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VXI bus

HP 75000 Series C

HP E1421A
6-Slot C-Size Mainframe

User Information

HEWLETT® PACKARD

Manual Part Number: E1421-90002
Printed in U.S.A. E0496

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Declaration of Conformity

According to ISO/IEC Guide 22 and EN 45014

The Hewlett-Packard Company declares that the HP E1421A 6-Slot C-Size Mainframe conforms to the following Product Specifications.

Safety: IEC 1010-1 (1990) Incl. Amend 1 (1992)/EN61010 (1993)
CSA C22.2 #1010.1 (1992)
UL 3111

EMC: CISPR 11:1990/EN 55011 (1991): Group1 Class A
IEC 801-2:1991/EN 50082-1 (1992): 4kVCD, 8kVAD
IEC 801-3:1984/EN 50082-1 (1992): 3 V/m
IEC 801-4:1988/EN 50082-1 (1992): 1kV Power Line

Supplementary Information: The product herewith complies with the requirements of the low voltage Directive 73/23/EEC and the EMC Directive 89/336/EEX.

Q.A. Manager
November 1994

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Printing History

The Printing History shown below lists all Editions and Updates of this manual and the printing date(s). The first printing 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 the current Edition of the manual. Updates are numbered sequentially starting with Update 1. When a new Edition is created, it contains all the Update information for the previous Edition. Each new Edition or Update also includes a revised copy of this printing history page. Many product updates or revisions do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual updates.

Edition 1 (Part Number E1421-90001) ..... November 1994

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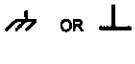
Safety Symbols



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.

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Chapter 1
Preparing the Mainframe for Use

This chapter describes how to install VXI plug-in modules into the mainframe and apply power to the mainframe. Preparing the mainframe for use includes:

- Installing the Correct Fuse for Your Line Voltage
- Rack Mounting the Mainframe (optional)
- Installing VXI Plug-in Modules
- Removing the Top Cover (optional)
- Connecting the Power Cord
- Connecting Standby DC Power (optional)

WARNING **SHOCK HAZARD. Only service-trained personnel who are aware of the hazards involved should install, remove, or configure the system. Before you perform any of the procedures in this guide, disconnect AC power and field wiring from the mainframe.**

CAUTION **Do not install modules into the mainframe with power applied. Doing so may damage the modules and the mainframe.**

CAUTION **STATIC ELECTRICITY. Static electricity is a major cause of component failure. To prevent damage to the electrical components in the mainframe and plug-in modules, observe anti-static techniques whenever installing a module into the mainframe.**

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Step 1 Install Correct Fuse for Your Line Voltage

WARNING **SHOCK HAZARD. Disconnect power from the mainframe before doing any installation steps.**

The HP E1421A mainframe uses a 10A 250V line fuse which is factory installed. When necessary, the fuse can be replaced as shown in Figure 1-1.

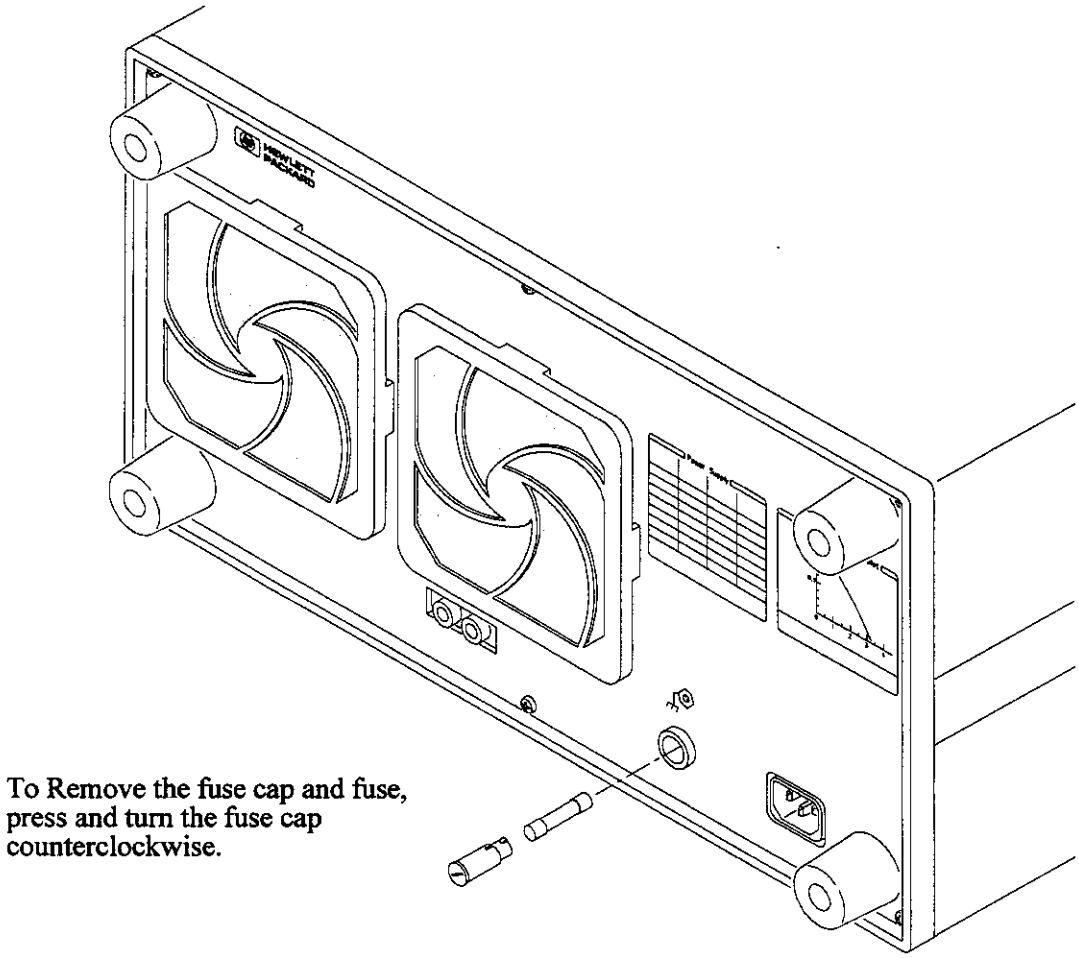
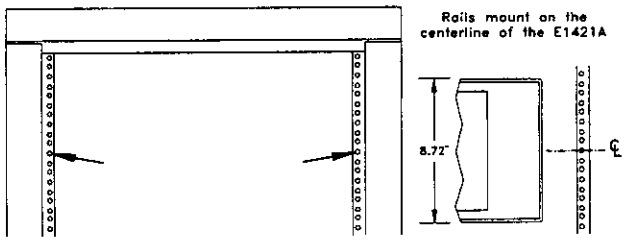


Figure 1-1. Replacing the HP E1421A Line Fuse

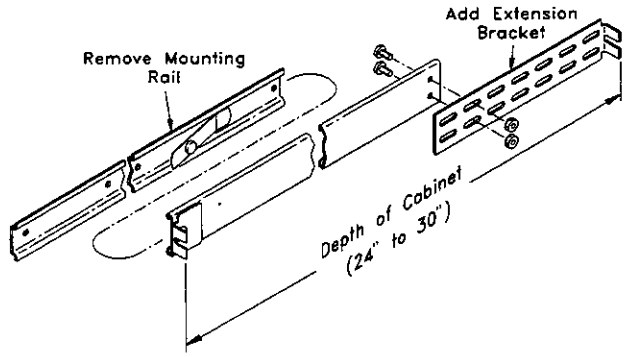
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Step 2 Rack Mount the Mainframe (Optional)

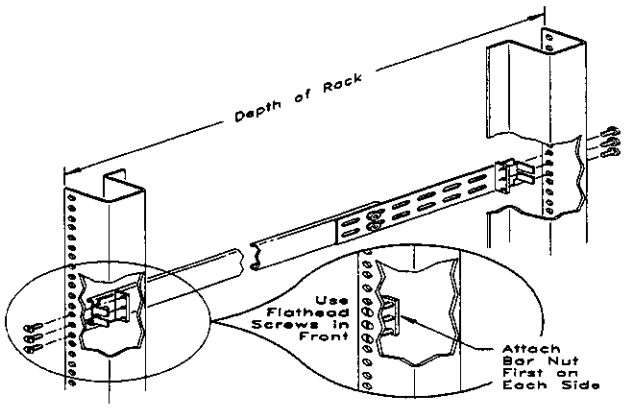
Note *Simplified rack mount installation steps are shown here. Refer to the instructions provided with the rack mount kit for specific details.*



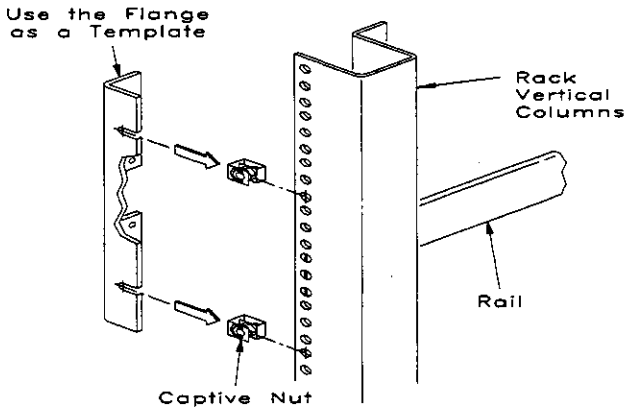
1. Locate where the E1421A will be mounted in the cabinet. The rails to be mounted in the cabinet will attach to the E1421A center line.



2. Remove the sliding arms from the rails. Attach an extender bracket to each rail, adjusting for the depth of the cabinet.



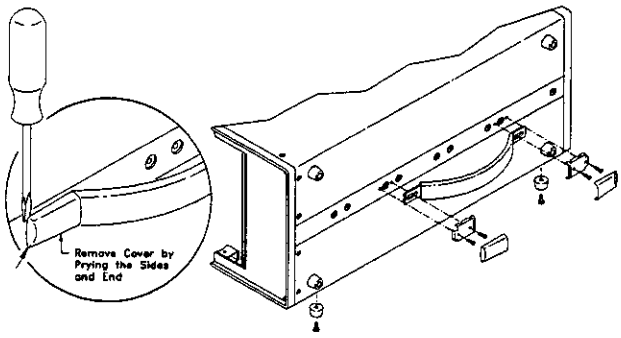
3. Install each rail in the cabinet using 10-32 flat head and pan head screws. Note the spacing between the holes in the cabinet's vertical columns.



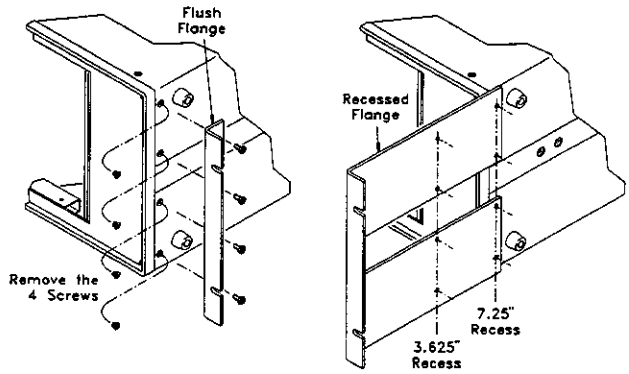
4. Install the captive nuts in the cabinet's front vertical columns. Use a flange (flush or recessed) as a template.

Figure 1-2. Rack Mounting the Mainframe

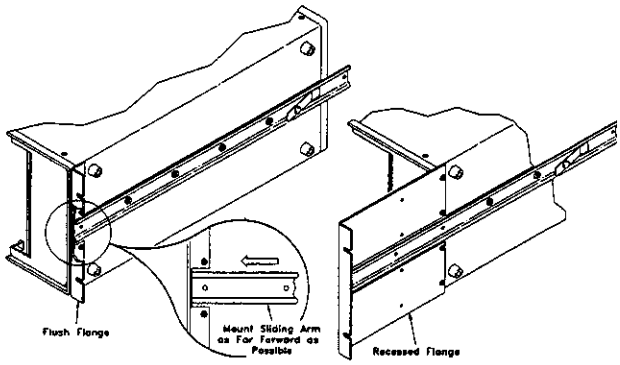
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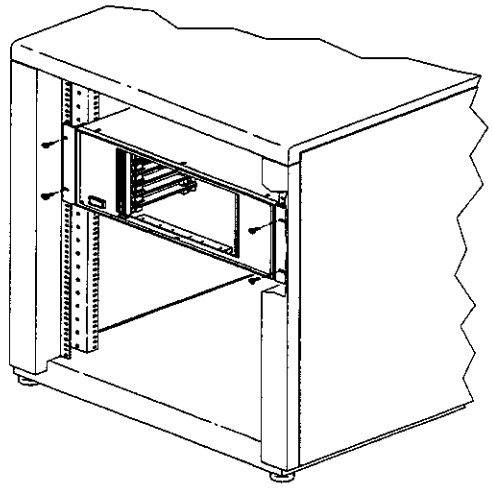
5. Remove the handle and the bottom feet. You must remove the front side feet if the E1421A is to be recessed 3.625" (see step 6).



6. Remove the four screws from the front sides of the E1421A. Attach the (flush or recessed) flanges using the 6-32x.5 pan head screws.



7. Attach the sliding arms to the E1421A using the 10-32x.375 pan head screws. Mount the arms as far forward as the flanges will allow.



8. With two people, align the sliding arms with the rails and install the E1421A into the cabinet. Secure with the 10-32x.5 mounting screws.

Figure 1-2. Rack Mounting the Mainframe (Continued)

NOTE Refer to Chapter 3 for rack mount kit part numbers.

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Step 3 Install Plug-In Modules

WARNING **SHOCK HAZARD. Secure all modules tightly to the frame and cover all unused slots.**

CAUTION **To prevent equipment damage, DISCONNECT the mainframe's power before installing any module into the mainframe.**

The following diagrams show how A, B, and C-size modules are installed in the HP E1421A mainframe.

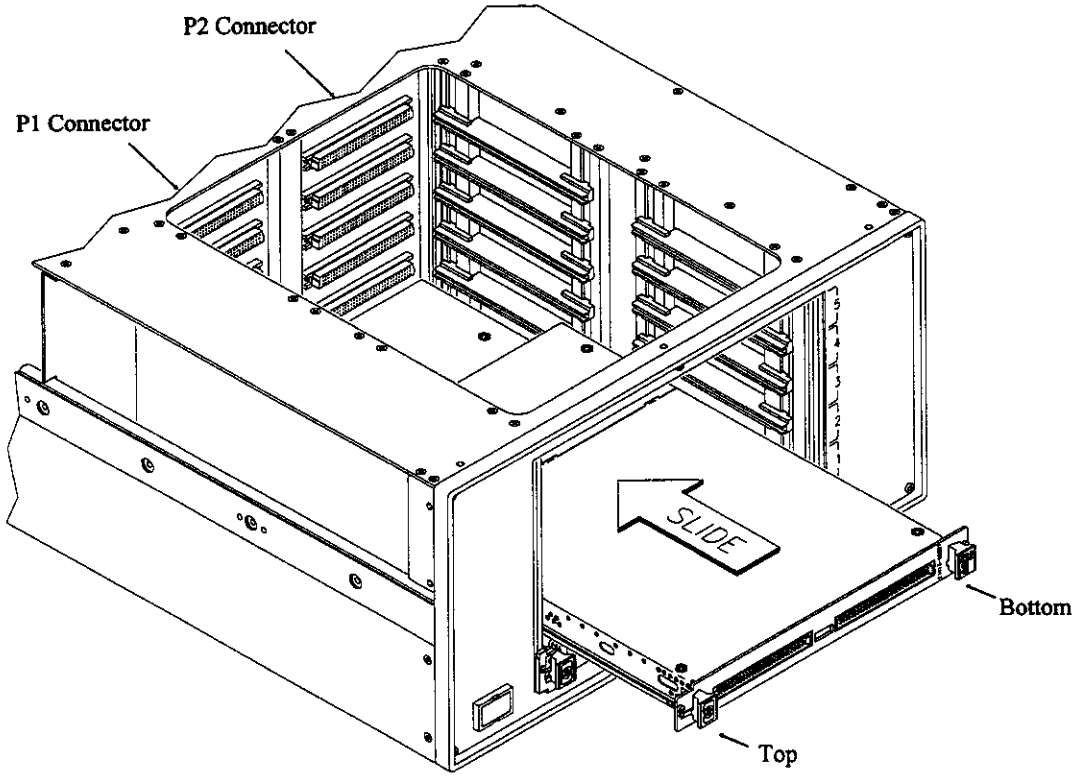
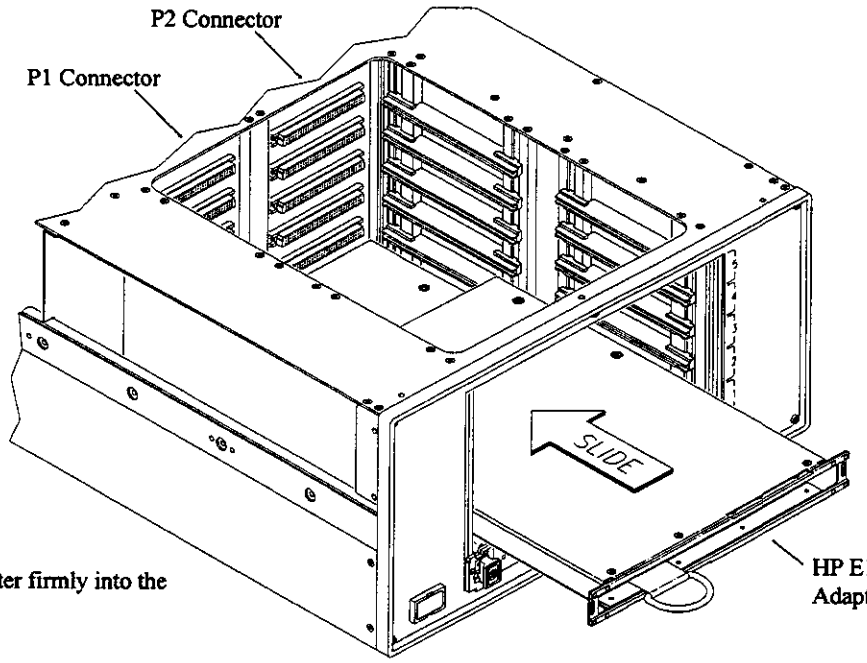


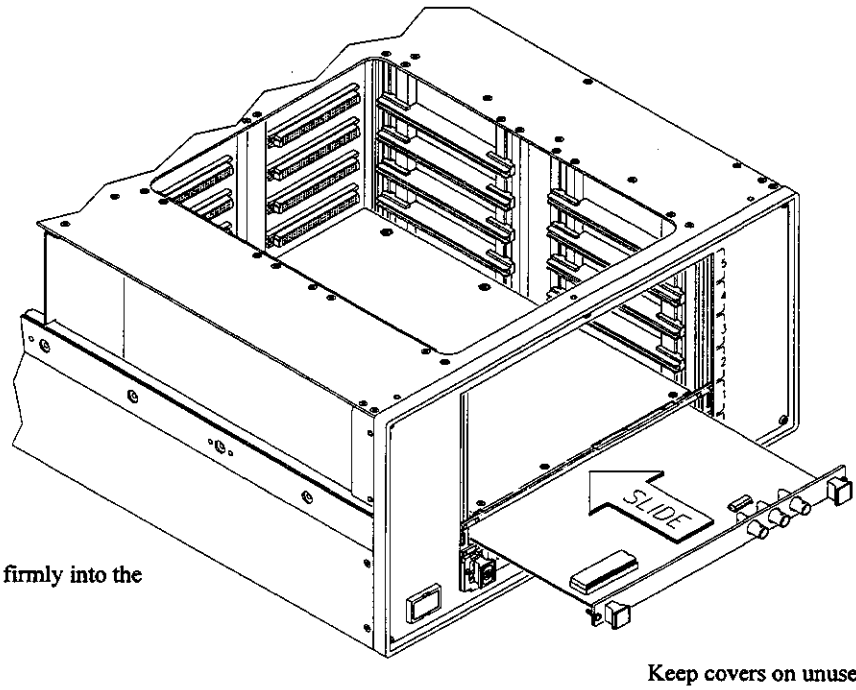
Figure 1-3. Installing C-Size Modules

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Slide the adapter firmly into the backplane.

Remove slot covers as required.
Keep covers on unused slots.



Slide the module firmly into the adapter.

Keep covers on unused slots.

Figure 1-4. Installing an A- or B-Size Module

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Step 4

Removing the Top Cover (Optional)

For easy access to installed modules, the HP E1421A mainframe can be converted to a repair / development mainframe by removing the top cover as shown in Figure 1-5.

WARNING **The HP E1421A when configured as a repair / development mainframe is intended for use by trained service or design personnel only.**

Remove the top cover by removing the 10 screws as indicated.

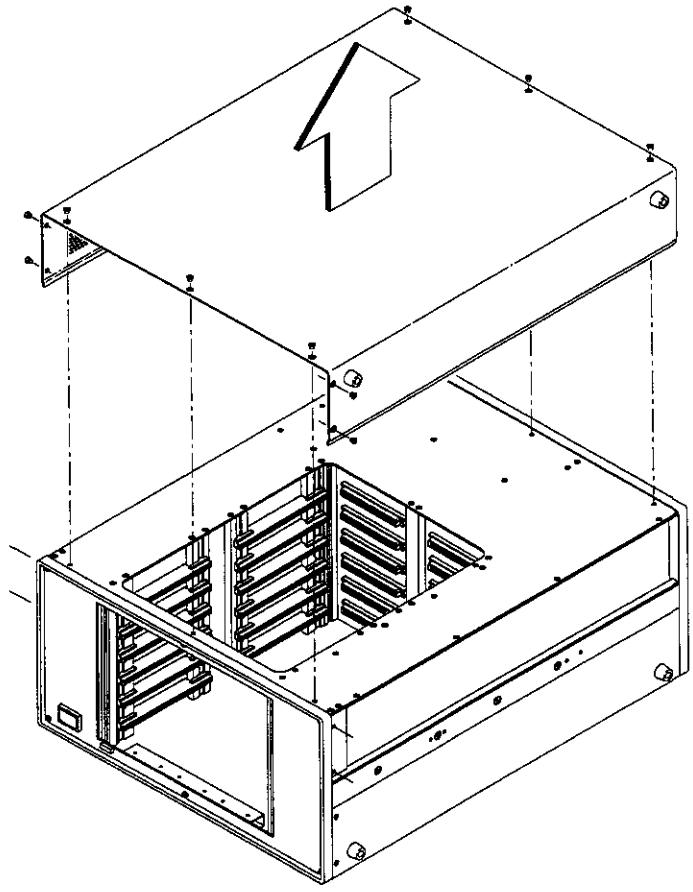


Figure 1-5. Removing the HP E1421A Top Cover

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Step 5 Connecting the Power Cord

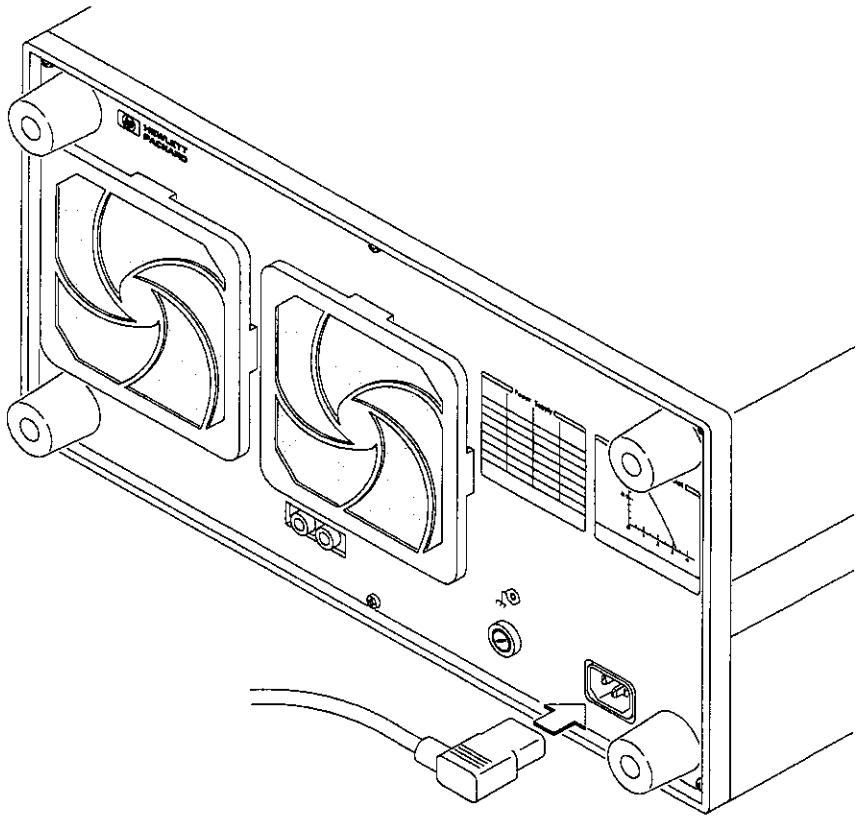


Figure 1-6. Connecting the HP E1421A Power Cord

Warning **The power cord consists of three wires: line, neutral, and earth ground. Should an electrical fault occur, the earth ground wire provides a low resistance current path from conductive parts in the instrument to the outlet socket ground. The ground wire is also a path for leakage current during normal operation. Notice the following before connecting the power cord:**

1. Do not cut off the earth ground pin on the power cord plug.

2. Do not use a three-prong to two-prong adapter unless the adapter has a safety agency approval and it is properly grounded and maintains the same polarity.

3. Do not use a power cord if its grounding path from plug to plug is an open circuit or is intermittent.

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Step 6

Connect Standby DC Power (optional)

The mainframe's rear-panel +5VDC Standby input connects to the +5VSTDBY line on the backplane J1 connectors. You can connect an external battery or power supply to this input to sustain memory, clocks, and so on when AC power to the mainframe is cut-off.

CAUTION **The +5VDC Standby input is NOT protected from an over-current situation. To prevent equipment damage, use a power source that is current-limited (6A max.) or install a 6A fast-blow fuse in series in the +5V line.**

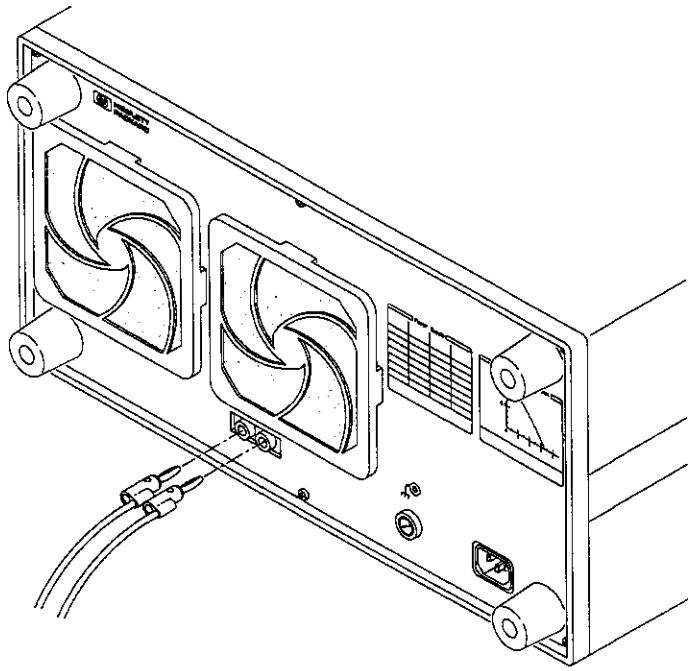


Figure 1-7. Connecting Standby DC Power

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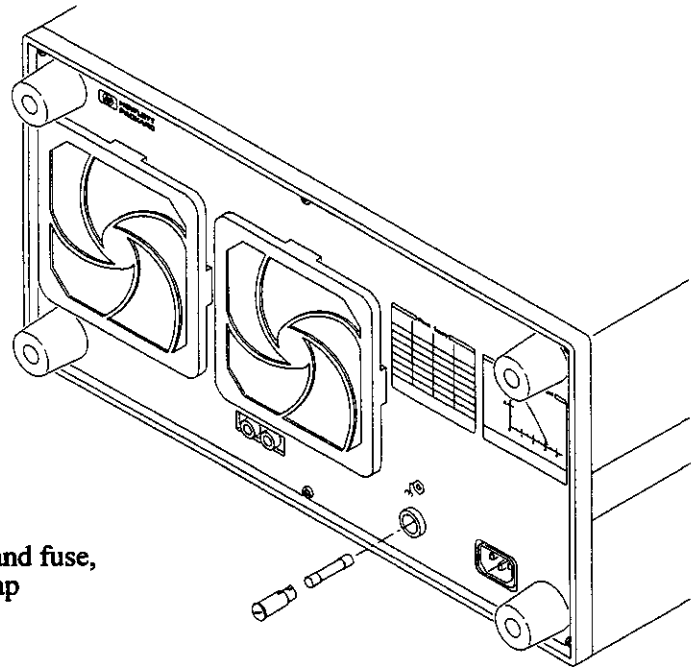
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Chapter 2
Maintenance Information

This chapter contains procedures for replacing parts listed in Table 3-1 *Replaceable Parts*.

Replacing the Line Fuse

The HP E1421A mainframe uses a 10A 250V line fuse which is factory installed. When necessary, the fuse can be replaced as shown in Figure 2-1.



To remove the fuse cap and fuse, press and turn the fuse cap counterclockwise.

Figure 2-1. Replacing the HP E1421A Line Fuse

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Removing Outside Panels

The HP E1421A mainframe has four replaceable outside panels. Refer to Figure 2-2 to remove the top, bottom, front, or rear panel(s).

WARNING **SHOCK HAZARD. Only service-trained personnel who are aware of the hazards involved should remove mainframe covers. Before you perform any procedures in this guide, disconnect AC power and field wiring from the mainframe.**

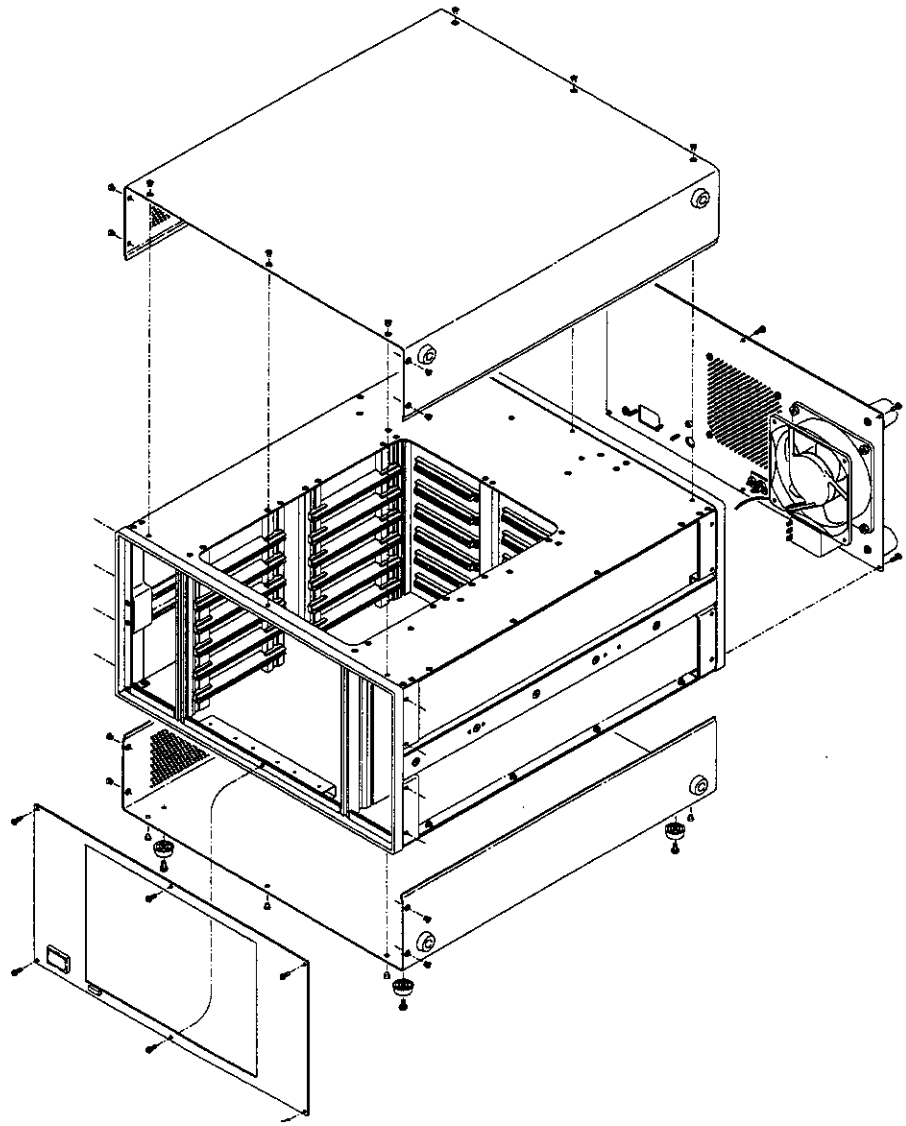


Figure 2-2. Removing Outside Panels

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Replacing the Fan

To replace the fan, first remove the back cover. Then remove the fan as shown in Figure 2-3. If you use a replacement fan from Hewlett-Packard (HP part number 3160-0377), you will need to cut the wires from the old fan and solder them to the solder terminals of the new one.

WARNING **SHOCK HAZARD. Only service-trained personnel who are aware of the hazards involved should remove mainframe covers. Before you perform any procedures in this guide, disconnect AC power and field wiring from the mainframe.**

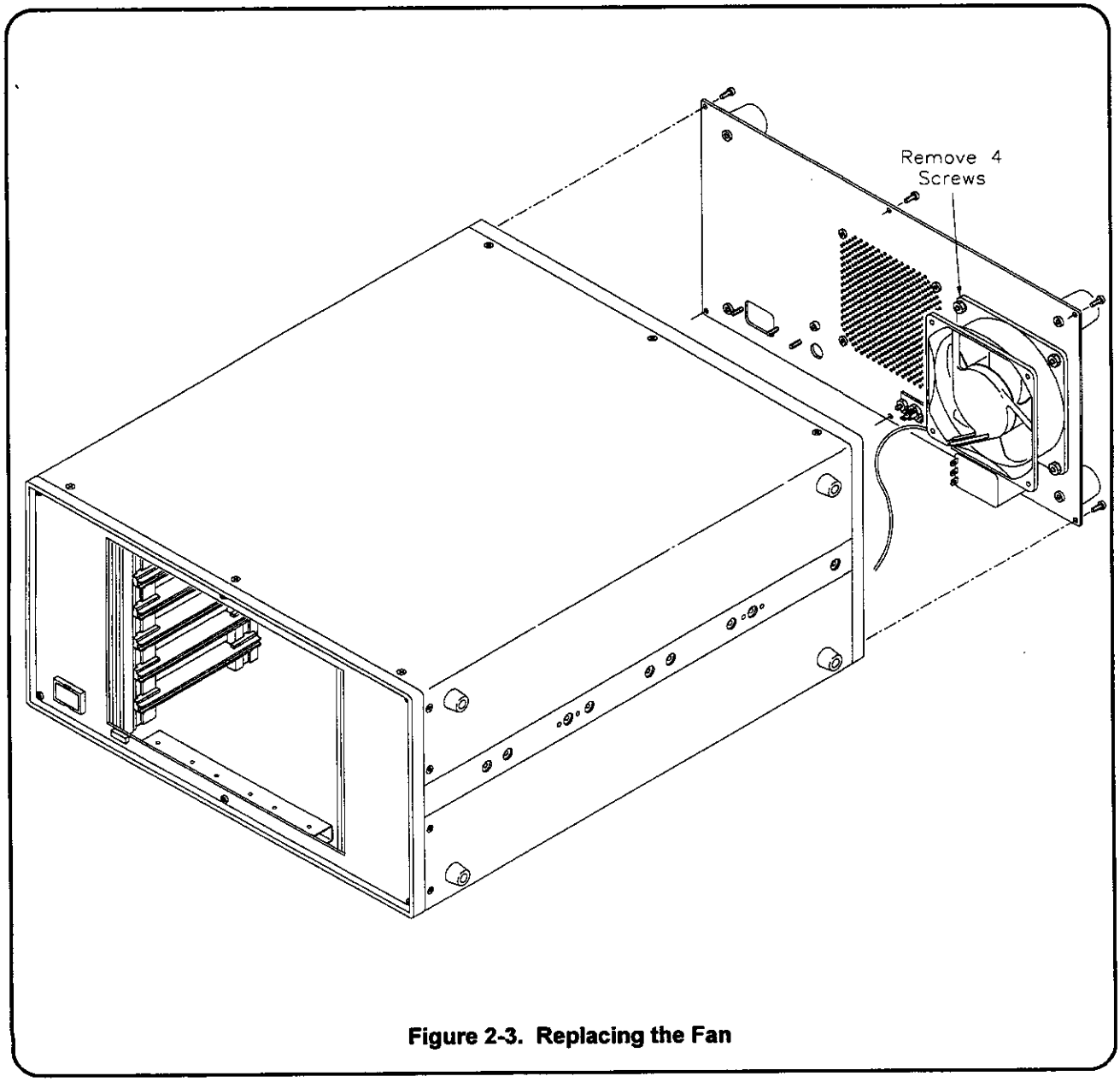


Figure 2-3. Replacing the Fan

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Replacing the On/Off Switch

To replace the On/Off switch, first remove the bottom cover as described in Figure 2-2. Then unplug the wires from the rear of the switch. Note the position of each wire and plug them back into the new switch in the proper position (see Figure 2-4). Secure the new switch into position with the clips removed from the old switch.

WARNING **SHOCK HAZARD. Only service-trained personnel who are aware of the hazards involved should remove mainframe covers. Before you perform any procedures in this guide, disconnect AC power and field wiring from the mainframe.**

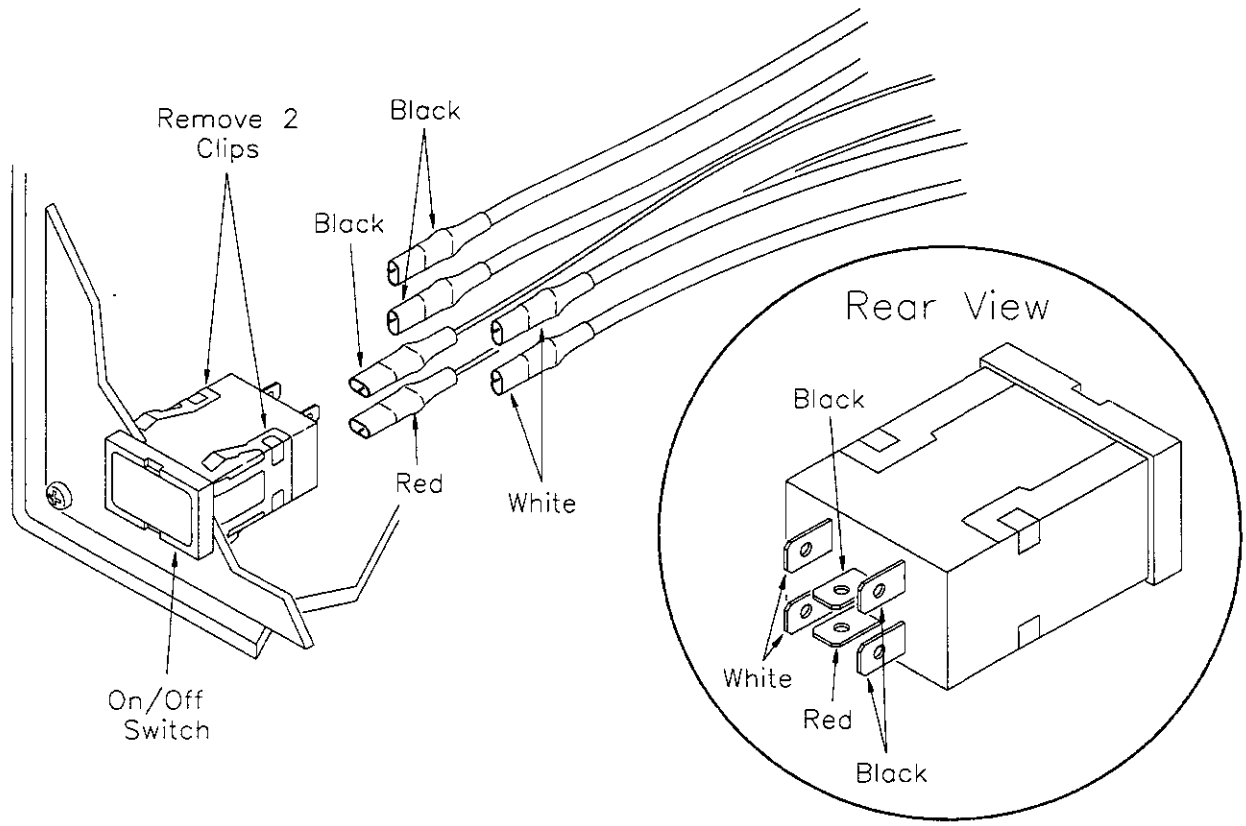


Figure 2-4. Replacing the On/Off Switch

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Replacing the Card Guides

To replace the card guides, remove the top cover as described in Figure 2-2. Press lightly with a small flat-head screwdriver on the top of the guides where they are connected to the frame. Install the new card guides by lightly pressing them into place as shown in Figure 2-5.

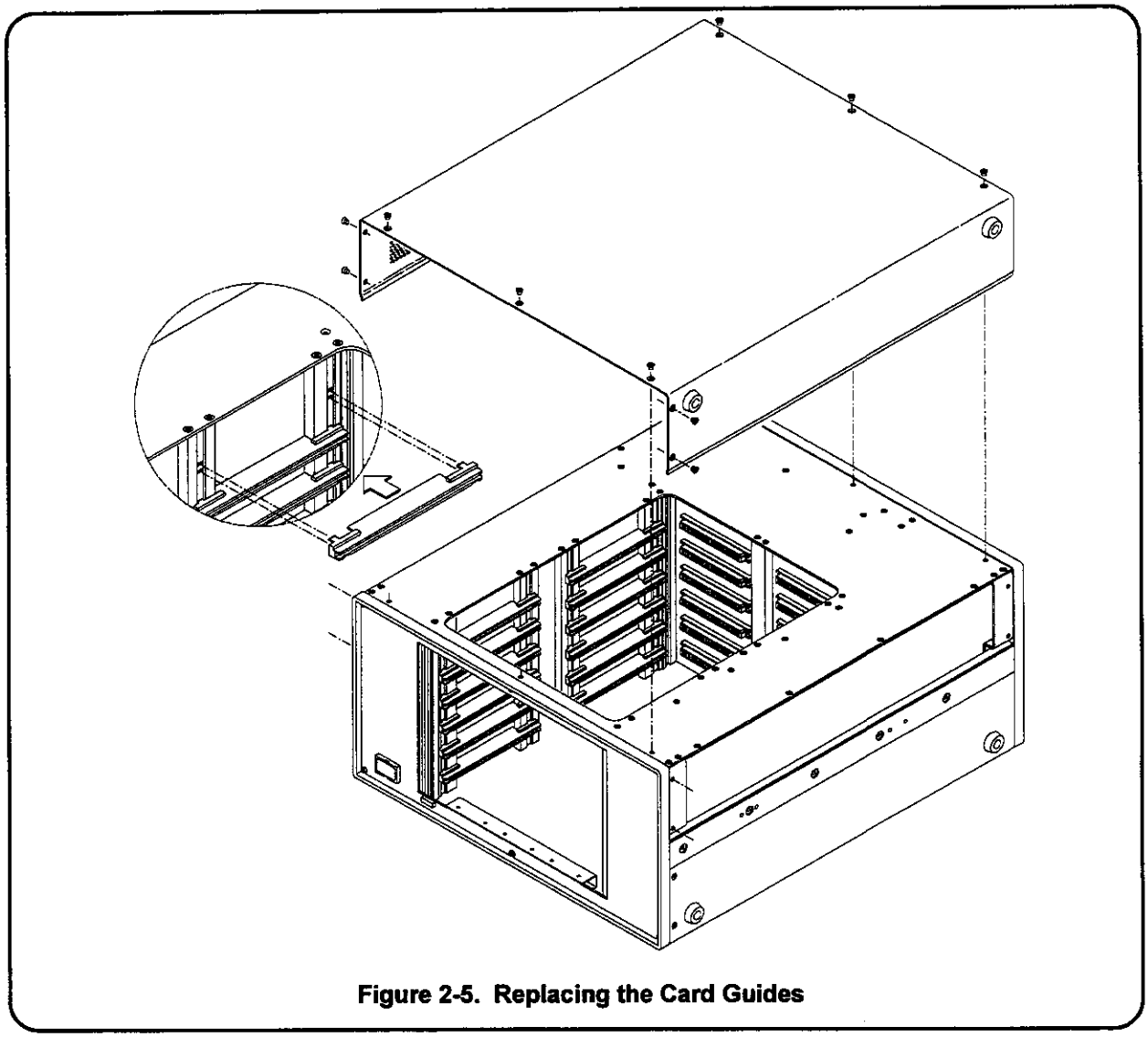


Figure 2-5. Replacing the Card Guides

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Removing the Handle

Remove the covers at the ends of the handle by prying the sides of the cover. Then remove the four screws that hold the handle in place. Install the new handle by reversing the procedure.

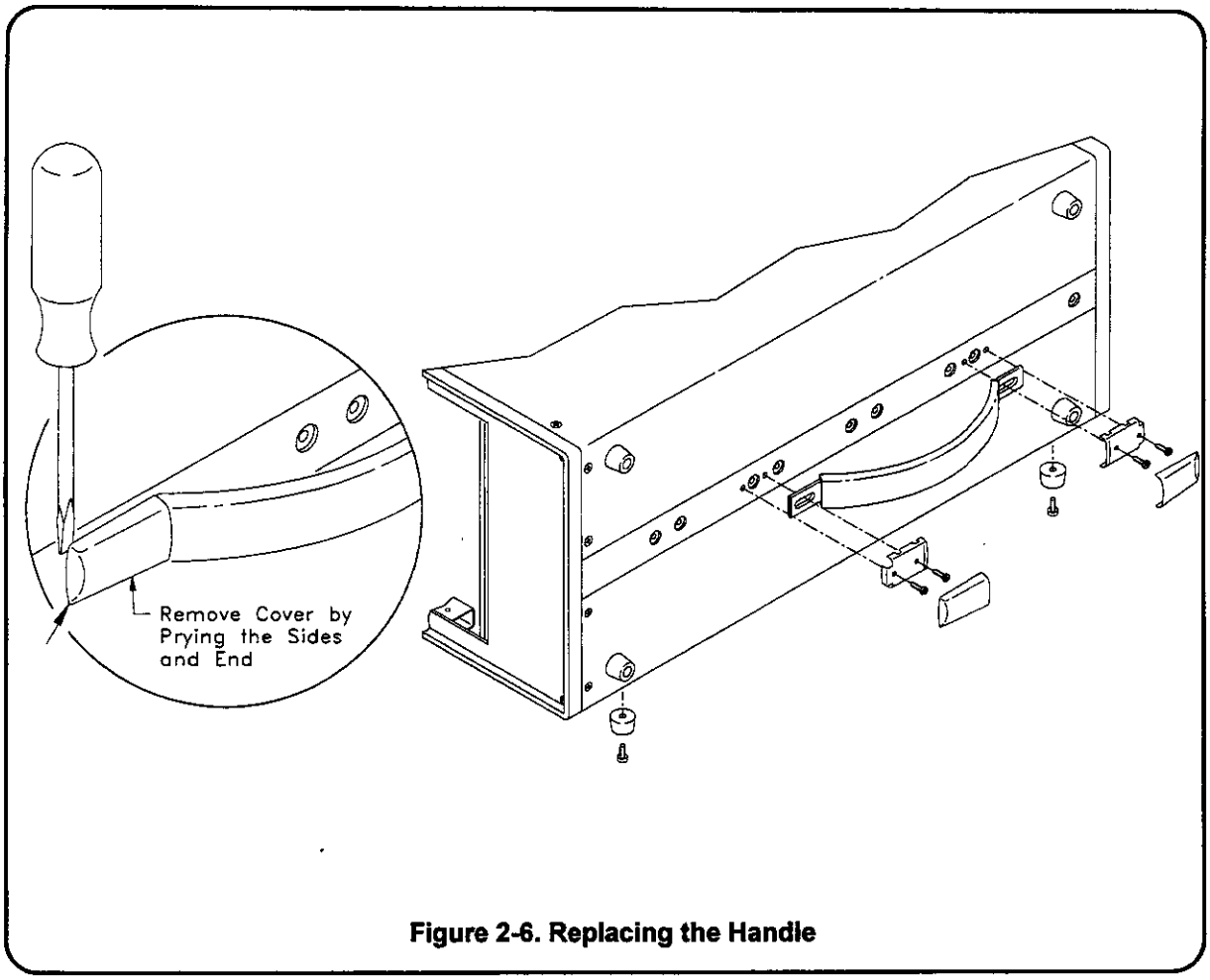


Figure 2-6. Replacing the Handle

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Chapter 3
Replaceable Parts

Introduction

This chapter contains information to order replaceable parts for the HP E1421A mainframe.

In the event of a mainframe failure, contact your nearest Hewlett-Packard Sales and Service Office for instructions on returning the mainframe. Table 3-1 lists part numbers for mainframes and power supplies that may be replaced.

Parts that are not critical to the operation of the mainframe, such as meachanical parts or hardware, may be ordered from Hewlett-Packard or directly from the manufacturer

Ordering Information

To order a part listed in Table 3-1, specify the Hewlett-Packard part number and the quantity required. Send the order to your nearest Hewlett-Packard Sales and Support Office. Parts without an HP Part Number may be ordered directly from the manufacturer.

Replaceable Parts List

Table 3-1, HP E1421A Replaceable Parts, lists the replaceable parts for the HP E1421A mainframe. See Figure 3-1 for locations of parts listed in Table 3-1.

Table 3-1. HP E1421A Replaceable Parts

Reference Number	HP Part Number	Qty	Description	Mfr* Code	Mfr Part Number
			EXCHANGE ASSEMBLIES		
	E1421-66400	1	Mainframe (new)	28480	E1421-66400
	E1421-69400	1	Mainframe (exchange)	28480	E1421-69400
	E1421-66200	1	Power Supply (new)	28480	E1421-66200
	E1421-69200	1	Power Supply (exchange)	28480	E1421-69200
			POWER CABLES		
	8120-1521	1	pwr cbl, US/CAN, rt ang	28480	8120-1521
	8120-1703		pwr cbl, rt ang, U.K.	28480	8120-1703
	8120-0696		pwr cbl, rt ang, AUST	28480	8120-0696
	8120-1692		pwr cbl, rt ang, EUR	28480	8120-1692
	8120-2296		pwr cbl, rt ang, SWITZ	28480	8120-2296
	8120-2957		pwr cbl, rt ang, DENMK	28480	8120-2957
	8120-4600		pwr cbl, rt ang, S AFR	28480	8120-4600
	8120-4754		pwr cbl, rt ang, JAPAN	28480	8120-4754
	8120-5181		pwr cbl, rt ang, ISRAEL	28480	8120-5181

Continued on next page ....

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Table 3-1. HP E1421A Replaceable Parts (continued)

Reference Number	HP Part Number	Qty	Description	Mfr* Code	Mfr Part Number
			MECHANICAL PARTS		
1	2110-0395	1	Fuse, 10AT	28480	2110-0395
3	2110-0564	1	Fuse Holder	28480	2110-0564
2	2110-0565	1	Fuse Cap	28480	2110-0565
4	0403-1008	12	Card Guides, Front	28480	0403-1008
5	0403-1007	12	Card Guides, Rear	28480	0403-1007
6	3160-0377	1	Fan, 110 CFM, 12Vdc	28480	3160-0377
7		1	AC Power Switch	05542	AML31LBB4AD
8		1	AC Power Switch Bulb	05542	AML91LA86
			HARDWARE		
9		1	Handle	08180	12270-02
10		1	Front Panel	08180	12863-01
11		1	Bottom Panel	08180	12862-01
12		1	Top Panel	08180	12861-01
13		1	Rear Panel	08180	12864-02
	E1421-80001		Rack Mount Kit, Flush	28480	E1421-80001
	E1421-80002		Rack Mount Kit, Recessed	28480	E1421-80002

* See Table 3-2 for Code List of Manufacturers

Table 3-2. HP E1421A Code List of Manufacturers

Mfr Code	Manufacturer Name	Address
28480	Hewlett-Packard Company	Palo Alto, CA US 94304
08180	Mac Panel	High Point, NC US 27264
05542	Microswitch	Freeport, IL US 61032

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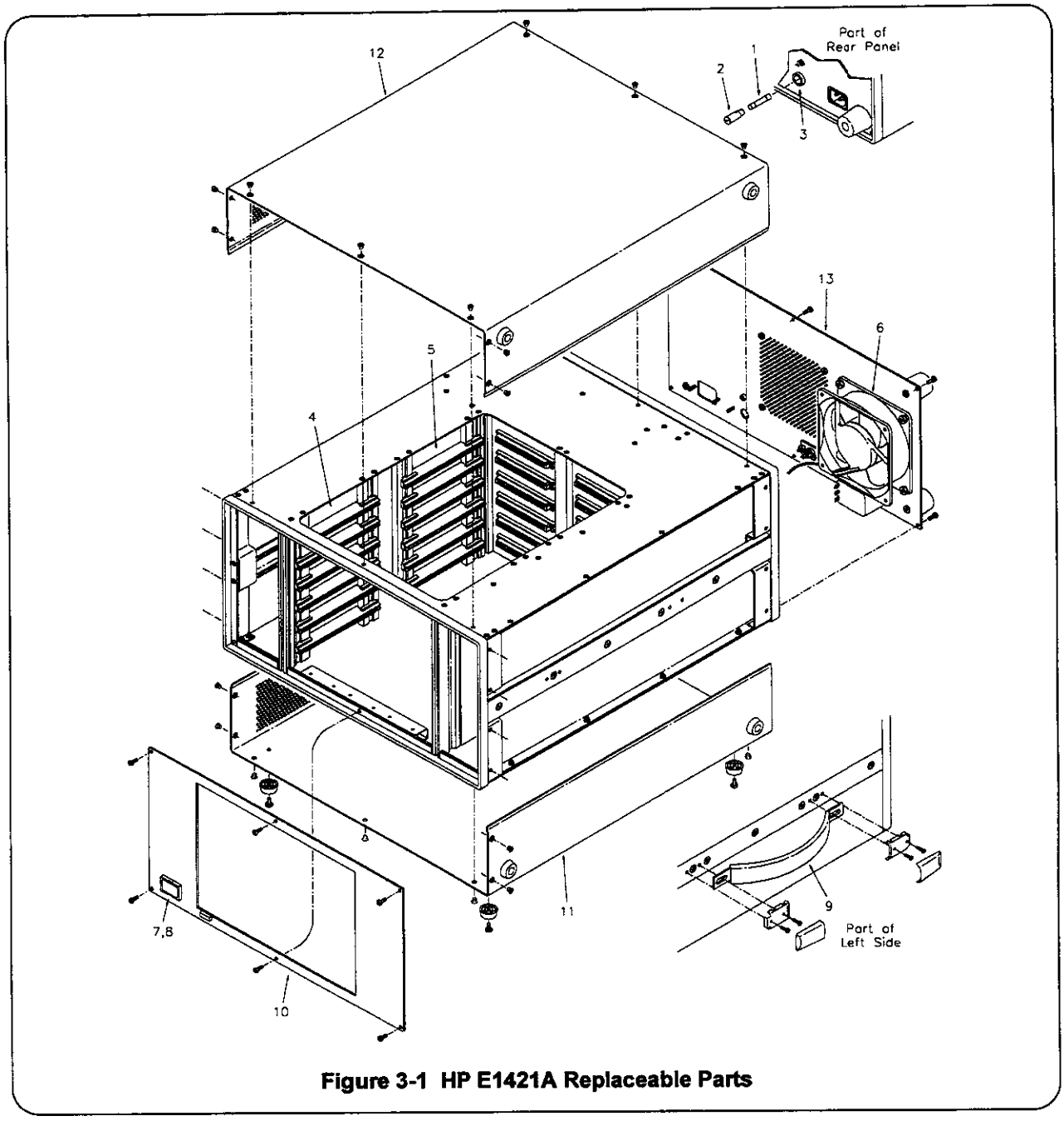


Figure 3-1 HP E1421A Replaceable Parts

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Appendix A
HP E1421A Specifications

Mechanical

General

- Six C-size VXI slots are accessible from the front, oriented horizontally, with Slot 0 on the bottom.
- Plug-in module front panels are recessed 6.4 mm (0.25 in) from the front of the product
- Four cover panels are included, installed over slots 2-5.
- A lighted power on/off button is located on the front in the lower left corner
- Feet are provided on the bottom, right side, and rear. The rear feet provide sufficient clearance for the power cord. The bottom and side feet are removable for rack mounting.
- A carry handle is provided on the left side. The handle is removable for rack mounting.
- The top cover is removable for access to installed VXI modules.
- Power input and cooling air intake is through the rear.
- Cooling air exhaust is through the left side.
- Construction is primarily aluminum sheet and extrusion.

Dimensions

Height (without bottom feet):	221.5 mm (8.72 in)
Height (with bottom feet):	229.4 mm (9.03 in)
Width (without side feet):	431.8 mm (17.00 in)
Width (with side feet):	439.7 mm (17.31 in)
Depth (without rear feet):	508.0 mm (20.00 in)
Depth (with rear feet):	530.2 mm (20.88 in)
Weight:	13.9 kg (30.6 lbs)

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Power Supply

General

The power supply conforms to HP specification 0950-2729. All cables are labeled and match the label on the power supply.

Output

The following power supply voltages are available on the backplane in compliance with the VXI specification, Revision 1.4.

Voltage	Pk Current I_{MP} @ 40 °C	Pk Current I_{MP} @ 55 °C	Allowed Variation	Ripple/Noise DC Load	Dynamic Current I_{MD}	Induced Ripple/Noise
+ 5V	30A	25A	+0.25V/-0.125V	50 mV	3.5A	50 mV
+12V	6A	5A	+0.60V/-0.36V	50 mV	2.0A	50 mV
- 12V	5A	4A	- 0.60V/+0.36V	50 mV	2.0A	50 mV
+24V	3A	2.5A	+1.20V/-0.72V	150 mV	3.0A	150 mV
- 24V	3A	2.5A	- 1.20V/+0.72V	150 mV	3.0A	150 mV
- 5.2V	15A	12A	- 0.26V/+0.156V	50 mV	1.5A	50 mV
- 2V	10A	8A	-0.10V/+0.10V	50 mV	1.5A	50 mV

- Maximum Power Output: 450W at 40 °C, 350W at 55 °C.
- The power supply generates the backplane logic signals ACFAIL* and SYSRESET* in full compliance with the VXI Specification, Revision 1.4. In addition to meeting the specifications, these signals are immune to power line transients and surges as specified in the electromagnetic compatibility tests called out below. On power-up, the delay between SYSRESET* and ACFAIL* is 700-800 ms.

Input

- Power supply is autoranging and power factor corrected.
- Input voltage: 90 VAC to 264 VAC
  (will operate at 90 VDC to 250 VDC but is not certified)
- Input frequency: 47 Hz to 66 Hz
  (will operate at 400 Hz but is not certified)
- Inrush current: 50A peak at cold start.
- Power switch: Line On/Off on front with lighted indicator.
- Fuse: Single 10A 250V line fuse and fuse holder on rear, suitable for operation over full voltage range and output loading range.
- Socket for detachable line cord: IEC 320 on rear panel.
- + 5V STDBY: Power taps on rear for input of standby voltage and ground to backplane, 6A maximum.
- A threaded attachment point, M4.0x0.7, is located on the rear to allow connection of an earth ground wire.

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Protection All outputs are protected from over-temperature, over-voltage, over-current, and short-to-ground.

Over-Temperature: The power supply will shut down when ambient temperature exceeds 60 °C. Each output will shut down individually if it gets too hot. Recovery occurs when it has cooled and power is cycled.

Over-Voltage: Nominal 115-135% latching

Over-Current: Nominal 105-125% of full load. Fold-back on voltages ≤ 5.2V. Straight line on voltages >5.2V. Automatic restart after condition is corrected.

Short-to-Ground: Same as over-current. Continuous short circuit without damage.

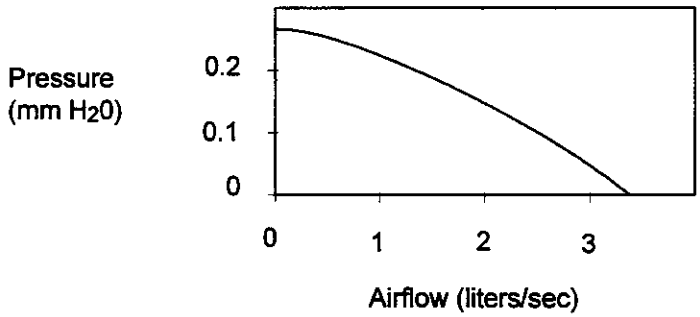
Backplane

- High performance, 8-layer, monolithic, 6-slot, VXI P1 and P2 backplane.
- The backplane is in full compliance with the VXIbus Specification, Revision 1.4.
- The backplane includes solid state, automatic daisy-chain jumpering for the VME bus grant and interrupt acknowledge lines.
- The backplane is compatible with the HP backplane connector shield kit (HP p/n E1400-80920). Backplane connectors do not have mounting flanges.
- The backplane ground plane (power supply output ground) is connected to chassis through the backplane mounting extrusions.

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Cooling

- Air enters the mainframe through the rear panel. Module cooling air is driven through a fan mounted on the rear panel, into a pressurized plenum on the right side, across installed VXI modules, and out through the left side. Power supply cooling air is driven through two fans mounted on the power supply, across the supply, and out through the left side.
- Two air filters are mounted on the rear, accessible for cleaning without the use of tools.
- For a load card set to 40W, temperature rise through the module is less than or equal to 10 °C. For a load card set to 55W, temperature rise through the module is less than or equal to 15 °C. This is independent of slot number, filler panels in other slots, or module loading in other slots.
- Per the proposed VXI-8 Cooling Specifications:



VXI Specifications

The mainframe complies with all requirements of the VXI Specification, Revision 1.4 (IEEE Std 1155-1992).These must include:

- ACFAIL* and SYSRESET*. Refer to the Power Supply Output section.
- Local bus keying per VXI Specification Section B.7.3.7
- Grounding contact near Slot 0 and contact surface near Slot 5 per VXI Specification Section B.7.2.3
- Injection surface per VXI Specification Section B.7.3.3

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Environmental and Regulatory

Temperature Profiles

No components in the power supply exceed their specified temperature range when fully loaded at 55 °C.

Operating and Storage Temperatures

Operating Temperature Range	0 °C to +55 °C
Non-Operating Storage Temperature Range	-40 °C to +70 °C

Humidity

Maximum Operating Humidity at 40 °C	95% RH for 24 hours
Non-Operating Humidity at 65 °C	90% RH for 24 hours

Acoustic Noise

Less than 52 dBA sound pressure at bystander position (measured 1m in front of product per DIN 45635 T.l).

Electromagnetic Compatibility

- Conductive Emission per CISPER 11:1990/EN55011: Group 1, Class A.
- Radiated Emission per CISPER11:1990/EN55011: Group 1, Class A.
- ESD Immunity per IEC 801-2:1991/EN50082-1(1992): 4 kV-CD and 8 kV-AD.
- Radiated Immunity per IEC 801-3:1984/EN50082-1(1992): 3 V/m.
- Fast Transients Immunity per IEC 801-4:1988/EN50082-1(1992): 1 kV Power Line, 0.5 kV Signal Line.
- Power Line Surge Immunity per IEC 801-5(Draft 1992): 1 kV.
- Conducted Immunity per IEC801-6/EN50082-1.

Safety

- Manufacturer's Declaration of Conformity to IEC 1010-1(1990) including Amendment 1 (1992)/EN61010 (1993)
- Certified to CSA C22.2#1010.1 (1992)
- Certified to UL 3111

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