

# Installation Note

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**Agilent Technologies ESA-L1500A or Agilent  
Technologies E4411A Spectrum Analyzer  
GPIB/Parallel (Option A4H) Kit Number E4401-60053  
RS-232/Parallel (Option 1AX) Kit Number E4401-60054  
IF, Sweep, and Video Output (Option A4J)  
Kit Number E4401-60055**



**Agilent Technologies**

Part Number E4401-90039 Supersedes: December 1997

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**GPIB/Parallel (Option A4H) Kit Number E4401-60053  
 RS-232/Parallel (Option 1AX) Kit Number E4401-60054  
 IF, Sweep, and Video Output (Option A4J)  
 Kit Number E4401-60055**

Product Affected: . . . . .	E4411A or ESA-L1500A
Serial Numbers: . . . . .	US00000000/US99999999
Options: . . . . .	A4H, 1AX, and A4J
To Be Performed By: . . . . .	(X) Service Center (X) Personnel Qualified by Agilent Technologies (X) Customer
Estimated Installation Time: . . . . .	0.5 Hours
Estimated Verification Time: . . . . .	0.5 Hours

**Introduction**

This kit contains the parts and instructions to install GPIB/Parallel Option, or RS-232/Parallel Option, and/or IF, Sweep, and Video Output Option.

**Installation Kit Parts List**

**Table 1                      Parts Kit Option A4H GPIB/Parallel Parts Kit E4401-60053 Contents**

<b>Item</b>	<b>Quantity</b>	<b>Description</b>	<b>Part Number</b>
1	1	Board Assembly GPIB/Parallel	E4401-60013
2	1	ESA-L1500A Programmer's Guide	E4411-90003
3	1	Screw M3 x 8-mm (crest washer - pan head - TORX)	0515-0372
4	1	Protective Cap, 25-pin female	1252-4690
5	1	Protective Cap, 24-pin female	1252-5007
6	1	Installation Note	E4401-90039

**Table 2**                      **Parts Kit Option RS-232/Parallel Parts Kit E4401-60054 Contents**

<b>Item</b>	<b>Quantity</b>	<b>Description</b>	<b>Part Number</b>
1	1	Board Assembly RS-232/Parallel	E4401-60014
2	1	ESA-L1500A Programmer's Guide	E4411-90003
3	1	Screw M3 x 8-mm (crest washer - pan head - TORX)	0515-0372
4	1	Protective Cap, 25-pin female	1252-4690
5	1	Protective Cap, 9-pin male	1252-4697
6	1	Installation Note	E4401-90039

**Table 3**                      **Parts Kit Option A4J IF, Sweep, and Video Output Kit E4401-60055 Contents**

<b>Item</b>	<b>Quantity</b>	<b>Description</b>	<b>Part Number</b>
1	1	Board Assembly GPIB/Parallel	E4401-60011
2	1	Screw M3 x 8-mm (crest washer - pan head - TORX)	0515-0372
3	1	Installation Note	E4401-90039

## **Tools Required**

- T-8 TORX screwdriver
- T-10 TORX screwdriver
- T-15 TORX screwdriver
- Oscilloscope
- 50 W termination
- Torque driver (Torque driver requirements are shown in Table 4.)

To avoid potential RFI leakage and prevent connector damage, tighten screws and RF coax cable connectors to the following torque limits

**Table 4**                      **Torque Settings**

<b>Item</b>	<b>Torque in.-lbs</b>
SMA Connector	8.5
SMC Connector	5.5
3-mm, T-8 TORX screws	9.0
3.5-mm, T-10 TORX screws	14
4-mm, T-15 TORX screws	21
Pozidrive Screws	14

**WARNING**

**Before you disassemble the instrument, turn the power switch OFF and 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**

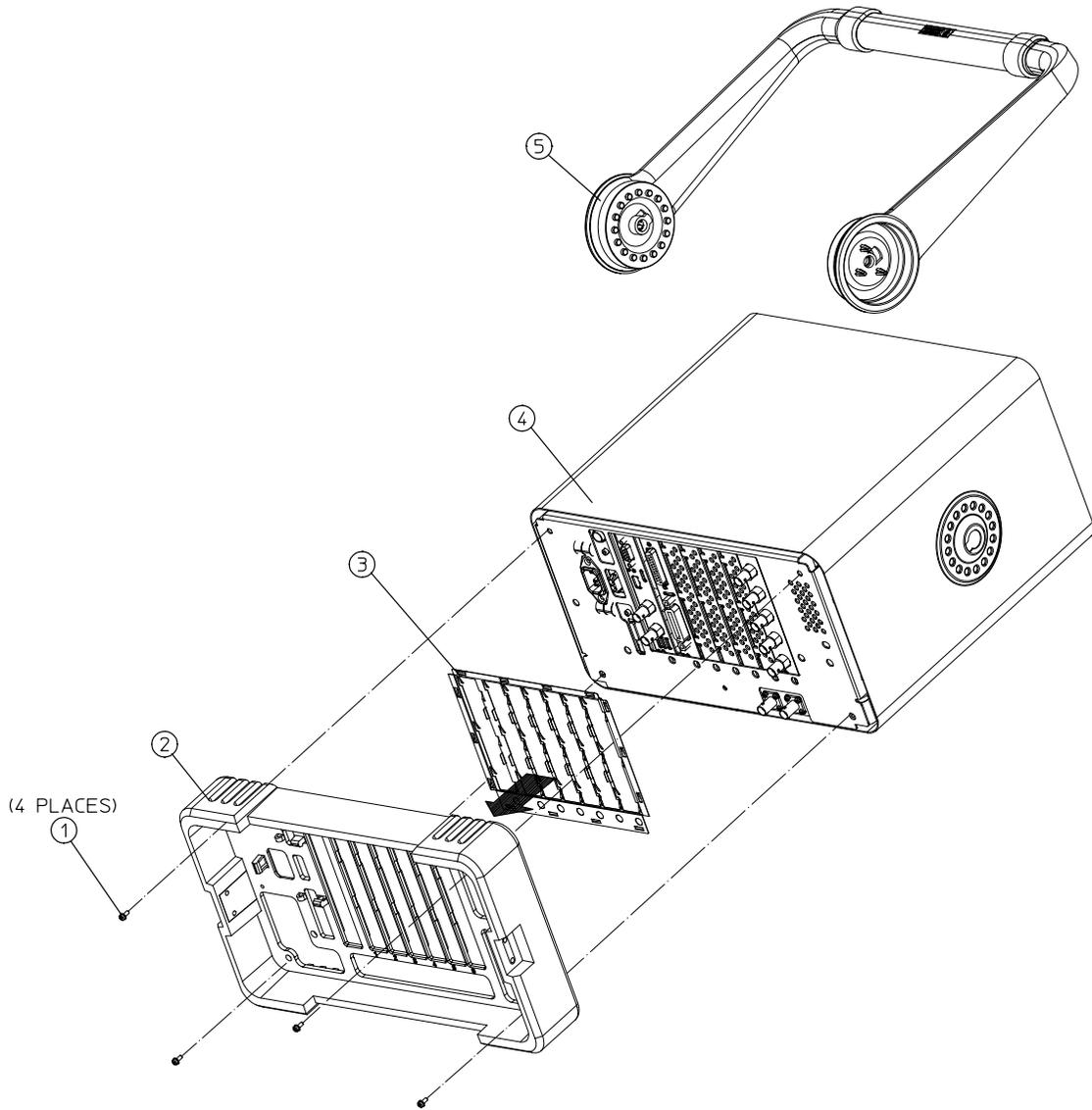
### **Remove Instrument Cover**

1. Disconnect the spectrum analyzer from ac power.
2. Carefully place the analyzer on the work surface with the front frame facing down.
3. Remove the four screws (1) that hold the rear frame (2) and outer case in place. Refer to Figure 1.
4. Pull the instrument outer case and rear frame off towards the rear of the instrument.

**CAUTION**                    The rear EMI contact grid (3) that clips onto the rear panel can come loose. Note the correct position to reattach. Refer to Figure 1.

**Figure 1**

**Outer Case, Rear Frame Removal**

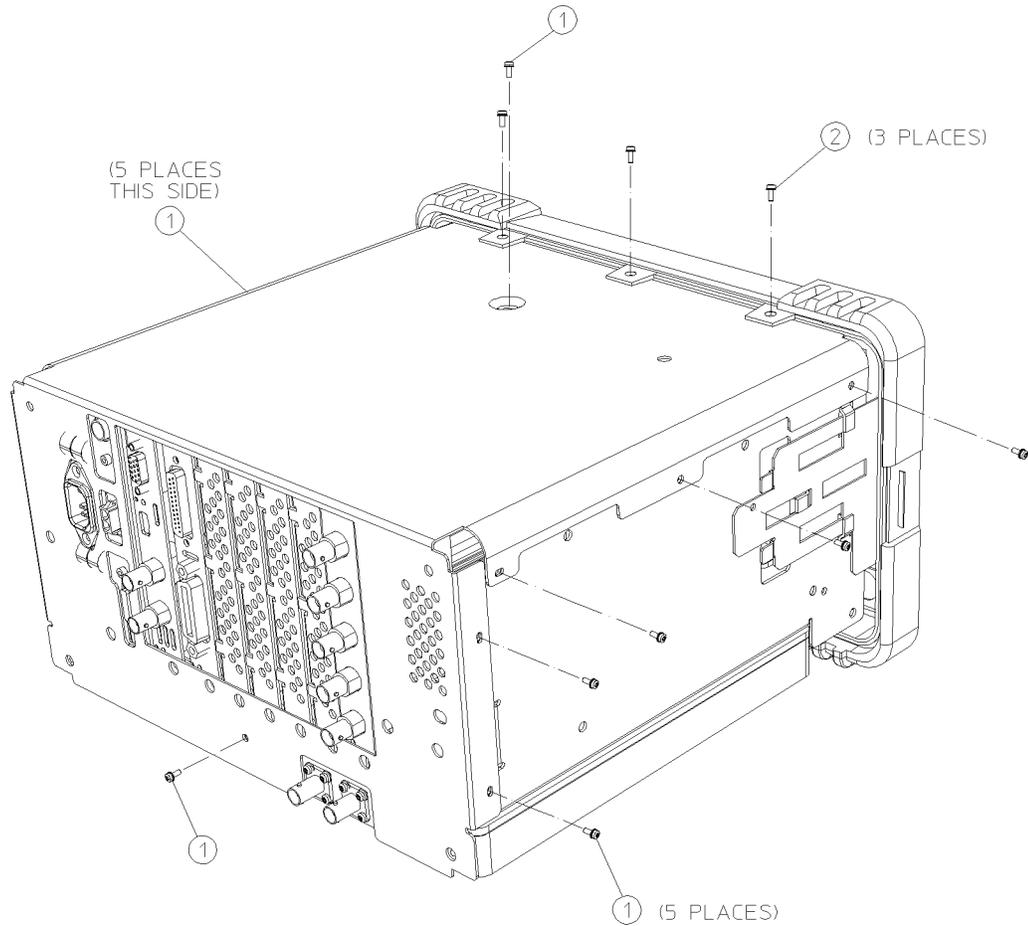


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## Removal of Inner Shield

5. Remove the instrument outer case. Refer to the “Instrument Outer Case” removal procedure.
6. Remove the 16 screws (1) and (2) attaching the inner shield to the chassis (15 screws if you have the tracking generator option). Refer to Figure 2.
7. The inner shield can now be removed from the chassis.

**Figure 2** Inner Shield Removal

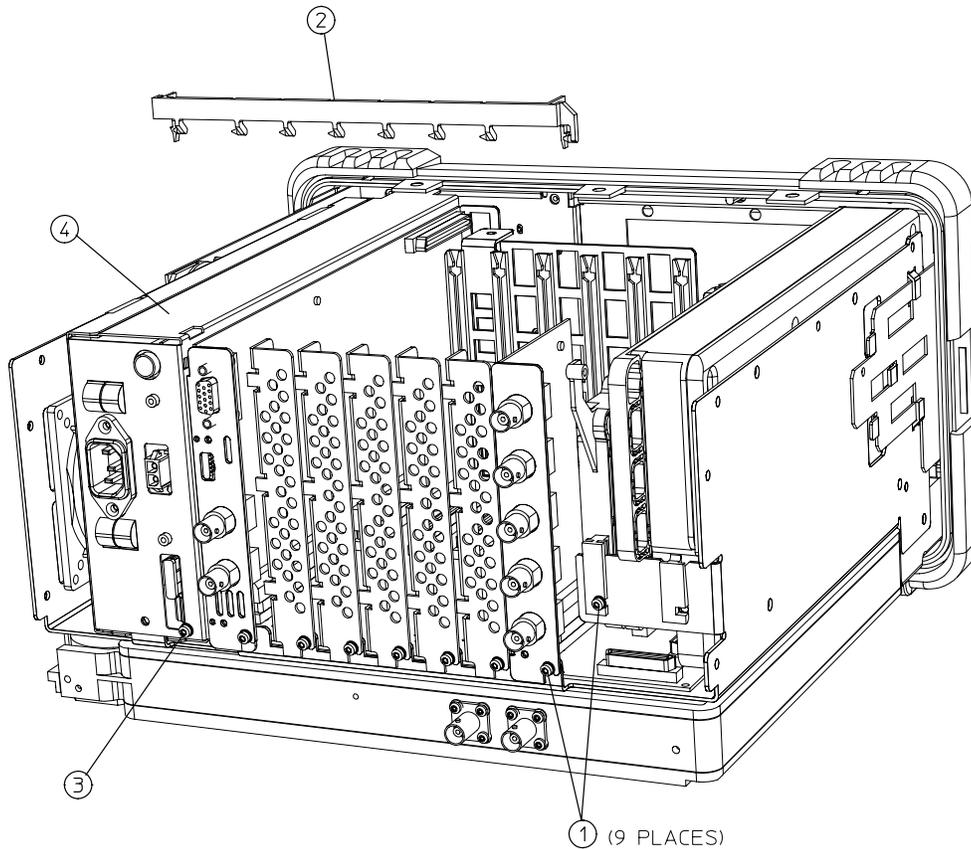


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8. Loosen but do not remove all of the screws securing the boards and blank plates at the rear of the chassis.
9. Remove the vibration support bar at the top rear of the instrument by pinching in the ends of the bar and rotating upward. The support can be removed by sliding it out of the holes in each assembly. Refer to Figure 3.

**CAUTION**                      The vibration support can be broken if it is forced. Remove with care.

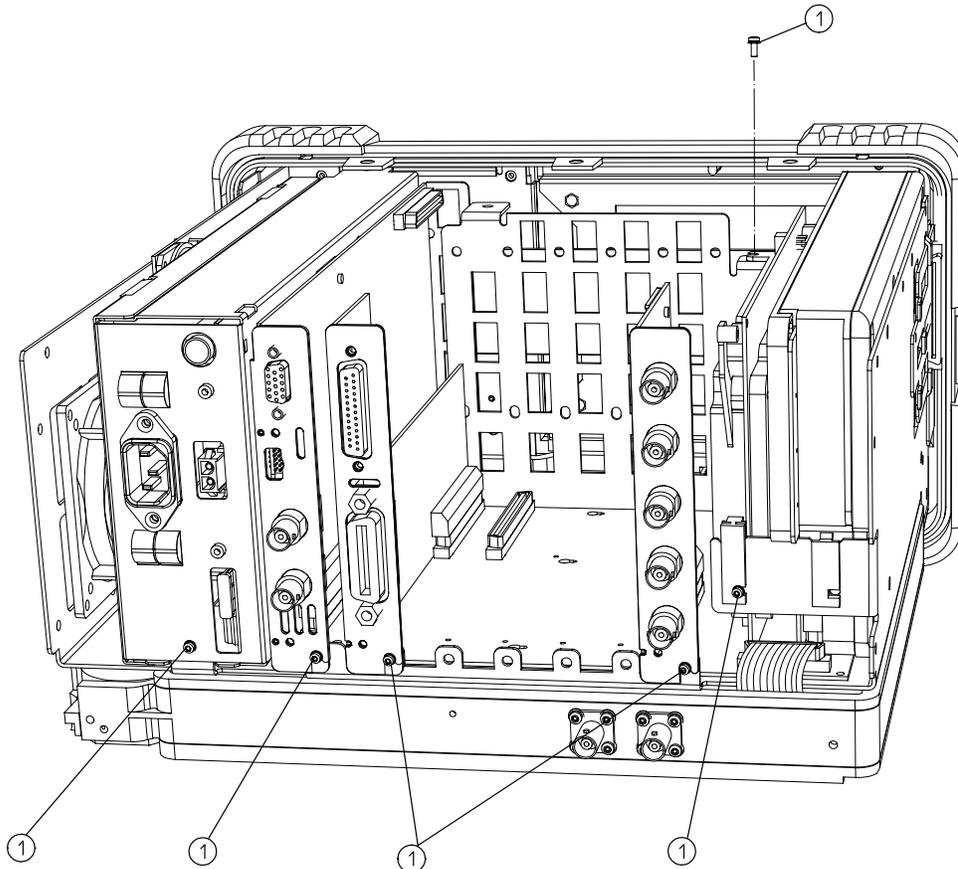
**Figure 3**                      **Vibration Support**



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10. Refer to Figure 4 to locate the where the new I/O assembly will go.
11. Remove the single screw (1) securing the I/O assembly or blank panel to the chassis.  
Refer to Figure 3.
12. Carefully pull up on the I/O assembly (if present) to remove it from the motherboard connector.

**Figure 4 Instrument, Rear View**



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**The following procedure can be used for all of the I/O assemblies:**

- A7A1 Spectrum Analyzer Input/Output Assembly (Option A4J)
- A7A2 GPIB/Parallel Assembly (Option A4H)
- A7A3 RS-232/Parallel Assembly (Option1AX)

**Installation and Replacement**

13. Carefully plug the I/O assembly into the motherboard.
  - A7A1 Spectrum Analyzer Input/Output Assembly (Option A4J) goes into slot 6.
  - A7A2 GPIB/Parallel Assembly (Option A4H) goes into slot 1.
  - A7A3 RS-232/Parallel Assembly (Option1AX) goes into slot 1.

14. Replace the single screw that secures the I/O assembly to the chassis, but do not tighten it yet. Refer to Figure 3.
15. Replace the vibration support at the top rear of the instrument. Line up the tabs on the support with the holes in each assembly and rear blank panel. Slide the support sideways into the holes, then rotate down until the ends clip into the power supply and the IF assemblies. Refer to Figure 3.
16. Tighten all the screws that were loosened in the removal procedure. Torque to 9 inch pounds.
17. Carefully position the inner shield on the instrument as shown in Figure 2.
18. Replace the 16 screws (1) shown in Figure 2 (15 if you have the tracking generator option). Torque to 9 inch pounds.
19. Carefully place the spectrum analyzer on the work surface with the front frame facing down.
20. Replace the instrument outer case by matching the grill on the side of the case to the fan on the A5 power supply assembly.
21. The rear EMI contact grid (3) that clips onto the rear panel can come loose. When replacing the outer case, make sure the gasket is in the correct position. Refer to Figure 1.
22. Fit the leading edge of the case completely into the slot on the back of the front frame assembly.
23. Replace the rear frame assembly (2) using the four screws (1) to fasten the rear frame to the instrument. Torque to 21 inch pounds.
24. Refer to Table 19 in Chapter 5 of the *Agilent Technologies ESA-L1500A Spectrum Analyzer Service Guide* for the related adjustments and performance verification tests required for each assembly.

## Functional Testing

- ❑ Option A4H, GPIB/Parallel.
  1. Connect to GPIB Controller.
  2. Send and receive data.
  3. Remove cable from the GPIB connector and install the protective caps on the GPIB and parallel connectors.
- ❑ Option 1AX, RS-232/Parallel.
  1. Connect to RS-232 Controller.
  2. Send and receive data.
  3. Remove cable from the RS-232 connector and install the protective caps on the RS-232 and parallel connectors.

□ Option A4J, IF, Sweep, and Video Output.

Use an oscilloscope on the following outputs and confirm the presence of signal.

a. SWP OUT

Analyzer settings

**Preset, System**  
**50 MHz osc ON**  
**Frequency 50 MHz**  
**Span 0 Hz**

Check for a sweep ramp of 0 to +10 volts.

b. HI SWP OUT

Analyzer settings

**Preset, System**  
**50 MHz osc ON**  
**Frequency 50 MHz**  
**Span 0 Hz**

Check for a 0 to 5 volt signal, TTL signal.

c. AUX VIDEO OUT

Analyzer settings

**Preset, System**  
**50 MHz osc ON**  
**Frequency 50 MHz**  
**Span 5 MHz, Bw/Avg 1 MHz**  
**Amplitude -276 dBm**  
**Scale Type Lin.**

Check for a 0 to 1 volt signal similar to that displayed on the analyzer's display. Trigger oscilloscope from HI SWP OUT (positive edge).

d. AUX IF OUT

Analyzer settings

**Preset, System**  
**50 MHz osc ON**  
**Frequency 50 MHz**  
**Span 0 Hz**  
**Amplitude -276 dBm**  
**Scale Type Lin.**

Check for a 21.4 MHz signal, approximately 250 mV at signal's maximum peak.

e. HI SWP IN

Analyzer settings

**Preset**

Connect a 50  $\Omega$  termination or short from the center lead of the HI SWP IN to ground.  
Check to see that the analyzer stops sweeping.