

Expansion Cabinet Installation Guide

For 99x Family and T-Class Systems

HP 3000 Corporate Business Systems and HP 9000 Business Servers

HP A1884A / HP A1897A



Part No. A1809-90006

Edition 4- May 1997

E0597

Printed in: USA

Legal Notices

The information in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be held liable for errors contained herein or direct, indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Restricted Rights Legend. Use, duplication or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 for DOD agencies, and subparagraphs (c) (1) and (c) (2) of the Commercial Computer Software Restricted Rights clause at FAR 52.227-19 for other agencies.

HEWLETT-PACKARD COMPANY 3000 Hanover Street Palo Alto, California 94304 U.S.A.

Copyright Notices. ©copyright 1983-97 Hewlett-Packard Company, all rights reserved.

Reproduction, adaptation, or translation of this document without prior written permission is prohibited, except as allowed under the copyright laws.

Trademark Notices UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

Printing History

The manual printing date and part number indicate its current edition. The printing date will change when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The manual part number will change when extensive changes are made.

Manual updates may be issued between editions to correct errors or document product changes. To ensure that you receive the updated or new editions, you should subscribe to the appropriate product support service. See your HP sales representative for details.

First Edition: September 1992

Second Edition: September 1993

Third Edition: October 1995

Fourth Edition: May 1997

NOTE

Reader Comments. We welcome your comments about our documentation. If you have editorial suggestions or recommended improvements for this document, please write to us. You can reach us through e-mail at: *hardwaredocs@cup.hp.com* or by sending your letter to: *Documentation Manager M/S 5657, Hewlett-Packard Company, 8000 Foothills Blvd., Roseville, CA 95747-6588 USA*. Please include the following information in your message:

- Title of the manual you are referencing.
- Manual part number (from the title page).
- Edition number or publication date (from the title page)..
- Your name.
- Your company's name.

SERIOUS ERRORS, such as technical inaccuracies that may render a program or a hardware device inoperative, should be reported to your HP Response Center or directly to a Support Engineer.

Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation. The following figure shows some of the safety symbols used on the product to indicate various safety considerations.

SAFETY SYMBOLS

On some areas of the product you may find these symbols. They mean CAUTION - Do not proceed with any action until you have read the instructions provided on the marking and in this manual.

Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the product against damage.



Indicates hazardous voltages.



On some of the product you may find this symbol. It means that an abbreviated set of instructions are provided on the product in the general area.



Indicates earth (ground) terminal (sometimes used in manual to indicate circuit common connected to grounded chassis).



Indicates wiring terminal intended for connection of the protective earthen conductor associated with the supply wiring.



Indicates chassis earth (ground) terminal (used to indicate common connected to grounded chassis and for ESD prevention).



WARNING **The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not done correctly or adhered to, could result in injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

CAUTION The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not done correctly or adhered to, could damage or destroy part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Safety and Regulatory Information

For your protection, this product has been tested to various national and international regulations and standards. The scope of this regulatory testing includes electrical/mechanical safety, radio frequency interference, ergonomic, acoustic, and hazardous materials. Where required, approvals obtained from third-party test agencies are shown on the product label. In addition, various regulatory bodies require some of the information under the following headings.

IT POWER SYSTEM

WARNING **This product has not been evaluated for connection to an IT power system (an ac distribution system having no direct connection to earth according to IEC 950).**

CABINET STABILITY

CAUTION To reduce the risk of cabinet instability, fully extend the anti-tip stabilizer before extending any devices. Extend only one device at a time. Do not stand or sit on any extended device. All non-operator servicing should be done by qualified service personnel.

LEAKAGE CURRENT

WARNING **To reduce the risk of electric shock, never operate the product with the ground conductor disconnected. An earth connection is essential before connecting the supply. Due to the types of products able to be installed in this product, there is a risk of high leakage current (>3.5mA). Reliable ground circuit continuity is vital for safe operation of this product.**

POWER LIMITATIONS

CAUTION To reduce the risk of overload, do not load any single PDU with more than a maximum of 16 Amperes. In addition, do not load a single NEMA 5-15 receptacle with more than 15 Amperes, and any single IEC 320 receptacle with more than 10 Amperes.

ACCESSORIES

CAUTION This product has been designed to be used with specific electrical accessories (i.e., PDUs and fans). The use of any other accessory is not recommended or supported.

Preface

This edition of the *Expansion Cabinet Installation Guide* contains technical information about expansion cabinets for HP 3000 Corporate Business Systems and HP 9000 Corporate Enterprise Servers, and is intended for experienced Hewlett-Packard customer service personnel.

At the time of publication, HP 3000 Corporate Business Systems and HP 9000 Corporate Enterprise Servers included the following models:

HP 3000 99x Family

990/992		991/995		996 ¹	997
990CX	990DX	991CX	991DX	996/80	997/100
992/100CX	992/100DX	995/100CX	995/100DX	996/100	997/200
992/200CX	992/200DX	995/200CX	995/200DX	996/200	997/300
992/300CX	992/300DX	995/300CX	995/300DX	996/300	997/400
992/400CX	992/400DX	995/400CX	995/400DX	996/400	997/500
		995/500CX	995/500DX	996/500	
		995/600CX	995/600DX	996/600	
		995/700CX	995/700DX	996/700	
		995/800CX	995/800DX	996/800	

1. A 996 System may be field upgraded to 9, 10, 11, or 12 processors. Factory integrated servers are sold with a maximum of 8 processors.

HP 9000 T-Class Systems

890	T500	T520	T600
-----	------	------	------

1 Introduction

The A1884A/A1897A Expansion Cabinet can be used to mount peripherals for the HP 3000 990/992, 991/995, 996, and 997 Systems, and the HP 9000 T-Class servers, allowing the consolidation of many peripherals into a single cabinet. The cabinet is 1.62 meter (63.8 inches) high, and has a usable depth of 0.905 meter (35.6 inches). The cabinet has mounting columns to receive equipment with EIA standard 19-inch mounting flanges.

Inspecting the Shipment

When the shipment arrives, make sure the cabinet has been received as specified by the carrier's bill of lading. Inspect the shipping container for evidence of mishandling during transit. If the container is damaged or water-stained, ask that the carrier's agent be present when the cabinet is unpacked. Refer to the instructions described in the *Claims Procedure* section. If everything appears to be in satisfactory condition, proceed with the unpacking instructions.

NOTE Do not discard or destroy the shipping container or the packaging material. If it becomes necessary to repackage the cabinet, these items will be needed. HP also suggests that you keep this manual, in case you later have to repackage the cabinet for shipment.

Claims Procedure

If the shipment is incomplete or if the equipment is damaged or fails to meet specifications, notify the nearest Hewlett-Packard Sales and Support Office. If damage occurred in transit, notify the carrier as well. Hewlett-Packard will arrange for replacement or repair without waiting for settlement of claims against the carrier. If the shipment was damaged in transit, keep the shipping containers and packaging material for inspection.

Required Tools

Before beginning the installation process, make sure you have the necessary tools.

1. Standard hand tools (including Torx-drive set and voltmeter).
2. Flat-blade screwdriver, 3/16-inch by 9 inches long.
3. Open-ended 1/2-inch wrench.

Safety Considerations

The expansion cabinet is equipped with an anti-tip stabilizer bar at the bottom front of the cabinet (see Figure 4-2). In addition, counter-balance weights must be installed for any peripheral that can be extended from the expansion cabinet.

WARNING **The installation of an HP 7980XC requires the installation of three (3) counter-ballast weights (C2786-60017 at 13.61 kg each).**

Cabinet Types

The same expansion cabinet is used for both HP 3000 Corporate Business Systems and HP 9000 Corporate Business Servers, under the model numbers listed in Table 1-1.

Table 1-1 Rack-mount Cabinets

Product Number	Description
A1884A	1.6 meter cabinet for HP 3000 computer system peripherals
A1897A	1.6 meter cabinet for HP 9000 computer system peripherals

2 Site Requirements

This chapter describes the site requirements for the installation of an HP A1884A or HP A1897A expansion cabinet. No HP site preparation is required for the expansion cabinet.

There are some customer site preparation requirements. The customer is responsible for having the proper type and amount of electrical outlets at the cabinet site. The customer must also be aware of any system site requirements for the SPU cabinet to which the expansion cabinet will be connected. Be sure to check all site requirements before installing any equipment.

Refer to Table 2-1 for the cabinet physical specifications.

NOTE There are no special environmental site requirements for the HP A1884A or HP A1897A cabinets.

Table 2-1 Physical Specifications

Description	Specification
Height:	63.8 inches (162 cm)
Width:	23.6 in (60 cm)
Depth:	35.6 in (90.5 mm)
Weight:	800 lbs (326.8kg) maximum
Cooling and access space:	24 in (61 cm), front and rear

Space and Floor Loading Requirements

Select a location for the cabinet that will afford adequate space for the doors to be fully opened. The cabinet requires a minimum of 600 mm for door clearance.

Floor Loading

If a raised floor has been constructed for routing of cables beneath the floor surface, it is the customer's responsibility to calculate floor loading. A fully loaded cabinet requires a reinforced floor (including the path over which the cabinet is moved).

Because the weight of the equipment in the cabinet is concentrated over the casters, the floor must be able to withstand a load of 2000 lbs/inch² (677 kg/cm²). This requirement is based on calculations for the heaviest recommended gross weight of the cabinet and equipment.

WARNING **The customer must determine the floor loading capacity, especially for a raised floor. Failure to do so could result in equipment damage, personal injury, or both.**

Components should be removed when the cabinet is moved over a raised floor of unknown strength.

WARNING **Heavily loaded cabinets may require reinforced tiles (or a sub-structure) on a raised floor.**

Power Requirements

The Power Distribution Unit (PDU) is installed along the right rear of the cabinet. It contains a power strip, circuit breakers, and, on some models, a front panel master switch. On those models with a master switch, power to the entire cabinet is controlled through the master switch located in the front upper right corner of the cabinet.

The PDU controls and distributes AC power to the computer, peripherals, and fan assemblies in the cabinet.

The fan assembly plugs into the top plug of the PDU. On those models with an ON/OFF power switch, the switch assembly is located in the front upper right of the cabinet.

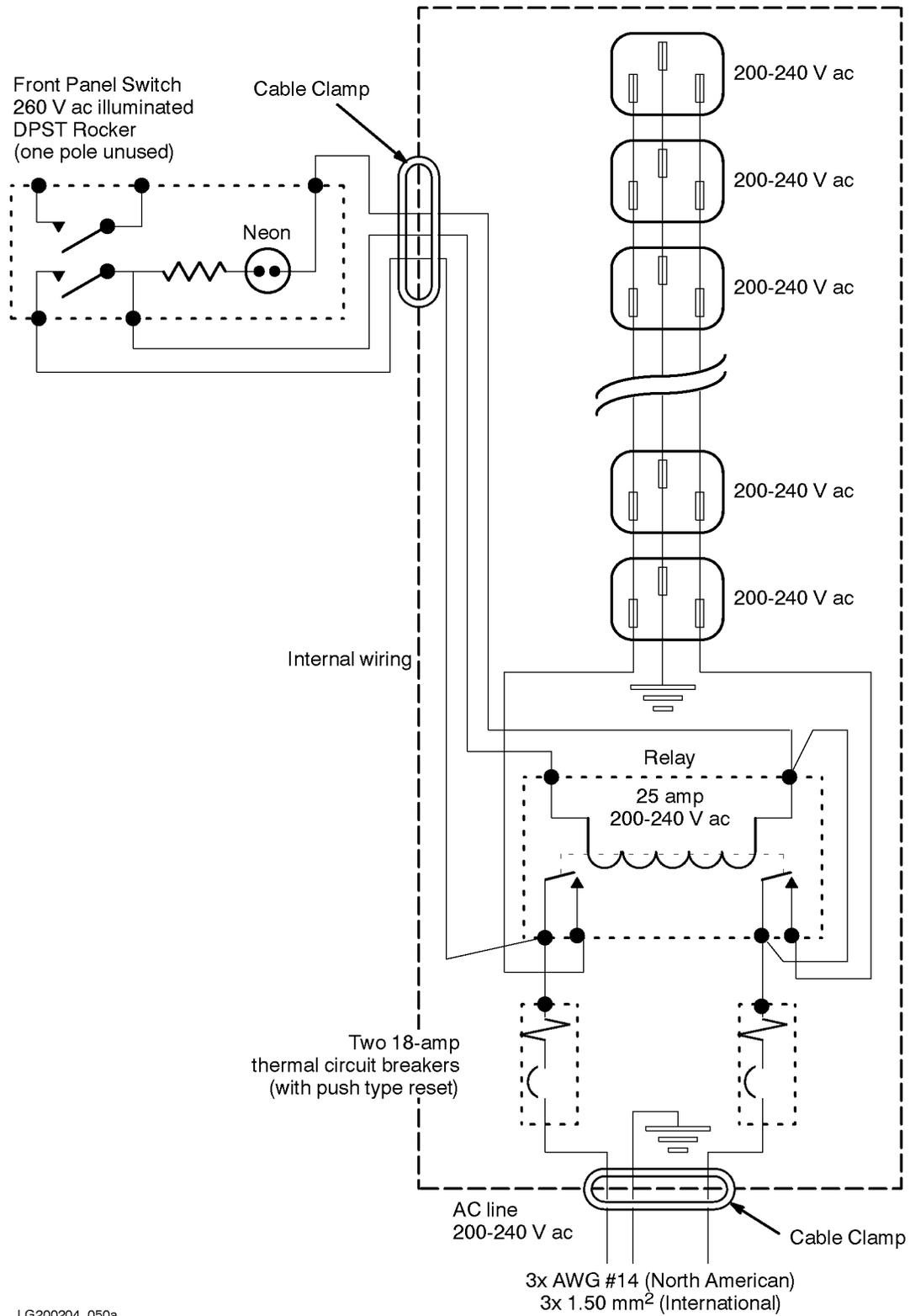
The cabinet is factory wired according to the equipment ordered. The expansion cabinet can be wired in one of the following configurations:

- 200-240V North American PDU (with NEMA plug)
- 200-240V International PDU (with no plug)

(A separate PDU with one of four different cord sets is shipped with a UPS.)

Figure 2-1 shows the basic wiring schematic for the cabinet.

Figure 2-1 200/240 VAC Wiring Diagram



LG200204_050a

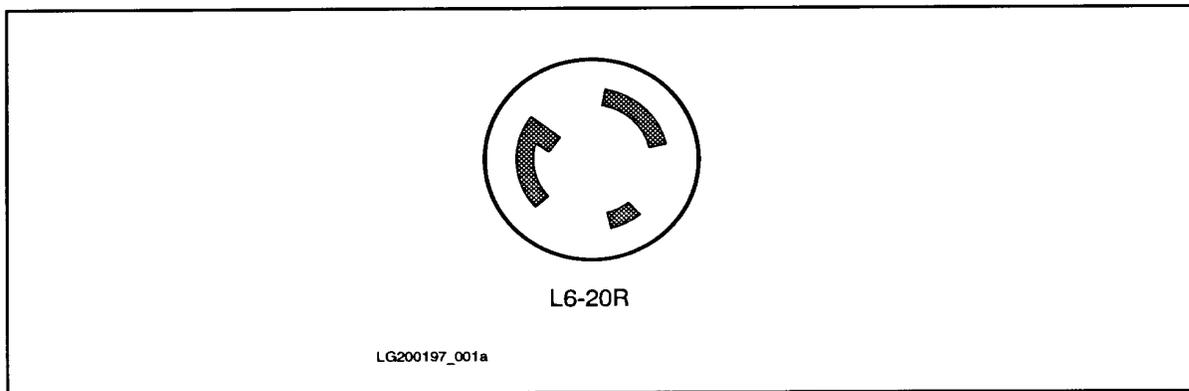
Table 2-2 Power Requirements

Cabinet	PDU V/A	Plug Type	Receptacle Type	# IEC 320 Outlets
A1884A	US 200-240V/50/60Hz, 16A max	NEMA L6-20P	NEMA L6-20R	10
(1.6 meter)	Europe 200V/50/60Hz, 16A max cord	no plug	Country dependent	10
A1897A	US 200-240V/50/60Hz, 16A max	NEMA L6-20P	NEMA L6-20R	10
(1.6 meter)	Europe 200V/50/60Hz, 16A max cord	no plug	Country dependent	10

Refer to Figure 2-2 for the type of receptacle required to accommodate the cabinet power cord.

NOTE The cabinets that are sold in Europe are shipped without a power plug on the end of the PDU cable. It is the responsibility of the customer to supply the correct plug and receptacle for the particular country and electrical code, or have the power cord wired to the power outlet.

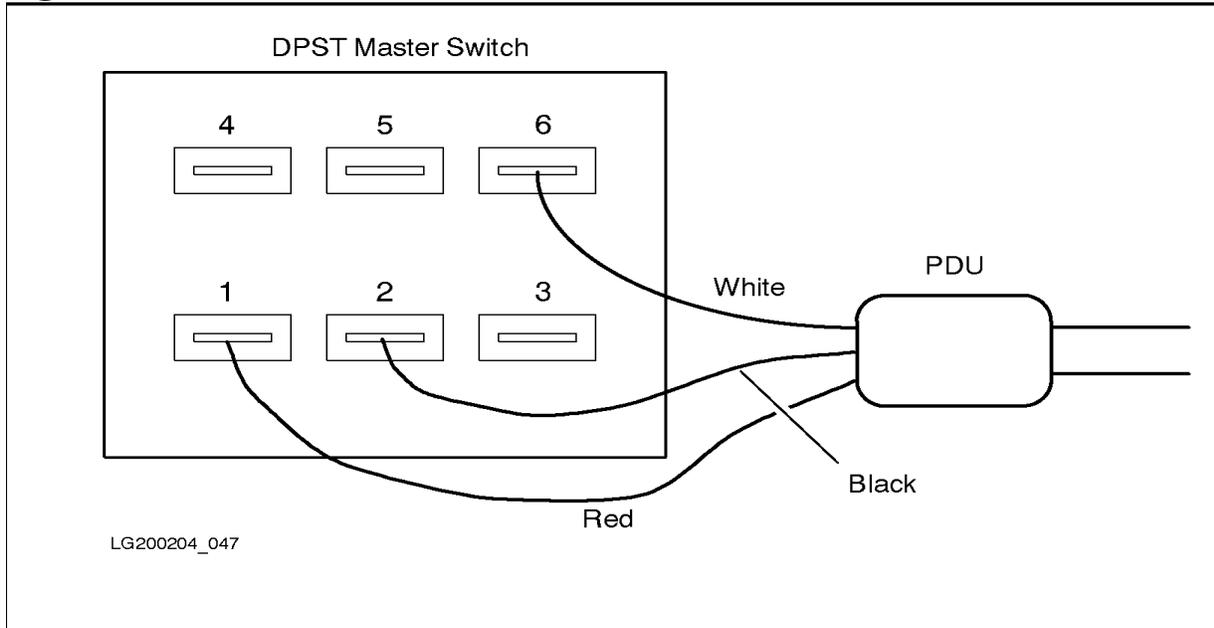
Figure 2-2 Receptacle Types



Main Power Switch

The main power switch controls power to the entire rack via the PDU. Figure 2-3 illustrates the connection of the main power switch to the PDU.

Figure 2-3 Main Power Switch Connections



NOTE The on/off switch on the expansion cabinet does not control the power to the Uninterruptible Power System (UPS). If a UPS has been factory-integrated into the expansion cabinet however, there is no power switch on the front of the cabinet and therefore no way to turn off the devices within the cabinet except to turn off the UPS output power or to turn off the power switches on the devices themselves.

3 Unpacking and Installation

This chapter describes how to unpack the A1884A/A1897A cabinet assembly.

It is the customer's responsibility to inspect the shipping package for shipping damage. It is not the customer's responsibility to remove the cabinet assembly from the shipping pallet.

NOTE	Do not discard or destroy the shipping container or the packaging material. If it becomes necessary to repackage the cabinet, the original packing material will be needed. HP also suggests that you keep this manual, in case you later have to repackage the cabinet for shipment.
-------------	---

Unpacking the Cabinet Assembly

Be sure to read the following unpacking instructions before proceeding.

WARNING **Be very careful when unpacking the cabinet! A fully configured 1.6 meter cabinet (A1884A or A1897A) can weigh more than 800 lbs (362.8 kg).**

It may take two or more people to safely move and position the cabinet.

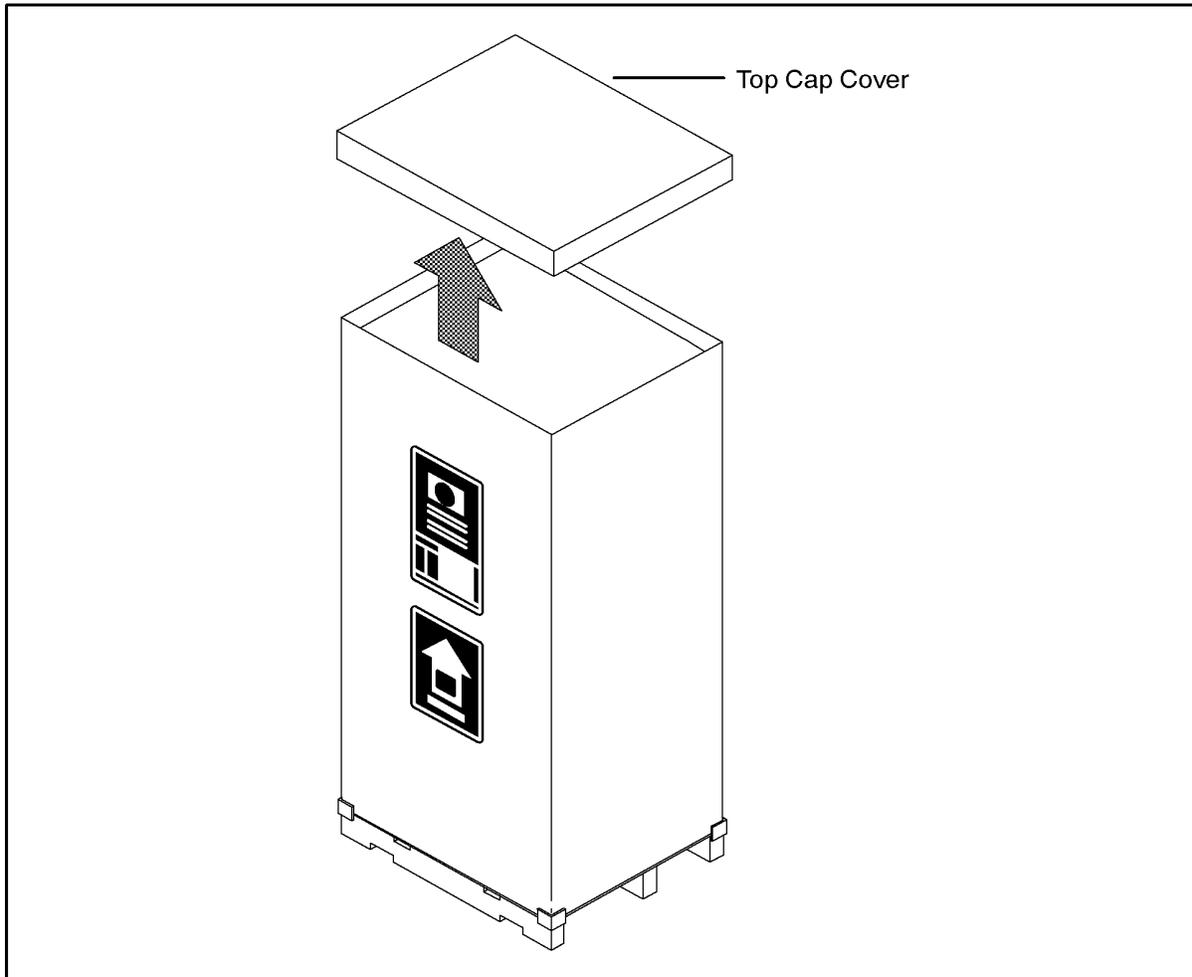
The unloading ramp for the cabinet is approximately twice the width of the cabinet. Make sure to allow enough room for the ramp and the cabinet before unpacking the cabinet.

To unpack the cabinet, perform the following steps:

WARNING **Wear protective glasses while cutting the plastic bands around the shipping container. These bands are under tension. When cut, they can spring back and cause serious eye injury.**

1. Cut the plastic polystrap bands around the shipping container.
2. Lift the cardboard top cap off of the shipping box, as shown in Figure 3-1.

Figure 3-1 Removing the Top Cap Cover



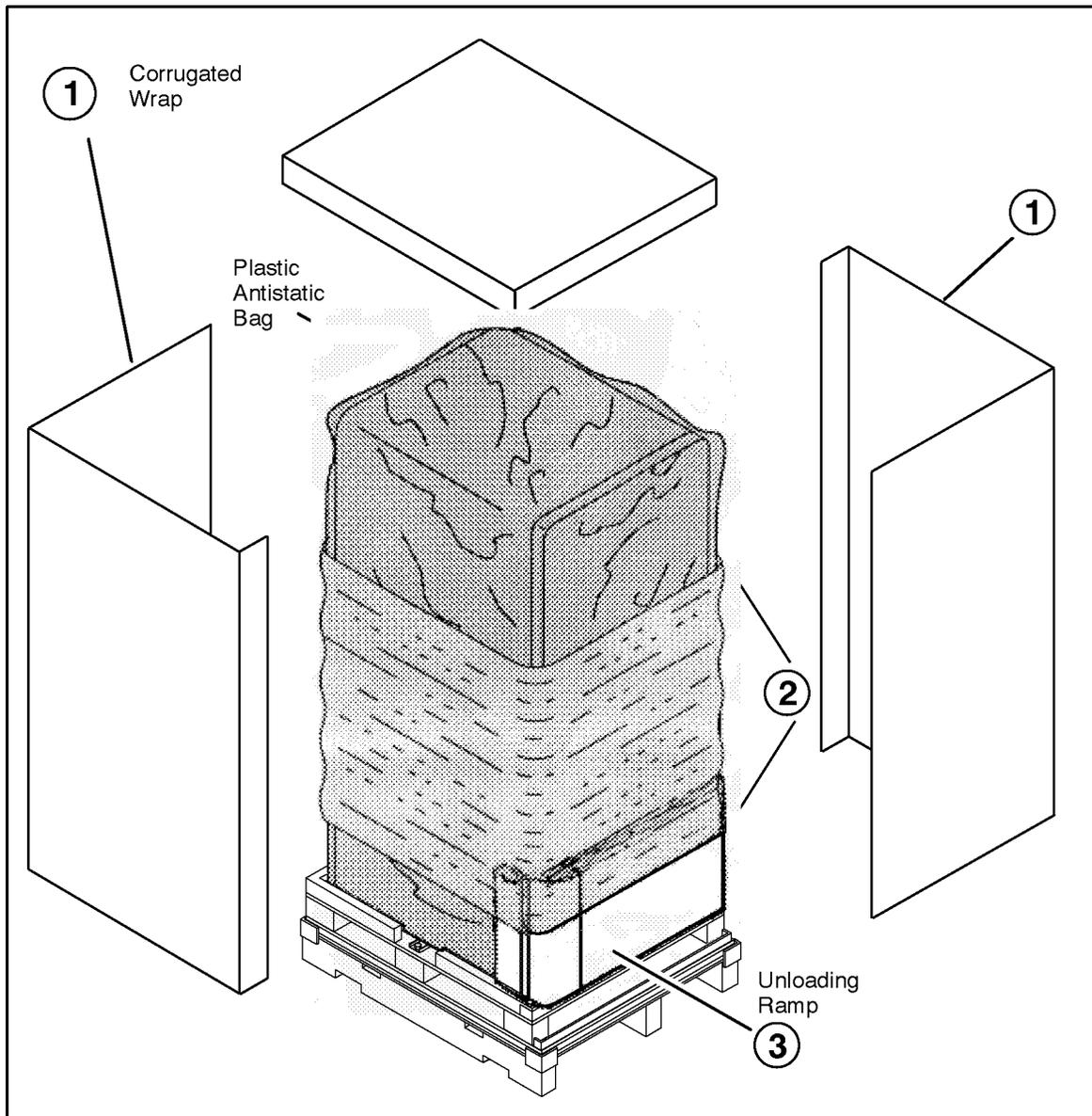
LG200197_004a

3. Remove the corrugated wrap from the pallet (item 1 in Figure 3-2).
4. Remove the shrink wrap from around the cabinet (item 2 in Figure 3-2).

You may want to save the packing materials in case the cabinet has to be reshipped or moved to another site. Do not reuse packing material that is visibly damaged.

5. Remove the unloading ramp (item 3 in Figure 3-2).
6. Remove the protective plastic antistatic bag from the cabinet.

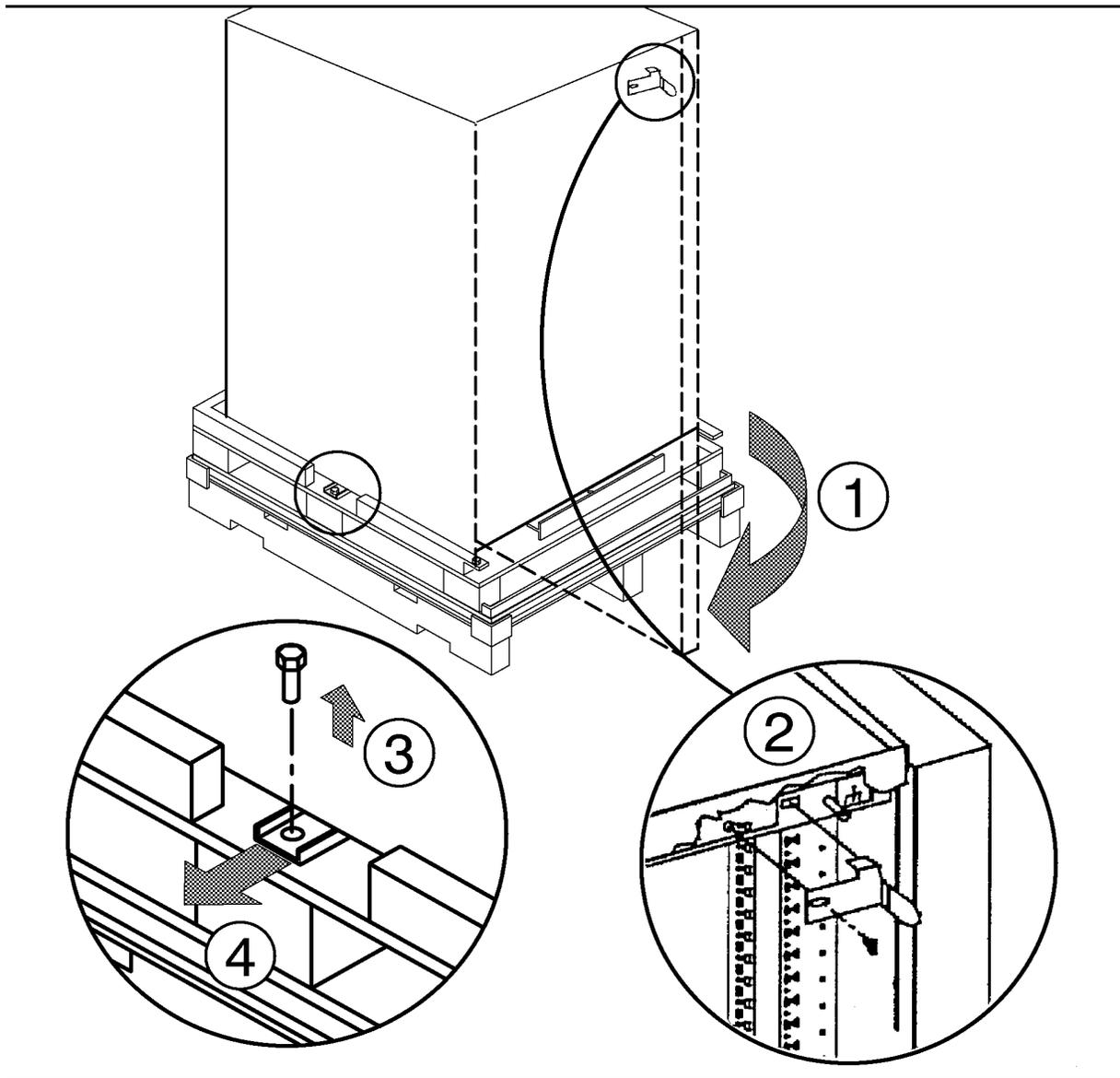
Figure 3-2 Removing the Ramp and Packing Material



LG200197_007e

7. Carefully open the rear door (item 1 in Figure 3-3). Remove the screw that secures the rear door support in place (item 2 in Figure 3-3) and pull the block out.
8. Remove the two shipping clamps (one on each side) from the bottom of the frame. They are bolted to the pallet. Remove the bolt (item 3 in Figure 3-3) and remove the clamp (item 4).

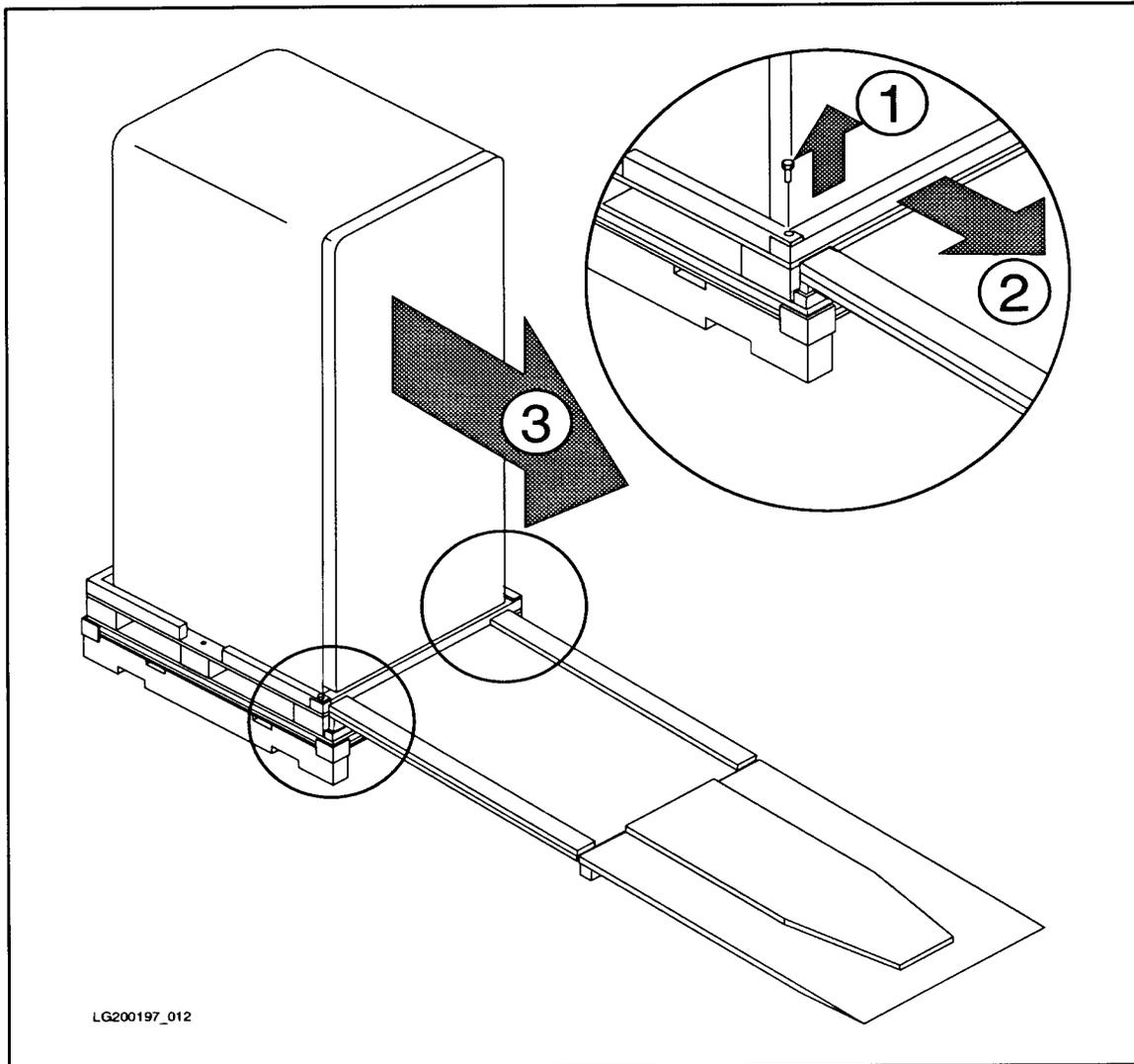
Figure 3-3 Removing Door Support and Shipping Clamp



LG200197_009b

9. Remove the pallet shipping block (item 2 in Figure 3-4) at the rear of the pallet. Remove the two bolts (item 1 in Figure 3-4), one on each corner, and pull the block (item 2) from under the cabinet.

Figure 3-4 Removing the Shipping Block



10. Position the ramp so that the block of wood under the ramp locks into the strip of wood at the edge of the pallet. This holds the ramp in place while the cabinet is moved across the pallet and down the ramp (number 3 in Figure 3-4).

11. Raise the cabinet leveling feet to their highest position.

WARNING Make sure that the leveling feet on the cabinet are raised before you roll the cabinet down the ramp. If the leveling feet are not raised, they can catch on the ramp and cause the cabinet to tip over.

12. Carefully roll the cabinet (item 3 in Figure 3-4) down the ramp.

13. Use casters or lift hooks to move the cabinet.

The lifting hooks supplied with the cabinet are suitable for lifting the cabinet fully loaded (maximum capacity, 227 kg/hook).

CAUTION Do not lift the unpackaged cabinet with a fork lift.

Cabinet Inspection

After the cabinet is taken off the shipping pallet, and before it is placed in the installation site, inspect the internal and external condition of the cabinet.

Exterior:

Check the cabinet exterior for signs of shipping damage:

1. Examine the top and sides for damage.
2. Check the front bezels for alignment, scratches, and that they open and close normally.
3. Check any filler panels on the front of the cabinet for proper fit.
4. Check the forehead assembly (see item 8 in Figure 6-1) for any signs of damage.
5. Check the rear door for dents, scratches, proper fit, and operation. Also visually inspect the fit of the door when it is closed.

Interior: Open the rear door and inspect the inside of the cabinet.

1. Inspect all cables to make sure they are secure.
2. Inspect all rails for signs of damage.
3. Check all mounting screws for tightness.
4. Check all components for signs of shifting during shipment, or any signs of damage.

If any damage is found, follow the claims procedures described in Chapter 1. Some damage may be repaired by replacing a damaged part, if that part is replaceable. Refer to Chapter 6 for a list of field replaceable parts for the cabinet. For internal component damage, refer to the *CE Handbook* (HP P/N A1809-90003) for replaceable parts and procedures.

If extensive damage is found, it may be necessary to return the entire cabinet to HP. Refer to the repackaging instructions included in this chapter.

Repackaging the Cabinet for Shipment

Use the original packing material to repack the cabinet for shipment. If the packing material is not available, contact your local Hewlett-Packard Sales and Support Office regarding the shipment.

Before shipment, place a tag on the container (or equipment) to identify the owner and the service to be performed. Include the equipment model number and the full serial number, if applicable. The label showing the model number and the full serial number is located on the outside of the rear door.

It may take two or more people to push a fully loaded cabinet up the ramp onto the pallet.

WARNING **Repackaging a loaded cabinet can be hazardous due to the weight of the loaded cabinet. Use caution when moving the cabinet and positioning the cabinet on the pallet. Check the condition of the loading/unloading ramp before use. If the ramp appears damaged, DO NOT attempt to push the loaded cabinet up the ramp onto the pallet. Contact your local Hewlett-Packard Sales and Support Office regarding the shipment.**

To repack the cabinet, follow the repacking checklist and refer to the unpacking instructions for detail.

Repackaging Checklist:

1. Assemble the HP packing materials that came with the cabinet.

NOTE Series 6000 HP-FL Disk Array modules must be removed from the cabinet and shipped separately.

2. Remove any Series 6000 HP-FL Disk Array modules that have been installed in the cabinet. Package these modules in their original shipping container.
3. Connect the loading ramp to the pallet.
4. Raise the cabinet levelers before moving the cabinet.
5. Push the cabinet up the ramp onto the pallet. Be sure to position the cabinet so the front goes up the ramp first.
6. Secure the cabinet to the pallet with the shipping clamps, shipping block, and rear door support.
7. Place the anti-static bag over the cabinet.
8. Place the top cap packing material on top of the cabinet.
9. Place the loading/unloading ramp on a side of the cabinet.
10. Place the corrugated wrap around the cabinet.
11. Put the box top on the box and secure the assembly to the pallet.

Be sure to follow the labeling instructions described previously. The cabinet is now ready for shipment.

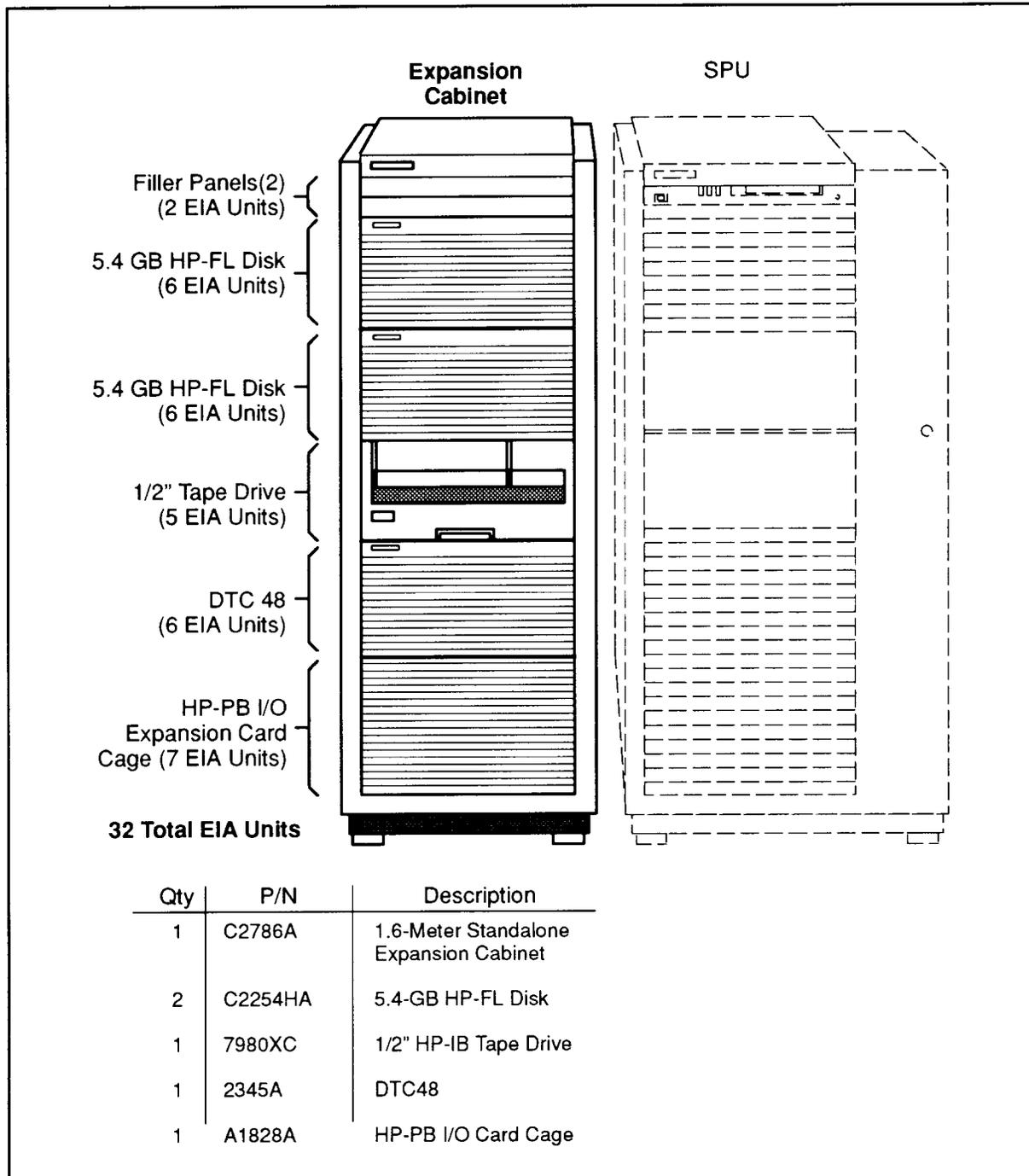
4 Cabinet Configurations

Although the expansion cabinet is designed to accommodate a variety of components mounted in almost any configuration, some basic rules apply to mounting peripherals in the expansion cabinet. These rules allow for weight distribution, accessibility of the components, and cable management inside the rack-mount cabinet. The rules are:

- **General Guidelines:**
 - Always load the EIA slots in the cabinet from the bottom up. (For purposes of this manual, the top slot is considered slot 1 and the bottom slot is considered slot 32.)
 - Leave slots 12 through 24 open until the last. If forced to use these slots, fill them from 12 downward. (Slots 12 through 24 should be used for devices requiring operator access.)
 - If the optional UPS (Uninterruptible Power System) is to be installed, it must be installed at the bottom of the expansion cabinet before all other components or peripherals are installed.
 - Cluster SCSI devices together to ensure the 0.5M SCSI cable will accommodate all SCSI devices.
 - Install DAT drives, CD-ROM drives, and other devices requiring convenient operator access in slots 12-24.
- **Product-Specific Guidelines:**
 - Stack devices using the following priority numbers (number 1 is highest priority, that is, first to go on the bottom):
 1. PowerTrust UPS (Uninterruptible Power System)
 2. HP-PB I/O card cage
 3. C2462 1.3GB disk drive without DATs
 4. HP 2345A DTC 48
 5. A7980XC Tape Drive
 6. A3324N, 2.0 GB disk drive with DATs (requires slots 12 through 24; if more space is needed, use slots 12 to 1).
 - **The installation of an HP 7980XC also requires the installation of three (3) counter-ballast weights (C2786-60017 at 13.61 kg each).**
 - Two filler panels must be at the bottom of the cabinet if an A2252A/54A HP-FL disk array system is the bottom-most racked device in the cabinet. The filler panels will allow ample space for cables at the bottom of the cabinet.

These rules are noted in case the customer wants to add any optional equipment or change the position of the components in the cabinet. <Undefined Cross-Reference> shows an example of an expansion cabinet configuration.

Figure 4-1 Expansion Cabinet Configuration Example



LG200204_038

See Appendix A, "HP 3000 Configuration Information," and Appendix B, "HP 9000 Configuration Information," for more information about cabinet configurations.

Rack Mount Kits

The following rack mount kits are available for the cabinet:

Table 4-1 Rack Mount Kits

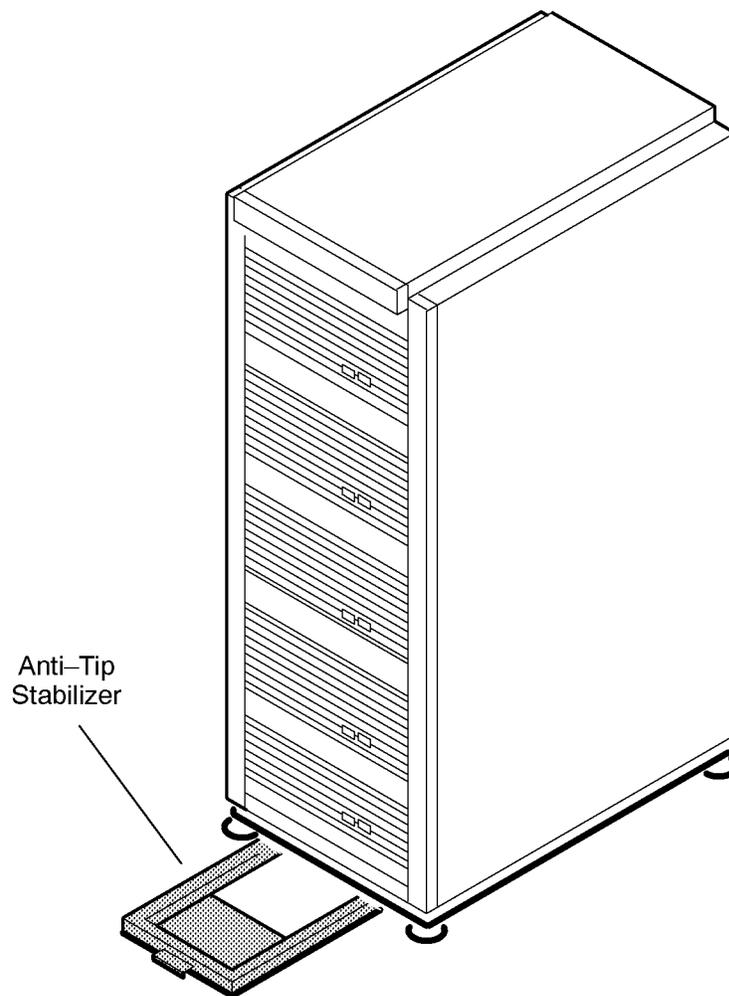
Kit Number	Cabinet Component
C2799A	HP 2345A (DTC-48)
79508A	C22CXA Rack mount kit
Opt 135	7979A or 7980A/S/CX with a non HP rack - deletes the rails
J2084A	MDP mounting bracket for front of cabinet
C2792A	MDP mounting bracket for rear of cabinet
07980-67190	Hoist Adapter Kit

Pre-Loaded Cabinet Installation

The installation of the pre-loaded cabinets consists of the following steps:

1. Move the cabinet to the installation site.
2. Adjust the anti-tip stabilizer by pulling it out from the front of the cabinet (see <Undefined Cross-Reference>).

Figure 4-2 Anti-Tip Stabilizer



_G200197_017a

NOTE The cabinet comes equipped with an anti-tip stabilizer (pull-out). This is located at the bottom center of the cabinet. The extension should be used temporarily when installing or servicing the equipment in the cabinet and is not extended for normal operations.

3. Floor levelers are located at each corner of the cabinet. Adjust the levelers for stability and levelness as desired.
4. If a Series 6000 HP-FL Disk Array was installed in the cabinet at the factory, the disk drive modules will be removed for shipment. These modules are shipped separately from the factory. Re-install the disk modules by following these steps:
 - If you are installing several HP-FL disk arrays, find the disk array with a label over slot 0 reading "System Disk" (Boot Disk). This disk array should be racked as the lowest disk array in the cabinet.
 - Examine the labels on the boxes containing the disk modules. Each module should be labeled with a preassigned slot in the disk array.
 - Locate the disk module which identified as the preloaded operating system (OS). Do not remove this label; the system will not boot if this module is in the wrong slot.
 - As shown in <Undefined Cross-Reference>, slide each module (item 2) into its assigned slot (item 1 points to slot #1) using the green plastic handle (item 3). Lock it in place using the securing latch (item 4).

Figure 4-3 Installing a Disk Module

5. Connect the expansion cabinet peripherals to the HP-PB I/O card cage (or directly to the SPU, as appropriate) according to the procedures described in the *Installation Guide* (HP P/N A1809-90001). Refer to the *External HP-PB I/O Card Cage Installation Guide* (HP P/N A18009-90013) for installation instructions.
6. For systems without a UPS, connect the cabinet power cord to the appropriate wall outlet.
7. For systems with a UPS, connect the cabinet power cord to an outlet on the UPS.

The cabinet/computer system assembly is now ready for the power-on process. Refer to Chapter 5 for operating instructions.

Standalone Cabinet Installation

The installation of the standalone cabinets consists of the following steps:

1. Move the cabinet to the installation site.
2. Adjust the anti-tip stabilizer by pulling it out from the front of the cabinet (see <Undefined Cross-Reference>).

NOTE The cabinet comes equipped with an anti-tip stabilizer (pull-out). This is located at the bottom center of the cabinet. The extension should be used temporarily when installing or servicing the equipment in the cabinet and is not extended for normal operations.

 If you intend to install one or more slide-mounted products, use the instructions in <Undefined Cross-Reference> to determine how much ballast to install in the cabinet.

3. Floor levelers are located at each corner of the cabinet. Adjust the levelers for stability and levelness as desired.
4. Plan the position of the peripheral according to the stacking guidelines described in "Product-Specific Guidelines:" in this chapter.
5. Install rails in the cabinet where the peripheral will be installed. Typically, rails are installed in the cabinet according to the following steps:
 - a. Insert one 10-32 tinnerman nut in each of the four columns. The cabinet columns are a folded design. The inside flange contains a column of rectangular holes for locating rails. It also contains a column of round holes for securing the rails with screws. <Undefined Cross-Reference> illustrates the spacing of the holes for the inside flange of the columns.

Figure 4-4 Inside Column Flange

- b. Attach two support rails as shown in <Undefined Cross-Reference>. Peripherals are mounted on horizontal rails. Rails sit in rectangular slots so screws can be easily inserted. The instrument should be positioned so that the holes on either side of the front panel are all aligned with the attached slip-nuts installed according to equipment requirements.

Figure 4-5 Installing a Cabinet Rail

6. Install the peripheral according to the installation instructions. Examples of installing the following components and peripherals are included in this chapter.
- HP-FL Multiuser Disk Arrays
 - DTC-48
 - SCSI Mass Storage System
 - HP-PB I/O Card Cage
 - Modem Distribution Panel (MDP) for MUX Connections

WARNING **Any equipment in the expansion cabinet should be installed from bottom to top to facilitate handling and to insure cabinet stability by maintaining a low center of gravity.**

If a PowerTrust UPS (Uninterruptible Power System) is to be installed, it must be the bottom-most component in the expansion cabinet. Refer to the *PowerTrust System Guide* for detailed information about installing PowerTrust systems into the expansion cabinet.

NOTE To meet the temperature specification, all unused front panel space must be covered with blank filler panels and the rear door must be closed. Secure the front panels of all instruments and blank panels to the cabinet.

PowerTrust UPS Installation

For information on how to install a PowerTrust UPS in the expansion cabinet, refer to the manual that came with the UPS.

HP-FL Disk Array Installation

An HP-FL disk array consists of individual disk modules installed in a disk array chassis.

-
- When removing or installing a disk drive module, avoid dropping or bumping it. A sudden mechanical shock can damage the disk drive inside the module.
 - If you need to move a disk array after installation, remove the disk modules from the array base and then remove the array base.
 - Protect disk modules and array bases against static electricity. Static electricity can damage electronic components. If a disk module is removed from an array base, place the disk module in an anti-static bag.
-

Up to five disk arrays can be installed into the cabinet.

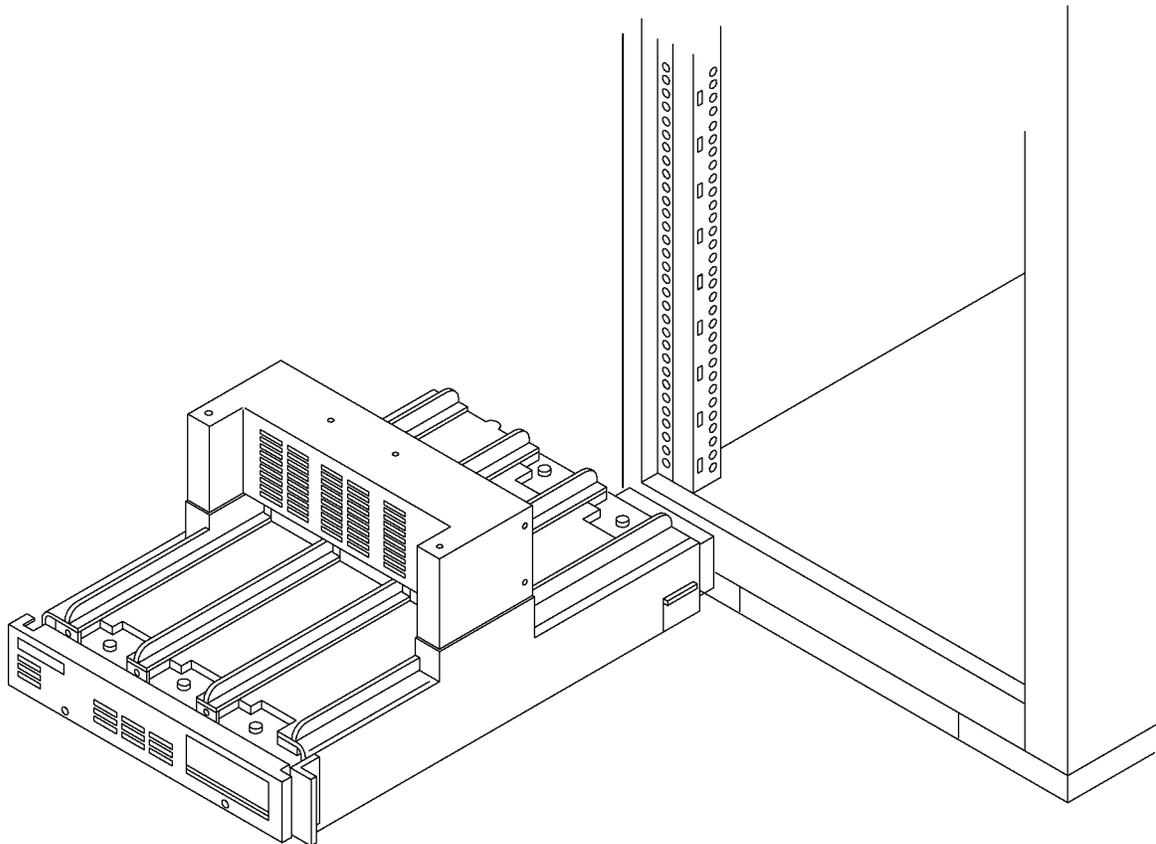
NOTE Two filler panels must be at the bottom of the cabinet if an A2252A/54A HP-FL disk array system is the bottom-most racked device in the cabinet. The filler panels will allow ample space for access to the bottom of the cabinet.

The following instructions briefly describe how to install the HP-FL disk array system. For a more detailed description, see the installation and service manuals shipped with the disk array system.

To install the HP-FL disk array system:

1. Install a set of two mounting rails (see <Undefined Cross-Reference>).
2. Install an array base (see <Undefined Cross-Reference>).

Figure 4-6 Installing an Array Base



3. Install the disk modules into the array base (see <Undefined Cross-Reference>).
4. Install the array access door.
5. Install the latch plate.
6. Install the filler panel by holding the filler panel up to the front of the cabinet between two of the stamped lines in the cabinet vertical rails.
7. Press on the filler panel until the clips snap into place.
8. Attach the power cable from the disk array to the vertical power strip in the expansion cabinet.

DTC Installation

The following instructions briefly describe how to install the DTC. For a more detailed description, see the installation and service manuals shipped with the DTC.

To install a DTC into the cabinet:

1. Attach the two rails to the cabinet (see <Undefined Cross-Reference>).
2. Slide the DTC into the cabinet from the front. The DTC should rest upon the rails you installed in step 1.
3. Attach the power cable (shipped with the cabinet) from the DTC to the vertical power strip in the expansion cabinet.

SCSI Mass Storage System Installation

The following instructions briefly describe how to install the SCSI Mass Storage System. For a more detailed description, see the installation and service manuals shipped with the mass storage system.

To install a Series 6000 Mass Storage System:

1. Install the rails in the cabinet. See <Undefined Cross-Reference>.
2. As shown in <Undefined Cross-Reference>, install the mass storage system (item 1) into the special mounting tray (rack adapter, item 2) that is shipped with the mass storage system.
3. Loosen several turns (but do not remove) the two screws (item 7) on the front clamp (item 5) and the two screws on the rear clamp (item 6) of the rack adapter.
4. Slide the rack adapter assembly into the cabinet and install the four front screws (item 8).

NOTE If the locking tabs on the cabinet rails do not allow the rack adapter to seat fully against the front columns, remove the locking tab screws and move the tabs further toward the rear.

5. Slide the locking tabs on the rails in the cabinet forward until they engage into the slots in the rear of the rack adapter. Tighten the screws while pressing forward on the locking tabs.
6. Slide the mass storage system into the rack adapter assembly until it stops.
7. Swing the front clamp up so that the four tabs of the front clamp engage into the four slots in the front of the mass storage system, and then tighten the two screws over the edge of the lip on the back of the mass storage system.
8. Swing the rear clamp up so that the three tabs on the top of the clamp engage over the edge of the lip of the mass storage system.
9. Attach the external front panel assembly (items 3 and 4) by snapping it into place.
10. Attach the power cable from the disk storage system to the vertical power strip in the expansion cabinet.

Figure 4-7 Installing a Mass Storage System

HP 7980XC Tape Drive

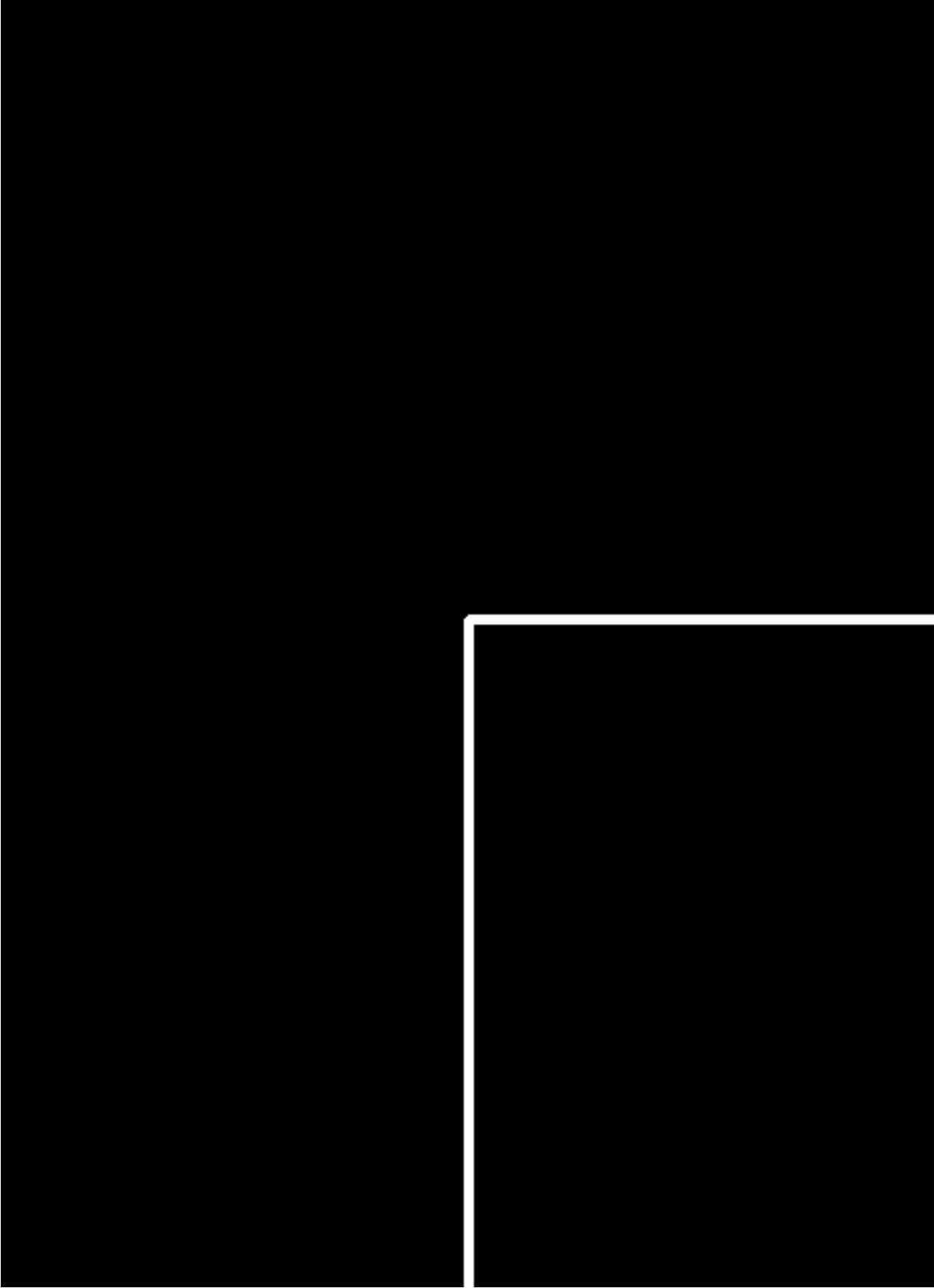
The following instructions briefly describe how to install the HP 7980XC Tape Drive. For a more detailed description, see the installation and service manuals shipped with the tape drive.

WARNING **The installation of an HP 7980XC requires the installation of three (3) counter-ballast weights (C2786-60017 at 13.61 kg each).**

To install an HP 7980, follow these steps:

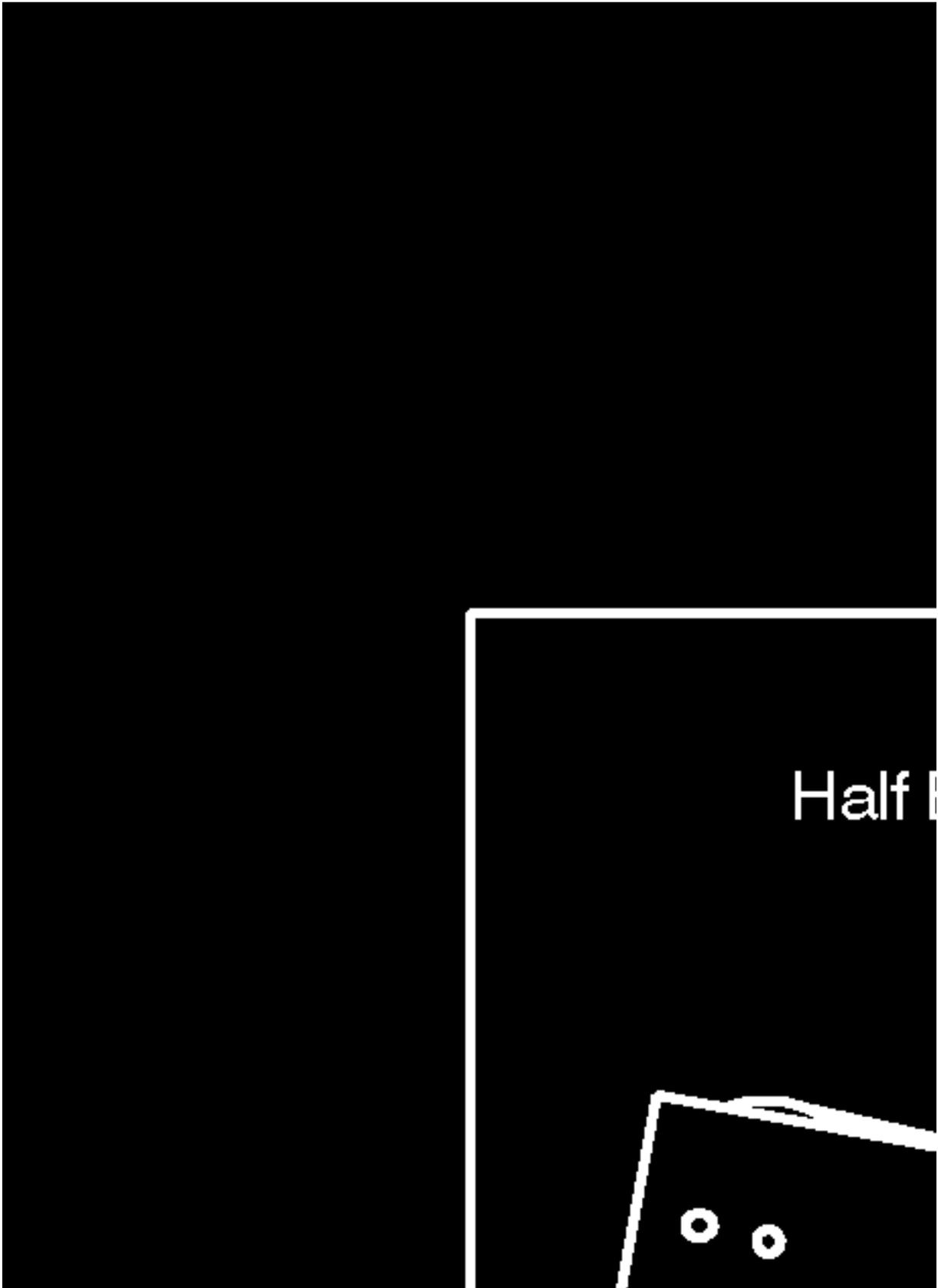
1. Verify that the anti-tip stabilizer and the floor levelers are adjusted for cabinet stability.
2. Open the rear door of the cabinet.
3. Remove the top panel from the cabinet by unfastening the two screws at the rear of the cabinet. From the front of the cabinet, pull the top panel upwards.
4. Remove the two side panels by unfastening the two screws that hold each panel to the top of the rack. Once the screws are removed, lift the panel up and then out.
5. Remove the front door of the cabinet by the lifting the two fasteners upward out of the hinges.
6. Attach the slides (PN 07980-00216 and 000217) to the sides of the tape drive.
7. Attach the fixed sections of the slide assemblies to the cabinet (see <Undefined Cross-Reference>).

Figure 4-8 The Slide on the Tape Drive



8. Secure the lifter tool (Hoist Adapter Kit (07980-67190)) to the cabinet by tightening the knob on the rear of the lifter tool (see <Undefined Cross-Reference>).

Figure 4-9 The Lifter Tool



9. Lift the tape drive into position with the lifter tool and position it in the cabinet (see [<Undefined Cross-Reference>](#)).

Figure 4-10 Lifting the Tape Drive into the Cabinet



10. Install the tape drive in the cabinet by sliding the tape drive into the cabinet.

WARNING **The tape drive must be securely fastened to the rack with the stop screws mounted before the straps of the lifter tool are removed.**

11. Loosen the TORX screws that hold the slide mounts onto the columns of the cabinet.
(Do not remove the screws.)

12. Move the slide mounts up or down in the cabinet to correct the position.

13. Tighten the TORX screws to hold the slide mounts in the correct position.

14. Lower the tape drive slightly with the lifter tool.

15. Remove the lifter tool and the straps.

16. Attach the power cable from the tape drive to the vertical power strip in the expansion cabinet.

HP-PB Card Cage Installation

The following instructions briefly describe how to install the HP-PB Card Cage. For a more detailed description, see the installation and service manuals shipped with the card cage.

To install an HP-PB card cage in the expansion cabinet:

1. Install metal slides at an appropriate height in the expansion cabinet. (Allow at least 22 holes in the vertical posts for the height of an HP-PB card cage.) Unless an HP-PB card cage is at the bottom position, it rests on metal slides attached by screws to the vertical posts in the cabinet. For an HP-PB card cage in the bottom position, no slides are necessary.
2. From the front of the expansion cabinet, slide the HP-PB card cage into the expansion cabinet along the metal slides.
3. Continue sliding the HP-PB card cage until the flanges of the HP-PB card cage seat against the vertical posts in the expansion cabinet.
4. Fasten the flanges of the card cage to the vertical posts using the screws provided.
5. Further secure the card cage in place by fastening locking tabs on the metal slide just behind the card cage.
6. Attach the plastic bezel to the front of the HP-PB card cage.
7. Install HP-PB I/O cards into the HP-PB card cage.

Date codes can be noted (in pencil) on the lower portion of the label at the left side of the card cage.

8. Install cables (see <Undefined Cross-Reference>):
 - Attach cables from the HP-PB I/O cards to peripheral devices.
 - Attach flat ribbon cables from the BC card in double slot 14/15 of the HP-PB card cage (the lowest slot) to a BC card (or HP-PB I/O Bus Converter on 997/T600 Systems) in the PMB card cage in the SPU cabinet. See <Undefined Cross-Reference>. To keep the cables neat, you can lead them from the HP-PB card cage to the side of the cabinet, behind the vertical posts. From there, you can bring them down the side of the cabinet and out the bottom. See <Undefined Cross-Reference>.
 - Attach the power cable from the HP-PB card cage to the vertical power strip in the expansion cabinet.

Figure 4-11 Cabling for the External HP-PB Card Cage

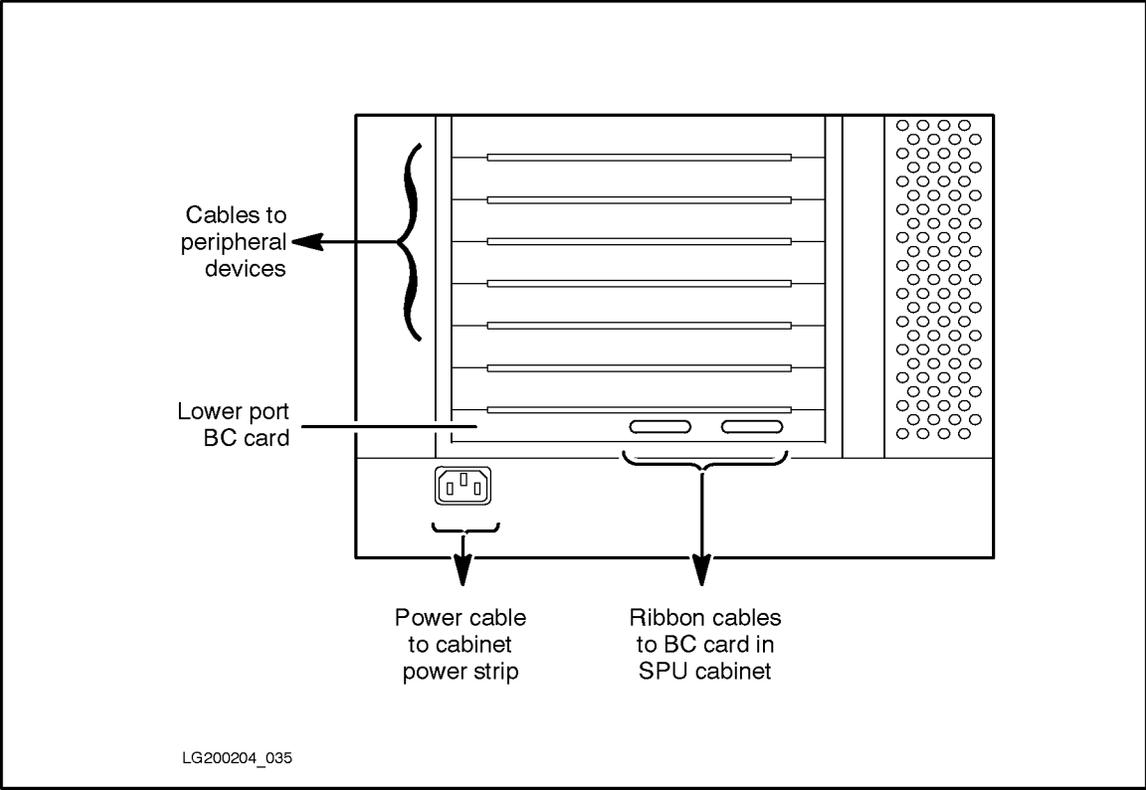
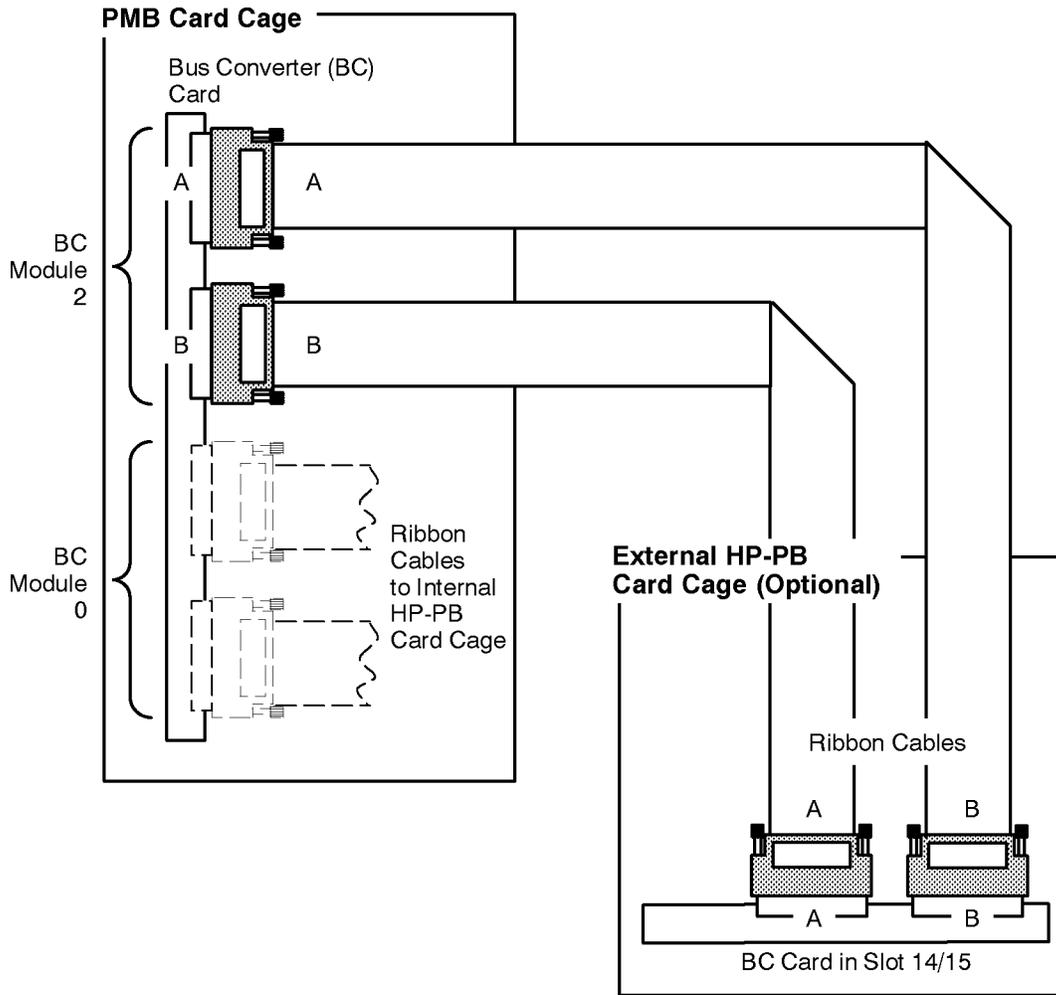


Figure 4-12 Flat Ribbon Cables Connecting an External HP-PB Card Cage



LG200204_030a

DDP/MDP Installation for MUX Connections (CS T-Class Only)

The T-Class Systems support 8-port, 16-port, and 32-port MUX cards. A 16-port MUX card is supplied with the base configuration.

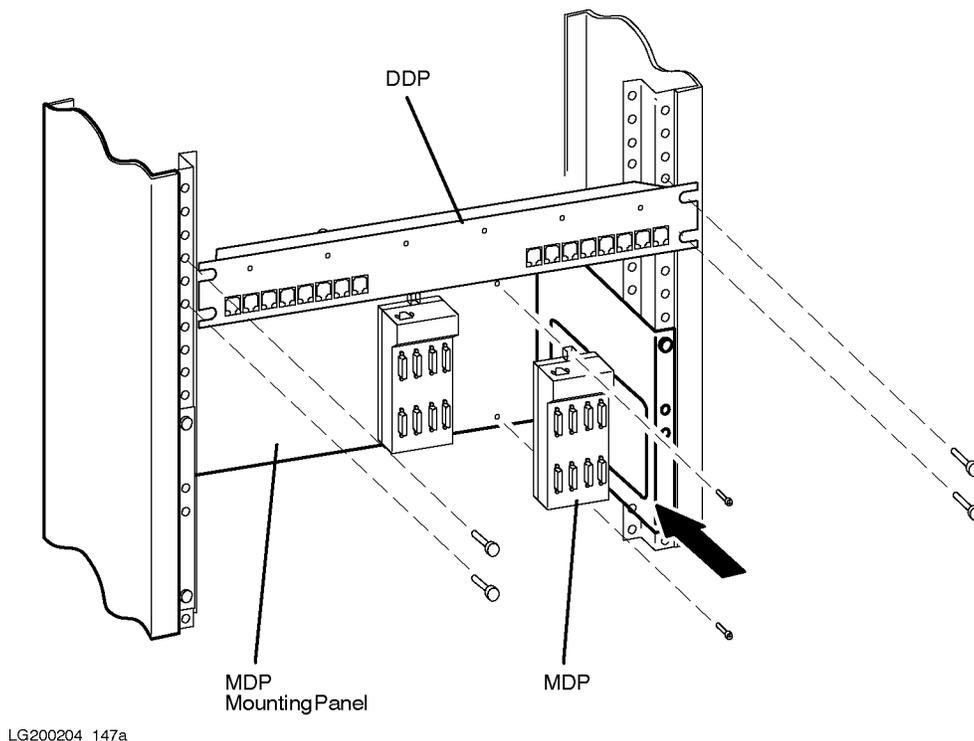
MUX cards attach to either a Modem Distribution Panel (MDP) or a Direct Distribution Panel (DDP) which provide connectors for modems, terminals, etc.

MDPs can be mounted in the front of the expansion cabinet using the J2084A MDP mounting panel (<Undefined Cross-Reference>), or in the rear of the expansion cabinet using the C2792A mounting bracket (<Undefined Cross-Reference>). The front mounting panel and the rear mounting bracket can each hold up to 5 MDPs.

The J2084A MDP mounting panel occupies 7 EIA units, and the C2792A mounting bracket occupies 6 EIA units.

The DDP mounts directly onto the cabinet frame columns, as shown in <Undefined Cross-Reference>.

Figure 4-13 MDP Mounting Panel for the Front of the Expansion Cabinet (J2084A)



MDP Front Mounting

To mount MDP at the front of the expansion cabinet, perform the following steps:

1. Position the mounting panel so that the cable-access holes in the panel are toward the bottom of the cabinet.
2. Attach the mounting panel to the rack using four (4) screws fromn the rack kit.
3. Attach the MDP(s) to the mounting panel. There are mounting holes in the MDP, and on the mounting panel. You will need 2 screws (metric size M4, 10mm long) to mount each MDP.
4. To connect cables, pull the device cables up through the cable-access holes in the mounting panel, and connect them to the ports on the MDP.
5. After all MDPs are cabled, attach the frame supplied with the J2084A mounting kit to the mounting panel with the screws supplied. The front panel clips onto this frame.
6. Repeat the above steps for each J2084A MDP mounting panel required.

MDP Rear Mounting

The C2792A mounting bracket occupies 6 EIA units, and has a hinge that allows the bracket to be swung out away from the cabinet. Depending on which rear column the hinge is attached to, the bracket can be installed to swing open to the left or to the right.

The C2792A mounting bracket can hold up to five MDP units, three on the inside and two on the outside.

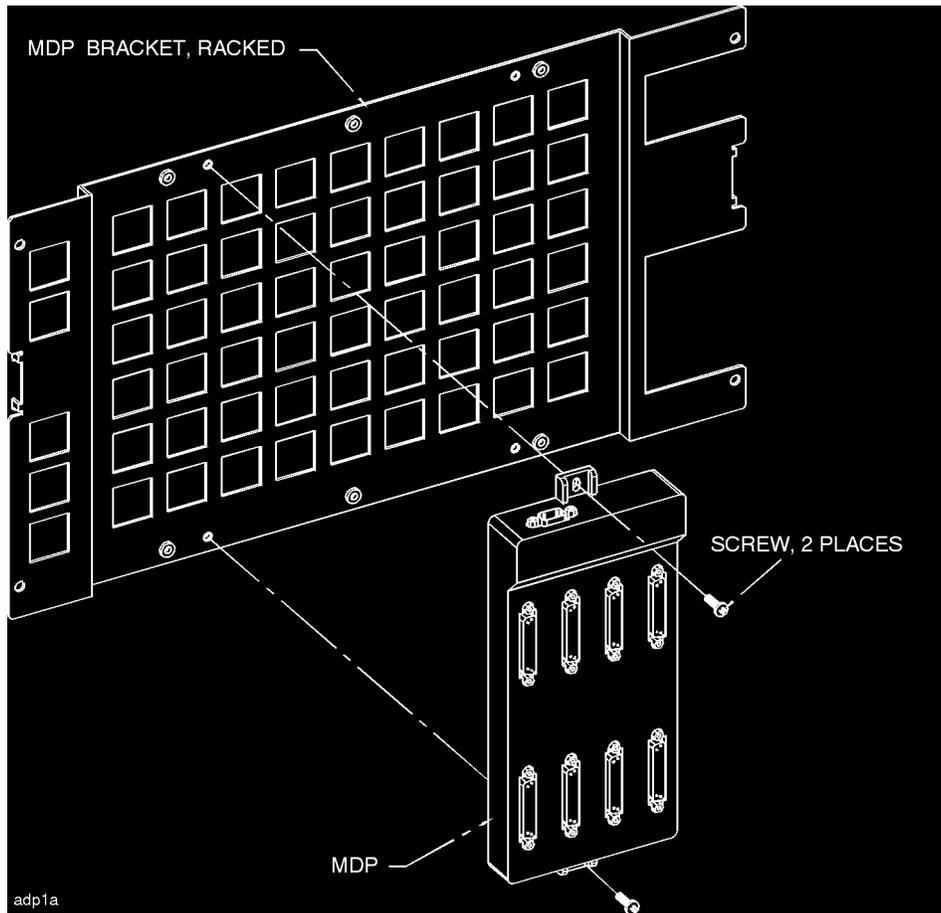
To mount the MDPs at the rear of the expansion cabinet, perform the following steps:

1. Position the mounting bracket as low as possible in the rear of the cabinet, and place six slip-nuts onto the rack columns to line up with the screw-holes in the bracket.
2. Insert and tighten six screws to secure the bracket. The hole alignment tabs will hold the bracket in place while the mounting screws are inserted through the bracket into the columns with slip-nuts attached.
3. Attach the MDP(s) to the mounting bracket using 8mm-long screws. Swing open the bracket to mount the three MDPs on the inside of the bracket, then swing the bracket closed to mount the remaining two MDPs that face the outside (rear of the cabinet).
4. Make all required cable connections to the MDPs. Be sure the cables are secured to the MDP connectors.

NOTE	The cutouts on the right side of the bracket are to accommodate mounting around the PDU mounting brackets, and for cable routing.
-------------	---

5. Tighten the mounting screws.
6. Repeat the above steps for each MDP mounting bracket required.

Figure 4-14 MDP Mounting Bracket for the Rear of the Expansion Cabinet



Peripheral Configuration

To configure the peripherals in the system:

1. Power up the system using the appropriate procedure in Chapter 5 (Cabinet Operation).
2. Verify that the status LEDs on the HP-PB card cage are correctly lit (for normal operation, only the green DC Power LED should be ON).
3. Verify that the green LED between the two connectors on the BC card (or HP-PB I/O Bus Converter on 997/T600 Systems) in the PMB card cage is lit. If lit, this LED indicates that the BC card in the PMB card cage can communicate with the BC card in the HP-PB card cage.
4. Configure the peripherals in the system. See either "HP 3000 Systems" or "HP 9000 Systems" below.

HP 3000 Systems

For HP 3000 systems, use the SYSGEN utility to add paths and devices to the software configuration.

You run SYSGEN to generate a CONFIG group of files for subsequent boots. The CONFIG group of files determines the I/O configuration at system startup (unless a different group is specified with the START command).

To generate a CONFIG group of files, use the appropriate configuration group supplied with the system (see <Undefined Cross-Reference>).

Table 4-2 Configuration Groups Supplied With the 99x

Name	Description
CONFG990 CONFG991 CONFG992 CONFG995 CONFG996 CONFG997	Default configuration for a 99x using a SCSI boot device.
ALINK990 ALINK991 ALINK992 ALINK995 ALINK996 ALINK997	Default configuration group for a 99x using an HP-FL (= Fiber Link = PB-FL) boot device.

For many installations, the factory-supplied configuration group will be sufficient and will not need to be modified; it can be saved as is, with the name of CONFIG.

You will need to modify the configuration files if the system requires LDEVs that are not specified in the configuration group. SYSGEN allows you to add or delete entries in the configuration files. Although deleting unneeded entries is not necessary, it reduces the number of WARNING messages displayed when the system is started up.

For complete instructions on using SYSGEN, see the *MPE/iX System Configuration Manual* (HP part number 32650-90042).

To create the CONFIG group:

1. Logon as MANAGER.SYS and run the SYSGEN program:

```
:SYSGEN
```

2. Assign the appropriate configuration group as the base group (see <Undefined Cross-Reference>). For example:

```
sysgen > BA CONFIG997
```

(Instead of CONFIG997, you can specify some other configuration group name, such as CONFIG996.

3. Activate the I/O Configurator by entering:

```
sysgen > IO
```

4. List all LDEVs predefined in the configuration group:

```
io> LDEV
```

5. Review the lists of predefined LDEVs and determine if all LDEVs required for this installation are included in the list.

Steps 6 and 7 show how to add paths and devices. For complete instructions, refer to the *System Startup, Configuration, and Shutdown Reference Manual* (HP P/N 32650-90042).

6. To add a path (for a device adapter or a bus converter), use the APATH command. For example, to add the path for an HP-FL (PB-FL) device adapter on a 990/992/991/995/996 System, enter:

```
io> APATH 2/52 HP28616A
```

To add the path for a HP-FL device adapter on a 997 System, enter:

```
io> APATH 2/28/52 HP28616A
```

To add paths for a bus converter (HPA1809-60005) in PMB slot 1 (paths 4 and 6) on 990/992/991/995/996 Systems, enter:

```
io> APATH 4 HPA1809-60005
io> APATH 6 HPA1809-60005
```

To add a path on a 997 System for an HP-HSC I/O Bus Converter (HPA3567A) in PMB slot 1, enter:

```
io> APATH 4 HPA3567A
```

To add a path on a 997 System for an HP-HSC I/O Bus Converter in PMB slot 1 with an HP-PB I/O Bus Converter (HPA3568A) in module 0 and module 2, (path 4/28 and 6/28), enter:

Cabinet Configurations

Peripheral Configuration

```
io> APATH 4/28 HPA3568A
io> APATH 6/28 HPA3568A
```

7. To add devices, use the ADEV command. For example, to add a "Coyote" disk drive to a 990, 992, 991, 995, or 996 System:

ADEV using keyword syntax:

```
io> ADEV LDEV=31 PATH=2/44.0 ID=HP7937H
```

ADEV using positional syntax:

```
io> ADEV 31 2/44.0 HP7937H
```

To add a "Coyote" disk drive to a 997 System:

ADEV using keyword syntax:

```
io> ADEV LDEV=31 PATH=2/28/44.0 ID=HP7937H
```

ADEV using positional syntax:

```
io> ADEV 31 2/28/44.0 HP7937H
```

8. Temporarily save ("hold") the changes you have just made so you can exit the I/O Configurator:

```
io> HOLD
```

9. Exit the I/O Configurator:

```
io> EXIT
```

10. Keep the files from the configuration group into the CONFIG.SYS group. CONFIG.SYS is the default group when the system is subsequently started.

```
sysgen> K CONFIG
```

11. Exit the SYSGEN program:

```
sysgen> EXIT
```

12. If the configuration group was modified, the system must be shut down and restarted as follows:

- After resetting the system, enter:

```
: CTRL A
=SHUTDOWN
```

- To restart the system, enter;

```
ISL> START NORECOVERY
```

If the configuration group is new, at the ISL prompt, add a semicolon (;) and the group name. For example START NORECOVERY; GROUP=CONFIG

HP-UX Systems

For HP 9000 systems, use `ioscan(1M)` to verify the hardware configuration.

1. Boot the system. The newly installed peripherals will be automatically configured into the hardware of the system by the operating system.

2. To verify proper hardware configuration, execute the `ioscan(1M)` command using the `-f` option:

```
ioscan -f
```


5 Cabinet Operation

After all peripherals are installed in the expansion cabinet and all the peripherals are connected, you are ready to turn on the cabinet.

NOTE It is recommended that the expansion cabinet peripherals be turned on before the SPU is turned on. If the SPU Autoboot flag is set, and the expansion cabinet peripherals are not turned on, boot configuration errors may occur.

Equipment in an expansion cabinet can receive power from three possible sources:

- A conventional switched PDU without power protection.
- An unswitched PDU powered by a PowerTrust UPS (Uninterruptible Power System) installed in the same cabinet.
- An unswitched PDU powered by a PowerTrust UPS in an adjacent expansion cabinet.

A single expansion cabinet can have either switched or unswitched PDUs (or one of each) installed. Refer to the *PowerTrust System Guide* (HP P/N 5961-8383) for detailed information about the PowerTrust UPS.

Power On/Off Procedures for Equipment Without Power Protection

The basic steps of the power-on and power-off sequences for equipment that is not powered by a PowerTrust UPS (Uninterruptible Power System) are listed below.

Power On

NOTE	If any of the external equipment has been OFF due to any environmental problem, such as heating or air conditioning failure, or outside storage conditions (such as a loading dock), allow approximately 30 minutes for the temperature of the equipment to stabilize before turning on the computer.
-------------	---

1. Set the expansion cabinet ON/OFF switch to the ON position.
2. Set all ON/OFF switches of the peripherals to the ON position.
3. Check all READY or ONLINE indicators on the peripherals to confirm that they are powered up and ready.

Power Off

1. If the cabinet has a power switch, put it in the OFF position. This removes AC power from all of the components mounted in the cabinet. (If the cabinet has a factory-integrated UPS, turn off the components mounted within the cabinet by switching off the component power switches.)
2. At this point, the power switches for individual peripherals can be set to the OFF position, if necessary.

6 Removal and Replacement Procedures

This chapter tells how to remove and replace parts in the Expansion Cabinet.

WARNING **To prevent risk of electric shock, make sure input power is disconnected from the cabinet before proceeding.**

This chapter lists all of the parts of the rack-mount cabinet that can be replaced if damaged. It also provides the procedures for accomplishing the replacement of a damaged part. Refer to <Undefined Cross-Reference> for a list of the cabinet parts that can be replaced if damaged.

Refer to <Undefined Cross-Reference> and <Undefined Cross-Reference> while performing the procedures outlined in this chapter.

Figure 6-1 Cabinet Exploded View Front

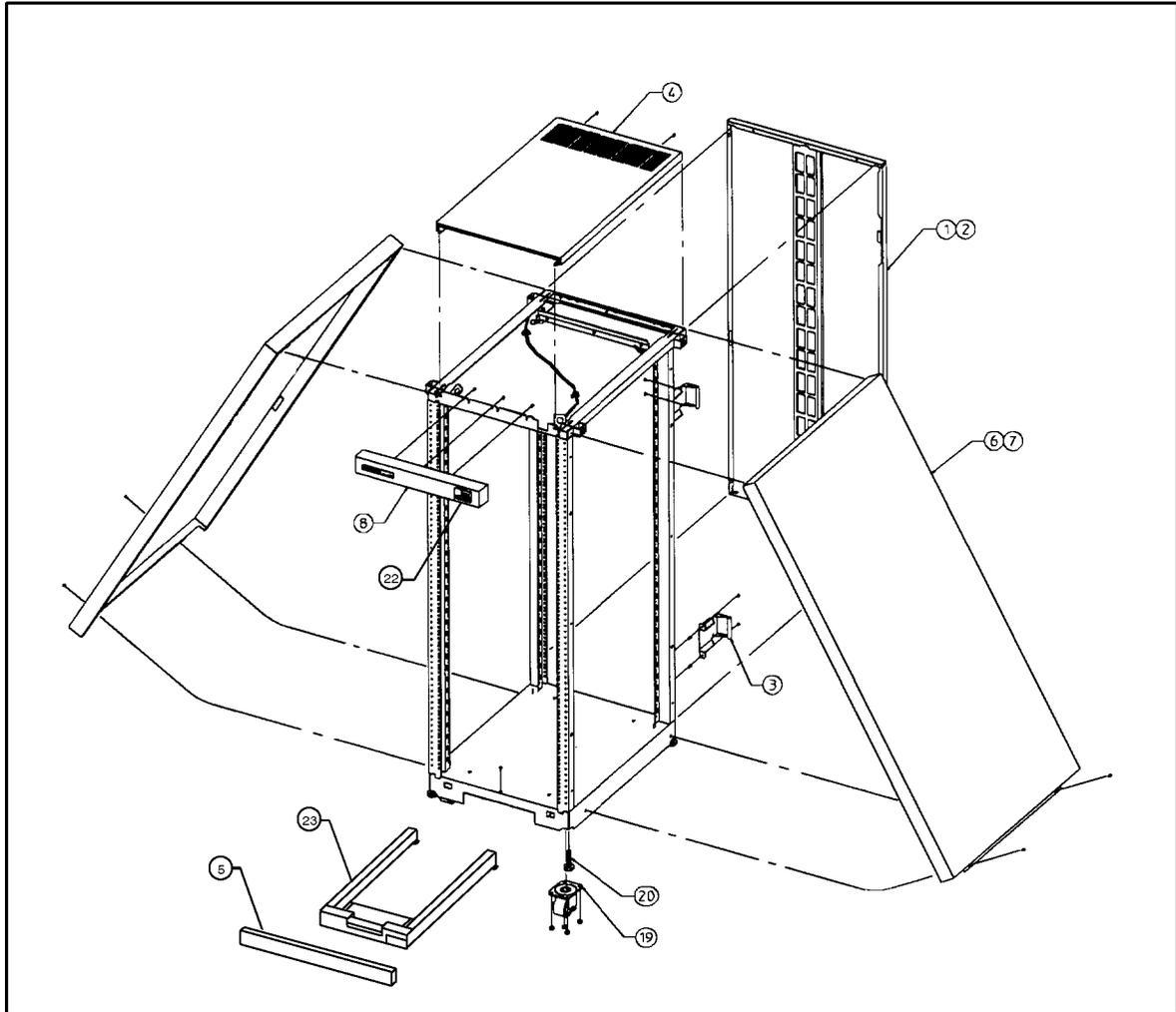


fig51b

Figure 6-2 Cabinet Exploded View Rear

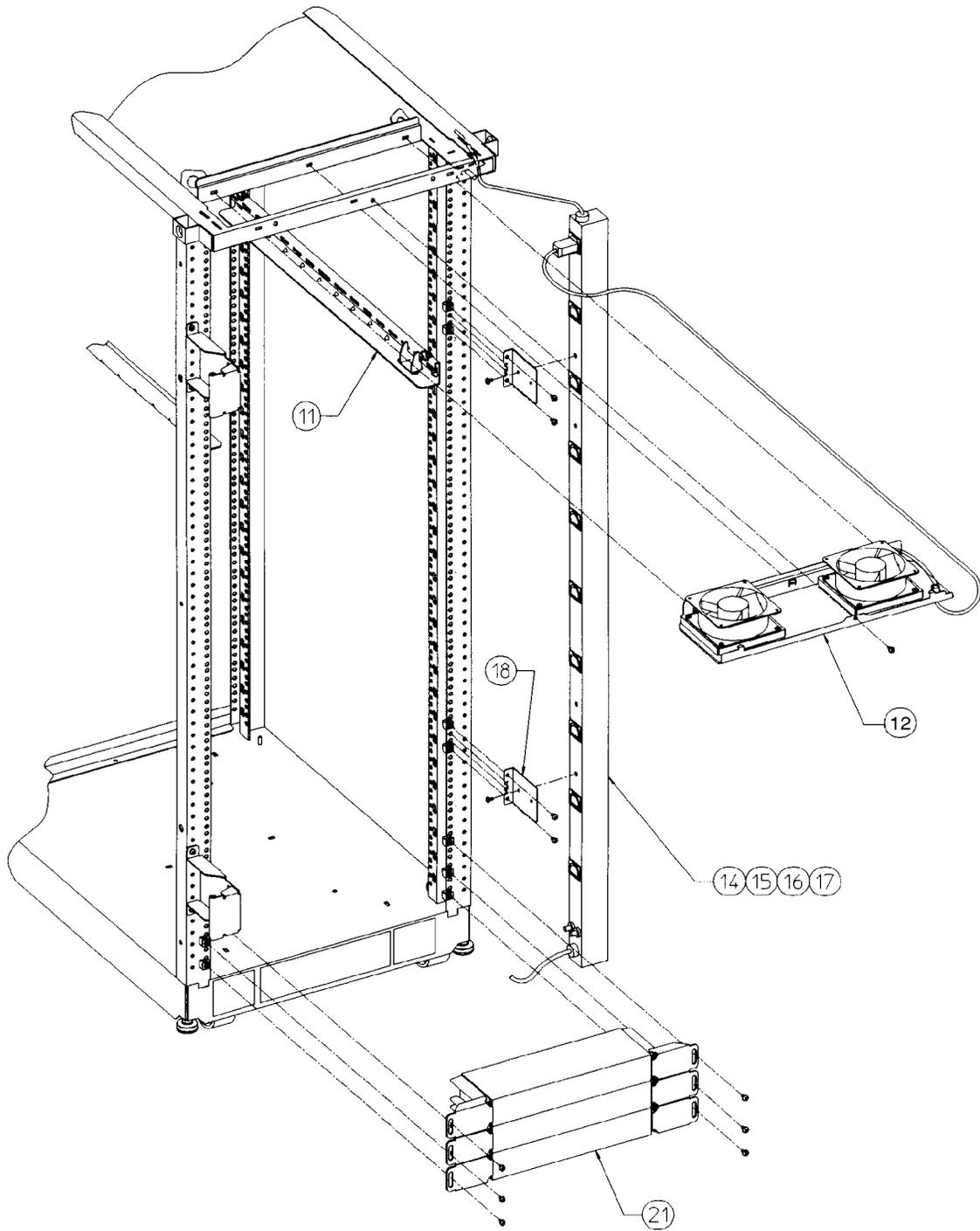


Table 6-1 Rack-mount Cabinet Replaceable Parts

No.	Part No.	Description
1	C2786-6001 6	Rear door assembly, 1.6 meter
	1390-0489	Strike Plate
	1390-0265	Magnetic Door Catch
	0403-0780	Door Bumper
2		not used in this configuration
		not used in this configuration
		not used in this configuration
		not used in this configuration
3	C2786-0001 2	Rear hinge
4	C2786-6001 5	Vented top cap
5	C2786-0001 4	Base cover, 1.6 meter
	C2785-6000 7	Non-vented top cap (not shown)
6	C2786-6001 4	Side cover, 1.6 meter
7		not used in this configuration

No.	Part No.	Description
8	C2786-6000 4	Forehead assembly (with On/Off Switch)
	5181-8713	On/Off Switch 120V
	5181-8714	On/Off Switch 220V
10		not used in this configuration
11	C2786-6001 8	Rail assembly
	C2786-000 19	Rear Stop Bracket
12	C2786-6000 5	230V Fan assembly
	3160-0378	230V Fan
14	C2786-6300 6	US 208-240V PDU, 1.6 meter
15	C2786-6300 7	EURO 230V PDU, 1.6 meter
16		not used in this configuration
17		not used in this configuration
18	C2786-0002 1	PDU Support Bracket
19	1492-0159	Caster

No.	Part No.	Description
	0535-0096	Nut-Wiz, M8 x 1.25 (caster)
20	0403-0778	Leveler
21	C2786-6001 7	Ballast assembly
	0590-0804	Nut-Tinner man 10/32
	2680-0278	Screw, T15 10/32 w/washer
	2680-0281	Screw, T25 10/32
	C2786-6000 1	1U Filler assembly
	8120-5470	Rack device Power cord, 20 inches
	8120-1396	Rack device power cord, 30 inches
	C2786-0003 6	MDP mounting bracket

Removal and Replacement Procedures

The following procedures are for the HP Field Replaceable Units (FRUs) contained in the HP A1884A or HP A1897A rack-mount cabinets.

Rear Door

Refer to item 1 in <Undefined Cross-Reference> while performing these procedures.

Rear Door Removal:

1. Remove the rear door of the cabinet by opening the door.
2. Disconnect the bonding wire from the door.
3. Grasp the rear door support and lift the door straight up and away from the cabinet.

Rear Door Replacement:

1. Hold the rear door by the support column, in an open position.
2. Align the door hinge pins over the cabinet hinge holes.
3. Lower the door onto the cabinet hinge.
4. Reconnect the bonding wire to the door.

Top Cap

Refer to item 4 in <Undefined Cross-Reference> while performing these procedures.

Top Cap Removal:

1. Power down the cabinet using the appropriate procedure in Chapter 5 (Cabinet Operation).
2. Remove the power cord from the wall outlet or UPS.
3. Open the rear door all the way.
4. Remove the two outside mounting screws at the top rear of the cabinet.
5. Then, from the rear of the cabinet, pull the top cap toward the back, a few inches.
6. Lift the top cap off the cabinet.

Top Cap Replacement:

1. From the rear of the cabinet, place the top cap between the side covers and slide it forward until it stops.
2. Insert the two mounting screws at the top rear. Tighten the screws.
3. Close the rear door.
4. Plug the cabinet power cord into the wall outlet or UPS and power up the computer system.

Side Cover

Refer to item 6 in <Undefined Cross-Reference> while performing these procedures.

Side Cover Removal:

1. Remove the two mounting screws at the bottom of the cabinet.
2. On the right side cover, open the rear door and remove the two mounting screws on the upper door hinge (that secure the hinge to the side panel).
3. Grasp the sides of the side cover (pulling the bottom of the panel away from the cabinet offers a better grip), then lift up and away.

Side Cover Replacement:

1. Grasp the side cover on the sides and align it with the cabinet at a vertical angle with the bottom out and the top toward the top of the cabinet.
2. Lower the side onto the top edge of the cabinet side so the top of the side cover hooks onto the top of the cabinet.
3. With the side cover flush with the cabinet frame and insert the two mounting screws in the bottom. Tighten the screws.
4. On the right side cover, insert the mounting screws through the upper door hinge into the side panel and tighten screws.

Forehead Assembly

To remove the forehead assembly, the power has to be turned off and the top cap has to be removed first. Refer to item 8 in <Undefined Cross-Reference> while performing these procedures.

Forehead Assembly Removal:

1. Turn the power off (refer to Chapter 5 for power off procedures).
2. Unplug the cabinet power cord.
3. Remove the top cap (refer to top cap removal).
4. If the cabinet has an ON/OFF switch, unplug the PDU harness from the back of the ON/OFF switch.
5. Remove the three mounting screws behind the forehead assembly.
6. Pull the forehead assembly away from the cabinet frame.

Forehead Assembly Replacement:

1. Align the forehead assembly at the top of the cabinet frame, so the three mounting holes match the frame holes, and the mounting hooks on each side engage the mounting slots.
2. Insert the three mounting screws through the frame into the forehead assembly. Tighten the screws.

3. If the cabinet has an ON/OFF switch, attach the PDU harness to the ON/OFF switch lugs as indicated:

Red: switch terminal 1
Black: switch terminal 2
White: switch terminal 6

4. Replace the top cap (refer to top cap replacement).
5. Plug the cabinet power cord into the wall outlet or UPS and turn on the main power switch.

Base Cover

Refer to item 9 in <Undefined Cross-Reference> while performing these procedures.

Base Cover Removal:

1. Remove the mounting screw located on the top edge, center, of the base cover.
2. Pull the base cover away from the bottom of the cabinet.

Base Cover Replacement:

1. Align the base cover hooks on the bottom of the cabinet frame and roll the base cover until the mounting holes in the cabinet and base cover align.
2. Insert the mounting screw. Tighten the screw.

Anti-tip Stabilizer

Anti-tip Stabilizer Extension

1. Extend the anti-tip stabilizer until it stops.
2. Lift the two side bars that go into the rack frame and pull the stabilizer away from the rack.

Anti-tip Stabilizer Retraction

1. Align the two extension arms with the opening at the bottom of the rack and insert the arms at an angle.

This allows the stop tabs to go into the rack cavity for the stabilizer.

2. Push the anti-tip stabilizer all the way into the rack.

Rear Door Hinge

Refer to item 3 in <Undefined Cross-Reference> while performing these procedures.

Rear Door Hinge Removal:

1. Remove the rear door (refer to rear door removal).
2. Remove the two mounting screws from the cabinet column (on the upper hinge, also remove the two mounting screws in the side panel), and lift the door hinge away.

Rear Door Hinge Replacement:

1. Align door hinge with the pressed nuts in the rear cabinet column.
2. Insert the two mounting screws through the hinge into the column (on the upper hinge insert the two mounting screws into the side panel). Tighten the screws.

Rail Assembly

This procedure is also used to remove or replace a rail clamp. Refer to item 11 in <Undefined Cross-Reference> while performing these procedures.

Rail Removal:

1. Remove the component mounted on the rail to be replaced. Removing the component could involve a lot of cable handling. Be sure to tag the removed cables for replacement later.
2. Remove the two rail mounting screws.
3. Lift the rail out of the rail support notch in the cabinet column.
4. If the rail clamp needs to be removed, remove the clamp screw, and slide the clamp out of the rail groove.

Rail Replacement:

1. Slide the rail clamp into the rail.
2. Insert the rail tab into the appropriate inside cabinet column support notch.
3. Insert the two mounting screws through the rail into the slip nuts on the column. Tighten the screws.
4. Re-install the component that was previously removed.
5. Slide the rail clamp up to the rear of the component and insert the clamp screw. Tighten the screw.

Fan Assembly

Refer to <Undefined Cross-Reference> and items 12 and 13 in <Undefined Cross-Reference> while performing these procedures.

Fan Assembly Removal:

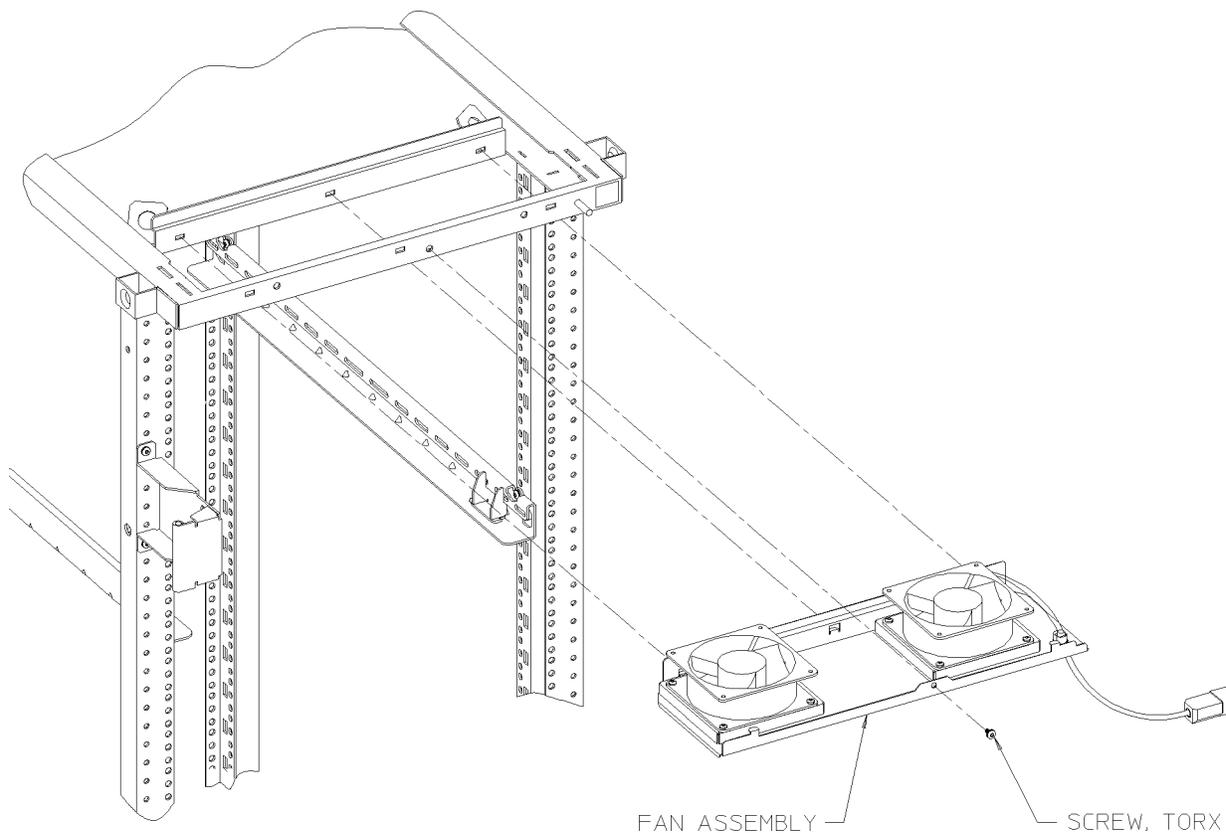
1. Turn off the cabinet power. Refer to the power off procedures in Chapter 5.
2. Open the rear door.
3. Disconnect the fan power cord from the PDU.
4. Remove the one mounting screw at the top rear cabinet frame bar.

5. Grasp the fan assembly from the bottom and pull toward the rear of the cabinet.
6. The fan assembly should release from the cabinet, and can be lowered out of the cabinet.

Fan Assembly Replacement:

1. Raise the fan assembly into the rear cabinet frame opening.
2. Slide the fan assembly forward engaging the tabs on the fan assembly into the slots in the cabinet frame.
3. Insert the mounting screw. Tighten the screw.
4. Connect the fan power cord from the fan assembly to the PDU.
5. The rear door can now be closed and the system powered up.

Figure 6-3 Fan Assembly



Fan

Refer to <Undefined Cross-Reference> while performing these procedures.

Fan Removal:

1. Remove the fan assembly (refer to fan assembly removal).
2. Remove the power cable connectors from the fan.

3. Remove the two mounting screws and nuts holding the fan to the fan tray.
4. The fan bracket stays with the fan tray.

Fan Replacement:

1. Position the fan over the fan bracket/tray mounting holes so that the power lugs are at the rear of the fan tray, and on the right side of the fan (as viewed from the back of the assembly). Also verify the air flow arrow points up.
2. Insert the mounting screws up through the bottom of the fan tray/bracket and fan.
3. Attach mounting nuts/washers on the mounting screw. Tighten screws and nuts.
4. Attach power cord lugs to spades on the fan (polarity does not matter).
5. Replace fan assembly (refer to fan assembly replacement).

Figure 6-4 Fan Diagram

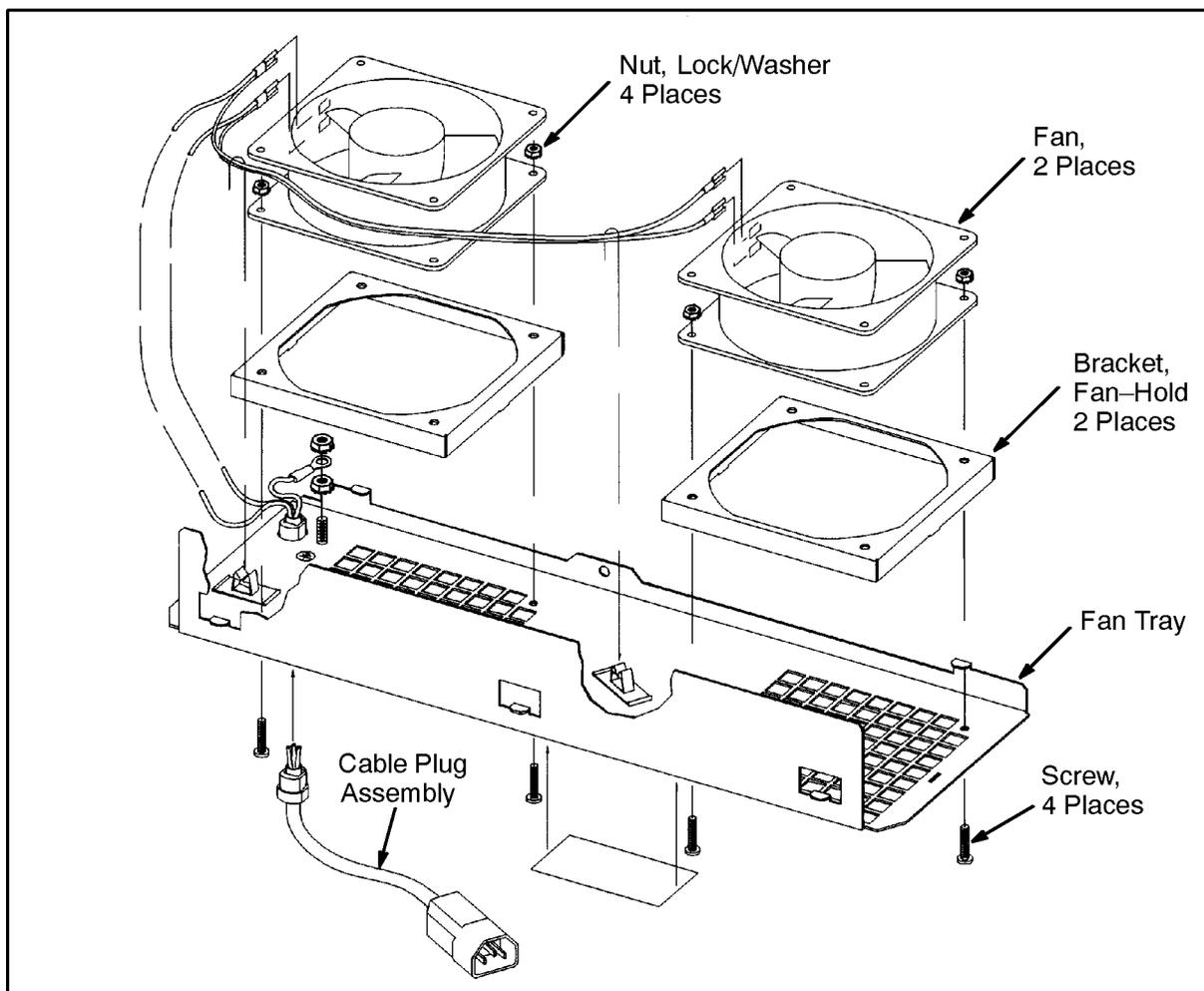


fig54b

PDU

Refer to item 14 in <Undefined Cross-Reference> while performing these procedures.

PDU Removal:

1. Power down the cabinet using the appropriate procedure in Chapter 5 (Cabinet Operation).
2. Remove the power cord from the wall outlet or UPS.
3. Remove the top cap (refer to top cap removal procedure).
4. If the cabinet has an ON/OFF switch, unplug the PDU harness from the back of the ON/OFF switch.
5. Unclip the PDU harness from the cable clamps on the cabinet frame top and pull the PDU harness down through the top frame.
6. Remove all component power cords from the PDU.
7. Remove the four (two on each bracket) mounting screws from the PDU mounting brackets that attach to the frame columns.
8. Lift the PDU up to disengage, the PDU mounting bracket hooks from the frame column.
9. Pull the PDU out of the cabinet.

NOTE The PDU mounting brackets can be removed at this point, if necessary.

PDU Replacement:

1. Align the PDU (with the brackets attached) on the right rear column of the cabinet frame.
2. Insert the PDU bracket hooks into the column holes and lower the PDU until it rests on the column.
3. Insert the PDU mounting screws through the brackets into the column with slip nuts attached.
4. Route the PDU harness up through the top of the cabinet and through the cable clamps.
5. If the cabinet has an ON/OFF switch, plug the PDU harness onto the ON/OFF switch.
6. Replace the top cap (refer to top cap replacement).
7. Reconnect all the cabinet components to the PDU.
8. Plug the power cord into the wall outlet or UPS.
9. The cabinet and computer are ready to be powered up.

Cabinet Leveler or Caster

Refer to item 19 or 20 in <Undefined Cross-Reference> while performing these procedures.

Leveler or Caster Removal:

1. Power down the cabinet using the appropriate procedure in Chapter 5 (Cabinet Operation).
2. Remove the power cord from the wall outlet or UPS.
3. Carefully move the cabinet to an area with enough room to allow the cabinet to be laid on its side.
4. Remove all computer components mounted in the cabinet.
5. Carefully lay the cabinet over on one of its sides.
6. Unscrew the desired leveler, or remove the desired caster by removing four mounting nuts and pulling the caster off.

Leveler or Caster Replacement:

1. With the cabinet still on its side, screw in the leveler, or place the caster over the four mounting studs, and attach the four mounting nuts. Tighten the nuts.
2. Carefully lift the cabinet back up to an upright position.
3. Install all computer components that were removed previously.
4. Carefully move the cabinet to its install site.
5. Plug the cabinet power cord into the wall outlet or UPS.
6. The cabinet is now ready for operation.

Magnetic Door Catch

The magnetic door catch is located in the rear door, with catch plate on the left side cover.

Magnetic Door Catch Removal:

1. Open the rear door.
2. Grasp the magnetic door catch on the top and bottom. It is inside the rear door fold.
3. Simultaneously press the top and bottom mounting tabs of the door catch, while pushing the door catch out of the rear door.
4. When the door catch mounting tabs are clear of the rear door opening, pull the door catch out.
5. If the door catch plate needs to be removed, pry it off with a flat blade screwdriver. It is stuck onto the side cover.

Magnetic Door Catch Replacement:

1. Align the magnetic door catch back to the mounting hole in the rear door.
2. Firmly press the door catch into the rear door mounting hole.
3. Press the door catch until the mounting tabs snap into place and the door catch is firmly locked into place.

4. If the door catch plate needs to be replaced, first peel the adhesive cover off the back of the catch plate. Then align it with the magnetic door catch and press it against the side cover until firmly stuck.

Door Bumper

The rear door bumpers (one top and one bottom) are self-adhesive rubber bumpers stuck to the rear door. To remove, pry it off with a flat blade screwdriver. To put a bumper on, peel off the adhesive cover, and press the bumper on the appropriate corner of the rear door.

Removal and Replacement Procedures
Removal and Replacement Procedures

A hp 3000 Configuration Information

For the most up-to-date configuration information, refer to the *HP 3000 900 Series Computer Systems Configuration Guide*.

Expansion Cabinet Racking

The HP 3000 Corporate Business System (CS) 99x supports the 1.6 Meter Expansion Cabinet for racking disks, tapes, Distributed Terminal Controllers (DTCs) and additional HP-PB I/O card cages. This is the same 1.6 Meter Cabinet that is supported on the 9x7 systems. The 1.6 Meter Cabinet provides 32 EIA (Electronic Industries Association) units of rack space (one EIA unit = 1.75 inches). Each component occupies a specific number of EIA units.

How to Order Cabinets and Peripherals

Cabinets can be ordered as a Factory Integrated product or as a Standalone product. The Factory Integrated Cabinet provides a choice of peripherals as options to the cabinet which are rack-mounted at the factory. Additional separate peripherals can be ordered as add-on products to the cabinet and rack-mounted at the customer site by a Customer Engineer (CE). The Standalone Cabinet and peripherals are both ordered as separate products. The Standalone Cabinet arrives unracked and all peripherals are rack-mounted into the cabinet at the customer site by a Customer Engineer.

Supported Racked Components

The Corporate Business System cabinet supports a variety of disk drives, tape drives, DTCs and the HP-PB I/O Card Cage. Combinations of supported products are limited only by space inside the cabinet and 16-amp maximum current limit. Factory Integrated Cabinets have been structured so that all orderable configurations will not exceed the 16-amp maximum current limit. When configuring cabinets to be installed in the field, the configuration should be checked to ensure it does not exceed 16-amp maximum current limit.

Table A-1 Components Supported in the 1.6 Meter Cabinets

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
Tape Drives¹					
7979A	1/2-inch tape drive (HP-IB)	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980A	1/2-inch tape drive (HP-PB)	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
7980XC	1/2-inch tape drive (HP-IB)	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980S	1/2-inch tape drive (SCSI)	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980SX	1/2-inch tape drive (SCSI)	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
Series 6000 SCSI Multi-Mechanism Package³ (also available as integrated cabinet option)					
C3040R/RZ	One 2 GB 3 1/2-inch SCSI disk	4	Included	3.0 A	1.8 A
C3041R/RZ	Two 2 GB 3 1/2-inch SCSI disks	4	Included	3.0 A	1.8 A
C3042RZ	Three 2 GB 3 1/2-inch SCSI disks	4	Included	3.0 A	1.8 A
C3550R	One 2 GB 3 1/2-inch Fast/Wide/Differential SCSI disk	4	Included	3.0 A	1.8 A
C3551R/RZ	Two 2 GB 3 1/2-inch Fast/Wide/Differential SCSI disks	4	Included	3.0 A	1.8 A
C3553R/RZ	Three 2 GB 3 1/2-inch Fast/Wide/Differential SCSI disks	4	Included	3.0 A	1.8 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C5254R/RZ	One 2 GB 3 1/2-inch low-profile SCSI disk	4	Included	3.0 A	1.8 A
C5255R/RZ	Two 2 GB 3 1/2-inch low-profile SCSI disks	4	Included	3.0 A	1.8 A
C5256RZ	Three 2 GB 3 1/2-inch low-profile SCSI disks	4	Included	3.0 A	1.8 A
C5258R	One 2 GB 3 1/2-inch Fast/Wide/Differential disk	4	Included	3.0 A	1.8 A
C5259R/RZ	Two 2 GB 3 1/2-inch Fast/Wide/Differential disks	4	Included	3.0 A	1.8 A
C5260RZ	Five 2 GB 3 1/2-inch Fast/Wide/Differential disks	4	Included	3.0 A	1.8 A
C5262R/RZ	One 4 GB 3 1/2-inch SCSI disk	4	Included	3.0 A	1.8 A
C5264R/RZ	One 4 GB 3 1/2-inch Fast/Wide/Differential disk	4	Included	3.0 A	1.8 A
C5265RZ	Five 4 GB 3 1/2-inch low-profile Fast/Wide/Differential disks	4	Included	3.0 A	1.8 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C2466R	Up to 8 GB data compression DAT	4	Included	2.6 A	1.5 A
Fast/Wide SCSI Options					
A3331A	Model 10 Disk Array	7	Included	4.0 A	2.0 A
A3388A	Model 10 Disk Array	7	Included	4.0 A	2.0 A
A3232A	Model 20 Disk Array	9	Included	8.0 A	4.0 A
A3389A	Model 20 Disk Array	9	Included	8.0 A	4.0 A
C2436HA	2 GB F/W SCSI Disk Array (3 x 1 GB)	6	Included	2.9 A	1.7 A
C2437HA	4 GB F/W SCSI Disk Array (5 x 1 GB)	6	Included	2.9 A	1.7 A
C2439JA/JZ	3 x 2 GB F/W SCSI Disk Array	6	Included	5.2 A	3.0 A
C2440JA/JZ	5 x 2 GB F/W SCSI Disk Array	6	Included	5.2 A	3.0 A
HP-FL Disk Arrays³					
C3660R	1 GB S/E disk	4	Included	3.0 A	1.8 A
C3662R	1 GB Fast/Wide/Differential disk	4	Included	3.0 A	1.8 A
C2258HA/HZ	4.0 GB high availability disk array	6	Included	5.3 A	3.2 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C2259HA/HZ	8.0 GB high availability disk array	6	Included	5.3 A	3.2 A
C2258B/BZ	4.0 GB disk array with 2 disks	6	Included	5.3 A	3.2 A
C2259B/BZ	8.0 GB disk array with 4 disks	6	Included	5.3 A	3.2 A
Datacomm and Terminal Controllers					
J2060AZ	DTC 16TN	1	Included (for optional kit E3664A)	0.5 A	0.25 A
J2070A(Z)	DTC 72MX	3-10	Option 1AC (standalone)	1.8 A	0.9 A
2345A	DTC 48	6	Kit #C2799A	2.0 A	1.0 A
2340A	DTC 16	6	Kit #35199E	2.0 A	1.0 A
Expansion Modules					
A1828AZ	HP-PB I/O Expansion Module	7	Included	6.5 A	3.5A
HP PowerTrust Uninterruptible Power Systems					
A2998A, ODZ	3.0 kVA UPS	12	Included	N/A	N/A
A3589A, OD1	5.5 kVA UPS	14	Included	N/A	N/A
High Availability Storage Systems					
A3312A		6	Included	7.5 A	3.5 A
A3312AZ		6	Included	7.5 A	3.5 A
High Availability Fast/Wide SCSI Disk Array Options					
A3231A	2.1 GB - Model 10	7	Included	4.0 A	2.0 A
A3388A	4.2 GB - Model 10	7	Included	4.0 A	2.0 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
A3232A	2.1 GB - Model 20	9	Included	8.0 A	4.0 A
A3389A	4.2 GB - Model 20	9	Included	8.0 A	4.0 A
Rackmounting Hardware					
C2788A	Generic Rail Kit for nonstandard 19-inch peripherals	1	Included	N/A	N/A
C2792A	ADP Rackmount Kit for rear of cabinet	none	Included	N/A	N/A
Anti-Tip Ballast					
C2790A	Anti-tip ballast 14 Kg (30 lbs)	none	Included	N/A	N/A
Filler Panels					
C2791A	Package of Six One-EIA-Unit Filler Panels				
¹ Three anti tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms. for 200V-240V power, order power cord (8120-1860).					
² 1/2-inch tape drives require 5 EIA units for the mechanism plus 1 EIA unit for access to the tape drive handle.					
³ If HP-FL disk is the bottom-most racked device in the cabinet, add two EIA space units. This will allow ample space for cables coming into the bottom of the cabinet.					

Factory Integrated Expansion Cabinet

For quick, easy ordering, and installation, the Factory Integrated Expansion Cabinet (A1884A) is the desired racking choice. The integrated cabinet contains options for SCSI disk or SCSI disk/tape, PB-FL disk, DTCs, and HP-PB I/O Card Cages. An integrated cabinet with an option for a disk allows software and subsystem software to be pre-loaded at the factory.

Certain add-on peripherals NOT in the Integrated Expansion Cabinet product structure can be installed at the customer site. (These include Series 6000 SCSI DDS, 7980, 7980XC tape drives, and 4280 cartridge tape drives.) Peripherals that are part of the Integrated Expansion Cabinet can also be ordered later as standalone and installed at the customer site.

Refer to the *HP 3000 Series 900 Computer Systems Configuration Guide* for a list of orderable products. Refer to the "Factory Integrated Expansion Cabinet Racking Configuration Worksheet" in this chapter for a list of supported options and add-on peripherals and their EIA units.

Integrated Cabinet Racking Configuration Worksheet

The Factory Integrated Expansion Cabinet Racking Configuration Worksheet (following page) illustrates the integrated expansion cabinet options and add-on products. Use the worksheet to determine supportability of the proposed peripheral and HP-PB I/O Card Cage Racking Configuration. Use the worksheet as follows:

1. After entering the proposed configuration in the quantity column, multiply the quantity entered for each peripheral and card cage by the EIA number given for each component.
2. Sum all of the components to ensure that the total EIA units are less than or equal to 32. If more than 32 EIA units an additional Expansion cabinet must be ordered.

NOTE	If add-on peripherals are ordered with the Factory Integrated Expansion Cabinet, ensure that enough unracked space is left to install additional peripherals.
-------------	---

Table A-2 Factory Integrated Expansion Cabinet Racking Configuration Worksheet

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
I.	A1884A 1.6 meter cabinet <i>The A1883A 1.1 meter cabinet is not available for the 99x Systems. Filler panels to cover unused space will be installed automatically at the factory for integrated cabinet products.</i>					
	Power Options:					
	ABA - Adds U.S. 200V - 240V power					
	ABB - Add European 200V - 240V power					
	021 - For connection to UPS in primary cabinet					
	022 - For connection to UPS in primary cabinet - U.S. power A1884A only)					
	023 - For connection to UPS in primary cabinet - European power (A1884A only)					

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	Factory Integrated Mass Storage Products (See <Undefined Cross-Reference>):					
			X		=	
			X		=	
			X		=	
			X		=	
			X		=	
	DTC Products:					
	J2070AZ - Adds DTC72MX		X	3	=	
	Option 001 - Configure DTC72MX with 24 direct ports		X	1	=	
	Option 002 - Configure DTC72MX with 48 direct ports		X	2	=	
	Option 003 - Configure DTC72MX with 72 direct ports		X	3	=	

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	Option UG4 - Configure DTC72MX with 24 RS-423 direct ports		X	1	=	
	Option UG5 - Replace eight RJ-45 direct ports with eight DB-25 modem ports, on 1 modem distribution panel (MDPs). Must order option 001, 002, or 003.					
	Option UG6 - Replace 24 RJ-45 direct ports with 24 DB-25 modem ports, on 3 modem distribution panel (MDPs). Must order option 001, 002, or 003.		X	-1	=	

hp 3000 Configuration Information
Expansion Cabinet Racking

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	To rack a 1.1 or 1.6 meter expansion cabinet, order a model distribution panel (MDP) rack mounting hardware kit:					
	C2792AZ for rear mounting up to five MDPs or		X	6	=	
	J2084AZ for front mounting up to five MDPs or		X	7	=	
	J2087AZ for front/rear mounting up to ten MDPs		X	7	=	

Component	Quantity		EIA Units		Vertical Space Required (EIA units)
	<p>For example, to configure 48 modem ports and 24 direct ports, order: One option 003 (provides 72 ports), two option UG6 (provides 48 modem ports on six MDPs), one J2087AZ (provides racking for up to ten MDPs)</p>				
	<p>Option 1CW - Add X.25 card with RS-232 interface</p>				
	<p>Option 1CX - Add X.25 card with V.35 interface</p>				
	<p>Option 004 - Add Telnet Access Card</p>				
	<p>These options do not require additional EIA units.</p>				
<p>Continued on next page</p>					

hp 3000 Configuration Information
Expansion Cabinet Racking

Component	Quantity		EIA Units		Vertical Space Required (EIA units)
	<p><i>Note: The DTC72MX comes with three slots. Option 001 consumes one slot, 002 consumes two, and 003 consumes three. Options 1CW, 1CX, and 004 each take one slot. The maximum number of X.25 cards per DTC72MX is three. One Telnet Access Card is allowed per DTC72MX. A Telnet Access Card and an X.25 card can be used in the same DTC.</i></p>				
	<p>HP-PB I/O Card Cage (Corporate Business Servers only)</p>				

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	A1828A - Adds HP-PB I/O card cage with 14 single-high card slots, 10 meter HP-PB Dual Cable, and lower bus converter. Racking hardware for the HP-PB I/O card cage is included.		X	7	=	
II	Add-on Mass Storage ^{1,2,3,4}					
	Not factory racked. Filler panels and rackmount kits must be ordered for add-on peripheral products.					
			X		=	
			X		=	
			X		=	
			X		=	

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
III.	Optional Power Protection					
	A3589A - 5.5 kVA HP PowerTrust UPS		X	15	=	
	A2998A - 3 kVA HP PowerTrust UPS		X	12	=	
	A2997A - 1.8 kVA HP PowerTrust UPS		X	9	=	
	A2996A - 1.3 kVA HP PowerTrust UPS		X	6	=	
IV.	Total EIA Units (must be ≤32)				=	
If number of EIA units is greater than 32, more than one cabinet is required.						
¹ Stacker requires ten inch clearance above and below tape drives, therefore devices racked above or below the 4280 must not have front panel accessibility.						
² Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms.						
³ Current leading-industry disks require a UPS for powerfail protection.						

Standalone Expansion Cabinet

A Standalone Expansion Cabinet (C2786A) is available for customers who decide to order all peripherals and HP-PB I/O Card Cages separately. When configuring an expansion cabinet, ensure that all appropriate components (filler panels and peripheral rack mounting kits) are ordered to successfully complete racking and that the configuration does not exceed the 16-amp current limit of the cabinet. The Standalone Cabinet arrives

unracked and all peripherals are rack-mounted into the cabinet at the customer site by a Customer Engineer. Refer to the "Standalone Expansion Cabinet Configuration Worksheet" for a list of supported components along with their EIA space units.

Standalone Expansion Cabinet Product Structure

Table A-3

Product Number	Description
C2786A	1.6 meter cabinet (32 EIA units) same as for 9x7 family
AW3	100V - 120V North American
AW4	200V - 240V North American
AW5	200V - 240V International
C2791A	Adds six 1-unit filler panels
A40101A - A40107A	Adds up to 7 filler panels

Standalone Cabinet Racking Configuration Worksheet

Use the racking configuration worksheet on the following page to determine supportability of the proposed peripheral and HP-PB I/O Card Cage Configuration. Use the worksheet as follows:

1. After entering the proposed configuration in the quantity column, multiply the quantity entered for each peripheral and card cage by the EIA number given for each component.
2. Sum all the components to ensure that the total EIA units are less than or equal to 32. If more than 32 EIA units an additional Expansion Cabinet must be ordered.
3. Sum the current requirements of all components to ensure the 16-amp current limit is not exceeded.

The Standalone Expansion Cabinet Racking Configuration Worksheet illustrates the standalone cabinet products.

Table A-4 Standalone Expansion Cabinet Racking Configuration Worksheet

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
I.	C2786A 1.6 meter racking cabinet <i>The C2785A 1.1 meter cabinet is not available for the 99x Systems. Filler panels to cover unused space must be ordered separately.</i>					
	Power Cords:					
	AW3 - 100V - 120V North American					
	AW4 - 200V - 240V North American					
	AW5 - 200V - 240V International					
	Mass Storage Products ^{1,2,3,4,5} (See <Undefined Cross-Reference>):					
			X		=	
			X		=	
			X		=	

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
			X		=	
			X		=	
	<i>Add two EIA unit panels if HP-FL disk is the bottom-most racked device in cabinet. (Allows room for cables.) Racking hardware for ALL disks is included.</i>					
	DTC Products:					
	J2070AZ - Adds DTC72MX		X	3	=	
	Option 001 - Configure DTC72MX with 24 direct ports		X	1	=	
	Option 002 - Configure DTC72MX with 48 direct ports		X	2	=	
	Option 003 - Configure DTC72MX with 72 direct ports		X	3	=	

hp 3000 Configuration Information
Expansion Cabinet Racking

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	Option UG4 - Configure DTC72MX with 24 RS-423 direct ports					
	Option 1AC - To rack a 1.1 or 1.6 meter cabinet, order a DTC racking kit.		X	0	=	
	Option UG5 - Replace eight RJ-45 direct ports with eight DB-25 modem ports, on 1 modem distribution panel (MDPs). Must order option 001, 002, or 003.					
	Option UG6 - Replace 24 RJ-45 direct ports with 24 DB-25 modem ports, on 3 modem distribution panel (MDPs). Must order option 001, 002, or 003.		X	-1	=	

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	To rack a 1.1 or 1.6 meter expansion cabinet, order a model distribution panel (MDP) rack mounting hardware kit:					
	C2792A for rear mounting up to five MDPs or		X	6	=	
	J2084A for front mounting up to five MDPs or		X	7	=	
	J2087A for front/rear mounting up to ten MDPs		X	7	=	

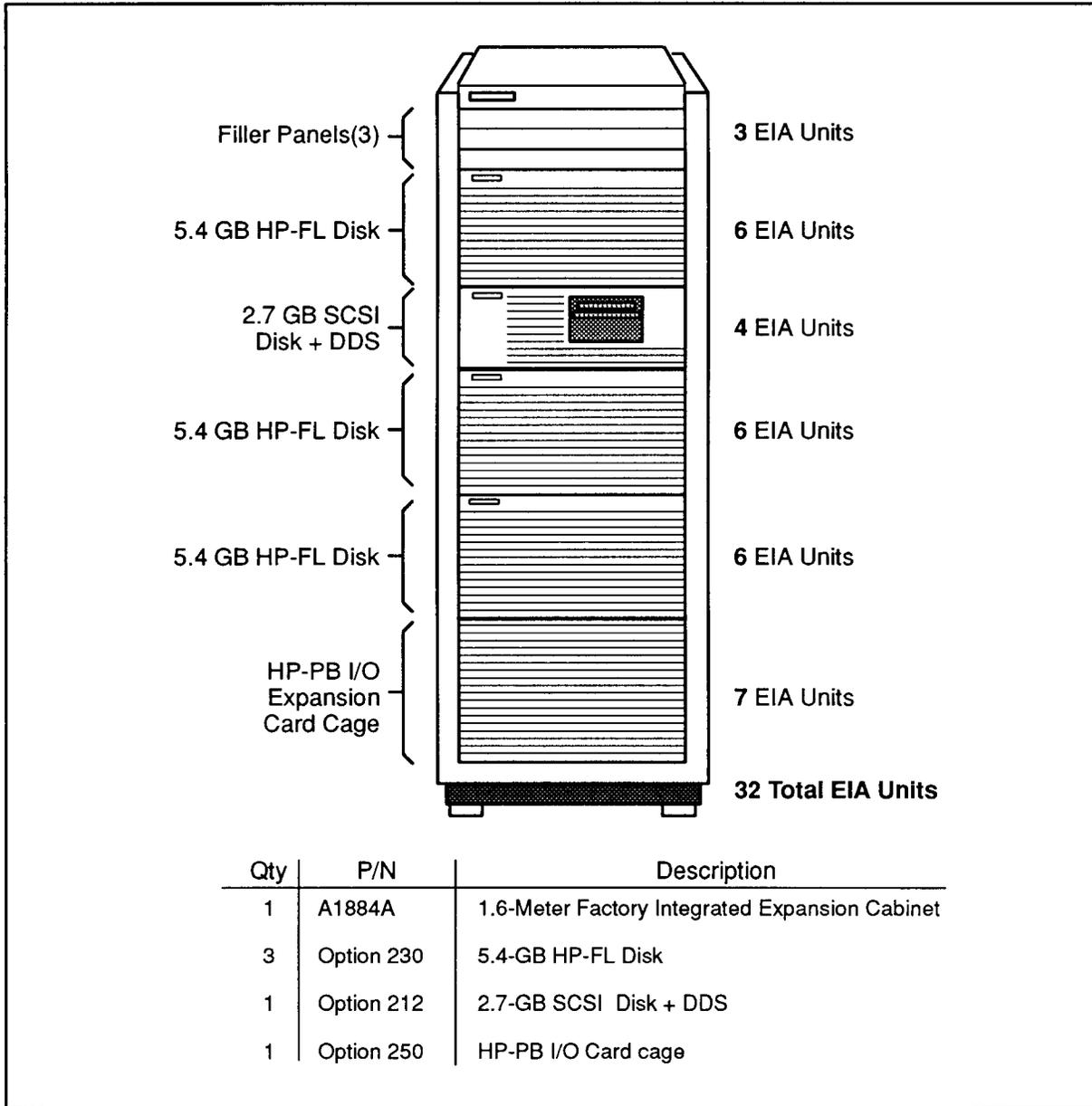
Component	Quantity		EIA Units			Vertical Space Required (EIA units)
	<p>For example, to configure 48 modem ports and 24 direct ports, order: One option 003 (provides 72 ports), two option UG6 (provides 48 modem ports on six MDPs), one J2087A (provides racking for up to ten MDPs)</p>					
Continued on next page						
	<p>Option 1CW - Add X.25 card with RS-232 interface</p>					
	<p>Option 1CX - Add X.25 card with V.35 interface</p>					
	<p>Option 004 - Add Telnet Access Card</p>					
	<p>These options do not require additional EIA units.</p>					

Component	Quantity		EIA Units		Vertical Space Required (EIA units)
	<p><i>Note: The DTC72MX comes with three slots. Options 001 consumes one slot, 002 consumes two, and option 003 consumes three. Options 1CW, 1CX, and 004 each take one slot. The maximum number of X.25 cards per DTC72MX is three. One Telnet Access Card is allowed per DTC72MX. A Telnet Access Card and an X.25 card can be used in the same DTC.</i></p>				
	<p>HP-PB I/O Card Cage (Corporate Business Servers only)</p>				

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
	A1828A - Adds HP-PB I/O card cage with 14 single-high card slots, 10 meter HP-PB Dual Cable, and lower bus converter. Racking hardware for the HP-PB I/O card cage is included.		X	7	=	
II.	Optional Power Protection					
	A3589A - 5.5 kVA HP PowerTrust UPS		X	14	=	
	A2998A - 3 kVA HP PowerTrust UPS		X	12	=	
	A2997A - 1.8 kVA HP PowerTrust UPS		X	9	=	
	A2996A - 1.3 kVA HP PowerTrust UPS		X	6	=	

Component		Quantity		EIA Units		Vertical Space Required (EIA units)
III.	Filler Panels					
	C2791A - Adds six 1 EIA unit filler panels					
	A40101A - A40107A - Adds up to 7 filler panels					
	<i>Racking hardware for DDS is included.</i>					
IV.	Total EIA Units (must be ≤32)				=	
If number of EIA units is greater than 32, more than one cabinet is required.						
¹ Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms.						
² Stacker requires ten inch clearance above and below tape drive, therefore devices racked above or below the 4280 must not have front panel accessibility.						
³ All new disks require option 002 or 003 for HP 3000 to ensure correct firmware and option 0DG for field service installaion.						
⁴ Must order MPE/iX 4.0 plus power patch or 5.0 for the C2258/59 disk arrays. This patch can be obtained through Powerpatch or by ordering C3300A.						
⁵ Current leading-industry disks require a UPS for powerfail protection.						

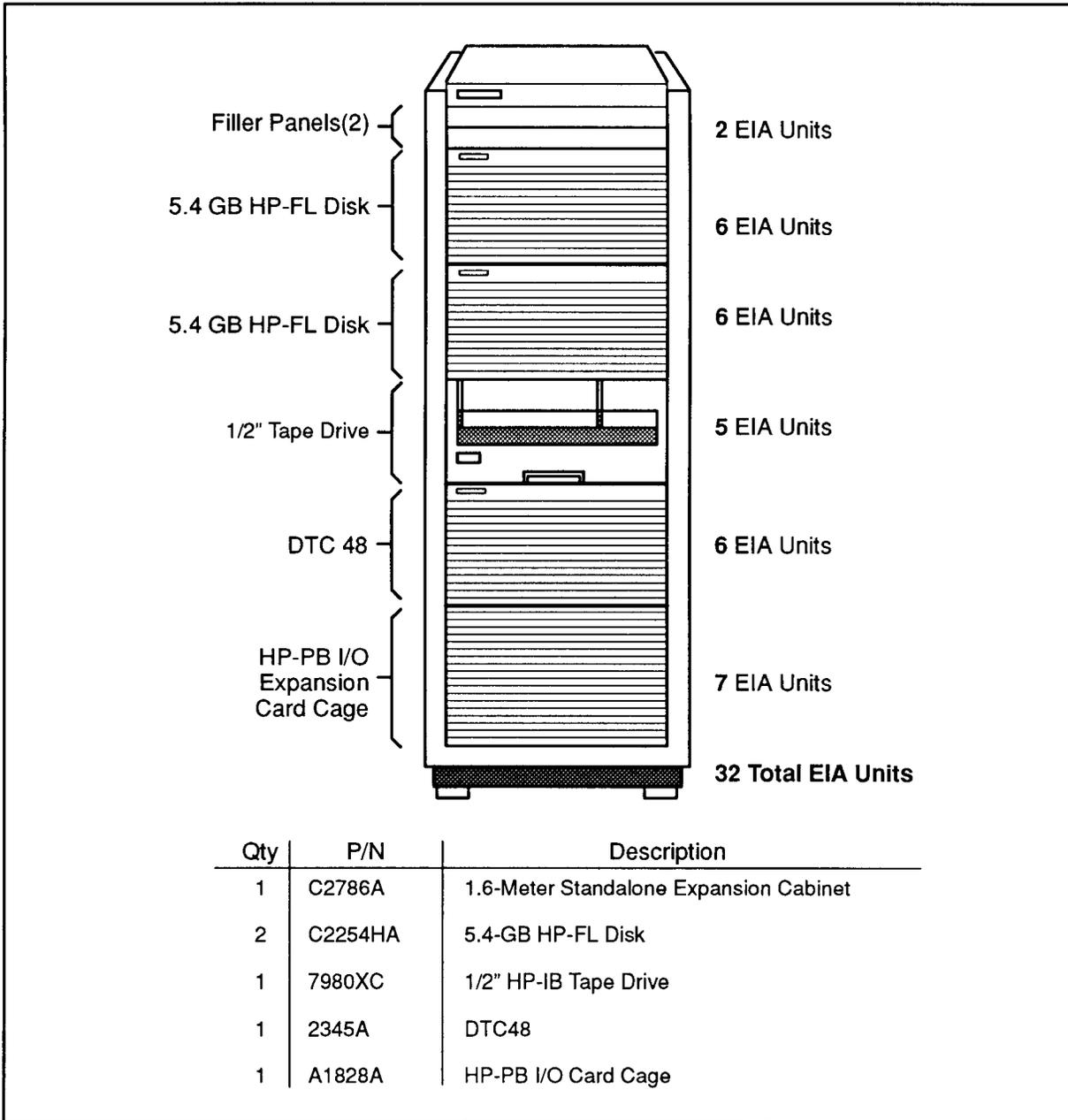
Figure A-1



LG200205_013

1.6 Meter Factory Integrated Expansion Cabinet Configuration Example

Figure A-2



1.6 Meter Standalone Expansion Cabinet Configuration Example

NOTE This configuration requires the following racking hardware:

- C2799A - DTC
- 7980XC option 1A4

Cabling and Racking Configuration Guidelines

To ensure that peripheral devices and corresponding 1.6 Meter Expansion Cabinets are configured correctly, interconnect cable length limits must be adhered to.

CS 99x Racking Configuration Examples

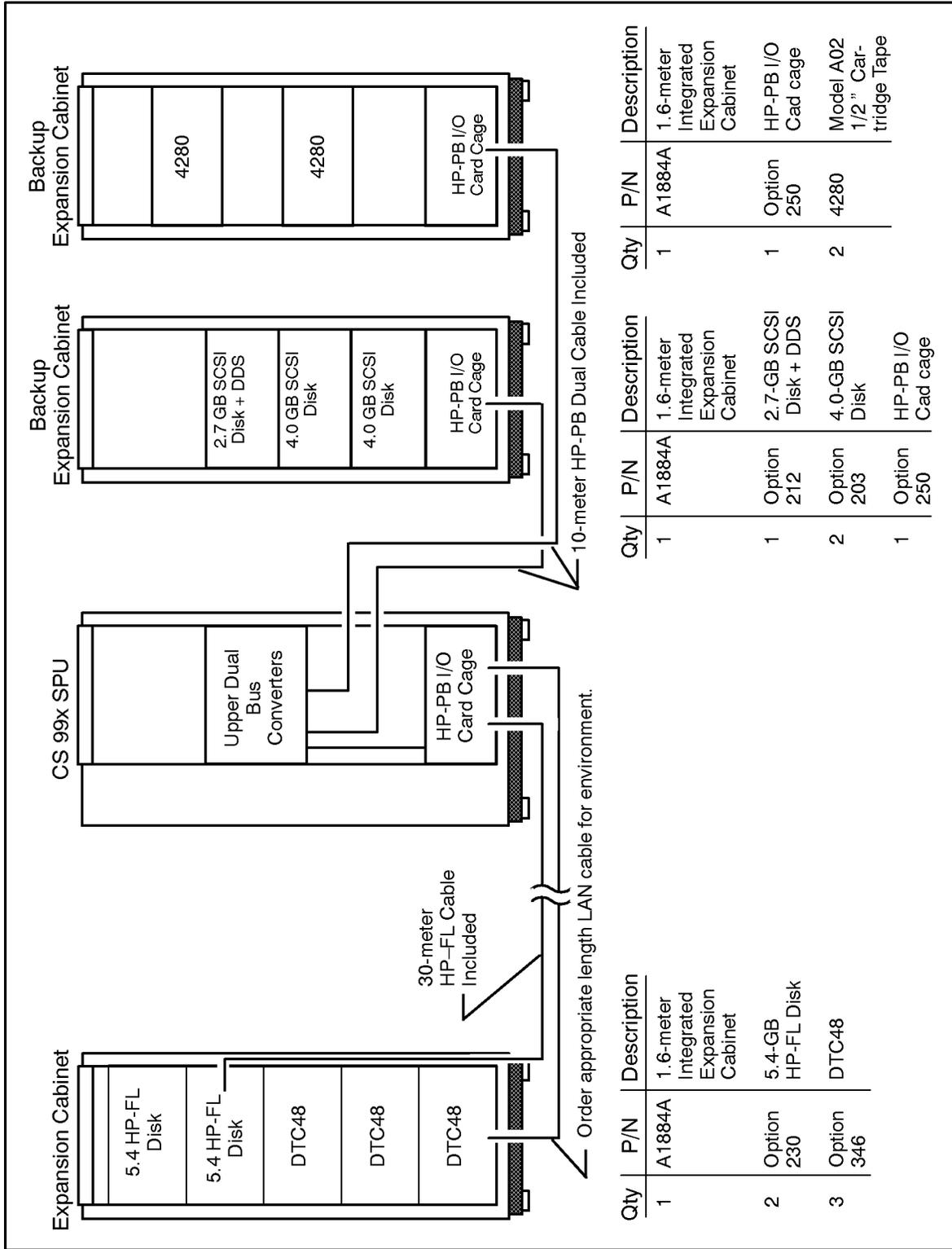
The illustrated configuration in <Undefined Cross-Reference> is an example of a 99x System racking arrangement as dictated by cable length limits. The system consists of one SPU cabinet and one cabinet for disk drives and DTCs, and two backup cabinets.

The SPU cabinet houses the HP-PB I/O Card Cage for the Expansion Cabinet to the left of the SPU in the illustration. The racked components in the cabinet are HP-FL 5.4 GB disks and DTC48s. The Fiber Link interface card ships standard with a 30 meter cable. A custom length cable of up to 500 meters can be ordered if required. The cable for connection of the LAN card to the DTC ships standard with a length of 4 meters. A custom length DTC cable can be ordered for extended lengths. The custom length cables for the HP-FL and DTC mentioned above allow flexible racking configurations and distances between Expansion Cabinets.

The two cabinets to the right of the SPU cabinet (each containing SCSI devices) house their own HP-PB I/O Card Cage. The card cages are racked in each Expansion Cabinet to bypass the limited cable length of 2.5 meters between the SCSI card and the first SCSI device. The SCSI cable provided with the base SPU is 2.5 meters. To resolve the distance restriction, an HP-PB I/O Card Cage can be mounted in each expansion cabinet (as shown in the illustration) to allow the use of a 10 meter HP-PB Dual Cable.

A SCSI Bus has a maximum supported cable length of 6 meters, including internal, interconnect, and external cables of SCSI devices. In order to connect a SCSI card housed in the Expansion Cabinet, no more than a maximum of 2 Series 6000 multi-mechanism packages can be racked and still remain within the 6 meter length (each Series 6000 package utilizes 1.5 meters internal cable length and .5 meters of interconnect cabling for "daisy chaining" of SCSI packages). If a greater separation distance is required between the SPU and the expansion cabinet housing the SCSI devices, then the HP-PB I/O Card Cage containing the SCSI should be in the same cabinet as the SCSI device. Refer to the "SCSI Racking Examples" in this section for additional racking examples.

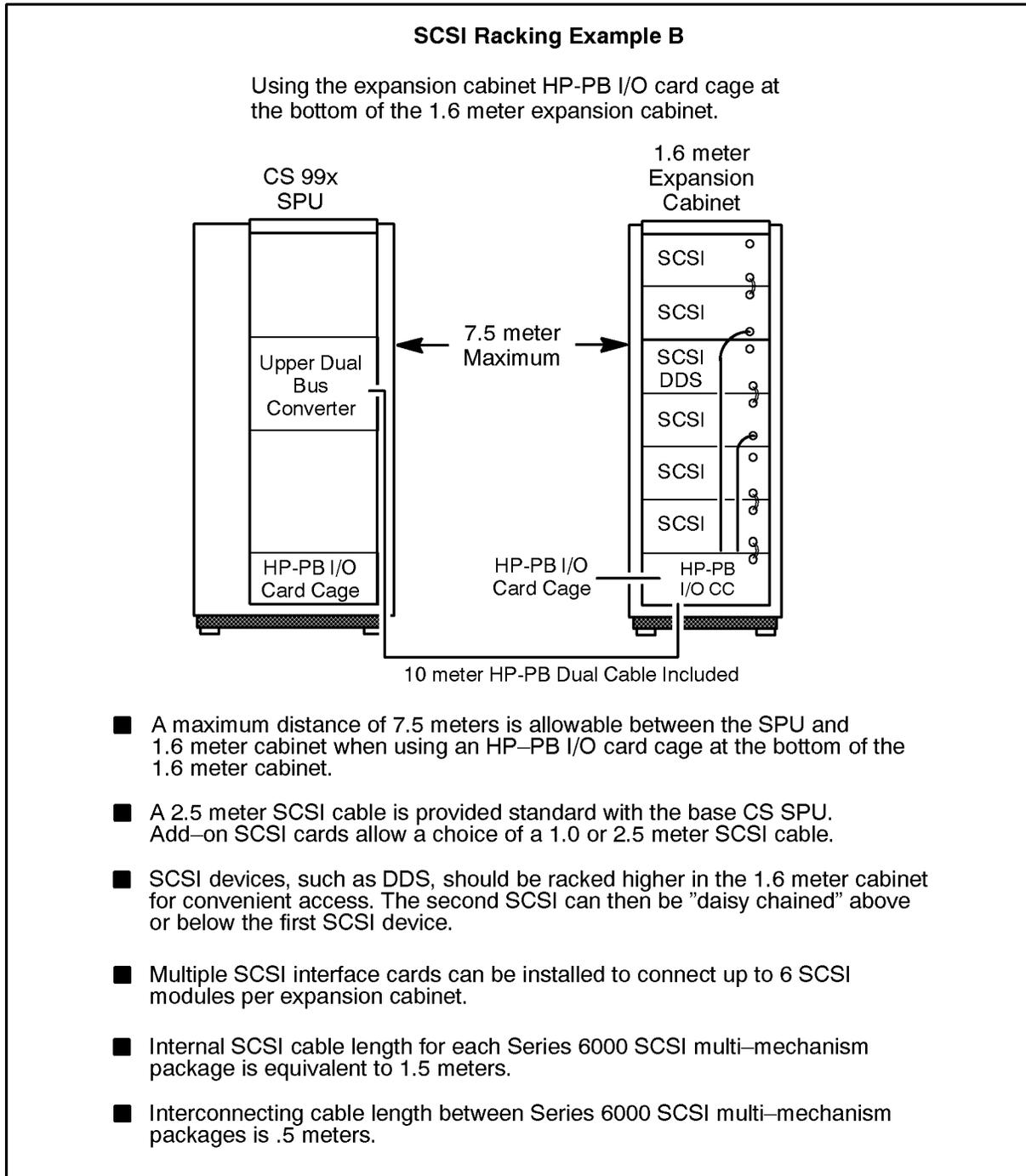
Figure A-3 CS 990/992, 991/995 Racking Configuration Example



LG200205_012c

CS 990/992, CS 991/995 Racking Configuration Example

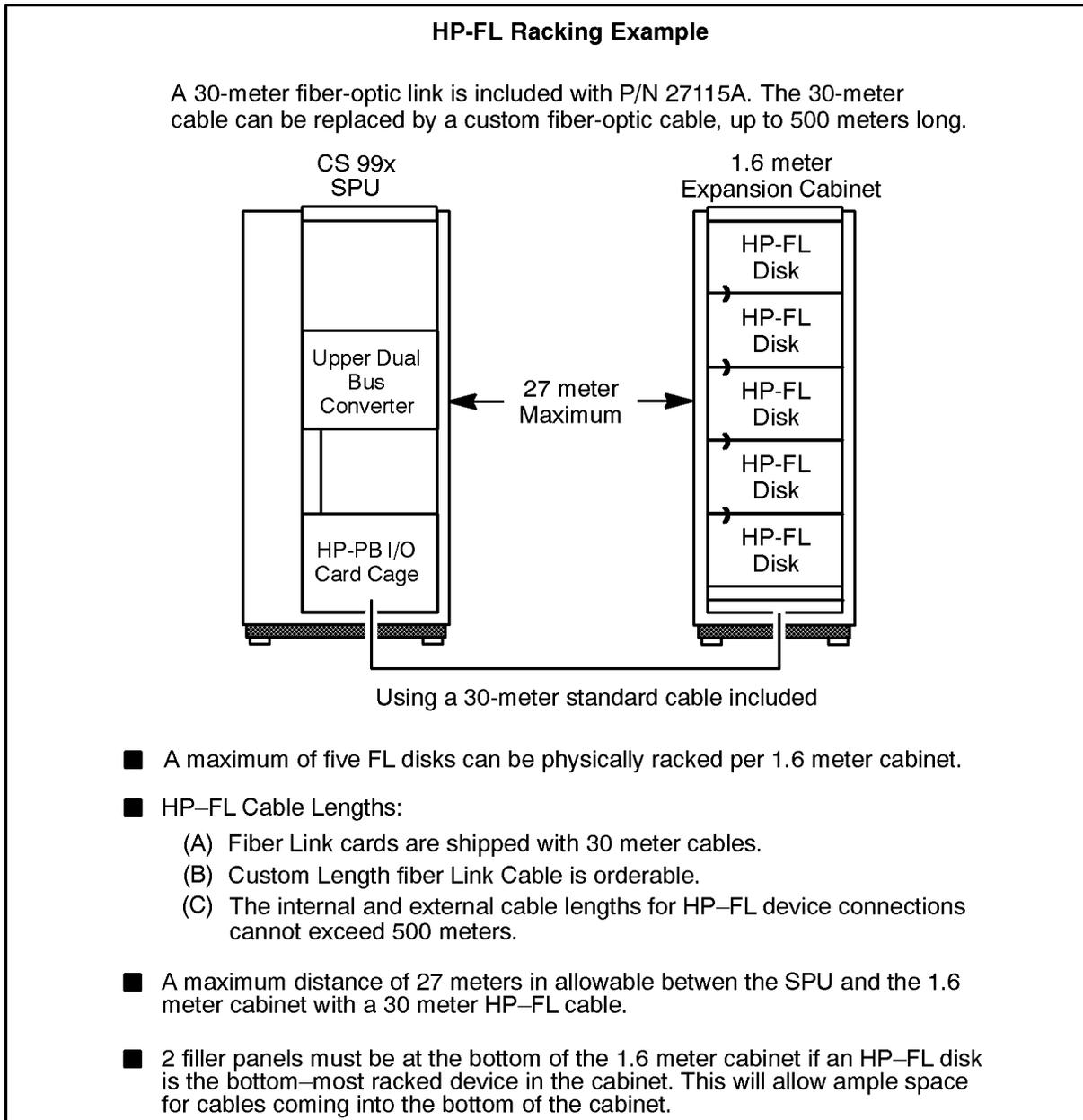
Figure A-5 SCSI Racking Example B



LG200205_011a

HP-FL Racking Example

Figure A-6 HP-FL Racking Example



LG200205_008a

SCSI Extender Guidelines

The SCSI extender (P/N 28643A) is only recommended for customers who must have greater cabling flexibility than the 6-meter SCSI cable length provides.

The SCSI extender is supported for use with the Rewriteable Optical Autochangers and the HP 5000 High End Printer only. The extender is available in 50-meter and 100-meter cable lengths. The SCSI extender has performance implications when used with SCSI

devices that are asynchronous. The Optical Autochangers have asynchronous interfaces and therefore performance can be impacted by as much as 50%. The F100 printer has a synchronous interface and therefore should see little performance degradation when connected to the extender.

B HP 9000 Configuration Information

Introduction

All disks, tapes, CD-ROMS, and other rack-mounted peripherals for the HP 9000 Corporate Business Server T-Class Family may be separately installed in one or more of the A1897A 1.6 meter expansion cabinets. A typical CS T-Class server will consist of the SPU and three or more expansion cabinets.

The expansion cabinet and all rack-mounted peripherals can be ordered as separate products, or as an Integrated Cabinet, which offers several commonly-used peripherals as options to that cabinet (additional separate peripheral products can also be added to the Integrated Cabinet).

NOTE Peripherals ordered as Integrated Cabinet options are mounted in the cabinet at the factory, but installation of interconnecting cables and configuration into the system are done as part of field installation.

For the most current configuration information, refer to the *HP 9000 Enterprise Servers Configuration Guide* (PN 5965-4749E).

Cabling and Racking Considerations

To properly configure systems using external peripherals in the expansion cabinet, it is important to understand the racking considerations, and the limits that are imposed by the interconnect cables, as described below.

General Racking Considerations

The A1897A 1.6-meter expansion cabinet contains 32 EIA (Electronic Industries Association) units of space for racking peripherals. Each peripheral occupies a specific number of EIA units. Refer to Chapter 4, "Cabinet Configurations," for specific rules on racking peripherals.

Standalone Cabinets

Standalone expansion cabinets must be ordered with rack-mount kits for each component to be installed, as well as filler panels for the empty spaces remaining in the cabinet. Refer to <Undefined Cross-Reference> to determine how much space (in EIA units) will be filled by servers and peripherals. The remaining empty space will require filler panels. Each filler panel covers one EIA unit of space.

NOTE	The A1897A 1.6-meter expansion cabinet comes with two filler panels.
------	--

Anti-Tip Ballasts

Racks with 1/2-inch tape drives are unstable without anti-tip ballasts (counter-weights). Three C2790A ballasts are required when installing one or more 1/2-inch tape drives. Ballasts are installed in the bottom of the expansion cabinet and do not consume any EIA units.

Integrated Cabinets

Integrated expansion cabinets have rack-mount kits and filler panels installed at the factory. Certain peripherals are not available as factory-mounted components, and must be installed as add-on peripherals (e.g., HP 7980 Tape Drive).

Supported Peripherals

<Undefined Cross-Reference> lists the peripherals and hardware components supported in the A1897A expansion cabinet for configuration in a T-Class server.

WARNING Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drives.

Table B-1 Peripherals Supported in the A1897A Expansion Cabinet

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
Tape Drives					
7979A ¹	1/2-inch tape drive	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980A ¹	1/2-inch tape drive	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980XC ¹	1/2-inch tape drive	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980S ¹	1/2-inch tape drive	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980SX ¹	1/2-inch tape drive	6 ²	Opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
Single-Ended SCSI Disks DAT Tapes					
C2466R	Up to 8 GB data compression DAT Rackmount Storage System	4	Included	2.6 A	1.5 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C2467RZ	Rackmount Storage System containing 2 units of the data compression DAT (up to 8 GB per drive)	4	Included	2.6 A	1.5 A
C3040R/RZ	2 GB Half-Height Disk Storage System Rackmount	4	Included	3.0 A	1.8 A
C3041R/RZ	2 x 2 GB Half-Height Disk Storage System Rackmount	4	Included	3.0 A	1.8 A
C3042RZ	3 x 2 GB Half-Height Disk Storage System Rackmount	4	Included	3.0 A	1.8 A
High Availability Fast/Wide SCSI Disk Array Options					
A3231A	16.8 GB High Availability Disk Array Model 10	7	Included	4 A	2 A
A3232A	33.6 GB High Availability Disk Array Model 20	9	Included	8 A	4 A
HP-FL Disk Arrays					
C2258HA/HZ	4 GB High Availability Disk Array	6	Included	5.3 A	3.2 A

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C2259HA/HZ	8 GB High Availability Disk Array	6	Included	5.3 A	3.2 A
C2258B/BZ	4 GB Disk Array with 2 disks	6	Included	5.3 A	3.2 A
C2259B/BZ	8 GB Disk Array with 4 disks	6	Included	5.3 A	3.2 A
Data Terminal Connects					
J2060AZ	DTC 16TN	1	Included	.5 A	.25 A
J2070AZ	DTC 72MX	3	Opt. 1 AC (or optional kit C2788A)	2.2 A	1.1 A
2340A	DTC 16	6	Kit # 35199E	2 A	1A
2345A	DTC 48	6	Kit # C2799A	2 A	1A
Expansion Module					
A1828A	HP-PB I/O Expansion Module	7	Included	n/a	3 A
Rackmounting Hardware and Ballast					
C2788A	Generic Rail Kit for Non-standard 19-inch Peripherals	1	Included	n/a	n/a
C2792A	ADP Rackmount Kit for Rear of Cabinet	None	Included	n/a	n/a
C2790A	Anti-Tip ballast - 14kg (30 lbs)	None	Included	n/a	n/a
Fast/Wide SCSI Options					

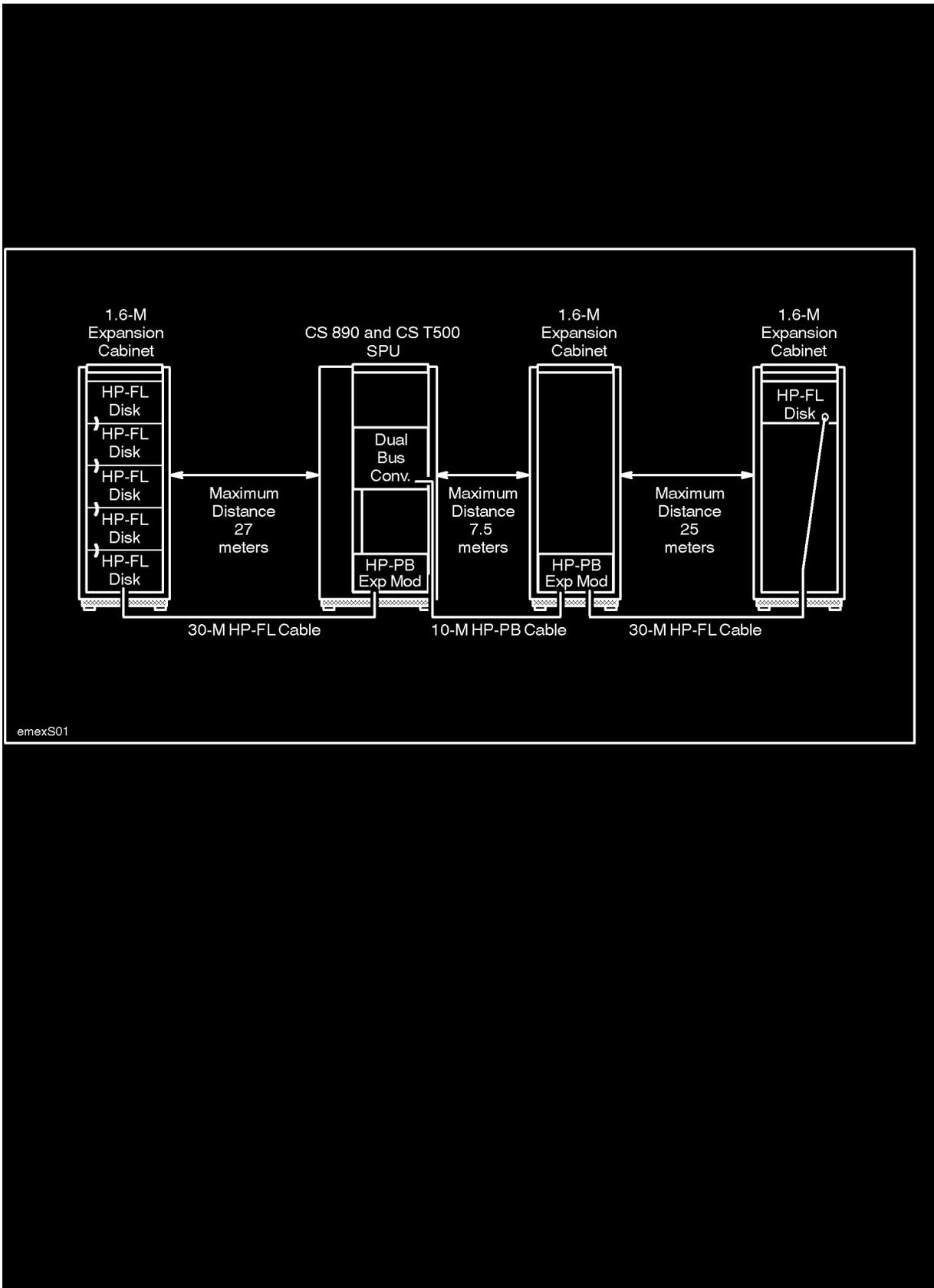
Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
C2440JA/JZ	5 x 2 GB F/W SCSI Disk Array	6	Included	5.2 A	3.0 A
C2439JA/JZ	3 x 2 GB F/W SCSI Disk Array	6	Included	5.2 A	3.0 A
C2437HA/HZ	5 x 1 GB F/W SCSI High Availability Disk Array	6	Included	2.9 A	1.7 A
C2436HA/HZ	3 x 1 GB F/W SCSI High Availability Disk Array	6	Included	2.9 A	1.7 A
C3550R	2 GB FWD SCSI Storage System	4	Included	2.3 A	1.2 A
C3551R/RZ	4 GB F/W SCSI Storage Subsystem	4	Included	2.3 A	1.2 A
C3553RZ	8 GB F/W SCSI Storage Subsystem	4	Included	2.3 A	1.2 A
¹ Three anti tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms. for 200V-240V power, order power cord (8120-1860).					
² 1/2-inch tape drives require 5 EIA units for the mechanism plus 1 EIA unit for access to the tape drive handle.					

HP-PB I/O Card Cage

On a T-Class System, an external HP-PB I/O card cage is linked to a Bus Converter in the SPU by a 10-meter HP-PB cable-pair (two separate cables, side by side). As shown in <Undefined Cross-Reference>, the maximum distance between the SPU and the expansion cabinet containing the HP-PB I/O card cage is about 7.5 meters (this distance allows for

cable routing underneath a raised floor). With this maximum spacing, up to twelve expansion cabinets may be placed between the SPU and the cabinet with the HP-PB I/O card cage.

Figure B-1 HP-FL Sample Configuration



HP-FL Connections

The total length of external and internal cabling for HP-FL device connections cannot exceed 500 meters. For most installations, this maximum distance is not a restriction, making HP-FL the best choice when disks and the SPU need to be placed in separate locations.

HP-FL interface cards are supplied with a 30-meter HP-FL cable. Most configurations do not need cables longer than the standard 30-meter cable. For configurations requiring a cable length greater than 30 meters, a custom-length cable must be fabricated.

If you are using the standard 30-meter HP-FL cable, the expansion cabinets must be no further than about 25 to 27 meters away from the SPU or expansion cabinet containing the HP-PB I/O card cage and the HP-FL interface card (see <Undefined Cross-Reference>).

SCSI Connections

HP-HSC F/W SCSI Cabling Guidelines

- Ensure that the total external and internal cabling does not exceed 25 meters—a limitation imposed by the F/W Differential bus.
- If a device other than the adapter also supplies termination power, its optimal location is at the end of the SCSI bus. Devices that supply termination power can be distributed anywhere along the bus.
- Make sure that all cables are attached to a device at both ends (except for the Host Adapter).

SCSI Cabling Guidelines

- Ensure that the total length for external and internal cabling does not exceed 6 meters—a limitation imposed by the SE SCSI bus.
- The length of the SCSI bus cable should be kept as short as possible. However, do not use cables shorter than 0.5 meters.
- Make sure that all cables are attached to a device at both ends (except for the Host Adapter).

Cable impedance and construction can have a significant effect on signal quality. For this reason, it is recommended that only HP cables be used.

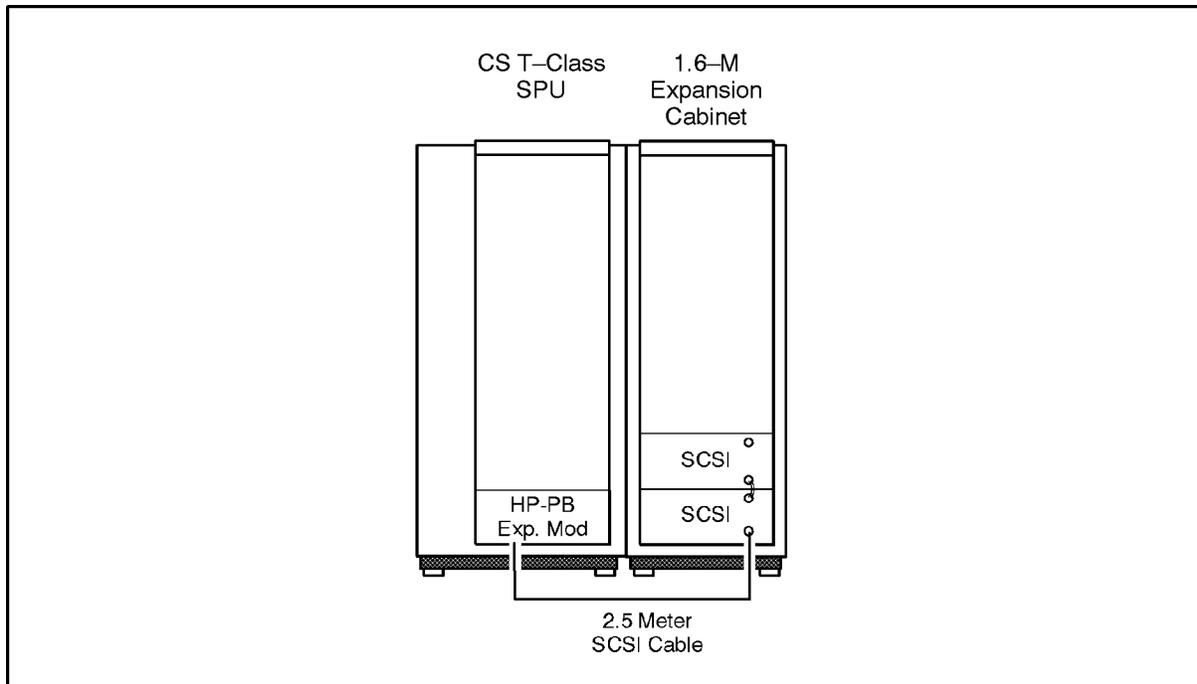
Refer to the manual that came with the HP-HSC F/W SCSI card for card-specific connecting guidelines.

SCSI as a System Disk

If SCSI is chosen as the system disk, then the system disk must be housed in an expansion cabinet that is placed immediately adjacent to the SPU (see <Undefined Cross-Reference>). The SCSI system disk must be connected to a SCSI interface card in the HP-PB I/O card cage that is housed within the SPU, and the interconnection cable must be 2.5 meters long. (Note: the base configuration SCSI card is equipped with a 2.5-meter cable.)

If Series 6000 SCSI Mass Storage enclosures are used to house the SCSI disk(s), then no more than two Series 6000 units can be connected in series to the 2.5-meter SCSI interface cable. This restriction is due to the SCSI cable length consumed by the internal SCSI cable length in each Series 6000 unit, plus the .5-meter cable to "daisy-chain" from the first Series 6000 unit to the second. As long as the expansion cabinet containing the SCSI disk drives is immediately adjacent to the SPU, the disks may be mounted in any position in the rack.

Figure B-2 SCSI System Disk Configuration



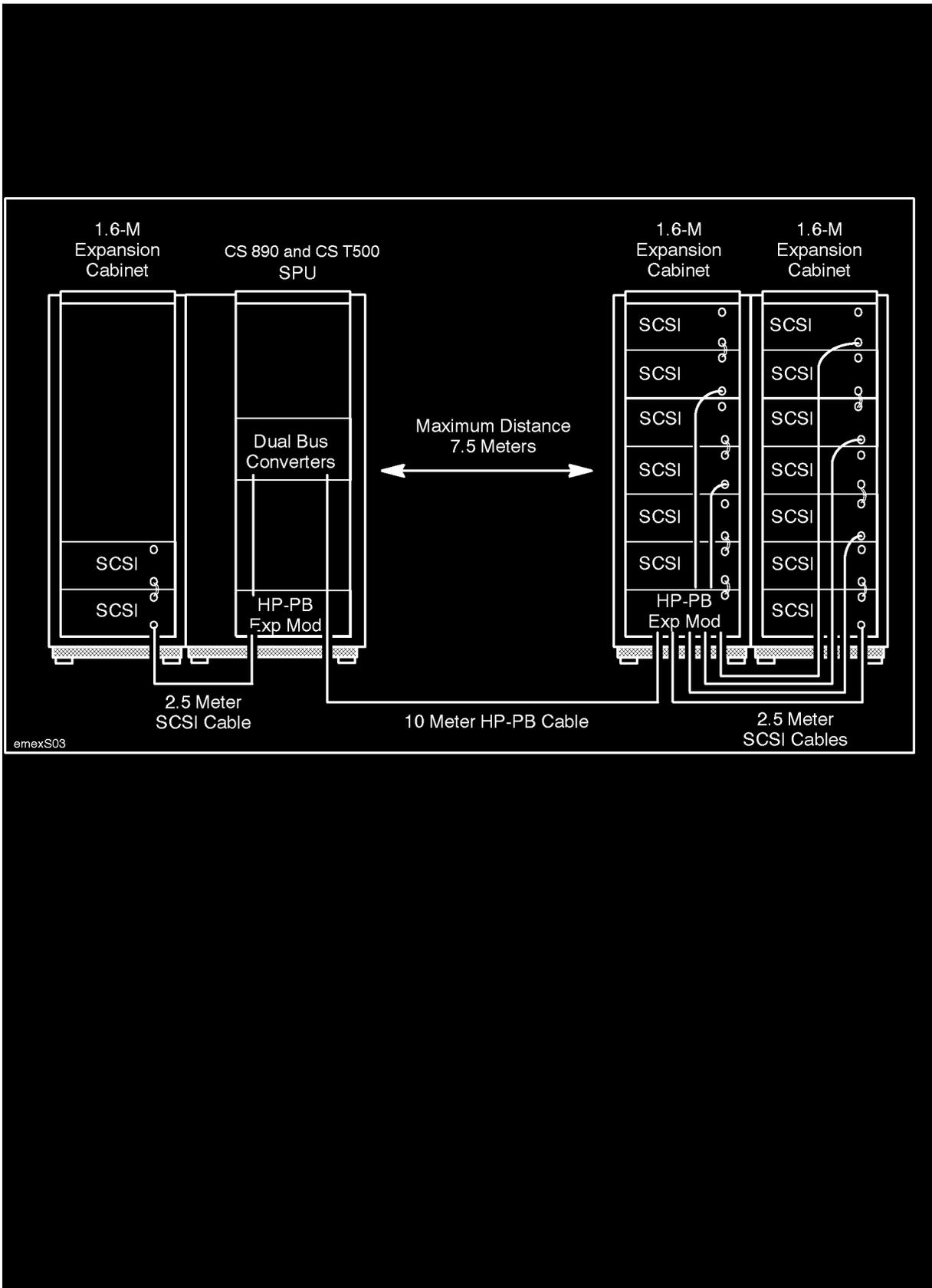
emexS02a

Racking of General-Purpose SCSI Devices

General-purpose SCSI devices such as data disks, DAT tapes, or megneto-optical disk libraries may be connected to SCSI interface cards which are in the I/O card cage within the SPU, or in the external HP-PB I/O card cage mounted in an expansion cabinet. As shown in <Undefined Cross-Reference>, the SCSI devices may be housed within the same expansion cabinet as the HP-PB I/O card cage, or in a separate cabinet.

When the SCSI devices and the I/O card cage are in separate cabinets, the cabinet containing the SCSI devices must be immediately adjacent to the cabinet containing the I/O card cage, and the SCSI interface cable must be 2.5 meters long (for this situation, the optional 2.5-meter cable must be ordered with the HP 28655A SCSI interface card). The expansion cabinet containing the HP-PB I/O card cage may be up to 7.5 meters away from the SPU cabinet due to the 10-meter length of the HP-PB cable.

Figure B-3 SCSI Sample Configuration



Using the 28643A HP Fiber-Optic SCSI Extender

The SCSI Extender product overcomes the 6-meter overall cable length limitation of single-ended SCSI. The SCSI Extender may be used to increase the distance between the SCSI interface card and the SCSI device by either 50 meters or 100 meters using a pair of extender units and fiber-optic cable.

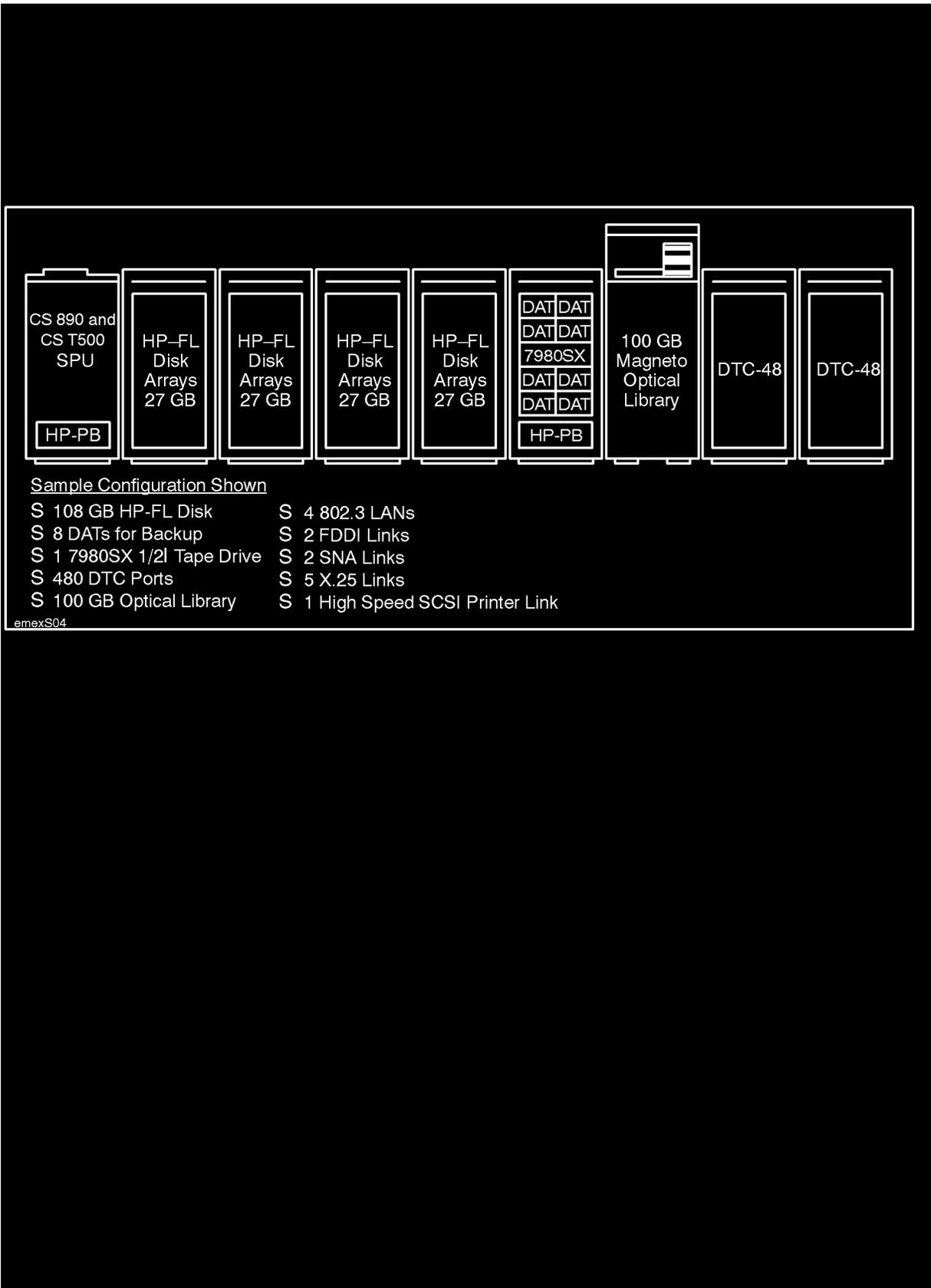
NOTE	Use of the SCSI Extender is not recommended for disks due to the resulting performance decrease; the SCSI Extender is appropriate for long-distance hook-up requirements for printers, optical libraries, and magnetic tape units.
-------------	--

Peripheral Racking Examples

A sample configuration for a reasonably large T-Class server is shown in <Undefined Cross-Reference>. The configuration shown in the figure uses one additional HP-PB I/O card cage to provide the additional slots and I/O bandwidth necessary to support the expanded configuration. Depending on the system workload, it may even be advisable to add a third HP-PB I/O card cage to increase the aggregate I/O bandwidth, allowing the disk, LAN, and X.25 traffic to be divided across three HP-PB channels.

NOTE	If a third HP-PB I/O card cage is added (as described above), an additional Dual Bus Converter (A1829A) would need to be added to a 890/990/992, 991/995/T500, or 996/T520 SPU; or an HSC-to-HP-PB Bus Converter would need to be added to a 997/T600 SPU. An additional expansion cabinet would also be required to house the HP-PB I/O card cage.
-------------	---

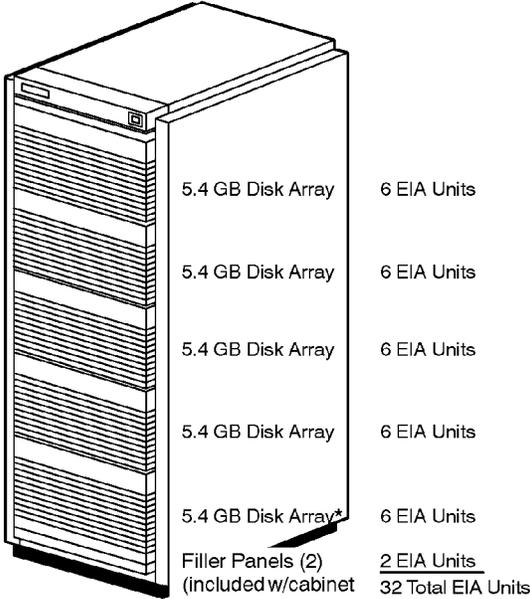
Figure B-4 Corporate Business Server T-Class Sample Configuration



Several examples of expansion cabinet configurations are shown on the following pages. All sample configurations illustrate the use of the A1897A Integrated Cabinet as a base unit. In some examples, additional components must be ordered separately. Only the components ordered as options to the A1897A are factory-integrated.

Figure B-5 Maximum High-Availability Disk Array Configuration
Sample Racking Configuration
T-Class 1.6 m Factory Integrated Cabinet (A1897A)

Qty.	P/N	Description
1	A1897A	1.6 m Integrated Cabinet
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk (0.5 m interconnect cables included)



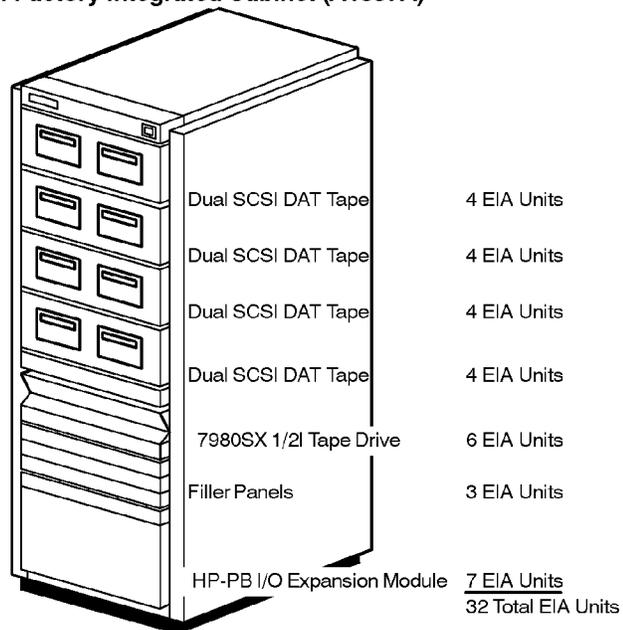
* System disk if this cabinet configuration is orderd in the same order section as the Model 890 SPU

emexS05a

Figure B-6 SCSI Backup Sub-System Configuration

Sample Racking Configuration
T-Class 1.6 m Factory Integrated Cabinet (A1897A)

Qty.	P/N	Description
1	A1897A Opt. ABA	1.6 m Integrated Cabinet Add HP-PB Expansion Module
4	C2463R	1.3 GB Rackmount 5.25I DAT tape storage sytem
4	C2475R Opt. 0D1	1.3 GB 5.25I add-on DAT tape drive Add HP-PB Expansion Module
1	7980SX Opt. 1A4	1/2I tape drive with SCSI interface
2	28655A	HP-PB SCSI/parallel host adapter card with 1.0 m cable

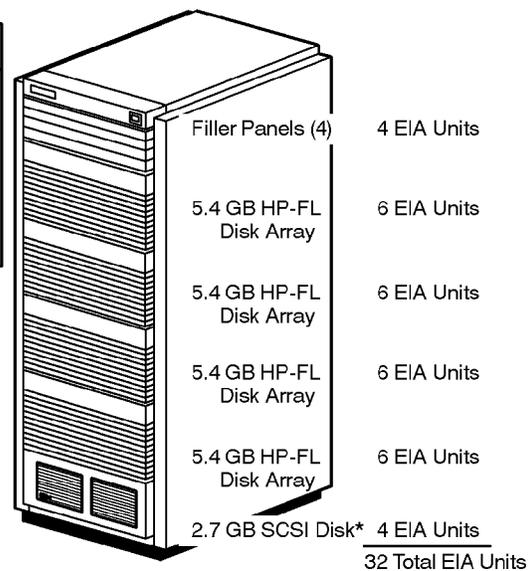


emexS06a

Figure B-7 SCSI System Disk Configuration with HP-FL Add-On Disk

Sample Racking Configuration
T-Class

Qty.	P/N	Description
1	A1897A Opt. 202 Opt. 230 Opt. 230 Opt. 230	1.6 M Integrated Cabinet Add 2.7 GB disk in Series 6000 SCSI Mass Storage System Add 5.44 GB 4-way striped disk array with parity disk Add 5.44 GB 4-way striped disk array with parity disk Add 5.44 GB 4-way striped disk array with parity disk Add 5.44 GB 4-way striped disk array with parity disk (disk arrays include 0.5 M interconnect cable.)

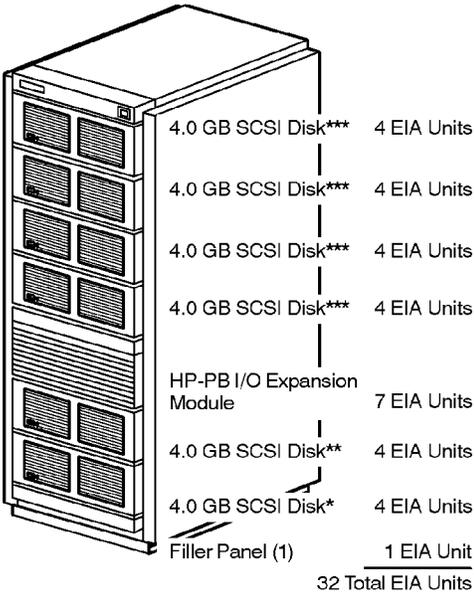


* System disk must be connected to SCSI card in SPU cabinet.

emexS07a

Figure B-8 SCSI System Disk Configuration with SCSI Add-On Disk
Sample Racking Configuration
T-Class

Qty.	P/N	Description
1	A1897A	1.6 M Integrated Cabinet
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 250	Add HP-PB Expansion Module

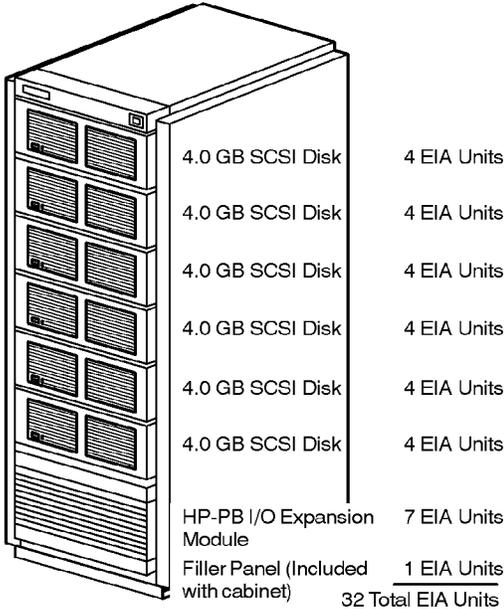


- * System disk must be connected to SCSI card in SPU cabinet.
- ** May be chained to system disk or connected to a separate SCSI card.
- *** May be connected to SCSI cards in this cabinet.

emexS08a

Figure B-9 SCSI Add-On Disk Configuration
Sample Racking Configuration
T-Class 1.6 m Factory Integrated Cabinet (A1897A)

Qty.	P/N	Description
1	A1897A	1.6 M Integrated Cabinet
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 250	Add HP-PB Expansion Module
6	28655A	HP-PB SCSI/Parallel Host Adapter Card with 1.0 meter cable

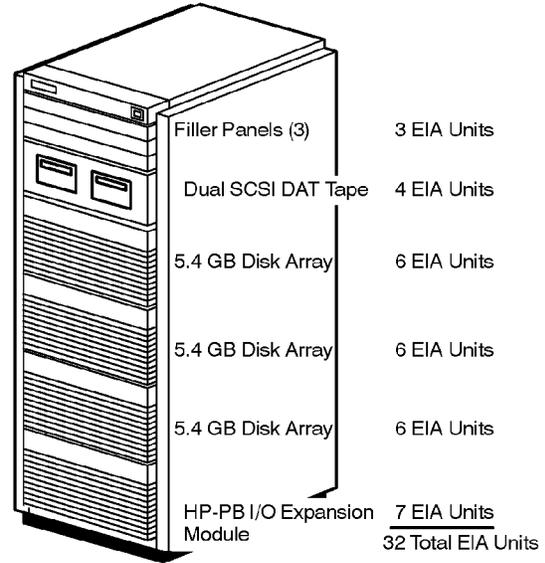


emexS09a

Figure B-10 Multi-Purpose Combination Configuration

Sample Racking Configuration
T-Class 1.6 m Factory Integrated Cabinet (A1897a)

Qty.	P/N	Description
1	A1897A	1.6 M Integrated Cabinet
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 250	Add HP-PB Expansion Module
1	C2463R	1.3 GB Rackmount 5.25 inch DAT Tape Storage System
1	C2475R	1.3 GB 5.25 inch add-on DAT Tape Drive
	Opt. 001	



emexS10a

C Ballast Installation Instructions

The HP C2790 ballast kit is used to provide permanent anti-tip stability to the expansion cabinet.

To reduce the risk of cabinet instability, it may be necessary to install one or more C2790A ballast kits. Each kit contains a 30lb. ballast and mounting hardware. The ballast mounts on the rear columns of the cabinet and provides a counter weight for equipment and peripherals that extend out from the front of the cabinet.

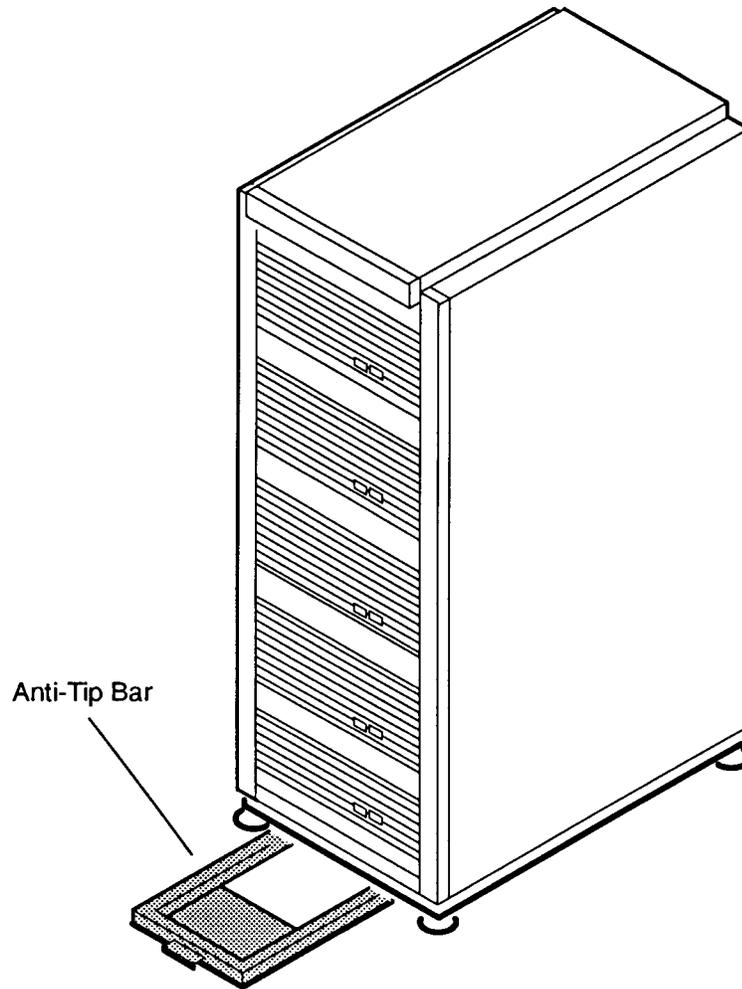
To determine the correct number of ballasts (1 ballast per HP C2790 kit) to install in the cabinet for your particular system configuration, use the stability calculations that follow.

Refer to the manual that came with the device to determine the device's weight. This information is usually in the specifications section of the manual.

WARNING **The ballast is not a substitute for the anti-tip stabilizer. The anti-tip stabilizer can be pulled out from the base at the front of the cabinet. It is intended to be used temporarily, such as when installing or servicing equipment. The anti-tip stabilizer should not be extended during normal operation.**

NOTE If a PowerTrust UPS (Uninterruptible Power System) is to be installed in an expansion cabinet, no ballast is required.

Figure C-1 Anti-Tip Stabilizer

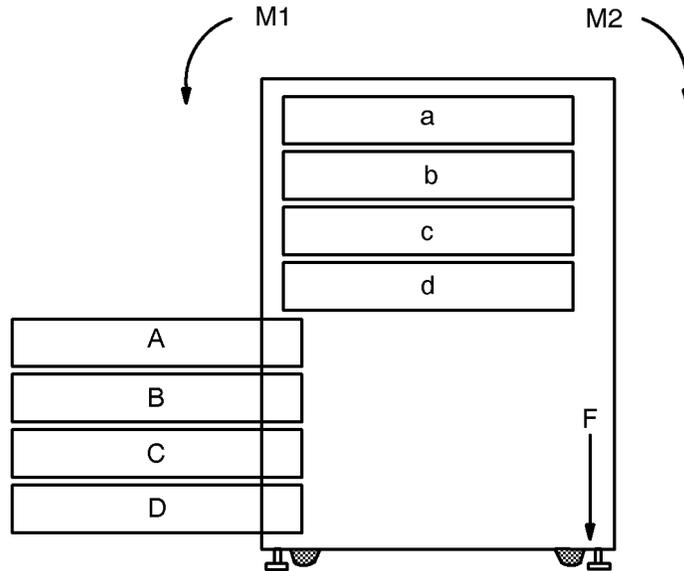


.G200197_017

Calculations for Slide Mounted Products

A slide mounted product is a product that can be extended from the cabinet for servicing.

Figure C-2 Slide Mounted Products



emex011

Weight of serviceable slide mount products:

A=lbs; B=lbs; C=lbs; D=lbs;...

Weight of serviceable non-slide mount products:

a=lbs; b=lbs; c=lbs; d=lbs;...

Table C-1 Calculations for Slide Mounted Products

M1	M2
$(A + B + C + D + \dots) \times 1.25$ ft.	-13.80 ft-lbs + $(a + b + c + d + \dots) \times 1.00$ ft.

If $M1 \leq M2$: No additional counterweight is required.

If $M1 > M2$: Additional counterweight is required. Use the formula and the table below to calculate how many ballast kits you will need to install.

F = amount of force (lbs) @ 2.05 ft.

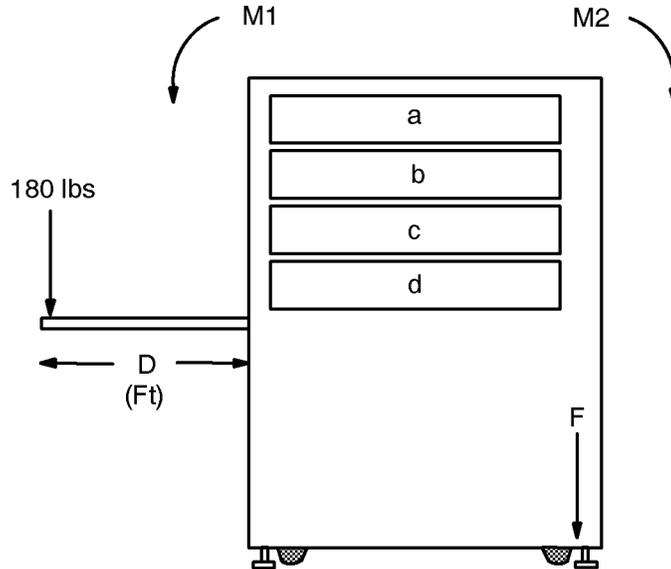
Use the following table to determine the number of C2790A ballast kits required.

Table C-2 Kits Required for Calculated F (Force) Value

Calculated F (Force) Value	Kits required
$0 \leq F$	No ballast required
$0 \% < F \leq 30$	1 - C2790A Ballast Kit
$30 \% < F \leq 60$	2 - C2790A Ballast Kits
$60 \% < F \leq 90$	3 - C2790A Ballast Kits
$90 \% < F \leq 120$	4 - C2790A Ballast Kits
$120 \% < F \leq 150$	5 - C2790A Ballast Kits
$150 \% < F \leq 180$	6 - C2790A Ballast Kits

Calculations for Work Surface/Keyboard Products

Figure C-3 Work Surface/Keyboard Products



emex012

To reduce the risk of cabinet instability when using a work surface or a keyboard mounting kit, use the following worksheet to determine the need for additional counterweight.

Weight of work surface/keyboard products:

$D = \text{ft}$

Weight of all fixed (non-slide mounted) products:

$a = \text{lbs}; b = \text{lbs}; c = \text{lbs}; d = \text{lbs}; \dots$

Table C-3 Calculations for Work Surface/Keyboard Products

M1	M2
$180 \text{ lbs} \times D$ ft	281.25 ft-lbs $+ (a + b + c +$ $d + \dots) \times$ 1.00 ft.

If $M1 \leq M2$: No additional counterweight is required.

If $M1 > M2$: Additional counterweight is required. Use the formulas below to calculate how many ballast kits you will need to install.

$F = \text{amount of force (lbs) @ 2.05 ft.}$

Use the following table to determine the number of C2790A ballast kits required.

Table C-4 Kits Required for Calculated F (Force) Value

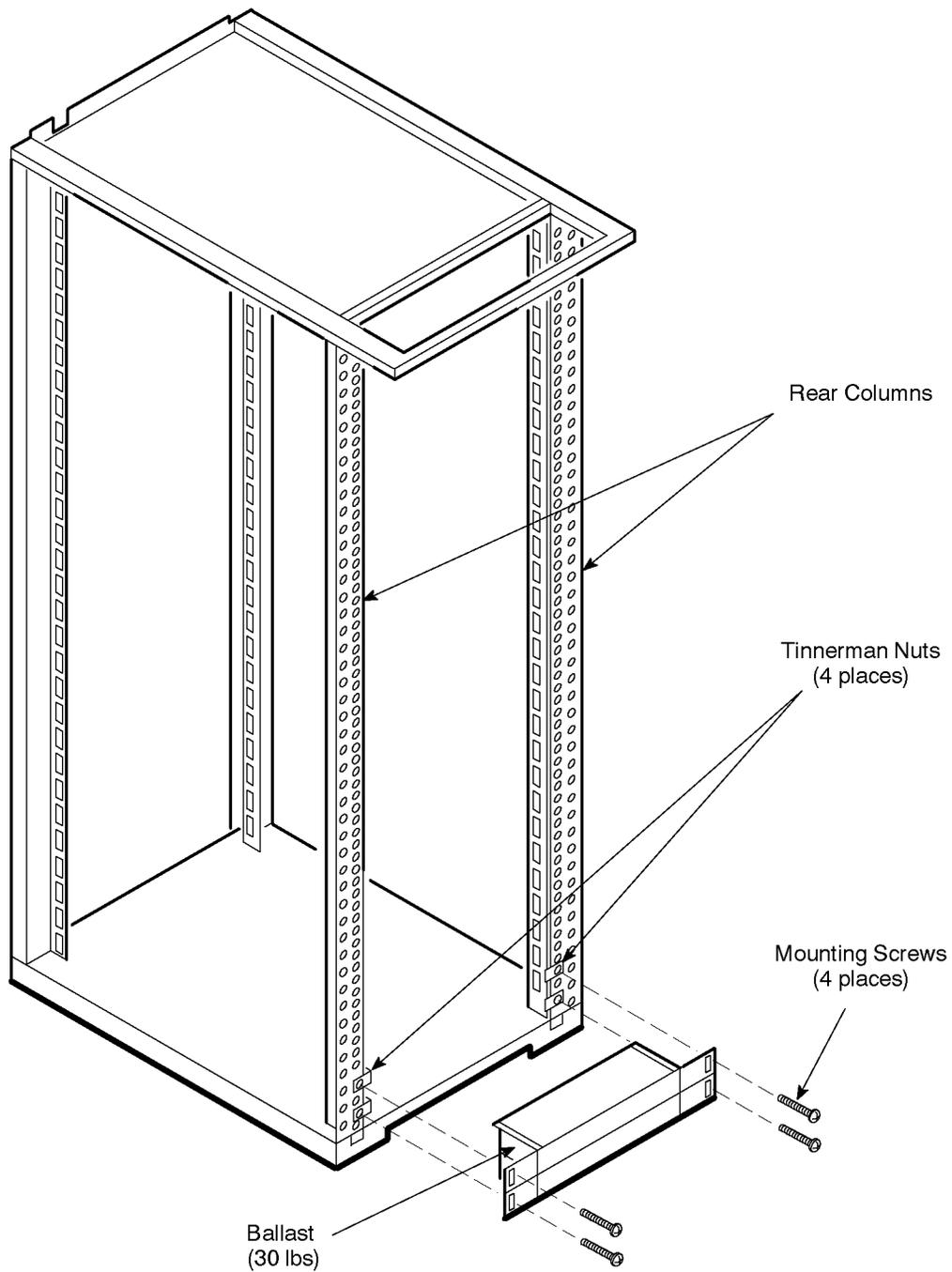
Calculated F (Force) Value	Kits required
$0 \leq F$	No ballast required
$0 \% < F \leq 30$	1 - C2790A Ballast Kit
$30 \% < F \leq 60$	2 - C2790A Ballast Kits
$60 \% < F \leq 90$	3 - C2790A Ballast Kits
$90 \% < F \leq 120$	4 - C2790A Ballast Kits
$120 \% < F \leq 150$	5 - C2790A Ballast Kits
$150 \% < F \leq 180$	6 - C2790A Ballast Kits

Installation Procedure

WARNING **Never mount ballast on the front of the cabinet! Ballast should be installed at the bottom of the cabinet resting on the base. Install additional ballast so it rests on top of the first.**

NOTE If ballast cannot be installed at the bottom of the cabinet, it can be installed on top of the plain cabinet shelf (P/N E3666A). Mount the shelf backwards so that ballast is supported across the entire shelf width. The plain shelf can support up to four ballast (120 lbs). Remove the ballast from the shelf before moving or shipping the cabinet.

Figure C-4 Ballast Installation



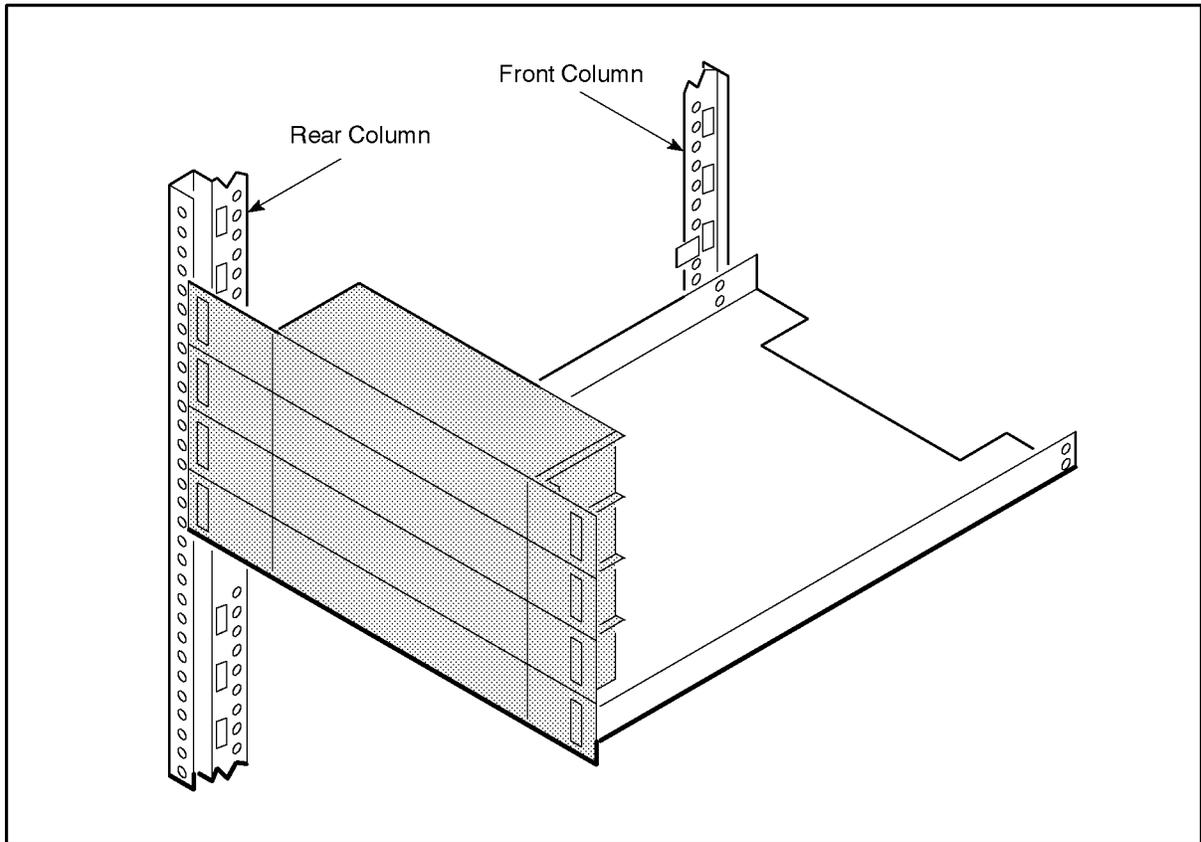
204_139a

Once you have calculated how many ballast kits you will need to install, follow these steps.

1. Position the two tinnerman nuts over the appropriate holes in the rear columns.

2. Attach the ballast to the rear columns of the cabinet using two screws.
3. When installing more than one ballast kit, make sure that they rest on top of each other for support.

Figure C-5 Ballast Shelf Installation



LG200204_138

WARNING **Remove ballast before shipping the cabinet. The cabinet is not designed to be shipped with ballast installed. Note that when ballast is removed, the stability of a loaded cabinet may be impaired.**
