# Installation Guide

## T- Class

### HP 3000 99x Family, HP 9000 Systems


**A1809-90001**

**Edition 9 October 1999**

**E1099**

Printed in: USA

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## Printing History

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**NOTE**

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- 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 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.

## USA Radio Frequency Interference

The United States Federal Communications Commission (in 47 CFR Subpart B, of Part 15) has specified that the following notice be brought to the attention of the users of this product:

| | |
|---|---|
| WARNING | **This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.** |

## Japanese Radio Frequency Interference

The following notice is for users of this product in Japan:

Japanese Radio Frequency Notice

> 注意
>
> この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づく第一種情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

upsg008

## EMI Statement (European Union Only)

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

## Digital Apparatus Statement (Canada)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus”, ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur : “Appareils Numériques”, NMB-003 édictée par le ministre des Communications.

## EMI (Australia and New Zealand)

Models HP3000 997 and HP9000 T600 meet the applicable requirements of the Australia and New Zealand EMC Framework.

## United Kingdom General Approval

The HP3000 99x and the HP9000 T-Class computers are approved under Approval No. NS/G/1234/J/100003 for indirect connection to public telecommunication systems within the United Kingdom.

## Acoustics (Germany)

Laermangabe (Schalldruckpegel $L_pA$) gemessen am fiktiver Arbeitsplatz bei normalem Betrieb nach DIN 45635, Teil 19: $L_pA = 61$ dB.

Acoustic Noise (A-weighted Sound Pressure Level $L_pA$) measured at the bystander position, normal operation, to ISO 7779: $L_pA = 61$ dB.

## Battery Notices

| | |
|---|---|
| WARNING | **This product may contain sealed, lead acid batteries. Replace only with the same type and part number. Recycle used batteries or send them to the following address for disposal:**<br><br>**Hewlett Packard Co.**<br>**Environmental Health and Safety Department**<br>**8000 Foothills Boulevard**<br>**Roseville, Ca. 95678**<br>**ATTN: Battery Disposal Coordinator.** |

| | |
|---|---|
| WARNING | **Fire, explosion, and severe burn hazard! Do not crush, disassemble, heat, incinerate, or expose the batteries to water.** |

## 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).** |

## High 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. Reliable ground circuit continuity is vital for safe operation of this product.** |

## Installation Conditions (U.S.)

**WARNING** **Please note the following conditions of installation:**

**An insulated earthing conductor that is identical in size, insulation material, and thickness to the earthed and unearthed branch-circuit supply conductors except that it is green with or without one or more yellow stripes is to be installed as part of the branch circuit that supplies the unit or system. The earthing conductor described is to be connected to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor-generator set.**

**The attachment-plug receptacles in the vicinity of the unit or system are all to be of an earthing type, and the earthing conductors serving these receptacles are to be connected to earth at the service equipment.**

## 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**

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 presence of electric shock hazard.

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 earthing conductor associated with the supply wiring.

| | |
|---|---|
| **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. |

## DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

**Manufacturer's Name:** Hewlett-Packard

**Manufacturer's Address:** 8000 Foothills Boulevard
Roseville, CA, 95747, U.S.A

**declares, that the product**

**Product Name:** PA-RISC Computer System

**Model Number(s):** HP 3000 Models 99x (may have prefix "Corporate Business System" or "CS" and suffix such as "DX/100, /200, ...")
Note: 'x' can be any number 0-9;
HP 9000 Models 890, T500, T520, and T600 (may have prefix "Corporate Business Server)

**Product Options:** All

**conforms to the following Product Specifications:**

Safety: EN60950:1988+A1+A2 / IEC 950:1986+A1+A2
EN60825-1:1993 / IEC 825-1:1993

EMC: EN55022:1994 / CISPR 22:1993 Class A[1)]
EN 50082-1:1992
IEC 801-2:1991 / prEN55024-2:1992 - 4 kV CD, 8kV AD
IEC 801-3:1984 / prEN55024-3:1991 - 3V/m
IEC 804-4:1988 / prEN55024-4:1992 - 0,5 kV Signal Lines
1,0 kV Power Lines
IEC 1000-3-2:1995 / EN 61000-3-2:1995 [no limits, par. 7]
IEC 1000-3-3:1995 / EN 61000-3-3:1995 [no test, par. 6.1]

**Supplementary Information:**
The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC and carries the CE marking accordingly.

1) The above products were tested in a typical configuration using Hewlett-Packard Information Technology Equipment .

Roseville, CA March 31, 1997

Dan Blount

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Strasse 130, D-71034 Böblingen (FAX:+49-7031-143143)

# Preface

This edition of the Installation Guide is intended for experienced system operators.

This guide contains technical information about HP 3000 Corporate Business Systems (99x Family) and HP 9000 Corporate Business Servers (T-Class System).

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

**HP 3000 99x Family**

| 990/992 | | 991/995 | | 996[1] | 997[2] |
|---|---|---|---|---|---|
| 990CX | 990DX | 991CX | 991DX | 996/80 | 997/100 |
| 992/100CX | 992/100DX | 995/100CX | 995/100DX | 996/100 | 997/200 |
| 992/200CX | 992/300DX | 995/200CX | 995/200DX | 996/200 | 997/300 |
| 992/300CX | 992/400DX | 995/300CX | 995/300DX | 996/300 | 997/400 |
| 992/400CX | | 995/400CX | 995/400DX | 996/400 | 997/500 |
| | | 995/500CX | 995/500DX | 996/500 | 997/600 |
| | | 995/600CX | 995/600DX | 996/600 | 997/800 |
| | | 995/700CX | 995/700DX | 996/700 | 997/1000 |
| | | 995/800CX | 995/800DX | 996/800 | 997/1200 |

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.
2. As of 2000, 997 systems may be upgraded in the field to 4, 6, 8, 10, or 12 processors. Factory-integrated servers are sold with a maximum of 2 processors.

**HP 9000 T-Class Systems**

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

# 1 Introduction

# Overview

This guide provides installation and configuration procedures for the Hewlett-Packard Precision Architecture-RISC (PA-RISC) systems listed in the Preface of this guide.

# Terminology

The following terms are used in this document to refer to systems and components:

| Term | Refers to: |
|---|---|
| 990 | HP 3000 Systems (990/992) |
| 991/995 | HP 3000 Systems (991/995) |
| 996 | HP 3000 Systems (996) |
| 997 | HP 3000 Systems (997) |
| 99x | All HP 3000 990, 991, 992, 995, 996, 997 Systems |
| 890 | HP 9000 Servers (890) |
| T500 | HP 9000 Servers (T500) |
| T520 | HP 9000 Servers (T520) |
| T600 | HP 9000 Servers (T600) |
| T-Class Systems | All HP 9000 890, T5x0, and T600 Servers |
| HP-HSC I/O Bus Converter | The bus converter motherboard on an 997/T600 System to which HSC I/O cards and HP-PB I/O Bus Converters are attached. |
| HSC I/O cards | High Speed Connect I/O cards (also know as General System Connect + (GSC+) cards) |
| HP-PB I/O Bus Converter | Adapter card used to connect to internal and external HP-PB card cages on 997/T600 Systems. It has the same function on the 997/T600 System as the Upper Bus Converter does on systems prior to the 997/T600. |

**BC cards and HP-HSC I/O Bus Converters.** On 997/T600 Systems, the *HP-PB I/O Bus Converter* and the *HP-HSC I/O Bus Converter* together serve the same function as the upper bus converter on 990/992/890, 991/995/T500, and 996/T520 Systems. The HP-PB I/O Bus Converter is attached to the *HP-HSC I/O Bus Converter.*

The standard configurations for 99x/T-Class Systems differ slightly. Throughout this manual, system-specific configurations will be noted where applicable (for example, as **99x Systems Only** or **890/T500 Systems Only**).

## Contents

This guide includes detailed information on the following subjects:

- Safety and Environment Considerations

- Unpacking and Inspection
- Processor Configuration
- Power Supply Configuration
- I/O Configuration
- Initial Power Up and Selftest

## Audience

Customers should read the information in Chapter 1 (Introduction) and Chapter 2 (Unpacking and Inspection).

HP Customer Engineers (CEs) and service personnel who have successfully completed HP's authorized training should perform the procedures in Chapter 3 (Installation).

## Site Preparation

Before the system can actually be installed, the system site must comply with the specifications outlined in the *99x/T-Class Systems Site Preparation and Requirements Guide* (PN A1809-90002)

The service and installation requirements for any peripheral equipment to be installed with the system should also be taken into consideration before the installation process gets under way. Refer to the appropriate manual for each peripheral being installed.

## Tools

The following tools are required for computer installation:

- Standard hand tools
- Digital Voltmeter (capable of reading AC/DC voltages)
- #10 Torx-drive screwdriver
- #15 Torx-drive screwdriver

## Other References

Related manuals include:

- *CE Handbook* (PN A1809-90003)
- *99x/T-Class Systems Operator's Guide* (PN A1809-90009)
- *99x/T-Class Systems Site Preparation and Requirements Guide* (PN A1809-90002)
- *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006)
- *99x/T-Class Systems HP-PB Cardcage Installation Guide* (PN A1809-90013)
- *99x/T-Class Systems Bus Converter Card Installation Guide* (PN A1809-90012)
- *99x/T-Class Systems Add-On Memory Installation Guide* (PN A1809-90005)

- *Upgrade Installation Guides*
  - *Upgrading 990/992/890 to 991/995/T500* (PN A1820-90001)
  - *Upgrading 990/992/890 to 996* (PN A3310-90002)
  - *Upgrading 991/995/T500 to 996* (PN A3310-90001)
  - *Upgrading 991/995/T500 and 996/T520 to 997/T600* (PN A3329-90001)
  - *HP 3000 to HP 9000 Conversion Kit Ordering and Configuration Guide* (PN 5964-9539E)
- *Diagnostic Media User's Guide* (PN B6191-90001)

# Safety and Environment Considerations

Before proceeding with any installation, maintenance, or service on a system which requires physical contact with electrical or electronic components, be sure that either power is removed or safety precautions are followed to protect against electric shock and equipment damage. Observe all "WARNING" and "CAUTION" labels on equipment. All installation and service work must be done by qualified personnel.

## Communications Interference

Hewlett-Packard system compliance tests are conducted with Hewlett-Packard supported peripheral devices and shielded cables, such as those received with the system. The system meets interference requirements of all countries in which it is sold. These requirements provide reasonable protection against interference with radio and television communications.

Installing and using the system in strict accordance with Hewlett-Packard's instructions minimizes the chances that the system will cause radio or television interference. However, Hewlett-Packard does not guarantee that the system will not interfere with radio and television reception.

Take these precautions:

- Use only shielded cables.
- Install and route the cables per the instructions provided.
- Ensure that all cable connector screws are firmly tightened.
- Use only Hewlett-Packard supported peripheral devices.
- Ensure that all panels and cover plates are in place and secure before system operation.

## Electrostatic Discharge

Hewlett-Packard systems and peripherals contain assemblies and components that are sensitive to electrostatic discharge (ESD). Carefully observe the precautions and recommended procedures in this manual to prevent component damage from static electricity.

Take these precautions:

- Always wear a grounded wrist strap when working on or around the system.
- Treat all assemblies, components and interface connections as static-sensitive.
- When unpacking cards, interfaces, and other accessories that are packaged separately from the system, keep the accessories in their conductive plastic bags until they are ready to be installed.

- Before removing or replacing any components or installing any accessories in the system, select a work area where potential static sources are minimized (preferably an anti-static work station).
- Avoid working in carpeted areas, and keep body movement to a minimum while installing accessories.

## Installation Environment

A special installation environment is not required as long as ESD considerations are observed.

# Orientation

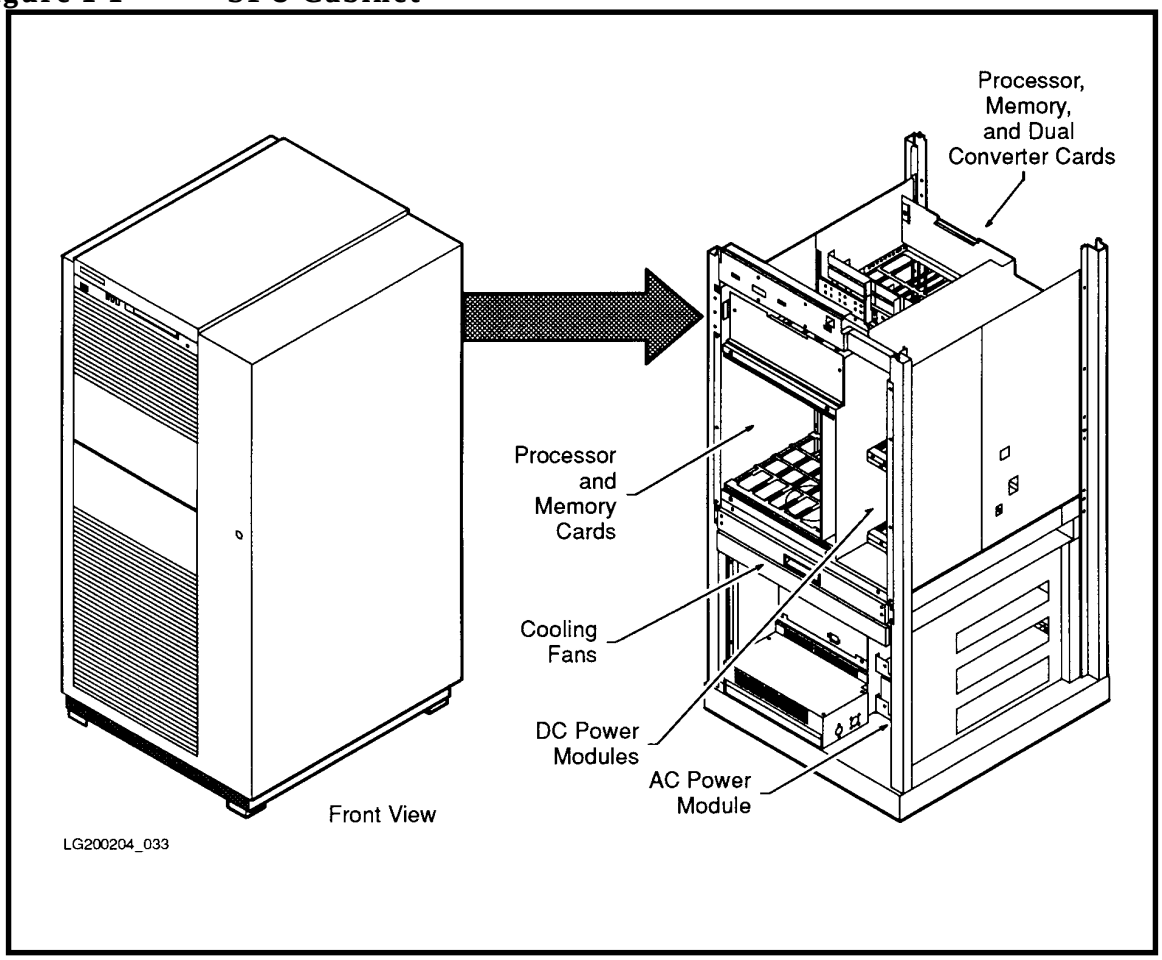
This section is a brief orientation to the SPU for 99x/T-Class Systems.

## SPU Cabinet

The basic system consists of one SPU cabinet, as shown in Figure 1-1. At the middle right of the cabinet is a cabinet door lock. To open the cabinet door, you insert a hexagonal cabinet key into this lock and turn it counter-clockwise. The cabinet key is included with the computer.

Additional cabinets (called expansion cabinets) are shipped separately. Refer to the *Expansion Cabinet Installation Guide* (HP P/N A1809-90006) for information about installing peripherals in the expansion cabinets.

**Figure 1-1 SPU Cabinet**



## SPU Cabinet Internal Layout

The SPU cabinet contains the processor cards, memory cards, bus converter cards, I/O cards, the power supply system, and the cooling fan assembly (see Figure 1-2 and Figure 1-3).

- At the top front of the cabinet is the control panel, with various switches and indicators.
- The top half of the cabinet contains:
  - Processor Memory Bus (PMB) card cages. There is a front PMB card cage and a rear PMB card cage. The PMB card cages contain processor cards, memory cards, bus converter cards, and a service processor (SP) card.
  - DC-to-DC power modules for memory, BC cards, processors, and fans.
  - Miscellaneous Power Module (MPM) for the Service Processor.
- In the middle of the cabinet is the cooling fan tray.
- The bottom half of the cabinet contains:
  - HP-PB card cage. This card cage accepts HP-PB I/O cards.
  - AC-to-DC power module (PFC unit).
  - AC Front End (ACFE) with the circuit breaker switch.
  - Battery Back-up Unit (BBU) for 890, 990, and 992 only.

**Figure 1-2 SPU Cabinet Internal Layout (Front)**

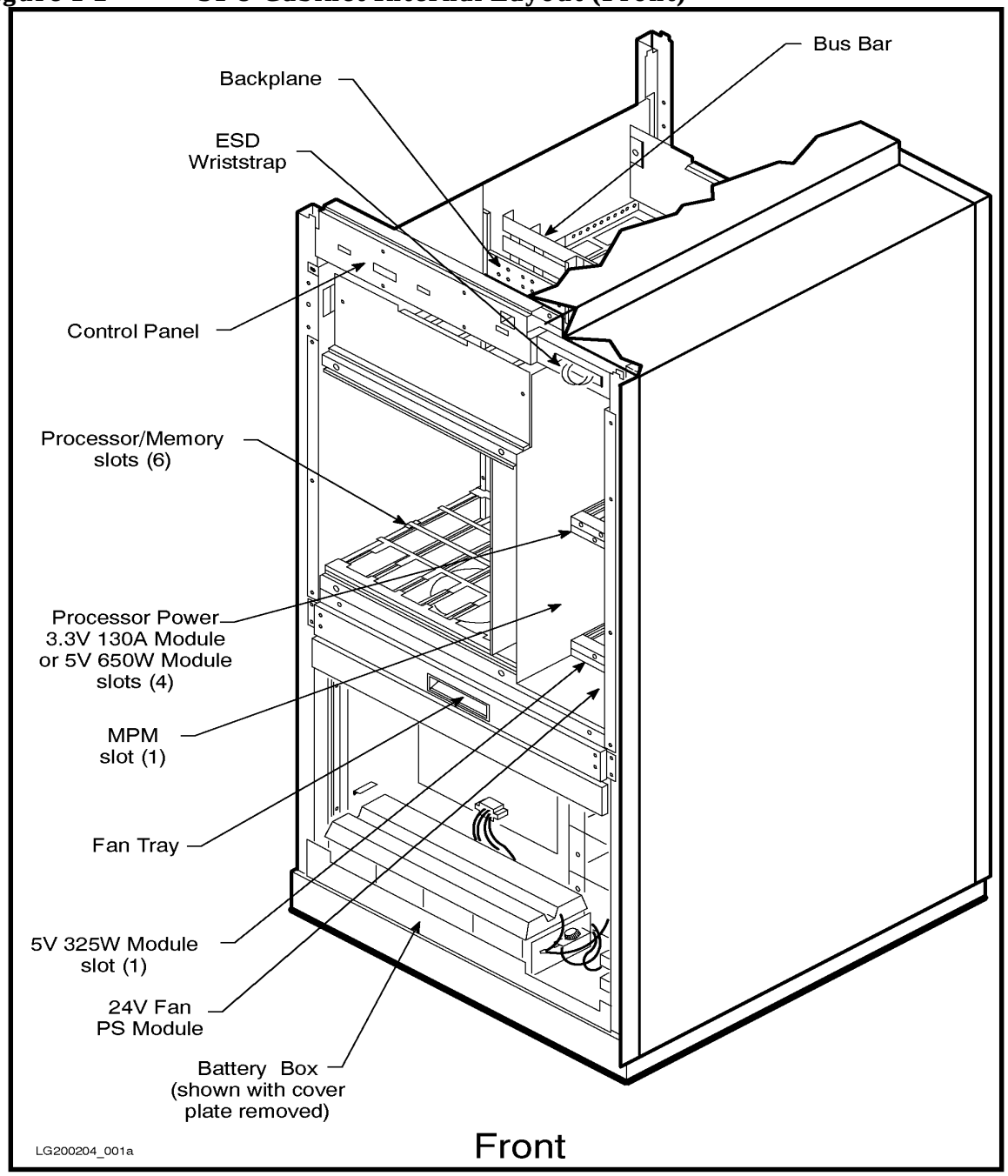
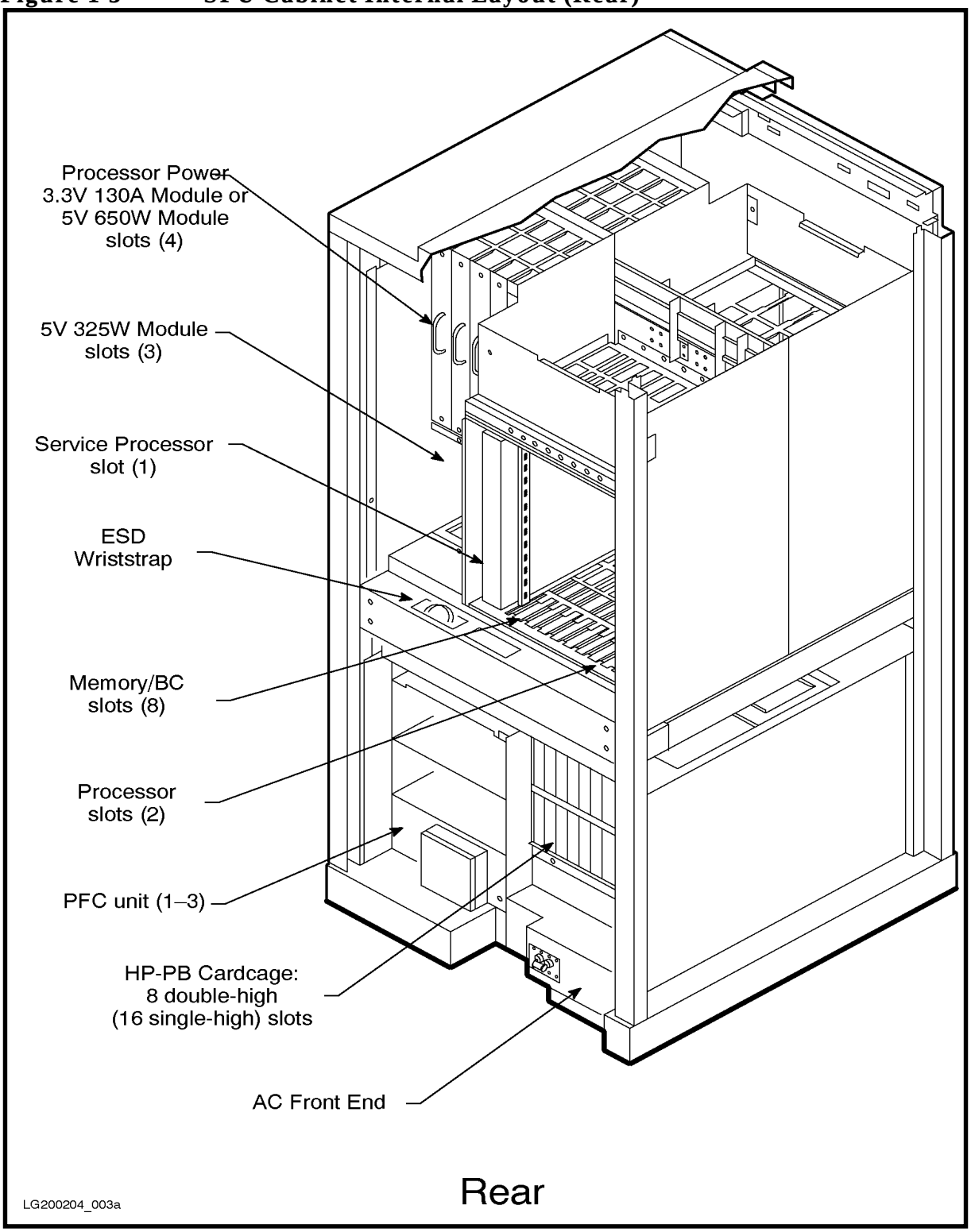


**Figure 1-3 SPU Cabinet Internal Layout (Rear)**



# 2 Unpacking and Inspection

# Overview

This chapter contains procedures for unpacking and inspecting the system before installation. Careful unpacking and inspection according to the procedures in this chapter are an important part of trouble-free system installation.

The customer performs the following tasks:

- Inspect the shipping package for shipping damage.
- Arrange for the system to be moved to the location where it is to be installed.
- Unpack the computer and peripherals.

HP performs the following tasks:

- Supervise uncrating, positioning, and racking of the HP products.
- Inventory the shipment against the packing list(s).

## Inspection Precautions

Observe the following precautions:

- When the shipment arrives, check each container against the carrier's Bill of Lading. Inspect the exterior of each container immediately for mishandling or damage during transit. If any of the containers are damaged, request the carrier's agent be present when the container is opened. Follow the damage claim procedure given later in this guide.
- When unpacking the container(s), inspect each item for external damage. Look for broken controls and connectors, dented corners, scratches, bent panels, and loose components. Check the rigid foam and plastic cushioning for damage which indicate rough handling during transit.

**NOTE** HP recommends keeping 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.

If you decide to discard the shipping container or packaging material, please dispose of them in an environmentally responsible manner (recycle if possible).

## Unpacking the Cabinet Assembly

Be sure to read the following unpacking instructions before proceeding.

| | |
|---|---|
| **WARNING** | **Be very careful when unpacking the cabinet! The loaded SPU cabinet can weigh up to approximately 808 lb (366.5 kg).** |

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 2-1.
3. Remove the clam shell box from the pallet.
4. Remove the ramp and packing material (item 1 in Figure 2-2) from the top of the cabinet. Two persons may be required to lift this item.

**Figure 2-1 Removing the Cardboard Container**

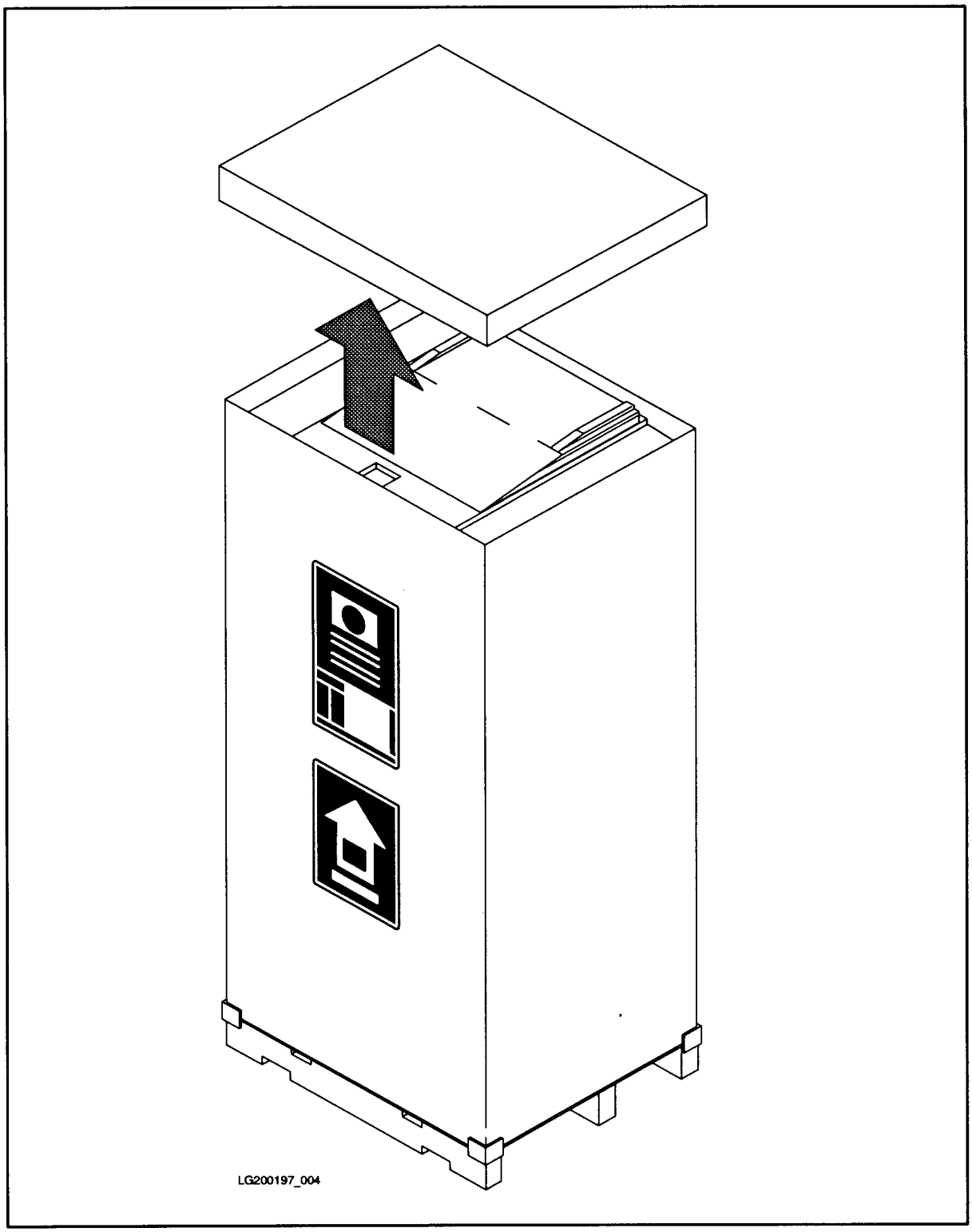
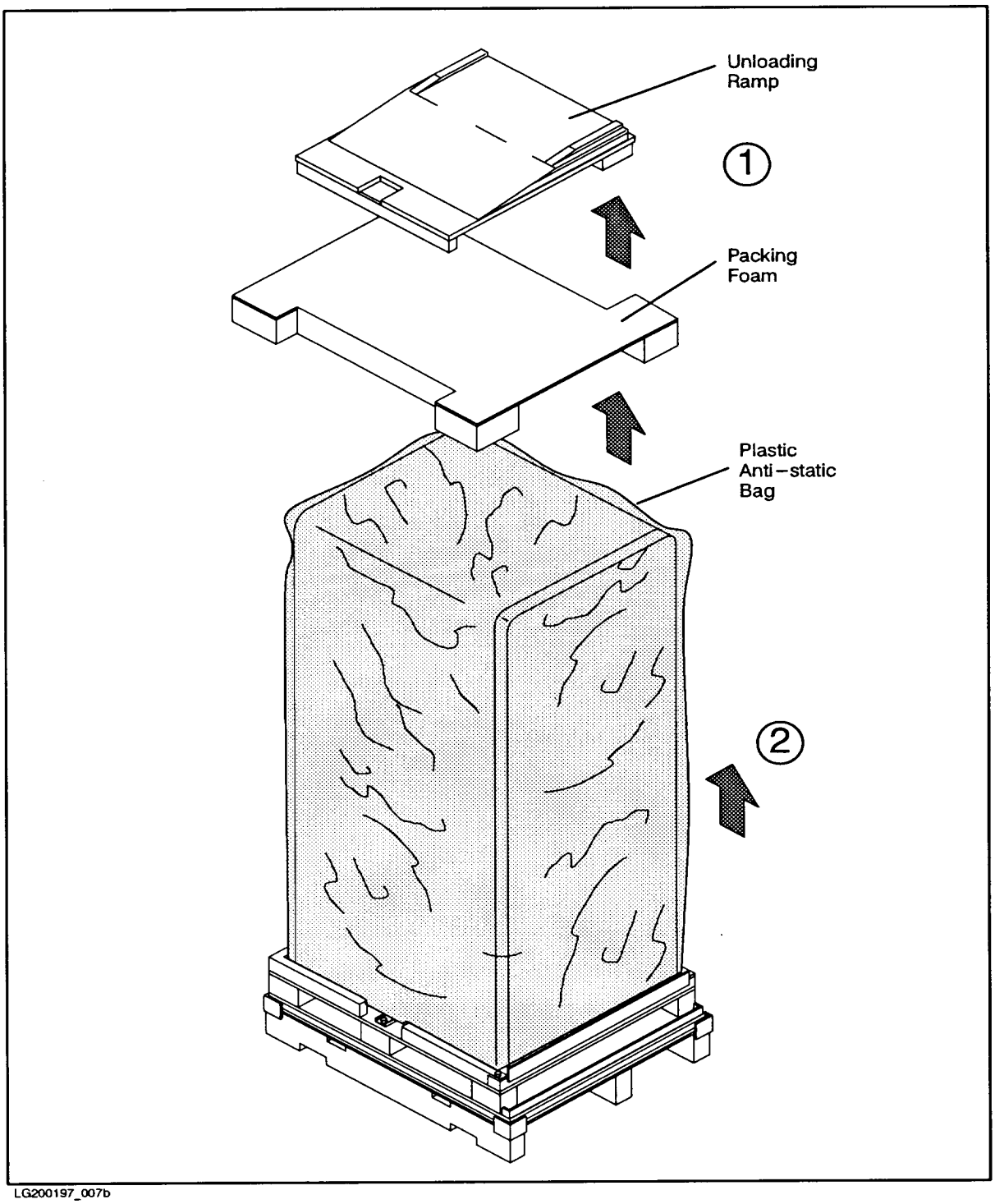


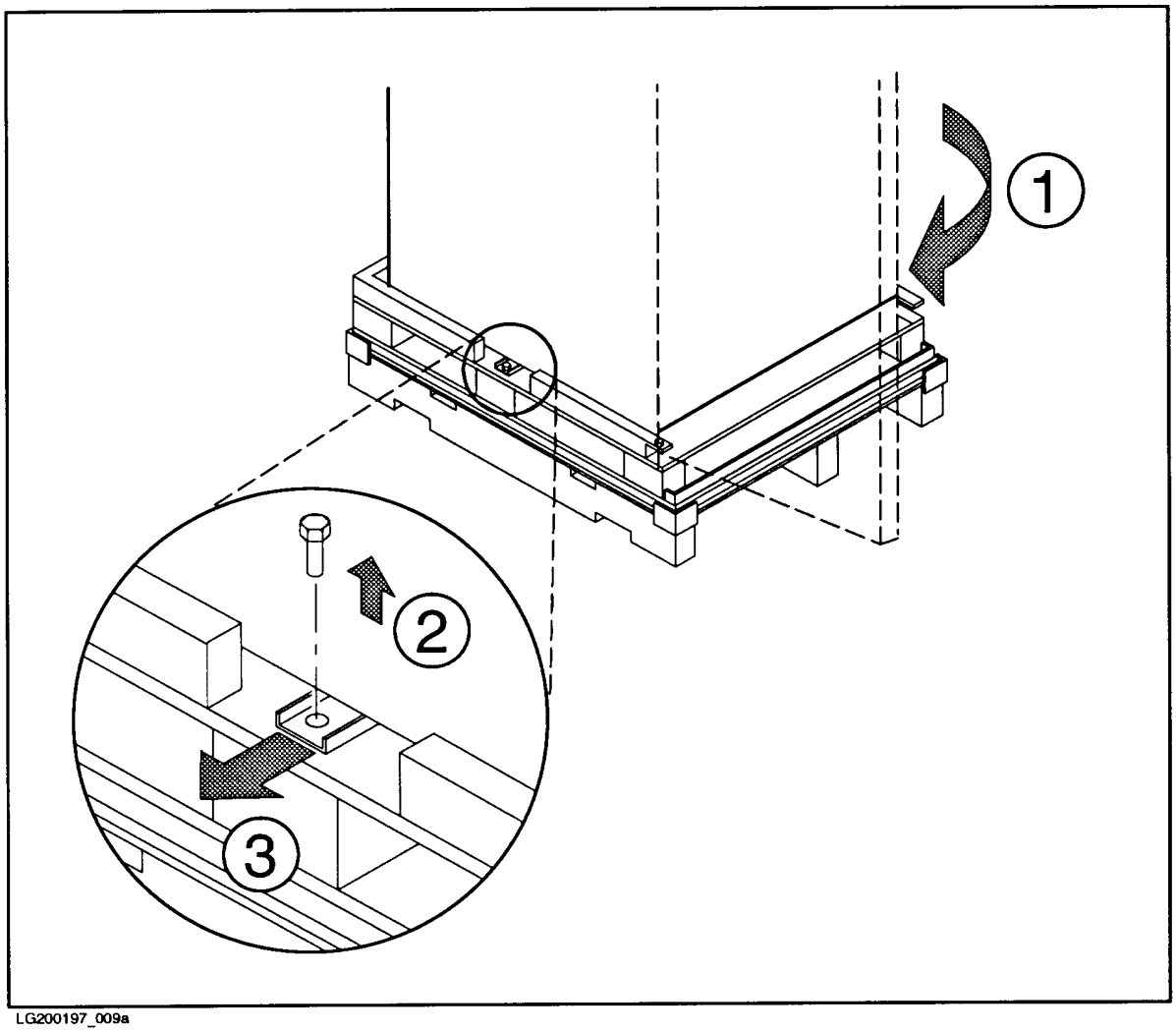
**Figure 2-2 Removing the Ramp and Packing Material**




5. Remove the plastic anti-static bag by lifting it straight up off the cabinet.

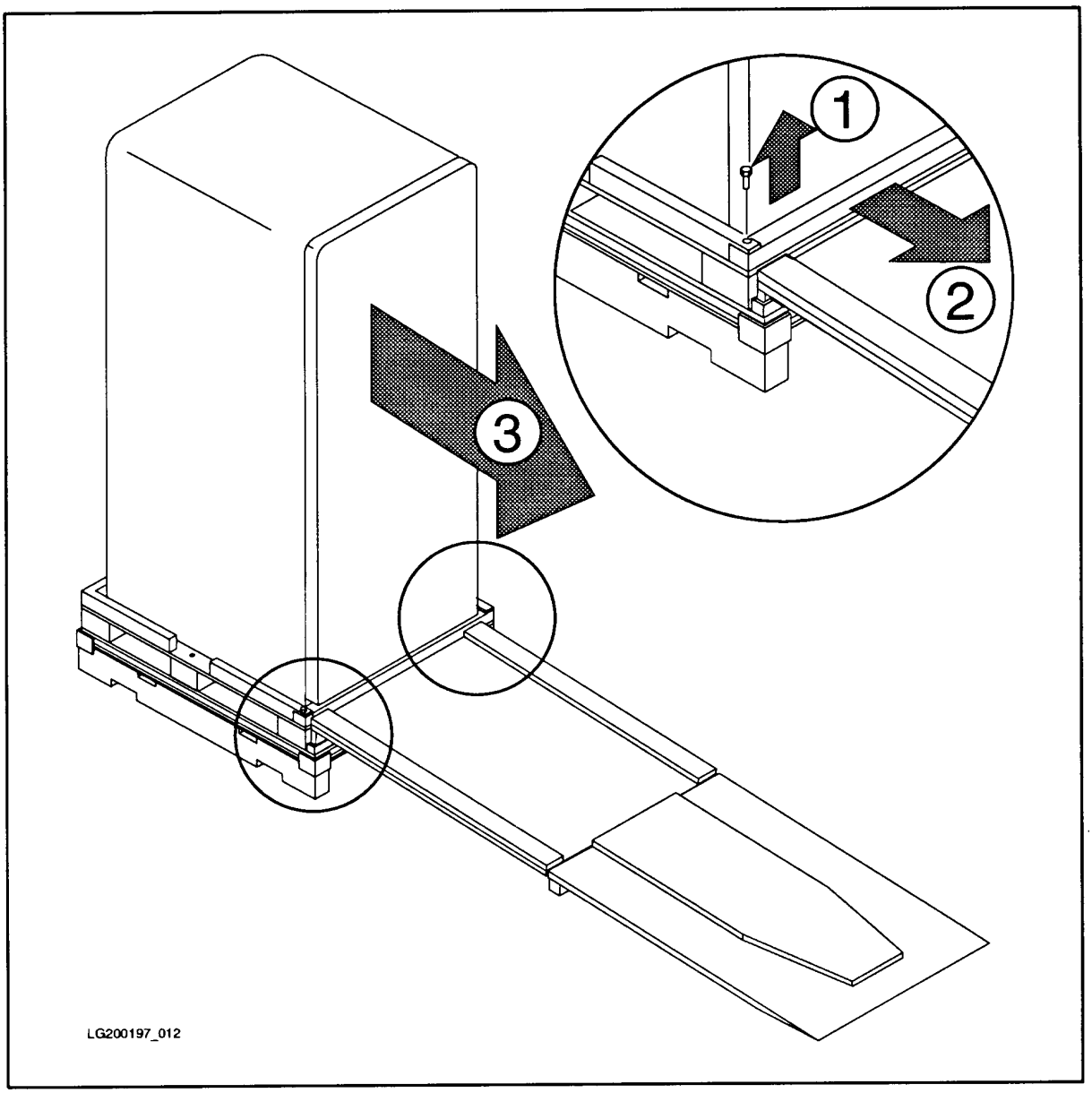
6. Remove the two shipping clamps (one on each side) from the bottom of the frame. The shipping clamps are bolted to the pallet; remove the bolt and then remove the clamp (items 2 and 3 in Figure 2-3).

**Figure 2-3 Removing Door Support and Shipping Clamp**




7. Remove the two bolts (item 1 in Figure 2-4), one on each corner, that secure the pallet shipping block (item 2 in Figure 2-4) at the rear of the pallet. Pull the pallet shipping block out from under the cabinet.

**Figure 2-4 Removing the Shipping Block**




8. Position the ramp so that the block of wood under the ramp locks into the edge of the pallet with the strip of wood forming a lip. This holds the ramp in place while the cabinet is moved across the pallet and down the ramp (number 3 in Figure 2-4).
9. Raise and tape 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.** |

10.Carefully roll the cabinet (item 3 in Figure 2-4) down the ramp.

| | |
|---|---|
| **WARNING** | **The cabinet weighs approximately 808 lb (366.5 kg). To prevent a runaway cabinet, station one person on the downhill side of the cabinet while the other guides it from the uphill side.** |

# Inspecting the Cabinet

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. Look at the top and sides for dents, warpage, or scratches.
2. Check the control panel and forehead assembly for any signs of damage.
3. Check the front and rear door for dents, scratches, proper fit, and operation. Also visually inspect the fit of the doors when they are closed.

**Interior**: Open the front and rear doors and inspect the inside of the cabinet.

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

If any damage is found, follow the claims procedures described below. Some damage may be repaired by replacing a damaged part, if that part is replaceable. Refer to *CE Handbook* (PN 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.

## Claims Procedures

Notify the nearest Hewlett-Packard Sales and Service Office if the shipment is incomplete, the equipment is damaged or it fails to meet specifications. 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. In the event of damage in transit, retain the packing container and packaging materials for inspection.

# Moving the Cabinet to the Site

Carefully roll the cabinet to the installation site.

If the cabinet is to be hoisted into position, you can access lifting nuts on the cabinet as described below:

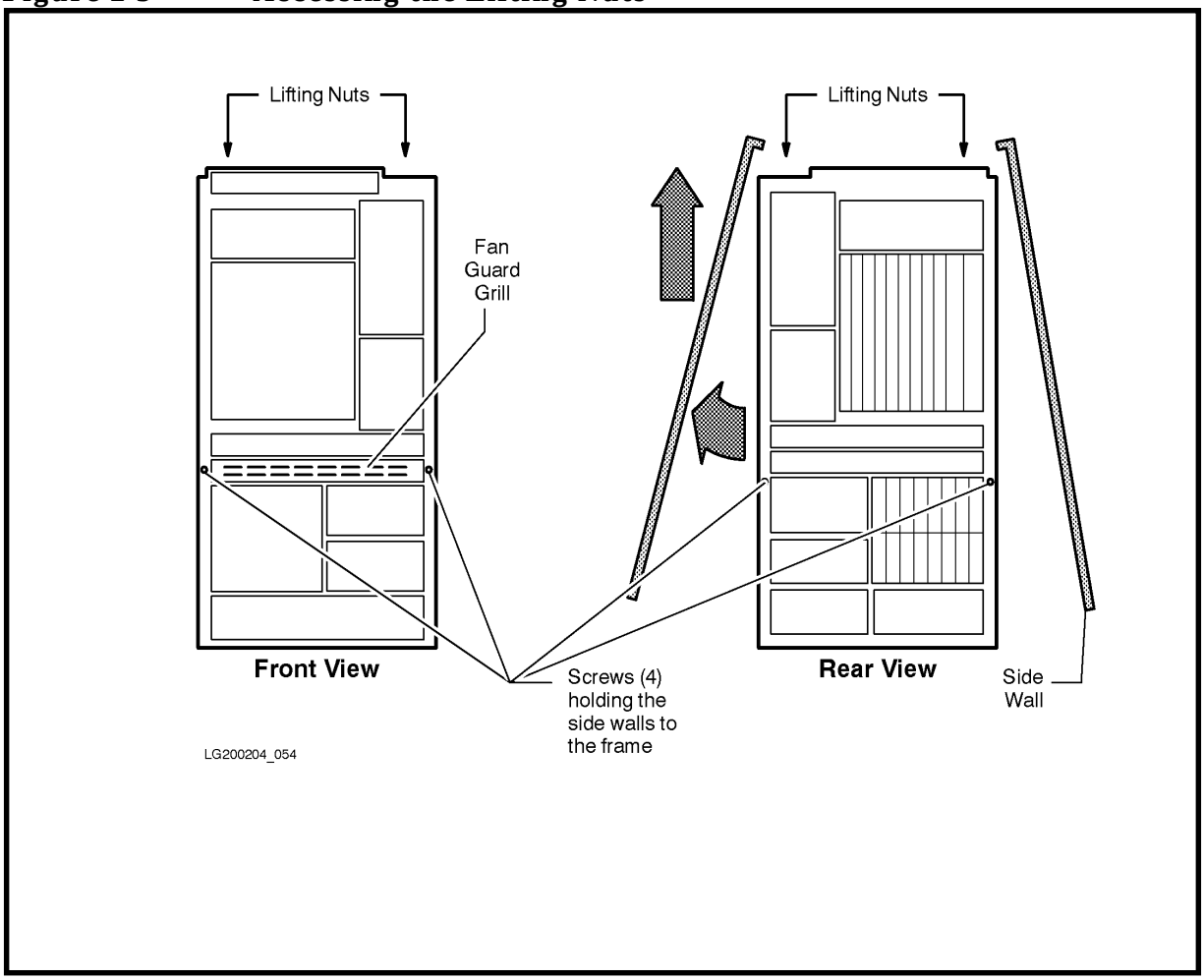
## Accessing the Lifting Nuts

| | |
|---|---|
| **NOTE** | Only perform the following procedure if you need access to the lifting nuts to attach a chain hoist. |

The unit is equipped with 4 lifting nuts which are used for attaching eyebolts for a chain hoist. The nuts are 3/8-inch, with 16 threads/inch. To access the lifting nuts (see Figure 2-5):

1. Open the front door of the system.
2. Remove the fan guard grill (just below the fan tray) by unfastening two M4 screws.
3. From the front of the system, remove the two M6 screws (one on either side) that fasten the side walls to the frame. These two screws are just behind the fan guard grill.
4. Open the rear door and remove the two M6 screws (one on either side) that fasten the side walls to the frame.
5. Remove the left and right side walls from the system. A side wall is removed by lifting the bottom end outward, then lifting the wall upward.
6. The 4 lifting nuts (on the top of the frame) are now accessible.

**Figure 2-5 Accessing the Lifting Nuts**

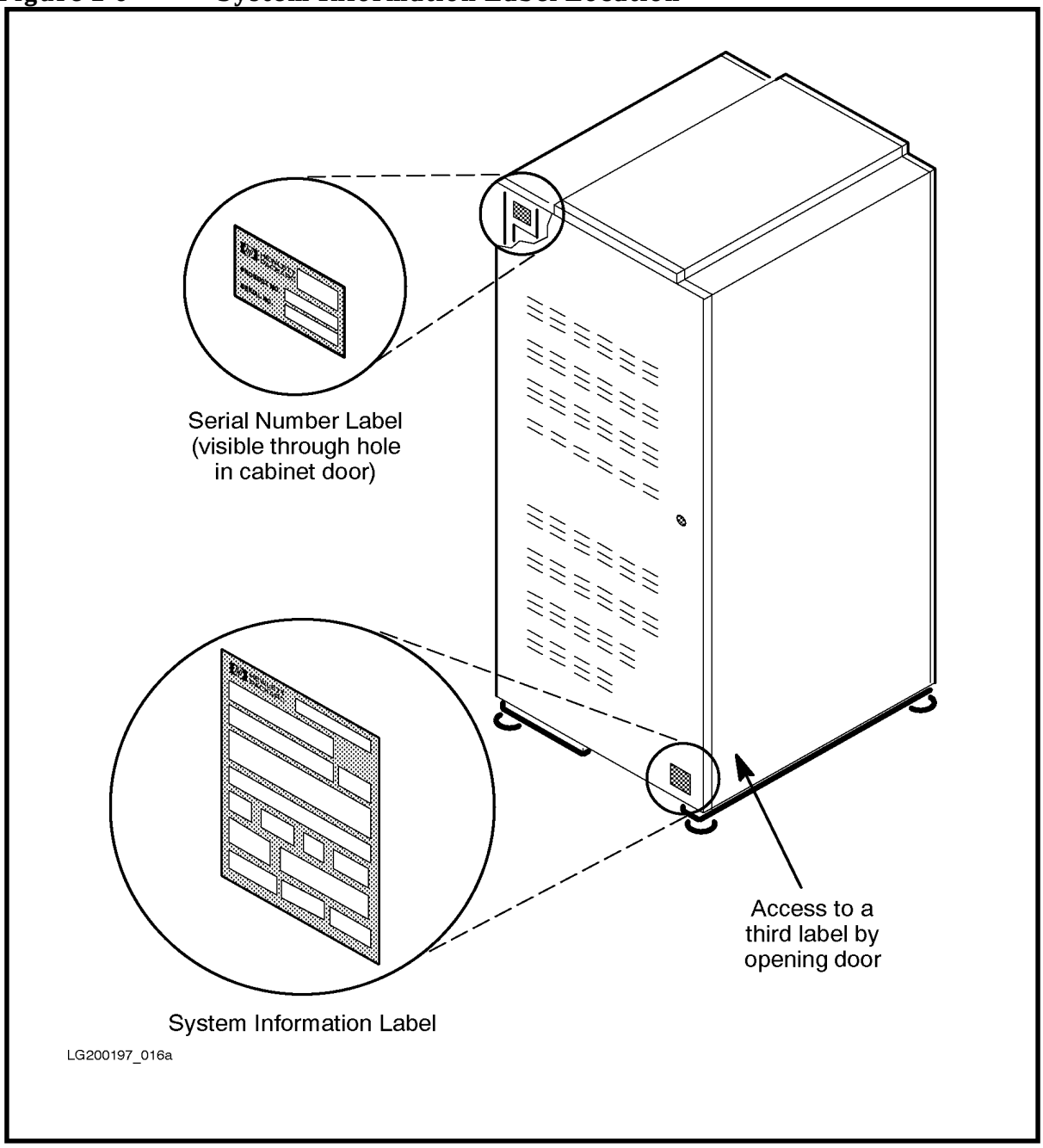


# Unpacking Accompanying Equipment

Once the cabinet is at the installation site, unpack the cartons that accompany the cabinet and inspect the model/serial numbers:

1. Open the carton marked "MANUALS AND ACCESSORIES" and remove the check list.
2. Open all other cartons and make sure all of the equipment on the list has been received. This includes options, spare parts, cables, and software. Refer to the original purchase order if required.
3. If optional assemblies or cards have been ordered separately, make sure they have been furnished with the shipment and are in accordance with the purchase order.
4. Update the documentation. Updating instructions are packed with each document.
5. Make sure that the system model number and serial number are identical to those specified on the packing list. The numbers are printed on the System Information label, located in the rear of the system, shown in Figure 2-6.

**Figure 2-6 System Information Label Location**



# Reshipment

The system can be shipped within North America via padded cargo van (without a pallet), provided the van has been designed to haul electronic equipment. In all other cases, the system must be secured to a pallet and protected from vibration and shock as it was during original shipment.

# Repackaging the Cabinet for Shipment

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

Due to the weight of a fully loaded cabinet, it may require two people to push the 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 shipment.** |

To repackage 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.
2. Connect the loading ramp to the pallet.
3. Raise the cabinet levelers before moving the cabinet.
4. Push the cabinet up the ramp onto the pallet. Be sure to position the cabinet so the front goes up the ramp first.
5. Secure the cabinet to the pallet with the shipping clamps, shipping block, and rear door support.
6. Place the anti-static bag over the cabinet.
7. Place the top cap packing material and loading/unloading ramp on top of the cabinet.
8. Wrap the clam shell box around the cabinet.
9. 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.

# 3 Installation

After a site has been prepared, and the system has been unpacked, system installation can begin.

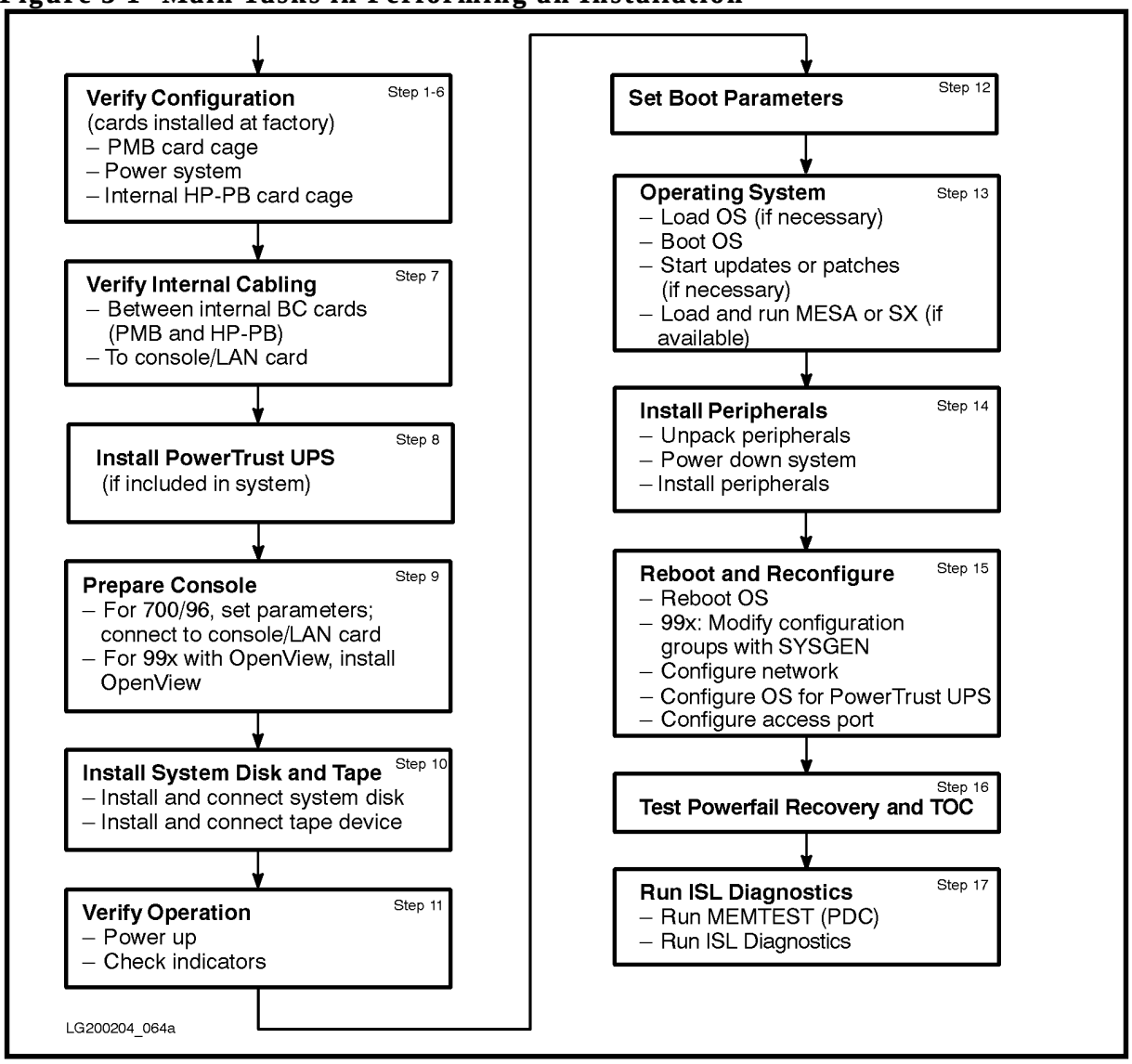
This chapter describes the procedures for installing 99x/T-Class Systems. It covers:

- Summary.
- Gaining Access to the Card Cage.
- PMB Cards.
- Power System.
- HP-PB I/O Cards.
- Internal SPU Cabinet Connections.
- PowerTrust UPS.
- The Console.
- Installing the System Disk and Tape.
- Verifying the System.
- Setting Boot Parameters.
- Operating System.
- Installing the Remaining Peripherals.
- Rebooting and Reconfiguring.
- Testing Powerfail Recovery on 890/990/992 Systems.
- Testing Transfer of Control.
- Running PDC and ISL Diagnostics (Recommended).
- Operating the Computer.

# Summary

Figure 3-1shows the main tasks involved in installing 99x/T-Class Systems.

**Figure 3-1 Main Tasks in Performing an Installation**




The following summarizes the procedures for installing 99x/T-Class Systems:

1. **Perform site prep tasks**; see *99x/T-Class Systems Site Preparation and Requirements Guide* (PN A1809-90002).
2. **Unpack and inspect the system**; see Chapter 2 (Unpacking and Inspection) in this manual. (Responsibility of the customer.)
3. **Gain access to the card cages**:

   a. Open cabinet doors.

b. Remove front card cage cover if necessary.

c. Remove individual slot shields if necessary.

4. **Install/verify PMB cards**:

   a. **990/992/890, 991/995/T500, and 996/T520 Systems.** Processor cards in this sequence: PMB slots 15, 14, 13, 12, 11, 10, 9, 8 (six processor cards maximum on the 890/T500 System and seven processor cards maximum on the T520 System).

   b. **997/T600.** Processor cards in this sequence: PMB slots 15, 14, 13, 11, 10, 9 (six processor cards maximum).

**NOTE** Each 997/T600 processor card is designed to accommodate two processor daughterboards. The system is not designed to support two or more processor cards that have only one daughterboard attached.

   c. Bus converters (BC) and HP-HSC I/O Bus Converters (997/T600) in this sequence: PMB slots 0, 1, 2, 3, 4, and 5 (six HP-HSC I/O Bus Converters maximum on 997/T600 Systems; four BC cards maximum on all other systems.) See "Terminology" in Chapter 1.

   d. Service processor (SP) card in the SP slot in rear PMB card cage.

   e. Memory cards in this sequence: PMB slots 4, 6, 8, 9, 10, 11, 12, 13, 14, 7, 5, 3, 2, 1. If one of these slots is occupied, go to the next slot in the sequence.

5. **Install/verify power system:**

   **997/T600 only:**

   a. Use the following table to verify that the power and PFC modules are properly installed:

**Table 3-1 3.3V 130A Power Supply Configuration**

| Processor Card Slot # | 15 | | 14 | | 13 | | 11 | | 10 | | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # of Processors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Power Modules Required | 1 | | 2 | | | | 3 | | | 4 | | |
| 3.3V Power Module Slot # | P10 | | P9 | | | | P11 | | | P1 | | |

**NOTE** If the system was ordered with the "power resiliency" option, refer to Appendix D, "Power Resiliency".

   b. Slot P12 contains Miscellaneous Power Module (MPM).

   c. Slot P14 contains +24V module.

   d. Slots P5, P6, P7, and P13 contain +5V 325W (65A) power modules.

   e. One PFC for systems with two or fewer processors. Two PFCs for systems with more than two processors.

**On all other systems:**

Verify that power modules are properly installed:

a. Slot P10 contains +5V 130A (650W) power module.

b. Slot P12 contains Miscellaneous Power Module (MPM).

c. Slot P14 contains +24V module.

d. Slots P6, P7, and P13 contain +5V 325W (65A) power modules.

e. Systems with more than 8 processors: Slot P1 contains +5V 130A (650W) power module.

f. Verify that input power meets requirements.

g. Install power cord and plug for European/international locations. (Not necessary for North America.)

6. **Install/verify HP-PB I/O cards:**

   a. BC card (lower port) in double-high slot 14/15.

   b. Console/LAN card in double-high slot 10/11.

   c. T-Class only: MUX-16 card in slot 7.

   d. 99x only: PBA-IB card in double-high slot 2/3.

   e. HP-FL system disk. (Not supported on T600 Systems.)

      i. HP-FL (PB-FL) card in double-high slot 12/13.

      ii. SCSI card in slot 9.

   f. SCSI or Fast/Wide SCSI system disk:

      i. HP-FL (PB-FL) card in double-high slot 8/9. (Not supported on T600 Systems.)

      ii. SCSI (single ended) card in slot 13.

      iii. SCSI (Fast/Wide) card in slot 12/13.

   g. Other cards should follow HP-PB guidelines; see Appendix B (Configuring the HP-PB Cardcage):

      i. Power guidelines (so HP-PB card cage is not overloaded).

      ii. Performance guidelines. Some rules of thumb:

         1. 99x: Install cards for disk drives in higher numbered (higher priority) slots, but below LAN/console card.

         2. T-Class: Install LAN cards in higher numbered (higher priority) slots, but below LAN/console card.

7. **Make/verify internal connections.**

a. Verify connection of two flat ribbon cables from lower connectors (module 0) on BC cards or HP-HSC I/O Bus Converters (997/T600) in PMB card cage to the BC card in the HP-PB card cage.

b. Make/verify connections to the console/LAN card:

i. To console.

ii. To Service Processor (SP) card.

iii. To remote support modem.

iv. To LAN cable (ThinLAN or ThickLAN). Check/change position of jumper on console/LAN card (INT for ThinLAN; EXT for ThickLAN).

8. **Install PowerTrust UPS.** If the system includes PowerTrust Uninterruptible Power System (UPSs), install it according to the manual that accompanies it. Install the system cabinet power cables.

9. **Prepare console:**

a. For T-Class, 990CX, 991CX, 992CX, 995CX, 996, and 997 Systems that have been ordered with one: Connect the 700/96 console terminal to the LAN/console card. Set/verify parameters on the console (Baud 9600; Parity/databits none/8; Chk parity NO; EnqAck YES; CS (CB) Xmit NO; RecvPace Xon/Xoff; XmitPace Xon/Xoff).

b. For 990DX, 991DX, 992DX, 995DX, 996, and 997 Systems that have been ordered with one: install the OpenView Console.

i. Connect OpenView PC to the LAN/console card with a direct connect cable.

ii. Connect OpenView PC into the LAN cabling.

iii. Power up the OpenView PC.

iv. Enter `WIN` at the C:\> prompt.

10. **Install system disk and tape device.**

a. Install system disk and tape device in an A1884A/A1897A expansion cabinet (refer to *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006)).

b. Connect system disk to SPU:

i. For HP-FL system disks: Install the disk module containing the OS into slot 0 of the disk array with the label "System Disk". Connect the system disk to the HP-FL (PB-FL) card in double-high slot 12/13 of the internal HP-PB I/O card cage. (Address 0/52.0).

ii. For SCSI and Fast/Wide SCSI system disks: Connect the system disk to the SCSI card in slot 13 of the internal HP-PB I/O card cage. (Address 0/52.6.0).

c. Connect tape device to SPU:

i. For systems with HP-FL system disks:

1. For SCSI tape devices, connect the tape device to the SCSI card in slot 9 of the internal HP-PB I/O card cage. (Address 0/36.0.0).

2. For HP-IB tape devices, connect the tape device to the HP-IB card in slot 3. (Address 0/12.0.3).

iii. For systems with SCSI system disks:

1. For SCSI tape devices, connect the tape device to the SCSI card in slot 13 of the internal HP-PB I/O card cage. (Address 0/52.0.0).
2. For HP-IB tape devices, connect the tape device to the HP-IB card in slot 3. (Address 0/12.0.3).

iii. For systems with Fast/Wide SCSI system disks:

1. For SCSI tape devices, connect the tape device to the SCSI card in slot 9 of the internal HP-PB I/O card cage. (Address 0/36.0.0).
2. For HP-IB tape devices, connect the tape device to the HP-IB card in slot 3. (Address 0/12.0.3).

11. **Verify system operation.**

a. Make sure console, peripherals, expansion cabinets, and external HP-PB card cages (if any) are powered up and ready.

b. Power up the computer:

i. Turn on the circuit breaker switch at the rear of the SPU cabinet.

ii. Turn the "Standby-Ready" switch on the front panel to the "Ready" position.

c. Enter the PDC user interface.

d. Enter the PDC command to enable or disable the memory page deallocation table (PDT).

e. Verify that indicators show normal status.

f. Check the SP error log with the DL command (SP)

g. Check the autostart flag with the AF command (SP).

h. Check the PMB card cage configuration with the HC command (SP).

12. **Set boot parameters.**

a. Enter the PDC boot menu.

b. Verify/change autoboot flag.

c. Verify/change default hardware paths. See PDC on-line help for appropriate values.

13. **Operating system.**

a. Load the operating system if necessary. Some configurations are preloaded at the factory.

b. Boot the operating system.

c. If OS patches are included with the system, install them now.

d. If the System Exerciser (SX) is available, run it to further verify system operation.

14. **Install additional peripherals.**

    a. Unpack peripherals.

    b. Power down the system.

    c. Install additional peripherals in the A1884A/A1897A expansion cabinets; see *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006).

    d. Connect bus converter (BC) cards in the PMB card cage to HP-PB I/O card cages in the expansion cabinets.

    e. Make MUX connections and install MDPs (T-Class only).

    f. Make DTC connections to the console/LAN card.

    g. Connect other peripherals to HP-PB I/O cards.

15. **Reboot and reconfigure.**

    a. Reboot the operating system (OS).

    b. 99x: If the hardware configuration (I/O cards, peripherals, etc.) does not match the MPE/iX configuration, modify the MPE/iX configuration. See the listing of default configuration groups in Appendix A (MPE/iX Configuration and SYSGEN) in this manual. If necessary, use SYSGEN to modify the configuration group.

    c. Configure the network.

    d. Configure the OS for the PowerTrust UPS if one is included with the system.

    e. Configure Access Port (AP) for a remote console.

16. **Test powerfail recovery (990/992/890 without UPSs) and Transfer of Control (TOC).**

17. (Recommended.) **Run diagnostics:** For all systems except T600s and 997s, run MEMTEST at the PDC interface; then run EDPROC and EDBC at the ISL prompt. On 997/T600 Systems, use ODE (Off-line Diagnostic Environment) to run UDIAG, JAVADIAG, KEYDIAG, and MEMTEST.

# Gaining Access to the Card Cage

## Opening the Cabinet Doors

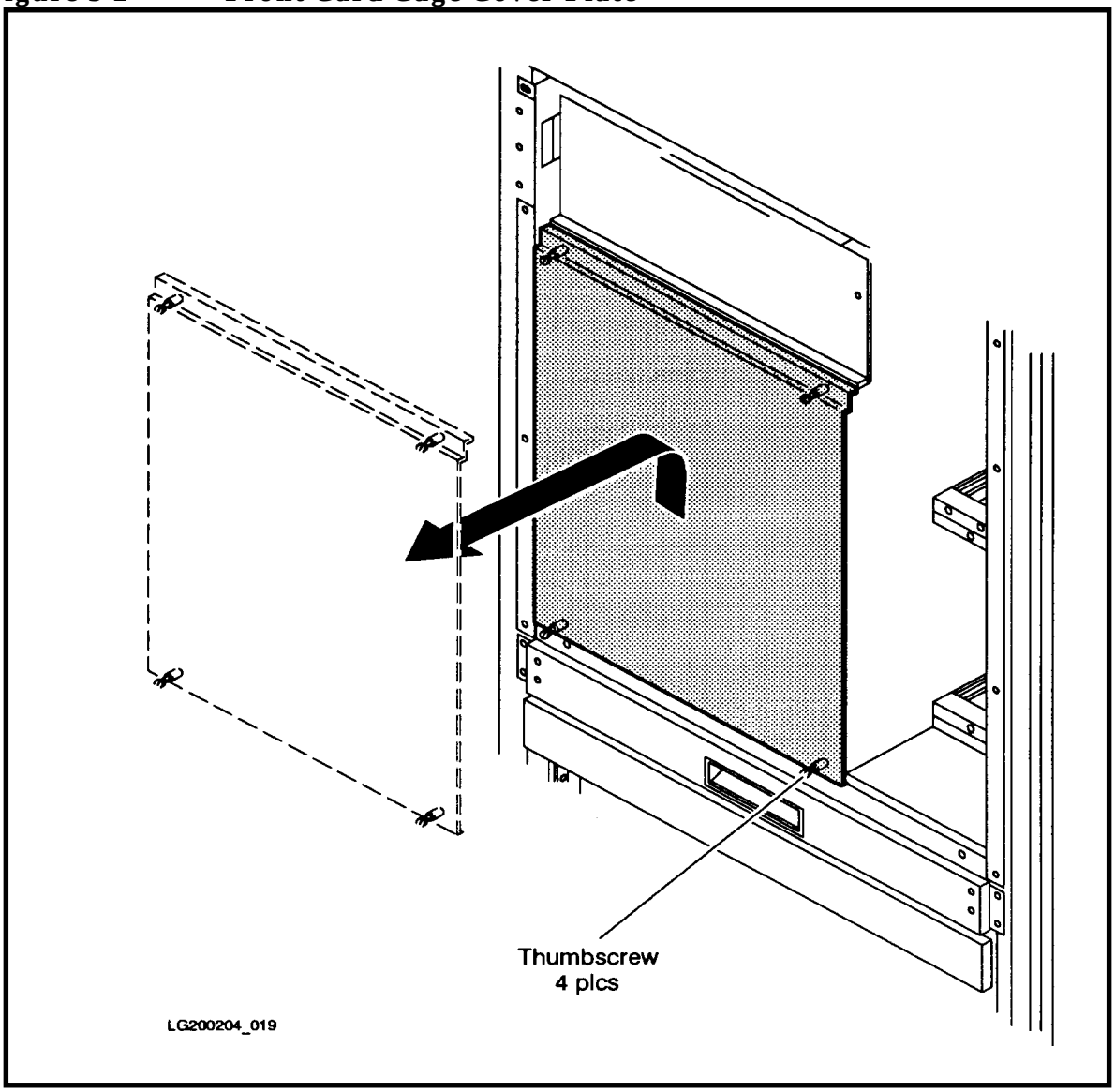
To open the front and rear cabinets:

1. Insert the hexagonal cabinet key into the black hexagonal hole on the right of the cabinet door.
2. Rotate the cabinet key about a quarter-turn counter-clockwise.
3. Pull the door open.

## Removing the Front Card Cage Cover Plate

A metal plate covers the PMB cards in the front card cage. See Figure 3-2.

**Figure 3-2 Front Card Cage Cover Plate**




To verify the presence of PMB cards, you do not have to remove the cover plate. You can see the PMB cards through holes in the cover plate.

To install/remove PMB cards, you have to remove the cover plate.

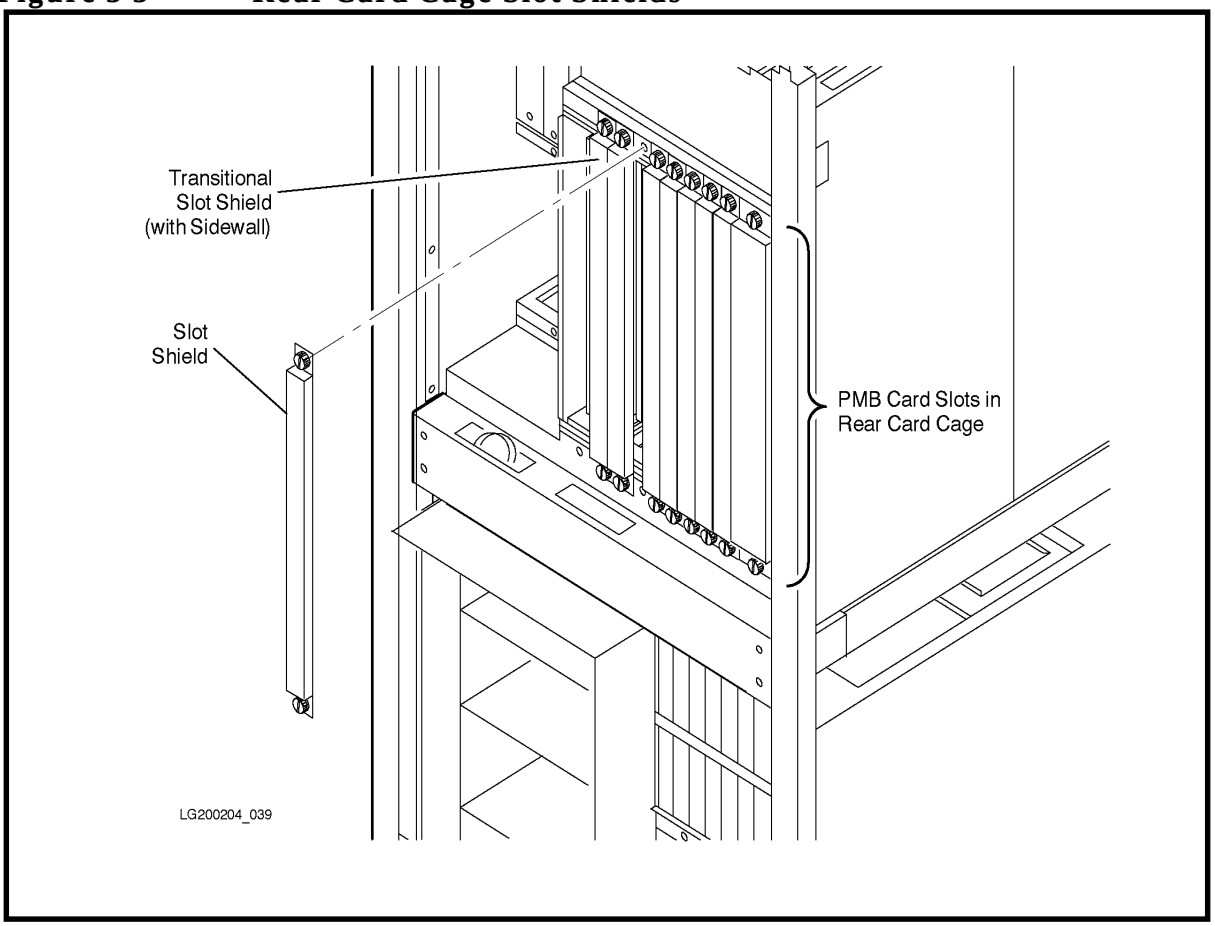
To remove the front card cage cover plate, loosen the four (4) thumbscrews (two each at the upper and lower edges), and lift the cover plate up and out.

To install the cover plate, place the cover plate lip over the raised edge of the cabinet frame. Tighten the four thumbscrews with a screwdriver so that they are more than finger-tight. (The torque specification for the thumbscrews is 24-28 inch-lbs.)

## Removing Rear Card Cage Slot Shields

The rear card cage is not protected by a cover plate. However, individual slots that are not being used (no card installed) are protected by metal shields secured by two thumbscrews. To remove a metal slot shield, loosen the two (2) thumbscrews (one at the top edge and one at the bottom edge), and remove the shield from the card cage (see Figure 3-3).

**Figure 3-3 Rear Card Cage Slot Shields**




To install a slot shield, set the shield over the slot so that the screws are aligned with the holes in the card cage frame. Tighten the two thumbscrews with a screwdriver so that they are more than finger-tight. (The torque specification for the thumbscrews is 24-28 inch-lbs.)

Note that the left-most slot shield is a "transitional shield." This shield has a wide sidewall for EMI emissions control. This transitional slot shield should always be located immediately to the right of the right-most BC card.

**NOTE** If a slot shield does not fit easily into place when you are installing it, do not force it. Instead, lever the shield into place from the bottom, from the top, or from the left side. Forcing the shield into place may damage the EMI contacts on the right side of the shield.

| | |
|---|---|
| **NOTE** | All cover plates and slot shields should be in place and securely fastened while the unit is in operation. (Card cage cover plates and slot shields are required for proper cooling and for EMI emissions control.) |

# PMB Cards

99x/T-Class Systems are preconfigured at the factory and shipped with all cards that have been ordered as part of the system. None of the cards have any jumpers or switches to set.

This section describes the location of the cards in the Processor Main Bus (PMB) card cage. (See Figure 3-6, Figure 3-8, and Figure 3-9). Use this information to verify that PMB cards have been correctly installed in the system.

## Processor Cards

The loading sequence of processor cards into the PMB card cage depends on the system with which you are working.

### 990/992/890, 991/995/T500, and 996/T520 Only

Processors must be installed according to the following rules:

1. PMB card slot 15 is reserved for the first processor card.
2. Use the following sequence for installing additional processor cards: PMB slots 14, 13, 12, 11, 10, 9, 8.

If a processor card is installed in slots 8 through 11, an additional +5V 130A (650W) power supply (PN 0950-2229) should be installed in slot P1.

| | |
|---|---|
| **CAUTION** | Do not handle the processor card or daughterboard by the cooling vanes. Applying pressure to these vanes may cause the ceramic to crack. |

### 997/T600 Only

Processors must be installed in the following sequence: PMB slots 15, 14, 13, 11, 10, and 9.

| | |
|---|---|
| **NOTE** | Multiprocessor systems have special power requirements. For more information, refer to “Verifying Installation of Power Modules”. |

Make sure the operating system has been updated:

1. MPE/iX Release 5.5 or later is required to support up to 4 processors.
2. MPE/iX Release 5.5, PowerPatch 5 or later, is required to support up to 8 processors.
3. MPE/iX Release 6.5 or later is required to support up to 12 processors.

### Configuration Limits for Systems with 4+ CPUs

If more than 4 CPUs are configured on a system, the number of memory and BC cards must be reduced due to PMB slot and arbitration line limitations. Refer to Table 3-2 for configuration combinations.

The table shows the maximum number of CPUs that can be configured in the system cabinet for a given number of memory cards and BC cards. (The term *BC Card* in column 1 refers to BC cards on 990/992/890, 991/995/T500, and 996/T520 Systems, and to HP-HSC I/O Bus Converters on 997/T600 Systems.)

**NOTE** As of the publication date of this manual, the 990 and 997 systems support a maximum of 1 CPU, the 992 system supports a maximum of 4 CPUs, and the 997 system supports a maximum of 8 CPUs.

**Table 3-2 99x/T-Class System Configuration Limits for CPU, Memory, and BC Cards**

| # of BC Cards | # of Memory Cards | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs |
| 2 | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs |
| 3 | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 10 CPUs |
| 4 | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 12 CPUs | 10 CPUs | 8 CPUs |
| 5 [1] | 11 CPUs | 11 CPUs | 11 CPUs | 11 CPUs | 11 CPUs | 10 CPUs | 8 CPUs | 6 CPUs |
| 6[1] | 10 CPUs | 10 CPUs | 10 CPUs | 10 CPUs | 10 CPUs | 8 CPUs | 6 CPUs | 4 CPUs |

1. 997/T600 Systems only.

## Bus Converter (BC) and HP-HSC I/O Bus Converter Cards

Bus Converter and HP-HSC Bus Converter cards (997/T600) must be installed according to the following rules:

All bus converter cards must be installed in the rear of the PMB card cage in slots 0 through 5. A maximum of four BC cards can be installed on 990/992/890, 991/995/T500, and 996/T520 Systems; six can be installed on 997/T600 Systems. The rules for installing cards are as follows:

- The first BC card must be installed in PMB card slot 0.
- Additional bus converter cards must be installed in the following sequence:

  Slots 1, 2, 3 (on 990/992/890, 991/995/T500, and 996/T520 Systems); and 1, 2, 3, 4, and 5 (on 997/T600 Systems). If a memory card is installed in one of these slots, move the memory card to another valid slot.

Before you can install HP-HSC I/O Bus Converters, you may have to attach any HP-PB I/O Bus Converters and HSC I/O cards that the customer ordered onto the HP-HSC I/O Bus Converter.

## Guidelines for Attaching HP-PB I/O Bus Converters and HSC I/O Cards to HP-HSC I/O Bus Converters

1. Attach the HP-PB I/O Bus Converter to the HP-HSC I/O Bus Converter only at module 0 or module 2. Use the following rules to attach them to the HP-HSC I/O Bus Converter:

   a. Attach one HP-PB I/O Bus Converter per HP-HSC I/O Bus Converter until you have attached all of the HP-PB I/O Bus Converters.

   b. If you have more HP-PB I/O Bus Converters than HP-HSC I/O Bus Converters, attach a second HP-PB I/O Bus Converter to each HP-HSC I/O Bus Converter until you have installed all of the HP-PB I/O Bus Converters.

2. Attach any other HSC I/O cards to the HP-HSC I/O Bus Converters, one per HP-HSC I/O Bus Converter. (HSC I/O cards include such cards as ATM, Fibre Channel, and F/W SCSI cards.)

3. If there are more HSC I/O cards than HP-HSC I/O Bus Converters with available slots, attach a second HP-HSC I/O card to each HP-HSC I/O Bus Converter.

4. Repeat the previous step until you have attached all of the remaining HSC I/O cards.

**To attach a card to an HP-HSC I/O Bus Converter:**

| | |
|---|---|
| **CAUTION** | Be sure to follow ESD precautions by grounding yourself to the cabinet chassis using a wriststrap. (The cabinet chassis has wriststraps permanently attached at both the front and rear.) |

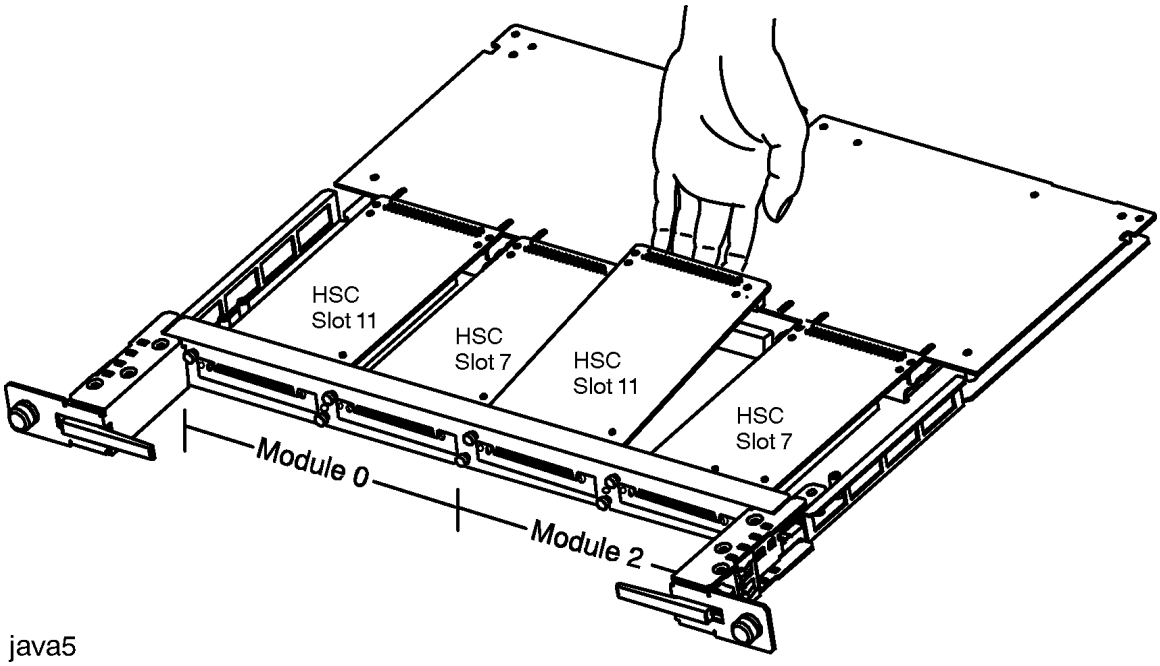
1. Using a #10 TORX head driver, remove the cover blank from the slot you want to use for the HP-HSC I/O card.

   The screws that secure the cover blanks are spring loaded. When removing the screws, apply slight inward pressure to prevent the screw from separating from the spring. When the screw no longer moves outward, it is detached from the cover plate.

2. Orient the HSC I/O card so that the connector at the back of the card faces the connector on the HP-HSC I/O Bus Converter.

3. Using light pressure at the back of the HSC I/O card, press the card against the bulkhead of the HP-HSC I/O Bus Converter. See Figure 3-4.

**Figure 3-4 Attaching an HSC I/O Card to an HP-HSC I/O Bus Converter**

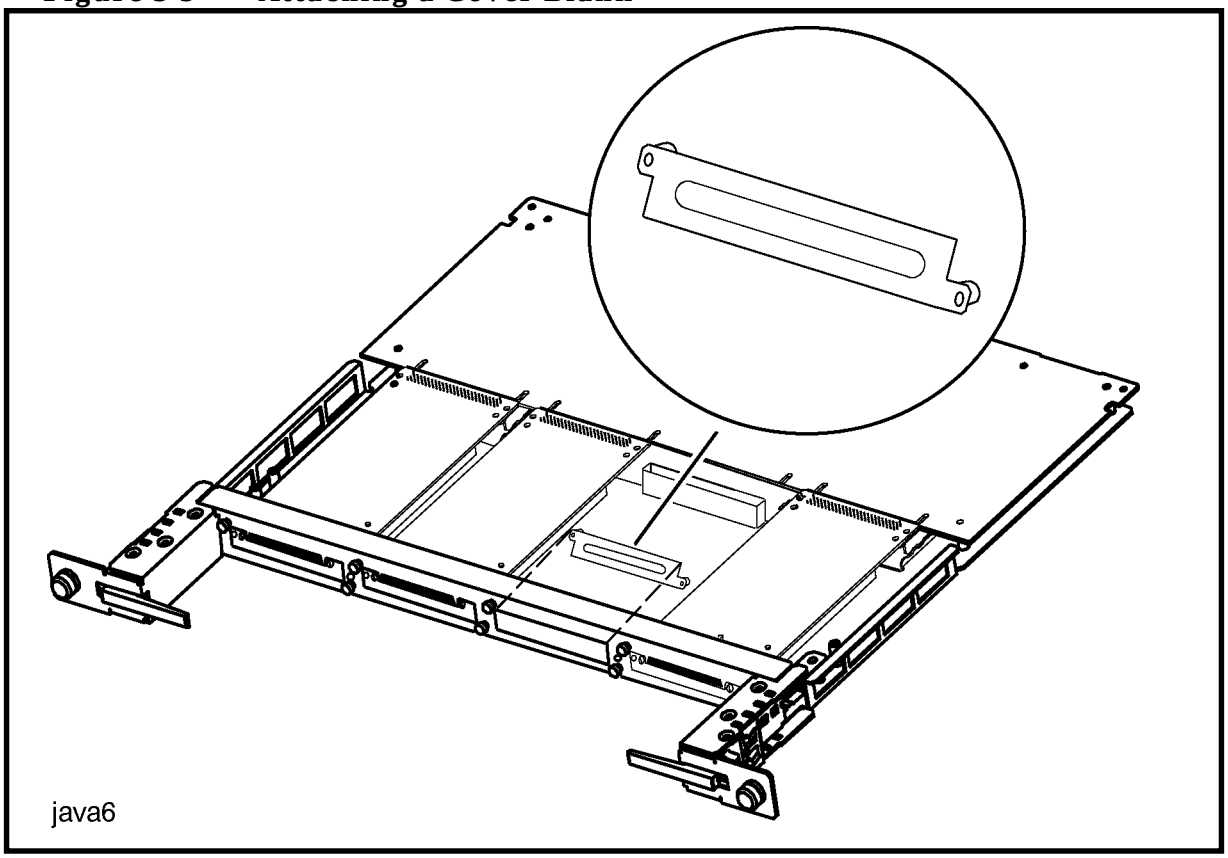



java5

4. While holding the connectors about 1 millimeter apart, tighten the captive screws on the bulkhead.
5. To avoid damage to the connectors, verify that the connectors on the boards are aligned properly, then press them together securely by applying even force across the length of the HSC I/O card connector.
6. Attach cover blanks to any openings on the HP-HSC I/O Bus Converter. Openings occur where an HSC I/O card has not been attached on an HP-HSC I/O Bus Converter. Cover blanks must be in place to satisfy EMI emissions and thermal requirements.
7. Tighten the captive screws on the HP-HSC I/O Bus Converter bulkhead to the cover blank. See Figure 3-5.

   Screw the first screw about halfway, tighten the other screw completely, then tighten the first screw completely.

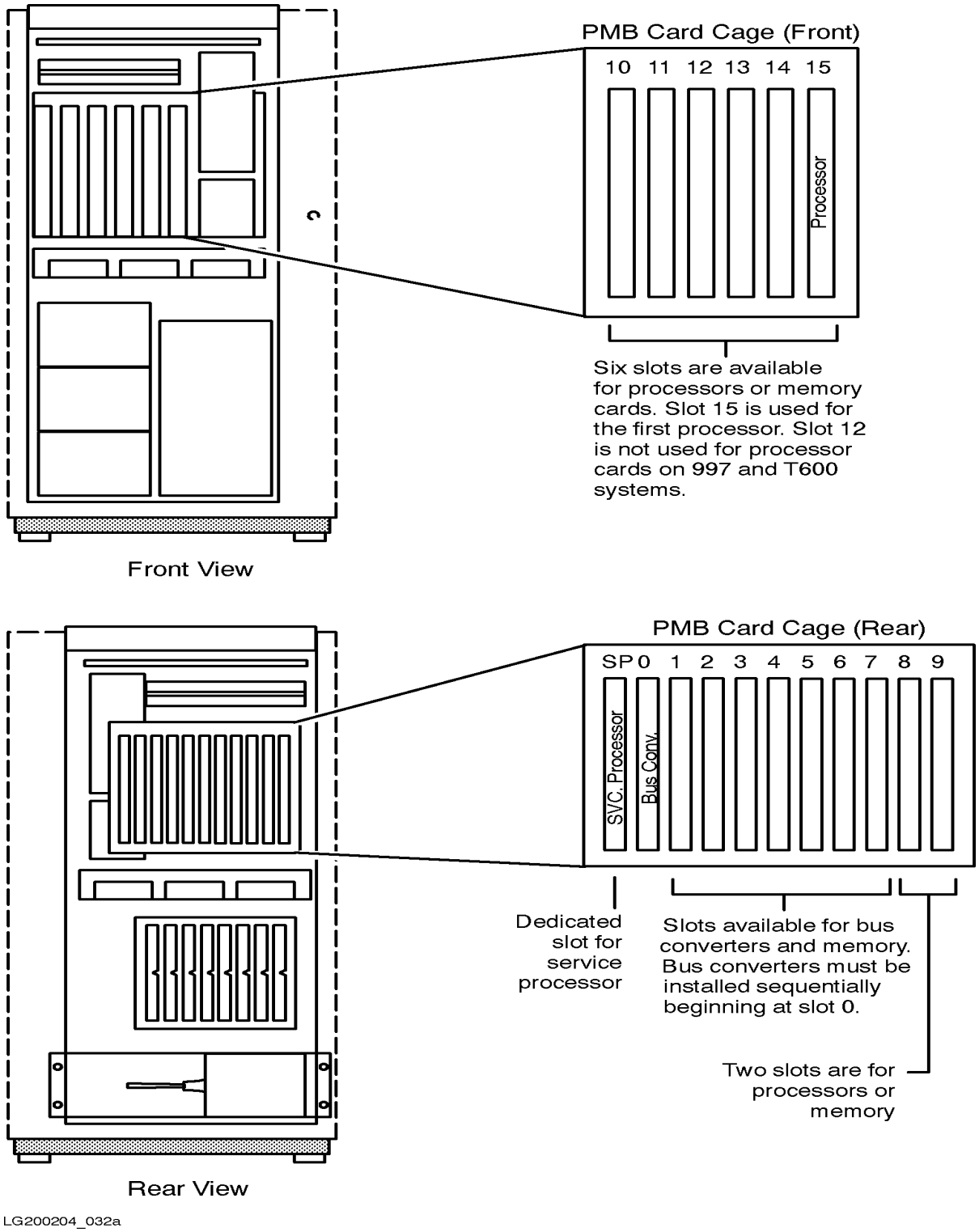
**Figure 3-5 Attaching a Cover Blank**




## Service Processor (SP) Card

Each system must contain one Service Processor (SP) card located in a dedicated slot (slot SP in the rear card cage).

**Figure 3-6 Processor Main Bus (PMB) Card Cage Card Locations**



## Memory Cards

Up to 8 single-wide, 4 double-wide (8 GB), or a combination of single-wide or double-wide PMB memory cards may occupy PMB card slots 1-14. (PMB card slots 1 through 7 are single-wide slots. Slots 8 through15 are double-wide slots.)

Memory cards must be installed after processor and bus converter cards, respectively, and in the following sequence, and according to the following rules:

1. Load 8 GB memory boards in the following sequence: 8, 12, 9, 10, 6, 4. If a slot is occupied with a processor or bus converter board, use the next available slot.

**NOTE** If there is a single-wide memory board (64, 128, 256, 512, or 768 MB) in a double-wide slot, you will have to relocate it to another slot.

2. Load all other memory cards in the following sequence: 4, 6, 8, 9, 10, 11, 12, 13, 14, 7, 5, 3, 2, and 1. If a slot is occupied, use the next available slot.

**CAUTION**

**Minimum memory for systems with a UPS:** 128MB for 890, 256MB for T-Class or 99x Systems.

**Minimum memory for 890/990/992 Systems without a UPS:** For powerfail recovery to function properly on these systems, a minimum amount of memory must be installed in the system:

- 890/990/992 Systems with **one or two** processors: 128MB of memory
- 890 Systems with **three** processors: 192MB of memory
- 890 Systems with **four** processors: 256MB of memory
- 990/992 Systems with **three or four** processors: 256MB of memory
- 991/995/T500, 996/T520, and 997/T600 Systems with one processor: 256MB of memory. See also Table 3-3.

Failure to meet the minimum memory requirements will result in lost data during a powerfail recovery.

The 512-Mbyte and 768-Mbyte cards are not supported on 990/992 or 890 Systems.

## Minimum Number of Memory Banks

For best performance, the memory configuration should have at least four banks of the same size (64 MB or 256 MB). For example, consider a system that currently has only 64-MB banks. If you want to add 512-MB cards (with two 256-MB banks) or 768-MB cards (with three 256-MB cards), add sufficient cards so the resulting configuration will have at least four 256-MB banks. This could be accomplished with two 512-MB cards (making a total of four 256-MB banks) or with one 512-MB and one 768-MB card (total of five 256-MB banks).

The reason for this guideline has to do with memory interleaving. The Processor Dependent Code (PDC) will configure memory cards with the largest bank size (256 MB) in Memory Interleave Group 1 (assigned Block_IDs 40-5n). Memory cards with a smaller bank size (64MB) are configured in Memory Interleave Group 3 (assigned Block_IDs C0-Dn).

### Minimum Recommended Memory

Table 3-3 shows the recommended minimum memory for each CPU configuration. The recommended minimum is the least amount of memory necessary to achieve satisfactory performance under normal workloads. It may be necessary or desirable to increase the actual memory in the configuration to achieve optimum performance for a specific application workload.

**Table 3-3 Minimum Recommended Memory**

| # of CPUs | Recommended Minimum |
|---|---|
| 1 | 256 MB |
| 2 | 384 MB |
| 3 | 512 MB |
| 4 | 640 MB |
| 5 | 768 MB |
| 6 | 896 MB |
| 7 | 1024 MB |
| 8 | 1152 MB |
| 9 | 1280 MB |
| 10 | 1408 MB |
| 11 | 1536 MB |
| 12 | 1664 MB |

### Memory Interleaving

99x/T-Class Systems support memory interleaving to improve system performance. The system automatically configures memory for interleaving and no special procedures are necessary.

### Installing a Memory Card

To install/remove a memory card:

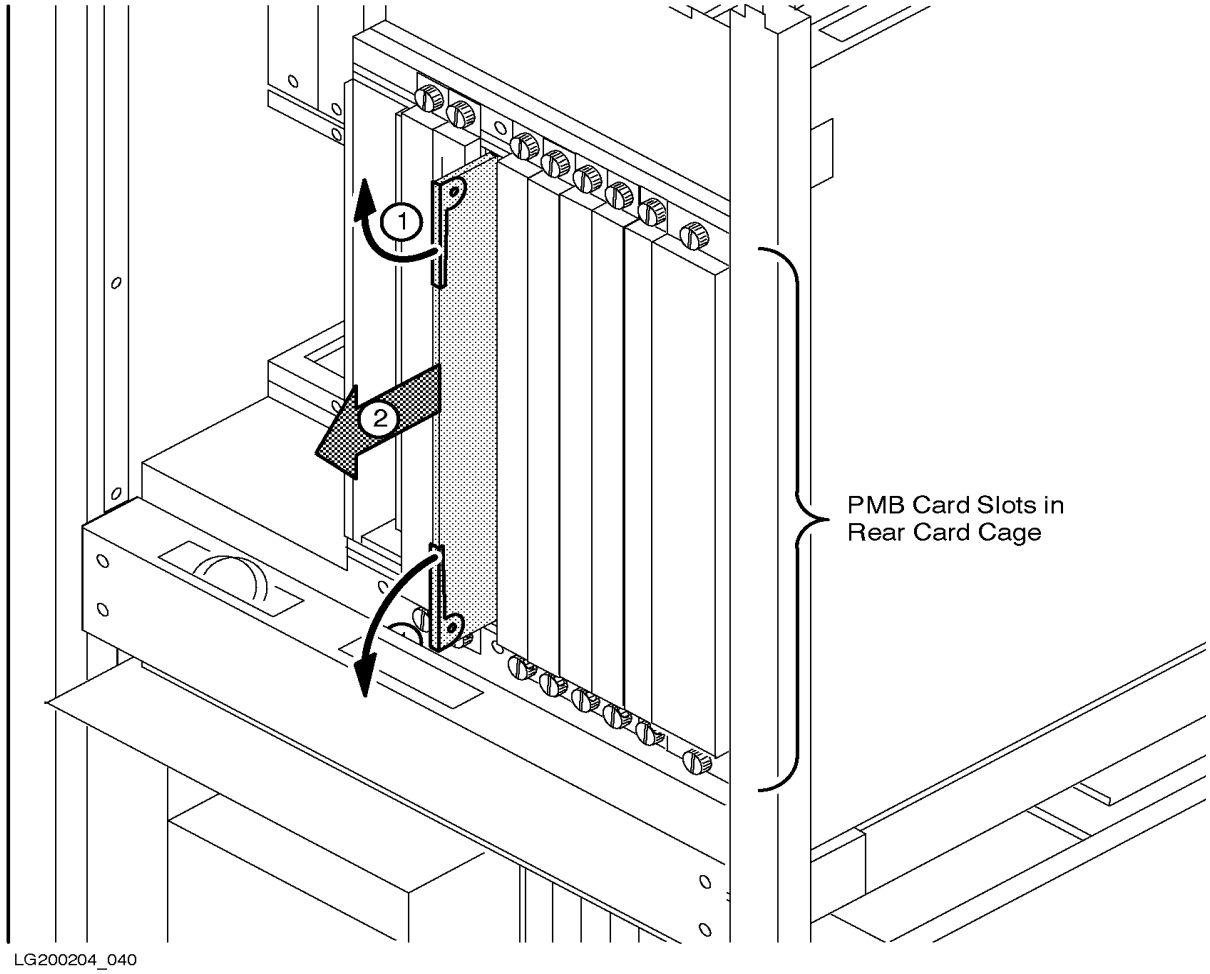
1. If the system is running the operating system (OS), shut down the OS using the appropriate command.
2. Wait until the OS has finished its shutdown routine.

3. Turn the "Standby-Ready" switch at the top front of the computer to the "Standby" position.
4. Turn off the circuit breaker switch at the bottom rear of the chassis.

| WARNING | **Be sure that the circuit breaker at the rear of the computer is turned off, and that the "Standby-Ready" switch is in the "Standby" position.** |
|---|---|

5. Using the memory configuration guidelines given above, decide whether the new memory cards will go in the front or rear PMB card cage (slots 1 to 9 are in the rear; slots 10 to 14 are in the front).
6. Remove the PMB card cover for the front or rear PMB card cage.
7. Follow ESD precautions (ground yourself to the chassis by using a wriststrap.) The chassis has wriststraps permanently attached at both the front and rear.
8. If necessary, remove the individual slot shields on slots which will receive a memory card.
9. Install/remove the memory card, holding the card by its insertion levers or by its bulkhead. See Figure 3-7.
10. Slide the memory card in/out along the metal card guides.
11. If installing a card, make sure it is seated snugly.
12. Reinstall the PMB card cover when finished.

**Figure 3-7 Inserting/Removing a PMB Card.**



# Power System

This section describes how to verify the installation of the power system.

**NOTE** If the system was ordered with the “power resiliency” option, refer to Appendix D, “Power Resiliency”.

## Verifying Installation of Power Modules

Power modules have been pre-installed at the factory.

To verify the installation of power modules for 990/992/890, 991/995/T500, and 996/T520 Systems, refer to Figure 3-8 and Figure 3-9.

To verify the installation of power modules for 997/T600 Systems refer to the following table and see Figure 3-10 and Figure 3-11.

**Table 3-4 3.3V 130A Power Supply Configuration (997/T600)**

| Processor Card Slot # | 15 | | 14 | | 13 | | 11 | | 10 | | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # of Processors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Power Modules Required | 1 | | 2 | | 3 | | 4 | | | | | |
| 3.3V Power Module Slot # | P10 | | P9 | | P11 | | P1 | | | | | |

The system should have one PFC for systems with two or fewer processors and two PFCs for systems with more than two processors.

**Figure 3-8 Power Modules and PMB Cards in the Front Card Cage—990/992/890, 991/995/T500, and 996/T520**

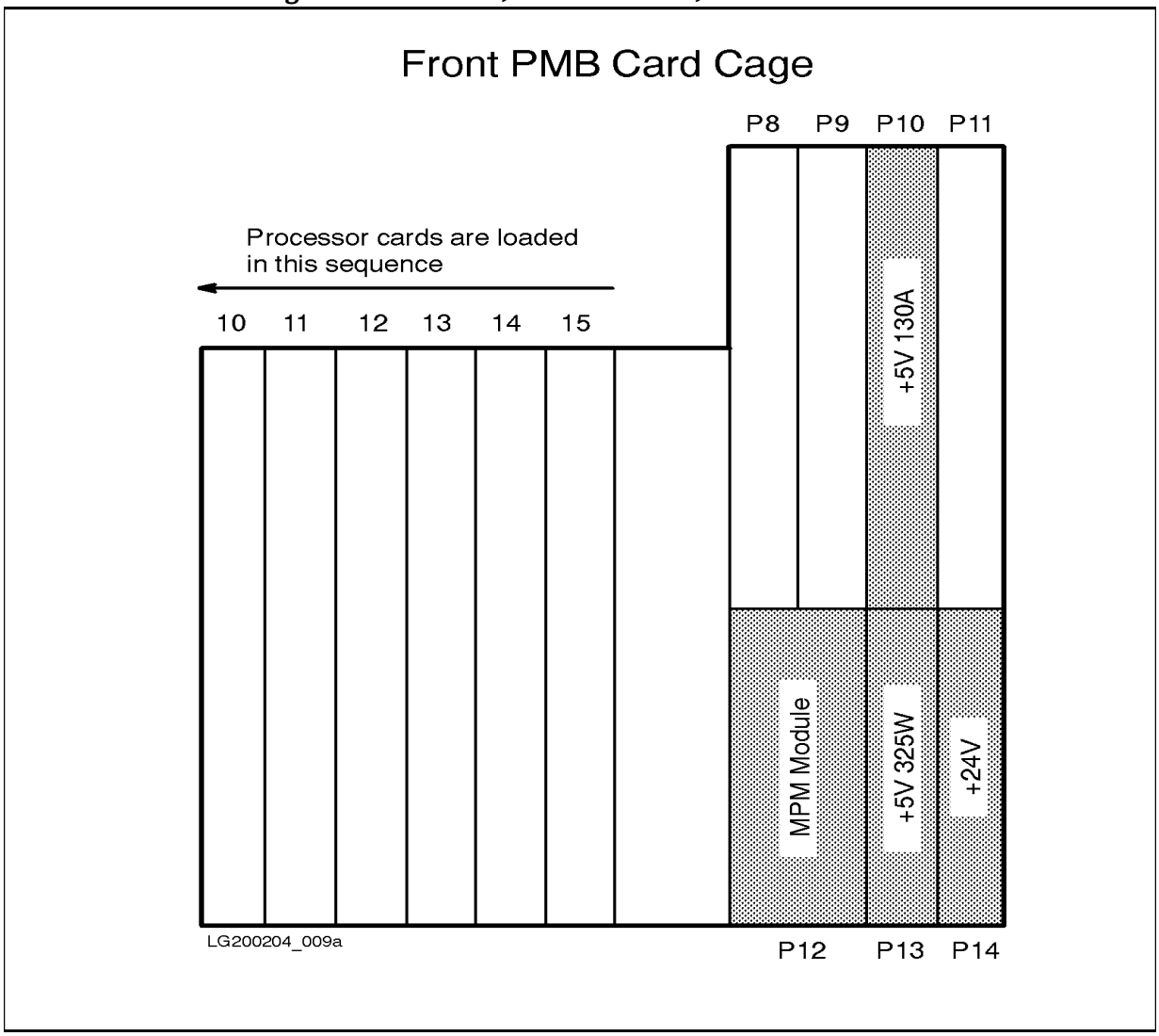
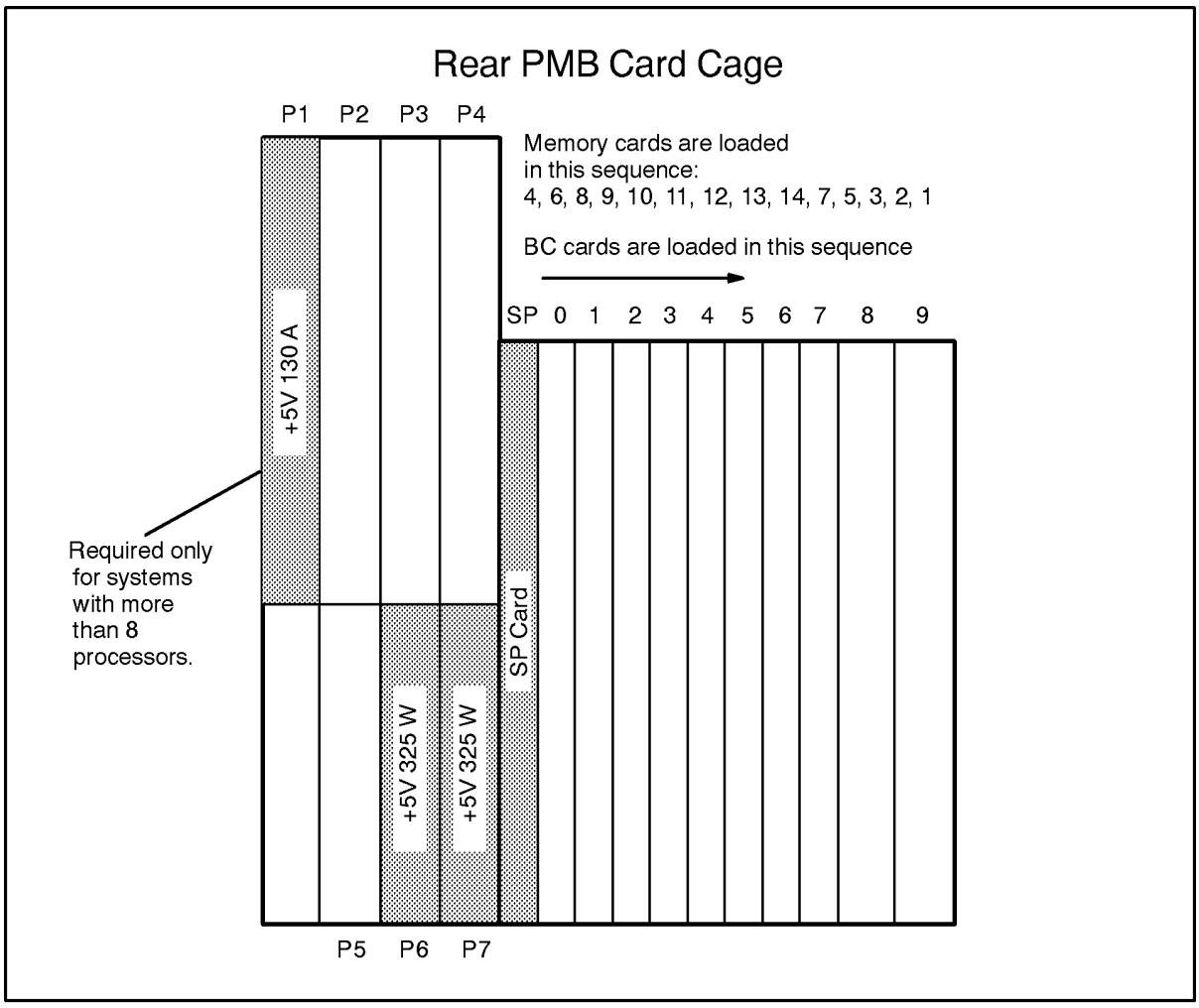
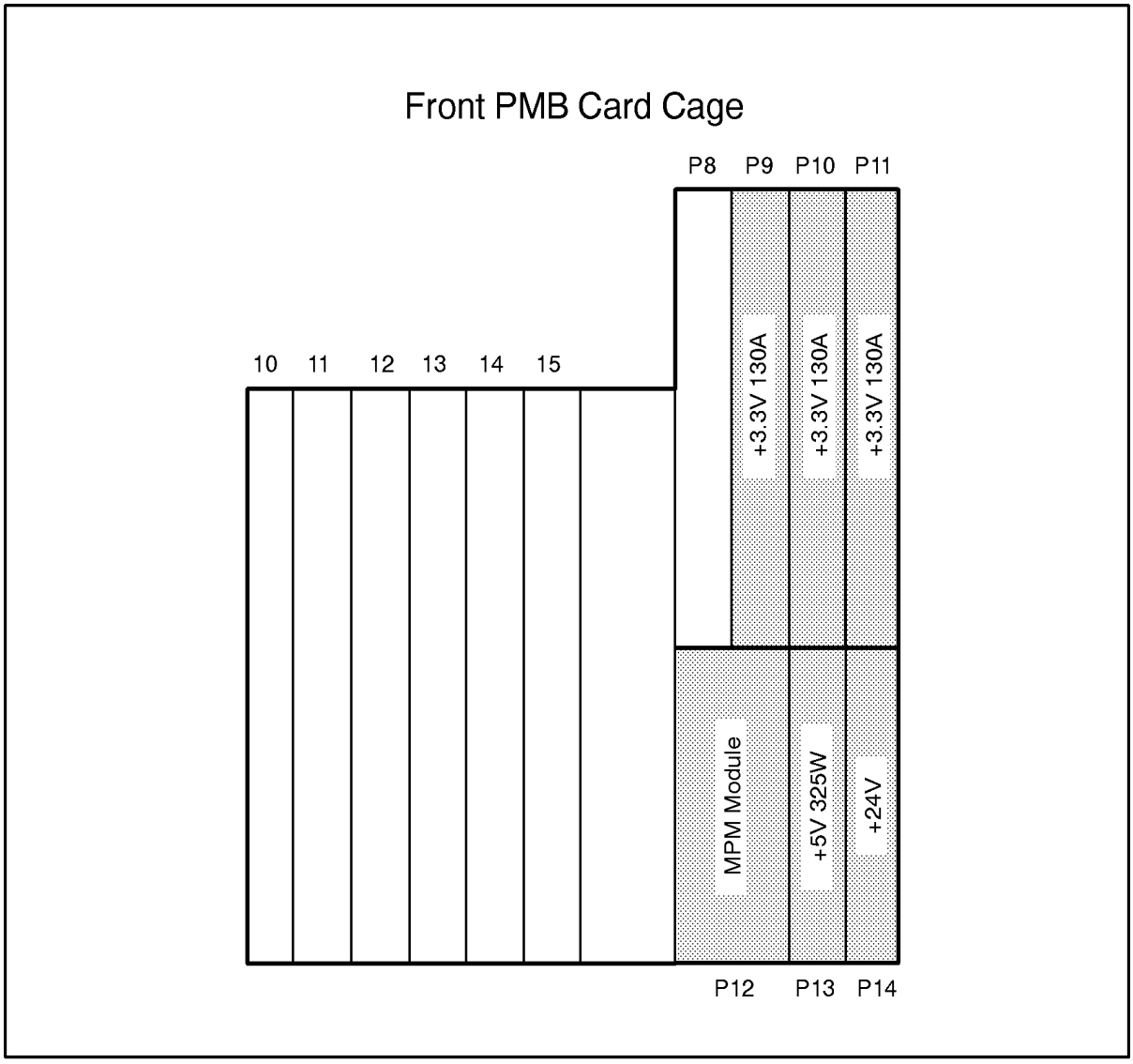


**Figure 3-9 Power Modules and PMB Cards in the Rear Card Cage—990/992/890, 991/995/T500, and 996/T520**



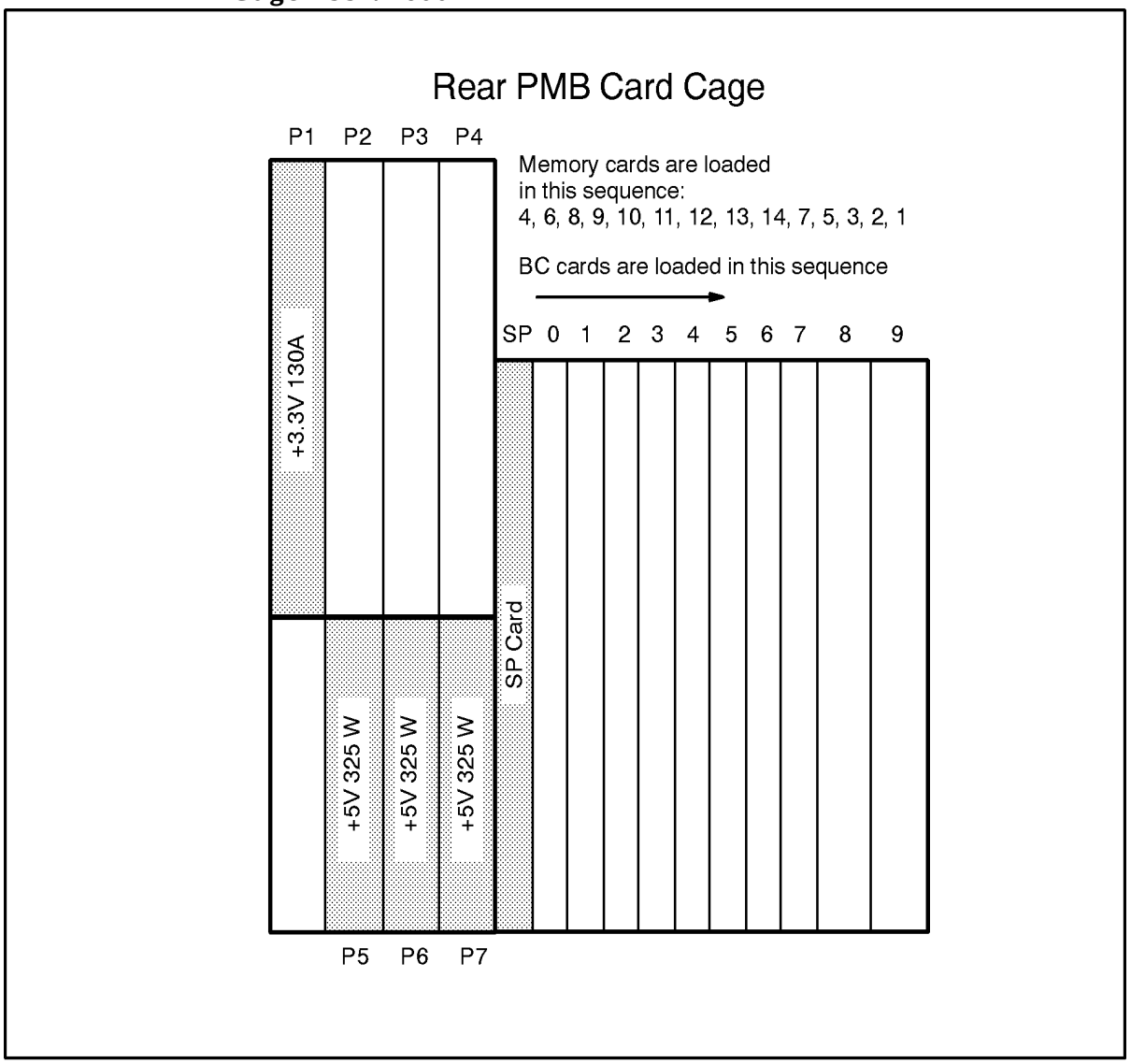

LG200204_010a

**Figure 3-10 Power Modules and PMB Cards in the Front Card Cage—997/T600**




LG200204_009b

**Figure 3-11 Power Modules and PMB Cards in the Rear Card Cage—997/T600**




LG200204_010b

## Verifying Input Power

As part of site preparation, the site should have been checked for adequate power. 99x/T-Class Systems operate with 200-240 VAC, phase-to-phase or phase-to-neutral.

# Installing Power Cord and Plug

## Power Cord and Plug Installation, North America (60Hz)

For North America, the 99x/T-Class SPU cabinet is shipped with a 10-foot length of 3-wire #10 AWG line power cord. A twist-lock (NEMA L6-30P) plug on one end connects to the AC power source; the other end of the cord is connected to the terminal block (labeled **TB1**) and to the grounding terminal, both in the AC front end.

## Power Cord Installation, International (50Hz)

For European and other international locations, an AC line power cord and plug different from those supplied for North America are used to satisfy local requirements. The international power cord is not shipped with the SPU cabinet and must be connected according to the following procedure.

This procedure applies only to configuring the power system for international (50Hz) systems. The rating of the cord should be determined by a qualified electrician familiar with the electrical codes for the site location. The customer should supply the power cord. The cross-sectional area of the cord conductors should be not less than 2.5 $mm^2$. This figure of 2.5 $mm^2$ is based on a rated current range of 16 to 25 Amps, per IEC 950; local or national codes should also be consulted to determine the appropriate conductor cross-sectional area. The strain relief bushing provided will accept a cord with a diameter of 15.9 to 19.1 mm (.625 to .750 inches).

| | |
|---|---|
| **CAUTION** | Tighten all connections firmly. Loose connections can overheat, restrict current flow, and may burn! Double check all connections before proceeding. Make sure cord size is adequate for system load. |

Install the cord as follows:

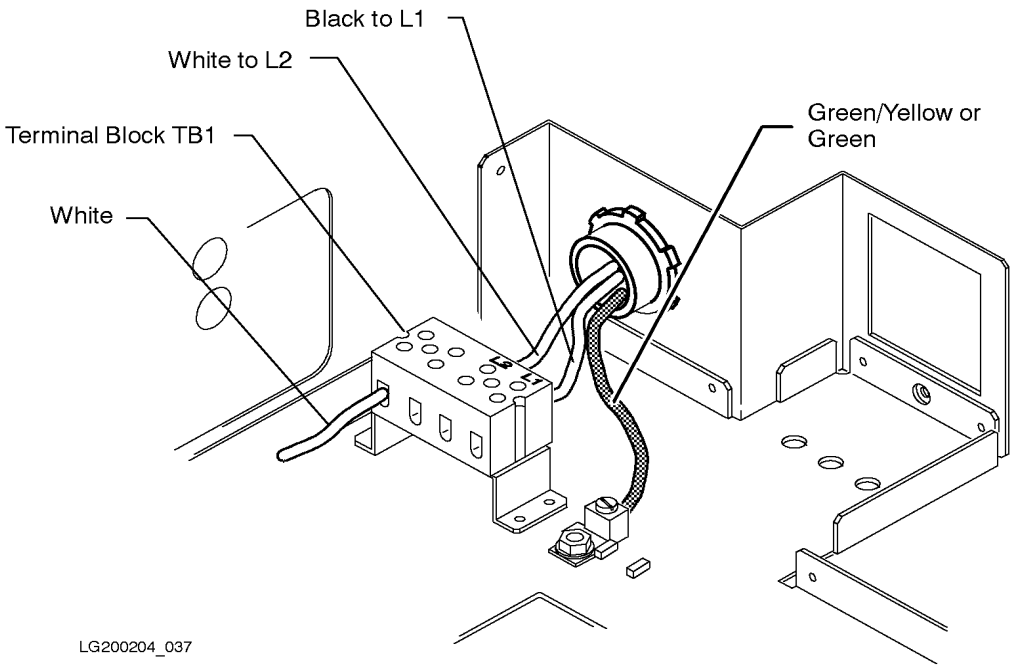
1. Remove the sheetmetal enclosing the AC unit. This sheetmetal surrounds the circuit breaker on the lower right of the cabinet rear. You should see the components shown in Figure 3-12.
2. Insert the power cord into the AC unit through the strain relief.
3. Connect the two phase wires (or the phase and neutral wires) to the terminal block according to the color code listed in Table 3-5 and tighten the screws. (Color code may not apply at all installation sites.)
4. Connect the green/yellow conductor to the earthing terminal as shown in Figure 3-12.

**Table 3-5 TB1 and Earthing Terminal Color Code Designations**

| Wire Color | Usage | Designator |
|---|---|---|
| Black (or brown) | Phase A (01) | L1 (on TB1) |
| White (or blue) | Phase B (02), or neutral | L2 (on TB1) |
| Green or green/yellow | Safety Gnd | Symbol for a protected earthing terminal (wire is connected to earthing terminal, not to TB1) |

5. Adjust the power cord length within the AC unit to prevent cord bunching within the box.
6. Tighten the strain relief.
7. Replace the sheetmetal covering the AC unit and tighten the mounting screws.

**Figure 3-12 Attaching Power Cord**




## Power Plug Installation (50Hz Only)

Connect a suitable plug at the power source end. Electrical codes specified by each country determine the proper attachment plug, receptacle, and wiring convention. The type of plug should be determined by a qualified electrician familiar with the electrical codes for the site location. The customer supplies the power plug.

| | |
|---|---|
| **WARNING** | **The plug can only be inserted into a power source (outlet) provided with a protective earth ground. The protective earth terminal on the system must be connected to the protective conductor of the AC line (mains) power cord before the system is switched on. The protective earth connection must not be defeated by using a power extension cord that does not have a protective grounding conductor.** |

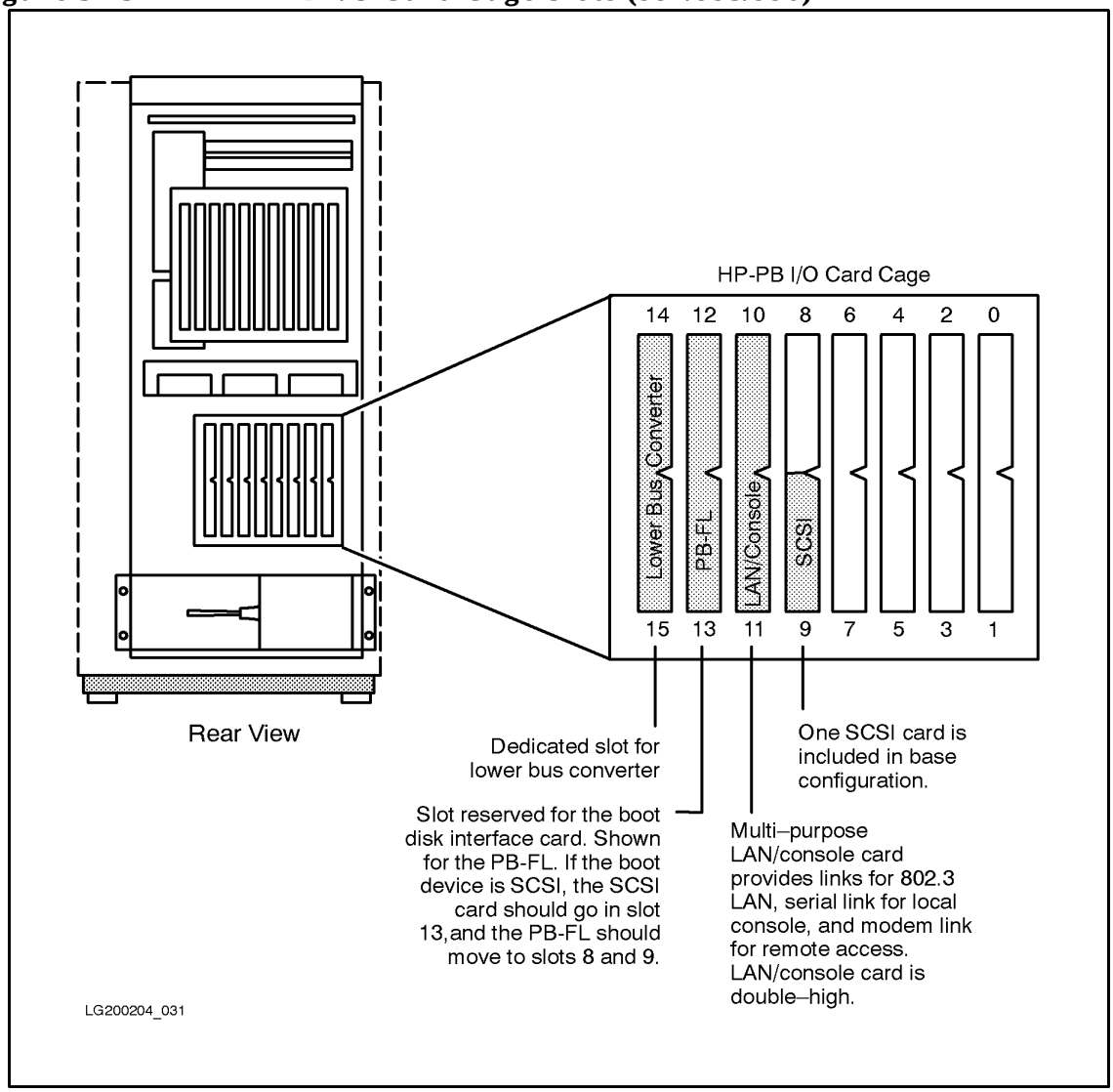
| | |
|---|---|
| **CAUTION** | Make sure that the AC line voltage agrees with the voltage requirements specified on the rear of the system. Incorrect power may cause permanent damage to the system.<br><br>Check the power outlet used to supply AC power to the system to ensure that it furnishes the proper voltage.<br><br>The power outlet and associated wiring and fuses (or circuit breakers) must be capable of carrying the specified AC voltage and current. |

# HP-PB I/O Cards

One HP-PB I/O card cage is located in the base of the SPU system cabinet. Figure 3-13 shows the minimum I/O cards installed in the 991/995/996 Systems.

- Minimum configuration for the Model T-Class is similar, except that it has a MUX-16 card in slot 7. Also, the T-Class System base configuration does not include a PB-FL card.
- Minimum configuration for the 990/992 Systems is also similar, except that it does not support MUX cards.

**Figure 3-13 HP-PB I/O Card Cage Slots (991/995/996)**




Check to make sure that I/O cards have been properly installed at the factory:

- BC card (lower port) in double-high slot 14/15.
- Console/LAN card in double-high slot 10/11.
- **T-Class only**: MUX-16 card in slot 7.
- **HP-FL system disk** (Not supported on T600 Systems.):
  - ❑ HP-FL (PB-FL) card in double-high slot 12/13.
  - ❑ SCSI card in slot 9.
- **SCSI or Fast/Wide SCSI system disk**:
  - ❑ SCSI card in slot 13 or Fast/Wide SCSI card in slot 12/13.
- Other cards should follow HP-PB guidelines; see Appendix B (Configuring the HP-PB Cardcage).
  - ❑ To make sure the HP-PB card cage is not overloaded, add up the power requirements for the individual cards as described in Appendix B (Configuring the HP-PB Cardcage).
  - ❑ For maximum performance, follow the performance guidelines in Appendix B (Configuring the HP-PB Cardcage). Rules of thumb:
    - 99x: Install cards for disk drives in higher numbered (higher priority) slots, but below LAN/console card.
    - T-Class: install LAN cards in higher numbered (higher priority) slots, but below LAN/console card.

**NOTE** The Fiber-Optic Link card for 99x/T-Class Systems is called by several different names:

- *HP-FL card* on T-Class.
- *PB-FL card* on the 99x
- *Fiber-Optic Link* on the card itself.

## PBA-IB Card (Series 99x Only)

All supported I/O cards (connecting to peripherals) are Precision Bus (PB) cards with the exception of the HP-IB card on the Series 99x which is a CIO card. In order to support the CIO HP-IB card on the Precision Bus, a Precision Bus Adapter (PBA) must be used. The PBA combines the CIB adapter and physical bus adapter into a single, double-high card. Only one CIO HP-IB can be connected to each PBA.

The A1809-60095 is the only PBA-IB card supported on the 99x. You should not use a PBA-IB card designed for xx7 systems. The xx7 PBA-IB cards will cause system hangs during tape backup and are not supported for boot disks.

# Internal SPU Cabinet Connections

## Bus Converter (BC) and HP-PB I/O Bus Converter Connections

On 990/992/890, 991/995/T500, and 996/T520 Systems, BC cards in the PMB card cage have four bulkhead connectors. The bottom two connectors (module 0) on the BC card in slot 0 are used to connect the card to the internal HP-PB card cage. The top two connectors (module 2) and the bottom two connectors (module 0) on any other BC cards are used to connect the card to external HP-PB card cages.

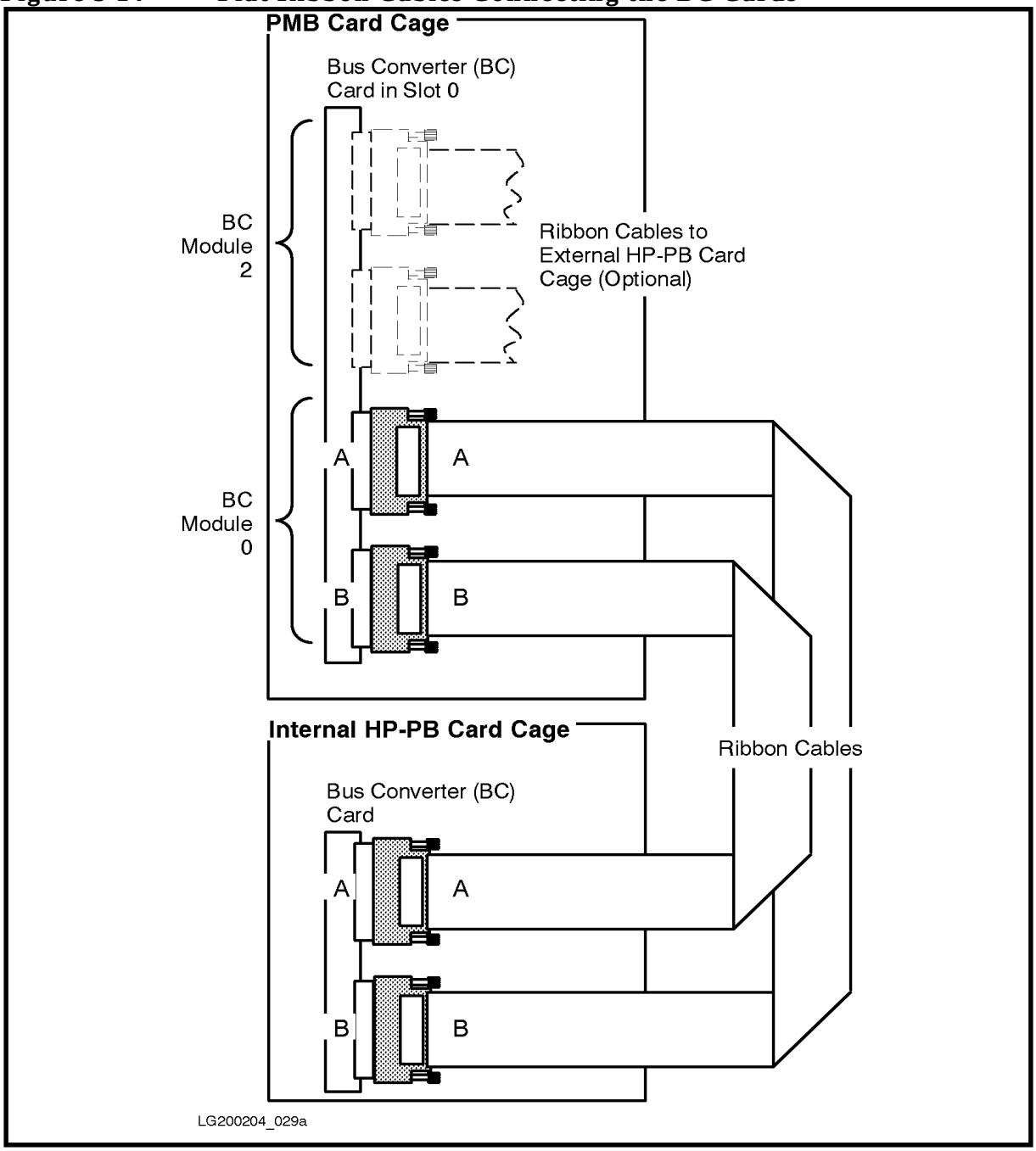
On 997/T600 Systems, each HP-HSC I/O Bus Converter may have one or two HP-PB Bus Converters attached to it. An HP-HSC I/O Bus Converter in slot 0 with an HP-PB Bus Converter attached at module 0 is connected to an internal HP-PB card cage. Other HP-HSC I/O cards with attached HP-PB Bus Converters are connected to optional external HP-PB card cages. A maximum of twelve HP-PB card cages can be used with a 997/T600 System — one internal and 11 external.

| | |
|---|---|
| **NOTE** | BC cards from 990/992/890, 991/995/T500, or 996/T520 Systems cannot be used on 997/T600 Systems. Similarly, 997/T600 HP-PB Bus Converters cannot be used on 990/992/890, 991/995/T500, or 996/T520 Systems. |

In this part of the installation, verify that the BC card or HP-PB I/O Bus Converter in the PMB card cage is connected to the BC or HP-PB I/O Bus Converter card in the HP-PB I/O card cage: (This connection is made at the factory.)

1. Locate the two flat ribbon cables for connecting the BC cards.
2. Verify that the cables are in the configuration shown in Figure 3-14.

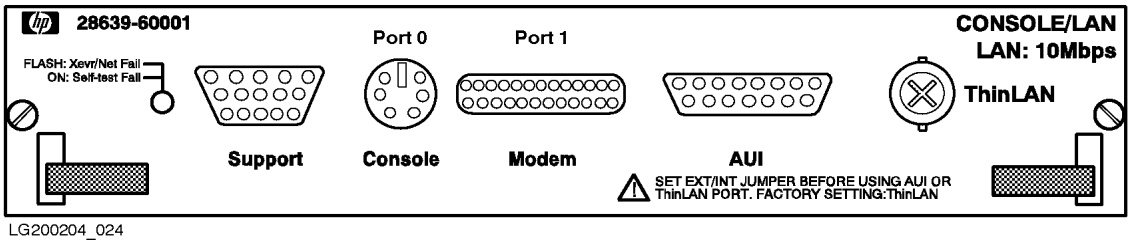
**Figure 3-14 Flat Ribbon Cables Connecting the BC Cards**




## Console/LAN Connections

The console/LAN card is located in double-high slot 10/11 of the internal HP-PB I/O card cage. See Figure 3-15.)

**Figure 3-15 Front Plate of the Console/LAN Card**




In this part of the installation, you connect the console/LAN to other parts of the system. You connect the:

1. **Support** connector to the Service Processor (SP) card.
2. **Console** connector to the console device (700/96 terminal or OpenView PC).
3. **Modem** connector to the remote support modem.
4. **AUI** or **ThinLAN** connector to a LAN.

Detailed procedures follow.

## Connecting the SP Card

The connector labeled **Support** is connected to the Service Processor (SP) card in the rear PMB card cage. This connection is normally made at the factory.

## Connecting the Local Console

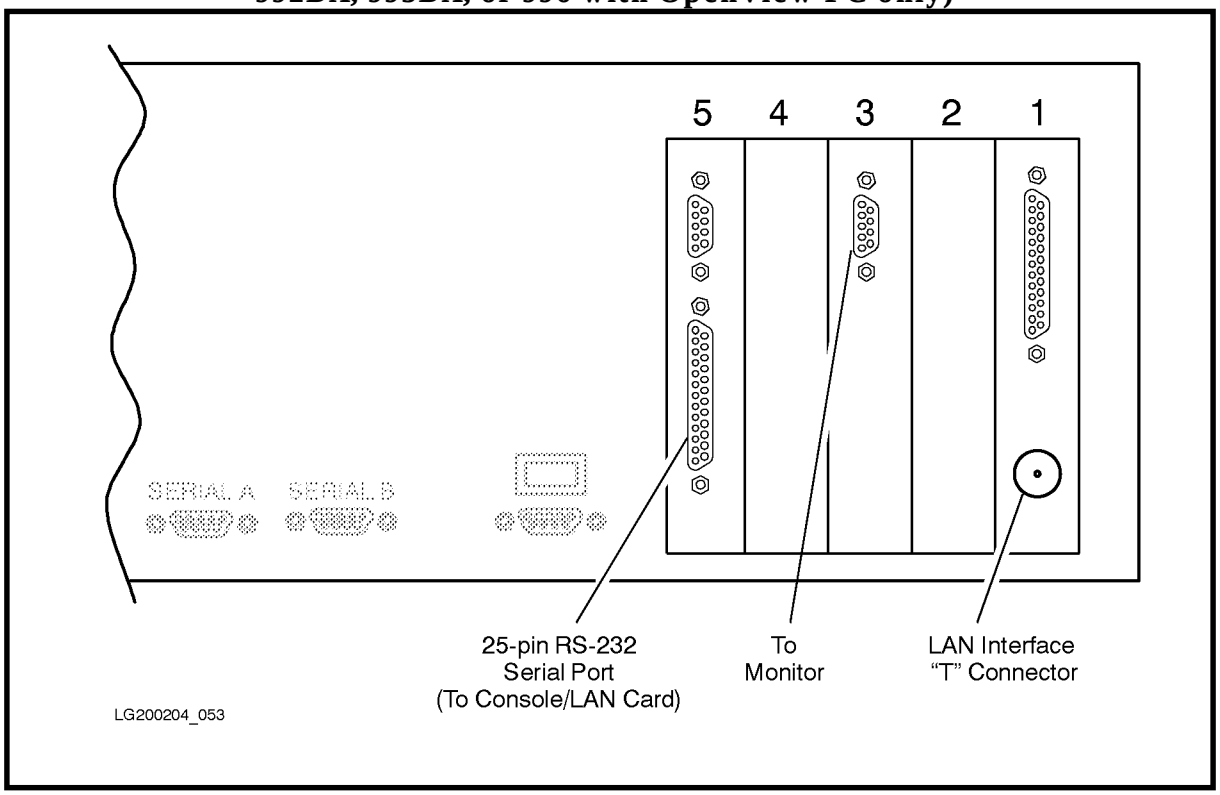
The connector labeled **Console** is connected to the console device. Different models have different consoles:

- A 700/96 terminal on a T-Class or a 990CX, 991CX, 992CX, 995CX, 996, or 997 System that has been ordered with one.
- An OpenView Console PC on 990DX, 991DX, 992DX, 995DX, 996, or 997 Systems that has been ordered with one.

To connect the console:

1. Locate the system console cable (PN A1703-63003).
2. Connect one end to the round connector labeled "Console" on the Console/LAN card.
3. Connect the other end to the console:
   a. On the 700/96 terminal, to the connector marked **DATACOMM**.
   b. On the OpenView PC, to the RS-232 serial port on the rear. The serial port is a 25-pin connector on a card in the expansion slots. See Figure 3-16.

**Figure 3-16 Rear Connectors on OpenView PC Console (990DX, 991DX, 992DX, 995DX, or 996 with OpenView PC only)**




**NOTE** When installing the OpenView Console, plug the cable from the monitor into the card in slot 3 in the rear of the Vectra.

## Connecting the Remote Support Modem

To connect the remote support modem (recommended model is HP50759A):

1. Perform the installation and verification procedures outlined in the documentation supplied with the modem. See Appendix C (Remote Support Modem) for configuration information.
2. Connect a 92219Q cable between the support modem and the connector labeled "Modem" on the console/LAN card.

## Connecting to a LAN

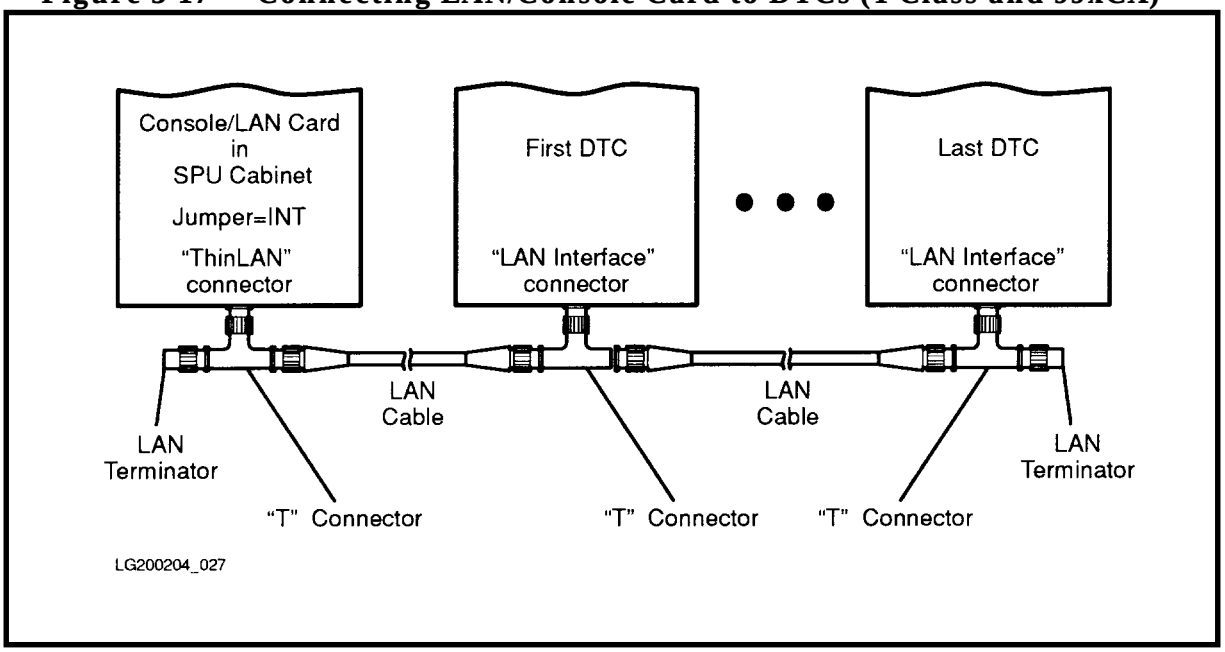
The console/LAN card can be connected to ThinLAN or a ThickLAN (AUI). Procedures for a ThinLAN and for a ThickLAN follow:

**ThinLAN .** To connect a ThinLAN:

1. Verify that the jumper on the console/LAN card is set to the INT side (see Figure 3-19). This is the default setting. INT stands for internal transceiver (MAU).
2. Assemble a BNC T connector (PN 92227N), with a LAN terminator (PN 92227P) on one end, and a LAN cable (PN 92227B) on the other end.

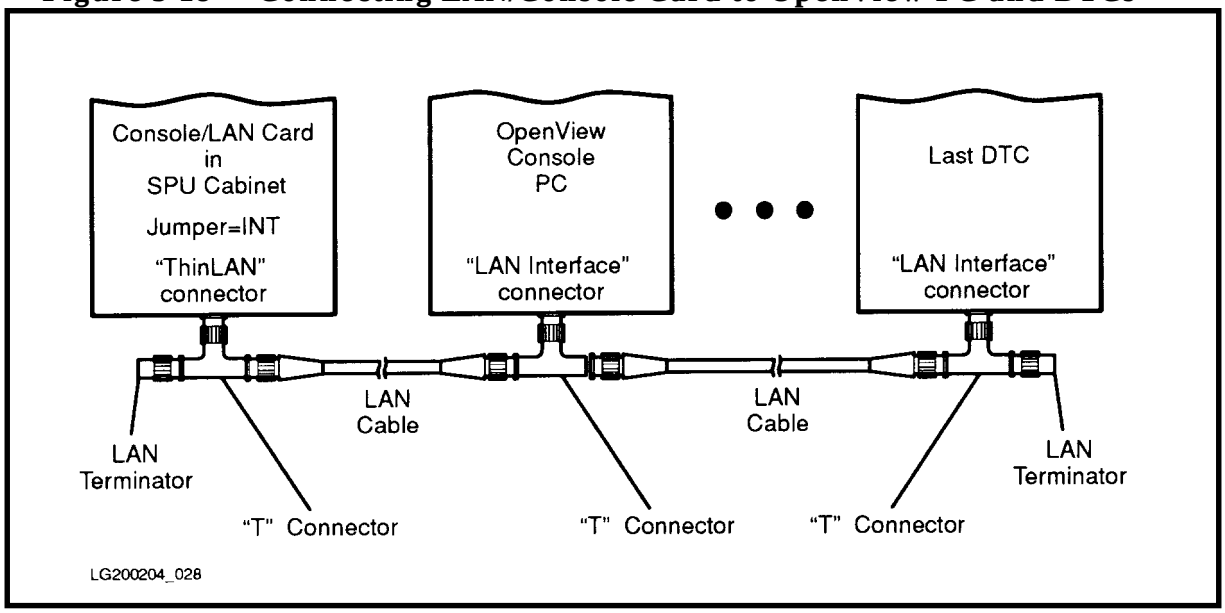
3. Connect the BNC T assembly to the **ThinLAN** connector on the console/LAN card, and cover it with a fabric anti-static cover.
4. For T-Class and 99xCX Systems (Figure 3-17):
   a. Connect another BNC T connector to the connector labeled **LAN interface** on the back of the DTC.
   b. Connect the cable from the console/LAN card to the BNC T connector on the DTC.

**Figure 3-17 Connecting LAN/Console Card to DTCs (T-Class and 99xCX)**




5. For 99xDX Systems (Figure 3-18):
   a. Connect another BNC T connector to the LAN connector on the back of the OpenView PC.
   b. Connect the cable from the console/LAN card to the BNC T connector on the OpenView PC.

**Figure 3-18 Connecting LAN/Console Card to OpenView PC and DTCs**

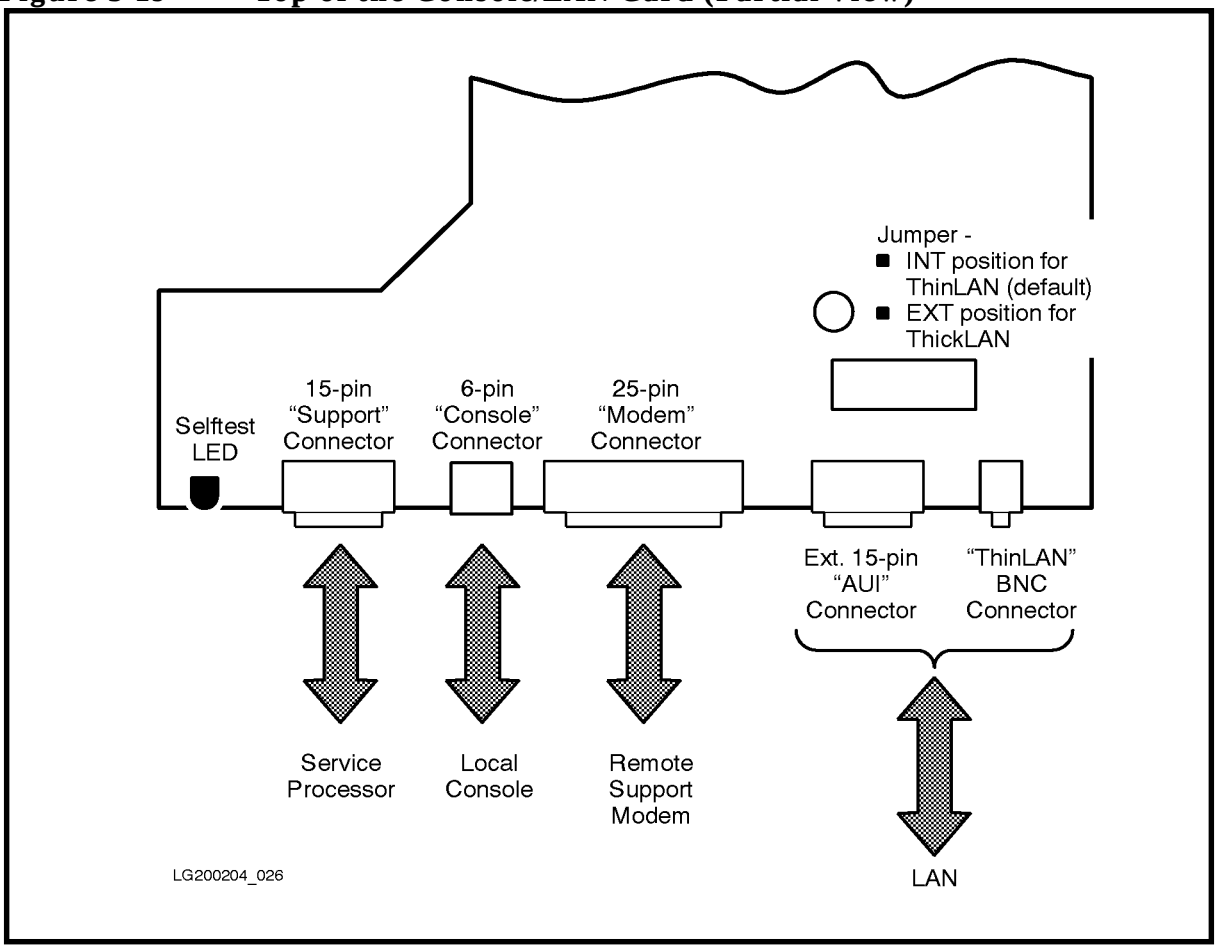



6. If there is another DTC, connect a LAN cable from the other end of the BNC T connector to the next DTC.
7. On the last DTC installed, connect a LAN terminator to the remaining side of the BNC T connector assembly.
8. Cover all the BNC T connector assemblies with the fabric anti-static cover that came with the T connectors.

**ThickLAN .** To connect a ThickLAN (AUI):

1. Set the jumper on the console/LAN card to the EXT side (see Figure 3-19). EXT stands for external transceiver (MAU).
2. Connect ThickLAN cable to AUI port.

**Figure 3-19 Top of the Console/LAN Card (Partial View)**




**CAUTION** When setting the jumper, be careful not to bend the jumper pins.

# PowerTrust UPS

If the system includes one or more optional PowerTrust Uninterruptible Power Systems (UPS), now is the time to install them. Follow the procedures in the manual that accompanies the PowerTrust UPS. Install the system cabinet power cables.

# The Console

The console shipped with a T-Class or the 990CX, 991CX, 992CX, or 995CX is a 700/96 terminal.

The console shipped with a 990DX, 991DX, 992DX, or 995DX System is an OpenView Console PC.

996 and 997 Systems can be ordered with either the 700/96 terminal or the OpenView Console PC.

Procedures for installing these consoles follow.

## The 700/96 Terminal as Console

On T-Class 990CX, 991CX, 992CX, 995CX, 996 and 997 Systems that have been ordered with one, the 700/96 terminal should be connected to the console/LAN card as described in the previous section (“Console/LAN Connections”).

Configure the 700/96 terminal as shown:

Datacomm Configuration Parameters:

Baud Rate: 9600

Parity/Databits: None/8

Chk Parity: NO

EnqAck: YES

CS (CB)Xmit: NO

RecvPace: Xon/Xoff

XmitPace: Xon/Xoff

Configuration parameters that are not mentioned can be set to any value and do not affect the operation of the Console/LAN card or the system.

## OpenView Console

On 990DX, 991DX, 992DX, 995DX or 996 and 997 Systems that have been ordered with one, the OpenView Console is a Vectra 386-based (or greater) OpenView Workstation supplied with the necessary software to act as the system console. The OpenView Console provides a windows-based, PC environment which allows system operators to monitor the Corporate Business System via icons.

The PC software is preloaded on the internal hard disk at the factory prior to shipment.

**NOTE** **Continuous Power Source Recommended:**

To ensure maximum availability of the OpenView Console in the event of power fluctuation or interruption, a continuous power source is recommended for the OpenView Console PC.

## Installing an OpenView Console

The OpenView Console comes pre-configured with all hardware and software installed. Although the OpenView Console provides many features, you will only use it as a terminal for the system console during an initial install. Do not run the DTC Manager program on the same PC as OpenView; this configuration is not supported and may not work.

**NOTE** When installing the OpenView Console, plug the cable from the monitor into the card in slot 3 in the rear of the Vectra.

The OpenView Console can communicate with the system via a serial cable or via a LAN connection. During the initial install, you communicate via serial cable; the LAN connection is not used. When the operating system is loaded, you can use the NMMGR utility to configure the LAN.

After the OS is loaded and the network is configured, OpenView can be configured for system management tasks. For details, see the *OpenView Console Manager's Guide* (PN B3118-90002) that accompanies the OpenView Console.

**NOTE** In case of problems, you can use a 700/96 terminal as the system console.

To access the system console through the OpenView Console:

1. Make sure the OpenView PC is connected to the console/LAN card by a serial cable and a LAN connection. The procedure for connecting the OpenView Console to the console/LAN card was covered in the previous section (“Console/LAN Connections”).
2. Turn on the OpenView Vectra.
3. When the OpenView Vectra displays the C:\> prompt, enter this command:

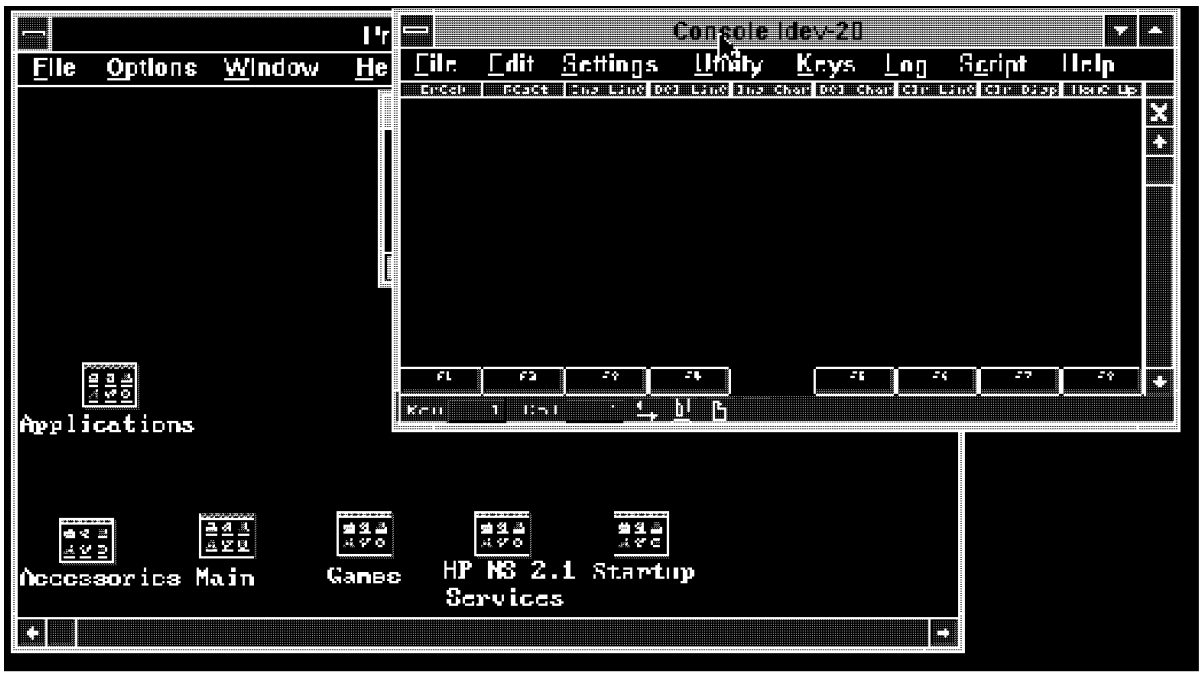
   ```
   WIN <ENTER>
   ```

   This starts MS Windows and runs AdvanceLink to open a connection to the HP 3000 System. In a minute or so, you should see a window labeled "Console ldev-20" on the screen. See Figure 3-20.
4. Since this is an initial install, you are prompted to set a password.
5. Move the mouse onto the title bar at the top of the new window. Click the left button once. You can issue commands and see messages in this window just as you would at a terminal. (All parameters should already be set to the correct values.)

a. If you don't see a window labeled "Console ldev-20", the window may be "minimized" (displayed only as an icon). Turn the icon to a full-sized window, by double-clicking on the icon. ("Double-clicking" means that you move the mouse cursor over the object, then press the left mouse button twice in rapid succession.) If nothing happens, try double-clicking again.

b. If the console window has been accidentally closed, you can always get a new one by double-clicking on the icon labeled "Console" in the Program Manager start-up group.

**Figure 3-20 The ldev-20 Window on the OpenView Console**




## Exiting OpenView

To exit the OpenView program, follow of one of the standard procedures for exiting Windows. For example:

1. In the upper left hand corner of the window labeled "Program Manager", there is a box containing a minus sign (-). Move the mouse cursor to this box, then double-click the left mouse button.
2. You are prompted whether you want to close the Windows session. Click the mouse once in the box labeled "OK".
3. You are returned to the C:\> prompt.

# Installing the System Disk and Tape

We suggest that you get the system up and running with only the system disk and system tape device. Postpone installing the other peripherals until after the OS is booted.

By doing this:

- You reassure the customer.
- You verify that the system can run. You quickly learn if any crucial parts are defective.
- You give yourself time to unpack peripherals.

## Installing an Expansion Cabinet

Install the expansion cabinet (A1884A or A1897A) that will contain the system disk and tape. Consult the *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006) that accompanies the cabinet.

## System Disk Drive Connections

The system disk on the 99x and T-Class can be either:

- A Fast/Wide SCSI disk drive, disk array, or a SCSI disk drive (Series 6000), or
- An HP-FL (PB-FL) disk or disk array. (Not supported on T600 Systems.)

The procedures for both types are given below.

### SCSI System Disk

**NOTE** For information on installing and configuring SCSI devices, see the documentation that accompanies the SCSI card. Also see the *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006).

A SCSI system disk should be connected to the SCSI card in single-high slot 12/13 of the internal HP-PB I/O card cage, following the guidelines given below.

- A Fast/Wide SCSI system disk should be connected to the Fast/Wide SCSI card in double-high slot 12/13.
- The system disk should be given a device ID of six (6) so that it has highest priority.
- The resulting hardware path (the Primary Boot Path) is 0/52.6.0.

**SCSI System Disk Guidelines .** Observe the following guidelines when using a SCSI system disk:

- The system disk must be housed in an expansion cabinet placed immediately next to the SPU.

- The cable connecting the SCSI system disk to the SCSI card in the internal HP-PB card cage must be 2.5 meters long. (The base configuration SCSI card is equipped with a 2.5-meter cable.)
- Maximum cable length (including external and internal cables) must not exceed 6 meters.
- If Series 6000 SCSI Mass Storage enclosures are used to house the SCSI disk(s), as is recommended, no more than two Series 6000 units can be connected in series to the 2.5 meter SCSI interface cable. This is due to the SCSI cable length consumed by the internal SCSI cable length of 1.4 meter for each Series 6000 unit, and the .5 meter cable to "daisy chain" from the first Series 600 unit to the second.
- As long as the cabinet containing the SCSI disk drives is immediately next to the SPU, the disks may be mounted at any position in the rack. It is recommended that SCSI devices be clustered together to ensure the .5M SCSI cable will accommodate all SCSI devices.

**Fast/Wide SCSI System Disk Guidelines .** With HP-UX 9.04 and MPE/iX 5.0, the Fast/Wide SCSI card (28696A) and Fast/Wide SCSI disks will be supported.

Fast/Wide SCSI has the following configuration guidelines:

- Similar to Single-Ended (S.E.) SCSI, devices on the Fast/Wide SCSI bus are connected to each other in a "daisy-chain." The first and last devices on the SCSI bus must provide proper termination on the bus. A terminator, which fits on a SCSI connector, is shipped with the adapter card and can be used to terminate the last device on the SCSI bus.
- The Fast/Wide SCSI card ships standard with a 2.5 meter 68-in P-connector cable which supports 16-bit devices.
- The Fast/Wide SCSI card supports up to 15 peripherals. The SCSI address of a device dictates the device's priority when arbitrating for the SCSI bus. SCSI address "7" is the address for the highest priority device (and is usually reserved for the host). Address "7" is followed in priority (from highest to lowest) by the subsequent addresses 6, 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, and 8. Note that for disk arrays only, each F/W SCSI card supports 7 arrays only, connected to addresses 0 through 7 only. Disk arrays cannot be connected to addresses 8 through 15. F/W SCSI disk arrays and F/W SCSI disks can be mixed on the same card.
- Fast/Wide SCSI devices and Single-Ended SCSI devices cannot be mixed on the same SCSI bus.
- The Fast/Wide SCSI card uses differential transceivers that support distances up to 25 meters. When considering cable distances, however, all cable distances must be added, including cable from the host to the first storage device, cable consumed within the storage enclosure, and cable from storage device to storage device.
- There are three types of Fast/Wide SCSI cables:
  - ❑ Standard male-male 68-pin high-density cable which can be used to cable from the host adapter to the first peripheral, and from peripheral to peripheral. These cables are available in .9, 2.5, 5, and 10 meter lengths.

- ❑ An extender cable which is also 68-pin high-density with one male and one female connector. This cable can be used to extend the cable from the adapter to a peripheral or to extend the peripheral-to-peripheral cable. Extender cable lengths available are 2, 5, and 10 meters.
- ❑ V-cable, 68-pin high-density, male, male, male.

**NOTE** As of this printing, there is a temporary limitation on Fast/Wide SCSI configurations. Customers cannot mix Independent Mode SCSI Arrays with the following products: C3040T, C3040R, C3041T, C3041R, C3044U, C3550T, C3550R, C3551T, C3551R, C3552T, and C3554U.

## Assembling HP-FL Disk Arrays

An HP-FL disk array consists of individual disk modules installed in a disk array chassis. To assemble HP-FL disk arrays:

1. If you are installing several HP-FL disk arrays, find the 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.
2. Examine the labels on the boxes containing the disk modules. Each module should be labeled with a preassigned slot in the disk array.
3. Locate the disk module which is 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.
4. Slide each module into its assigned slot. Lock it in place with the green plastic handle.

## HP-FL System Disk

An HP-FL system disk (or disk array) should be connected to the HP-FL (PB-FL) card in double-high slot 12/13 of the internal HP-PB I/O card cage.

The procedure for making HP-FL connections is given below.

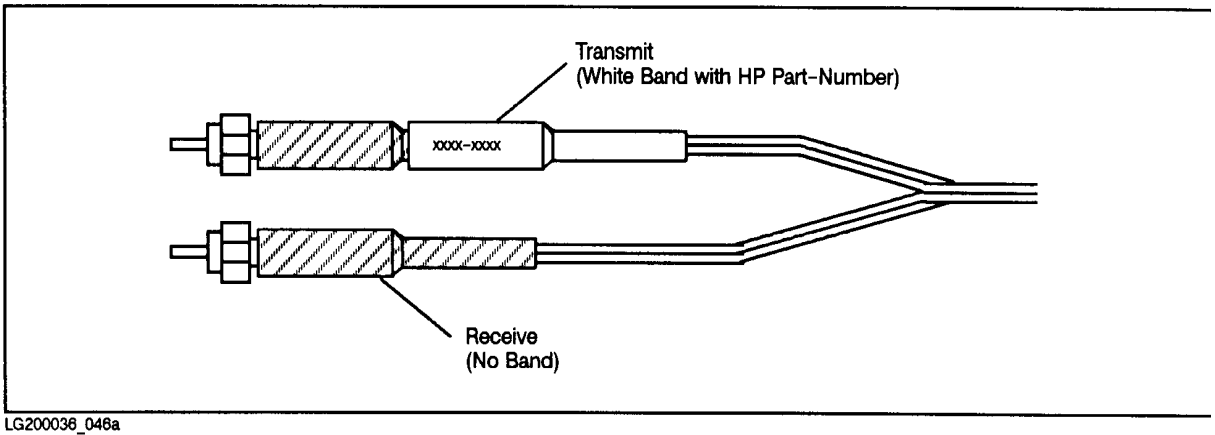
The system disk should be given a device ID of zero (0).

The resulting hardware path (the Primary Boot Path) is 0/52.0.

**HP-FL Fiber Cable Connections .** The following paragraphs describe the color keying and connection procedure for the fiber cables used with the HP-FL boards.

The duplex fiber cables (i.e., two fibers, one transmit, one receive) are color-keyed for connection to the HP-FL board. One of the two fibers at each end of the duplex fiber cable has a colored band around it. The band is located near the optical connector of each fiber. The white-banded fiber connects to the optical transmitter of the HP-FL board; the fiber with no band connects to the optical receiver of the board. See Figure 3-21 for the location of the colored bands on the fiber cable.

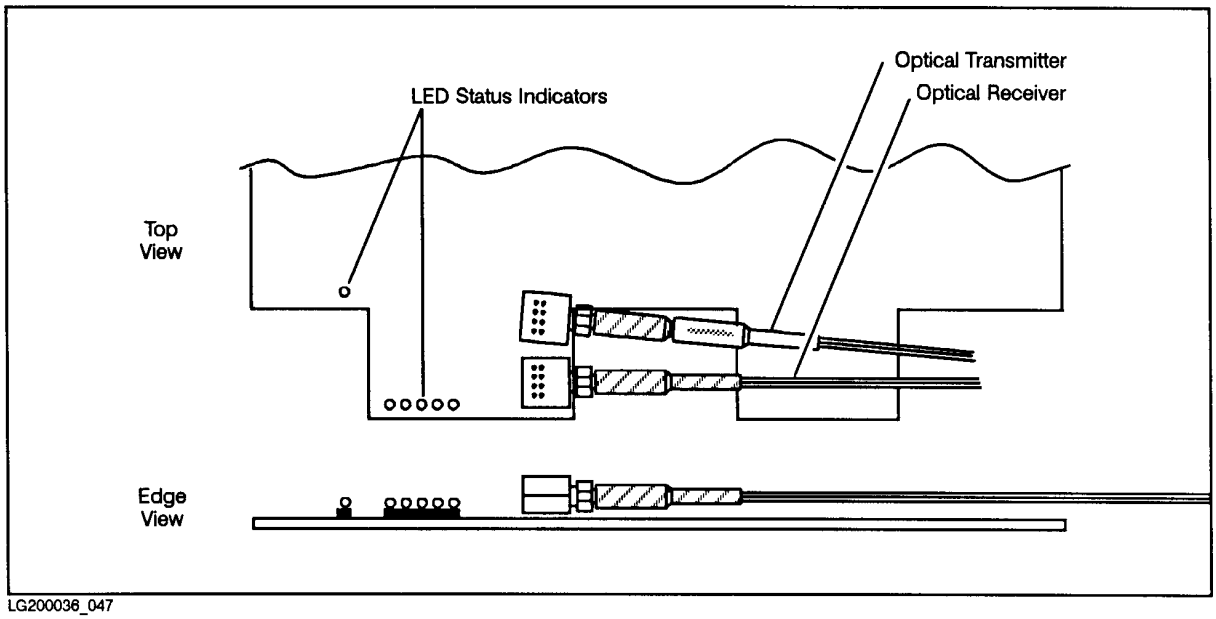
**Figure 3-21 Keyed Duplex Optical Fiber Cable**




The location of the Transmit (Tx) and Receive (Rx) optical connectors of the HP-FL board are shown in Figure 3-22. The barrel housings of the HP-FL board's optical connectors are also color-keyed. The Transmitter housing is light-gray and the Receiver housing is dark-gray. To attach the fiber cable connectors to the optical barrel housings on the HP-FL board:

1. Grasp the metal housing of the fiber cable connector.
2. Insert the fiber into the appropriate optical barrel housing.
3. Rotate the metal housing CLOCKWISE.

**Figure 3-22 HP-FL Board Connections**



### Fibre Channel System Disk

A Fibre Channel system disk (or disk array) should be connected to the HP-HSC Fibre Channel Interface card located on the HP-HSC I/O Bus Converter in the PMB card cage.

The system disk should be given a device ID of zero (0).

The resulting hardware path (or Primary Boot Path) is 0/52.0.

**Connecting the Fibre Channel Cables .** This section describes the procedure to connect the Fibre Channel card.

1. Access the PMB card cage and locate the HP-HSC Fibre Channel card. It will be located on one of the cards in PMB locations 0 through 5.
2. Remove the black plastic loopback connector from the Fibre Channel adapter.
3. Attach the duplex SC connector cable to the Fibre Channel adapter. Align the slotted plug with the keyed connector. Push the connector in until you hear it click.
4. Attach the free end of the cable to any fabric (F) port on the Fibre Channel switch. Record the F-port number.

## System Tape Drive Connection

The procedure for connecting a system tape drive is different, depending on whether the computer has a SCSI system disk or an HP-FL system disk.

### SCSI Tape Drive for SCSI System Disk

1. Connect the system tape to the SCSI card in slot 13 of the internal HP-PB card cage.
2. Set the device ID on the tape to be zero (0).
3. The resulting hardware path (Alternate Boot Path) is 0/52.0.0.

### SCSI Tape Drive for Fast/Wide SCSI System Disk

1. Connect the system tape to the SCSI card in slot 9 of the internal HP-PB card cage.
2. Set the device ID on the tape to be zero (0).
3. The resulting hardware path (Alternate Boot Path) is 0/36.0.0.

### SCSI Tape Drive for HP-FL System Disk

1. Connect the system tape to the SCSI card in slot 9 of the internal HP-PB card cage.
2. Set the device ID on the tape to be one (1).
3. The resulting hardware path (Alternate Boot Path) is 0/36.1.0.

### HP-IB Tape Drive

1. Connect the system tape to the HP-IB card in slot 2/3 of the internal card cage.
2. Set the device ID on the tape to be three (3).

3. The resulting hardware path (Alternate Boot Path) is 0/12.0.3.

# Verifying the System

In this part of the installation, you verify that the power system is operating correctly and that the SPU passes its selftest.

## Initial Power Up

| | |
|---|---|
| **CAUTION** | Before powering up the SPU for the first time, verify that the AC voltage at the input source is within specifications. |

**To power up the computer:** (See Figure 3-23.)

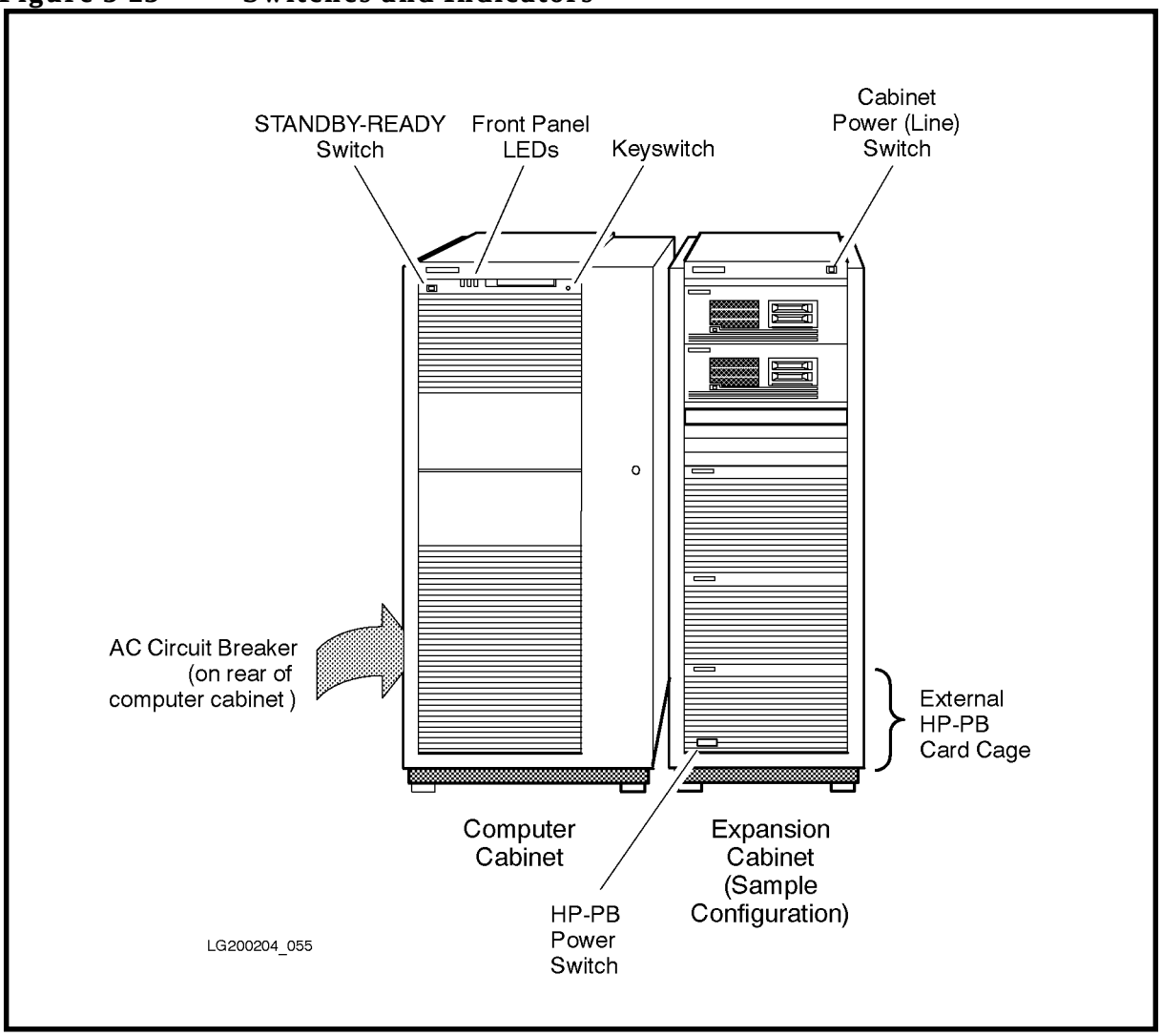
1. Verify that the circuit breaker at the rear of the computer is turned off, and that the "Standby-Ready" switch at the top front of the computer is in the "Standby" position. Also verify that the computer cabinet is plugged in.
2. If the computer system includes PowerTrust Uninterruptible Power Systems (UPSs), verify that the computer cabinet is plugged into a PowerTrust UPS. Verify that other units in the system that should be plugged into the UPS are plugged in (for example the system disk); see the manual that came with the UPS for details.
3. Turn on power to each external HP-PB card cage by turning on its switch. A switch is located on each HP-PB card cage in the expansion cabinets.
4. Turn on all the external equipment, except for the Data Terminal Connect (DTC), connected to the computer and expansion cabinets.
5. If there is a power switch located on the front of the expansion cabinet, turn it on. Verify that the cabinet fans are working.
6. Check all READY or ONLINE indicator lights on the external equipment to be sure that the external equipment is powered up and ready.

| | |
|---|---|
| **CAUTION** | If any of the external equipment has been OFF due to any environmental problems, such as heating or air conditioning failure, allow approximately 30 minutes for the temperature of the equipment to stabilize before turning on the computer. |

7. Turn on the console.
   a. On 990CX, 991CX, 992CX, 995CX, 996, and 997 Systems that come with one, turn on the 700/96 terminal used as the console.
   b. On T-Class or 990DX, 991DX, 992DX, 995DX, 996, or 997 Systems that come with one, turn on the OpenView Console and enter `WIN` at the C:\> prompt. In a minute or so, you should see a window labeled "Console ldev-20". For details, see the section titled “The Console,” earlier in this chapter.
8. Insert the key into the lock in the control panel of the computer and turn it to the "Console Enabled" position.

9. When all external equipment have their READY or ONLINE indicators lit, turn on AC to the SPU cabinet by switching on the power switch (circuit breaker) at the bottom rear of SPU cabinet.
10. Turn the "Standby-Ready" switch at the top front of SPU cabinet to the "Ready" position.

**Figure 3-23 Switches and Indicators**




## Startup Process

After you turn on the AC circuit breaker on the rear of the cabinet, the Service Processor begins its startup process:

1. For about 1 second, all control panel LEDs (except the REMOTE ENABLED indicator) are turned on in various patterns. The power supply fans in the rear of the cabinet should turn on. A few moments later the REMOTE ENABLED LED turns ON if remote console is enabled.

2. A sequence of 2-digit status codes appear on the front panel in the "Processors" display. These status codes progress from 0 to 51 as the Service Processor goes through its selftest. When the display reads 51, the Service Processor has successfully completed its selftest. The fans in the front of the cabinet turn on. (Depending on the version of firmware, the highest numbered SP selftest may be different than 51.)
3. Assuming that you have switched the "Standby-Ready" switch to the "Ready" position, the computer continues its startup process: The system goes through the standard SPU selftests (PDC selftests). The time to complete these selftests is configuration dependent; for example, systems with lots of memory will take more time.

## Entering the PDC Interface

After passing the PDC selftest, the computer continues the boot process:

1. The system console displays messages similar to the following:

```
------------------------------------------------------------------------
                  PDC - Processor Dependent Code
                           Version x.xx
                    (c) Copyright 1990-1997
                   The Hewlett-Packard Company
                       All rights reserved
------------------------------------------------------------------------
          Total Memory:         256 MB
          Total Bus Converters: 2
          Total Processors:     2

          Primary Boot Path:     0/52.0.0.0.0.0.0
                                    0 means BC 0 in PMB slot 0
                                   52 means I/O card in HP-PB slot 13
                                    0 means device ID of 0

          Alternate Boot Path:    0/36.0.0.0.0.0.0
          Console/Keyboard Path:  0/44.0.0.0.0.0.0
 ------------------------------------------------------------------------
```

2. At the bottom of the display, you will see one of two possible prompts:

   a. If the autoboot flag is not enabled, you will see:

      ```
      Continue with primary boot path?   ([y]/n/<new_path>)> N
      ```

      If you see the above prompt, press N. You will see:

      ```
      Continue with alternate boot path?                    ([y]/n/<new_path>)> N
      ```

      If you see the above prompt, press N.

   b. If the autoboot flag is enabled, you will see:

      ```
      Processor is starting the autoboot process.

      To discontinue, press any key within 10 seconds...
      ```

      As soon as you see the above prompt, press a key quickly. Do not wait more than several seconds. If you wait, and the system continues to boot, use the RS or RE command at the SP prompt to start again. After you press the key, you will see:

      ```
      Continue with primary boot path?   ([y]/n/<new_path>)> N
      ```

      When you see the above prompt, press N. You will see:

      ```
      Continue with alternate boot path?                ([y]/n/<new_path)> N
      ```

      When you see the above prompt, press N.

**NOTE** **Minimum memory for 990/992/890 Systems without a UPS**

If one of these systems does not have enough memory for powerfail, you will see a message similar to the following:

```
WARNING: Insufficient memory to guarantee powerfail recovery.
         The system requires 64 MB per processor.  This system
         has 64 MB and needs at least 128 MB for 2 processors.
```

Failure to meet the minimum memory requirements will result in lost data during a powerfail recovery.

3. The console displays the main menu for PDC:

```
------- Main Commands ----------------------------------------------------

        Commands Available

        PR Primary:   Continue boot using primary boot path
        RE Restart:   Restart the system and activate new settings


        Menus Available

        BO Boot:        Perform boot tasks (menu)
        FI Firmware:    Update firmware (menu)
        SE Service:     Service the system (menu)
        TO Tomb:        Display HPMC troubleshooting information (menu)


        HE Help:        Display help text on menu selections
 -------

 Main>
```

## PDC Command to Enable/Disable the PDT

MPE/iX version 5.0 and higher and HP-UX version 10.0 and higher include a feature called Memory Page Deallocation (MPD). This feature allows the OS to deallocate bad pages (4 KBytes) of memory from system use rather than requiring the memory array to be replaced. To store MPD information, the computer system uses a special NVRAM table called the Page Deallocation Table (PDT).

If the system came with (or was upgraded to) MPE/iX version 5.0 or higher, or HP-UX version 10.0 or higher, the PDT is enabled, otherwise it is disabled.

**You should check the state of the PDT (enabled or disabled) using the following procedure to determine if it is properly set for the OS version running on the system.**

1. **To display the current state of the PDT,** enter `toxic_flag_pd` at the Main Menu. For example:

```
Main> toxic_flag_pd
     PD - Enable Page Deallocation flag value is false
```

2. **To enable PDT** if it is disabled, enter `toxic_flag_pd true`. For example:

```
Main> toxic_flag_pd true
     PD - Enable Page Deallocation flag value is TRUE
```

**NOTE** DO NOT ENABLE THE PDT UNLESS THE SYSTEM IS RUNNING MPE/iX 5.0 or HP-UX 10.0 OR HIGHER. THE SYSTEM CANNOT HANDLE DOUBLE-BIT ERRORS.

3. **To disable PDT** if it is enabled, enter `toxic_flag_pd false`. For example:

```
Main> toxic_flag_pd false
     PD - Enable Page Deallocation flag value is false
```

4. If you change the PDT state, enter the command RESTART (RE) at the PDC prompt to perform a hard reboot.

Refer to the *Memory Page Deallocation Familiarization Guide* (CE42-MEMPAGE) for more details.

## Verifying SPU Indicators

After the system has gone through all of its selftests and the console is displaying one of the PDC screens, check the SPU indicators:

1. Verify that all indicators and switches on the front panel are in their normal states. (see Table 3-6). RUN should be flashing, LINE and SP POWER should be ON, ATTENTION and REMOTE ENABLED may be ON or OFF.

**Table 3-6 Normal State of the Front Panel Indicators and Switches**

| Indicator/Switch | Normal State |
|---|---|
| Front "Standby-Ready" switch | "Ready" position. |
| Run (green LED) | ON for normal OS system activity. Flashing for non-OS system initialization activity. |
| Attention (yellow LED) | OFF. (Will be ON if there is a critical unread message in the SP log.) |
| Stopped (red LED) | OFF. (Could be ON if user input is required to continue boot). |
| Processors | "01" or greater. (Shows the number of processors which are configured and have passed PDC selftest.) |
| Activity | 0 to 10 LEDs lit. |
| Line | ON. |

| Indicator/Switch | Normal State |
|---|---|
| Battery (890/990/ 992 only) | (990/992/890) OFF. On rare occasions, this LED may be ON, indicating that the battery is charging/discharging. (In this case, the battery is charging if the "Line" LED is ON; the battery is discharging if the "Line" LED is OFF, i.e. - you are in battery back up mode). |
| SP Power | ON. |
| Remote Enabled | ON or OFF. For maximum security, this should be OFF. |
| Console Keyswitch | Locked or unlocked. For maximum security, this should be locked. The keyswitch should be unlocked during boot. |

2. Verify that LED indicators inside the SPU cabinet are normal (see Table 3-7).

**Table 3-7 Normal States of Indicators Inside the SPU Card Cage (After Passing Selftests)**

| Indicators | State |
|---|---|
| Indicator grid at top of SP card bulkhead | ST not lit; CK flashes ON and OFF at one second intervals. For other SP indicators, see Table 3-8. |
| Hexadecimal digit display labeled "Power" at bottom of SP card bulkhead (PSCM codes). | Flashing hex codes. "Selftest" indicator is OFF. If the yellow ATTENTION LED on the front panel is lit and this display flashes anything other than double zeros, check the SP error log (described later in this chapter). |
| LEDs on power modules and AC Front End (ACFE) | Green "ON" LEDs are lit (after SP turns on main DC power). |
| LEDs on Bus Converter (BC) cards in both the PMB and HP-PB card cages. | Green "CONNECTED" LEDs are lit. |
| LEDs on HP-PB cards | Should indicate that the card passed selftest. |

Figure 3-24 shows the indicator grid at the top of the bulkhead on the SP card. This grid reports on the state of the Service Processor (for example: SP selftests, SP communication with the console, SP clock). Table 3-8 lists the state of the lights in the indicator grid for different conditions.

**Figure 3-24 Indicator Grid on the SP Card**

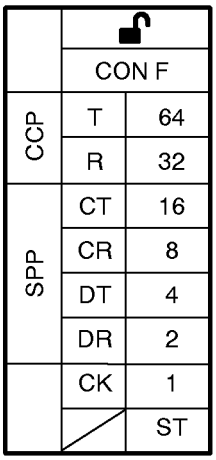



**Table 3-8 Normal States of Lights in Service Processor (SP) Grid**

| Condition | State of Lights |
|---|---|
| During SP selftest | ST lit; numbered lights are lit so that the sum of the numbers equals the SP selftest in progress. |
| SP selftest failure | ST lit; numbered lights lit, so that the sum of the numbers equals the SP selftest that failed. |
| After SP selftest | ST not lit; CK flashes ON and OFF at one second intervals. Also, CT (SPP) and CR (SPP) flash at one minute intervals as the SP and the Console/LAN card handshake. |
| At PDC prompt or whenever PDC is active | T (CPP) and R (CPP) flash during console input/output. |
| At SP prompt | CT (SPP), CR (SPP), DT (SPP), and DR (SPP) flash during console input/output. |

If the indicators show normal status as described in the proceeding tables, the system has passed its selftests. Continue to the next section.

If the indicators do not match those shown, refer to the troubleshooting chapter in the *CE Handbook* (PN A1809-90003) and look at the SP error log.

## Checking the SP Error Log

Before loading the operating system, it is a good idea to check the Service Processor (SP) error logs, correct any problems, and clear the logs:

1. Make sure that the Console keyswitch on the computer front panel is in the unlocked position.
2. Enter <**Control>-B** at the system console.
3. Enter SP to enter the Service Processor interface.
4. Enter DL at the SP prompt.
5. To see a record of errors:
   a. If the "Latest Errors" log has entries, enter L.
   b. If the "Latest Errors" log has no entries, enter E to see the "Earliest Errors" log (The "Latest Errors" log only has entries if the "Earliest Errors" log is full.)
6. To see a history of system activity, enter A
7. Use the CL (Clear Log) command at the SP prompt to clear the error logs for the customer.

If the ATTENTION LED on the front panel was ON because of an unread error entry, performing this procedure will turn the LED OFF.

## Checking the Autostart Flag

Check the autostart flag to make sure it is set to a value suitable for the customer's system.

If the autostart flag is set, the computer startup process continues even if processor or memory modules are scheduled to be de-configured (for example if they fail selftest).

If the autostart flag is cleared, the computer startup process halts at the SP prompt if processor or memory modules are scheduled for de-configuration.

The autostart flag described here is different from the autoboot flag which can be modified from the PDC interface. The PDC autoboot flag allows the OS to boot automatically upon power-up.

1. Enter **<Control>-B** at the system console.
2. Enter SP to enter the Service Processor interface.
3. Enter AF at the SP prompt.

## Checking the PMB Card Cage Configuration

Use the HC (Hardware Configuration) command to make sure that the PMB cards are recognized by the system:

1. Enter **<Control>-B** at the system console.
2. Enter SP to enter the Service Processor interface.
3. Enter HC at the SP prompt.
4. Deconfigure any bus converter ports not currently in use; that is, ports that do not have an HP-PB card cage attached.

# Setting Boot Parameters

## Changing the Autoboot Flag or Hardware Paths

In this part of the installation, you verify that hardware paths and autoboot flag are correct for the computer system. Use the following procedure to verify that the default primary and alternate boot paths match the paths listed in the appropriate table (Table 3-9, Table 3-10, or Table 3-11.)

**Table 3-9 System Default Device Configuration (SCSI System Disk/NIO F/W SCSI) — Non-997/T600 Systems**

| Device | I/O Path | Logical Dev. No. (MPE/iX Only) |
|---|---|---|
| System disk | 0/52.6.0 | 1 |
| System tape (SCSI) | 0/52.0.0 | 7 |
| System tape (HP-IB) | 0/12.0.3 | 7 |
| System console | 0/44.0 | 20 |

**Table 3-10 System Default Device Configuration (SCSI System Disk) — T600**

| Device | I/O Path |
|---|---|
| System disk (SCSI) | 0/28/52.6.0 |
| System disk (NIO SCSI) | 0/28/52.6.0 |
| System tape (SCSI) | 0/28/36.0.0 |
| System tape (HP-IB) | 0/28/44.0 |

**Table 3-11 System Default Device Configuration (HP-FL, HP-IB, SCSI, F/W SCSI) — 997**

| Device | I/O Path | Logical Dev. No. |
|---|---|---|
| System disk | 0/28/52.0 | 1 |
| System tape (SCSI) | 0/28/36.0.0 | 7 |
| System tape (HP-IB) | 0/28/12.0.3 | 7 |
| System console | 0/28/44.0 | 20 |

**To change the autoboot flag or hardware paths:**

1. Access the PDC main menu, as described earlier in the chapter.
2. At the PDC main menu, enter BO to access the boot menu. You see:
3. For most installations, the autoboot flag should be set to TRUE. To set the autoboot flag to TRUE, enter:

```
Boot> AB TRUE
```

```
Main> BO

------ Boot Commands ------------------------------------------------

       Commands Available

       PR Primary:    Boot system using primary boot path.
       AL Alternate:  Boot system using alternate boot path.
       AB Autoboot:   Change the autoboot flag.
       PA Path:       Change a path  (PA <path_type> <new_path>
                                <path_type>= Pri, Alt, Cons, or Update


       Values stored in Stable Storage:

          Autoboot Flag:              TRUE
          Primary Boot Path:          0/12.0.0.0.0.0.0
          Alternate Boot Path:        0/36.0.0.0.0.0.0
          Console/Keyboard Path:      0/44.0.0.0.0.0.0

       HE Help:      Display help text on menu selections
       eXit:         Return to previous menu
------
Boot>
```

4. Compare the paths displayed on the Boot menu with the appropriate values for the computer system (See Table 3-5 or Table 3-6). To change the path values, use the **PA** Path command.

   a. To set the path values for a 99x with a SCSI system disk, enter the following commands:

      i. To set a primary boot path of 0/52.6.0:

      ```
      Boot> PA P 0/52.6.0
      ```

      ii. To set an alternate boot path of 0/52.0.0 (for a SCSI device):

      ```
      Boot> PA A 0/52.0.0
      ```

      iii. To set an alternate boot path of 0/12.0.3 (for an HP-IB device):

      ```
      Boot> PA A 0/12.0.3
      ```

      iv. To set console path of 0/44.0:

      ```
      Boot> PA C 0/44.0
      ```

   b. To set the path values for a 99x with a HP-FL system disk, enter the following commands:

      i. To set a primary boot path of 0/52.0:

      ```
      Boot> PA P 0/52.0
      ```

      ii. To set an alternate boot path of 0/36.0.0 (for a SCSI device):

      ```
      Boot> PA A 0/36.0.0
      ```

iii. To set an alternate boot path of 0/12.0.3 (for an HP-IB device):

```
Boot> PA A 0/12.0.3
```

iv. To set console path of 0/44.0:

```
Boot> PA C 0/44.0
```

5. When you are satisfied with the hardware path values, continue to the next section.
6. If you would like more information on boot commands, access the on-line help screens by pressing HE:

```
Boot> HE

------- Boot Commands Help -----------------------------------------------

Contents:       I.   RECOMMENDED PATHS
                II.  BOOT COMMAND DESCRIPTIONS
                III. WHAT IS A PATH?
                IV.  PATH FORMAT


I.   RECOMMENDED PATHS

                     With SCSI system disk    With HP-FL system disk
Primary:                  0/52.6.0                 0/52.0
Alternate (SCSI dev):     0/52.0.0                 0/36.1.0
Alternate (HP-IB dev):    0/12.0.3                 0/12.0.0
Console:                   0/44.0                   0/44.0
```

**NOTE** In the above help text, the value for Alternate (SCSI dev) on systems with an HP-FL system disk should be 0/36.0.0.

```
II.  BOOT COMMAND DESCRIPTIONS

        Primary       Boot from primary boot path.  The primary boot path
                      points to the device used to boot the operating
                      system (usually the system disk).

        Alternate     Boot from alternate boot path. The alternate boot
                      path points to the device (typically a tape drive)
                      used to load the operating system from the
                      distribution media.

        Autoboot      Set autoboot flag TRUE or FALSE.If autoboot is TRUE,
                      the system automatically boots when powered up.
                      (More precisely, it loads the software on the
                      primary boot device.)  During an autoboot, the
                      process pauses for 10 seconds to allow the operator
                      to stop the boot process.

                      If the autoboot flag is modified, the new setting
                      takes effect when the system is powered up again.

                      Syntax:   AUTOBOOT <boolean>.  For <boolean>:
                                     TRUE  =  T = 1
                                     FALSE =  F = 0

                      Example:   AUTOBOOT TRUE  or  B TRUE  or   B T

        Path          Change/display paths kept in Stable Storage.

                       Syntax: PATH[<path_type> [ <new_path> ]]
                           <path_type> is one of:
                             P = primary boot path
                             A = alternate boot path
                             C = console path
                             U = update path
                           <new_path> = a path description

                      Examples:
                       PATH            Displays all paths
                       PATH A          Displays only alternate path
                       PATH P 0/52.0   Changes primary path to 0/52.0
```

```
III. WHAT IS A PATH?

A path is a hardware address, showing the location of a
peripheral device in the bus structure.  Typical bus structure:



       ================== Processor-Memory Bus (PMB) ================
             ||
            [BC] Bus Converter
             ||
         ========== HP Precision Bus (HP-PB) ===========
                ||
               [DA] Device Adapter
                ||
               [DEV] Peripheral Device
```

```
IV. PATH FORMAT

On this system, a path has the format:

     BC/DA.DEV

     BC  = The PMB module of the Bus Converter (BC).  This decimal value
           is based on: 1)  the slot number of the BC card.
                        2)  whether the upper or lower connector of
                            the BC card is used.

            BC = (4 * slot number of the BC) + (BC module number)
            BC module number is 0 for the lower connector.
                                2 for the upper connector.

            Examples:
             BC =  0 for BC card in slot 0, lower connector; (4*0)+0 = 0
                =  2 for BC card in slot 0, upper connector; (4*0)+2 = 2
                = 16 for BC card in slot 4, lower connector; (4*4)+0 =16

     DA  = The HP-PB module of the device adapter (DA).
           Equals 4 * HP-PB slot number of the DA (decimal).

     DEV = The ID number of the device, often set on the
           device itself (hexadecimal).

  Example:   4/36.3   (decimal format)
     BC = 4        4/4 = 1.  The BC is in PMB slot 1; module 0.
     DA = 36      36/4 = 9.  The I/O card is in HP-PB slot 9.
     DEV = 3      The ID on the device is set to 3.

Values for BC and DA are expressed in decimal notation.
If there are additional values in the path (for example, to specify
a LAN address), these are expressed in hexadecimal notation.

END
```

# Operating System (OS)

## Loading the OS

Some 99x/T-Class Systems come pre-loaded with the operating system (OS).

If the OS is not preloaded, load it now by following the procedures in one of these manuals:

**99x:** Refer to *HP 3000 MPE/iX Installation, Update, and Add-On Manual* (HP P/N 36123-90001) that accompanies the SLT, FOS, and subsystem tapes.

**T-Class:** Refer to *Installing and Updating HP-UX 9.0: HP 9000 Series 800* (HP P/N B3108-90006).

## Booting the OS

Once 99x/T-Class Systems have been configured and the operating system has been installed, booting up is largely automatic. The system automatically boots up if the autoboot option is set to true and the boot path is correct. (The autoboot option can be changed with either PDC or ISL commands.)

**NOTE** While booting the OS and running the System Exerciser (SX), you can unpack the other peripherals and get ready to install them.

**To boot the OS:**

1. Power up the computer as described in the section "Initial Power Up" earlier in this manual.
2. Respond to any prompts that ask whether to continue with the boot process.

**To boot the OS from PDC:**

To boot the OS from the PDC interface, enter the command `PRIMARY` at any PDC menu prompt. The system will boot from the primary boot path (system disk).

### HP-UX Configuration (T-Class)

The operating system is automatically configured when HP-UX is loaded.

### MPE/iX Configuration (99x)

If the 99x is not pre-loaded with the operating system, you should specify a configuration group when first booting the system. (Table 3-12):

1. If you have not done so, enter the command `PRIMARY` at any PDC menu prompt. The system will boot from the primary boot path (system disk).
2. Enter `y` when the computer prompts you:

```
Interact with ISL? (y/[n]) > y
```

3. At the ISL prompt, enter:

   ISL> START GROUP=xxxxxxxx NORECOVERY <RETURN>

   where xxxxxxxx is the appropriate name from Table 3-12.

**Table 3-12 Configuration Groups Supplied With the 99x**

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

See Appendix A (MPE/iX Configuration and SYSGEN) for listings of these configurations.

## OS Patches

If tapes with OS patches accompany the system, install the patches now.

## Verifying System Operation

### Running the System Exerciser (SX) — MPE/iX

To further verify system operation, it is recommended that you run SX.

### Verifying System Operation — HP-UX

Use the Support Tools Manager (STM) to verify HP-UX system operation. STM is supported on HP-UX version 10.01 and later and is shipped on the support media. Using STM you can access verifiers, exercisers, diagnostics, utilities, information tools, expert tools, firmware update tools, and identification modules. For complete information on STM, refer to *Diagnostic Media User's Guide* (PN B6191-90001).

# Installing the Remaining Peripherals

**To prepare for installing the remaining peripherals:**

1. Unpack the other peripherals and prepare to install them.
2. When you are ready to install the additional peripherals, power down the system:
   a. Shut down the operating system. Consult the OS documentation for the appropriate procedure.
   b. Wait until the OS has finished its shutdown routine.
   c. Turn the "Standby-Ready" switch on the front panel to the "Standby" position. In this position:
      i. DC power is no longer supplied to PMB cards in the cabinet.
      ii. (990/992/890 Systems only) Battery back-up is disabled.
      iii. Cabinet still contains AC and DC voltages.
   d. Turn off power to all external HP-PB card cages by pressing the push-button switch on the front of each of them. (Both the computer and the external HP-PB card cage must be powered down before HP-PB cards can be installed or removed.)
   e. Turn off power to the expansion cabinet(s) by placing the front power switch to the OFF position.
   f. To completely turn off all voltages in the system cabinet, turn off power switch (circuit breaker) at the bottom rear of the cabinet. This switch disconnects the AC line from the cabinet. No lights or fans should remain on.

## Expansion Cabinets and Peripherals

If the customer's system includes additional A1884A or A1897A expansion cabinets, install them now using the *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006) that accompanies them.

## Bus Converter and HP-HSC I/O Bus Converter Connections (in PMB Slot 0)

In a previous step, you connected the bottom two connectors on the BC or HP-HSC I/O Bus Converter (997/T600 Systems) to the internal HP-PB card cage. In this part of the installation, you connect the top two connectors to an optional external HP-PB card cage.

This connection allows the card (upper port) in the PMB card cage to communicate with the card (lower port) in the external HP-PB I/O card cage.

To make this connection:

1. Locate the two flat ribbon cables for connecting the BC or HP-HSC I/O Bus Converter cards. These cables are 10 meters long.

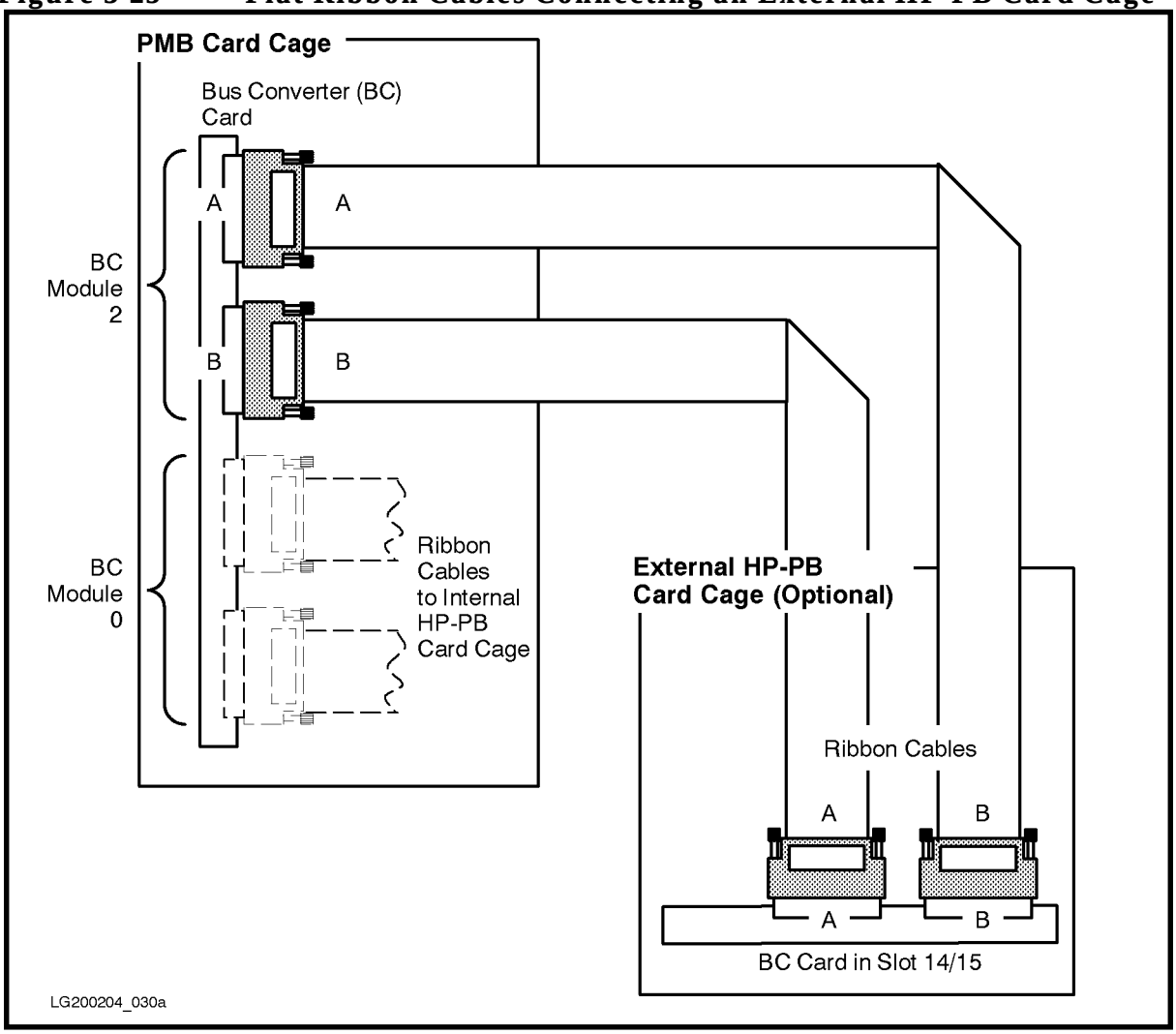
2. Connect the cables in the configuration shown in Figure 3-25.

## Connecting Other BC Cards

If the PMB card cage contains more than one BC or HP-HSC I/O Bus Converter card (997/T600), connect them to lower-port BC cards in external HP-PB card cages.

Connect the ribbon cables as described in the above procedure.

**Figure 3-25 Flat Ribbon Cables Connecting an External HP-PB Card Cage**




## MUX Connections and MDPs (Model T-Class Only)

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

MUX cards attach to an Modem Distribution Panel (MDP) which provides connectors for modems, terminals, etc. MDPs are mounted in the rear of an expansion cabinet, on an MDP mounting bracket.

**NOTE** MDPs were formerly known as Active Distribution Panels (ADPs).

For instructions on mounting MDPs on the expansion cabinet, see the *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006).

## Installing DTCs

Distributed Terminal Controllers (DTCs) allow connection of terminals, PCs in terminal mode, and printers. DTCs are installed in expansion cabinets and are connected to LAN cards.

1. If you have not already installed the DTC in the expansion cabinets, do so now, using the *99x/T-Class Systems Expansion Cabinet Installation Guide* (PN A1809-90006) that accompanies the expansion cabinet.
2. Earlier in this manual, the section “Console/LAN Connections” explained how to connect DTCs to the console/LAN card.
3. For details of configuring the DTC cabinet, interconnect cable or initializing the DTC, refer to the installation guide supplied with the DTC.

## Connecting Other Peripherals

Connect other peripheral devices to the appropriate HP-PB I/O or HP-HSC I/O cards. For HP-PB configuration information, see Appendix B (Configuring the HP-PB Cardcage) in this manual or see the *CE Handbook* (PN A1809-90003).

# Rebooting and Reconfiguring

Once you have installed all peripherals, you are ready to reboot and reconfigure the system.

## Rebooting

To reboot the system follow the procedures already given for powering up and booting the OS.

## Modifying the MPE/iX Configuration

The MPE/iX operating system expects a certain hardware configuration (I/O cards, peripherals, etc. in certain slots). If you have installed I/O cards and peripherals that do not match this default configuration, you must modify the OS configuration.

Appendix A (MPE/iX Configuration and SYSGEN) in this manual contains information on the default configuration for the 99x. It also contains a procedure for using SYSGEN to modify the OS configuration. Some 99x Systems require that you modify the configuration for the remote console to function. This procedure is described in Appendix A.

**NOTE** Hardware configuration is not an issue with the Model T-Class, since HP-UX supports auto-configuration. HP-UX configures itself to the hardware configuration it sees at boot-up.

## Configuring The Network

After the operating system is running, you can configure the network. Consult the appropriate networking manuals for the operating system. For example on MPE/iX systems, see the *HP 3000/iX Network Planning and Configuration Guide* (PN 36922-61023). For systems with OpenView Consoles, see also the *OpenView Console Manager's Guide* (PN B3118-90002) that accompanies the OpenView Console.

**NOTE** On 990DX, 991DX, 992DX, 995DX Systems, and on 996 and 997 Systems that have been ordered with an OpenView Console, the network must be properly configured for the advanced features on the OpenView Console to be functional.

**NOTE** Do not run the DTC Manager program on the same PC as OpenView; this configuration is not supported and may not work.

## Configuring the OS for the PowerTrust UPS

This section contains instructions for configuring HP-UX and MPE/iX so they can "talk" with the PowerTrust UPS.

## Configuring HP-UX for UPS on T-Class

On HP-UX 9.04 and later releases, PowerTrust UPS messages are displayed and logged. Also, HP-UX must be configured to perform a graceful shutdown at a time interval after AC power is lost.

(HP-UX 9.04 and later releases only)
**In order for HP-UX to display UPS messages and log UPS events to the system log, you must perform several configuration tasks:**

1. For each UPS on the system, connect the supplied RS-232 cable from the UPS to a port on a Modem Distribution Panel (MDP).

   The supplied cable is 2 meters (6.5 feet) in length. If it won't reach, you can use a straight-through 25-wire RS-232-C extender cable (30062C, 25 feet long) from the MDP port to the DB-25 connector end of the cable supplied with the UPS, and then the UPS cable to the UPS' DB-9 connector.

2. Once HP-UX is running, use SAM (Peripheral Devices) to configure the PowerTrust UPS. You can specify:

   a. The port(s) to be used for the UPS.

   b. Whether to activate or deactivate the automatic shutdown feature entirely.

   c. Whether the UPS is "critical." If a UPS is specified as "critical," it will be turned off as part of an automatic shutdown. You should specify as "critical" all UPSs to which HP-PB card cages or the SPU (the computer) are connected. No other UPSs should be specified as "critical.".

   d. The parameter shutdown_delay_mins (default = 1 minute). This parameter specifies the number of minutes to wait before initiating shutdown -h following notification that AC power to the UPS is lost. This interval allows the computer to continue operation through brief electrical glitches.

| **NOTE** | Consider increasing the value of shutdown_delay_mins if the site commonly experiences momentary power interruptions greater than one (1) minute for which recovery of power is expected. |
|---|---|

   e. The parameter shutdown_timeout_mins. This parameter specifies the number of minutes to monitor the shutdown -h operation before initiating reboot with the halt option. In this way a reboot is executed even if the shutdown process hangs.

| **NOTE** | Consider increasing the value of shutdown_timeout_mins if shutdown(1M) will take longer than 5 minutes (including the 60 second delay by shutdown(1M) after notification of users).<br><br>Consider decreasing the value of shutdown_timeout_mins if shutdown(1M) will take less than 5 minutes; small systems can take advantage of this. |
|---|---|

   For detailed information, see the man pages on ups_mond(1M) and ups_conf(4).

3. Verify that HP-UX has been properly configured for the UPS by making sure that UPS messages are displayed on the console. You can also check for UPS messages in /usr/adm/syslog.
4. If UPS messages are not being displayed on the console:
   a. Verify that the RS-232 cable is properly connected to the UPS and to an appropriate modem port on an MDP. Verify that the RS-232 cable is the one supplied with the UPS; other RS-232 cables probably won't work.
   b. Verify that the value for the port entered during configuration corresponds to the physical port used on the MDP.
   c. Call the Response Center.

### Configuring MPE/iX for UPS on the 99x

In order for MPE/iX 5.0 and later releases to display PowerTrust UPS messages and log UPS events to the system log, you must perform several configuration tasks:

1. For each PowerTrust UPS on the system, connect the supplied RS-232 cable from the UPS to a 25-wire modem port on a DTC. Any DTCs used for this purpose should themselves be protected by a UPS. (Otherwise when AC power fails, the UPS messages would not be displayed.)

   The supplied cable is 2 meters (6.5 feet) in length. If it won't reach, you can use a straight-through 25-wire RS-232-C extender cable (30062C, 25 feet long) from the DTC port to the DB-25 connector end of the cable supplied with the UPS, and then the UPS cable to the UPS' DB-9 connector.
2. Any LDEVs to be used by UPSs should NOT be defined in the configuration group for the system; the UPS LDEVs will be added to the configuration by NMMGR. The configuration groups supplied for 991, 995, 996, and 997 Systems leave the LDEV 22 undefined and hence suitable for use with UPSs.

   If you are adding a UPS to an existing 990/992/890 System, you will have to delete LDEVs from the configuration using SYSGEN.
3. Once the OS is running, use NMMGR to configure the DTC ports for the UPSs. Configure the port almost exactly as you would configure a terminal.

   Ports that are to be connected to an UPS are configured in a way similar to a terminal. To configure a port to be connected to an UPS, a profile with the following parameters is needed. The field 'Allow:HELLO logon?' is set to 'N', the first device class field is set to HPUPSDEV, and the baud rate is set to 1200 baud. All other fields remain the same as those used for a terminal. The sample configuration file NMSAMP1.PUB.SYS contains the profile UP10D12 that is configured with these parameters. This profile is then entered in the 'Profile Name' field on the 'Async Card Configuration' screen for the desired DTC port.

   On a system configured for PC-based management, it is necessary to configure the correct baud rate using the Open View DTC Manager workstation.

4. Verify that MPE/iX has been properly configured for the UPS by making sure that UPS messages are displayed on the console. You can also use LOGTOOL to check whether UPS messages are being stored in the system log.
5. If UPS messages are not being displayed on the console:
   a. Verify that the RS-232 cable is properly connected to the UPS and to an appropriate modem port on a DTC. Verify that the RS-232 cable is the one supplied with the UPS; other RS-232 cables probably won't work.
   b. Verify that the value entered in NMMGR for the port corresponds to the physical port used on the DTC.
   c. Verify that the correct "UPS terminal profile" has been used: baud rate 1200, no parity, terminal type #10, and first (and only) device class name = 'HPUPSDEV'.
   d. Power-cycle the DTC to force the DCC (Data Comm Configurator) to download the DTC as the system finished booting. This is needed to get the baud rate changed from its DTC-firmware default of 9600 baud to the NMMGR configured 1200 baud value.
   e. Call the Response Center.

## Configuring the Access Port for a Remote Console

The console/LAN card contains circuitry for the Access Port (AP). Configure the Access Port for a remote console as follows:

1. Enable the AP by turning the key switch on the control panel to CONSOLE ENABLED.
2. Press the CTRL and B keys simultaneously, on the system console, to obtain the CM>prompt.
3. From the system prompt CM>, enter the configure system remote support modem port command CA

```
CM> CA
```

4. The system responds with a display like the following:

```
Current remote support modem port configuration:

   Bit rate:                9600 bits/sec
   Protocol:                Bell
   Autodial Protocol:       Hayes
   System identification:   System_name

Do you wish to change the configuration? (Y/[N]):
```

The "Bit rate" field must be set for the speed of the incoming modem. This function is not speed-sensed; the bit rate MUST match the speed of the incoming call.

In most cases, the "Protocol" field should be set to "Bell" or "CCITT". In the United States, the protocol is usually "Bell." In Europe, the protocol is usually "CCITT."

The "Autodial Protocol" should match that of the modem.

5. If you need to change parameters, enter Y in response to the prompt. The system displays a change menu:

```
Enter your change.  <CR> retains the current value.

Current bit rate is 9600 bits/sec.  Select the new bit rate.
    (0=300, 1=1200, 2=2400, 3=4800, 4=9600, 5=19200): 2
Current Protocol is CCITT.  Select the new protocol.
    (0=CCITT, 1=Bell, 2=CCITT_BIS): 1
Current Autodial Protocol is V25.BIS.  Select the new protocol.
    (0=V25.bis, 1=Hayes): 1
Current System identification: System_name
   New system identification (limited to 1 to 23 displayable characters
   or space for none): (New_system_name)

New configuration (takes effect at next remote connection):

   Bit rate:               2400 bits/sec
   Protocol:               Bell
   Autodial Protocol:      Hayes
   System identification:  System_name
```

6. An N response to the prompt in step 5 returns the CM> prompt.
7. From the system prompt CM>, enable remote access by a remote console command ER:

```
CM> ER
```

8. The system responds with the following display:

```
Current remote console access configuration:

   Remote CS:        Enabled
   Mode:             Multiple
   Password:         (current password)
   Password faults:  03

Do you wish to change the configuration? (Y/N):
```

The "Remote CS" parameter enables the Copy Screen (CS) to be executed from the remote console. The CS command copies a screen from the local console to the remote console.

The "Mode" field determines whether only one remote access will be permitted (Single) or many (Multiple).

**NOTE** For predictive support to function correctly, the AP should be set to *single mode*. In single mode, the port is a normal session port.

9. To change parameters, enter Y in response to the prompt. The system displays a change menu:

```
Enter your changes. (CR) retains the current value.

Current mode: Multiple
  Select the new setting (S=single, M=multiple): S
Current Password:  (current password)
  New password (1 to 24 displayable characters or space if
  no password is to be required): new password
Current Password fault limit: 03
  New number of password faults (Range: 099 or space, space or 0 will
  permit unlimited password faults.): 03

New remote console access configuration:
  Remote CS:        Enabled
  Mode:             Multiple
  Password:         (new password)
  Password Faults:  03

Remote console is now enabled.

CM>
```

10. If you choose to disable remote console access, enter DR.

```
CM> DR
```

11. Enter CO to return the console to console mode.

# Testing Powerfail Recovery (990/992/890 Systems without a UPS)

**NOTE** This section applies only to 990/992/890 Systems without a Uninterruptible Power System (UPS).

After the operating system has been installed, the following test can be performed to determine if system powerfail recovery and memory battery backup are functioning correctly.

**CAUTION** **Minimum memory for 990/992/890 Systems without a UPS**

For powerfail recovery to function properly on these systems, a minimum amount of memory must be installed in the system:

- 990/992/890 Systems with **one or two** processors: 128MB of memory
- 890 Systems with **three** processors: 192MB of memory
- 890 Systems with **four** processors: 256MB of memory
- 990/992 Systems with **three or four** processors: 256MB of memory

Failure to meet the minimum memory requirements will result in lost data during a powerfail recovery.

Powerfail recovery occurs when primary AC power is restored before the memory battery backup fails. The system therefore resumes with fully valid memory. This test checks the ability of the system (after the operating system has been installed) to perform a powerfail recovery, and also checks the memory backup battery.

Proceed as follows:

1. Turn on system, booting normally (autoboot flag set ON!). Make sure one or more applications are active, so that memory swapping is active. Also verify that the BATT CHG LED is off.
2. Turn off the power switch (circuit breaker) on the lower rear of the cabinet, wait five minutes, then switch power back on.

**NOTE** Do NOT turn the "Standby-Ready" switch on the front panel to the "Standby" position; this disconnects the battery and disables powerfail recovery.

3. Observe reboot and action of application.

If the system performs normally, powerfail recovery is working properly, and the memory battery backup is good.

# Testing Transfer of Control

It is a wise idea to test Transfer of Control (TOC) during the installation. Execute a TOC using the procedure below, monitor the messages that appear on the console, and see whether the system successfully reboots.

To execute a TOC:

1. If the console is locked, unlock it with the front panel keyswitch.
2. Enter **<Control>**-B at the system console to enter the Access Port control mode.
3. At the AP prompt (`CM>` ) (Control Mode), enter SP to access the Service Processor (SP) commands.
4. At the SP prompt enter TC to execute a Transfer of Control (TOC).
5. At the SP prompt enter CO to return to console mode and monitor boot process messages.
6. After the boot process is complete, lock the console using the front panel keyswitch.

# Running PDC and ISL Diagnostics (Recommended)

At this point in the installation, it is wise to run the diagnostics available from the PDC and ISL interfaces. By taking a few minutes to run the diagnostics, you verify the functionality of the processor, BC, and memory.

To run the PDC/ISL diagnostics:

1. At any PDC prompt, enter the command `MEMTEST` to execute the extended memory self-test. Respond to the prompts.
2. Once MEMTEST has completed, go to the ISL interface:
   a. If the OS is pre-installed, enter the command `PRIMARY` at any PDC prompt.
   b. If the OS is NOT pre-installed, enter the command `ALTERNATE` at any PDC prompt (You need a tape mounted Support Tape).
3. You will see a display like:

```
Trying boot path 0/52.0.0.0.0.0.0 ...

Booting ...

Interact with ISL? (y/[n]) > y
```

   Answer Y to the prompt.

4. Enter the command `EDPROC` (x90 (990/992/890), 991/995/T500, and 996/T520) or `UDIAG` (997/T600) to run the processor diagnostic with the default sections selected.
5. After the processor diagnostic has completed, enter the command `EDBC` (x90 (990/992/890), 991/995/T500, and 996/T520) or `JAVADIAG` and `KEYDIAG` (997/T600) to run the Bus Converter (BC) diagnostic with the default sections selected.

# Operating the Computer

Complete instructions on operating 99x/T-Class Systems are given in *99x/T-Class Systems Operator's Guide* (PN A1809-90009) which is shipped with the SPU.

# A MPE/iX Configuration and SYSGEN

During system installation, you can 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 Table A-1).

**Table A-1 Configuration Groups Supplied With the 99x**

| Name | Description |
|---|---|
| CONFG990<br>CONFG991<br>CONFG992<br>CONFG995<br>CONFG996<br>CONFG997 | Default configuration for a 99x using a SCSI boot device. |
| ALINK990<br>ALINK991<br>ALINK992<br>ALINK995<br>ALINK996<br>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 Table A-1). For example:

   ```
   sysgen> BA CONFG997
   ```

   (Instead of CONFG990, you can specify some other configuration group name, such as CONFG996 or ALINK995.)

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. Table A-2 and Table A-4 list entries for the different configuration groups.

   Steps 6 and 7 show how to add paths and devices. For complete instructions, refer to the *MPE/iX System Configuration Manual* (HP part number 32650-90042).

6. To add a path (for a device adapter or a bus converter), use the APATH command. For example, to add paths 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 HSC I/O Expansion Module (HPA3567A) in PMB slot 1, enter:

```
io> APATH 4 HPA3567A
```

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

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

7. To add devices, use the ADEV command. For example, to add an HP 7937FL disk drive at path 4/52.0:

   ADEV using keyword syntax:

```
io> ADEV LDEV=23 PATH=4/52.0 ID=HP7937FL
```

   ADEV using positional syntax:

```
io> ADEV 23 4/52.0 HP7937FL
```

   To add an HP 7937FL disk drive to a 997 System:

   ADEV using keyword syntax:

```
io> ADEV LDEV=23 PATH=4/28/52.0 ID=HP7937FL
```

   ADEV using positional syntax:

```
io> ADEV 23 4/28/52.0 HP7937FL
```

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

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

    a. Shut down the system by entering:

       ```
       : <CTRL> A
       =SHUTDOWN
       ```

    b. To reset the system, enter:

       ```
       : <CTRL> B
       ```

    c. Enter SP

    d. Enter RS

    e. If the autoboot flag is set, you will see:

       ```
       Processor is starting the autoboot process.

       To discontinue, press any key within 10 seconds ... discontinued.
       ```

       As soon as you see the above prompt, press a key. (If you do not press a key within several seconds, the system continues with its bootup and you will have to start over again by resetting the system).

    f. The computer will prompt you:

       ```
       Continue with primary boot path?   ([y]/n/,new_path>) >
       ```

       i. Answer Y if the operating system and ISL are installed on the system disk (This is the normal condition after initial installation).

       ii. Answer N if the operating system and ISL are NOT installed on the system disk. You will be taken to the PDC main menu. Type the command ALTERNATE to boot from the alternate boot path (the tape drive).

    g. You will see:

       ```
       Trying boot path 0/52.0.0.0.0.0.0 ...

       Booting ...

       Interact with ISL? (y/[n])> Y
       ```

Answer Y to the prompt. The ISL prompt now appears. You will see:

```
MMSAVE Version n.nn
DUMPAREA protected, proceeding to ISL without memsave
ISL loaded
ISL Revision v.uu.ff Month Day, Year
ISL>
```

h. To restart the system, enter:

```
ISL> START NORECOVERY
```

# Configuring MPE/iX for the PowerTrust UPS

If the system has a PowerTrust Uninterruptible Power System (UPS), you should configure MPE/iX as described in Chapter 3 (Installation) and in the manual that accompanies the UPS.

To configure a PowerTrust UPS, you assign it an LDEV number with NMMGR. Any LDEVs to be used by UPSs should NOT be defined in the configuration group for the system; the UPS LDEVs will be added to the configuration by NMMGR.

The default configuration groups leave the LDEV 22 undefined and hence suitable for use with UPSs.

If you are using more than one PowerTrust UPS, you should assign them additional LDEV numbers. If the LDEV numbers you choose are currently defined in the configuration group, you will have to delete them using SYSGEN. Follow the procedure given at the beginning of this appendix.

If you are adding a UPS to an existing 990/992/890 system, you will also have to delete LDEV numbers from the configuration using SYSGEN.

# Configuring the Remote Console

This section describes the correct configuration for the 99x remote console. The remote console port is used by the Response Center to view the contents of the support processor. HP Predictive can also use this port when it is correctly configured.

**NOTE** MPE/iX 5.0 and later releases should have LDEV 21 properly set for the remote console, so you should not have to perform this procedure.

Earlier releases may or may not have LDEV 21 properly set.

## The Problem

The former default configuration for LDEV 21 specified an HPC2204A "Bifocus" disk drive. Since remote console and HP Predictive Support can use LDEV 21 as the dial up port, it is important for this port to be configured correctly. The default configuration will cause Predictive Support to abort with the following error messages on the console:

```
CTL(17) Cannot FOPEN port on LDEV 21 (FSERR 56)
CTL(7)  Terminating Transfer Attempt
```

To fix this, the default configuration for LDEV 21 for the 99x has to be changed to HP28639-60001 console terminal.

## Procedure

**To change an improper configuration for LDEV 21:**

1. Call up the SYSGEN program:

   ```
   : SYSGEN
   ```

2. Activate the IO Configurator by entering:

   ```
   sysgen> IO
   ```

3. Use the LD command to list the current parameters for LDEV 21:

```
io> LD 21
```

   You will see:

```
 LDEV:   21  DEVNAME:       OUTDEV:        0   MODE:
   ID: HPC2204A             RSIZE:       128   DEVTYPE: DISC
 PATH: 0/36.0                MPETYPE:       4   MPESUBTYPE:  3 CLASS: DISC     SPOOL
```

4. Use the MD command to modify the parameters for LDEV 21:

```
io> MD 21 id=HP28639-60001-CONSOLE-TERMINAL path=0/44.1
```

5. Use the LD command to verify the change:

```
io> LD 21
```

   You will see:

```
LDEV:    21 DEVNAME:                 OUTDEV: 21  MODE:   JAID
  ID: HP28639-60001-CONSOLE-TERMINAL RSIZE:  40  DEVTYPE: TERM
PATH: 0/44.1                          MPETYPE:16  MPESUBTYPE: 0
```

6. Use the LP command to verify that the PMGR and LMGR are correct:

```
io> LP 0/44.1
```

   See xref emscboot> and Table A-4 for the correct values.

7. Use the HOLD command to save the changes you have made:

```
io> HOLD
```

8. Use the EXIT command to exit the I/O Configurator:

```
io> EXIT
```

9. Use the KEEP command to keep the files from the configuration group to the CONFIG.SYS group:

```
sysgen> KEEP CONFIG
```

10. Exit the SYSGEN program:

```
sysgen> EXIT
```

After the configuration is changed complete these additional steps:

1. Use NMMGR to set the modem type:
   a. Open Config.
   b. DTS.
   c. Go To User Port.
   d. Set the modem type as appropriate.
   e. Save Data.
2. Validate DTS/LINK in NMMGR.
3. Cross-validate the configuration in SYSGEN by entering SYSGEN. Make sure there are no new conflicts.
4. Create a new CSLT in SYSGEN. This saves the changes permanently.

5. An Update is not necessary. However, after the configuration group is modified, the system must be shut down, reset, and restarted as follows:

   a. Shut down the system by entering:

   ```
   : CTRL A
   =SHUTDOWN
   ```

   b. To reset the system, enter:

   ```
   : CTRL - B
   ```

   c. Enter SP

   d. Enter RS

   e. If the autoboot flag is set, you will see:

   ```
   Processor is starting the autoboot process.

   To discontinue, press any key within 10 seconds ... discontinued.
   ```

   As soon as you see the above prompt, press a key. (If you do not press a key within several seconds, the system continues with its bootup and you will have to start over again by resetting the system).

   f. The computer will prompt you:

   ```
   Continue with primary boot path?   ([y]/n/,new_path>) >
   ```

      i. Answer Y if the operating system and ISL are installed on the system disk (This is the normal condition after initial installation).

      ii. Answer N if the operating system and ISL are NOT installed on the system disk. You will be taken to the PDC main menu. Type the command ALTERNATE to boot from the alternate boot path (the tape drive).

   g. You will see:

   ```
   Trying boot path 0/52.0.0.0.0.0.0 ...

   Booting ...

   Interact with ISL? (y/[n])> Y
   ```

   Answer Y to the prompt. The ISL prompt now appears. For HP-UX systems, you will see:

   ```
   SOFT Booted.
   ISL Revision xx.xx.xx xxxxxx xx, 199x
   ISL>
   ```

   For the MPE/iX system, you will see:

   ```
   MMSAVE Version n.nn
   DUMPAREA protected, proceeding to ISL without memsave
   ISL loaded
   ISL Revision v.uu.ff Month Day, Year
   ISL>
   ```

   h. To restart the system, enter:

   ```
   ISL> START NORECOVERY
   ```

# Default Configuration for 99x with SCSI Boot Device (CONFG99x)

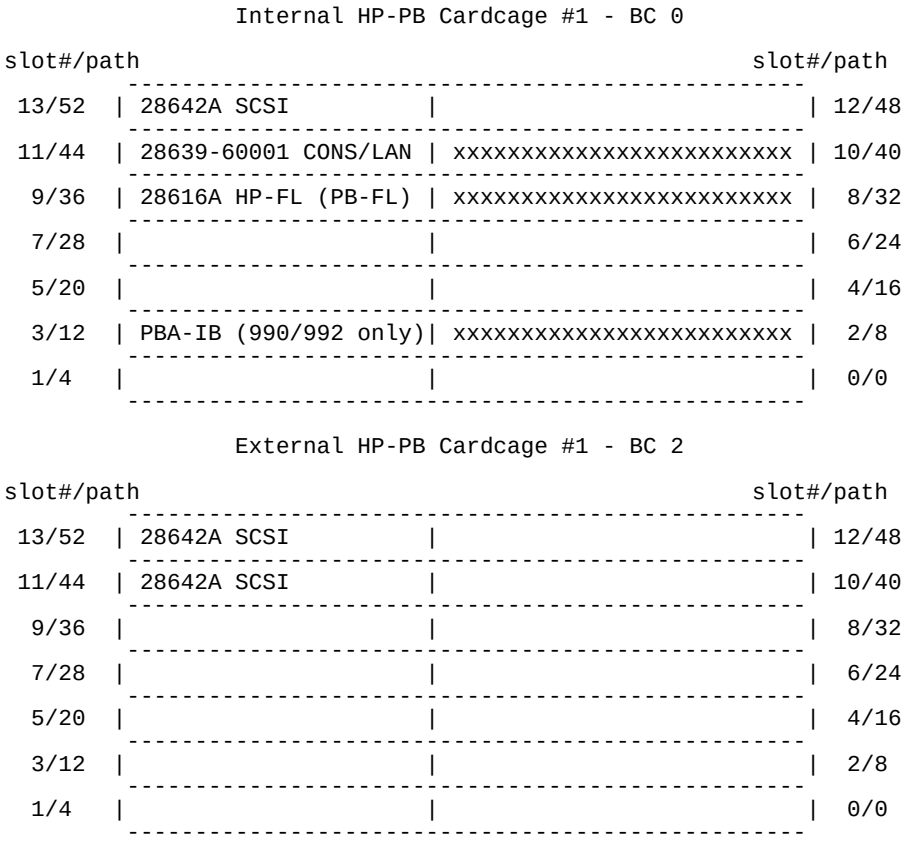



**Table A-2 99x Default Configuration for SCSI Boot Device: Internal HP-PB Cardcage (CONFG99x)**

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 0 | | HPA1809-60005 | BC | BUS_CONV_MGR | 2 | | 0 |
| 0/12 | | HPA1809-60095[1] | CA | SPECTRUM_CIO_CAM | 6 | | 0 |
| 0/12.0 | | HP27113A | DA | HPIB_DAM | 6 | | 0 |
| 0/12.0.1 | 9 | HP2566A | LP | CIPER_DM | 10 | LDEV_MGR | 0 |
| 0/12.0.3 | 8 | HP7980A | TAPE | TAPE_7968_DM | 10 | LDEV_MGR | 0 |
| 0/12.0.6 | 19 | HP2680A | PP | PP_DM | 10 | LDEV_MGR | 0 |
| 0/24 | | HP28642A-SCSI | DA | SCSI_DAM | 6 | | 0 |

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 0/36 | | HP28616A | DA | NIO_ALINK_DAM | 6 | | 0 |
| 0/36.1 | 23 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/44 | | HP28639-60001-CONSOLE/LAN | DA | LAN_8023_DRIVER | 6 | | 0 |
| 0/44.0 | 20 | HP28639-60001-CONSOLE-TERMINAL | TERM | CDM_CONSOLE_DM | 9 | TIO_TLDM | 0 |
| 0/44.1 | 21[2] | HP28639-60001-CONSOLE-TERMINAL | TERM | CDM_CONSOLE_DM | 9 | TIO_TLDM | 0 |
| 0/52 | | HP28642A-SCSI | DA | SCSI_DAM | 6 | | 0 |
| 0/52.0 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.0.0 | 7 | HPC1300S | TAPE | SCSI_TAPE_DM | 10 | LDEV_MGR | 0 |
| 0/52.1 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.2 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.3 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.3.0 | 4 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.4 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.4.0 | 3 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.5 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.5.0 | 2 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.6 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.6.0 | 1 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.8 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.8.0 | 6 | HP2567B | LP | SCSI_DISC_DM | 10 | LDEV_MGR | 0 |
| 0/52.9 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/52.9.0 | 10 | HPC1503B | TAPE | SCSI_TAPE_DM | 10 | LDEV_MGR | 0 |

1. (Releases prior to MPE/iX 5.0) In the default configuration group, the ID may incorrectly be given as HPA1700-60001. Use SYSGEN to change the ID to HPA1809-60095.

2. (Non-preloaded and preloaded systems shipped before March 15, 1993) In the default configuration group, LDEV 21 is incorrectly assigned to an HPC2204A disk. To use the remote support modem, call up the SYSGEN program to assign LDEV 21 to a HP28639-60001-CONSOLE-TERMINAL, and change the I/O path to 0/44.1 (see procedure earlier in the chapter). Change other values to those shown in Table A-2.

**Table A-3 99x Default Configuration for SCSI Boot Device: External Cardcage (CONFG99x)**

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 2 | | HPA1809-60005 | BC | BUS_CONV_MGR | 2 | | 0 |
| 2/44 | | HP28642A-SCSI | DA | SCSI_DAM | 6 | | 0 |
| 2/44.3 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/44.3.0 | 34 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.4 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/44.4.0 | 33 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.5 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/44.5.0 | 32 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.6 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/44.6.0 | 31 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52 | | HP28642A-SCSI | DA | SCSI_DAM | 6 | | 0 |
| 2/52.4 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/52.4.0 | 28 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52.5 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/52.5.0 | 27 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52.6 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 2/52.6.0 | 26 | HPC2474R | DISC | SCSI_DISC_DM | 8 | LDEV_MGR | 0 |

# Default Configuration for 99x with HP-FL Boot Device (ALINK99x)

```
                Internal HP-PB Cardcage #1 - BC 0

slot#/path                                                  slot#/path
          ------------------------------------------------
 13/52   | 28616A HP-FL (PB-FL) | xxxxxxxxxxxxxxxxxxxxxxxxx | 12/48
          ------------------------------------------------
 11/44   | 28639-60001 CONS/LAN | xxxxxxxxxxxxxxxxxxxxxxxxx | 10/40
          ------------------------------------------------
  9/36   | 28642A SCSI          |                           |  8/32
          ------------------------------------------------
  7/28   |                      |                           |  6/24
          ------------------------------------------------
  5/20   |                      |                           |  4/16
          ------------------------------------------------
  3/12   | PBA-IB (990/992 only)| xxxxxxxxxxxxxxxxxxxxxxxxx |  2/8
          ------------------------------------------------
  1/4    |                      |                           |  0/0
          ------------------------------------------------


                External HP-PB Cardcage #1 - BC 2

slot#/path                                                  slot#/path
          ------------------------------------------------
 13/52   | 28616A HP-FL (PB-FL) | xxxxxxxxxxxxxxxxxxxxxxxxx | 12/48
          ------------------------------------------------
 11/44   | 28616A HP-FL (PB-FL) | xxxxxxxxxxxxxxxxxxxxxxxxx | 10/40
          ------------------------------------------------
  9/36   |                      |                           |  8/32
          ------------------------------------------------
  7/28   |                      |                           |  6/24
          ------------------------------------------------
  5/20   |                      |                           |  4/16
          ------------------------------------------------
  3/12   |                      |                           |  2/8
          ------------------------------------------------
  1/4    |                      |                           |  0/0
          ------------------------------------------------

Legend:         "xxxxxx" denotes a slot occupied by double-width card.
                 Spaces denote an empty slot.
```

**Table A-4 99x Default Configuration for HP-FL Boot Device: Internal HP-PB Cardcage (ALINK99x)**

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 0 | | HPA1809-60005 | BC | BUS_CONV_MGR | 2 | | 0 |
| 0/12 | | HPA1809-60095[1] | CA | SPECTRUM_CIO_CAM | 6 | | 0 |
| 0/12.0 | | HP27113A | DA | HPIB_DAM | 6 | | 0 |
| 0/12.0.1 | 9 | HP2566A | LP | CIPER_DM | 10 | LDEV_MGR | 0 |
| 0/12.0.3 | 8 | HP7980A | TAPE | TAPE_7978_DM | 10 | LDEV_MGR | 0 |
| 0/12.0.6 | 19 | HP2680A | PP | PP_DM | 10 | LDEV_MGR | 0 |
| 0/24[3] | | HP28616A | DA | NIO_ALINK_DAM | 6 | | 0 |

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 0/24.1[3] | 23 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/36 | | HP28642A-SCSI | DA | SCSI_DAM | 6 | | 0 |
| 0/36.0 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/36.0.0 | 7 | HPC1300S | TAPE | SCSI_TAPE_DM | 10 | LDEV_MGR | 0 |
| 0/36.8 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/36.8.0 | 6 | HP2567B | LP | SCSI_DISC_DM | 10 | LDEV_MGR | 0 |
| 0/36.9 | | PSEUDO | DA | TRANSPARENT_MGR | 6 | | 0 |
| 0/36.9.0 | 10 | HPC1503B | TAPE | SCSI_TAPE_DM | 10 | LDEV_MGR | 0 |
| 0/44 | | HP28639-60001-CONSOLE/LAN | DA | LAN_8023_DRIVER | 6 | | 0 |
| 0/44.0 | 20 | HP28639-60001-CONSOLE-TERMINAL | TERM | CDM_CONSOLE_DM | 9 | TIO_TLDM | 0 |
| 0/44.1[2] | 21[2] | HP28639-60001-CONSOLE-TERMINAL | TERM | CDM_CONSOLE_DM | 9 | TIO_TLDM | 0 |
| 0/52 | | HP28616A | DA | NIO_ALINK_DAM | 6 | | 0 |
| 0/52.0 | 1 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.1 | 2 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.2 | 3 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.3 | 4 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 0/52.4 | 5 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |

1. (Releases prior to MPE/iX 5.0) In the default configuration group, the ID may incorrectly be given as HPA1700-60001. Use SYSGEN to change the ID to HPA1809-60095.
2. (Non-preloaded and preloaded systems shipped before March 15, 1993) In the default configuration group, LDEV 21 is incorrectly assigned to an HPC2204A disk. To use the remote support modem, call up the SYSGEN program to assign LDEV 21 to a HP28639-60001-CONSOLE-TERMINAL, and change the I/O path to 0/44.1 (see procedure earlier in the chapter). Change other values to those shown in Table A-4.
3. In the default configuration group, the I/O path is incorrectly assigned to 0/24 and 0/24.1. If you are using these entries, use SYSGEN to change them to 0/28 and 0/28.1.

**Table A-5 99x Default Configuration for HP-FL Boot Device: External Cardcage (ALINK99x)**

| I/O Path | Ldev # | ID | Type | Pmgr | Pmgrpri | Lmgr | Maxios |
|---|---|---|---|---|---|---|---|
| 2 | | HPA1809-60005 | BC | BUS_CONV_MGR | 2 | | 0 |
| 2/44 | | HP28616A | DA | NIO_ALINK_DAM | 6 | | 0 |
| 2/44.0 | 31 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.1 | 32 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.2 | 33 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/44.3 | 34 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52 | | HP28616A | DA | NIO_ALINK_DAM | 6 | | 0 |
| 2/52.0 | 26 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52.1 | 27 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |
| 2/52.2 | 28 | HPC2204A | DISC | EAGL_DISC_DM | 8 | LDEV_MGR | 0 |

# B Configuring the HP-PB Card Cage

# Planning the HP-PB Configuration

This section provides information for planning the configuration of I/O cards in the HP-PB card cage. Two sets of guidelines are provided:

- Configuring I/O for System Performance.
- Power and Space Budgeting for HP-PB Card Cage.

**NOTE** **HP-PB Slot Priority:**

On HP-PB, the higher the slot number, the higher the priority. However, priority is not that important, since each module can get one transaction during each transaction interval. Rules of thumb:

- 99x: Install cards for disk drives in higher numbered (higher priority) slots, but below LAN/console card.
- T-Class: install LAN cards in higher numbered (higher priority) slots, but below LAN/console card.

## Configuring I/O for System Performance (99x Only)

The maximums stated in this table are to optimize system performance. These values should not be confused with the maximum number of cards supported.

To optimize system performance, the following HP-PB I/O guidelines are recommended (Table B-1).

**Table B-1 Performance Guidelines (99x)**

| I/O Card | Slot Height | Maximum I/O Cards per HP-PB Card Cage | Maximum Devices per I/O Card | Maximum I/O Cards per System |
|---|---|---|---|---|
| HP-FL (PB-FL) | double-high | 5[1] | 5 | Refer to "Power Budget Worksheet" |
| SCSI | single-high | 5[1] | 5 | Refer to "Power Budget Worksheet" |
| FW SCSI | double-high | 5[1] | 5 | Refer to "Power Budget Worksheet" |
| PBA-IB | double-high | 2 | 4 | Refer to "Power Budget Worksheet" |
| 802.3 LANIC | single-high | N/A | N/A | 2[2] |

| I/O Card | Slot Height | Maximum I/O Cards per HP-PB Card Cage | Maximum Devices per I/O Card | Maximum I/O Cards per System |
|---|---|---|---|---|
| 802.5 Token Ring | single-high | N/A | N/A | 1 |
| LAN/Console | double-high | N/A | N/A | 1 |
| PSI | single-high | N/A | N/A | 8 |

1. A maximum of 5 connections for SCSI and a maximum of 5 connections for HP-FL (PB-FL). Remaining slots can be used for other non-disk activity as long as power limits are not violated. This limit applies to single disks as well as disk arrays.
2. First 802.3 LANIC standard in LAN/Console card.

*Boot disk - system performance may be enhanced by separating system software and user data on separate disk arrays.*

**NOTE** HP recommends against putting printers on the same HP-IB card with a system disk. This configuration has been reported to cause some data corruption on the system disk.

## Power and Space Budgeting for the HP-PB Card Cage

Because of power and space constraints, there are limits on the number and type of HP-PB cards supported by an HP-PB cardcage. These limits apply both to an internal HP-PB cardcage in the SPU cabinet, and to an external HP-PB cardcage in an expansion cabinet.

The HP-PB cards in an HP-PB cardcage must:

- Not require more than 14 single-high slots. (One double-high card = two single high cards.)
- Not exceed the power available at each voltage:
  - ❑ 71.64W at +12V.
  - ❑ 161.58W at +5V.
  - ❑ 23.64W at –12V.
- Not exceed the total power available (222.82W).

### Power Budgeting Worksheets

To see whether a configuration of HP-PB cards is supported, use the worksheets on the following pages:

- For the 99x, use Table B-3.
- For T-Class, use Table B-4.

The two systems differ only in the types of HP-PB cards supported. Power requirements are the same.

### Directions for the Worksheets

For each HP-PB cardcage, fill out a worksheet:

1. For each type of HP-PB card, enter the proposed number of cards in the column labeled "Qty".
2. For each type of HP-PB card, multiply the number in the "Qty" column by the value given in each of the three "Power Req./Card" columns. Put the results in the appropriate "Total Power Required" column.
3. Add the values in each column (+12V column, +5V column, and –12V column). Put the results in the row labeled "Sum of power used per voltage". Compare these results with the three voltage power limits.
4. Add the power required for each voltage (+12V, +5V, and –12V) to get a grand total of all the power required. Put the result in the row labeled "Total power used for +12V, +5V, –12V". The total power used for all three voltages must not exceed 222.82 watts.
5. For each type of HP-PB card, multiply the number in the "Qty" column by the value in the "Slots/Card" column. Put the result in the column labeled "Total Slots Used." (This number represents the number of *single-high* slots used.)
6. Add the values in the "Total Slots Used" column. Put the result in the entry at the bottom of that column. The total number of single-high slots used must not exceed 14.

**CAUTION** An HP-PB card configuration must meet TWO sets of power limitations:

- Power limits for specific voltages.
- Total power limit for the card cage power supply (222.82W).

### Example

Table B-2 shows an example of using the worksheet for the 99x.

**NOTE** Information entered by the service person is shown in *italic*. An *OK* in a box means that the value in the box is under the recommended limit.

**Table B-2 HP-PB Power Budgeting Worksheet (99x): EXAMPLE**

| I/O Card | Qty | Power Requirements per I/O Card (watts) | | | Total Power Required (watts) | | | Slots/ Card | Total Slots Used |
|---|---|---|---|---|---|---|---|---|---|
| | | +12V | +5V | –12V | +12V | +5V | –12V | | |
| LAN/Console[1] (ThinLAN) | *1* | 0.40 | 14.20 | 0.40 | *0.40* | *14.20* | *0.40* | 2 | *2* |
| LAN/Console (Ethertwist or ThickLAN) | | 6.60 | 14.20 | 0.40 | | | | 2 | |
| HP-FL (PB-FL) [1] | *3* | 0.48 | 19.65 | 0.60 | *1.44* | *58.95* | *1.80* | 2 | *6* |
| SCSI[1] | *2* | 0.00 | 4.50 | 0.00 | *0.00* | *9.00* | *0.00* | 1 | *2* |
| Fast/Wide SCSI | | 0.12 | 20.5 | 0.00 | | | | 2 | |
| PBA-IB[1] (HP-IB) | *1* | 1.13 | 27.50 | 0.66 | *1.13* | *27.50* | *0.66* | 2 | *2* |
| 802.3 LAN | *1* | 6.00 | 10.65 | 0.00 | *6.00* | *10.65* | *0.00* | 1 | *1* |
| 802.5 Token Ring | | 0.00 | 8.30 | 0.00 | | | | 1 | |
| PSI | | .98 | 12.00 | 1.07 | | | | 1 | |
| Sum of power used per voltage: (Must not exceed total below) | | | | | *8.97 (OK)* | *120.30 (OK)* | *2.86 (OK)* | Total slots used *__13 (OK)* (Must not exceed 14) | |
| Maximum power available per voltage in HP-PB I/O card cage | | | | | 71.64 | 161.58 | 23.64 | | |
| Total power used for +12V, +5V, –12V (Must be less or equal to 222.82 watts) | | | | | *132.3 (OK)* | | | | |

1. *I/O cards included in base configuration.*

## Power Budget Worksheet for the 99x HP-PB Card Cage

**Table B-3 HP-PB Power Budgeting Worksheet (99x)**

| I/O Card | Qty | Power Requirements per I/O Card (watts) | | | Total Power Required (watts) | | | Slots/ Card | Total Slots Used |
|---|---|---|---|---|---|---|---|---|---|
| | | +12V | +5V | –12V | +12V | +5V | –12V | | |
| LAN/Console[1] (ThinLAN) | | 0.40 | 14.20 | 0.40 | | | | 2 | |
| LAN/Console (Ethertwist or ThickLAN) | | 6.60 | 14.20 | 0.40 | | | | 2 | |
| HP-FL (PB-FL)[1] | | 0.48 | 19.65 | 0.60 | | | | 2 | |
| SCSI[1] | | 0.00 | 4.50 | 0.00 | | | | 1 | |
| Fast/Wide SCSI | *2* | 0.12 | 20.5 | 0.00 | | | | 2 | |
| PBA-IB[1] (HP-IB) | | 1.13 | 27.50 | 0.66 | | | | 2 | |
| 802.3 LAN | | 6.00 | 10.65 | 0.00 | | | | 1 | |
| 802.5 Token Ring | | 0.00 | 8.30 | 0.00 | | | | 1 | |
| PSI | | .98 | 12.00 | 1.07 | | | | 1 | |
| Sum of power used per voltage: (Must not exceed total below) | | | | | | | | Total slots used _____ (Must not exceed 14) | |
| Maximum power available per voltage in HP-PB I/O card cage | | | | | 71.64 | 161.58 | 23.64 | | |
| Total power used for +12V, +5V, –12V (Must be less or equal to 222.82 watts) | | | | | | | | | |

1. *I/O cards included in base configuration.*

## Power Budget Worksheet for the T-Class HP-PB Card Cage

**Table B-4 HP-PB Power Budgeting Worksheet (T-Class)**

| I/O Card | Qty | Power Requirements per I/O Card (watts) | | | Total Power Required (watts) | | | Slots/ Card | Total Slots Used |
|---|---|---|---|---|---|---|---|---|---|
| | | +12V | +5V | –12V | +12V | +5V | –12V | | |
| LAN/Console[1] (ThinLAN) | | 0.40 | 14.20 | 0.40 | | | | 2 | |
| LAN/Console(Ethertwist) | | 6.60 | 14.20 | 0.40 | | | | 2 | |
| 8-Port MUX40299B | | 1.92 | 7.00 | 1.56 | | | | 1 | |
| 16-Port MUX[1] J2092A,J2093A, J2094A | | 3.60 | 8.50 | 1.80 | | | | 1 | |
| 32-Port MUXJ2096A | | 1.50 | 8.00 | 1.50 | | | | 1 | |
| 802.3 LAN J2146A | | 6.00 | 10.65 | 0.00 | | | | 1 | |
| SCSI/Cent Intfc[1] 28655A | | 0.00 | 3.75 | 0.00 | | | | 1 | |
| HP-IB Interface 28650B | | 0.00 | 10.50 | 0.00 | | | | 1 | |
| HP-FL Interface[2] 28615A | | 0.48 | 19.65 | 0.60 | | | | 2 | |
| Fast/Wide/ Differential SCSI Interface 28696A | | 1.44 | 25.5 | 0 | | | | 2 | |
| X.2536960A | | 0.96 | 9.55 | 0.96 | | | | 1 | |
| SNAplus Link J2220A | | 0.96 | 9.55 | 0.96 | | | | 1 | |
| FDDI J2157A | | 0.00 | 18.50 | 0.00 | | | | 2 | |
| 802.5 Token Ring J2166A | | 0.00 | 8.30 | 0.00 | | | | 1 | |

| I/O Card | Qty | Power Requirements per I/O Card (watts) | | | Total Power Required (watts) | | | Slots/ Card | Total Slots Used |
|---|---|---|---|---|---|---|---|---|---|
| | | +12V | +5V | –12V | +12V | +5V | –12V | | |
| Sum of power used per voltage:<br>(Must not exceed total below) | | | | | | | | Total slots used<br>_____<br>(Must not exceed 14) | |
| Maximum power available per voltage in HP-PB I/O card cage | | | | | 71.64 | 161.58 | 23.64 | | |
| Total power used for +12V, +5V, –12V<br>(Must be less or equal to 222.82 watts) | | | | | | | | | |

1. *I/O cards included in base configuration*
2. *HP-FL card included in base configuration for 890 but not for T500, T520, and T600 Systems.*

# C Configuring the Remote Support Modem

# Introduction

99x/T-Class Systems permit remote support and a remote console. These functions require:

- ❑ Access Port (AP) circuitry located on the Console/LAN card.
- ❑ A properly configured remote support modem.
- ❑ A cable for the remote support modem.

This appendix explains how to configure remote support modems.

The recommended remote support modem is an HP 50759A modem (Support Link). Other modems can also be used.

The recommended cable is an HP 92219Q cable. The HP 40233A cable can also be used. For V.22bis/V.25bis applications, the A1703-63006 modem cable is available (see "Modem Cable Pin-out" later in this chapter).

**NOTE** Table C-1 and Table C-2 contain the latest recommendations from the Predictive Support team. These settings have been tested and will work for Predictive Support.

The rest of this appendix contains reference information and recommendations that were compiled earlier by another group. Some of the recommendations later in the chapter are different than the Predictive Support recommendations.

**Appendix Organization:**

This appendix is organized as follows:

- ❑ Modem Settings for MPE/iX and HP-UX (Predictive Support)
- ❑ Quick Reference.
- ❑ General Guidelines.
- ❑ Configuring Individual Modems
  - ❑ HP 50759A (Support Link) Modem
  - ❑ HP 50759B (Support Link) Modem
  - ❑ HP 37212B Modem
  - ❑ Hayes Smartmodem 2400
  - ❑ Black Box V.32 Plus (Version 2.01.01)
  - ❑ Multitech MT224EH7
- ❑ Modem Cable Pin-out.
- ❑ Console/LAN Card-Modem Line Behavior.

# Modem Settings for MPE/iX and HP-UX (Predictive Support)

Table C-1 and Table C-2 contain the latest recommendations from the Predictive Support team. These settings have been tested and will work for Predictive Support.

The rest of this appendix contains reference information and recommendations that were compiled earlier by another group. Some of the recommendations later in the chapter are different than the Predictive Support recommendations.

**Table C-1 Predictive Modem Switch Settings for MPE/iX**

| Modem Model | Settings |
|---|---|
| HP 50759A (Support Link) [1] | X1, X2, X4, S4, S8: Down All others: Up |
| HP 50759B (Support Link) [2] | S2, S3, S4, S7, S8, S9, S12, S16: Down All others: Up |
| HP 37212B [3] | S3, S11, S12: Up (1) All others: Down (0) |

1. The HP 50759A (Support Link) modem has one bank of 8 switches (S switches) and one bank of 4 switches (X switches).
2. The HP 50759B modem has one bank of 16 switches (S switches).
3. The HP 37212B modem has one bank of 12 switches (S switches).

**Table C-2 Support Watch (Predictive) Modem Switch Settings for HP-UX**

| Modem Model | Settings |
|---|---|
| HP 50759A (Support Link) [1] | X1, X2, X4, S3, S8: Down All others: Up |
| HP 50759B (Support Link) [2] | S2, S3, S4, S7, S8, S9, S12, S16: Down All others: Up |
| HP 37212B [3] | S11, S12: Up (1) All others: Down (0) |

1. The HP 50759A (Support Link) modem has one bank of 8 switches (S switches) and one bank of 4 switches (X switches).
2. The HP 50759B modem has one bank of 16 switches (S switches).
3. The HP 37212B modem has one bank of 12 switches (S switches).

For more information, consult:

- **MPE/iX:** *MPE/iX Predictive Support Handbook*, part number 50779-90002,
- **HP-UX:** *HP Support Watch User's Guide*, part number H5169-90005.

The information in Table C-1 and Table C-2 is more current than the information contained in those two manual.

# Quick Reference

Table C-3 is a quick reference table on some modems used as remote support modems. For more details see the rest of the appendix.

**Table C-3 Settings for Remote Support Modem (Quick Reference)**

| Modem Model | Settings |
|---|---|
| HP 50759A (Support Link) | X1, X2, X3, X4, S8: Down S1, S3, S4, S5, S6: Up S2, S7: Do not care |
| HP 50759B (Support Link) | S2, S3, S4, S7, S8, S9, S12, S16: Down All others: Up |
| HP 37212B | S1, S2, S4, S5, S6, S7, S10: Down (0) S3, S8, S9, S11, S12: Up (1) |
| Hayes Smartmodem 2400 | S3, S9, S10: Down S1, S4, S5, S6, S7: Up S2: Do not care |
| Black Box V.32 Plus (Version 2.01.01) | `AT&D2&S1&C1&R` (See appendix.) |
| Multitech MT224EH7 | X1, X4, S3, S7, S8: Down S1, S2, S4, S5, S6, X2, X3: Up (See appendix.) |

## General Guidelines

General hints for configuring remote support modems:

- The modem must be set up to respond to DTR.
- CTS should follow RTS.
- DSR must follow OH, not DCD.
- For Bell mode, the modem should disregard RTS.
- Set both local and remote modems to either:
  - ❑ The same compression mode, OR
  - ❑ To NO data compression.

  If you have problems connecting two modems, a frequent cause is that one modem is enabled for an MNP level and the other modem is set for no data compression.

If the modem sends up modem dialog with all signals asserted, the user may be logged off immediately when a password is enabled for the Access Port (AP). This can be corrected by setting the modem so it does not report connection status via the data path.

# Configuring Individual Modems

This section gives configuration information for five different modems.

## HP 50759A (Support Link) Modem

Supported modes:

- Bell
- CCITT_OM
- CCITT_AM
- CCITT_BIS_OM
- CCITT_BIS_AM

Supported cables:

- HP 92219Q - Bell, CCITT_OM, CCITT_AM
- A1703-63006 - CCITT_BIS_OM, CCITT_BIS_AM

Auto-dial modes: Hayes

This modem is the standard HP Support Link. It supports V.22bis line discipline, but does not support V.25bis auto-dialing. In order for V.22bis answer mode to work properly, DSR must follow OH. Data Compression should be set *OFF*. Setting data compression *ON* can cause problems when connecting to other modems that do not have data compression.

### Settings

Two sets of configuration switches on the HP 50759A are on the underside of the modem. One set (Set S) consists of eight switches. The other set (Set X) consists of four switches. See Figure C-1.

Configure the modem by setting these switches to either of two positions: `UP` or `DOWN` (depressed).

| **NOTE** | A firmware upgrade that involves replacing two chips for MPE and MPE/iX systems is not necessary for HP-UX systems. If the upgrade is installed, there is no effect on the modem's switch settings. |
|---|---|

**Figure C-1 Configuration Switches on the HP 50759A Modem**

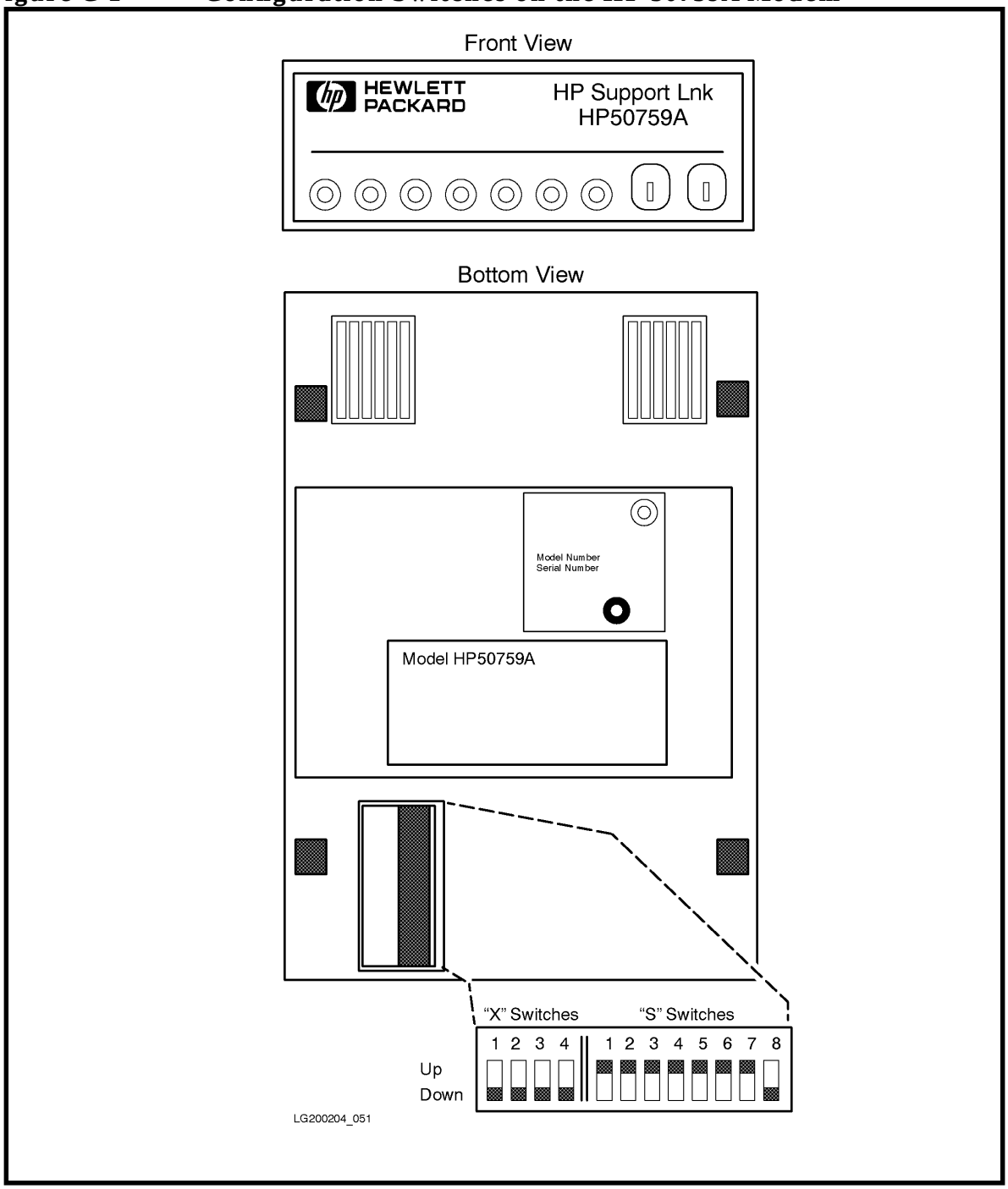


**Table C-4 8-Position DIP Switch Option Settings (Set S)**

| Switch | Position | Description | Option Command |
|---|---|---|---|
| S1 | up | DTR Normal | &D2 |
| S2 | **xx** | Verbose Responses | V1 |
| S3 | up | Suppress Responses | &Q0 |
| S4 | up | Enable Echo of commands | E1 |
| S5 | up | Enable Auto-Answer | S0=1 |
| S6 | up | DCD/DSR Normal | &C1 &S1 |
| S7 | **xx** | Depends on phone line | |
| S8 | down | Enable Command Mode | |

**NOTE** **xx** means "do not care."

**Table C-5 4-Position DIP Switch Option Settings (Set X)**

| Switch | Position | Description | Option Command |
|---|---|---|---|
| X1 | down | CTS Normal | &R0 |
| X2 | down | DSR Follows OH | &S1 |
| X3 | down | Use HP Defaults | &E0 &E3 &E6 &E10 &E14 $BA1 |
| X4 | down | No ENQ/ACK Pacing | &E8 |

An ATl5l7 command (that is, ATL5L7) should have the following output:

```
B0 E1 M1 Q0 V1 X0 &E0 &E3 &E6 &E8 &E10 &E14 &Q0
$MB2400 $SB2400 $BA1 &W1

&A0 $A0 &B0 &BS1 &C1 &D2 $D0 $F1 &G0 &I0 &M0 $MI0 &R0 $R0 &S1 &T5
&V1 &W1

OK
```

## HP 50759B (Support Link)

The HP 50759B modem has one bank of 16 switches (S switches). For both HP-UX and MPE/iX:

```
S2, S3, S4, S7, S8, S9, S12, S16: Down
All others: Up
```

## HP 37212B Modem

Supported modes:

- Bell

- CCITT_OM
- CCITT_AM
- CCITT_BIS_OM
- CCITT_BIS_AM

Supported cables:

- HP 92219Q - Bell, CCITT_OM, CCITT_AM
- A1703-64006 - CCITT_BIS_OM, CCITT_BIS_AM

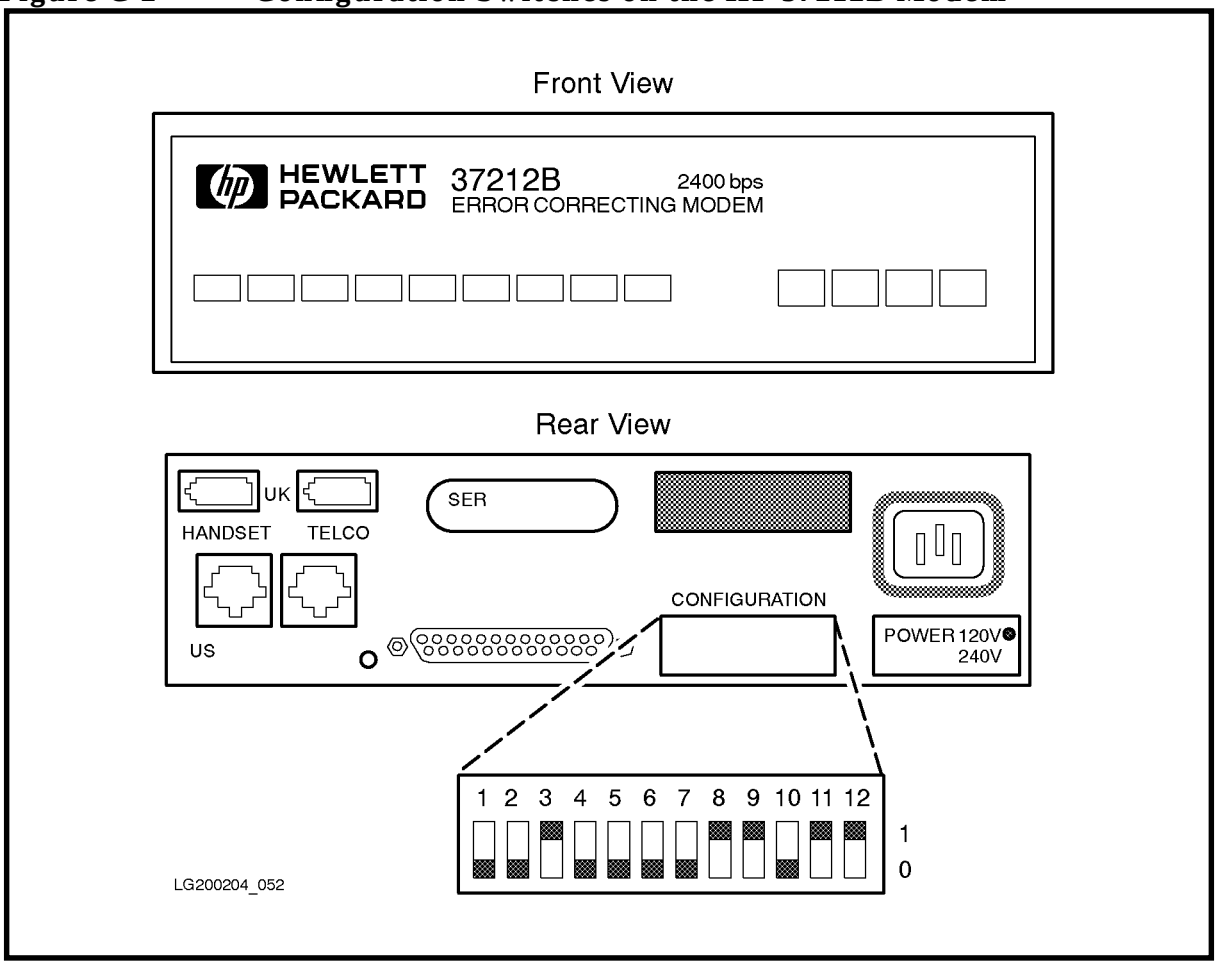
Auto-dial modes: None

It is best to use this modem in CCITT mode because it causes the Access Port to hang up if used in Bell mode at 1200 baud. It can be used in Bell mode at 2400 baud, or either 1200 or 2400 in CCITT mode. This modem can not be dialed with either Hayes or V.25BIS auto-dial protocols.

## Settings

Configuration switches on the HP 37212B are on the rear of the modem. See Figure C-2.

**Figure C-2 Configuration Switches on the HP 37212B Modem**



Configure the modem by setting these switches to either of two positions: UP (1) or DOWN (0).

**Table C-6 Settings for the HP 37212B Configuration Switches**

| Switch | Position | Name |
|---|---|---|
| S1 | down | Computer mode |
| S2 | down | operation (HP |
| S3 | up | command set) |
| S4 | down | Primary channel |
| S5 | down | 1 start, 8 data and 1 stop |
| S6 | down | |
| S7 | down | Error correction disabled |
| S8 | up | No Flow control |
| S9 | up | |
| S10 | down | DSR/CTS/CD to RS-232-C definition |
| S11 | up | |
| S12 | up | DTR behaves to RS-232-C definition |

**NOTE** Although this modem claims to be able to dial using V.25bis, it only uses the V.25bis line discipline. The command set does not match the set specified in the V.25bis specification.

## Hayes Smartmodem 2400

Supported modes:

- Bell
- CCITT_OM
- CCITT_AM

Supported cables:

- Must use 92219Q modem cable.

Auto-dial modes: Hayes.

This modem drives circuit 111 (Pin 23) instead of using it as an input. With either cable (92219Q or A1703-63006) the same line is driven by the Console/LAN card and the modem.

**CAUTION** This modem should not be used because all HP cables connect circuit 111 to the modem. If this modem is connected, circuit 111 will be driven by both the Console/LAN card and the modem. In the past, this modem was used with the CIO-based AP card and encountered the same problem.

Turn off all data compression modes.

### Settings

The Hayes defaults for the modem lines must be changed to the following:

**Table C-7 Switch Option Settings**

| Switch | Position | Description | Option Command |
|---|---|---|---|
| S1 | up | DTR normal | AT&D3&W |
| S2 | xx | | |
| S3 | down | Result codes disabled | ATQ1&W |
| S4 | up | Characters echoed | ATE1&W |
| S5 | up | Auto-Answer enabled | ATS0=1&W |
| S6 | up | Detect Carrier | AT&C1&S1&W |
| S7 | up | RJ-11 | AT&J0&W |
| S9 | down | CCITT | ATB0&W |
| S10 | down | Return to command state | AT&D3&W |

**NOTE** **xx** means "do not care."

## Black Box V.32 Plus (Version 2.01.01)

Supported modes:

- Bell
- CCITT_OM
- CCITT_AM

Supported cables:

- Must use 92219Q modem cable.

Auto-dial modes: Hayes.

This modem does not work with v.22bis because it does not supply 112 and because the sense of 111 is backwards (TRUE means low speed, FALSE means high speed). The problem that 111 is backwards can be remedied by configuring the modem to ignore 111. Change so that DTE Fallback is *Disabled*. This is the factory default. Not supplying 112 means that the Console/LAN card always thinks it is running at the lower speed. If you set the speed for twice the desired speed, then it will work at the desired speed. It is best not to use this modem with any of the CCITT bis protocols.

### Settings

The Black Box defaults for all of the modem lines are incorrect and must be changed before this modem will work properly. To do this from the front panel, go into the Change DTE Parameters and set the following:

Responds to DTR

DSR is Normal

DCD is Normal

CTS follows RTS

This can be done with the following AT command: `AT&D2&S1&C1&R`

For Hayes dialing, make certain that the AT command set is enabled. It is normally good to disable status messages to the host by using the `ATQ1` command.

The current configuration can become the power-on configuration by using the `AT&W` command.

This modem does not do any rate shifting. So the DTE rate and the DCE rate must be the same.

This modem seems to work in AP mode with the protocol set to either Bell or CCITT. It does not work with the modem protocol set to CCITT_BIS. Make certain to configure the modem to ignore 111, or configure the Access Port to set FS low. It also seems to work fine in normal mode (i.e. under host control).

## Multitech MT224EH7

Supported modes:

- Bell
- CCITT_OM
- CCITT_AM
- CCITT_BIS_OM
- CCITT_BIS_AM

Supported cables:

- HP 92219Q - Bell, CCITT_OM, CCITT_AM
- A1703-64006 - CCITT_BIS_OM, CCITT_BIS_AM

Auto-dial modes: Hayes, V.25bis.

**NOTE** The version of the modem has a problem when dialing with V.25bis; if the number that is dialed is busy, DSR does not drop. This same problem causes V.25bis error indications to be improperly decoded, meaning that the modem time-out timer must expire before we know that the attempt failed. This also means that multiple dialing attempt always fails. If the DSR jumper is set so that DSR follows DCD, this problem goes away.

## Settings

The configuration of the hardware switches on the modem are:

8-position DIP-Switch ("S" switches):

```
Switch:   1    2    3    4    5    6     7    8
-----------------------------------------------
         UP   UP  DOWN   UP   UP   UP   DOWN  DOWN
```

4-position DIP-Switch ("X" switches):

```
Switch:   1    2    3    4
--------------------------
        DOWN  UP   UP  DOWN
```

For Hayes mode to work correctly, AT&R0 must be set so that it drops CTS when the connection goes down. For Hayes, AT$V0 must be set. For V.25bis dialing, VT$V1 and AT$BA1 must be set.

Hayes dialing parameters:

```
B0 E1 M1 Q0 R0 V1 X0 &E1 &E4 &E6 &E8 &E10 &E13 &E15
$MB2400 $SB2400 $BA1 &W0

S0   S2   S3   S4   S5   S6   S7   S8   S9   S10  S11  S12  S24  s25  S30

001 043  013 010  008 002 030  020 006  007 070  050 020 000  000

$A0 &A0 &B0 &BS1 &C1 $D0 &D2 #DB0 $EB0 $F1 &G0 #L0 $MI0 &M0
&P0 #P2 &Q0 &Q3 $R0 &R1 &S1 $T1 &T4 $V0 $VD0 &X0 Y0
$MB2400 $SB2400 $BA1 &W0

OK
```

For V.22bis auto-answer, internal jumper DSR must be set so that DSR follows OH. The factory default is for DSR to follow CD. This is different from the Support Link where the factory default was for DSR to follow OH. There does not seem to be an AT command that does this.

V.25bis dialing parameters:

```
B0 E1 M1 Q0 R0 V1 X0 &E1 &E4 &E6 &E8 &E10 &E13 &E15
$MB2400 $SB2400 $BA1 &W0

S0   S2   S3   S4   S5   S6   S7   S8   S9   S10  S11  S12  S24  S25  S30

001  043 013 010  008  002 030 002 006  007 070 050  020 000 000

$A0 &A0 &B0 &BS1 &C1 $D0 &D2 #DB0 $EB0 $F1 &G0 #L0 $MI0 &M0
&P0 #P2 &Q0 &Q3 $R0 &R1 &S1 $T1 &T4 $V1 $VD0 &X0 Y0
$MB2400 $SB2400 $BA1 &W0
VAL
```

To modify a MT224E7B:

- Open modem and change the DSR jumper.
- Set switches on the bottom of the box to above.
- Send AT&R0
- For Hayes dialing, send AT$V0.
- For V.25bis dialing, send AT$V1.

# Modem Cable Pin-out

The following pin-out is for the 92219Q cable, the cable recommended for connecting the remote support modem to the Console/LAN card.

**Table C-8 Pin-out for 92219Q Cable**

| Computer End | Signal | Modem End |
|---|---|---|
| 2 | TD | 3 |
| 3 | RD | 2 |
| 8 | RTS | 4 |
| 22 | CTS | 5 |
| 20 | DSR | 6 |
| 6 | DTR | 20 |
| 9 | RI | 22 |
| 4,5 | DCD | 8 |
| 23 | FS | 23 |
| 7 | GROUND | 7 |

For the A1703-63006 cable, the pinout is the same except that pin 9 on the computer end is routed to pin 12 on the modem end and that line functions as Rate Select (RS). This cable is used with V.22bis/V.25bis applications.

# Console/LAN Card-Modem Line Behavior

## CCITT Mode AP protocol 0

This protocol is known as HP-UX CCITT. The card waits for RI before raising DTR. It also raises RTS when it raises DTR. If DSR does not come up within 25 seconds, DTR goes back down. The connection also depends on CTS and DCD. DCD can drop for up to 400ms before the connection will drop. CTS must stay high always. Once CTS drops, the connection starts to drop. A new connection cannot occur until DSR, DCD and CTS all drop. FS can be programmed to either state via the CA command.

## Bell Mode AP protocol 1

This is sometimes called Bell simple protocol. It raises DTR when it can accept a connection. The connection is valid when it sees DCD. It drives RTS whatever it was when Remote is enabled (usually, RTS is low) and does not look at DSR or CTS. When a disconnect is done, DCD must drop before a new connection can be made (i.e. it will not raise DTR until DCD drops).

## CCITT_BIS Mode AP protocol 2

This protocol is CCITT V.22bis. It requires the special cable A1703-63006 which is just like the 92219Q cable with the exception that pin 9 on the computer end is routed to pin 12 (RS) rather than pin 22 (RI). DTR is raised whenever a connection is allowed. RTS follows DSR. A connection is established when DSR is high. CTS can drop for an indefinite amount of time without dropping the connection. The card will not send data to the modem when CTS is low. DCD can drop for up to 400ms before the connection is dropped. Once the connection is dropped, DSR, DCD and CTS must all go low before a new connection can be made. RS controls what speed the card sends to the modem. If RS is high, the programmed baud rate is used. If RS is low, half of the programmed baud rate is used. If you use the 92219Q cable, the baud rate will most certainly be half the programmed baud rate, since RI will almost always be down. FS can be programmed to either state via the CA command.

# D Power Resiliency

# Introduction

This section contains information about the power resiliency option of the T600 System.

# Power System

This section describes how to verify the installation of the power resiliency system.

## Verifying Installation of Power Modules

Power modules have been pre-installed at the factory.

To verify the installation of power modules for T600 System, refer to the following table and see Figure D-2 and Figure D-3.

**Table D-1 3.3V 130A Power Supply Configuration**

| Processor Card Slot # | 15 | | 14 | | 13 | | 11 | | 10 | | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # of Processors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Power Modules Required | 2 | | 3 | | | | 5 | | | 6 | | |
| 3.3V Power Module Slot #[a] | P10, P9 | | P8 | | | | P11, P1 | | | P2 | | |
| PFCs[b] | middle<br>bottom | | top<br>middle<br>bottom | | | | | | | | | |

a. Refer to Figure D-2 and Figure D-3.
b. Refer to Figure D-1.

The system should have two PFCs for systems with two or fewer processors and three PFCs for systems with more than two processors.

**Figure D-1 PFC Module Locations**

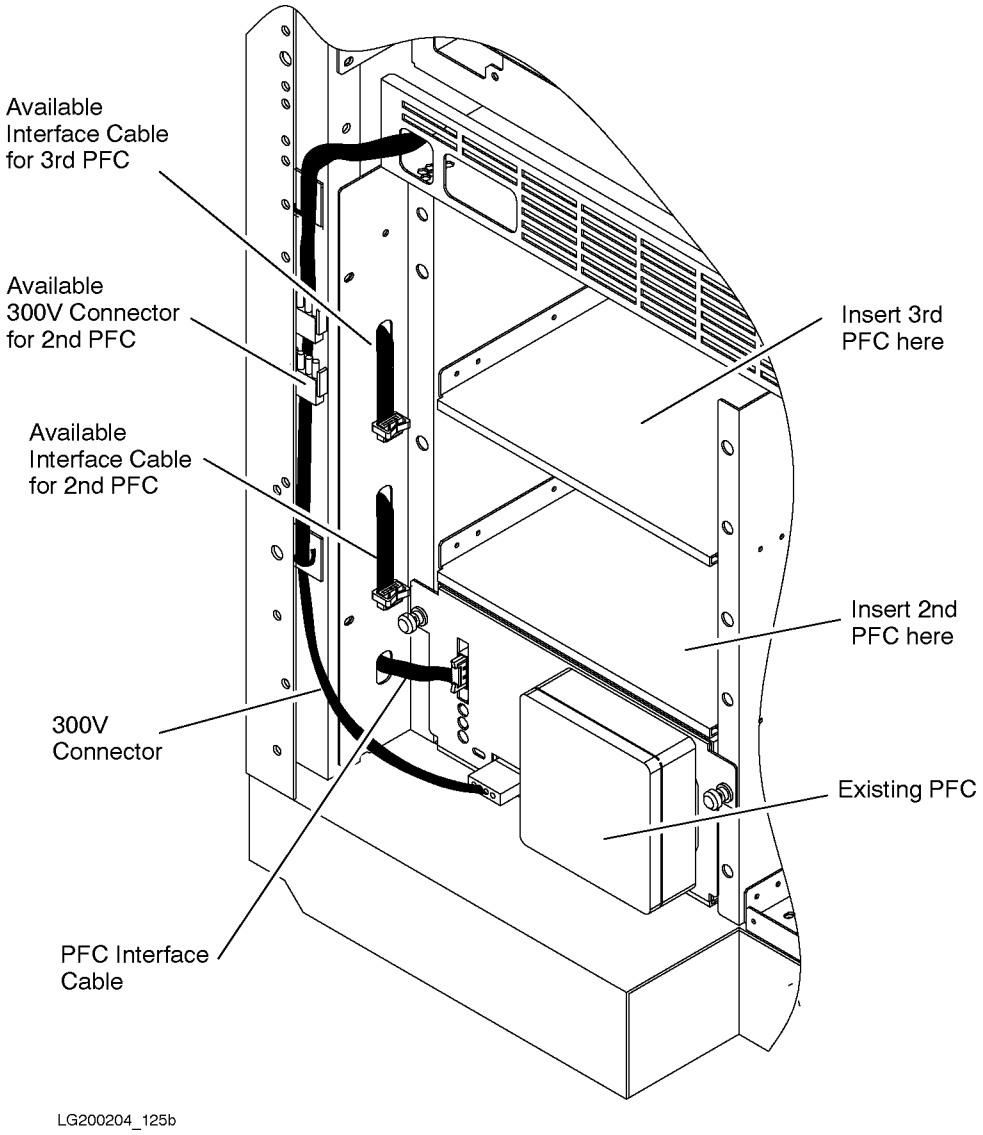


**Figure D-2 Power Modules and PMB Cards in the Front Card Cage—T600**

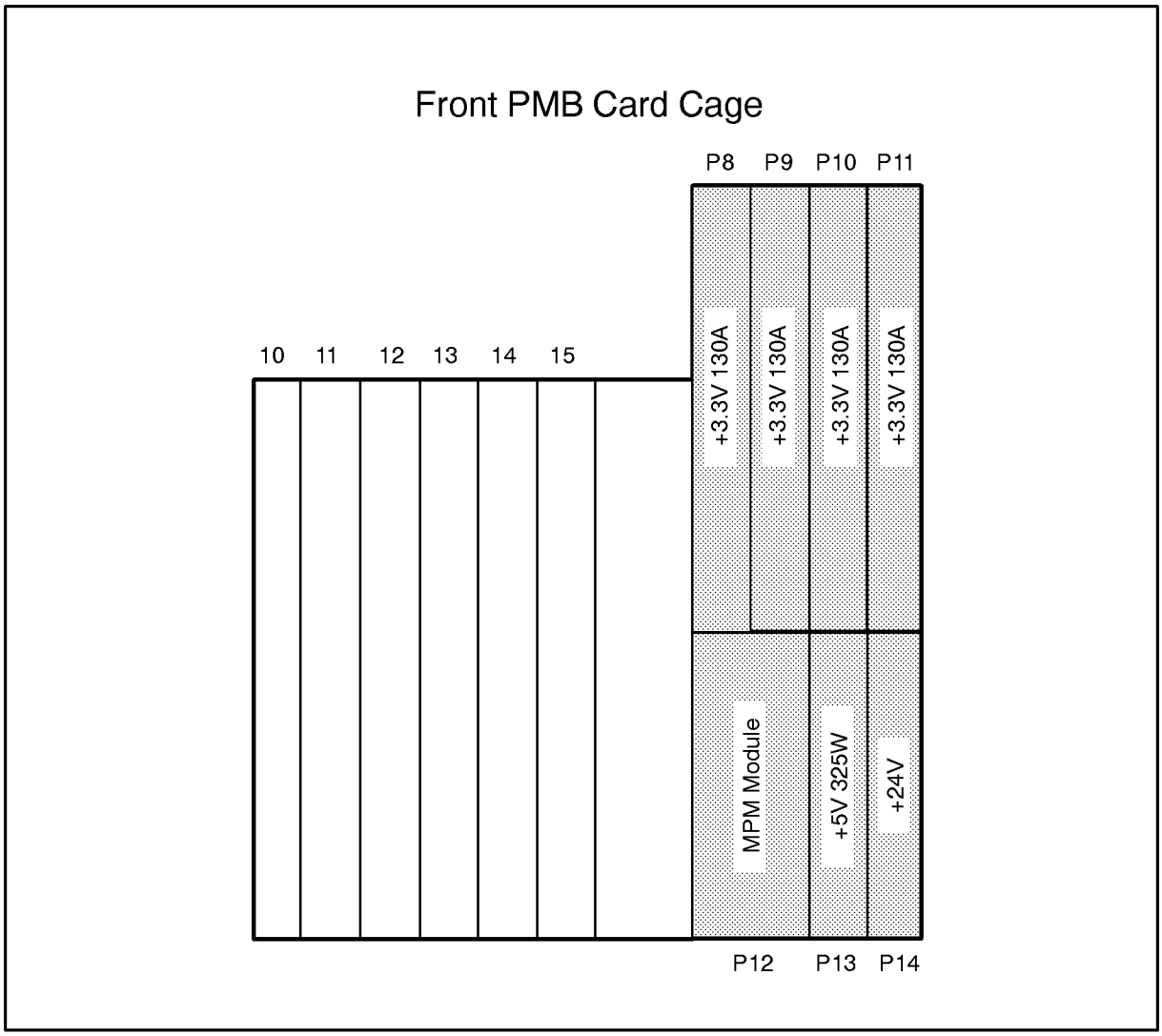



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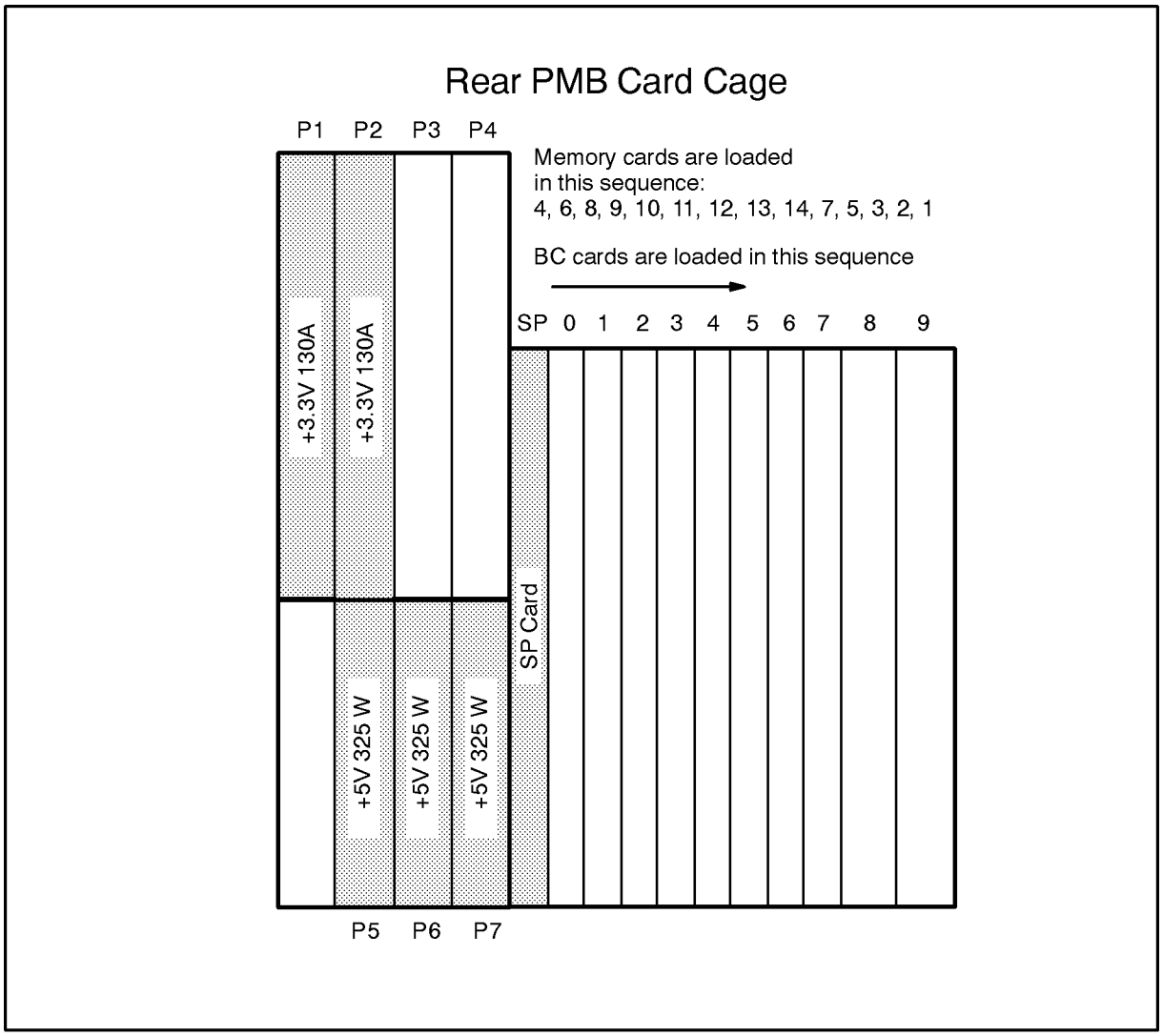
**Figure D-3 Power Modules and PMB Cards in the Rear Card Cage—T600**

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