB]
[Sweep] > [Single sweep]

CAUTION

When Attenuation is set to 0 dB, the maximum RF input power to the PSA spectrum analyzer should be -10 dBm. Refer to the PSA User's and Service Guide for additional information on RF input power and attenuator settings.

1. Adjust the 8648D Signal Generator by 1 dB steps, and measure the corresponding voltage on the 34401A Multi-Meter.
2. Calculate the slope by using the formula:

$$m = \frac{y1 - y2}{x1 - x2} = \frac{(Vdiff)}{(dBdiff)}$$

[Figure 3 on page 8](#) is available as an example of the slope characteristics of a typical H7L unit.

Figure 3 E444xA H7L Log Video Amp Slope Characteristics



Specifications

Review [Table 2](#) for the typical specifications of the log linearity of the E444xA Option H7L.

Table 2 **Specifications for the Log Video Output**

Parameter	Specification
Output Coupling	DC
Output Voltage	0 to 2.7 V
Rise Time	25 ns typical
Fall Time	30 ns typical
Settling Time	40 ns typical
Slope, $\pm 10\%$ Tolerance	25 to 30 mV/dB nominal
Propagation Delay	10 ns Max, 7 ns typical
Video Load	100 $\Omega \pm 10\%$

Replaceable Parts

The following table contains the list of replaceable parts for the Agilent Technologies E444xA Option H7L Log Video Amplifier. If any of these parts are replaced, you must run all performance tests to verify conformance to specifications.

Table 3 **Replaceable Parts**

Description	Agilent Part Number	Qty
Log Video Amplifier Board	E4440-65416	1
Cable assy, BNC to SMA (m)	8120-8787	1
Cable assy, SMA (m) to SMA (f)	70340-60013	1
Cable assy, SMA (m) to SMA (m)	8120-5066	1

Service

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.

Cleaning Instructions

Clean the instrument cabinet using a damp cloth only.

Shipping Instructions

Always transport or ship the instrument using the original packaging if possible. If not, comparable packaging must be used. Refer to [“Contacting Agilent” on page 15](#).

Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. 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.

Safety, and Regulatory Information

Warnings

WARNING 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.

Warnings applicable to this instrument are:

WARNING No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.

WARNING 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.

WARNING For continued protection against fire hazard replace line fuse only with same type and rating:

- United States—F 3A/250V, Part Number 2110-0780
- Europe—F 3.15A/250V, Part Number 2110-0655

The use of other fuses or material is prohibited.

WARNING 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.

WARNING 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.

WARNING 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.

WARNING 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.

WARNING **This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 1010 and 664 respectively.**

Cautions

CAUTION 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.










Cautions applicable to this instrument are:

CAUTION 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.

CAUTION This instrument has autoranging line voltage input; be sure the supply voltage is within the specified range.

CAUTION 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.

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.
ISM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 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.
	This symbol indicates the product meets the Australian Standards.

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

Use the following table to locate your nearest Agilent Technologies Sales and Service Center.

Online assistance: www.agilent.com/find/assist			
United States <i>(tel)</i> 1 800 452 4844	Latin America <i>(tel)</i> (305) 269 7500 <i>(fax)</i> (305) 269 7599	Canada <i>(tel)</i> 1 877 894 4414 <i>(fax)</i> (905) 282-6495	Europe <i>(tel)</i> (+31) 20 547 2323 <i>(fax)</i> (+31) 20 547 2390
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