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HP E8400A User and Service Manual

Edition 1

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HP E8400A C-Size VXI Mainframe User/Service Manual
Edition 1

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Documentation History

All Editions and Updates of this manual and their creation date are listed below. The first Edition of the manual is Edition 1. The Edition number increments by 1 whenever the manual is revised. Updates, which are issued between Editions, contain replacement pages to correct or add additional information to the current Edition of the manual. Whenever a new Edition is created, it will contain all of the Update information for the previous Edition. Each new Edition or Update also includes a revised copy of this documentation history page.

Edition 1 September, 1997

Safety Symbols



Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.



Indicates the field wiring terminal that must be connected to earth ground before operating the equipment — protects against electrical shock in case of fault.



Frame or chassis ground terminal—typically connects to the equipment's metal frame.



Alternating current (AC)



Direct current (DC).



Indicates hazardous voltages.

WARNING

Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

CAUTION

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

WARNINGS

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), an uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.

Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

DO NOT service or adjust alone: Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

Declaration of Conformity
according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Loveland Manufacturing Center

declares that the product:

Product Name: HP E8400A C-Size VXI Mainframe

Model Number: HP E8400A

Product Options: All

conforms to the following Product Specifications:

Safety: IEC 61010-1 (1990) including Amendments 1 (1992) and 2 (1995)
EN 61010-1 (1993) including Amendment 2 (1995)
CSA C22.2 #1010.1 (1992)
UL 3111-1 (1994)

EMC: CISPR 11:1990/EN55011 (1991): Group 1 Class A
EN61000-3-2:1995 Class A
EN61000-3-3:1995
EN50082-1:1992
IEC 801-2:1991: 4kV CD, 8kVAD
IEC 801-3:1984: 3 V/m
IEC 801-4:1988: 1kV Power Line, 0.5kV Signal Lines
ENV50141:1993/prEN50082-1 (1995): 3 Vrms
ENV50142:1994/prEN50082-1 (1995): 1 kV CM, 0.5 kV DM
EN61000-4-8: 1993/prEN50082-1 (1995): 3 A/m
EN61000-4-11:1994/prEN50082-1 (1995): 30 %, 10 ms 60 %, 100ms

Supplementary Information: The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (inclusive 93/68/EEC) and carries the "CE" mark accordingly.

September, 1997



Jim White, QA Manager

European contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen, Germany (FAX +49-7031-14-3143)

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Reader Comment Sheet

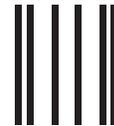
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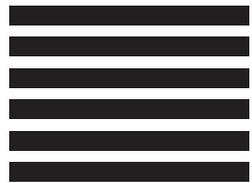
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Chapter 1

Using the HP E8400A Mainframe

Chapter Overview

This chapter contains information on the operating features of the HP E8400 VXI mainframe. The sections of this chapter include:

- Product Overview 9
- Front Panel Features 10
- Preparing Your VXI System for Use. 13

Product Overview

The HP E8400A VXI mainframe is designed in full compliance with VXIbus specification revision 1.4, VXIplug&play specification VPP-8, and VMEbus system specification revision C.1. Additional features of the HP E8400A mainframe include:

- Mainframe monitoring for instant verification of:
 - backplane voltage conditions
 - mainframe temperatures
 - fan and impeller operation
 - data flow
- State of the art cooling technology:
 - quiet, variable speed power supply fan and backplane impeller
 - increased static pressure
- Front panel Diagnostic connector for:
 - power supply voltage measurements
 - power supply and backplane temperature measurements
 - power supply fan and backplane impeller verification
 - +5V and +12V voltage source
- Easy maintenance:
 - rear panel access to power supply, power supply fan, and cooling impeller for either bench or rack mount operation

Front Panel Features

The HP E8400A front panel allows you to monitor power supply voltages, mainframe temperatures, fan operation, and communication across the backplane. Table 1-1 describes these features.

Table 1-1. HP E8400A Mainframe Front Panel Indicators and Switches.

Section	Indicator / Switch	Description																								
Input Power	On Indicator	Green - the mainframe is turned on. Off - there is no power applied to the mainframe. The mainframe is turned off but may be plugged into an AC power source.																								
Power Supply	Voltages Indicator	Green - all voltages on the VXI backplane are within $\pm 8\%$ of the VXI specification. Flashing Amber - one or more voltages is out of specification. The backplane voltages and allowed variations are listed below: <table border="1"> <thead> <tr> <th>Voltage</th> <th>Allowed Variation</th> <th>Diagnostic Pin</th> </tr> </thead> <tbody> <tr> <td>+5V</td> <td>+4.875V to +5.125V</td> <td>1</td> </tr> <tr> <td>+12V</td> <td>+11.64V to +12.6V</td> <td>14</td> </tr> <tr> <td>-12V</td> <td>-12.6V to -11.64V</td> <td>2</td> </tr> <tr> <td>+24V</td> <td>+23.28V to +25.2V</td> <td>15</td> </tr> <tr> <td>-24V</td> <td>-25.2V to -23.28V</td> <td>3</td> </tr> <tr> <td>-5.2V</td> <td>-5.46V to -5.044V</td> <td>16</td> </tr> <tr> <td>-2V</td> <td>-2.1V to -1.9V</td> <td>4</td> </tr> </tbody> </table>	Voltage	Allowed Variation	Diagnostic Pin	+5V	+4.875V to +5.125V	1	+12V	+11.64V to +12.6V	14	-12V	-12.6V to -11.64V	2	+24V	+23.28V to +25.2V	15	-24V	-25.2V to -23.28V	3	-5.2V	-5.46V to -5.044V	16	-2V	-2.1V to -1.9V	4
	Voltage	Allowed Variation	Diagnostic Pin																							
+5V	+4.875V to +5.125V	1																								
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-5.2V	-5.46V to -5.044V	16																								
-2V	-2.1V to -1.9V	4																								
	Temp Indicator	Green - the power supply temperature is acceptable. Flashing Amber - the power supply is approaching thermal shutdown. The power supply temperature can be measured on pin 11 of the Diagnostic connector.																								
Fans	Fan Switch	Full - the power supply and mainframe cooling fans are operating at full speed. Var(iable) - the power supply and mainframe cooling fans are providing adequate cooling (default setting). Fan speed is a function of the power supply temperature and the reference temperature (Diagnostic connector pin 12). The reference temperature is a function of ambient temperature and load.																								
	Fans Indicator	Green - the power supply and mainframe cooling fans are operating. Flashing Amber - the power supply fan or the mainframe cooling fan is not operating. Fan operation can be checked using pin 13 of the Diagnostic connector.																								
Backplane	Activity Indicator	Green - there is communication between instruments across the backplane. Off - there is no communication between instruments on the backplane.																								
	SYSFAIL Indicator	Flashing Amber - one or more instruments has asserted its SYSFAIL line due to a power-on initialization failure, self-test failure, or hardware failure. SYSFAIL is asserted momentarily at power on and during a system reset.																								
	Reset Switch	Resets all installed instruments to their power-on states.																								

Diagnostic Connector

The 25-pin Sub-D diagnostic connector provides access to backplane voltages, power supply and backplane temperatures, and output signals. The pins are described in Table 1-2.

Table 1-2. Diagnostic Connector Pin Descriptions

Pin #	Function	Description
1	+5 VM	+5V backplane voltage monitor (high impedance).
2	-12 VM	-12V backplane voltage monitor (high impedance).
3	-24 VM	-24V backplane voltage monitor (high impedance).
4	-2 VM	-2V backplane voltage monitor (high impedance).
5	Rem Stdby	Remote power on. See "Using the Remote Power-on Pins."
6	+5 VC	+5 VDC source output (1A maximum).
7	+12 VC	+12 VDC source output (1A maximum).
8	+5 V Stdby	Input for +5V STDBY (1A maximum for pins 8 and 21 combined).
9	GND	Chassis ground.
10	SysReset *	TTL low-true input signal causes system reset, output indicates system reset.
11	PS Temp	Output voltage proportional to power supply temperature (0 VDC at 0° C, with a rise of 10 mV per degree centigrade).
12	Ref Temp	Output voltage proportional to backplane temperature (0 VDC at 0° C, with a rise of 10 mV per degree centigrade). A function of the ambient temperature and load. At no load, $T_{ref} \approx 2\text{ }^{\circ}\text{C} + \text{ambient}$. At full load and high fan speed, $T_{ref} \approx 14\text{ }^{\circ}\text{C} + \text{ambient}$. At full load and low fan speed, $T_{ref} \approx 20\text{ }^{\circ}\text{C} + \text{ambient}$.
13	Fans OK *	TTL low-true output voltage indicates power supply and backplane cooling fans are operating.
14	+12 VM	+12V backplane voltage monitor (high impedance).
15	+24 VM	+24V backplane voltage monitor (high impedance).
16	-5.2 VM	-5.2V backplane voltage monitor (high impedance).
17	GND	Chassis ground.
18	REM SW	Remote power switch return. See "Using the Remote Power-On Pins."
19	V OK *	TTL low-true output voltage indicating the +5V, $\pm 12\text{V}$, $\pm 24\text{V}$, -5.2V, and -2V power supply voltages are within $\pm 8\%$ of its allowed variation.
20	GND	Chassis ground.
21	+5 V Stdby	Input for +5V STDBY (1A maximum for pins 8 and 21 combined).
22	GND	Chassis ground.
23	ACFAIL *	TTL low-true output asserted by the mainframe power monitor at power down or whenever a loss of power is detected.
24	GND	Chassis ground.
25	N/C	Unused.

Using the Remote Power-On Pins

The remote power-on pins (pins 5 and 18) allow you to turn the mainframe on and off without using the front panel On/Stdby switch. With the On/Stdby switch in the Stdby (off) position, connecting pin 5 to pin 18 on the diagnostic connector turns the mainframe on. Disconnecting pin 5 from pin 18 turns the mainframe off.

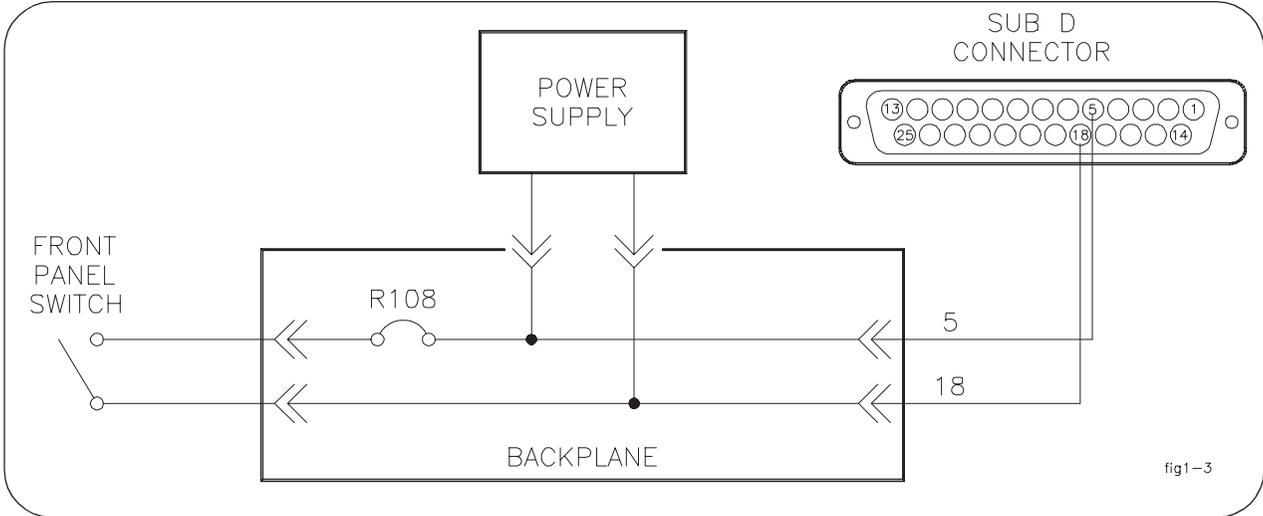


Figure 1-1. Remote Standby Switch Wiring.

Disabling the On/Stdby Switch

The front panel On/Stdby switch is disabled by removing surface mount resistor R108 located on the basic monitor board (Figure 1-2).

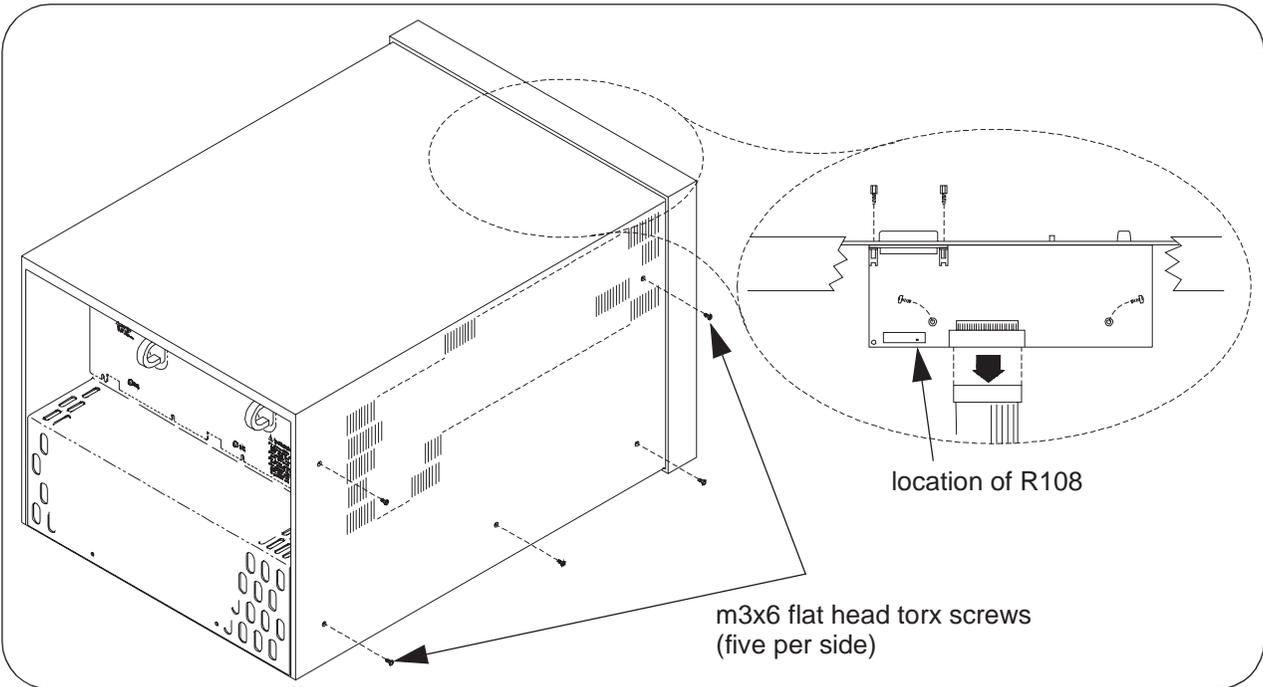


Figure 1-2. Disabling the On/Stdby Switch by Removing R108

Caution After removing R108, heat damage may prevent the resistor from being re-installed to re-enable the On/Stdby switch.

To access the basic monitor board and resistor:

1. Turn off the mainframe and remove the power cord.
2. Remove the mainframe cover by removing the 10 m3x6 flat head torx screws.
3. Remove the resistor by heating both sides simultaneously with soldering irons. Separate the resistor from the board by gently pressing the tips of the soldering irons together.
4. Save the resistor in order to re-enable the On/Stdby switch. Again, heat damage may prevent the resistor from being re-installed.

Preparing Your VXI System for Use

The HP E8400A is shipped from the factory ready to use. However, before installing VXI instruments and turning on the mainframe, refer to the following:

- AC Power Requirements
- Airflow Requirements
- Installing VXI Instruments

AC Power Requirements

The HP E8400A mainframe can be operated at line voltages of 90 VAC to 264 VAC, and line frequencies of 47 Hz to 66 Hz. The mainframe can also operate at 360 Hz to 440 Hz with line voltages of 90 VAC to 132 VAC.

The mainframe ships with a power cord and with a 250V, 15A fast blow fuse installed. The fuse is suitable for all line voltages. Refer to Chapter 3 for additional information on E8400A power cords and on fuse replacement. Appendix A contains complete input power specifications.

WARNING



The power cord is the only way to disconnect the mainframe from AC power and, therefore, it must be accessible to the operator at all times. When the HP E8400A is mounted in a system cabinet, the power cord need not be accessible since the cabinet must have its own disconnect device.

Connecting the HP E8400A to a Permanent Earth Ground

The mainframe must be connected to a permanent earth ground for line frequencies greater than 66 Hz. This connection is made on the back of the mainframe:

1. Connect a 16 AWG (1.3 mm or larger) wire to the PEM nut shown in Figure 1-3. The wire must be green with a yellow stripe, or bare (no insulation). Use a m4 x 10 screw, grounding lug, and toothed washers (or toothed lug) as shown in the Figure.
2. Attach the other end of the wire to a permanent earth ground using toothed washers or a toothed lug.

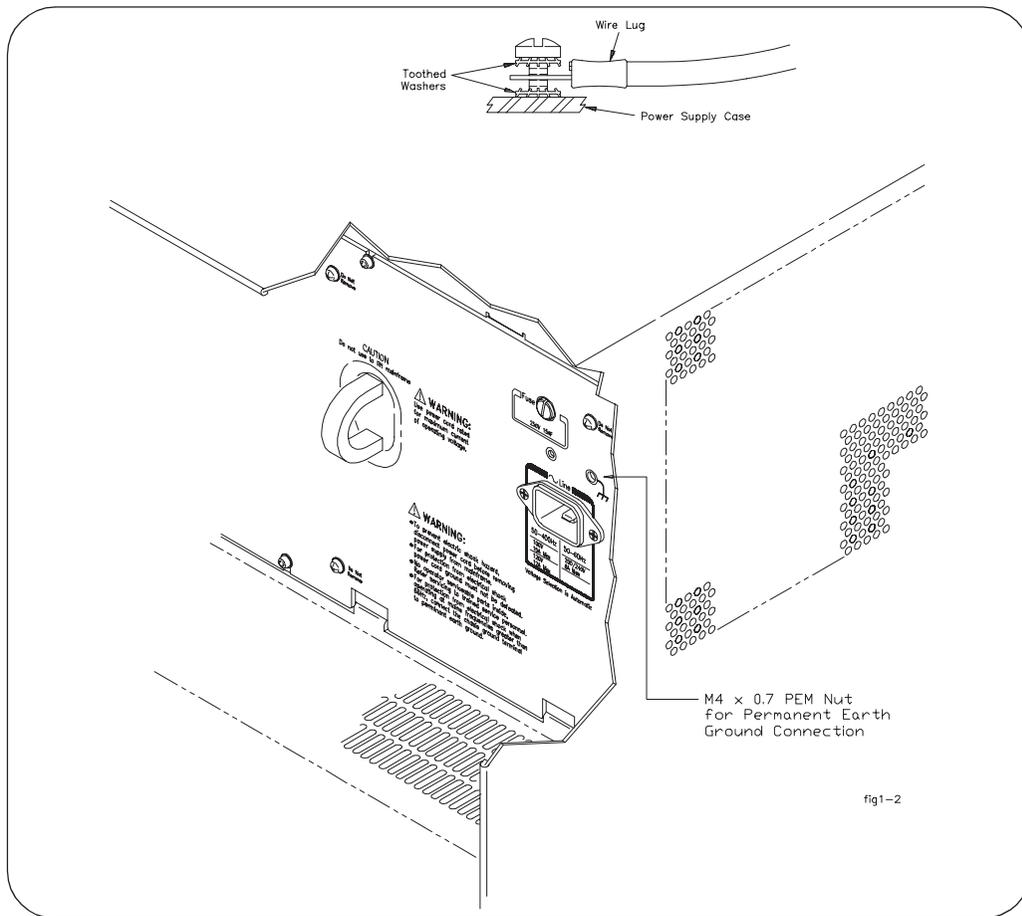


Figure 1-3. Connecting the HP E8400A to a Permanent Earth Ground

WARNING



For protection from electrical shock when operating at frequencies greater than 66 Hz, connect the chassis ground terminal to permanent earth ground.

AVERTISSEMENT

Risque de Choc électrique. Si la fréquence du secteur est supérieure à 66 Hz, relier la borne de masse du châssis à une prise de terre fixe.

Positioning the Mainframe for Adequate Cooling

VXI instruments are cooled by air drawn through the back of the mainframe and exhausted out the sides. The power supply is cooled by air drawn from the right side (facing the mainframe) and exhausted out the left side. When placing the mainframe on a work bench or if the mainframe is rack mounted, provide at least a one inch clearance at the back and sides to allow for proper air flow.

Installing VXI Instruments

The HP E8400A mainframe has 13 slots labeled 0 through 12. Any VXI instrument can be installed in any slot; however, slot 0 is reserved for devices capable of providing the system's slot 0 functionality. This functionality includes:

- locating instruments installed in the mainframe
- managing (arbitrating) data flow across the backplane
- providing the system clock (SYSCLK - 16 MHz)

Examples of these devices are the HP E1406 Command Module and embedded controllers such as the HP E6232/E6233 VXI Pentium PCs, the HP RADEPC7B PC, and the HP E1497/E1498 V743 controllers.

Multiple instruments which combine to create a virtual instrument (e.g. a scanning multimeter), and instruments which access the backplane local bus should be installed in adjacent slots.

Note

Hewlett-Packard VXI Installation Consultant (HP VIC) is an excellent tool for installing and configuring VXI systems. The program guides you through hardware installation, driver installation, and system self-test. HP VIC is available on the World Wide Web starting at http://www.hp.com/go/inst_drivers.

Installing C-Size Instruments

Figure 1-4 shows the installation of C-Size instruments.

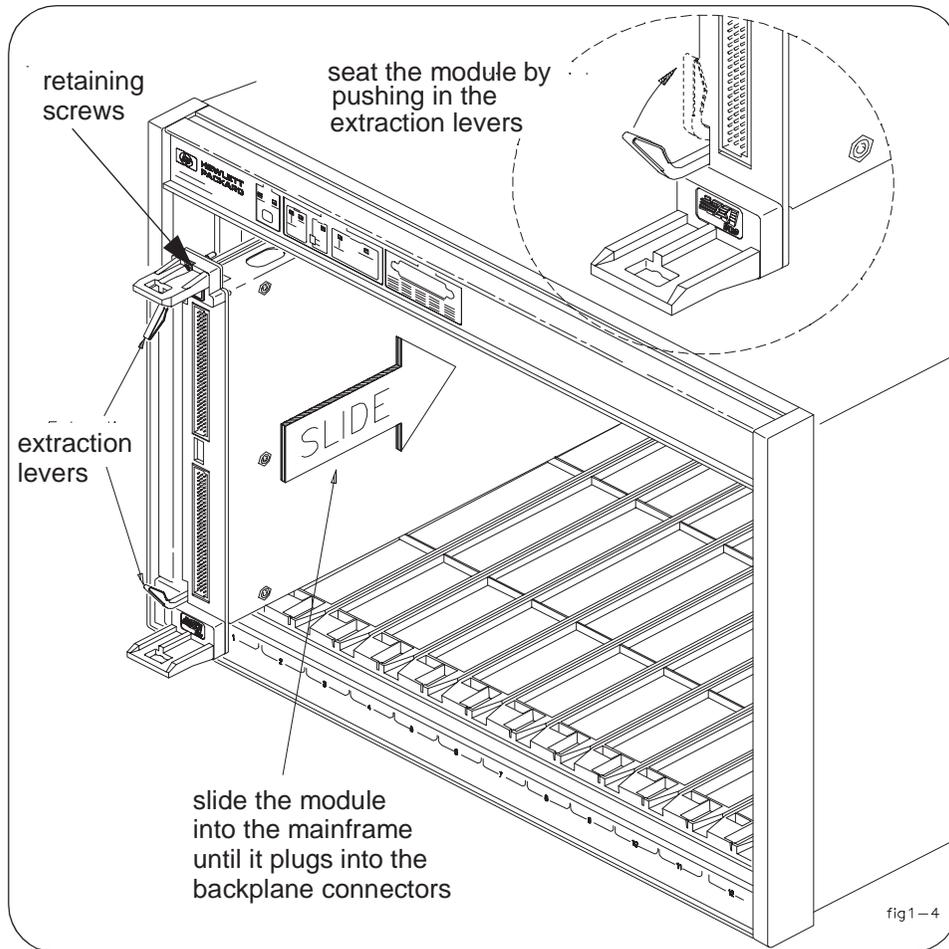


Figure 1-4. Installing C-Size Instruments in the HP E8400A Mainframe

1. To prevent damage to the VXI instruments, install the instruments when power is not applied to the mainframe.
2. Insert the instrument into the mainframe by aligning the instrument with the card guides inside the mainframe. Slowly push the instrument into the slot until it seats in the backplane connectors. The front panel of the instrument should be even with the front edges of the mainframe.
3. Tighten the retaining screws on the top and bottom of the module.

WARNING All instruments within the VXI mainframe are grounded through the mainframe chassis. During installation, tighten the instrument's retaining screws to secure the instrument to the mainframe and to make the ground connection.

Installing A- and B-Size Instruments

A-, B-, and C-size instruments can be installed in the mainframe. A- and B-size instruments are installed using a module carrier:

- **HP E1403B A/B-size Module Carrier** extends the P1 connector on the VXIbus backplane and mounts the (A/B-size) modules flush with C-size modules. This carrier is recommended for Hewlett-Packard B-size, slave-only devices which have the P1 connector.
- **HP E1407A A/B Module Carrier** extends the P1 and P2 connectors on the VXIbus backplane. This carrier is recommended for B-Size, slave-only devices which have the P1/P2 connectors.

Figure 1-5 shows the installation of A- and B-size instruments.

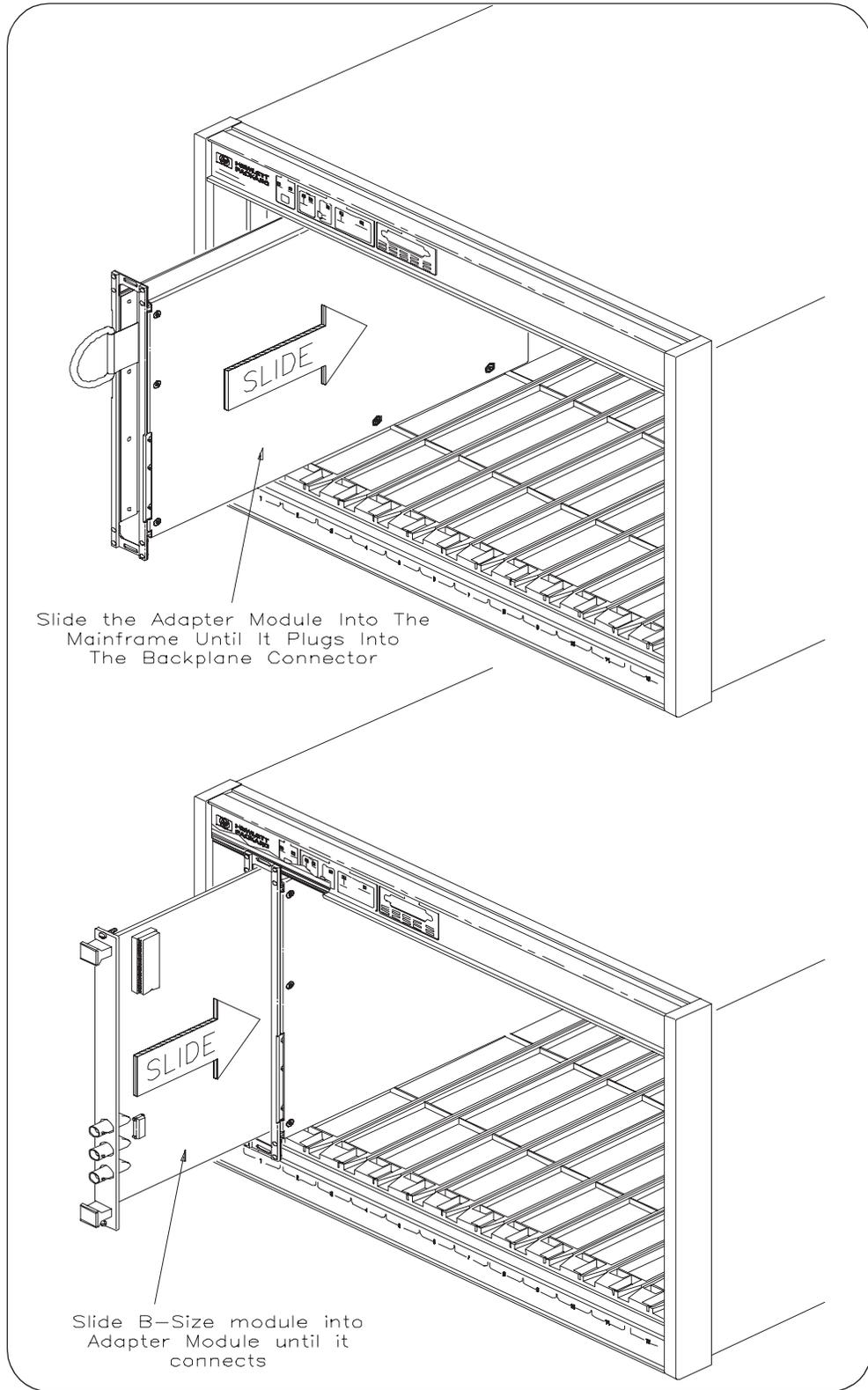


Figure 1-5. Installing A- and B-Size Instruments in the HP E8400A Mainframe

1. To prevent damage to the VXI instruments, install the instruments when power is not applied to the mainframe.
2. Install the HP E1403 A/B-size Module Carrier or the HP E1407 A/B-size Module Carrier into the mainframe. This is done by aligning the top and bottom of the carrier with the card guides and slowly pushing the carrier into the mainframe. The front of the carrier should be even with the front edges of the mainframe.
3. Slide the A- or B-Size instrument into the carrier until it connects.
4. Tighten the retaining screws on the top and bottom of the instrument.

WARNING All instruments within the VXI mainframe are grounded through the mainframe chassis. During installation, tighten the instrument's retaining screws to secure the instrument to the mainframe and to make the ground connection.

Table 2-2. Rack Mount Adapter, Support Rail, and Rack Slide Parts Lists.

Quantity	Description	Part Number
HP E8400A Standard Adapter Kit (HP p/n E8400-80923)		
1	Rack Mount Adapter (left)	E8400-61203
1	Rack Mount Adapter (right)	E8400-61204
2	Handles	*
4	Handle Screws - m5x10 flat head	0515-1020
8	Adapter-to-Mainframe Screws - m5x8 pan head	0515-0979
4	Adapter Dress Screws	0570-1577
4	Channel Nuts (for adapter dress screws)	0590-0804
HP E8400A Flush Mount Adapter Kit (HP p/n E8400-80924)		
1	Rack Mount Adapter (left)	E8400-61205
1	Rack Mount Adapter (right)	E8400-61206
4	Adapter-to-Mainframe Screws - m5x8 pan head	0515-0979
4	Adapter Dress Screws	0570-1577
4	Channel Nuts (for adapter dress screws)	0590-0804
HP E8400A VXIplug&play Compliant Adapter Kit (HP p/n E8400-80925)		
1	Rack Mount Adapter (left)	E8400-61207
1	Rack Mount Adapter (right)	E8400-61208
4	Fixture Screws - m5x12 flat head	0515-0956
8	Adapter-to-Mainframe Screws - m5x8 pan head	0515-0979
6	Adapter Dress Screws	0570-1577
6	Channel Nuts (for adapter dress screws)	0590-0804
Support Rails (HP E3664A)		
2	Support Rails	E3664-00001
4	Channel Nuts (for support rail-to-rack)	0590-0804
4	Support Rail-to-Rack Screws - 0.5x10.32	2680-0278
Rack Slides (HP p/n 1494-0411)		
2	Rack Slides	**
8	Rack Slide-to-Adapter Screws - m5x8 flat head	0515-1019
8	Channel Nuts (for slide rails)	0590-0804
4	Rack Slide-to-Rack Front Screws - m5x12 flat head	0515-0956

Table 2-2. Rack Mount Adapter, Support Rail, and Rack Slide Parts Lists.

Quantity	Description	Part Number
4	Rack Slide-to-Rack Rear Screws - m5x12 pan head	0515-0904
* AMATOM p/n 10939-A-032-2		
** General Devices p/n CC1502-99-0016		

Rack Mounting the HP E8400A using Support Rails

This section contains instructions for mounting the HP E8400A mainframe in an EIA cabinet using the HP E3664A support rail kit. The E3664A kit can be used with any of the rack mount adapter kits; however, the E3664A is only compatible with HP cabinets. The following procedures apply to all adapters, with adapter-specific information noted where necessary.

Note

If you ordered Cable Tray Option 914, refer to [page 32](#) and install the tray before rack mounting the mainframe.

Procedure

1. Attach the handles to the adapters using the m5x10 flat head screws (Figure 2-1). Handles are included only with the HP E8400A Standard Adapter Kit (p/n E8400-80923).

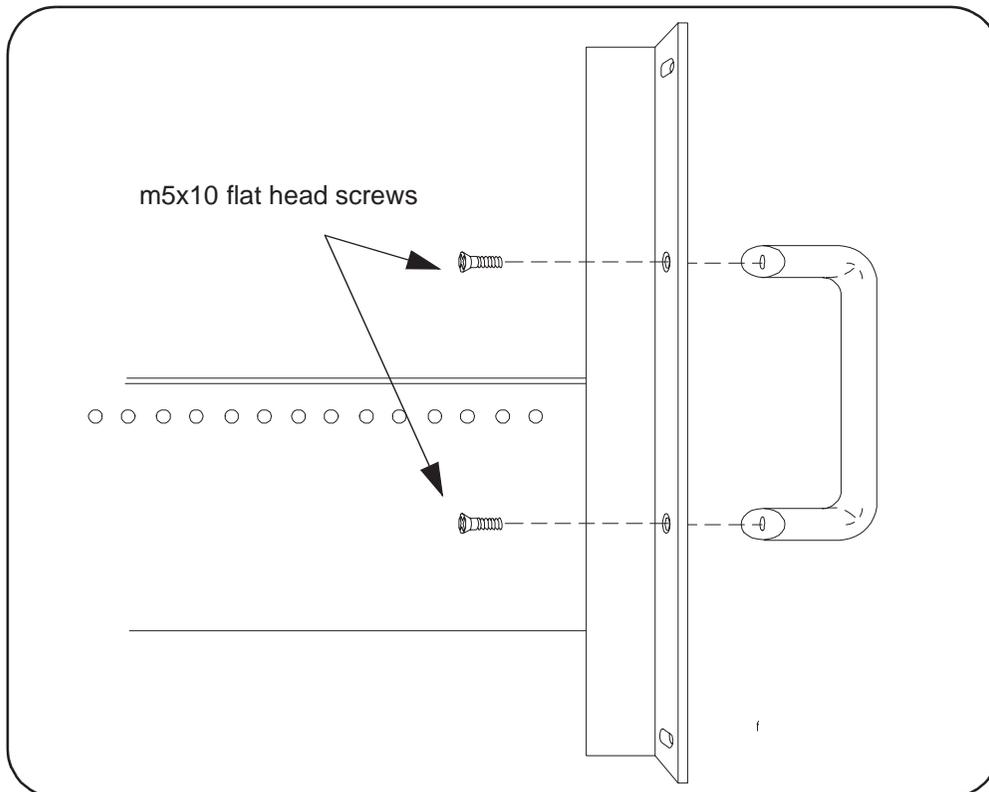


Figure 2-1. Attaching Handles to the Adapters (Standard kit p/n E8400-80923).

- Using the rack mount adapters as templates, position the adapters on the rack's vertical rails where the mainframe is to be mounted. Align the adapter holes over the "center" holes of the EIA rack units (Figure 2-2).

Note If you are using the HP E8400A VXiplug&play Compliant adapter kit, position the adapters such that all three mounting holes are directly over holes on the rack's vertical rails, and that the adapter flanges cover nine full EIA rack units with no overlap.

- Slide channel nuts over the rack holes to be used by the rack mount adapters.

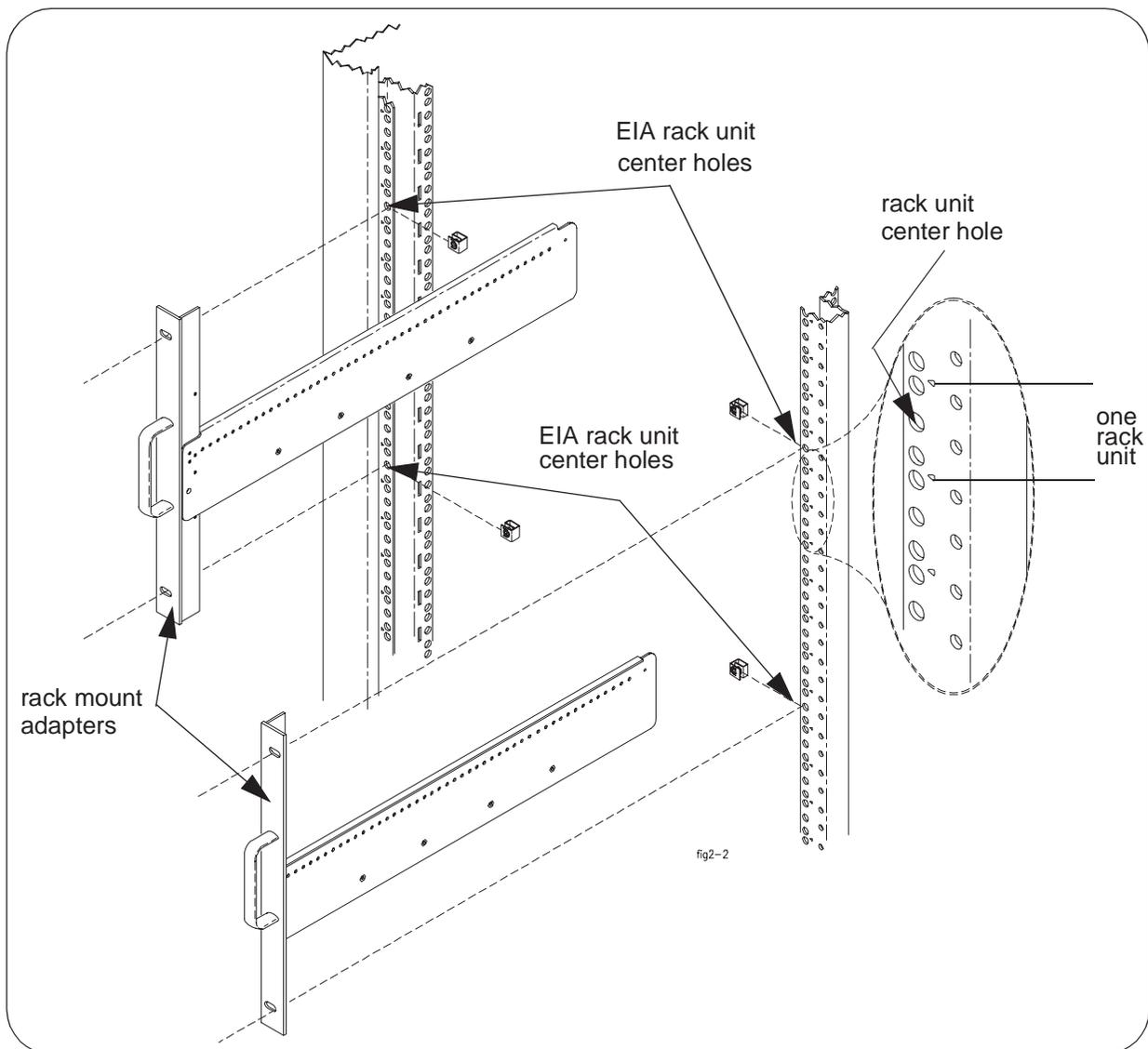


Figure 2-2. Positioning the Mainframe in the Rack.

4. Attach the support rails to the rack's inside vertical rails. The support rails must be positioned behind the **bottom** channel nuts installed in Step 3 (Figure 2-3). Use four channel nuts and the four 0.5x10-32 support rail-to-rack pan head screws to secure the rail.

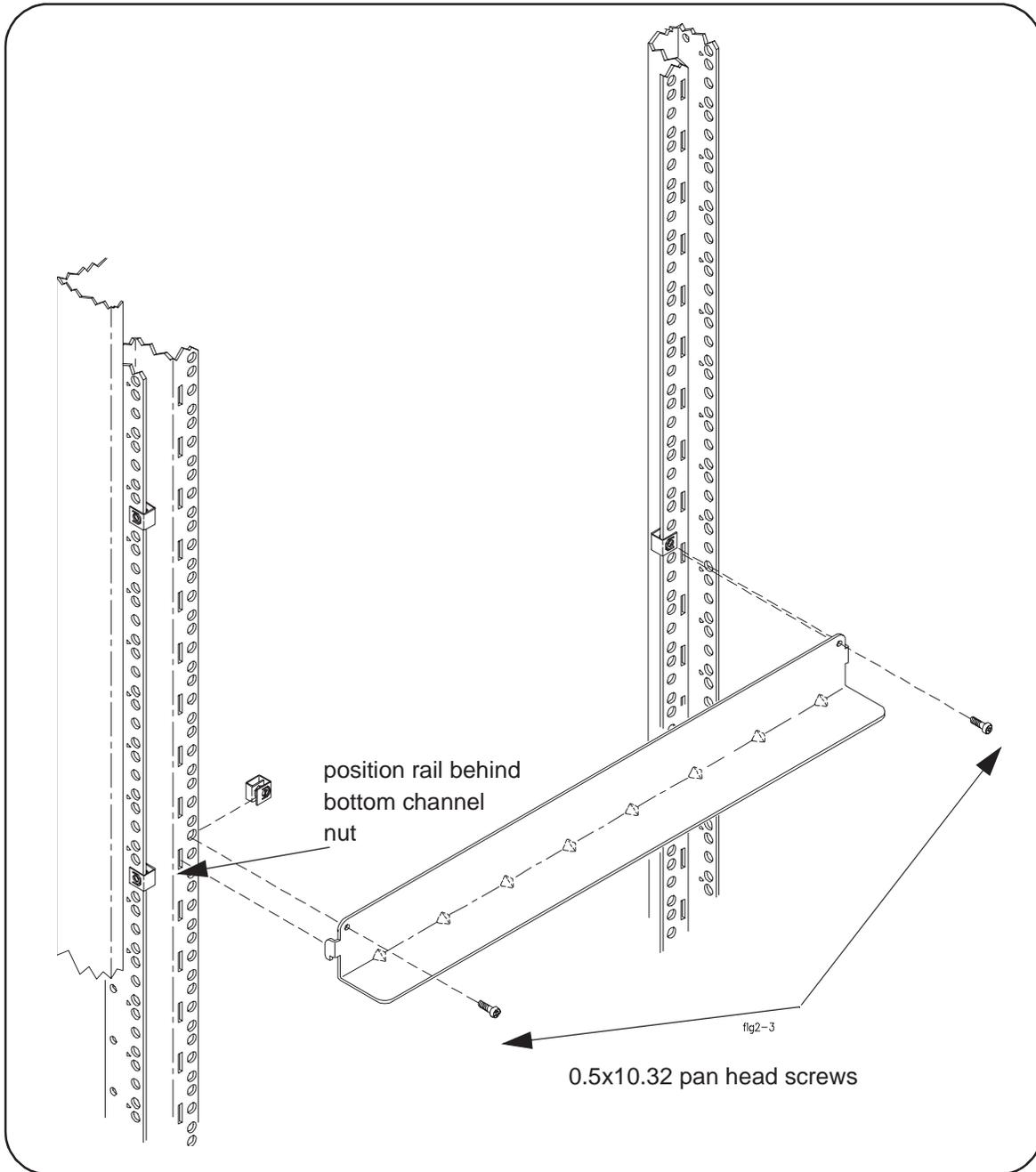


Figure 2-3. Attaching the Support Rails to the Rack.

5. Attach the rack mount adapters to the mainframe using the m5x8 pan head screws provided. To mount the mainframe flush with the rack front, begin with the 3rd hole from the front of the adapter (Figure 2-4).

With the standard adapter kit (p/n E8400-80923), the mainframe can be recess mounted up to 270.7 mm (10.6 inches), or extended out from the rack up to 147.6 mm (5.8 inches) in 12.3 mm (approximately 1/2 inch) increments.

The rack mount adapters for the VXI compliant and flush mount kits are also shown in Figure 2-4.

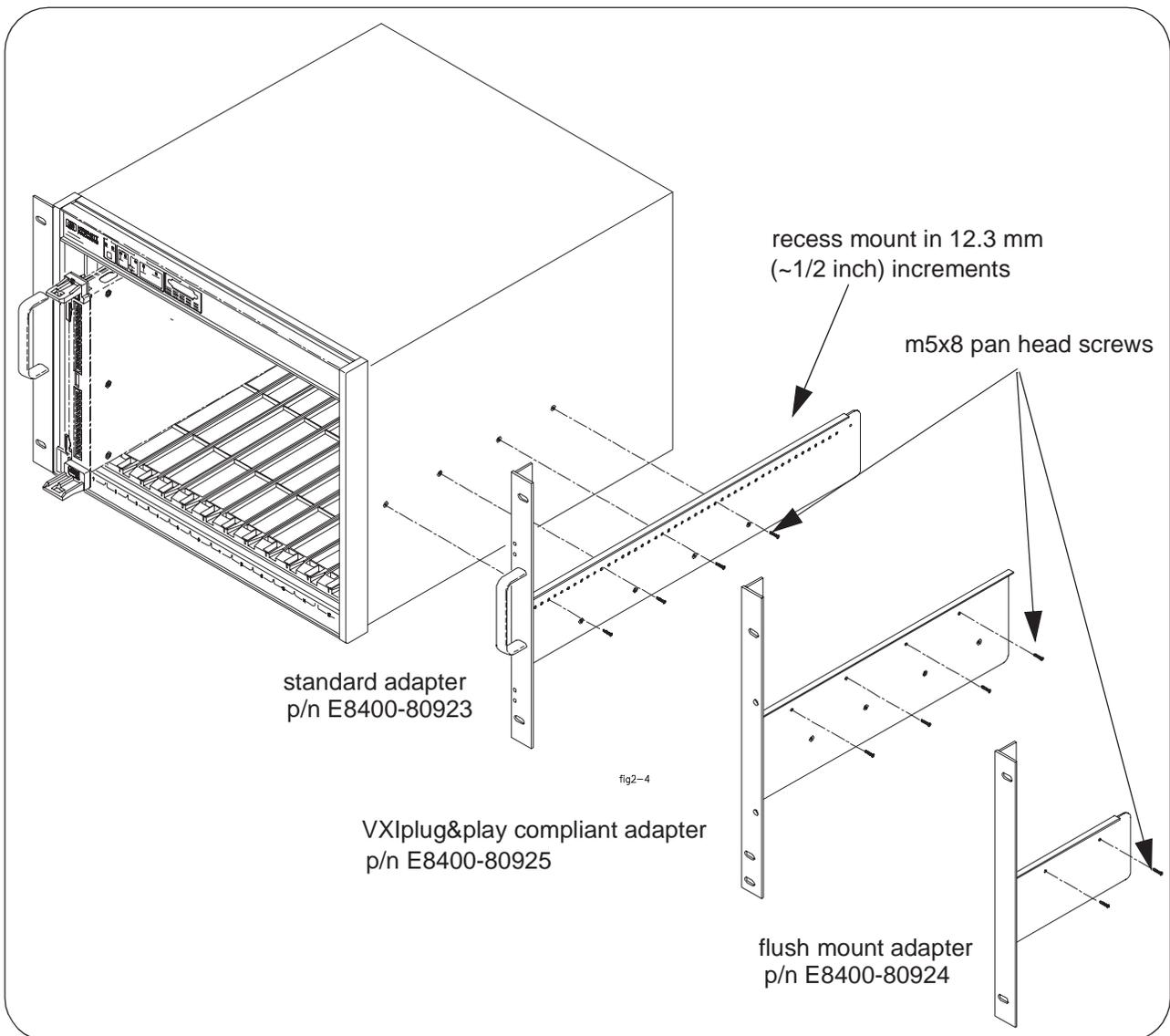


Figure 2-4. Attaching the Rack Mount Adapter to the Mainframe.

6. Remove the mainframe feet by lifting the tabs and sliding the feet towards the center of the mainframe.
7. With one person on each side of the mainframe, lift the mainframe onto the support rails. Slide the mainframe into the rack until the rack mount adapter flanges are against the rack's vertical rails. Secure the mainframe to the rack using the adapter dress screws.

WARNING



To prevent injury during rack mounting, the mainframe should be empty and two people should lift the mainframe into the rack.

Rack Mounting the HP E8400A Using Rack Slide Rails

This section contains instructions for mounting the HP E8400A mainframe in an EIA cabinet using the rack slide kit (p/n 1494-0411). The rack slide kit, which is used with either the Standard Adapter kit (p/n E8400-80923) or the VXiplug&play Compliant kit (p/n E8400-80925), allows you to extend the mainframe from the cabinet for easier access to installed instruments.

The following procedures apply to the adapter kits listed above, with adapter-specific information noted where necessary. The rack slide kit is not used with the flush mount adapter kit (p/n E8400-80924)

Procedure

1. Attach the handles to the standard adapters using the m5x10 flat head screws (Figure 2-5). Handles are included only with the HP E8400A Standard Adapter Kit.

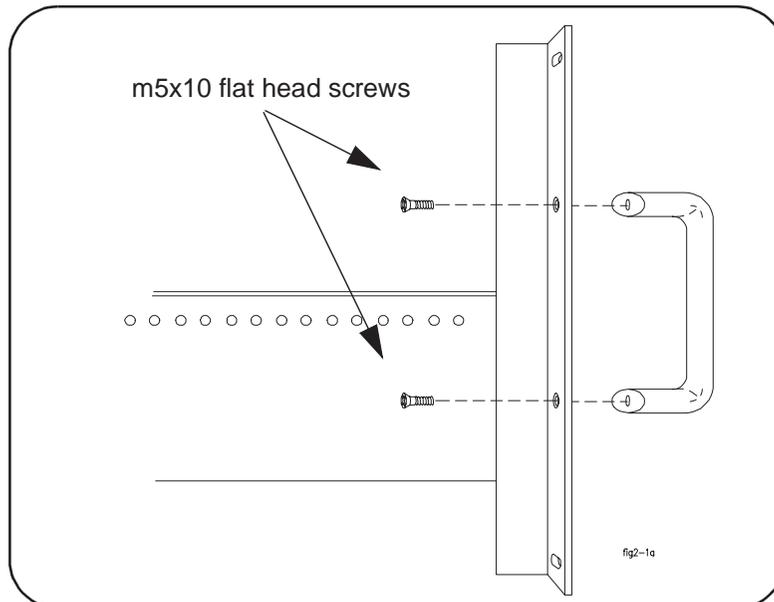


Figure 2-5. Attaching Handles to the Adapters (Standard kit p/n E8400-80923).

2. Using the rack mount adapters as templates, position the adapters on the rack's vertical rails where the mainframe is to be positioned. Be sure to align the adapter holes over center holes on the vertical rail (Figure 2-6).

If you are using the HP E8400A VXiplug&play Compliant adapter kit, position the adapters such that all three mounting holes are directly over holes on the rack's vertical rails, and that the adapter flanges cover nine full EIA rack units with no overlap.

3. Slide channel nuts over the rack center holes to be used by the rack mount adapters.

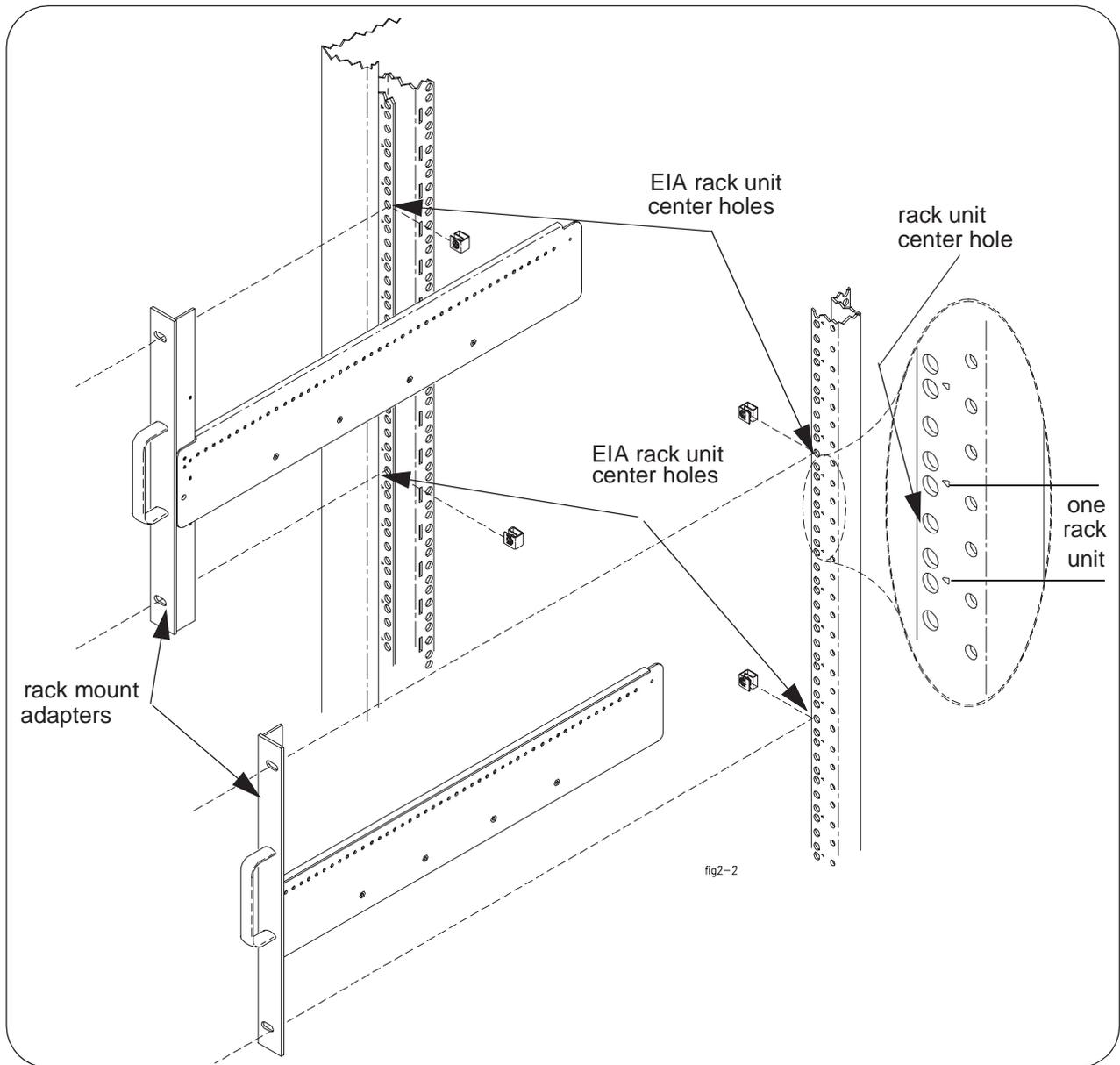


Figure 2-6. Positioning the Mainframe in the Rack.

4. From the bottom channel nut inserted in Step 3, count up four holes. Slide a channel nut over the corresponding hole on the inside vertical rail (Figure 2-7). Install a second channel nut on the inside rail four holes above the first nut. Repeat for the other rail. Install channel nuts on the corresponding holes on the rear inside rails.

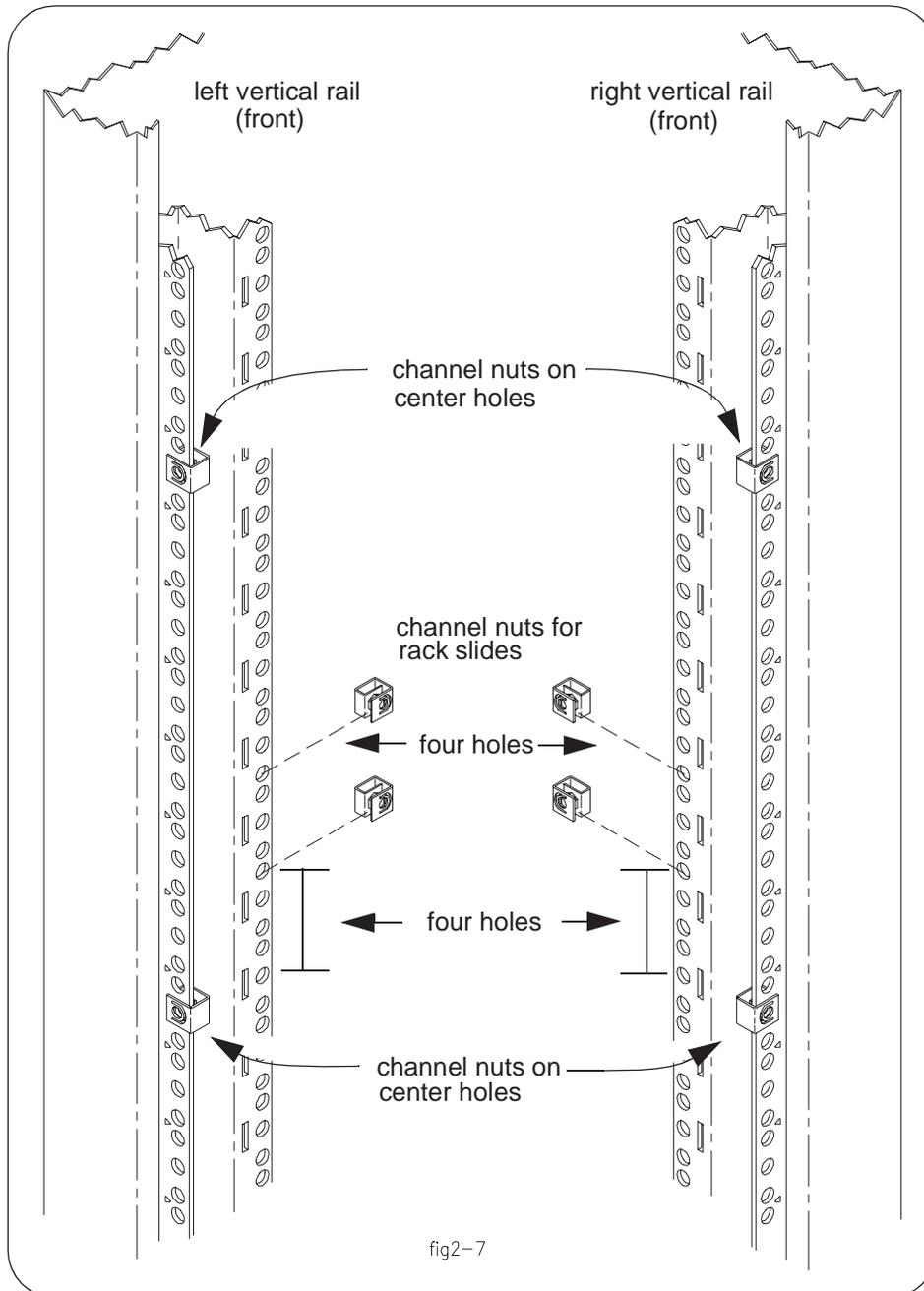


Figure 2-7. Positioning the Rack Slides (using the Standard Adapter Kit).

- Remove the chassis section from the intermediate section (Figure 2-8). (The chassis section will be connected to the mainframe in Step 7.) Slide the intermediate section back into the stationary section.

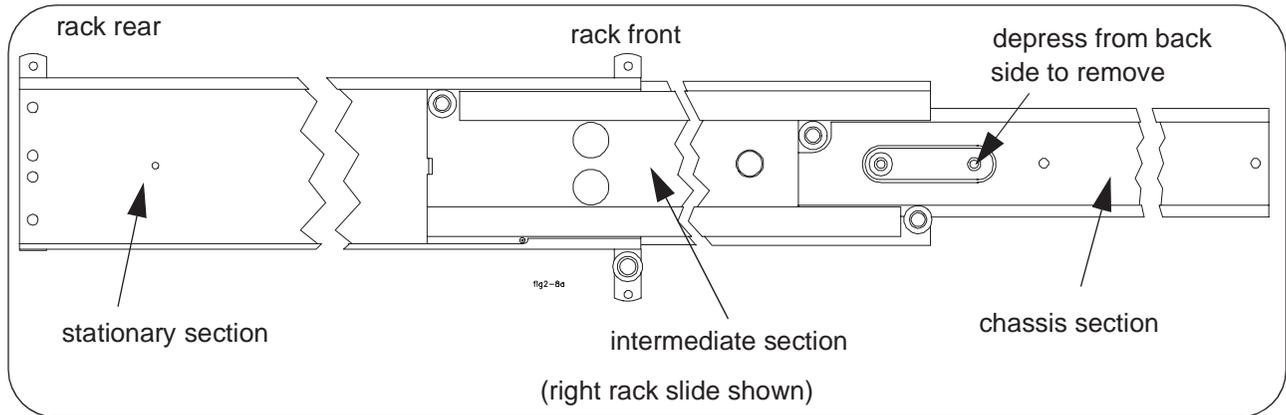


Figure 2-8. Removing the Rack Slide Chassis Section from the Intermediate Section.

- Attach the stationary section to the rack's front inside rail through the channel nuts. Use two m5x12 flat head screws. Attach the stationary section to the rear inside rail using two m5x12 pan-head screws (Figure 2-9).

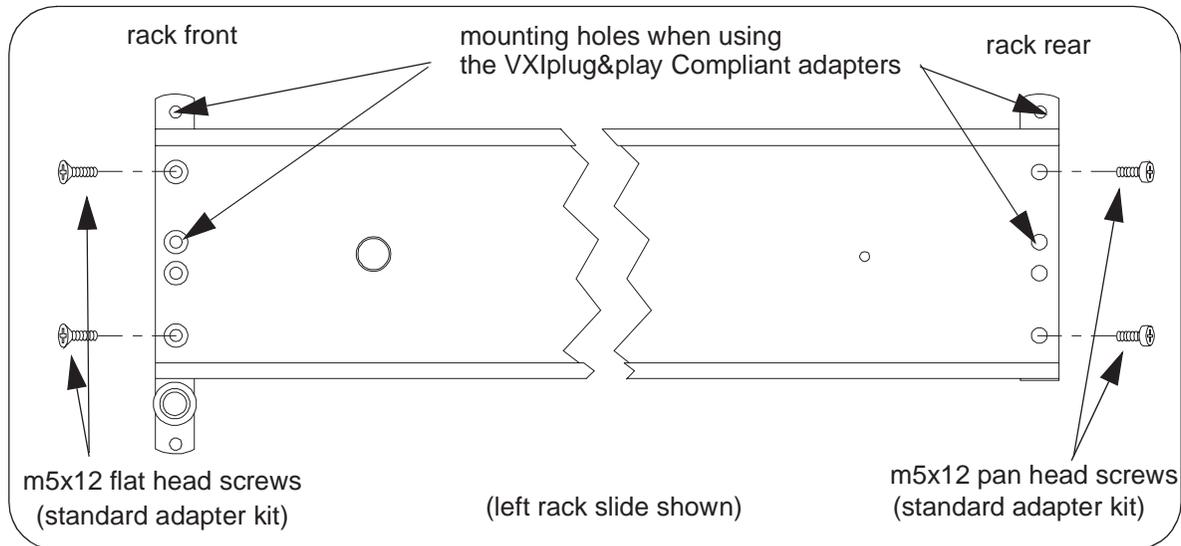


Figure 2-9. Installing the Rack Slide Stationary Sections.

- Attach the rack mount adapters to the mainframe using the eight m5x8 pan head screws provided. To mount the mainframe flush with the rack front, begin with the 3rd hole from the front of the adapter (Figure 2-10).

The mainframe can be recess mounted up to 270.7 mm (10.6 inches) in approximately 12.3 mm (1/2 inch) increments. Note that in some recess positions, the front screw attaching the rack slide adapter may have to be removed.

8. Attach the chassis sections to the rack mount adapters using four m5x8 flat head screws per side (Figure 2-10).

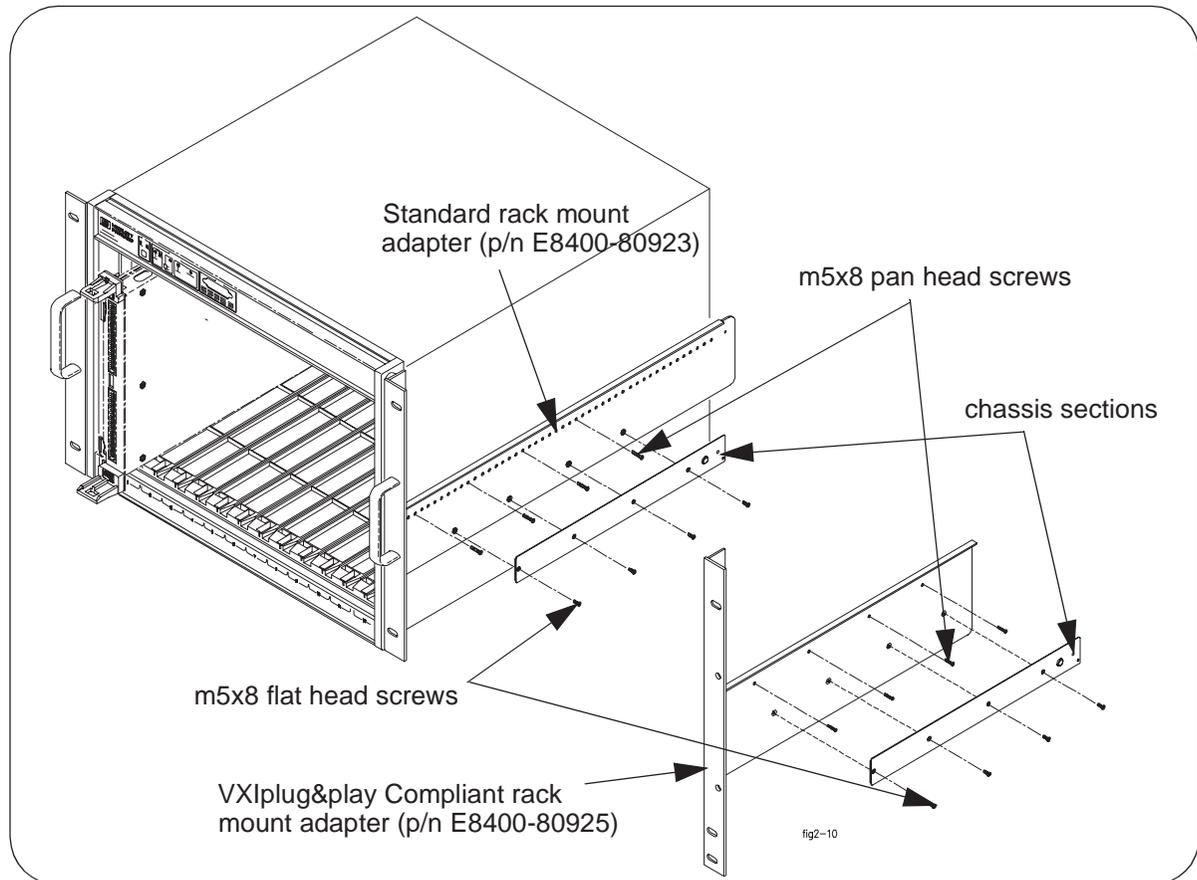


Figure 2-10. Attaching the Rack Mount Adapters and Chassis Sections to the Mainframe.

9. If additional rack space is required for other instruments, remove the mainframe feet by lifting the tabs and sliding the feet towards the center of the mainframe.
10. Slide the rack slide intermediate sections out from the rack slide stationary sections until they lock into place. With one person on each side, lift the mainframe and slide the chassis sections into the intermediate sections until the chassis sections lock into place. Slide the mainframe into the rack until the rack mount adapter flanges are against the rack's vertical rails. Secure the mainframe to the rack using the adapter dress screws.

WARNING

To prevent injury during rack mounting, the mainframe should be empty and two people should lift the mainframe into the rack.

Installing the Cable Tray

The HP E8400A Cable Tray (Option 914) allows you to route VXI instrument cables and wires under the mainframe. The cable tray can be used when the mainframe is on a bench top or when mounted in a standard EIA cabinet. The tray is compatible with the support rail (HP E3664A) and rack slide (HP p/n 1494-0411) kits.

Note If you ordered the support rail (HP E3664A) or rack slide (p/n 1494-0411) kit, install the cable tray before rack mounting the mainframe.

Parts List The parts included in Option 914 are shown in Table 2-3.

Table 2-3. HP E8400A Cable Tray Option 914 Parts List.

Quantity	Description	Part Number
1	Cable Tray	E8400-04102
4	Cable Tray-to-Mainframe Screws - m5x8 pan head	0515-0979

Procedure

1. Remove the four mainframe feet by lifting the tabs and moving each foot towards the center of the mainframe.
2. Attach the cable tray to the mainframe as shown in Figure 2-11 using four m5x8 pan head screws. Select the tray holes based on the amount of cable clearance required.

The bottom mounting holes position the tray over one additional EIA rack unit (44.5 mm), the top holes position the tray over two EIA rack units, and the center holes position the tray between one and two EIA rack units.

Note If the mainframe is mounted extending out from the rack, install the cable tray with the notched end at the front of the mainframe.

3. If the mainframe will be placed on a bench top, attach the mainframe feet to the cable tray. If the mainframe is to be rack mounted, you can save rack space by leaving the feet off.

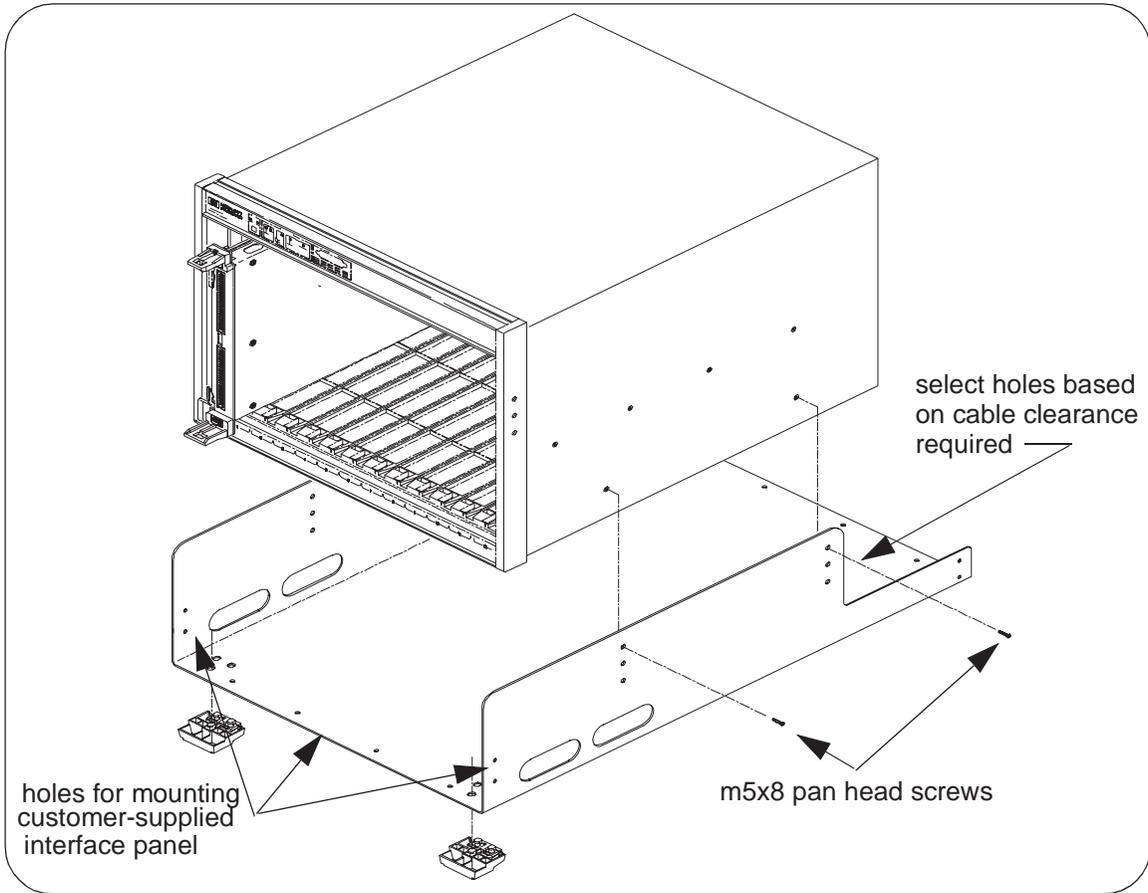


Figure 2-11. Installing the Cable Tray.

Note Holes are provided at each end of the cable tray for mounting a customer-supplied interface panel. The maximum height of the panel must be 41.275 mm for a one EIA rack unit cable tray position, or 85.725 mm for a two EIA rack unit cable tray position. The panel width cannot exceed 424 mm. The four holes across the bottom are 101.6 mm center-to-center, and centered on the tray. The side holes are 34.9 mm center-to-center, with the bottom hole 25.4 mm above the tray's inside surface. All holes are 12.7 mm from the edge and have a diameter of 3.175 mm.

Installing the Tinted Acrylic Door (Option 915)

This procedure describes how to install the Tinted Acrylic Door on the HP E8400A mainframe. The door requires the Standard Adapter Kit (p/n E8400-80923), and is compatible with either the support rail kit (HP E3664A) or the rack slide kit (p/n 1494-0411).

Parts List The parts included in Option 915 are shown in Table 2-4.

Table 2-4. HP E8400A Option 915 Parts List.

Quantity	Description	Part Number
1	Acrylic Door Assembly	E8400-09301
2	Hinges	3110-0409
1	Door Latch, Lock, and Keys	1390-0891
2	Rubber Door Stops	0403-0002
4	Screws - m5x10 flat head	0515-1020
4	Screws - m3x8 pan head	0515-0897

Note The door requires the mainframe to be recess mounted a minimum of 111 mm (4.36") or up to a maximum of 270.7 mm (10.6 inches) to accommodate wiring terminals on the VXI instruments. When using the minimum recess distance, field wiring cables must enter/exit the instruments through the top and/or bottom openings only.

Procedure

1. Recess mount the mainframe a minimum of 111 mm (4.36 inches) using the Standard Adapter kit and either the support rail kit ([page 23](#)) or rack slide kit ([page 27](#)).

Note For the minimum recess distance, attach the rack mount adapters to the mainframe beginning with the 12th hole from the front of the adapter.

2. If necessary, remove the dress screws (0570-1577) securing the adapters to the rack.
3. Attach the hinge pins to the right rack mount adapter using four m5x10 flat head screws (Figure 2-12). Attach the rubber door stops and door latch to the left adapter using four m3x8 pan head screws as also shown in Figure 2-12.

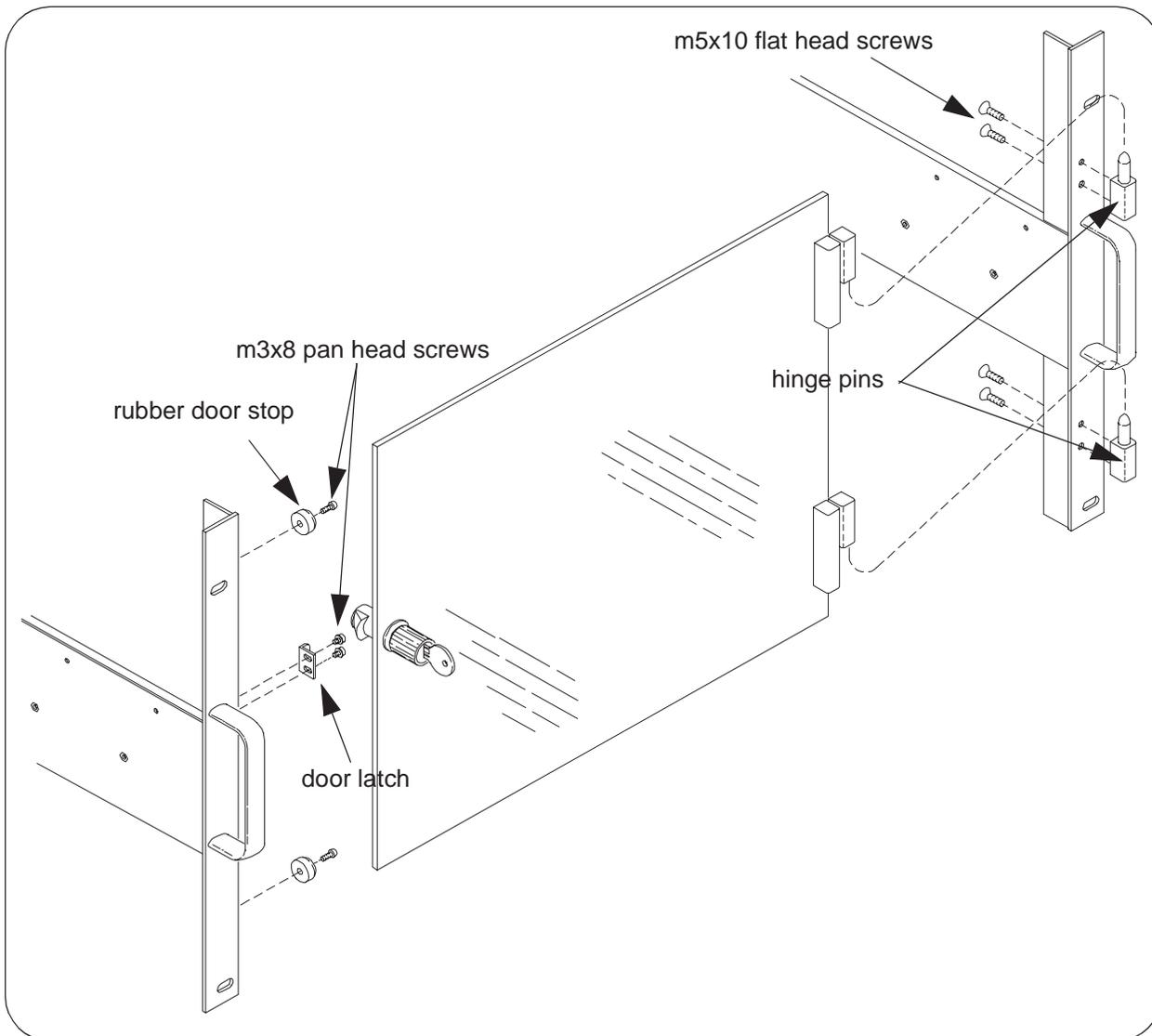


Figure 2-12. Installing the Acrylic Door Hinges, Door Stops, and Latch Keeper.

4. Slide the mainframe into the rack until the rack mount adapters contact the rack's vertical rails. Start the dress screws but do not tighten.
5. Install the door assembly by placing the hinges over the hinge pins on the right adapter. Adjust the door for squareness and clearance by holding the door in place while tightening the dress screws.
6. Adjust the latch keeper so that the door latches as it makes contact with the rubber door stops.

Note Once installed and adjusted, the door can be removed when necessary by lifting the door off the hinge pins.

Installing the Intermodule Chassis Shields

This procedure describes how to install chassis shields in the HP E8400A mainframe. The chassis shield is HP's implementation of VXI revision 1.4, specification B.7.3.4 that allows grounded shielding between mainframe slots. The shield is used to isolate VXI modules that generate electromagnetic interference (EMI) at excessive levels, or to protect VXI measurement modules from noise sources.

WARNING Do not install intermodule chassis shields while the mainframe is turned on or plugged into an AC power source.

Parts List

The parts included in the HP E8400-80909 Chassis Shield Kit are shown in Table 2-5.

Table 2-5. HP E8400-80909 Parts List.

Quantity	Description	Part Number
1	Chassis Shield	E8400-00600
8*	Grounding Spring	E8400-09101
* Includes 4 extra springs.		

Procedure

Note Each mainframe slot has top and bottom chassis shield guides (Figure 2-13). Chassis shields should be installed on both sides of an instrument generating interference/noise, or installed on both sides of a sensitive instrument.

1. Insert grounding springs into the four sockets (two top, two bottom) along the shield guides (Figure 2-13). Use a small flat blade screwdriver to secure each spring under the socket tab.

Use the chassis shield to cover the vent holes inside the mainframe when installing grounding springs in the top guide sockets. This prevents the springs from falling into the mainframe if they are accidentally dropped.

2. Align the chassis shield with the shield guides and gently slide the shield into the mainframe. Be careful not to crimp the front grounding springs with the edge of the shield. Slide the shield in until it reaches the end of the shield guide.

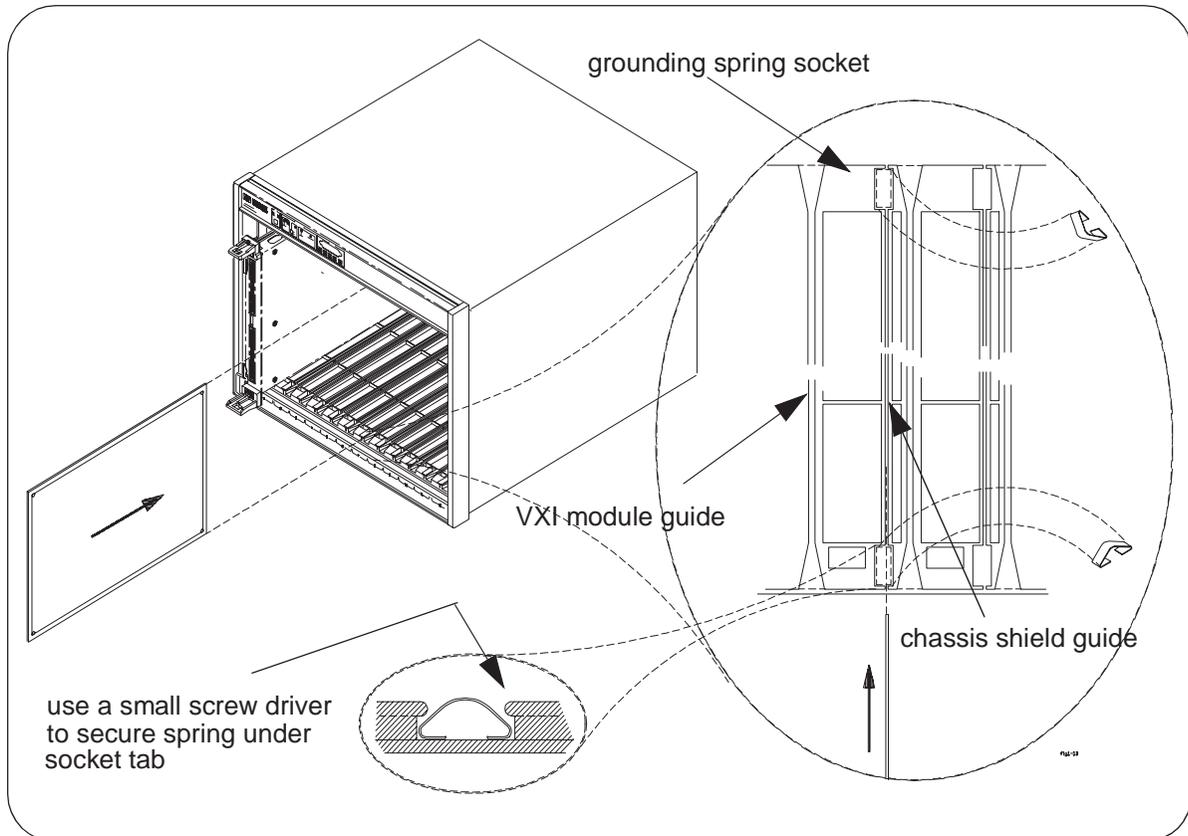


Figure 2-13. Installing the Grounding Springs and Chassis Shield.

Installing the Backplane Connector Shields

This procedure describes how to install backplane connector shields in the HP E8400A mainframe. The shields are HP's implementation of VXI revision 1.4, specification B.7.2.3 which ensures compliance with RFI levels specified in standards EN55011 and CISPR11.

Note A number of VXI instruments require shields for compliance with EN55011 and CISPR11. Refer to the instrument documentation to determine if shields are required.

WARNING Do not install backplane connector shields while the mainframe is turned on or plugged into an AC power source.

Parts List The parts included in Option 918 are shown in Table 2-6.

Table 2-6. HP E8400A Option 918 Parts List.

Quantity	Description	Part Number
54*	Torx Head Screw - 4-20x.25	0624-0702
1	Torx Driver	8710-1989
26	Backplane Connector Shield	E1400-80601
* Includes two extra screws		

Procedure

1. Position the shields over the backplane connectors as shown in Figure 2-14. Two connector shields and four screws are required for each slot.

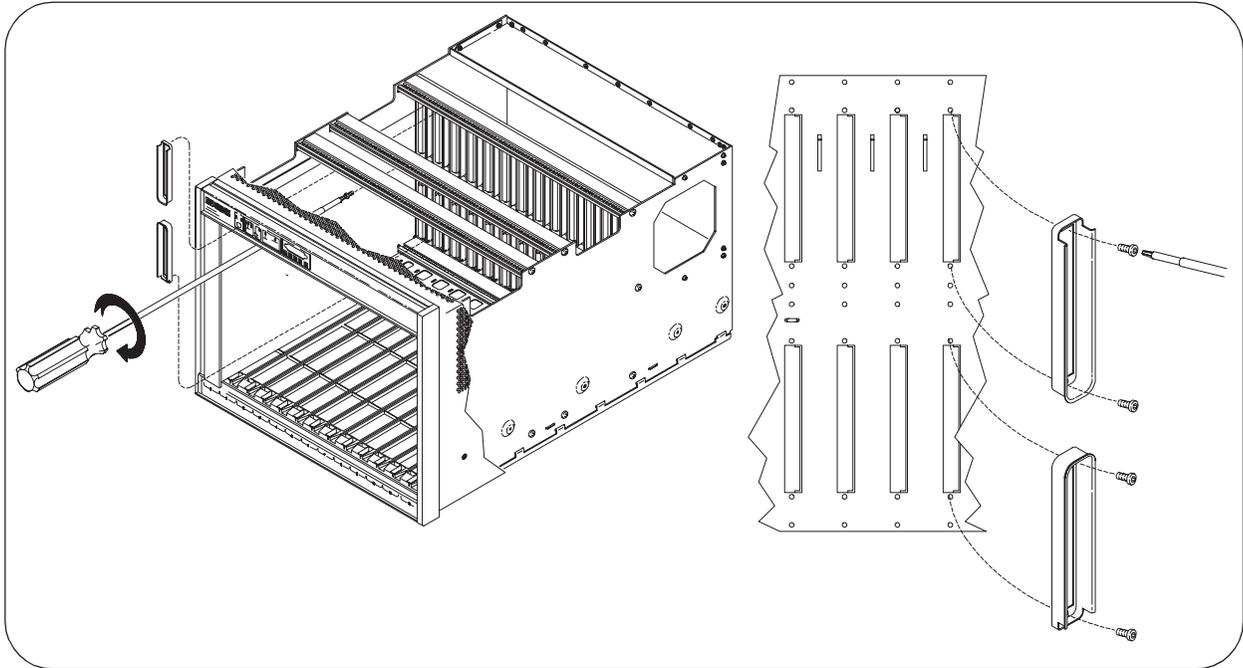


Figure 2-14. Positioning the Backplane Shields on the Connectors.

2. To install the Torx screws, firmly press the screw onto the Torx driver. This prevents the screw from falling off as you reach into the mainframe. Placing a sheet of paper under the backplane connectors will catch screws if they fall.
3. Tighten the screws by turning them clockwise. The screws are thread-forming and will go in slowly when you install them the first time.

HP E8400A Air Filter Kit

An optional air filter kit can be purchased for the HP E8400A mainframe. Contact the HP TMO Business Center at 1-800-829-4444 for information on availability.

Chapter 3

Troubleshooting and Repair

Chapter Overview

This chapter contains information for troubleshooting and replacing selected components of the HP E8400. The sections in the chapter include:

- Problem Isolation41
- Replacing Assemblies42
- Replacement Power Cords and Line Fuse48

Problem Isolation

Table 3-1 lists symptoms which could appear in the mainframe over time. The assembly most likely responsible for the symptom is also listed. Notice that customer repair of the HP E8400A is limited to replacement of the basic monitor, power supply, power supply fan, and impeller (module fan) assemblies.

WARNING There are no servicable parts inside the mainframe. Repair is limited to replacement of the basic monitor, power supply, power supply fan, and impeller (backplane fan). Replacement of these components must be performed at a static-controlled workstation by trained service personnel only.

Table 3-1. Isolating Problems Within the HP E8400A Mainframe.

Symptom	Action
Flashing Voltages Indicator	One or more backplane voltages may be out of specification. Check diagnostic connector pins 1, 2, 3, 4, 14,15,16. Check for a loose cable between the basic monitor assembly and the backplane. Replace power supply if any voltage remains out of specification.
Flashing Temperature Indicator	Power supply temperature is high. Mainframe is nearing automatic shutdown. Check for proper air flow and clearance around the mainframe fan.
Flashing Fans Indicator	Power supply fan or backplane impeller has failed. Visually inspect to determine which fan is not rotating. Turn off mainframe to avoid possible overheating. Replace the affected fan.
Monitor indicators are off and fans do not operate when On button is pressed.	Check for a loose cable between the basic monitor assembly and the backplane. Replace the basic monitor board.
No monitor indicators when mainframe is turned on.	Check diagnostic connector pins 1, 2, 3, 4, 13, 14, 15, 16 to determine if backplane voltages are within specification and power supply and backplane impeller are functioning. Replace the basic monitor
The SYSFAIL indicator will come on and remain on when a VXI module installed in the mainframe fails.	

Replacing Assemblies

This section contains instructions for replacing the basic monitor, power supply, power supply fan, and impeller. These assemblies are available from Hewlett-Packard under the part numbers shown in Table 3-2. Contact the HP TMO Business Center at 1-800-829-4444 to obtain replacement assemblies.

Table 3-2. HP E8400A Replacement Assemblies

Assembly	Part Number
Basic Monitor	E8400-66502
Power Supply	0950-3305
Power Supply fan	E8400-68500
Impeller (backplane fan)	E8400-68501

Replacing the Basic Monitor Board

1. Turn off the mainframe and remove the power cord.
2. Remove the mainframe cover by removing the ten m3x6 flat head torx screws (Figure 3-1).

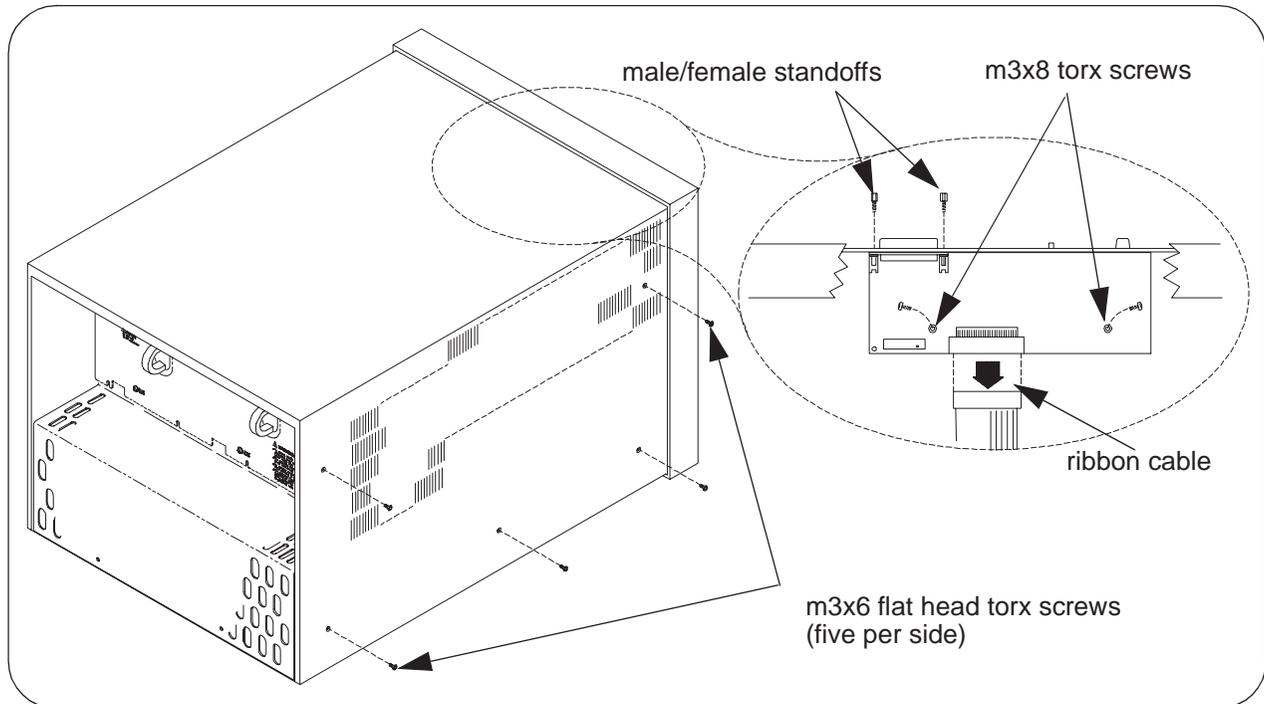


Figure 3-1. Removing the Mainframe Cover and Basic Monitor Board.

3. Remove the two male/female standoffs connecting the Diagnostic connector to the mainframe chassis.
4. Remove the ribbon cable and the two m3x8 torx screws from the basic monitor board.
5. Install the replacement monitor board and re-insert the standoffs, screws, and ribbon cable removed in the previous steps.

Replacing the Power Supply

1. Turn off the mainframe and remove the power cord.
2. Remove the eight m3x8 pan head torx screws connecting the power supply to the mainframe chassis (Figure 3-2).

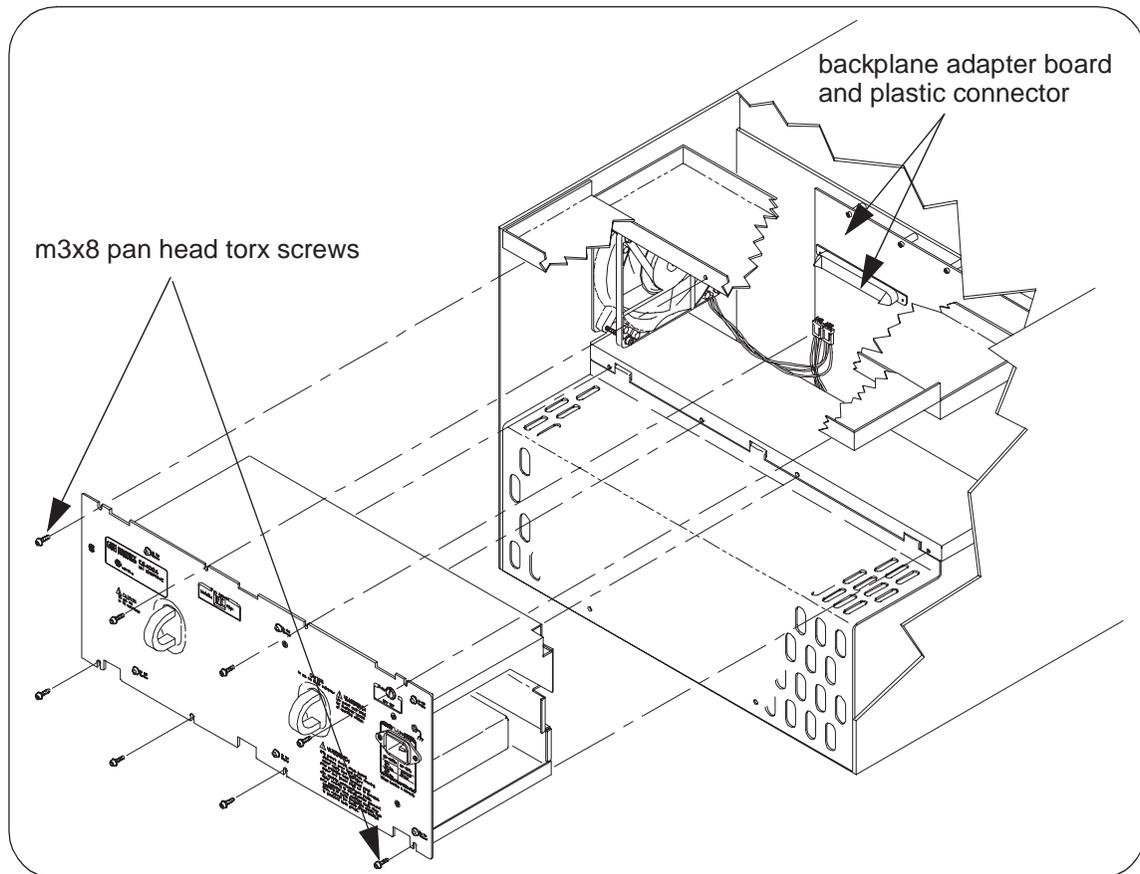


Figure 3-2. Removing the Power Supply from the Mainframe.

3. Using the metal rings on the power supply, gently pull the supply out from the plastic connectors on the backplane adapter board. Do not carry the supply using the metal rings.
4. Install the replacement power supply. Make sure the supply is firmly inserted into the adapter board connectors. Re-insert the eight screws removed in Step 2.

Replacing the Power Supply Fan

1. Turn off the mainframe and remove the power cord.
2. Remove the impeller cover by removing the two m3x6 flat head torx screws and lifting the cover off (Figure 3-3). (Removing the impeller cover provides easier access to the fan wires.)
3. Remove the eight m3x8 pan head torx screws connecting the power supply to the mainframe chassis (Figure 3-2).
4. Using the metal rings on the power supply, gently pull the supply out from the plastic connectors on the backplane adapter board. Set the power supply aside. Do not carry the supply using the metal rings.
5. Disconnect the (power supply) fan wires from the adapter board by gently pulling down on the wire housing (Figure 3-3). Note the position of the housing for re-installation.

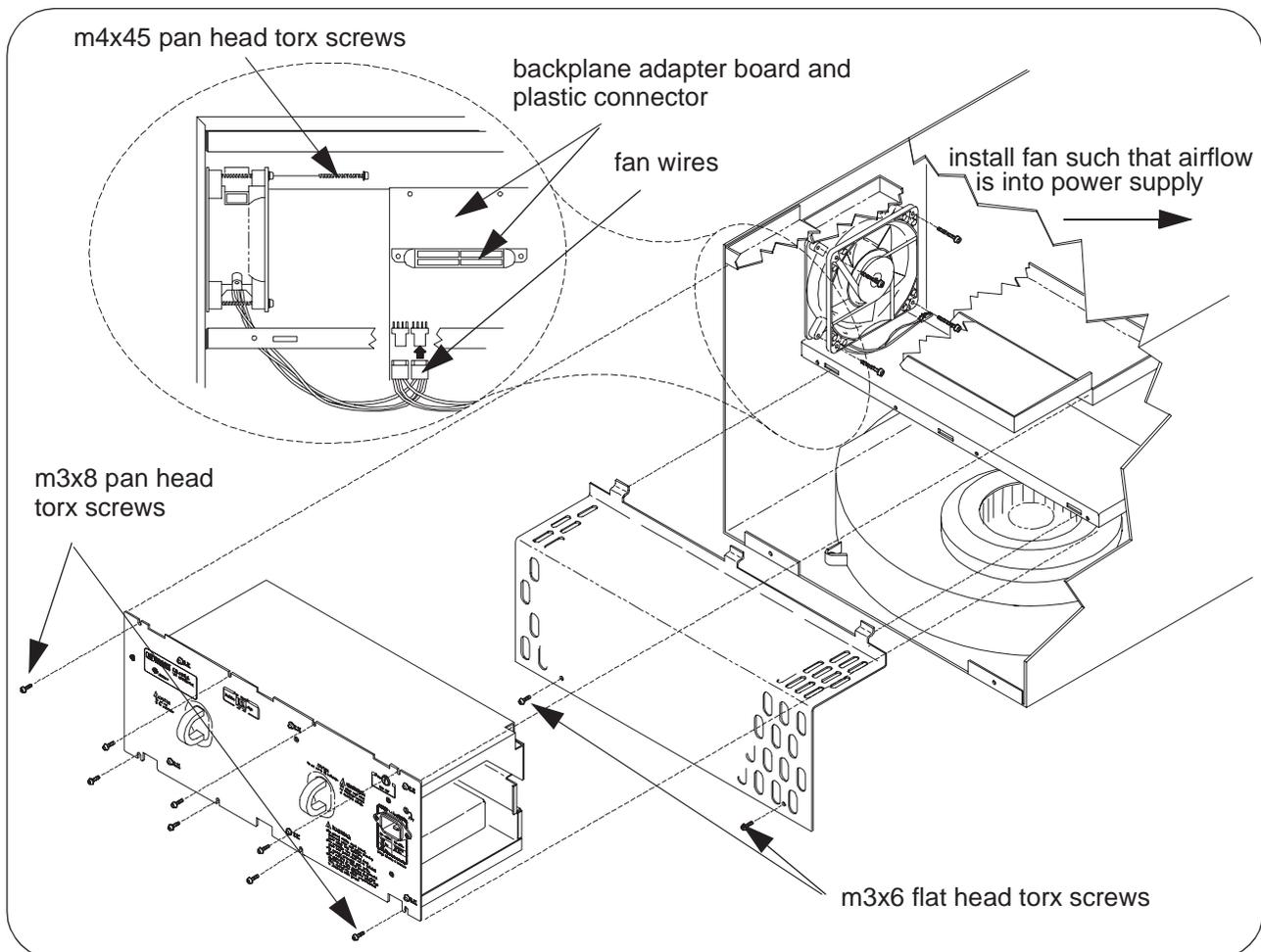


Figure 3-3. Removing the Power Supply Fan Wires.

Caution Static sensitive components on the mainframe backplane are exposed when the impeller cover is removed. Use care when removing / inserting the power supply fan wires.

6. Remove the fan from the mainframe chassis by removing the four m4x45 pan head torx screws. (These screws are also used with the replacement fan.)
7. Install the replacement fan such that the airflow is **into** the mainframe. The airflow direction is labeled on the fan. Reconnect the fan wires to the adapter board.
8. Install the power supply. Make sure the supply is firmly inserted into the adapter board connectors. Re-insert the eight screws removed in Step 3.
9. Install the impeller cover using the two m3x6 screws removed in Step 2.

Replacing the Impeller

1. Turn off the mainframe and remove the power cord.
2. Remove the impeller cover by removing the two m3x6 flat head torx screws and lifting the cover off.
3. Disconnect the impeller wires from the backplane adapter board by gently pulling down on the wire housing (Figure 3-4). Note the position of the housing for re-installation.

Caution Static sensitive components on the mainframe backplane are exposed when the impeller cover is removed. Use care when removing / inserting the impeller wires.

4. Loosen the two m4x8 pan head torx screws which secure the impeller to the mainframe.
5. Lift the impeller off the screw locators and gently pull the impeller out from the mainframe (Figure 3-4).

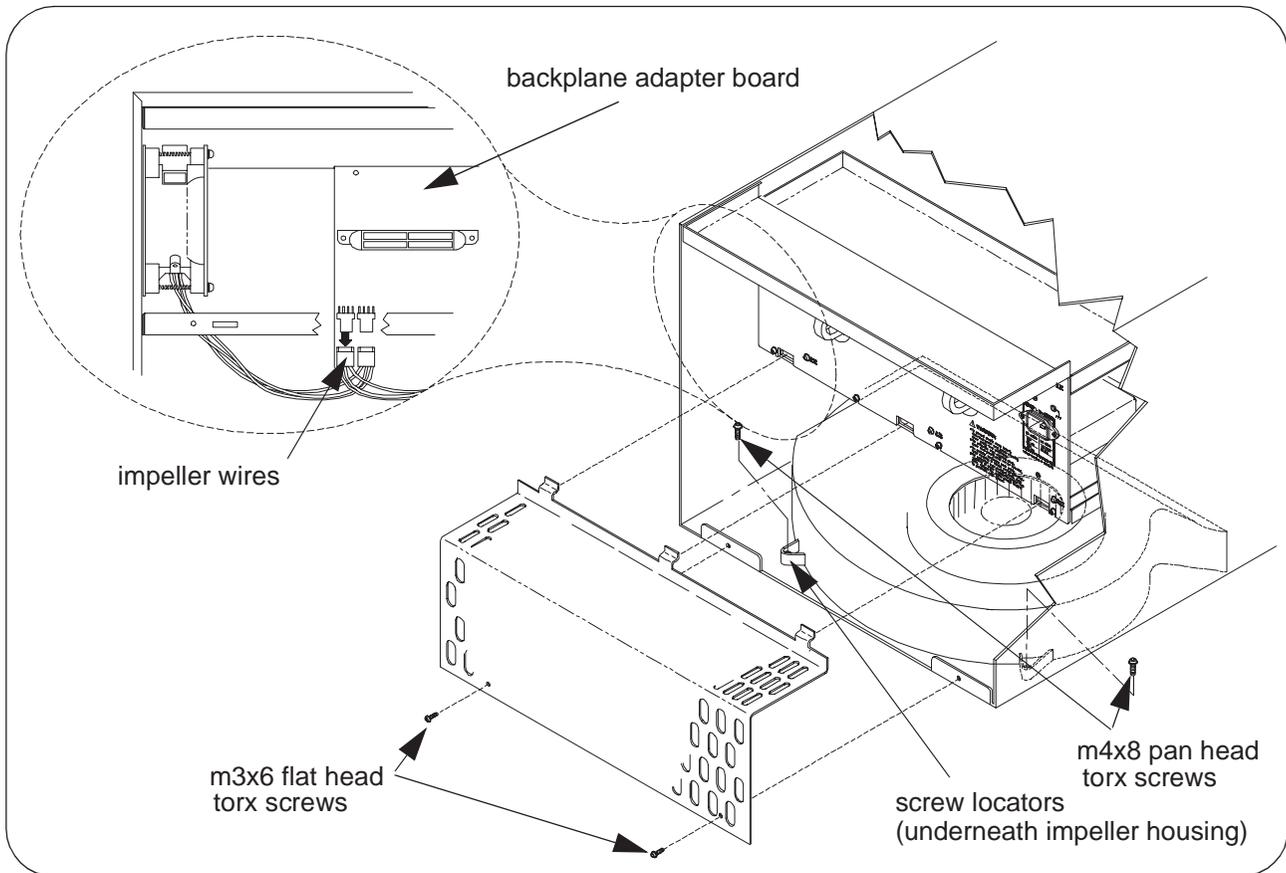


Figure 3-4. Removing / Installing the Impeller.

6. Install the replacement impeller by lining up the horizontal slots on the bottom of the impeller assembly with the raised edges on the mainframe. Slide the impeller into the mainframe until the impeller housing is over the screw locators.
7. Reconnect the impeller wires to the adapter board. Tighten the impeller screws into the screw locators.
8. Re-install the impeller cover.

Replacement Power Cords and Line Fuse



Table 3-3 lists the line fuse and power cords rated for use with the HP E8400A mainframe. If it becomes necessary to replace the power cord, obtain the appropriate cord listed in the table or use a cord with the same voltage and current ratings.

Table 3-3. Line Fuse and Power Cords for the HP E8400A

HP E8400A Replacement Fuse and Fuse Cap				
Mainframe	Part Number	Voltage	Fuse Type	Fuse Cap
HP E8400A	2110-0054	all specified line voltages	15AF 250V	2110-0565
HP E8400A Power Cords				
Country	Part Number	Voltage	Rated Amps	Type
U.K.	8120-1351	250 VAC	10A	Straight Connector
Australia	8120-1369	250 VAC	10A	Straight Connector
Europe	8120-1689	250 VAC	10A	Straight Connector
U.S. / Canada	8120-2371	125 VAC	13A	Straight Connector
Switzerland	8120-2296	250 VAC	10A	Right Angle Connector
Denmark	8120-2956	250 VAC	10A	Straight Connector
Japan	8120-5400	125 VAC	15A	Right Angle Connector
India / South Africa	8120-4211	250 VAC	10A	Straight Connector

Power cords supplied by HP have polarities matched to the power input socket on the instrument:

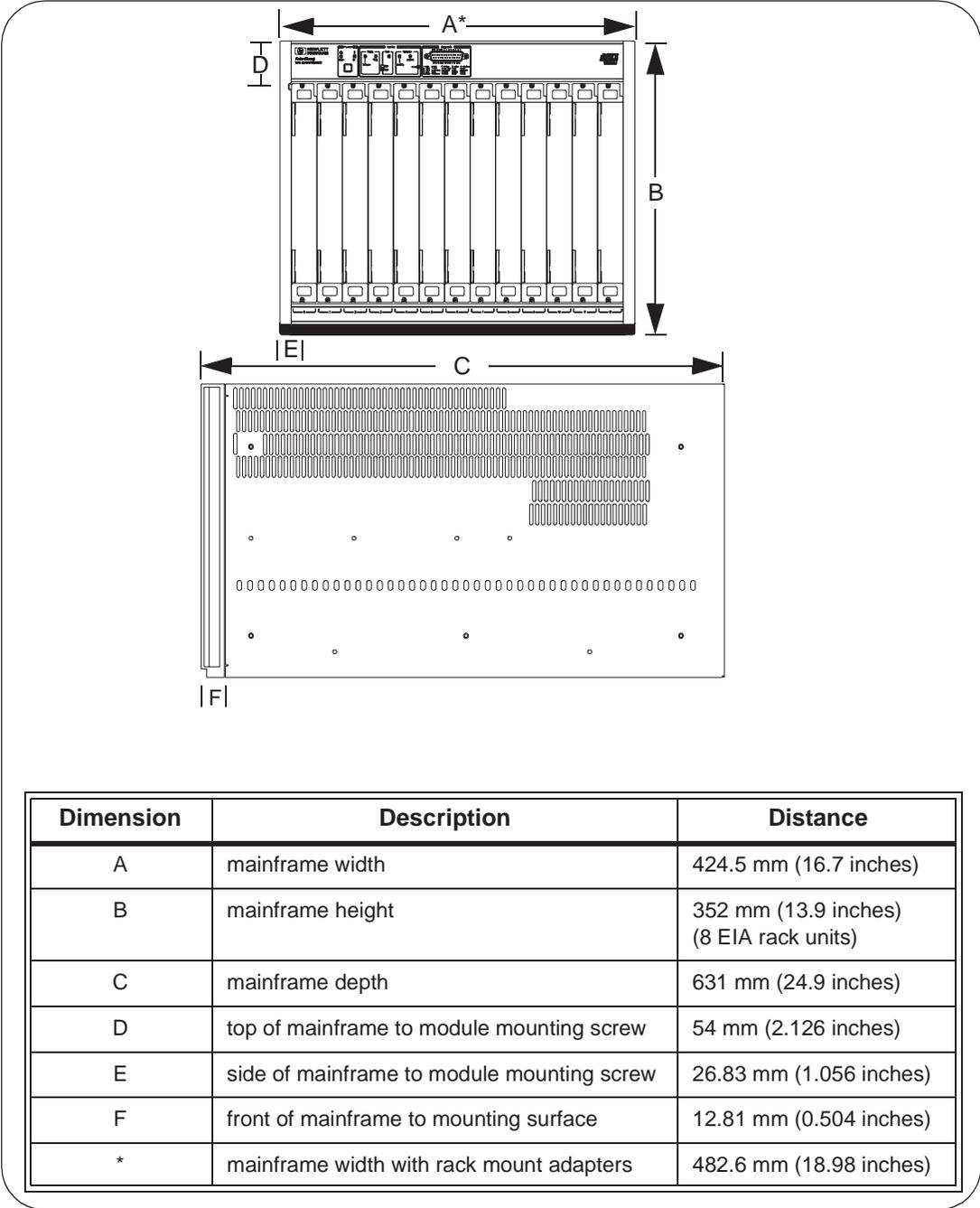
- L = line or active conductor (also called “live” or “hot”)
- N = neutral or identified conductor
- E = earth or safety ground

Appendix A

Specifications

The HP E 8400A VXI mainframe is 100% compatible with VXIbus specification revision 1.4.

Mechanical Specifications



Mainframe Weight	20.9 Kg (46 lbs) with no modules installed. Maximum module weight is 3.5 Kg (7.7 lbs) per slot to comply with shock and vibration specifications. Heavier modules can be installed if shock and vibration environment is less severe.
Module Size	Thirteen (13) C-Size slots. The mainframes also accept A- or B- size modules using the optional HP E1403/7 adapters.
Covering	Durable double-skin construction.
Cable Routing and Rack Mounting	<p>Cable routing and rack mounting can be enhanced with the following accessories:</p> <ul style="list-style-type: none"> • Versatile Rack Mount Adapters <ul style="list-style-type: none"> -- Recess from flush to 147.6 mm (5.8 inches) in 12.3 mm (approximately 1/2 inch) increments -- Extend from flush to 147.6 mm (5.8 inches) in 12.3 mm (approximately 1/2 inch) increments -- Rack Slides or Support Rails -- Locking, tinted door • Versatile Cable Tray, one or two EIA rack units in height, allowing for user-defined interface panels. • Various interconnect receivers and interface test adapters (ITAs).

Input Power Specifications

AC Operation	<p>Input Voltage: 90 VAC minimum to 264 VAC maximum.</p> <p>Input Frequency: 47 Hz to 66 Hz (full voltage range) 360 Hz to 440 Hz (90 VAC min to 132 VAC max)</p>
DC Operation	Input Voltage: 100 VDC to 270 VDC
Inrush Current	Inrush current is 40A maximum.

Note If inrush current causes mains supply voltage to temporarily drop below the required minimum voltage (90 VAC), the mainframe may not turn on properly.

Total Input Power Total input power can be estimated using the following expression:

$$1.5 * (\text{power output} + 75\text{W}) + 150\text{W}$$

Total power input in W or VA, power factor corrected. Power output in W = sum of voltage times current for the seven VXI output voltages.

Power Switch On/Stdby with lighted “On” indicator. Front panel Diagnostic connector allows remote power-on.

Detachable Line Power Cord IEC320 socket. See Chapter 3 for power cord specifications.

Fuse 250V, 15A, fast blow. Suitable for all specified line voltages.

Chassis Ground Tap m4x0.7 threaded nut insert on back of mainframe.

Mains Overvoltage Category Category II. Refer to Electromagnetic Compliance section for additional details.

Output Power Specifications

Temperature	Available Power * 90 - 264 VAC	Usable Power ** 120 - 264 VAC	Usable Power ** 90 - 120 VAC
0 - 25°C	1,168W	800W	550W
0 - 40°C	1,168W	700W	550W
0 - 55°C	1,168W	600W	550W

* Sum of voltages times currents. Not always usable due to thermal protection shutdown.
 ** Total output before thermal protection shutdown.

Voltage	Peak Current (I_{MP}^*) **	Allowed Variation *	Ripple/Noise DC Load *	Dynamic Current (I_{MD}^*) ***	Induced Ripple/Noise
+5V	60A	+0.25V / -0.125V	50 mV	7.0A	50 mV
+12V	10A	+0.60V / -0.36V	50 mV	2.5A	50 mV
-12V	10A	-0.60V / +0.36V	50 mV	2.5A	50 mV
+24V	9A	+1.2V / -0.72V	150 mV	5.0A	150 mV
-24V	10A	-1.2V / +0.72V	150 mV	5.0A	150 mV
-5.2V	30A	-0.26V / +0.156V	50 mV	8.0A	50 mV
-2V	20A	-0.10V / +0.10V	50mV	5.0A	50mV

* Specifications apply at the mainframe backplane, 0 - 55°C.
 ** I_{MP} = Rated mainframe peak DC output current as defined by the VXIbus Specification.
 *** I_{MD} = Rated mainframe peak-to-peak dynamic current as defined in the VXIbus Specification by a current vs. frequency curve.
 +5V STDBY: Up to 1A can be provided by the user through pins 8 and 21 of the diagnostic connector.

Cooling Specifications

High performance impeller provides cooling air to modules. Unique air distribution system (patent applied for) and pressurized plenum provides quiet operation and uniform airflow from front to rear of modules. Separate power supply cooling fan provides an independent air path for reliable cooling of power supply.

Cooling Modes

High or variable cooling mode switchable on the front panel. Controls both impeller and power supply fan.

High Fan Speed Mode: full airflow at all times.

Variable Fan Speed Mode: fan speed increments through 5 discreet speeds as a function of power supply and reference temperatures (pins 11, 12 of diagnostic connector). Reference temperature is a function of load and ambient temperature.

At full load:

- low speed up to approximately 25°C
- high speed above approximately 40°C

At no load:

- low speed up to approximately 38°C
- high speed above approximately 53°C

If power supply temperature exceeds a set limit, fan speed will increase.

At low fan speed, airflow is approximately 60% of high fan speed.

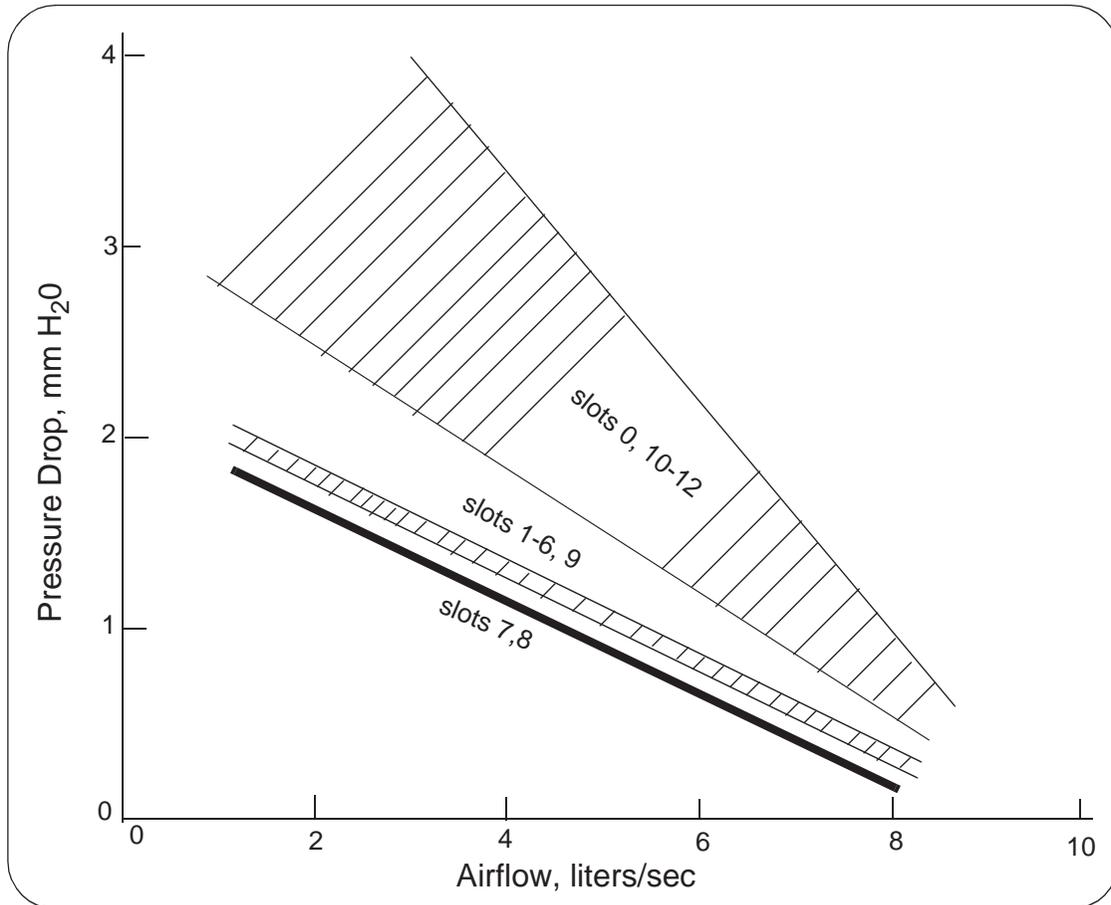
Airflow Path

For VXI module cooling, air enters through the back of the mainframe and exhausts out the sides.

For power supply cooling, air enters through the right side (when viewed from front) and is exhausted through the left side.

An Air Filter Kit is available for demanding environmental applications.

Cooling Specification Chart



These curves represent airflow through a single slot with the following conditions:

- fans at full speed
- all other slots empty
- filler panels installed over all other slots
- optional air filter not installed

Acoustical Noise Specifications

Low Fan Speed: 44 dBA sound power at bystander position one meter in front of mainframe.

High Fan Speed: 52 dBA sound power at bystander position one meter in front of mainframe.

Monitor Specifications

- Indicators**
- Input Power On
 - Power Supply Voltages within Spec ($\pm 8\%$)
 - Power Supply Temperature OK
 - Fans OK
 - Backplane Activity
 - SYSFAIL

- Switches**
- On/Standby
 - Fan Mode
 - Reset

- Diagnostic Connector**
- Output all 7 backplane voltages for monitoring.
 - Output +5V and +12V for remote applications (1A max each).
 - Input +5VSTDBY to backplane (1A total for pins 5 and 18).
 - Remotely operate On/Stdby.
 - Power supply temperature output (0 mV = 0°C, 10 mV per °C).
 - Reference temperature output (0 mV = 0°C, 10 mV per °C).
 - Fans OK output (TTL low true logic levels).
 - Backplane voltages OK output (TTL low true logic levels).
 - SYSRESET*, input or output. (TTL low-true logic levels).
 - ACFAIL*, output. (TTL low-true logic levels)
 - Ground

Backplane Specifications

- Solid state automatic daisy-chain jumpering for BUS GRANT and IACK signals.
- Full differential distribution of CLK10.
- ACFAIL* and SYSRESET* in full compliance with the VMEbus Specification.
- Surface mount construction and no sockets for maximum reliability.

Environmental Specifications

Operating Location Sheltered location where air temperature and humidity is controlled within this product's specifications and the equipment is protected against direct exposure to climatic conditions such as direct sunlight, wind, rain, snow, sleet and icing, water spray or splash, hoarfrost, or dew (typically indoors). Pollution degree 2.

Temperature Operating Temperature Range: 0°C to +55°C
Storage Temperature Range: -40°C to +75°C

Humidity **Operating Humidity Range:**

- Up to 95% RH from 0°C to +40°C (non-condensing).
- Up to 65% RH from +40°C to +55°C (non-condensing).

Storage Humidity Range:

- Up to 95% RH from 0°C to +55°C (non-condensing).
- Up to 90% RH from +55°C to +75°C (non-condensing).

Shock **End Use Handling:**

- Half sine waveform, <3 msec duration, $\Delta v = 160$ cm/sec minimum.

Transportation:

- Trapezoidal waveform, $\Delta v = 605$ cm/sec, 30 g minimum.

Vibration **Operating and Functional:**

- 5 to 500 Hz, 0.0001 g^2 /Hz Spectral Density

Survival, Swept Sine:

- 5 to 500 Hz Resonance Search, 5 minute dwell on resonances at 0.5g.

Survival, Random:

- 0.015 g^2 /Hz Spectral Density.

Altitude Up to 3000m.

Electromagnetic Compliance Specifications

The HP E8400A mainframe conforms to the following EMC product specifications:

- CISPR 11:1990/EN55011 (1991): Group 1 Class A
- EN61000-3-2:1995 Class A
- EN61000-3-3:1995
- EN50082-1:1992
- IEC 801-2:1991: 4kV CD, 8kVAD
- IEC 801-3:1984: 3 V/m
- IEC 801-4:1988: 1kV Power Line, 0.5kV Signal Lines
- ENV50141:1993/prEN50082-1 (1995): 3 Vrms
- ENV50142:1994/prEN50082-1 (1995): 1 kV CM, 0.5 kV DM
- EN61000-4-8: 1993/prEN50082-1 (1995): 3 A/m
- EN61000-4-11:1994/prEN50082-1 (1995): 30 %, 10 ms 60 %, 100ms

EMC Performance EMC performance can be further enhanced with the following accessories:

- Backplane Connector Shields per VXI rev 1.4, B.7.2.3.
- 1-slot Blank Panel with EMI Contact per VXI rev 1.4, B.7.2.3
- Intermodule Chassis Shield per VXI rev 1.4, B.7.3.4

Safety Specifications

- IEC 61010-1 (1990) including Amendments 1 (1992) and 2 (1995)
- EN 61010-1 (1993) including Amendment 2 (1995)
- CSA C22.2 #1010.1 (1992)
- UL 3111-1 (1994)

Power Supply Protection All outputs protected from over-temperature, over-voltage, over-current, short-to-ground and short-to-other-output. Protection mode is full shutdown. Recovery occurs when the fault condition is removed and power on/standby is cycled.

Repair Specifications

Diagnosis and Troubleshooting through the front panel monitor and connector.

MTTR for Power Supply:<5 min (with mainframe and modules fully installed in rack)

MTTR for Impeller and/or Fan:<5 min (with mainframe and modules fully installed in rack)

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