HP 3000/925 and HP 9000/825/835 Computer Systems

CE Handbook

HEWLETT PACKARD

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FOR USA ONLY

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List of Effective Pages

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Effective Page	Date
All	May 1988

Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

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 hazardous voltages.

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

WARNING

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

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Preface

The Customer Engineer (CE) Handbook is a reference guide for the CE. It provides specifications, procedures, replaceable parts lists and troubleshooting information.

Reference Documents

Use the following documents to find out more about the HP 3000/925 and the HP 9000/825/835:

Reference Documents

Document	HP Part Number
Hardware Support Manual	P/N A1002-90030
Site Preparation and Requirements Guide	P/N A1002-90040
825/835 Installation and Configuration Guide	P/N A1002-90000
925 Installation and Configuration Guide	P/N A1007-90000
Online Diagnostics Subsystem Utilities Manual	P/N 09740-90021
Online Diagnostics Subsystem Vol I. SPU and I/O	P/N 09740-90028
Online Diagnostics Subsystem Vol II. Peripherals	P/N 09740-90031
Offline Diagnostics System Manual	P/N 30190-90010
System Support Log	P/N 09740-90013
Support Tape User's Guide	P/N 92453-90010
CIO Expander Module Add-on Installation Manual	P/N A1002-90750
Battery Back-up Unit Add-on Installation Manual	P/N A1002-90760
Model 925LX to Model 925 Upgrade Manual	P/N A1016-9000
Model 825 to Model 835 Upgrade Manual	P/N A1036-9000
Model 825/835 to Model 835SE Upgrade Manual	P/N A1039-9000
Series 800 System Administrator's Manual (HP-UX)	P/N 92453-90004
HP Precision Architecture and Instruction Reference Manual	P/N 09740-90014
HP Precision Architecture Procedure Calling Conventions Reference Manual	P/N 09740-90015

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Tables

Tables (Continued)

Tables (Continued)

Figures

Figures (Continued)

1

Product Information

General Description

This CE Handbook covers the HP 3000/925 and the HP 9000/825/835 mid-range computer systems. These computers use HP Precision Architecture (HP-PA) and employ NMOS III technology.

Product Models

The 9000/825/835 and 3000/925 have basically the same SPU. Physical specifications, functional description, and troubleshooting are very similar for all models. There are differences, however, in configuration, operating system, and application. See Table 1–1, Table 1–2, and Table 1–3 for descriptions of the different models.

Note Model code names are listed here for reference only. HP discourages the use of code names after product release.

Model 825 (HP-UX)

Table 1–1. Model 825 Systems Running HP-UX

Model	Code Name	Description
825S	Firefox	Multi-user system running HP-UX. CIO Expander and Battery Back-up Unit (BBU) are optional.
825CH	Firefox with Bobcat	2-D graphics workstation running HP-UX. Includes color monitor, graphics adaptor, and graphics interface card (installed in the SPU).
825SRX	Firefox with Renaissance	3-D graphics workstation running HP-UX. Includes color monitor, graphics adaptor, and graphics interface card (installed in the SPU).

Model 835 (HP-UX)

Table 1-2. Model 835 Systems Running HP-UX

Model	Code Name	Description
835S	Top Gun	Multi-user system running HP-UX. This is an enhanced version of Firefox, with the two processor cards replaced by newly designed ones.
835SE	High-end Top Gun	Multi-user system running HP-UX. The 835SE is similar to the 835S, but supports up to 64 users (instead of 16). It includes a CIO Expander, BBU and 16 MB.
835CHX	Top Gun with Bobcat	2-D graphics workstation running HP-UX. Similar to 825CH.
835SRX	Top Gun with Renaissance	3-D graphics workstation running HP-UX. Similar to 825SRX.

Model 925 (MPE XL)

Table 1-3. Model 925 Systems Running MPE XL

Model	Code Name	Description
925	Commercial Firefox	Multi-user system running MPE XL. The 925 can be installed with the small Raven cabinet (92211R) or with the large cabinet (A1001A) which has the code name of Noah's Ark. BBU is standard with the 925, and CIO Expander is optional. In addition, the large cabinet can contain up to three 7936/37 (Eagle) disc drives, a 7979/80 (Gnu) tape drive, and a 2345 DTC (Avesta).
925LX	Low-end Commercial Firefox	Similar to the 925. comes with less memory, supports only 32 users and does not support a CIO Expander.

Differences Between Models 825 and 835

The differences between the 825 and 835 are listed in Table 1–4.

Table 1–4. Differences Between the Model 825 and Model 835

Model 825	Model 835
Main CPU card	Processor card
System card	PDH card (PDH = Processor Dependent Hardware)
1 Channel Adapter (CA) chip on System card	Model 835SE has 2 Channel Adapter chips on PDH card (835S still only has 1 CA on PDH card)
CIO Expander has path of 8.x.x, 16.x.x, etc. depending on location of CA card	With 835SE, CIO Expander has path of 36.x.x (because second CA is considered to be in Slot 9).
Max. of 14 CIO cards	835SE has a max. of 15 CIO cards (because there is no CA card which takes up a CIO and Mid-bus slot)
16 Kbyte cache	128 Kbyte cache
2 Kbyte Translation Lookaside Buffer (TLB)	4 Kbyte TLB
MIU (Math Interface Unit) chip for floating point	Floating Point Controller (FPC) chip
25 MHz clock frequency	30 MHz clock frequency
25/3 (= 8.333) MHz Mid-bus	30/3 (= 10) MHz Mid-bus

Differences Between Models 925 and 925LX

The Model 925 comes in two versions: the Model 925 and the Model 925LX. In this manual, "Model 925" refers to both versions, unless otherwise noted. Table 1–5 lists the differences between the two systems:

Table 1–5. Differences Between the Model 925 and Model 925LX

Model 925	Model 925LX
32 - 48 MB of memory supported	24 - 48 MB of memory supported
CIO Expander supported	No CIO Expander supported
Up to 152 connected workstations	Up to 32 connected workstations
6 DTCs supported	1 DTC supported
4-16 disc drives supported	4-8 disc drives supported

SPU Specifications

Model 825/925 SPU Specifications

The SPU specifications for the 825/925 are listed in Table 1–6.

Table 1–6. SPU Specifications

Description	Specification
Word Length	32 bits
Virtual Memory Addressing	48 bits
Physical Addressing	29 bits
Cache Size	16K byte (825/925), 128K byte (835)
Translation Lookaside Buffer (TLB)	2K byte (825/925), 4K byte (835)
HP PA MIPS	3.8 to 5.6 (825/925), N.A. (835)

The System card in the SPU contains three VLSI floating point processors to perform floating point ADD/SUBTRACT, MULTIPLY, and DIVIDE operations.

I/O is performed by using the Channel I/O (CIO). The SPU provides a maximum of seven internal CIO slots. It also supports additional I/O via the CIO Expander which contains eight CIO slots and one Buffer Card (BC).

Figure 1–1 shows the system block diagram for the 825 and 925. Figure 1–2 shows the system block diagram for the Model 835.

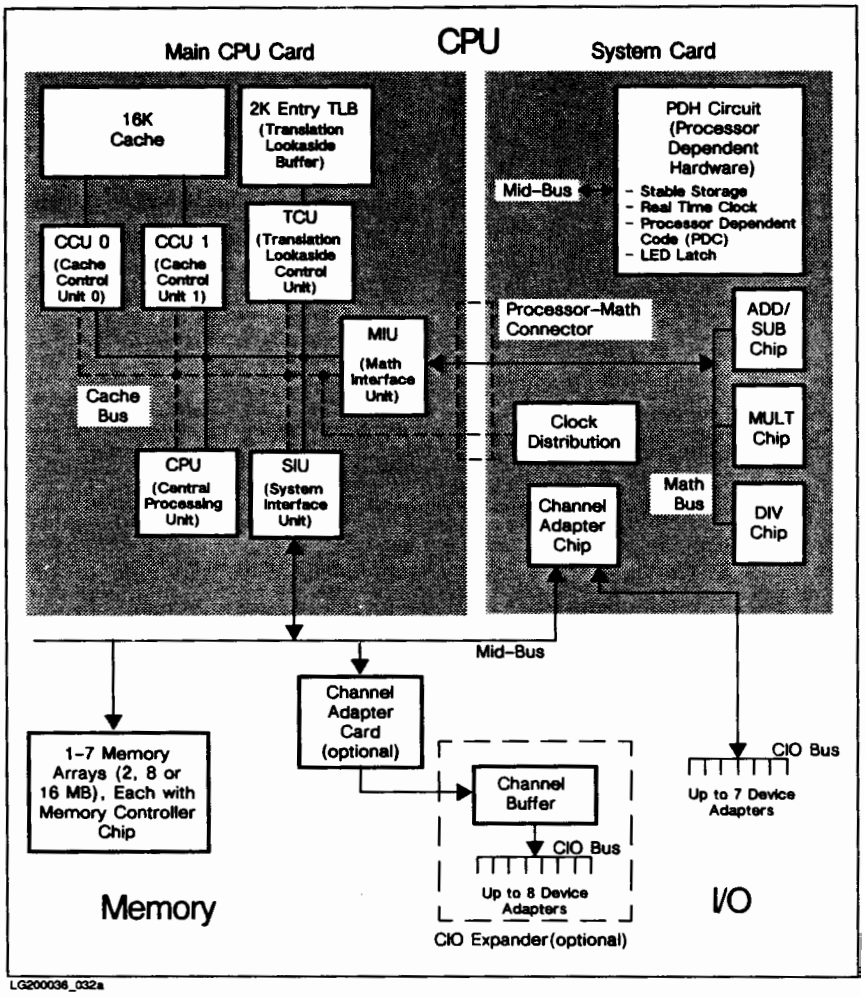

Figure 1–1. 825 and 925 System Block Diagram

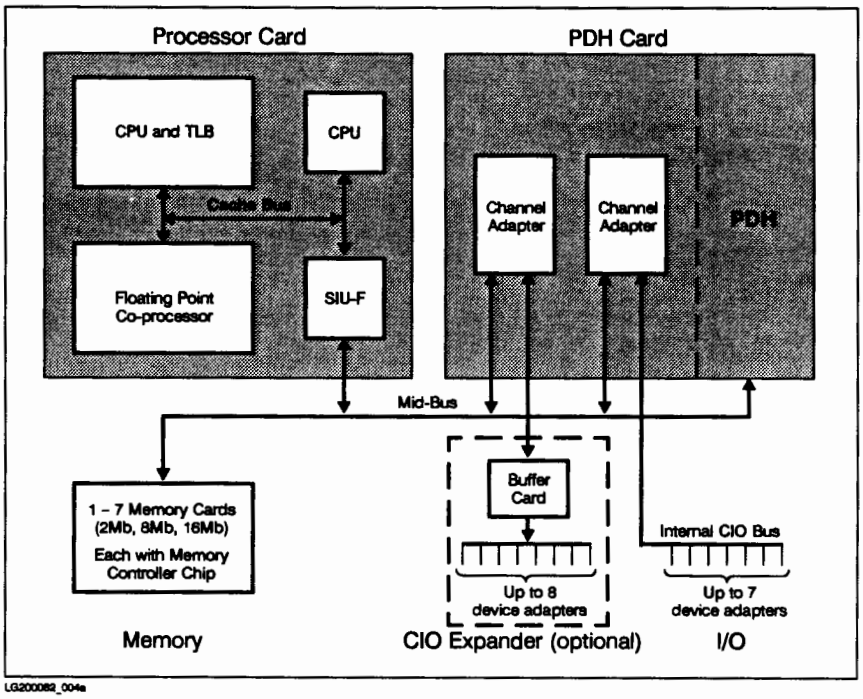

Figure 1-2. 835 System Block Diagram

SPU Orientation

Figure 1–3 through Figure 1–5 show the different models of the SPU, and how they connect to the BBU and the CIO Expander.

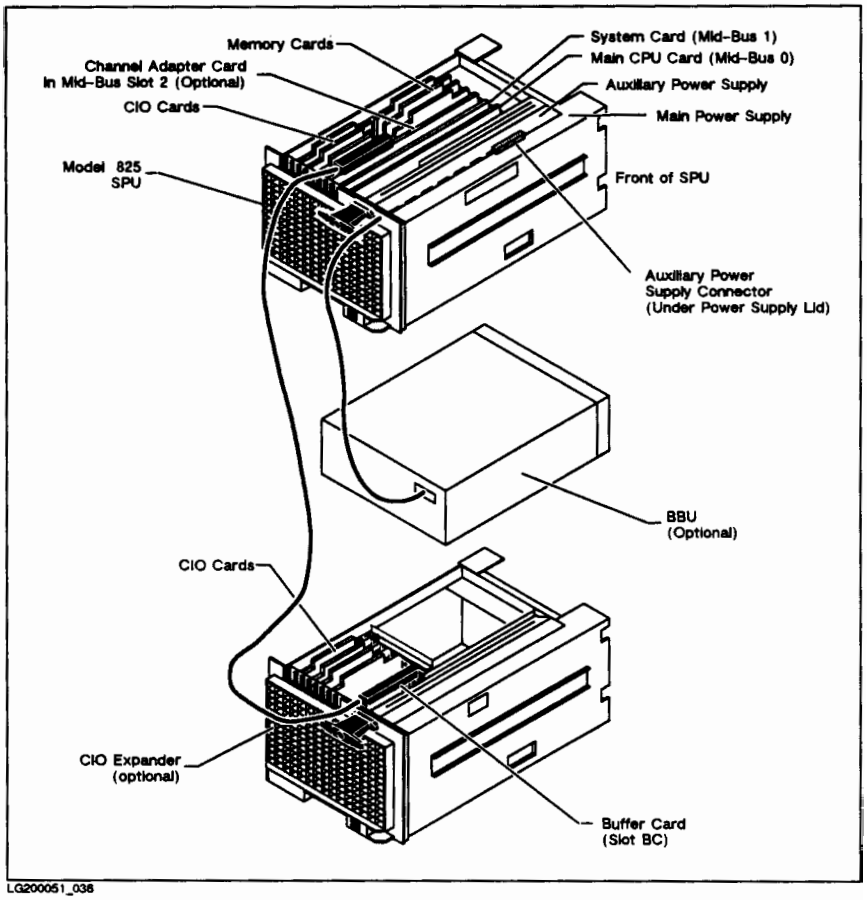

Figure 1–3. Model 825 Orientation

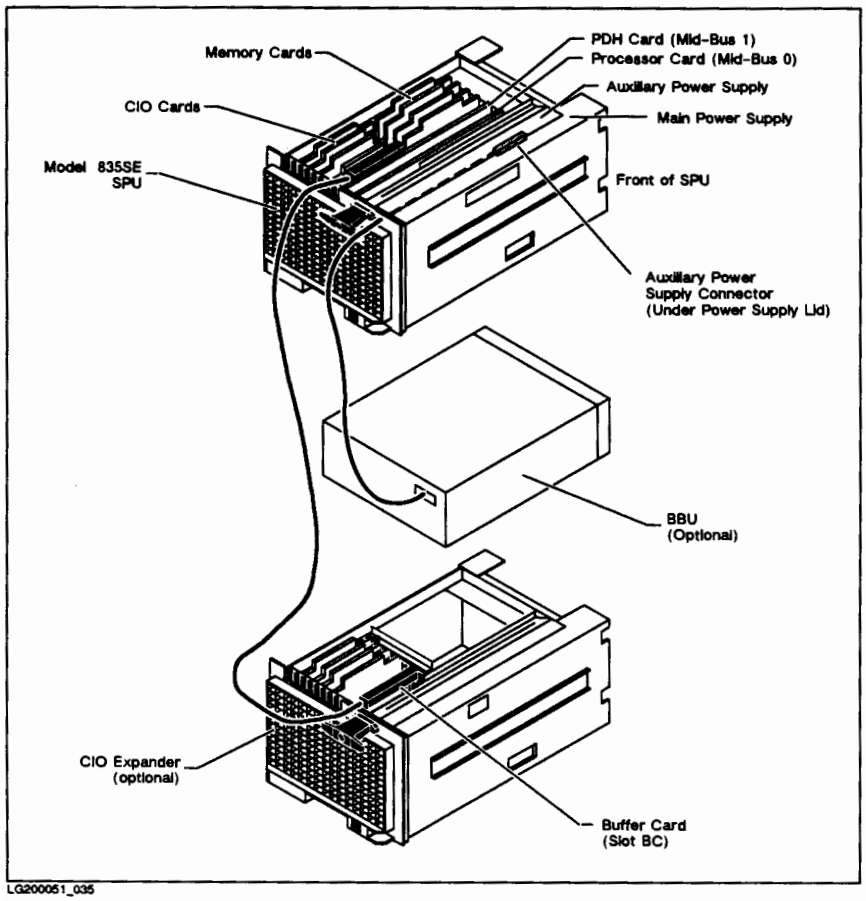

Figure 1–4. Model 835SE Orientation

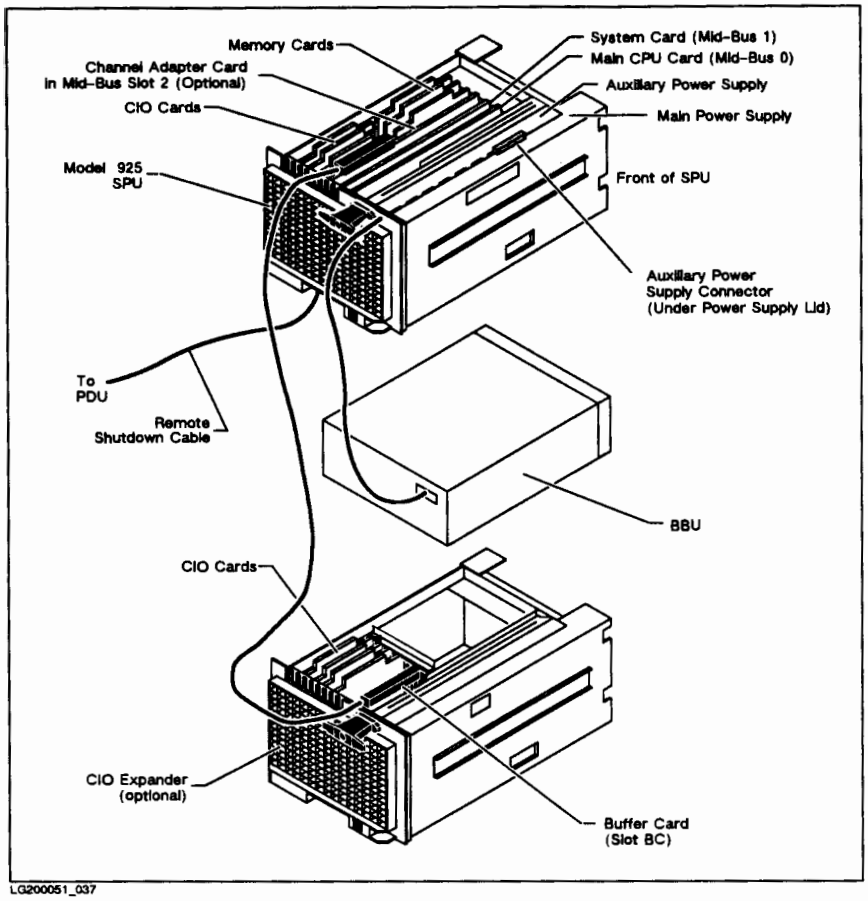

Figure 1-5. Model 925 Orientation

System Status Display Panel

When the front panel of the SPU is closed, only the power ON/OFF switch, FAULT and RUN LEDs are visible. When the front panel of the SPU is open, the remainder of the LEDs, clock battery tray, and key switch are visible as shown in Figure 1–6.

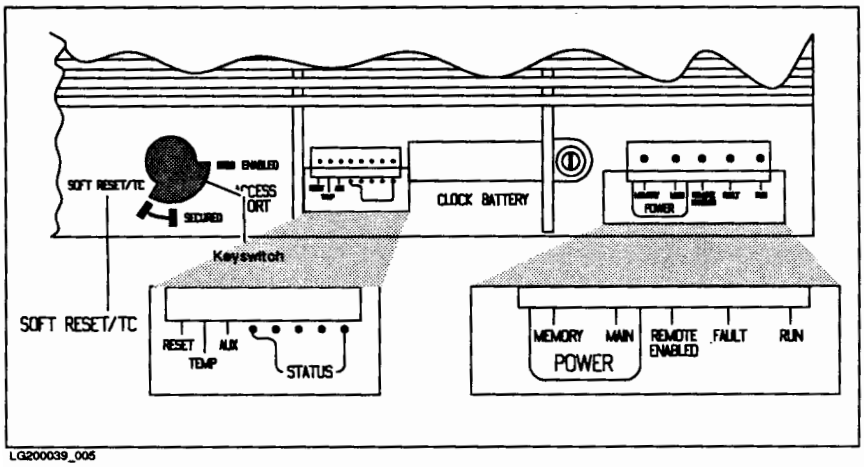

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Figure 1–6. Status Panel

The two green and one yellow LEDs, next to the FAULT and RUN LEDs, are labeled MEMORY power, MAIN power, and REMOTE ENABLED respectively. To the left of the five large LEDs are eight small red LEDs. From left to right the first three are labeled RESET, TEMP, and AUX. The remaining five are status indicators and are explained in detail in chapter 8 of the *Hardware Support Manual* (p/n A1002-90030).

2

Environment, Installation, Preventive Maintenance

HP 3000/925 and HP 9000/825/835 SPU Specifications

Physical Specifications

Table 2-1. Physical Specifications

Description	Specification
height:	23.4 cm (9.2 in.)
width:	32.5 cm (12.8 in.)
depth:	53.0 cm (20.9 in.)
weight:	23 kg max (51 lbs.)

Electrical Specifications

Table 2-2. Electrical Specifications

Description	Specification
Nominal AC line input	100, 120, or 240V AC (single phase)
Input frequency	50 to 60Hz (-4% to +10%, 48 to 66Hz)
Max steady state current	9.5A @ 100V, 8.0A @ 120V, 5.3A @ 240V
Surge current	70A (max)
Power dissipation	600W (max)
Worse case power factor	0.55
Max heat dissipation	2052 BTU/hr (max)
Min. battery backup time	15 minutes (30 minutes with option A1014A)
Power fail carry through	one cycle (min.)
Power line transients	1000V, 1.0 nsec rise time, 800 nsec duration, peak of twice nominal line voltage, 500 nsec rise time, 10 usec duration

Environmental Specifications

Table 2-3. Environmental Specifications

Description	Specification
Operating temperature	0 to 55 degrees C (32 to 131 degrees F)
Recommended operating temperature	20 to 30 degrees C (68 to 86 degrees F)
Storage temperature	-40 to 70 degrees C (-40 to 158 degrees F)
Operating temp rate of change	0.3 degrees C/min. (20 degrees C/hr.)
Operating humidity	5 to 95% RH @ 40 degrees C
Non-operating humidity	95% RH @ 40 degrees C
Humidity condensation recovery	15 minutes (max)
Altitude, operating	15,000 ft. temp derated -1.1 deg. C above 75000 ft. ambient temperature)
Altitude, non-operating	50,000 ft.
ESD immunity	0 to 15KV, no effect 15 to 25KV, no hardware failures
Magnetic emissions: operating non-operating	 1 gauss p-p 5.25 milligauss at 4.6 meters
Magnetic field immunity	4 gauss p-p, 48Hz to 198Hz
Electric field immunity radiated: 14Khz to 1 GHz	 5V/m
Electric field immunity conducted: 50Hz to 400 Mhz	 1V/m
Safety	UL listed, CSA certified, compliant to IEC 380, 435
Electromagnetic interference	Complies with FCC part 15J rules for Class A computing device. FTZ 1046/1984 verified. VCCI class 1 registered. SABS certified.

Table 2-3 (cont'd). Environmental Specifications

Description	Specification
Acoustics	50 dbA when ambient temperatures are < or equal to 30 degrees C
Vibration:	
Operational (random):	
5 to 35 Hz	0.0001 g(squared) /Hz
350-500Hz	-6 db/octave
500Hz	0.000005 g(squared) /Hz
Non-operational (survival, since):	0.5g p-p, 5 to 500 Hz

DC Power Specifications

Table 2-4. DC Power Specifications

Nom. Volts	Min. Amps	Max Amps	Min. Volts	Max Volts	P-P Ripple
+5V	2.7A	75.0A	4.90V	5.25V	100 mV
+5VS	0A	14.75A	4.09V	5.25V	100 mV
+12V	0A	4.5A	11.6V	12.6V	100 mV
-12V	0A	2.0A	-12.6V	-11.6V	100 mV
+2.85V	0A	5.0A	2.70V	3.0V	20 mV
-2V	0A	15A	-2.2V	-1.9V	20 mV

Installation

This section provides brief outlines of system installation procedures. For the most current and complete information refer to the Installation and Configuration Guides (p/n A1007-90000 for the 925 and A1002-90000 for the 825/835).

Model 825/835 Hardware Installation

The 825/835 is designed for a quick and straightforward installation. Most of the cards required for the 825/835 are installed in the SPU at the factory.

The exact procedure you follow for an installation depends on the system ordered by the customer:

- Multi-user system (such as 825S/835S) or graphics workstation (such as the 825SRX/835SRX)
- CIO Expander and BBU options included or not
- Additional CIO cards (like AP, MUX, and HP-IB cards)
- Rack-mount cabinet or freestanding units

The steps involved in an installation are as follows:

1. Install the CIO cards and cabling in the SPU. This includes MUX, HP-IB and optional AP cards.
2. If a CIO Expander is included, install the Buffer card and CIO cards in it. Attach a cable from the Buffer card to the Channel Adapter card in the SPU card cage.
3. If the system includes a BBU, connect it to the SPU.
4. If the system is a graphics system, install the Graphics Display Station (Adaptor) and color monitor.
5. If the system includes a rack-mount cabinet, mount the SPU, CIO Expander and BBU in it.
6. If the system includes an RS-232C Junction Panel, install it.
7. Install the system console.
8. Install peripherals.
9. Install HP-UX operating system

Model 925 Cabinet Configurations

The 925 is sold in several different cabinet configurations, as shown in Figure 2–1.

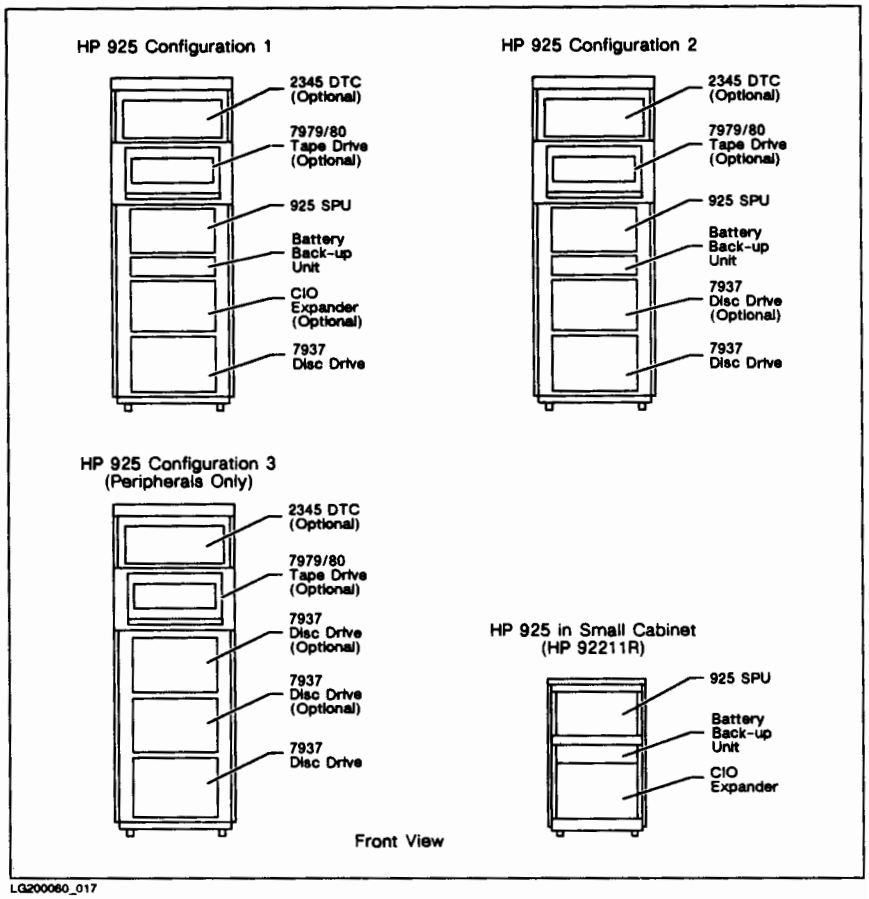

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Figure 2–1. Model 925 Configurations

Configurations 1 to 3 are housed in the large cabinet. Each configuration has a different set of peripherals packaged with the system. Some of the peripherals are optional (for example, the 7979/80 tape drive). Other peripherals are standard (for example, the first 7937 disc drive at the bottom is required for stability).

A 925 system can also be housed in a small cabinet or with no cabinet at all.

Model 925 Large Cabinet (HP A1001A) Installation

The 925 can be packaged in a large rack-mount cabinet, together with several peripherals. Figure 2-2 shows one possible configuration.

Several peripherals can be housed in the large cabinet:

- 7937 disc drives (up to 3 per cabinet)
- 7979/80 tape drive (1 per cabinet)
- 2345 Distributed Terminal Controller (1 per cabinet)

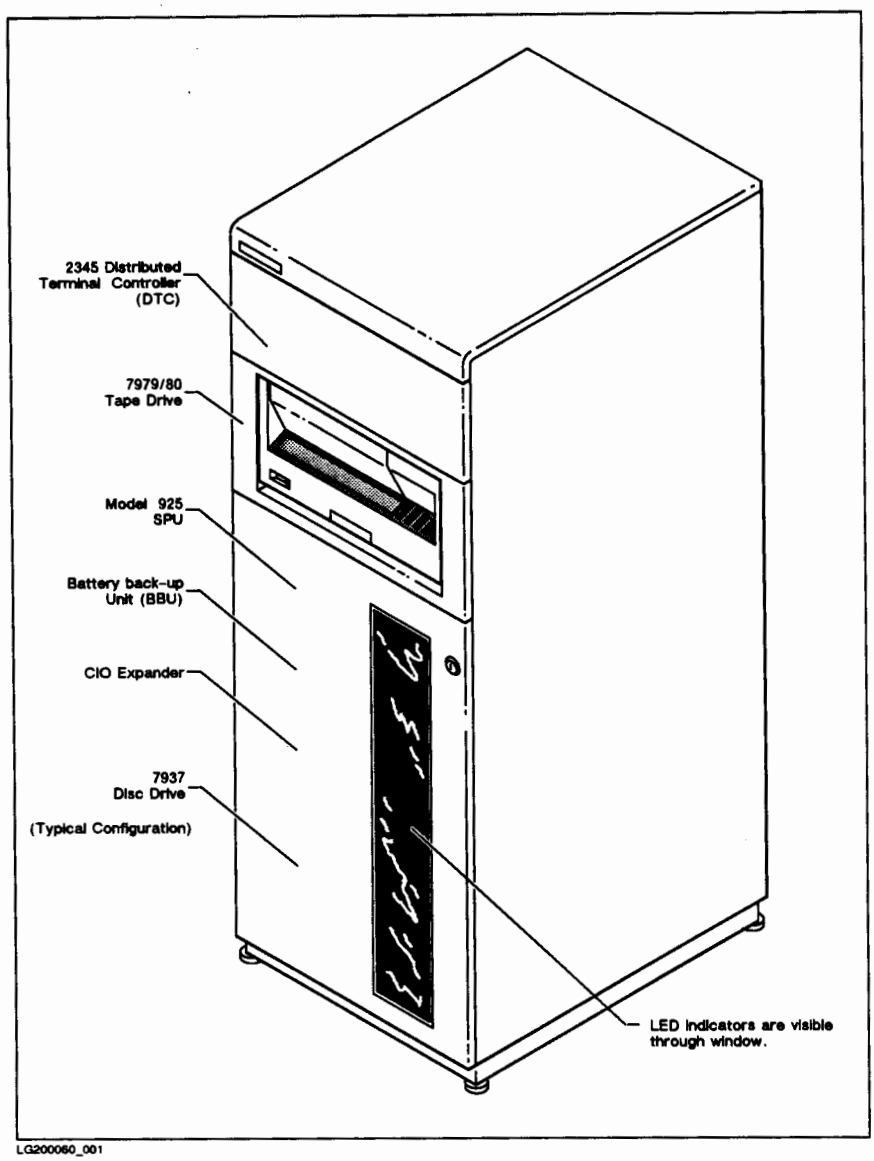

Figure 2-2. Model 925 System in a Large Cabinet

Model 925 Large Cabinet Installation

Installing a 925 system in a large cabinet is not easy. (The installation goes more easily with two people.) Up to five different units can go into a cabinet, and each unit is installed in a different way. In addition, the 7979/80 tape drive and 7937 disc drive are too heavy for one person to lift. Installing a 925 system in a large cabinet requires the special installation hoist (PN 07937-60141-1). Chapter numbers refer to the *HP 3000/925 Installation and Configuration Guide.*

Here is a brief overview of the steps to install a 925 system in a large cabinet:

1. **Plan the placement** of the CIO cards and gather the tools needed. (Covered in Chapter 1.)
2. **Unpack and inspect** all units, except cabinet. (Covered in Chapter 2.) Also, make sure the voltage on each is set for 120 VAC (N. America) or 220/240 VAC (Europe).
3. **Unpack the cabinet.** (Covered in Chapter 4.)
4. **Move the cabinet into place.** (Covered in Chapter 5.) Attach anti-tip feet.
5. **Prepare the cabinet.** (Covered in Chapter 5.) Remove the top and side panels from the cabinet. Remove the front door. Attach sheet metal screws to columns of cabinet.
6. **Install the units** starting at the bottom of the cabinet and going upwards. (Covered in Chapter 5.) The units you install depend on the configuration of the system (see Figure 2–1 for the three possible configurations of the 925). In general, you install the units in the following order:

   a. 7937 disc drive
   b. CIO Expander (optional) or second 7937 disc drive (optional)
   c. BBU or third 7937 disc drive (optional)
   d. SPU or vacant
   e. 7979/80 tape drive (optional)
   f. 2345 DTC (optional)

   There is a different installation procedure for each unit. In general: Install rails or shelf to support unit in cabinet. Attach any slides to unit. Slide unit into position. (There is a special procedure to make the SPU and CIO Expander lighter if only one person is doing the install.)
7. **Install cables and CIO cards.** (Covered in Chapter 5.) Install CIO cards and cables in the SPU and CIO Expander. Connect the cable to the BC card in the CIO Expander (if included in system). Connect the BBU cable to the BBU. Connect cables for disc drive and tape drives in large cabinet. Connect the SPU to the DTC via LAN cabling and a thin MAU (or use a Backbone LAN configuration). Connect the cables for terminals. Connect the cables to the RS-232C Junction Panel. Attach the RS-232C Junction panel to cabinet. Connect convenience cordsets for units in cabinet. Connect Remote Shutdown cable between the PDU and the SPU. See Figure 2–3 for typical cable connections on Configuration 1.
8. **Install Power Cable and other devices.** (Covered in Chapter 5.) Connect a system console. Install any other peripheral devices. Install a Remote Support Modem (if included in system). Connect the supplementary ground and power cable.
9. **Close up the cabinet.** (Covered in Chapter 5.) Attach front door. Attach top and side panels. Close rear door. Attach system label.

10. **Power up.** (Covered in Chapter 5.) Make sure that the cabinet is plugged in. Power up the system.

11. **Install the MPE XL operating system.** (Covered in Chapter 6.) Install the System Load Tape (SLT). Start the system. Run SYSGEN. If required, modify CONFG925 group and restart system. Run VOLUTIL. Run AUTOINST. Configure the Access Port. Test powerfail recovery.

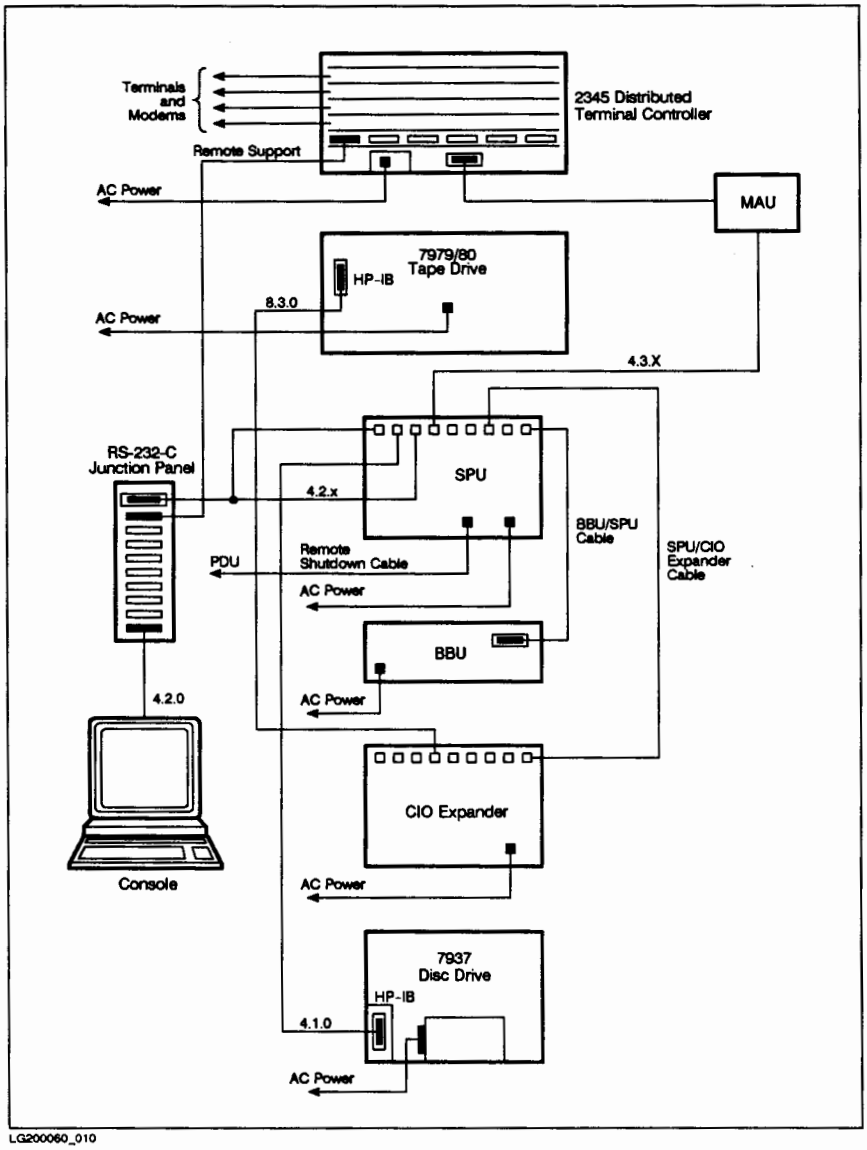

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Figure 2-3. Typical Cable Connections for Configuration 1 (Sample)

Model 925 Small Cabinet (HP 92211R) Installation

Figure 2–4 shows a 925 system in a small rack-mount cabinet (HP 92211R). The figure shows the SPU, the CIO Expander (optional) and the BBU.

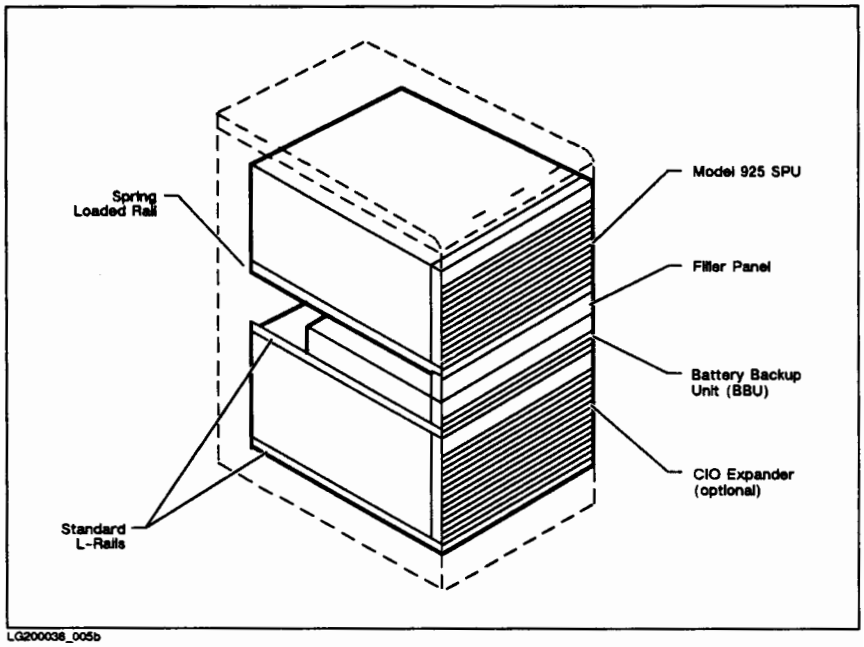


Figure 2–4. Model 925 System in a Small Cabinet

Model 925 Small Cabinet or No Cabinet Installation

Here is a brief overview of the steps involved in installing a 925 system in a small cabinet or with no cabinet. (Chapter numbers refer to the *HP 3000/925 Installation and Configuration Guide*).

1. **Plan the placement** of the CIO cards and gather the tools needed. (Covered in Chapter 1.)
2. **Unpack and inspect** all units. (Covered in Chapter 2.) Also check the settings of the voltage select switches. If you are installing a 925 with no cabinet, skip to Step 4.
3. **Prepare the cabinet.** (Covered in Chapter 3.) Remove the top, front and side panels from the cabinet. Attach rails to the cabinet.
4. **Install CIO cards and cables.** (Covered in Chapter 3.) Install CIO cards and cables in the SPU and CIO Expander.
5. **Install the units** in the cabinet. Insert the SPU, the BBU and the CIO Expander into the cabinet. (There is a special procedure to make the units lighter if only one person is doing the install.)
6. **Connect cables.** (Covered in Chapter 3.) Connect the CIO Expander cable to the BC card in the CIO Expander (if included in system). Connect the BBU cable to the BBU. Connect a power cord to each unit. Connect cables to the RS-232C Junction Panel.
7. **Close cabinet.** (Covered in Chapter 3.) Attach side and rear panels. Install module locks and filler panel(s). Attach the front panel locking frame. Attach the top panel.
8. **Install other devices.** (Covered in Chapter 3.) Connect a system console. Install any peripheral devices. Install a Remote Support Modem (if included in system).
9. **Power up.** (Covered in Chapter 3.) Connect power cords to AC power. Power up the system.
10. **Install the MPE XL operating system.** (Covered in Chapter 6.) Install the System Load Tape (SLT). Start the system. Run SYSGEN. If required, modify CONFG925 group and restart system. Run VOLUTIL. Run AUTOINST. Configure the Access Port. Test powerfail recovery.

Preventive Maintenance

There is no preventive maintenance necessary on HP Models 825 or 925 for the SPU, Expander, or BBU.

3

Configuration

This section provides figures, tables, and information about configuring standard HP 9000/825/835 and HP 9000/925 computer systems.

825/835 Hardware Configuration

825/835 Minimum Hardware

The minimum hardware configuration required for an HP 9000/825S/835S/835SE computer is listed in Table 3–1. Part numbers listed are for new parts.

Table 3-1. Model 825S/835S/835SE Minimum Hardware Configuration

Description	HP Part #
Main CPU Card (825)	09850-66510
System Card (825)	09850-66511
Processor Card (835)	09850-66515
PDH Card (1 CA) (835) or	09850-66516
PDH Card (2 CA) (835SE)	09850-66519
8 Mbyte Memory card	09850-66521
Main Power Supply card	0950-1899
Auxiliary Power Supply card (non-BBU ver.)	09850-66585
Auxiliary Power Supply card (BBU ver.)	09850-66587
HP-IB Card (27110 technical version)	27110-60301
MUX Card	27140-66001

825/835 Graphics Workstation Minimum Hardware Configuration

The minimum configuration for the Model 825/835 Graphics Workstation (CH/CHX and SRX) consists of the same items as the Model 825S/835S, except for the 6-channel MUX card. In addition, the following items are also included:

Table 3-2. Model 825/835 Graphics Workstation Minimum Hardware Configuration

Description	HP Product #
HP-HIL extension module	HP 46081A
3-D graphics subsystem (SRX) with Starbase and X-windows	HP 98721A
2-D graphics subsystem (CH/CHX)	HP 98550A
19 inch color monitor	HP 98784A
keyboard	HP 46021A
ID module	HP 46084A
Graphics Interface	HP A1017A
(opt. 721, 722, 723) Display Controller	HP 98720A
Mouse	HP 46060A
Supports ARPA/BSD Software Package (HP-UX version 6.2)	HP 98594A, HP 98594L (Licensed)
Supports LAN 9000/Link	HP 91786A

825/835 Minimum Peripherals

The minimum peripheral hardware needed to support the 825/835 SPU is listed in Table 3-3. Any of the devices listed under "model" can function as the required peripheral.

Table 3-3. 825/835 Minimum Peripherals

Peripheral	Model
System Console:	2392A 98720A
System Disc:	7914(CT, ST, R/P) 7933H 7935H 7936H 7937H 7936FL 7937FL
Magnetic Tape:	7974A 7978B
Cartridge Tape:	9144A 35401A
Line or Page Printer:	2225D 2227A 2228A 2235A 2563A 2564B 2565A 2566B 2567B 2684A 2686A 2686+ 2932A 2934A 3630A 41063A

825/835 Options

The following options may be added to meet individual configuration needs:

- HP A1014A Battery Back-up Unit
- HP A1013A CIO Expander Unit
- HP A1010A 8 Mbyte Memory Card
- HP A1009A 2 Mbyte Memory Card
- HP A1037A 16 Mbyte Memory Card
- HP A1015A Access Port Kit

825 Maximum Hardware

The maximum configuration of cards, peripherals, and devices for the 825 is listed in Table 3–4.

Table 3–4. 825 Maximum System Configuration

Device/Peripheral	Max. Qty.
Memory	96 MB(with 16 MB cards)
Mid-bus:	
CIO Expander	1
SRX Graphics Interface	4
CIO:	
HP-IB	13
Mux	11
LAN	3
CIO Parallel (AFI)	7 (5 practical)
HP-FL	8 (2/channel practical)
AP	1
Peripherals:	
Discs HP-IB	12
HP-FL	16
Tape Drives (HP-IB)	8
Printers	8
Terminals and serial devices	66
Instruments (HP-IB)	48
Plotters (HP-IB)	108

835S Maximum Hardware

The maximum configuration of cards, peripherals, and devices for the 835S is listed in Table 3-5.

Table 3-5. 835S Maximum System Configuration

Device/Peripheral	Max. Qty.
Memory	112
CIO:	
HP-IB	6
Mux	5
LAN	3
CIO Parallel (AF1)	4
HP-FL	7
AP	1
Peripherals:	
Discs HP-IB	12
HP-FL	16
Tape Drives (HP-IB)	8
Printers	8
Terminals and serial devices	30
Instruments (HP-IB)	24
Plotters (HP-IB)	8

835SE Maximum Hardware

The maximum configuration of cards, peripherals, and devices for the 835SE is listed in Table 3–6.

Table 3–6. 835S Maximum System Configuration

Device/Peripheral	Max. Qty.
Memory	112
Mid-bus:	
CIO Expander	1
CIO:	
HP-IB	14
Mux	13
LAN	3
CIO Parallel (AFI)	4
HP-FL	8
AP	1
Peripherals:	
Discs HP-IB	12
HP-FL	16
Tape Drives (HP-IB)	8
Printers	8
Terminals and serial devices	78
Instruments (HP-IB)	56
Plotters (HP-IB)	8

925 Hardware Configuration

925 Minimum Hardware

The minimum hardware configuration required for an HP 9000/925 computer is listed in Table 3-7. Part numbers listed are for new parts.

Table 3-7. 925 Minimum Hardware Configuration

Description	Part Number
HP 925 SPU	A1002-66510
Main CPU Card	09850-66510
System Card	09850-66511
8MB Memory Card (3 required for 925LX, 4 min. required for full 925)	09850-66521
Primary Power Supply Card	0950-1899
Auxiliary Power Supply Card (BBU version)	09850-69587
HP-IB Card (2 required)	27113-60301
MUX Card (for console only)	27140-66001
AP Card	5061-2541
LANIC Card	27125-66001
System Console	2392A
Disc Drive	7933H, 7935H or 7937A

925 Options

The following options may be added to meet individual configuration needs:

- HP A1013A CIO Expander Unit
- HP A1010A 8 Mbyte Memory Card
- HP A1037A 16 Mbyte Memory Card (not available at first release of Model 925)
- HP A1016A Model 925LX to Model 925 Upgrade Kit

925 Maximum Hardware

Table 3–8 lists the maximum system configuration for the 925. Table 3–9 lists the maximum system configuration for the 925 LX.

Table 3–8. Model 925 Maximum System Configuration

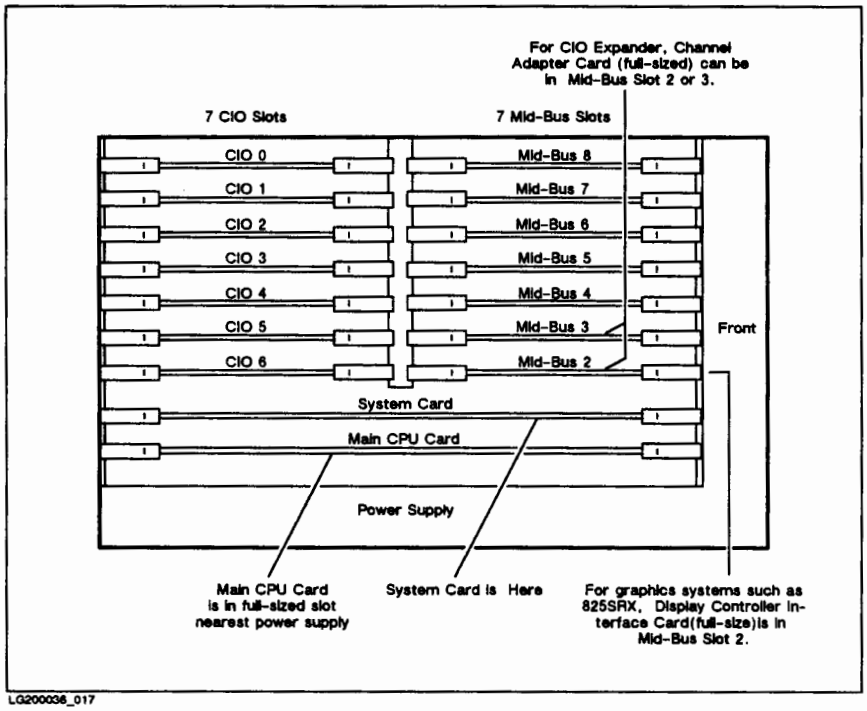
Device/Peripheral	Max. Qty.
Memory	32-48 MB (with 8 MB cards)
CIO:	
Channel adapters	2
Channel adapters per mid-bus	2
CIO expander	1
HP-IB device adapters	7
HP-IB device adapters per channel adapter	4
Devices per HP-IB device adapter	6
LANIC device adapters	2
Console MUX	1
Access port	1
Peripherals:	
Disc Capacity (9.1 GB)	16
Tape drives	4
System printers	4
Remote printers (RS-232)	8
Terminals and PCs	152
Data Terminal Controllers (DTCs)	6

Table 3-9. Model 925LX Maximum System Configuration

Device/Peripheral	Max. Qty.
Memory	24-48 MB (with 8 MB cards)
CIO:	
Channel adapters	1
Channel adapters per mid-bus	1
CIO Expander	0
HP-IB device adapters	4
HP-IB device adapters per channel adapter	4
Devices per HP-IB device adapter	6
LANIC device adapters	2
Console MUX	1
Access port	1
Peripherals:	
Disc Capacity (4.6 GB)	8
Tape drives	4
System printers	4
Remote printers (RS-232)	8
Terminals and PCs	32
Data Terminal Controllers (DTCs)	1

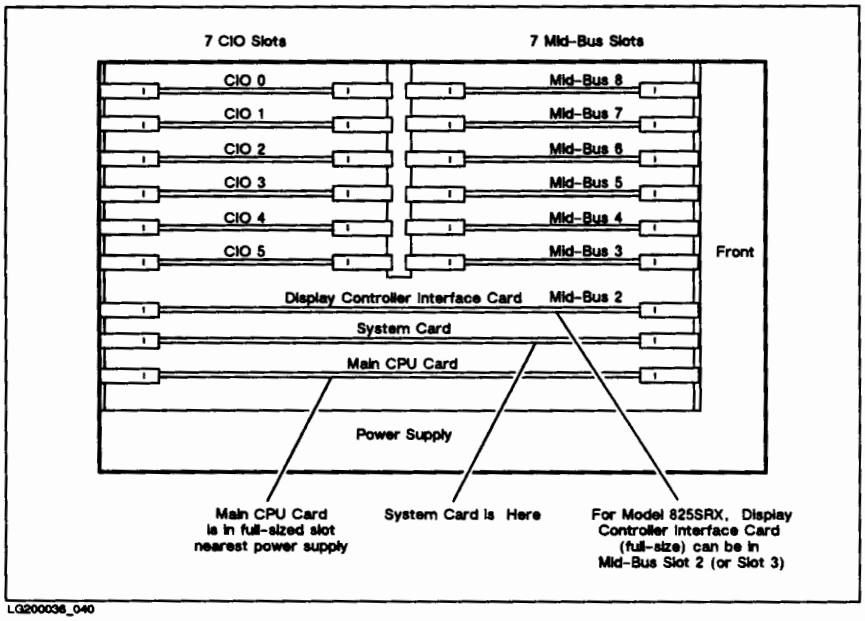
825/835/925 SPU Card Cage

The card cage accepts both full-size and half-size cards. Figure 3–1 shows where full-size cards may be located. For an 825SRX, a Graphics Interface card is installed in a Mid-bus slot at the factory; this configuration is shown in Figure 3–2. Other graphics systems are handled similarly. If the 825/925 is shipped with a CIO Expander, a Channel Adapter card is installed in a Mid-bus slot at the factory.



LG200036_017

Figure 3–1. SPU Card Cage



LG200036_040

Figure 3-2. 825SRX with Graphics Interface Card

825/835/925 Memory Card Configuration

The location of 16MB, 8MB and 2MB memory cards is shown in Figure 3–3. During an installation, you won't have to install memory cards since this is done at the factory.

Memory cards can be installed in any Mid-bus slots and in any order. The 16MB, 8MB and 2MB cards may be intermixed, and there may be gaps between cards.

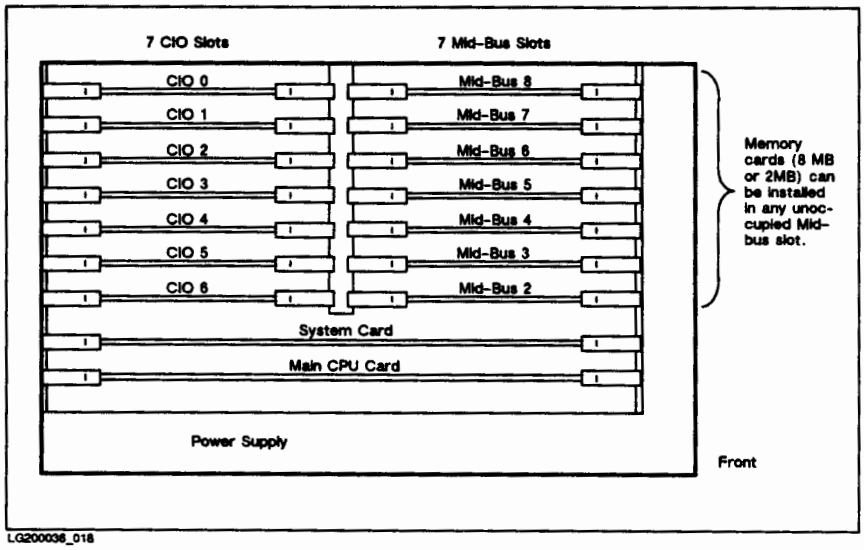


Figure 3–3. Memory Cards in the SPU Card Cage

825/835/925 CIO Expander

Figure 3–4 shows a top view of the CIO Expander. Any CIO card may be inserted in any of the CIO slots. However, certain configurations are recommended for the 925 as shown in Figure 3–7.

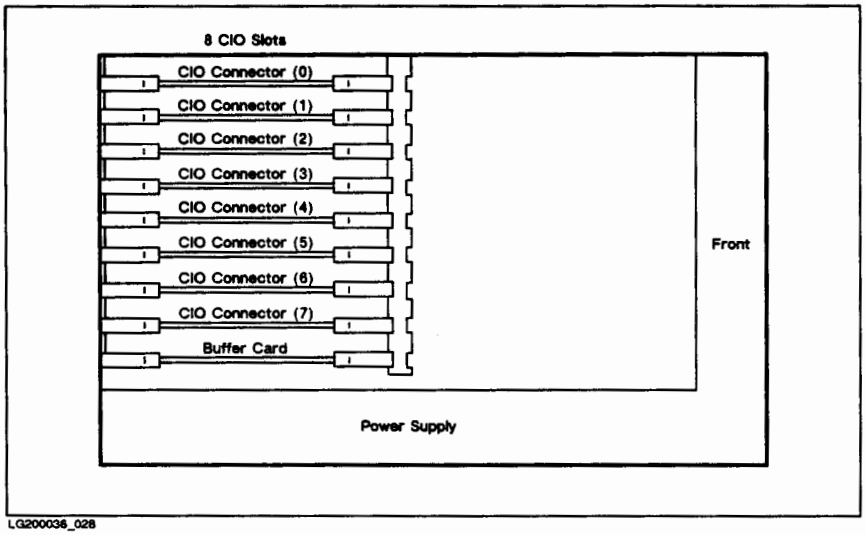


Figure 3–4. Cards in the CIO Expander

825/835/925 CIO Configurations

Physically, any CIO card can go in any CIO slot in the SPU or CIO Expander. (The one exception is the AP Card which requires the three-row connector in CIO slot 0 of the SPU.)

To tell the HP-UX operating system which card is in which slot, you edit the S800 file and run the **uxgen** program to recompile the HP-UX kernel. On MPE XL, the SYSGEN program allows you to change the configuration files.

For the default CIO configuration on the 825/835, see Figure 3–5.

For recommended CIO configurations on the 925, see Figure 3–6 and Figure 3–7.

CIO Priority

The CIO card in the lowest slot has the highest service priority, and vice-versa. For example, a system disc attached in an HP-IB card in CIO slot 1 has a higher priority than a disc attached to an HP-IB card in CIO slot 6.

Identifying CIO Cards

Table 3–10 summarizes the differences between the CIO cards. In addition to those cards listed, HP-FL cards are available for HP-UX systems to connect the system to tape and disc drives via a fiber-optic link.

Table 3–10. Differences Between CIO Cards

AP Card	MUX Card	HP-IB Card	LAN Card	AFI Card
Large connector and a bank of 10 green LEDs	Large connector and 1 LED	Small connector, 1 LED, and a DIP switch	Small connector, 2 LEDs, and a section of the card sticks out	Large connector

CIO Card Configuration

The CIO card configuration depends on whether the system has an AP card for remote support. Figure 3–5 shows the default configurations of the 825/835.

Model 825 Without Remote Support

high priority ↓ low priority

CIO Slot	825 (No Access Port)		MB Slot
0	HP–IB/HP–FL (root disc)		8
1	MUX (console)		7
2	HP–IB (mt/lp/etc)		6
3	MUX		5
4	LAN		4
5	MUX		3
6	HP–IB (disc)		2
n/a	System Card		1
n/a	Main CPU Card		0

low priority ↑ high priority

FRONT

Model 825 With Remote Support

high priority ↓ low priority

CIO Slot	825 (With Access Port)		MB Slot
0	Access Port (AP)		8
1	HP–IB/HP–FL (root disc)		7
2	HP–IB (mt/lp/etc)		6
3	MUX (console)		5
4	LAN		4
5	MUX		3
6	HP–IB (disc)		2
n/a	System Card		1
n/a	Main CPU Card		0

low priority ↑ high priority

FRONT

LG200033_009a

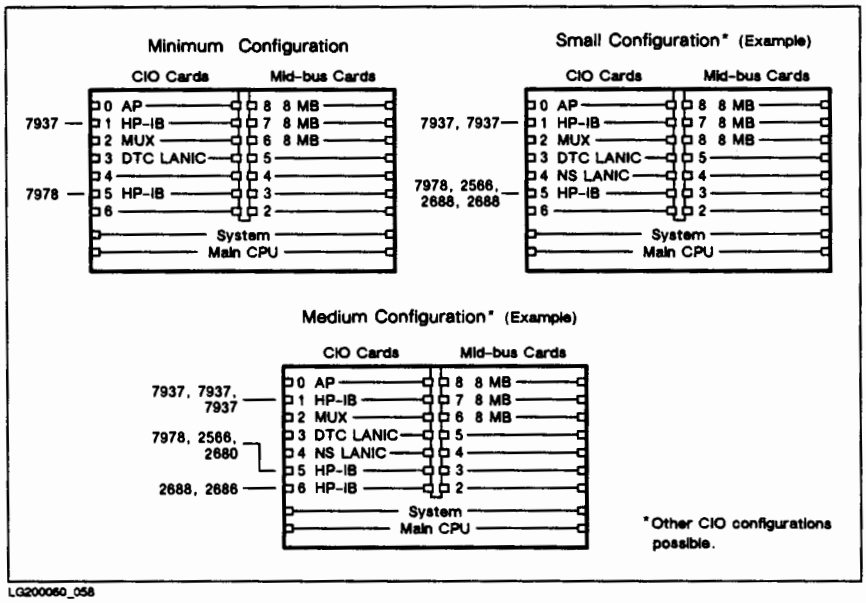
Figure 3–5. 825/835 Default CIO Configurations

925 CIO Configuration

The recommended configuration is shown in Table 3–11. Figure 3–6 shows sample configurations for systems without a CIO Expander. For systems that include a CIO Expander, see Figure 3–7.

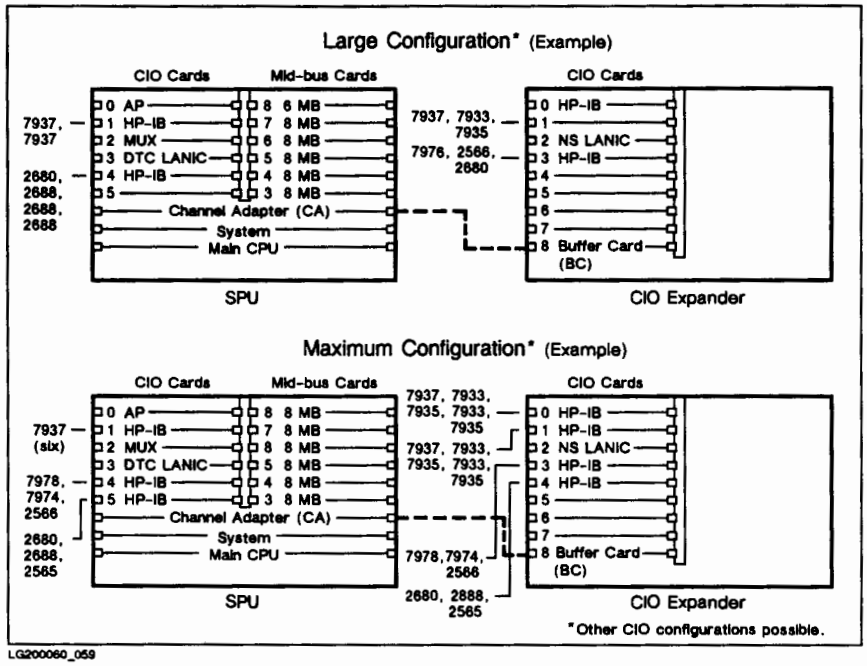
Table 3–11. Recommended Placement of CIO Cards in the 925 SPU

CIO Slot	CIO Card
CIO 0	Access Port (required)
CIO 1	HP-IB (for system disc)
CIO 2	MUX (for system console)
CIO 3	LANIC (for DTC)
CIO 4	LANIC (for NS on systems w/o CIO Expander), HP-IB, or empty
CIO 5	HP-IB (for tape drive on systems w/o CIO Expander)
CIO 6	Channel Adapter card (full-size), HP-IB, or empty



LG200060_058

Figure 3–6. Sample 925 CIO Configurations (Without CIO Expander)



LG200060_059

Figure 3-7. Sample 925 CIO Configurations (With CIO Expander)

925 CIO Configuration Guidelines

The guidelines for CIO Configuration in the 925 are as follows:

1. Disc drives are at the highest priority, (lowest slot number) and are spread across CIO busses (e.g. on both the CIO Expander (if present) and on the CIO bus in the SPU).
2. LAN I/O cards are at the next highest priority and are spread across CIO busses.
3. Tape drives are at the next highest priority and are spread across CIO busses.
4. Printers are at a lower priority than tapes on the same HP-IBs.
5. Tape drives are not attached to the same HP-IB card as discs. Printers are not attached to the same HP-IB card as discs. (If tape drives or printers are attached to the same HP-IB card as discs, HP-IB lock-ups can result.)

Thus, from highest to lowest priority:

1. Disc drives
2. LAN cards
3. Tape drives
4. Printers

Note The service priority for a CIO card depends on its slot number. The CIO card in the lowest slot has the highest priority, and vice-versa.

4

Troubleshooting

This section contains troubleshooting data to help CEs diagnose and repair the HP 9000/825/835 and the HP 3000/925 Computer Systems.

Troubleshooting Strategy

The troubleshooting strategy of the 825/835/925 is to identify and replace any failed field replaceable unit (FRU). This involves various troubleshooting procedures, SPU and I/O selftests, and peripheral selftests as well as the Online/Offline diagnostics.

The 825/835/925 troubleshooting strategy uses the following:

- Power-on Selftest
- Status LEDs (SPU, CIO Expander, BBU)
- Support Tape
  - Offline diagnostics (for SPU and CIO Expander)
  - Diagnostic Utility Interface (DUI) diagnostics (for peripherals)
  - Small memory-resident version of HP-UX
- Online diagnostics (DUI)

Troubleshooting Flowchart

The flowchart in Figure 4–1 shows the steps for troubleshooting the 825/835/925. These steps will be described later in this chapter.

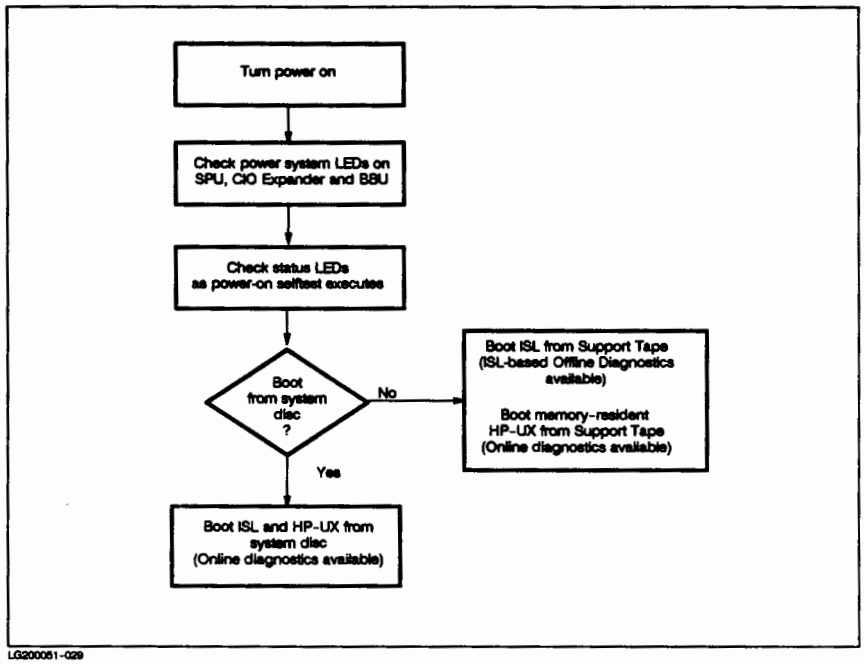


Figure 4–1. Troubleshooting Flowchart

Troubleshooting the SPU

This section describes troubleshooting problems in the SPU that prevent it from booting to ISL. Problems that occur after booting to ISL are covered later in this chapter in the "System Level Diagnostics" section. For troubleshooting, the SPU can be divided into four logical area:

- Power system (including overtemp)
- CPU (Processor cards)
- Memory (Mid-bus cards)
- I/O (CIO cards)

To determine which of the four areas has a problem, inspect the status LEDs behind the access panel and check for messages on the system console.

Power-up Sequence

After the power is turned on, the 825/835/925 runs through a sequence of tests and selftests, until the system displays the ISL prompt and boots HP-UX or MPE XL. Figure 4–2 shows the normal power-up sequence.

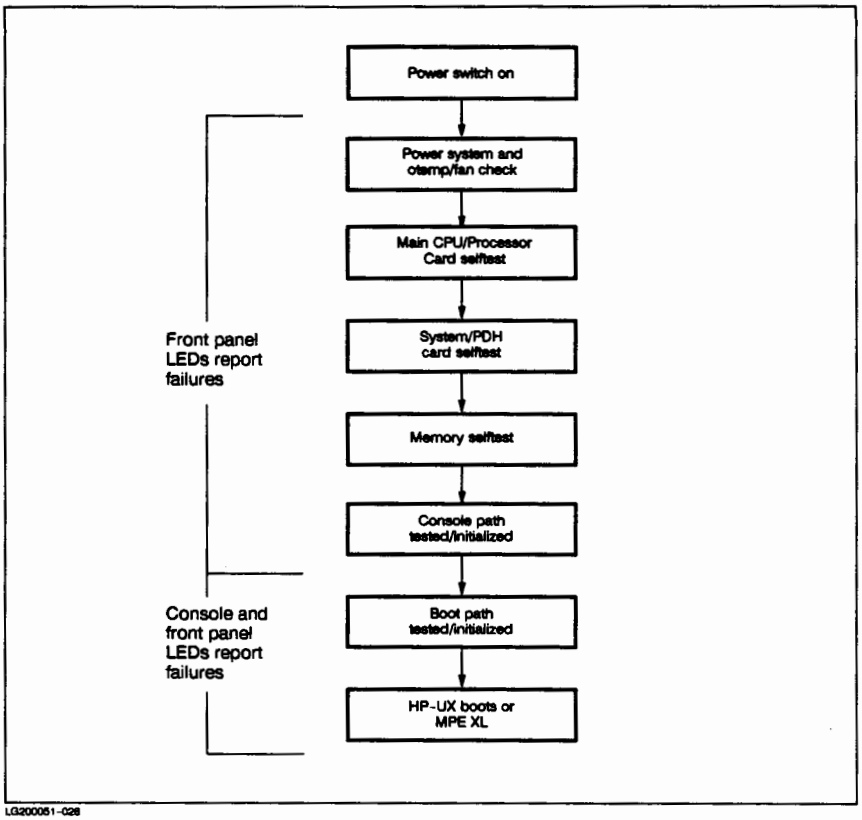


Figure 4-2. Power-up Sequence

The front panel LEDs report failures up to (and including) the test of the console path. Afterwards, the console reports failures as well.

Interpreting the Status LEDs

When a fault occurs in the SPU, the FAULT LED lights. To determine the nature of the fault, check the status LEDs behind the access panel. Figure 4–3 shows the LEDs behind the access panel.

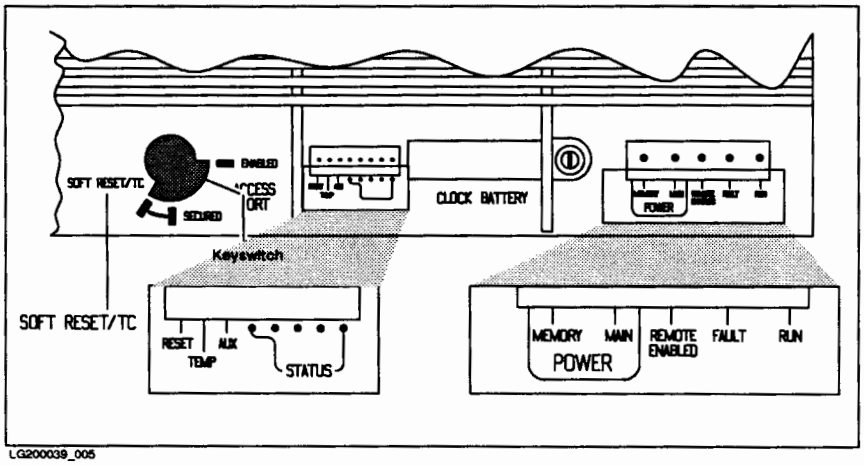
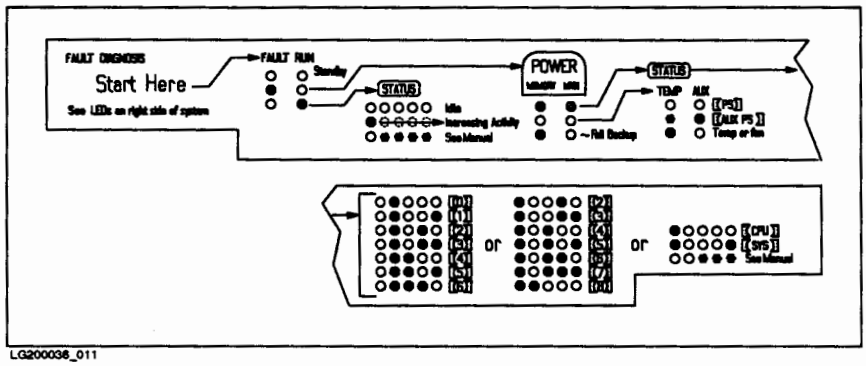


Figure 4–3. Front Panel Layout

On the back of the flip-down access panel, is a Fault Diagnosis flowchart. Use this to identify the failing FRU (Field Replaceable Unit) in the SPU. Figure 4–4 shows this flowchart (split in two). Refer to this figure during the discussion that follows.



LG200036_011

Figure 4–4. Fault Diagnosis Flowchart

SPU Power System Troubleshooting

Use the troubleshooting trees in Figure 4–5 through Figure 4–8 for SPU power system problems.

Figure 4–5 covers troubleshooting when there's no sign of life in the system; the LEDs don't light, and the fans don't turn.

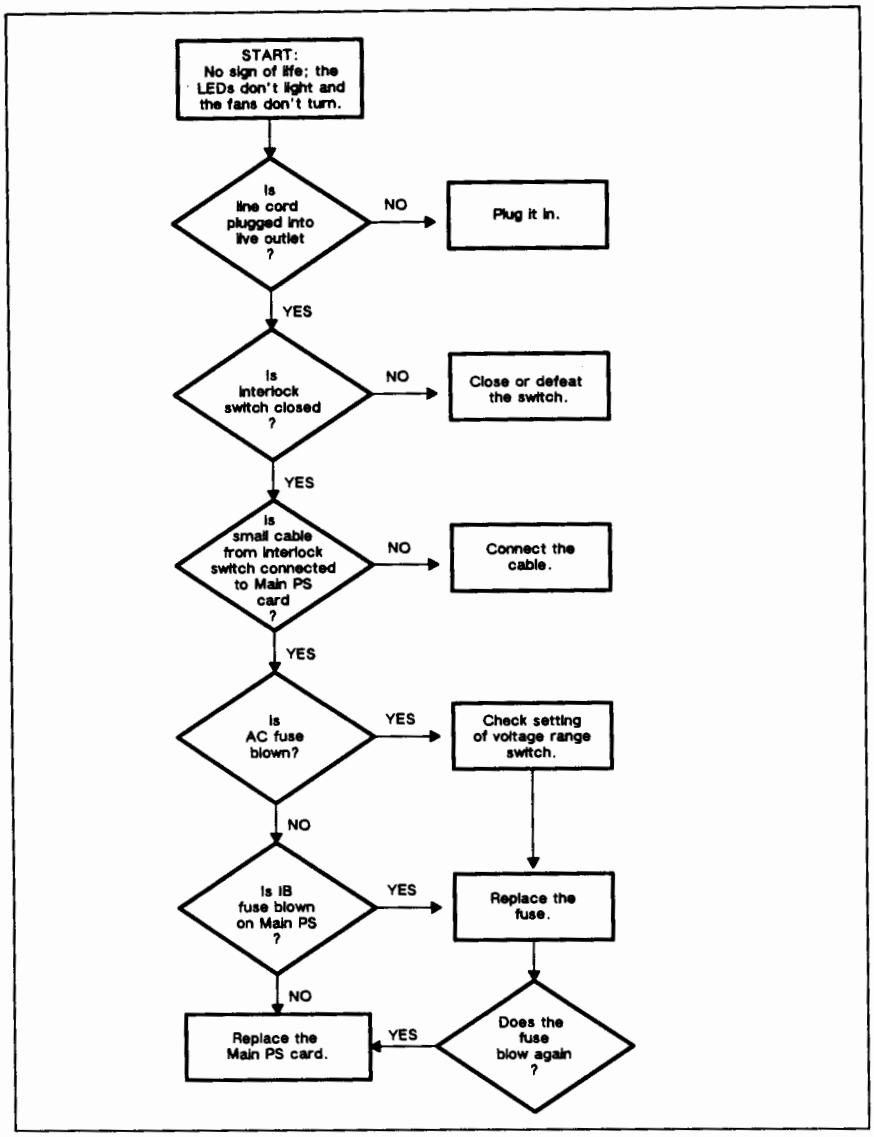
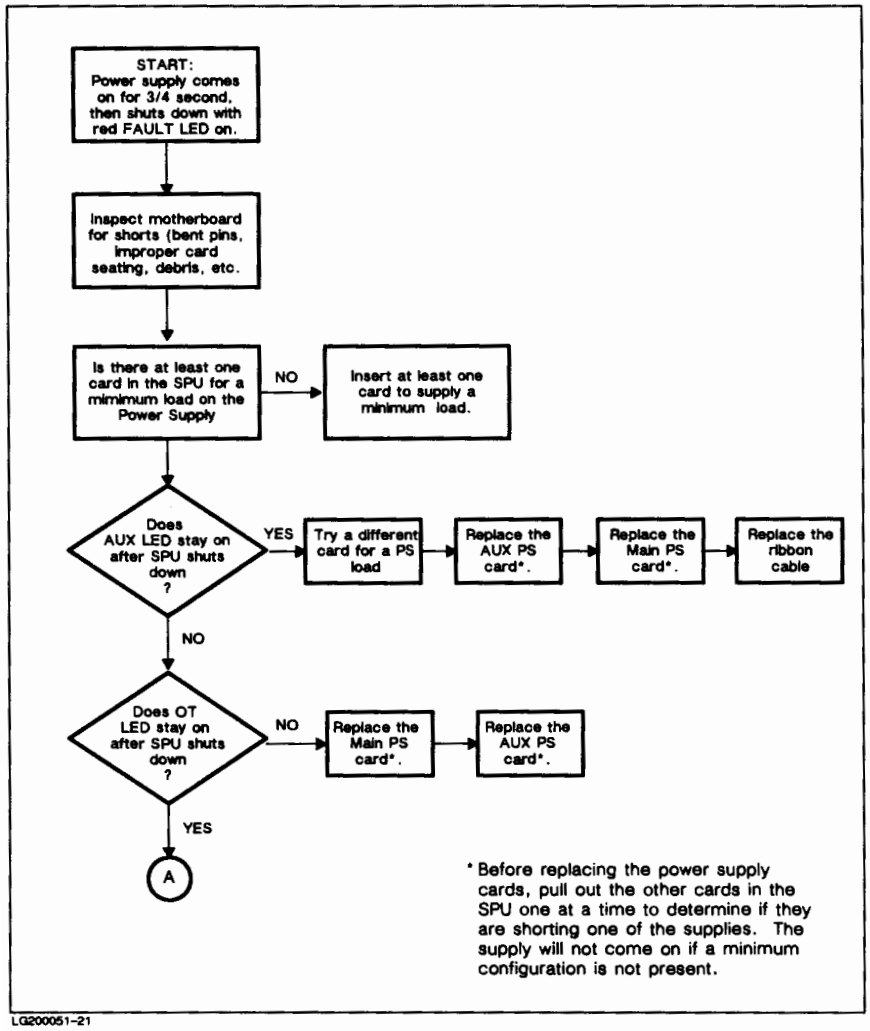


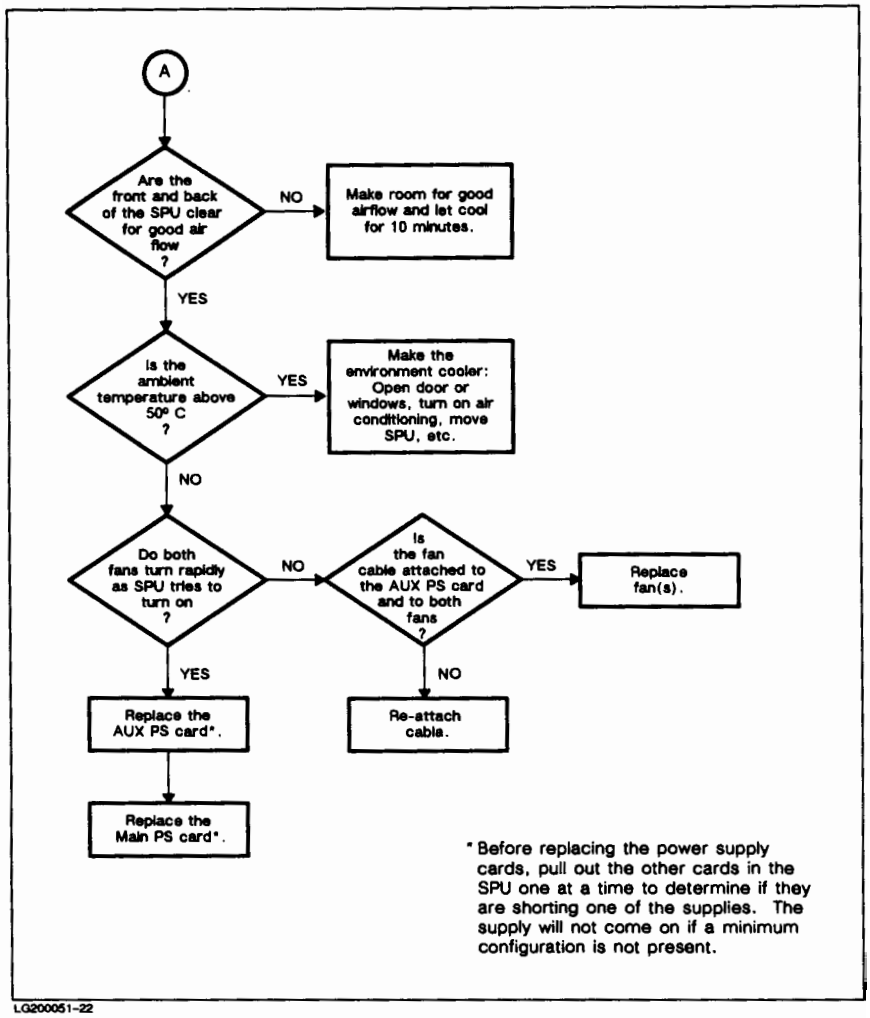
Figure 4-5. Troubleshooting a Dead System

Figure 4–6 covers troubleshooting when the power supply comes on for only about 3/4 second before shutting down with the red FAULT LED ON.



LG200051-21

Figure 4–6. Troubleshooting when Power Supply Comes on Momentarily



LG200051-22

Figure 4-7. Troubleshooting when Power Supply Comes on Momentarily (cont'd)

Figure 4–8 covers troubleshooting when the front panel LEDs flash once quickly when the SPU is turned on.

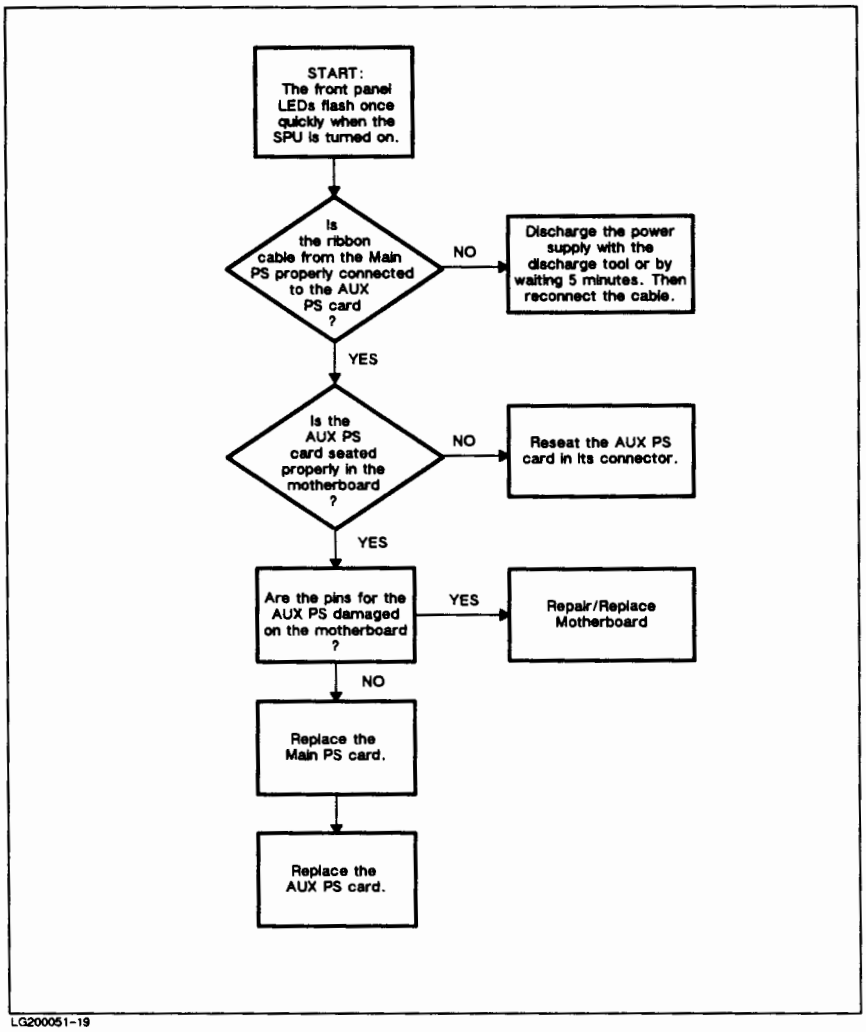
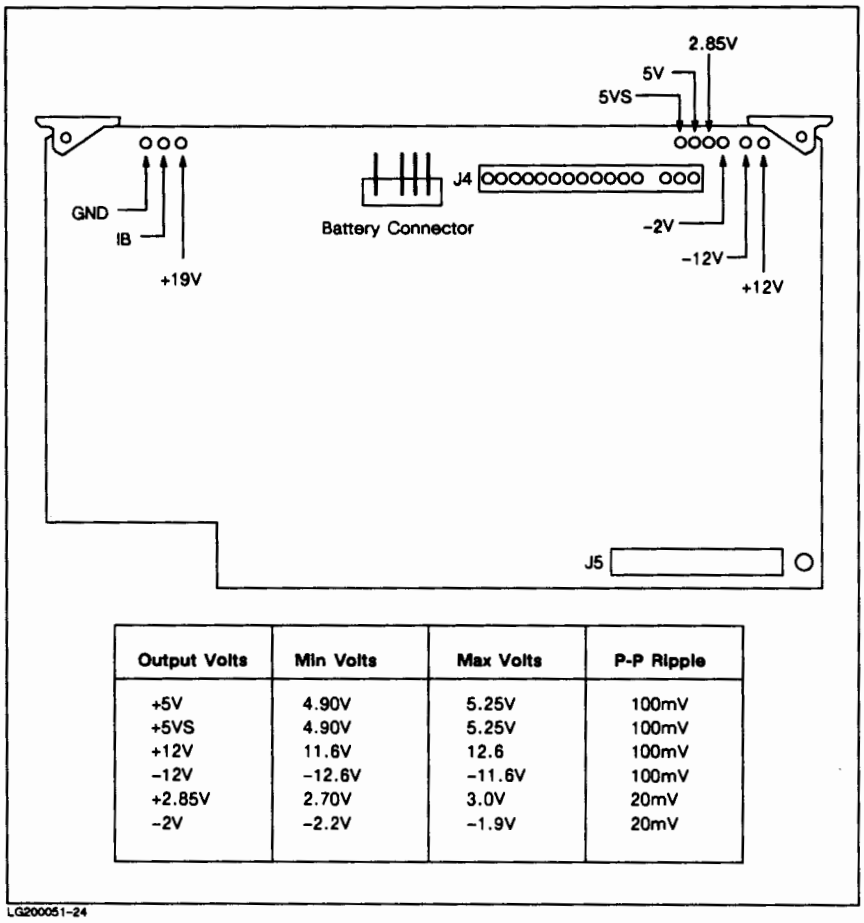


Figure 4–8. Troubleshooting when LEDs Flash Once Quickly

Auxiliary Power Supply Test Points

Figure 4–9 shows the test points and voltages for the Auxiliary Power Supply card. Normally Power Supply faults are reported by the front panel LEDs.



Output Volts	Min Volts	Max Volts	P-P Ripple
+5V	4.90V	5.25V	100mV
+5VS	4.90V	5.25V	100mV
+12V	11.6V	12.6	100mV
-12V	-12.6V	-11.6V	100mV
+2.85V	2.70V	3.0V	20mV
-2V	-2.2V	-1.9V	20mV

Figure 4–9. Test Points on the Auxiliary Power Supply

Power System Failures

The power system of the 825/835/925 constantly monitors the voltages of its power supplies. It also monitors for overtemp and fan failure conditions. If a failure occurs in any of these areas, the system immediately shuts down and the FAULT LED lights. Check the status LEDs behind the access panel to determine the cause of the failure. Trace the failure to the following components of the power system:

- Main power supply
- Auxiliary supply
- Cooling fans

Use the following procedure and Fault Diagnosis flowchart on the front panel of the SPU to find where the failure occurred:

1. Starting from the left side of the flowchart ("Start Here"), locate the pattern which represents the state of the FAULT and RUN LEDs.
2. Follow the arrow to the right. This leads to the POWER label. Locate the pattern there which represents the state of the MEMORY POWER and MAIN POWER LEDs. These LEDs are found in the bank of 5 large LEDs on the far right of the panel.
3. If MEMORY POWER is ON, and Main Power is OFF, then there has been an AC power failure and the SPU is in battery back-up mode (if BBU option is present).
4. If both MEMORY POWER and MAIN POWER LEDs are OFF, then follow the arrow to the right, which leads to the TEMP and AUX labels. Locate the pattern there which represents the state of the TEMP and AUX LEDs. Look to the right of the pattern to see which component failed.

Table 4–1 shows how to interpret the AUX and TEMP LEDs.

Table 4–1. Interpreting AUX and TEMP LEDs

TEMP	AUX	PROBLEM
OFF	OFF	Main power supply failure
OFF	ON	Aux. power supply card failure
ON	OFF	Overtemp condition or fan failure

The overtemp sensor is located on the auxiliary power supply card.

CPU, Memory or I/O Failures

The selftest checks the CPU, memory and I/O paths used in the boot process. A failure in any of these areas is reported to the status LEDs and, if possible, to the console. If an Access Port is installed, a selftest failure is displayed in four hex digits on the console. Figure 4–10 through Figure 4–15 show flowcharts on the selftest process.

The CPU/MEM/I/O portion of the selftest checks:

- Main CPU card (825/925) or Processor Card (835)
- System card (825/925) or PDH Card (835)
- The 2, 8, and 16 Mbyte memory cards
- MUX card (for the console)
- Device Adapter card (for the Boot device)

When the system is first powered on, the FAULT LED lights and the selftest starts executing. The selftest status LEDs (the 5 small LEDs to the right of the AUX LED) light briefly, representing the selftest error code for each test as it is run. When the system passes one test, the LED pattern advances to the next selftest error code. If the test fail the error code remains on the LEDs.

After the selftest completes and the operating system comes up, the 5 status LEDs show the level of system activity. Activity is displayed in bar graph fashion, filling from left to right. Each LED lit represents 20% of the maximum processor activity. For example, if 3 LEDs are lit, the system is running at 60% of its maximum level.

Processor Card Failures

If the system does not boot within 60 seconds of power up, a failure has occurred. The FAULT LED will be ON and the selftest status LEDs show where a possible failure may have occurred.

Use the following procedure and the Fault Diagnosis Flowchart on the front panel of the SPU to determine if one of the processor cards has failed its selftest:

1. Beginning at the "Start Here" label, follow the arrow to the FAULT and RUN.
2. Follow the arrow to the "POWER" label.
3. Follow the top arrow through "STATUS". This leads to the three groups of status LEDs. The first group contains 7 rows of status LEDs in various states. The numbers 0 through 6, framed in orange, are beside each of the rows. The second group is similar except each row is labeled 2 through 8, and is framed in pink and blue. The third group contains three rows, with the first two labeled CPU (4) and SYS, and framed in purple.

4. During Selftest, observe the pattern of the 5 status LEDs. For a CPU failure, the LEDs should have one of two patterns:

    a. LED 0 ON, other LEDs OFF.
    b. LED 0 and LED 4 ON, other LEDs OFF.

5. Using the Fault Diagnosis Flowchart, note that these patterns map to the third group of LEDs. See Figure 4–4. If LED 0 is ON and the rest OFF, the Main CPU or Processor card is bad. If LED 0 and 4 are ON and the other LEDs are OFF, the System or PDH card is bad.

Mid-bus Card Failures

If the status LEDs do not indicate a CPU failure, they may indicate a failure of one of the Mid-bus cards. This could be either a Memory card, Channel Adapter card, or Graphics Interface card. Use the following procedure to determine if a Mid-bus card has failed:

1. Observe the status LEDs behind the access panel. The FAULT LED will be ON. The MEMORY and MAIN power LEDs will also be ON, indicating that the power system is all right.
2. Observe the selftest status LEDs. For Mid-bus failures, LED 0 and one or more of the other LEDs will be ON. (If LEDs 0 and 4 are ON, the problem is with the System or PDH card, as described in the previous procedure.)
3. Following the Fault Diagnosis flowchart, you arrive at the second group of status LEDs. Find the matching pattern. Look to the right of the pattern to find the Mid-bus slot number of the failing card (slot number 2 through 8). Note that each number is enclosed by a blue/white border, thus matching the labels used on the SPU Mid-bus slots.

CIO Card Failures

After the CPU and memory are tested, the console and boot paths are tested. The status LEDs report errors that occur during the testing of boot paths. Use the following procedure to determine if such an error has occurred:

1. Observe the status LEDs behind the access panel. The FAULT LED will be ON, indicating a failure. The MEMORY and MAIN power LEDs will be ON, indicating that the power system is all right.
2. Observe the status LEDs. For failures occurring on the CIO bus, LED 0 is OFF and LED 1 is ON. The other LEDs can be either OFF or ON.
3. Following the Fault Diagnosis flowchart, you arrive the first group of selftest LED patterns. Find the pattern that matches the state of the selftest LEDs. Beside the pattern is the CIO slot number of the failing device adapter. The number is surrounded by an orange border, matching the orange labeling on CIO slots.

Note The boot code in the 825/835/925 looks for the console at the console path in stable storage. If that fails, it tries a hard-coded path. If that fails, boot code searches for a console. If a console is not found or errors are encountered, the boot continues without the console. Boot does not stop because of console errors.

Once the console has been found and initialized, errors occurring during the boot process are reported to the console and the status LEDs.

CIO Expander Card Failures

The boot or console device may be attached to a device adapter in the CIO Expander. In this case, power-on failures are reported on the status LEDs somewhat differently than as described in the paragraph "Failures in the CIO Cards". For example:

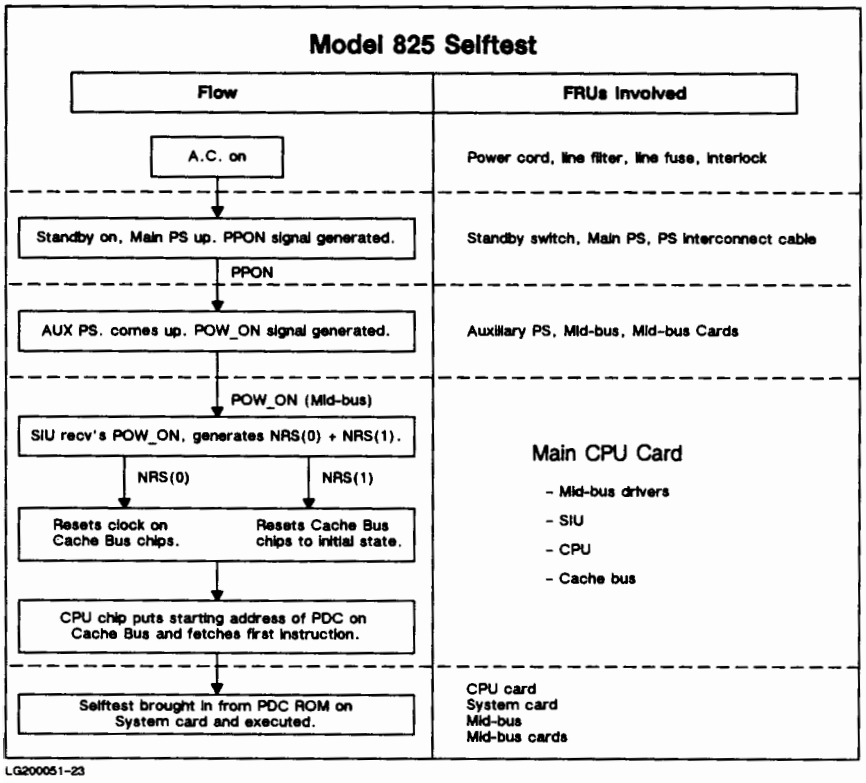
	STATUS LED				
	0	1	2	3	4
Boot Device Failure	OFF	OFF	ON	OFF	ON
Console Device Failure	OFF	OFF	ON	ON	OFF

The selftest does not identify the CIO slot number of the failing device. The failure could be in the Buffer card, in one of the device adapters, or in the device itself. On the fault diagnostic flowchart these two cases are shown as:

o o * * * See Manual

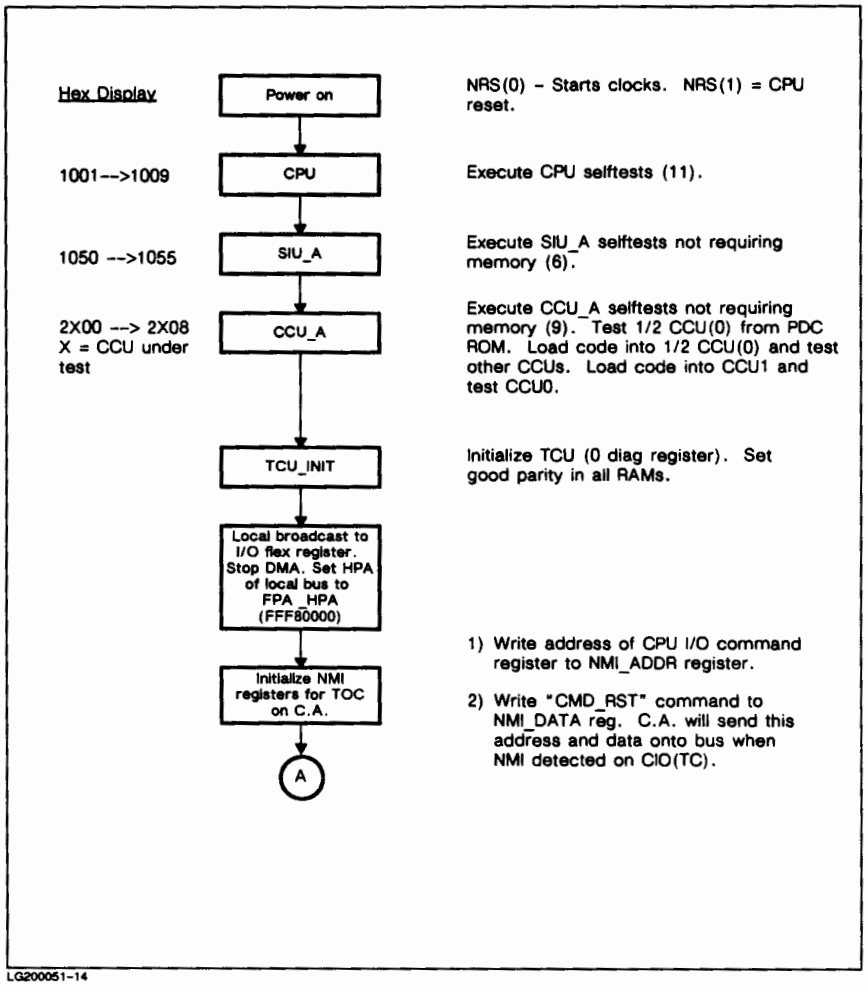
Selftest Flowcharts and Hex Codes

The figures and tables that follow give detailed information on the selftest.



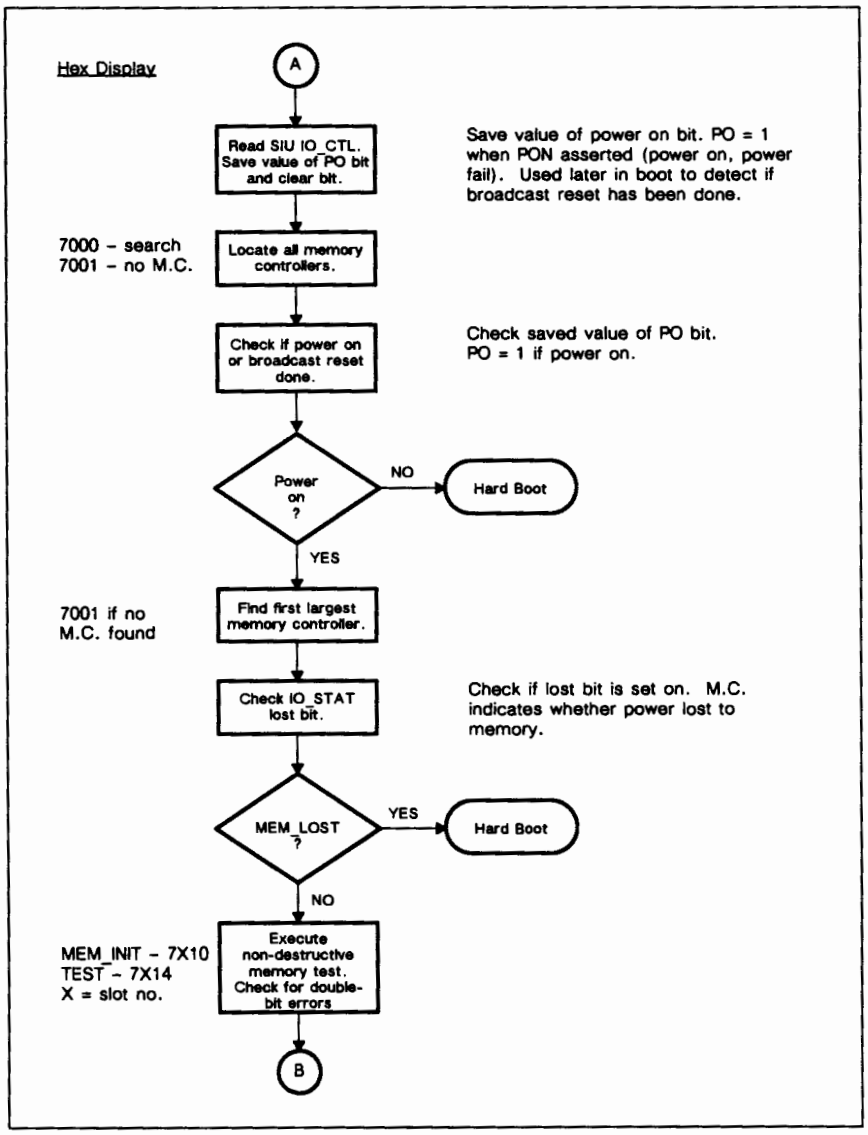
LG200051-23

Figure 4-10. Selftest Overview



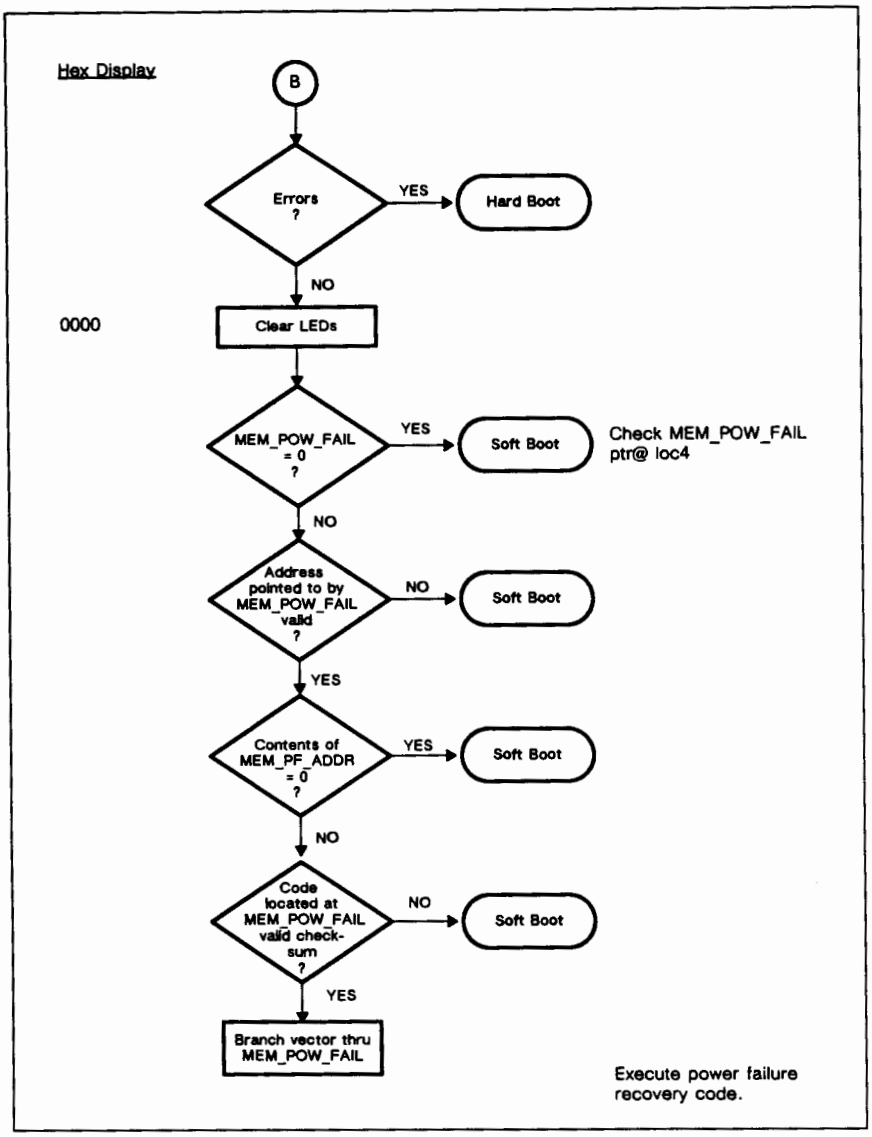
LG200051-14

Figure 4-11. Selftest Detailed Flowchart



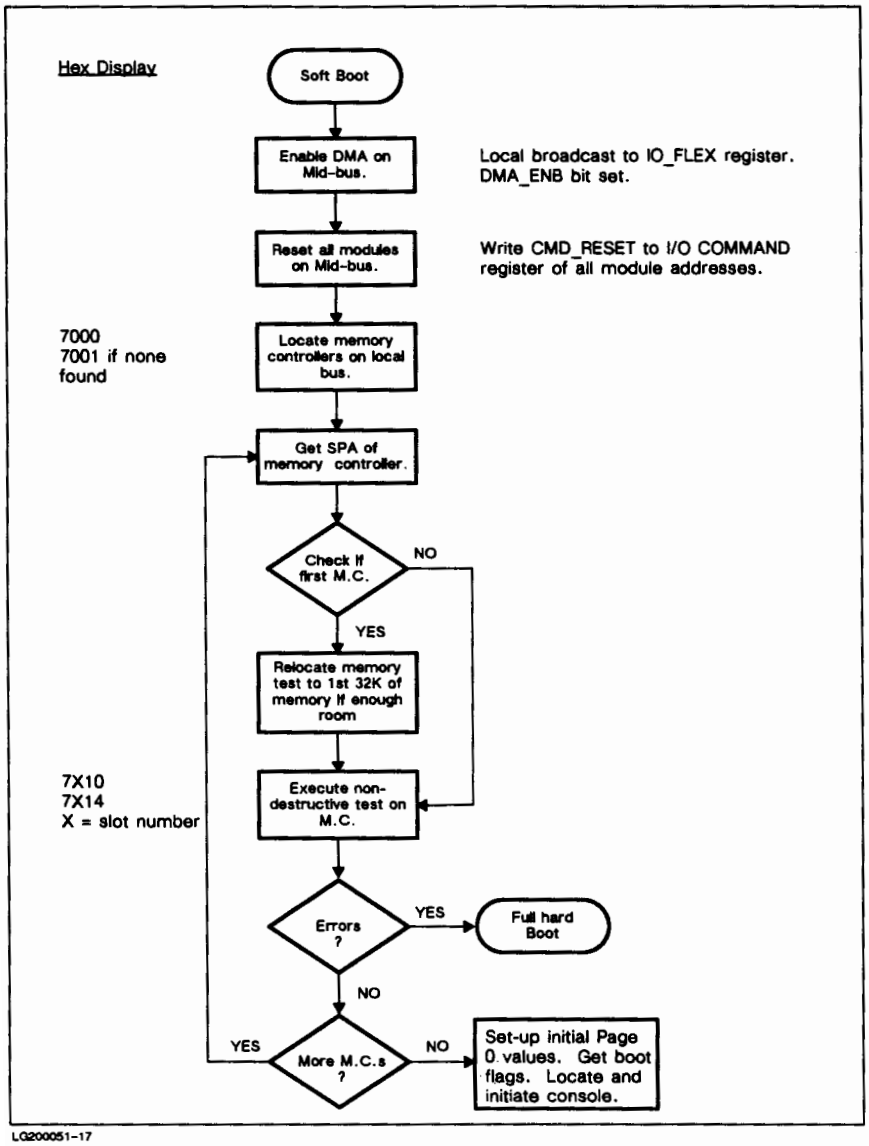
LG200051-15

Figure 4-12. Selftest Detailed Flowchart (cont'd)



LG200051-16

Figure 4-13. Selftest Detailed Flowchart (cont'd)



LQ200051-17

Figure 4-14. Flowchart for Soft Boot

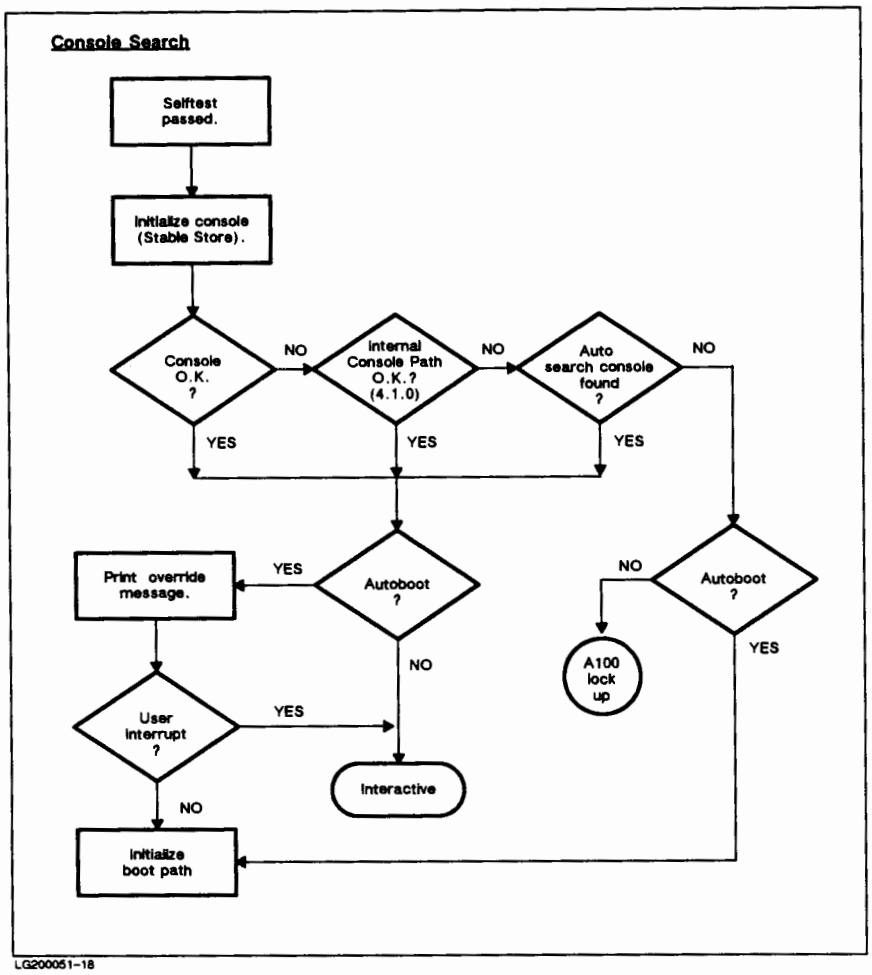


Figure 4-15. Flowchart for Console Search

Selftest Hex Codes

Selftest run time status and error messages are displayed on the STATUS LEDs. If the optional AP card is installed, a four digit hexadecimal code will be displayed on the system console. Figure 4–16 through Figure 4–22 list the error codes and hexadecimal codes that can be displayed.

Test Sequence	Hex Display 0 1 2 3	Run LED	Status LEDs 0 1 2 3 4
CPU	1 X X X	0	1 0 0 0 0
Cache/TBL	2 X X X	0	1 0 0 0 0
PDH	3 X X X	0	1 0 0 0 1
MIU	4 F X X	0	1 0 0 0 0
Other math chips	4 F X X	0	1 0 0 0 1
Bus protocols	5 X X X	0	1 0 0 0 0
Reserved	6 X X X	0	1 0 0 0 0
Memory	7 F X X	0	1 F F F F
I/O module	8 F X X	0	1 F F F F
Console device	9 X E X	0	0 1 E E E
Boot device	A X E X	0	0 1 E E E
Reserved		0	0 0 0 1 0
Reserved		0	0 0 0 1 1
Reserved		0	0 0 1 0 0
Boot device (exp*)	A X X X	0	0 0 1 0 1
Console device (exp*)	9 X X X	0	0 0 1 1 0
OS software	B X X X	0	0 0 1 1 1
Initialization	C S X X	1	0 S S S S
Software Shutdown	D X X X	0	0 0 0 0 1
Warning	E X X X	1	0 1 1 1 1
Run	F A X X	1	A A A A A

A = activity level (each status LED is 20% activity, 0 to 4)
E = failing CIO device
F = FRU, failing device slot number
S = stage of initialization
X = does not matter
* = Expander

Figure 4–16. Selftest Sequence Definitions

Test Name	Hex Code	Description
realtest	0x1001	Tests the general registers, branches, and ldil, addi, comb, and comib instructions
testalu	0x1002	Tests the ALU (add, addi, and, andcm, bl, combf, ldil, or, shadd, sub, subb, uaddcm, uxor, xor)
testbrln	0x1003	Tests the general register link storage during branch and link instructions (bl, blr, bv, mfctl, rsm, ssm, addb, movb)
testshft	0x1004	Tests the shifter during shift instructions (shd)
testsar	0x1005	Tests the SAR (cr11) control register (extru, mtctl, mfctl, or)
testexdp	0x1006	Tests the constant/variable extract/deposit instructions (dep, depi, extru, extrs, vdep, vdepi, vextru, vextrs, vxdep, vzdepi, zdep, zdepi)
testbb	0x1006	Test the branch on bit instruction (bb)
testarnc	0x1007	Tests arithmetic/logic, extract/deposit, and nullification (addib, dcor, or, sub, subi)
testcrbw	0x1008	Test the carry/borrow bits in PSW
testcrbw	0x1008	Further tests the carry/borrow bits in the PSW verifying the bypass/interlock mechanisms
testcrs	0x1009	Test the control registers (break, mtsm, rfi)
testmisc	0x100A	tests some of the traps and tests the following instructions: addio, addil, comclr, ldo
cpuend	———	Place holder for realtest (cpul.sa) to test long branches

Figure 4-17. CPU Selftest Hex Codes

Test Name	Hex Code	Description
siu_a	0x1050	Pattern tests the following SIU registers: cr15 (EIEM), cr23 (EIR), cr24 - cr31 (TRs), cr16 (ITLIM and ITCNT)
siu_ct	0x1051	Tests for crosstalk between the temporary CRs (cr24 to cr31)
siu_fl	0x1052	Tests access of Mid-Bus I/O registers
siu_in	0x1053	Tests external interrupt functionality
siu_rst	0x1054	Tests that a command reset to the SIU (processor) signals a hard reset and causes HPMC
siu_b	———	Initial setup for SUI-B selftests
siu_mid	0x1060	Tests the following Mid-Bus transactions and their timing: read cache line (read32), and purge data cache
siu_nm	0x1061	Tests invalid memory I/O addresses and the SIU_IOCTL register
sui_flh	0x1062	Tests the flush data cache instruction and its timing
siu_cp	0x01063	Tests copyouts from the SIU to memory (flush) and its timing

Figure 4-18. System Interface Unit Selftest Hex Codes

Test Name	Hex Code	Description
ccu_a	———	Main controller for CCU_A tests
ccu_reg	0x2X00	Tests the CCU diagnose registers
ccu_addr	0x2X01	Tests the CCU address lines
ccu_ram	0x2X02	Tests the CCU RAM array
ccu_hpar	0x2X03	Initializes CCU horizontal parity
ccu_vpar	0x2X04	Initializes CCU vertical parity
ccu_dir	0x2X05	Tests a store to a valid clean entry, sets dirty=1
ccu_pdca	0x2X06	Tests a purge data cache instruction, sets valid=0
ccu_par	0x2X07	Tests the CCU tag/data parity functionality
ccu_x	0x2X08	Tests code execution from cache
ccu_b	———	Main controller for CCU_B selftest
ccu_vld	0x2X10	Tests a load into an invalid entry, sets valid=1 and dirty=0
ccu_pdcb	0x2X11	Further tests purge data cache instruction functionality
ccu_fdc	0x2X12	Tests the flush data cache instruction functionality
ccu_lock	0x2X13	Tests the CCU lock functionality

Figure 4-19. Cache Control Unit Selftest Hex Codes

Note Hex digit D1 (x) represents the CCU being tested. Example: 0x2000 (would be CCU0), or 0x2100 (would be CCU1).

Test Name	Hex Code	Description
tcu_diag	0x2050	Tests the TCU diagnose register
tcu_reg	0x2051	Tests space/control registers
tcu_sq	0x2052	Tests the PC space queue (cr17)
tcu_par	0x2053	Tests parity field in TLB RAM array
tcu_rpn	0x2054	Tests RPN/RPN parity fields and I/O device bit in RPN RAM array
tcu_dsid	0x2055	Tests SID field in the TLB RAM array
tcu_dvpn	0x2056	Tests VPN field in the TLB RAM array
tcu_dpid	0x2057	Tests PID field in the TLB RAM array
tcu_dar	0x2058	Tests access rights field in data TLB RAM array
tcu_dvf	0x2059	Tests valid/flags fields in data TLB RAM array
tcu_isid	0x205A	Tests SID field in instruction TLB RAM array
tcu_ivpn	0x205B	Tests VPN field in instruction TLB RAM array
tcu_ipid	0x205C	Tests PID field in instruction TLB RAM array
tcu_iar	0x205D	Tests access rights field in instruction TLB RAM array
tcu_ivf	0x205E	Tests valid/flags field in instruction TLB RAM array
tcu_hash	0x205F	Tests hashing functionality for the TCU entry selection
tcu_purge	0x2060	Tests TLB purge functionality
tcu_lock	0x2061	Tests TCU lock functionality
tcu_pf	0x2062	Tests TLB parity functionality
tcu_rpf	0x2063	Tests RPN parity functionality
tcu_vdt	0x2064	Tests virtual data translation
tcu_arf	0x2065	Further tests the access rights/PC space queue functionality

Figure 4-20. TLB Control Unit Selftest Hex Codes

Test Name	Hex Code	Description
miu_a	0x4000	Include file and initial setup for the tests
miu0	0x4000	Tests the MIU floating point registers
miu1	0x4001	Tests fcpy on MIU chip
miu2	0x4002	Tests fabs on MIU chip
miu3	0x4003	Tests fadd on MIU and ADD chips
miu4	0x4004	Tests fsub on MIU and ADD chips
miu5	0x4005	Tests fcmp on MIU and ADD chips
miu6	0x4006	Tests fcnvff on MIU and ADD chips
miu7	0x4007	Tests fcnvfx on MIU and ADD chips
miu8	0x4008	Tests fcnvfx on MIU and ADD chips
miu9	0x4009	Tests fcnvxf on MIU and ADD chips
miu10	0x400A	Tests fcnvxf on MIU and ADD chips
miu11	0x400B	Tests fmpy on MIU and MLT chips
miu12	0x400C	Tests fdiv function on MIU and DIV chips

Figure 4-21. Math Interface Unit Selftest Hex Codes

Note Hex digit D1 (x) represents the Mid-Bus slot number of the chips being tested. Example: 0x4003 (would be CPU card), or 0x4103 (would be System card).

Test Name	Hex Code	Description
———	0x7000	Initial search for MCs
———	0x7001	No MCs were found on Mid–Bus
meminit	0x7X10	Include file and initial setup for the tests and tests the MC registers
m_write	0x7X11	Tests write/read/load and clear to RAM (destructive)
m_tsbe	0x7X12	Tests ECC by causing single bit errors (destructive)
m_m_tdbe	0x7X13	Tests that a double bit error can be detected (destructive)
m_read	0x7X14	Tests RAM array for parity errors (non–destructive)
m_addr	0x7X15	Tests each of the RAM address lines (destructive)
m_ram	0x7X16	Test the RAM array (destructive)
m_clear	0x7X17	Initializes RAMs to zeros (destructive)
m_return	———	Returns signaling success
m_wait	———	waits for an expected HPMC
bad_mc	———	Returns signaling failure

Figure 4-22. Memory Controller/RAM Selftest Hex Codes

Note Hex digit D1 (X) represents the Mid-Bus slot number of the memory controller/RAM being tested. Example: 0x7400 (would be Mid-Bus slot 4), or 0x7700 (would be Mid- Bus slot 7).

Disabling the AC Interlock

While troubleshooting, you may have to remove the chassis from the SPU can. When the chassis is removed, the AC interlock opens and cuts off power to the SPU. To get around this problem, bypass the interlock by inserting a screwdriver in the interlock to keep the switch closed.

Warning **If the AC interlock is bypassed, electrical voltages can be present on the uncovered chassis. Use care when handling components.**

Troubleshooting The CIO Expander

Two LEDs on the CIO Expander help locate the source of a problem. Problems can be isolated to:

- AC power connections
- Power supply

The CIO Expander front panel contains 2 LEDs: RUN and FAULT. Refer to Table 4–2 for LED definitions and Table 4–3 for troubleshooting information.

Table 4–2. Interpreting CIO Expander LEDs

LED	Meaning
RUN	Lights when the power supply is functioning properly. If the RUN LED does not light when the power switch is on, the failure is due to one of 3 causes: 1. AC is not getting to the power supply 2. The power supply has failed 3. Defective display panel
FAULT	Lights if one of the fans fail. The circuitry for detecting fan failure is on the motherboard.

Table 4-3. Troubleshooting the CIO Expander

Fault Condition	Probable Cause	Recommended Action
RUN LED does not light when AC LINE switch is on.	Bad AC connection. Wrong voltage selected. Fuse blown.(1) Power supply failure. Front panel failure.	Check power cord. Check voltage switch setting. Replace power supply.(2,3) Replace power supply.(2,3) Replace motherboard.
RUN and FAULT LEDs both on.	One or both fans have failed	Replace failed fan(s).
RUN LED is off, FAULT LED is on.	Power supply failure. Front panel failure.	Replace power supply.(2,3) Replace motherboard.
RUN LED is on, FAULT LED is off, but system doesn't indicate the CIO Expander is present.	Bad cable connection to Channel Adapter card. Failed Channel Adapter card. Failed Buffer Card. Front panel failure.	Check/replace cable to Channel Adapter card. Replace Channel Adapter card. Replace Buffer Card. Replace motherboard.
RUN LED is on, FAULT LED is off. System indicates that CIO Expander is present, but doesn't recognize any I/O cards in the CIO Expander.	Bad cable connection to Channel Adapter card. Failed Channel Adapter card. (5) Failed Buffer Card.	Check/replace cable to Channel Adapter card. Replace Channel Adapter card. Replace Buffer Card.(6)

Footnotes for this table are included on the next page.

Table 4-3 Footnotes:

1. A blown fuse indicates a more serious problem with the power supply.
2. Before replacing a power supply, check the +5V, +12V, and -12V voltages and the PFW- and PPON+ signals on the Buffer Card. If all supply voltages are within specification and both PFW-B and PPON+ are positive (logic 1), then the problem is not with the power supply.
3. A power supply failure can occur in either the supply or in the internal power cabling. While removing the power supply, examine both the internal AC cables and the DC cables for bad connections or broken conductors.
4. Examine PPON+ on the Buffer Card and check the selftest LEDs on the I/O cards. If PPON+ is positive (logic 1), and all the selftest LEDs are off, the Channel Adapter card has failed.
5. If the Channel Adapter card passes selftest, the Buffer Card has failed.
6. If the Channel Adapter card and Buffer Card have failed, the problem may be in the SPU hardware or software.

Troubleshooting The BBU

Normally the front panel LEDs on the BBU indicate the state of the BBU, as listed in Table 4–4.

Table 4–4. Interpreting BBU LEDs

AC on LED	Battery LED	Status
OFF	ON	Battery Backup Mode
ON	ON	Battery Charging
ON	OFF	Battery in Standby Mode

During a power failure, a 825/835/925 with BBU goes into battery back-up mode to protect system memory. The batteries in the BBU supply voltage to the Auxiliary Power Supply card in the SPU. This card, in turn, sends a discharge signal to the battery pack, lighting the BATTERY LED on the BBU.

If a unit does not go into battery back-up mode, the problem is in the Auxiliary Power Supply card or in the BBU. If the Auxiliary Power Supply card has been replaced, the following components in the BBU could be causing a problem:

- Battery charger card
- PNP transistor
- Battery pack
- Battery fuse
- BBU cable

Table 4–5 summarizes troubleshooting for the BBU.

Table 4–5. Troubleshooting the BBU

Problem	Probable Cause
AC LED doesn't light when BBU is plugged in.	Battery charger card failure No AC at source Blown battery fuse
BBU doesn't go into battery back-up mode when AC power fails.	BBU failure Auxiliary Power Supply card failure
Batteries don't output +12VDC (measured at pins 1 and 2 (the outside pins) on the BBU cable).	Blown battery fuse Dead batteries (indicates a problem in the charging circuit as well, since batteries should fully charge within 24 hours) Defective BBU cable
Battery LED ON, AC LED ON	Batteries are charging. If BATTERY LED doesn't go out within 24 hours, there is probably a failure in: Battery pack Battery charger card PNP transistor on rear of BBU Battery fuse
BATTERY does not light during battery back-up mode; Aux. P.S. is okay and batteries are putting out +12 VDC.	Failure in: PNP transistor on rear of BBU Battery charger card

The PNP transistor is the power transistor on the rear of the BBU. It can be checked with an ohmmeter.

System-Level Diagnostics

This section provides an overview of the system-level diagnostics. For more information about diagnostics, refer to Chapter 5, "Diagnostics" in this manual.

The power-on selftest locates problems in the 825/835 and the 925 until the system boots to the ISL prompt. After the ISL prompt is displayed, a variety of diagnostics, exercisers, and utilities can be used to isolate problems. In order of diagnostic power (from most powerful to least powerful), the following are available:

Table 4-6. System Level diagnostics

Diagnostics	Description
Diagnostics	Determines FRUs that need replacing
Exercisers	Stresses a part of the system at the maximum load or beyond.
Verifiers	Verifies which functions of a device are operating correctly; they cannot isolate defective FRUs by themselves.
Utilities and tools	Provides system information or perform specific I/O operations.

Diagnostics come in two different varieties: Offline (ISL-Bootable) and Online. Table 4–7 describes the two kinds of diagnostics.

Table 4–7. Two Types of System Diagnostics

Offline (ISL-Bootable Diagnostics)	Online diagnostics
Run from ISL prompt	Run from MPE XL or HP-UX (either normal HP-UX or the small memory-resident HP-UX on the Support Tape)
Offline only	Online or offline
Documented in the *Offline Diagnostics System Manual* (PN 30190-90010). Also see *Support Tape User's Guide* (PN 92453-90010).	Documented in the *Online Diagnostics Subsystems Manuals* (PN 09740-90028,-90021,-90031)
Available on Support Tape:	Available on Support Tape:
IOMAP (I/O mapping utility)	CS80DIAG (disc diagnostic)
CAEXER (channel exerciser)	DIAG7478 (mag tape diagnostic)
A1002AP (CPU diagnostic)	CIPER (printer diagnostic)
A1002AM (memory diagnostic)	HPIBDIAG (HP-IB DA diagnostic)
A1001AI (I/O diagnostic)	MUXDIAG (multiplexer diagnostic)
A11002AP (SPU Processor Diagnostic)	LANDAD (LAN DA diagnostic)
A11002AM (SPU Memory Diagnostic)	PSIDAD (PSI Device Adapter diagnostic)
A11002AI (SPU I/O Diagnostic)	DELOG/DECODE (diagnostic message decoding utility)
CLKUTIL (Read and Set the Battery Back-up Time of Day Clock)	AFIDAD (AFI diagnostic)
	CADIAG (Channel Adapter Diagnostic)
	MEMDIAG (Memory Diagnostic)
	GP3DDIAG (Graphics Processor Diagnostic)
	GS2DDIAG (Graphics Subsystem Diagnostic)
	SS80DIAG (disc Diagnostics)
	FLEXDIAG (disc Diagnostic)
	REELDIAG (Reel tape Diagnostic)
	PPDIAG (Page printer Diagnostic)
	LOGTOOL (System and Memory Log)
	SYSMAP (System Map)
	TERMDSM (Terminal Diagnostic)
	IOTT (I/O Test Tool)
	DIAGINST (MPE XL Online Installer)

Support Tape

The Support Tape allows diagnosis of problems when HP-UX can not be booted from the system disc. It contains a special version of HP-UX, called the *Recovery System* The Recovery System is smaller than normal HP-UX (about 4 Mbytes). It resides entirely in memory — no system disc is needed.

The Support Tape is available in 1600 BPI magnetic tape form (PN 92452-13503) and on cartridge tape (PN 92452-13303). Instructions for the Support Tape are given in the *Support Tape User's Guide* (PN 92453-90010).

With the Support Tape, the following may be run:

- Online diagnostics (using the small version of HP-UX in on the Support Tape)
- Offline (ISL-Bootable) diagnostics

The 825/835/925 requires Rev. 1.1 (or later) of the Support Tape. (The Rev. number of the Support Tape is the same as that of the HP-UX release it accompanies.)

Offline (ISL-Bootable) Diagnostics

ISL-Bootable diagnostics are used to check hardware in the SPU and CIO Expander. To perform the ISL-Bootable diagnostics:

1. Follow the instructions in the *Support Tape User's Guide* for booting the Support Tape, logging in, and using the Support Tape menus.
2. Refer to the *Offline Diagnostics Systems Manual* (PN 30190-90010) for instructions on the specific test you want to run.

The following diagnostics for the 825/835/925 are available on the Support Tape:

- IOMAP (Input/Output Map Utility)
- SADPATCH (Diagnostic Patching Utility)
- CAEXER (Channel Exerciser Utility)
- A1002AP (SPU Processor Diagnostic)
- A1002AM (SPU Memory Diagnostic)
- A1002AI (SPU I/O Diagnostic)

System Operation

During system selftest, or after selftest has run successfully and the system is operating under normal conditions, the front panel LEDs and status LEDs reflect the state of the system at failure points. The system states in regard to the front panel are listed in Figure 4-23.

System state	run	fault	remote	main pwr	mem pwr	reset	temp	aux	status 0	status 1	status 2	status 3	status 4
normal (run) operation	1	0	0	1	1	0	0	0	A	A	A	A	A
warning	1	0	0	1	1	0	0	0	0	1	1	1	1
initialize	1	0	0	1	1	0	0	0	0	S	S	S	S
test and fault	0	1	0	1	1	0	0	0	E	E	E	E	E
software shutdown	0	1	0	1	1	0	0	0	0	0	0	0	1
blanking	0	1	0	1	1	0	0	0	0	0	0	0	0
remote enabled	1	0	1	1	1	0	0	0	A	A	A	A	A
reset	0	1	0	1	1	1	0	0	1	1	1	1	1
over temp shutdown	0	1	0	0	0	0	1	0	0	0	0	0	0
aux card shutdown	0	1	0	0	0	0	0	1	0	0	0	0	0
5V shutdown	0	1	0	0	0	0	0	0	0	0	0	0	0
AC fail w/o BBU or off	0	0	0	0	0	0	0	0	0	0	0	0	0
AC fail w/BBU	0	1	0	0	1	0	0	0	0	0	0	0	0

1= on
0 = off
A = activity
E = error code
S = stage of initialization

Figure 4-23. System States and Front Panel LEDs

5

Diagnostics

The Diagnostics Section provides information about supported online and offline diagnostics and utilities for MPE XL and HP-UX operating systems. Also included in this section is booting up information when using the HP-UX Support Tape. Table 5–1 lists diagnostics and utilities available on MPE XL and HP-UX operating systems.

Table 5-1. Available Diagnostics

Command	Name	System
CS80DIAG	CS/80 Disc Diagnostic	MPE XL,HP-UX
SS80DIAG	SS80 DISC Diagnostic	HP-UX
DIAG7478	HP7974A/7978 Magnetic Tape Drive Diagnostic	MPE XL,HP-UX
CIPERLPD	Ciper Line Printer Diagnostic	MPE XL,HP-UX
PPDIAG	Page Printer Diagnostic	MPE XL
CADIAG	CIO Channel Adapter Diagnostic	MPE XL
PSIDAD	PSI Device Adapter Diagnostic	MPE XL,HP-UX
HPIBDIAG	HP-IB Device Adapter Diagnostic	MPE XL,HP-UX
MUXDIAG	Six-Port Mux Diagnostic	MPE XL,HP-UX
LANDAD	LAN Diagnostic	MPE XL,HP-UX
REELDIAG	HP7479/80 Magnetic Tape Drive Diagnostic	MPE XL,HP-UX
HPFLDIAG	Fiber Link Device Adapter Diagnostic	MPE XL,HP-UX
FLEXDIAG	Flexible Disc Diagnostic	MPE XL,HP-UX
MEMDIAG	Memory Diagnostic	HP-UX

Table 5-1 (cont'd). Available Diagnostics

Command	Name	System
AFIDAD	AFI Device Adapter Diagnostic	HP-UX
GP3DDIAG	HP98720A Graphics Processor Diagnostic	HP-UX
GS2DDIAG	HP98556A Graphics Subsystem Diagnostic	HP-UX

Table 5-2. Available Utilities

Command	Name	System
LOGTOOL	System and Memory Log Analysis Tool	MPE XL
SYSMAP	System Map	MPE XL
TERMDSM	Terminal Diagnostic System Monitor	MPE XL
IOTT	I/O Test Tool	MPE XL
DIAGINST	MPE XL Online Diagnostic Installer	MPE XL
DELOG, DECODE	HP-UX Logging Facility	HP-UX

For detailed information on the diagnostic subsystems and diagnostic utilities, refer to:

- *Online Diagnostics Subsystem Manual Volume I: SPU and I/O* (PN 09740-90028)
- *Online Diagnostics Subsystem Manual Volume II: Peripherals* (PN 09740-90031)
- *Online Diagnostics Subsystem Utilities Manual* (PN 09740-90021).

Diagnostic User Interface (DUI)

The Diagnostic User Interface (DUI) provides access to all programs in the Online Diagnostic System.

Mini-Operating Instructions:

1. Enter the following system command to the system prompt:

   `:SYSDIAG (for MPE XL)`

   `/usr/diag/bin/sysdiag (for HP-UX)`

   The diagnostic responds with the following header and welcome message indicating that access has been gained to the Online Diagnostic System:

```
                ONLINE DIAGNOSTIC SUBSYSTEM

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         DUI version xx.yy   Monitor version xx.yy


                Type "HELP" for assistance.
```

   There is no Monitor version appearing on HP-UX systems. On HP-UX systems a positive integer appears as part of the DUI prompt to represent how many commands have been entered into the current DUI session.

2. Enter HELP to the DUI prompt for the following list of available commands to appear:

```
DUI> HELP

COMMAND                 DESCRIPTION

ABORT           Terminates active diagnostic programs.
CI or !         Provide access to operating system interpreter (shell).
EXIT            Exit from the diagnostic system.
HARDCOPY        Echo data displayed on terminal to printer or file.
HELP or ?       Provide help information for DUI or diagnostic programs.
INSTALL         Add/update programs that are part of the diagnostics.
LIST            List the programs that are part of the diagnostics.
MODE            Display/change current system mode.
PURGE           Delete programs from the diagnostic system.
REDO            Display and edit last DUI command.
RESUME          Allow a suspended program to resume processing.
RUN             Execute the specified program.
SHOWACTIVE      Display programs running in diagnostic system.
SUSPEND         Suspend the processing of the specified program.
TEST            Provides the ability to test a diagnostic program.
UNLOCK          Releases specified device from lock status.
USE             Causes DUI commands to be read from a file.
WAIT            Wait for background programs to terminate.
```

The commands INSTALL and PURGE are applicable for HP-UX, only. The commands TEST and UNLOCK are applicable for MPE XL, only.

Installation, modification, and removal of Online Diagnostic Programs on MPE XL operating systems is accomplished by using the MPE XL Online Installer (DIAGINST) facility. Installation, modification, and removal of Online Diagnostic Programs on HP-UX operating systems is accomplished by using the HP-UX Online Installer facility. Refer to the *Online Diagnostics Subsystem Manuals* (09740-90021, 09740-90028, 09740-90031) for detailed information regarding MPE XL. Refer to the *HP-UX System Administrator's Manual* (92453-90004) for detailed information regarding HP-UX.

CS/80 Disc Diagnostic (CS80DIAG)

The CS/80 Disc Diagnostic (CS80DIAG) tests the following disc drives:

- HP7907A, 7908
- HP7911, 7912, 7914
- HP7933, 7935, 7936, 7937
- HP7957B, 7958B
- HP7961B, 7962B, 7963B

This diagnostic can detect failures of one or more Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN CS80DIAG <RUN Command Options>
   ```

   Typing HELP causes a summary of the DUI function and its commands to appear on the screen.

3. The diagnostic responds with a header and welcome message.

   If sections and steps to be run are not specified, the default sections and steps are executed. The default sections are Sections 2, 3, 4, 5, 8, and 9. Default steps are all steps within sections. Execution of these defaults is dependent on the test mode that has been granted by the system.

   Default Sections:

   Section 2 Clear
   Section 3 Identify
   Section 4 Loopback (all steps)
   Section 5 Selftest
   Section 8 Common System Operations (all steps)
   Section 9 Status Tests (all steps)
   Section 17 CS/80 External Exerciser (Interactive Section)

   Additional Sections:

   Section 6 Status
   Section 7 Error Logs

4. If Section 17 is selected, the CS/80 diagnostic prompt appears.

```
CS80DIAG>
```

Entering HELP to the prompt displays a list of the available CS/80 External Exerciser commands.

```
CS80DIAG> HELP
```

The following table describes the commands available to the CS/80 External Exerciser:

Table 5-3. CS/80 External Exerciser Commands

Command	Description
ADDRESS	Allows the user to convert block addresses to 3-vector addresses and vice versa.
CACHE LOG	Allows the user to access the Cache Memory Error Test Log.
CACHEOFF	Allows the user to disable the disc controller cache memory.
CACHEON	Allows the user to enable the disc controller cache memory.
CACHE STATS	Allows the user to access the Cache Statistic Table.
CLEAR LOGS	Clears the Run-Time Data Error Log, the Error-Rate Test Data Log and the Drive Fault Log.
DESCRIBE	Obtains a CS/80 describe message from the device being tested and displays the contents to the user in text form.
DIAG	Initiates internal diagnostic tests which reside in the disc drive.
ERRSUM	Lists all test errors that have occurred in the device.
ERT LOG	Allows the user to access the Error-Rate Test Data Error Log.
EXIT	Terminates the External Exerciser.
FAULT LOG	Allows the user to access the Drive Fault Log.
HELP	Provides access to information concerning the commands that are available in the external exerciser.
INIT MEDIA	Allows the user to format the disc media.
PRESET	Forces errors stored in the drives RAM to be logged to the maintenance track.
READ	Allows the user to access any data block on the selected device.
READCACHEOFF	Allows the user to disable the disc controller read cache memory.

Table 5-3 (cont'd). CS/80 External Exerciser Commands

Command	Description
READCACHEON	Allows the user to enable the disc controller read cache memory.
RESET STATS	Resets the Cache Statistics Table.
REV	Allows the user to read the revision numbers of the ROMs.
RFSECTOR	Allows the user to read a full sector of data from the disc starting at any valid address.
RO ERT	Initiates a read only error-rate test.
RUN LOG	Allows the user to access the Run-Time Data Error Log.
SENSE	Allows the user to read the Hardware and Read/Write Fault registers.
SERVO TEST	Executes the drives internal butterfly seek routine.
SET PATTERN	Allows the user to define and edit a pattern to be used in the write-then-read error-rate tests.
SET RPS	Allows the user to enable/disable the Rotational Position Sensing (RPS) of CS/80 discs.
SPARE	Allows the user to spare a block or sector to an address which is reserved for sparing.
SUSPEND	Suspends CS80DIAG and returns to the DUI.
TABLES	Provides access to information tables which reside in the drive.
UNIT	Allows the user to set the unit number within the drive.
WTR ERT	Initiates a write then read error-rate test.

5. Type EXIT to exit Section 17 and control returns to the Online Diagnostic System.

SS/80 Disc Diagnostic (SS80DIAG)

The SS/80 Disc Diagnostic (SS80DIAG) tests the HP9122D, 9122S, and the 9127A SS/80 discs drives. This diagnostic can detect failures of one or more Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   /usr/diag/bin/sysdiag
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN SS80DIAG <RUN Command Options>
   ```

   Typing HELP causes a summary of the DUI function and its commands to appear on the screen.

3. The diagnostic responds with a header and welcome message.

   If sections and steps to be run are not specified, the default sections and steps are executed. The default sections are Sections 2, 3, 4, 5, 8, and 9. Default steps are all steps within sections. Execution of these defaults is dependent on the test mode that has been granted by the system.

   Default Sections:

   Section 2 Clear
   Section 3 Identify
   Section 4 Loopback (all steps)
   Section 5 Selftest
   Section 8 Common System Operations (all steps)
   Section 9 Status Tests (all steps)
   Section 17 SS/80 External Exerciser (Interactive Section)

   Additional Sections:

   Section 6 Status
   Section 7 Error Logs

4. If Section 17 is selected, the SS/80 diagnostic prompt appears.

```
SS80DIAG>
```

Entering HELP to the prompt displays a list of the available SS/80 External Exerciser commands.

```
SS80DIAG> HELP
```

The following table describes the commands available to the SS/80 External Exerciser:

Table 5-4. SS/80 External Exerciser Commands

Command	Description
ADDRESS	Allows the user to convert block addresses to 3-vector addresses and vice versa.
CICLEAR	Clears the selected device.
DESCRIBE	Obtains a CS/80 describe message from the device being tested and displays the contents to the user in text form.
DIAG	Initiates internal diagnostic tests which reside in the disc drive.
EXIT	Terminates the External Exerciser.
HELP	Provides access to information concerning the commands that are available in the external exerciser.
INIT MEDIA	Allows the user to format the disc media.
READ	Allows the user to access any data block on the selected device.
SDCLEAR	Clears the device to its power-on state.
UNIT	Allows the user to set the unit number within the drive.

5. Type EXIT to exit Section 17 and control returns to the Online Diagnostic System.

Flex Disc Diagnostic (FLEXDIAG)

The Flex Disc Diagnostic (FLEXDIAG) tests the Flex disc drives. This diagnostic can detect failures of one or more Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   :SYSDIAG (for MPE XL)
   ```

   ```
   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN FLEXDIAG <RUN Command Options>
   ```

   Typing HELP causes a summary of the DUI function and its commands to appear on the screen.

3. The diagnostic responds with a header and welcome message.

   If sections and steps to be run are not specified, the default sections and steps are executed. The default sections are Sections 2, 3, 4, 5, 8, and 9. Default steps are all steps within sections. Execution of these defaults is dependent on the test mode that has been granted by the system.

   Default Sections:

   Section 2 Clear
   Section 3 Identify
   Section 4 Loopback (all steps)
   Section 5 Selftest
   Section 8 Common System Operations (all steps)
   Section 9 Status Tests (all steps)

   Additional Sections:

   Section 6 Status
   Section 7 Error Logs
   Section 17 External Exerciser

4. To exit FLEXDIAG, type EXIT. Control returns to the Online Diagnostic System.

HP 7974A and 7978A/B Magnetic Tape Drive Diagnostic (DIAG7478)

The HP 7974A and 7978A/B Magnetic Tape Drive Diagnostic (DIAG7478) tests an HP 7974A or HP 7978A/B Magnetic Tape Drive online and offline. Specify which sections and steps are to be run.

Mini-Operating Instructions:

1. Ensure the tape drive to be tested is powered on. Ensure that a scratch tape has been mounted and the tape drive is placed online for sections which tape movement and write/read operations are to be run.
2. Enter the following command to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

3. Enter the following command to the DUI prompt:

   ```
   DUI> RUN DIAG7478 <RUN Command Options>
   ```

   Type HELP for a summary of the available RUN commands.

4. The diagnostic responds with a header and welcome message. If specific sections and steps are not specified, the following default sections and steps are executed:

   Default Sections:

   Section 2 Clear
   Section 3 Identify
   Section 4 Loopback
   Section 6 Hardware Status
   Section 40 Firmware Utilities
   Section 50 Image Utilities
   Section 55 Display Logs

   For the HP 7974A Only:

   Section 34 HP 7974A Selftests

   For the HP 7978A/B Only:

   Section 38 HP 7978A/B Selftests

Additional Sections:

Section 10 Set Tape Density Commands
Section 15 Write/Read Comparison Check (NRZI or GCR)
Section 16 Write/Read Comparison Check (PE)
Section 20 Selectable Tape Movement Commands
Section 23 Selectable Tape Read Data Commands
Section 25 Paces
Section 45 Download Diagnostics
Section 60 Interactive Section
Section 62 Do All Tests

Note For MPE XL, the default magtape LDEV parameter is 7. For HP-UX, no default magtape device parameter exists.

5. Type EXIT and control returns to the Online Diagnostic System as soon as all requested steps are complete.

Reel Tape Diagnostic (REELDIAG)

The Reel Tape Diagnostic (REELDIAG) tests the HP7974A, HP7978A/B, HP7979A, and the HP7980A tape drives. The Tape drive under test must contain internal selftests that are capable of detecting failed field replaceable units in the tape drive. REELDIAG does the following:

- Set the selected tape drive to a known condition.
- Identify the tape drive as one of the listed types.
- Test the HP-IB communication link between the SPU and the device.
- Request the tape drive to run certain internal selftests.
- Obtain and decode hardware status and selftest results.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN REELDIAG <RUN command options>
   ```

   Enter HELP to display a summary of the available RUN command options.

3. The diagnostics responds with a header and day, date, and time display. If specific sections and steps are not specified, the following default sections and steps are executed:

   Default Sections:

Section 2	Clear
Section 3	Identify
Section 4	Loopback
Section 5	Selftest
Step 20	Complete electronics checkout
Section 6	Display device status

   Additional Sections:

Section 7	Display log information

4. Upon completion of all selected sections and steps, control returns to the DUI program.

Ciper Line Printer Diagnostic (CIPERLPD)

The Control Messages for Intelligent Peripherals (CIPER) Diagnostic tests HP2563A/64B/65A/66A/66B or HP 2567B Line Printer to detect failures of a Field Replaceable Unit (FRU). The CE can:

- Specify which sections and steps are to be run.
- Set test parameters to control the handling of error messages.
- Select the number of test executions and the particular CIPER Line Printer unit to be tested.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   `:SYSDIAG (for MPE XL)`

   `/usr/diag/bin/sysdiag (for HP-UX)`

2. Enter the following command to the DUI prompt:

   `DUI> RUN CIPERLPD <RUN Command Options>`

   Enter HELP to display a summary of the available RUN commands.

3. The diagnostic responds with a header and welcome message.

   If specific sections and steps are not specified, the following default sections and steps are executed:

Note The CIPER device to be tested must be powered up and put online to ensure proper completion of all sections and steps.

Default Sections:

Section 2 Reset
Section 3 Clear/Identify
Section 5 Selftest
Section 6 Request Device Status (all steps)

Additional Sections:

Section 10 Ripple Print
Section 12 Request and Decode Environmental Status
Section 14 Request and Decode Job Status

4. To exit CIPERLPD, type EXIT and control returns to the DUI upon completion of the current section and step.

Page Printer Diagnostic (PPDIAG)

The Page Printer Diagnostic (PPDIAG) tests the HP 2680A or HP 2688A Page Printer to detect failures of Field Replaceable Units (FRUs). The Page Printer Diagnostic program can be invoked by the I/O system on catastrophic errors for auto-diagnostic purposes. Only MPE XL operating systems have auto-diagnostic capability.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   :SYSDIAG
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN PPDIAG <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

Note The Page Printer to be tested must be powered up and put online to ensure proper completion of all sections and steps.

If specific sections and steps are not specified, the default sections and steps are executed.

Default Sections:

Section 2 Clear
Section 3 Identify
Section 4 Loopback
Section 5 Selftest
Section 20 Pattern Print

Additional Sections:

Section 6 Display I/O Status
Section 8 Display Environmental Status
Section 50 Simulate Panel (HP 2680 only)

4. To exit PPDIAG type EXIT. Control returns to the DUI upon completion of the current section and step. A description of PPDIAG and all sections contained within are available through the DUI HELP facility.

CIO Channel Adapter Diagnostic (CADIAG)

The CIO Channel Adapter Diagnostic (CADIAG) is a Diagnostic subsystem program providing capability to test online the functionality of the CIO Channel Adapter, which is itself a Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following command to the MPE XL prompt:

   ```
   :SYSDIAG
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN CADIAG <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If the sections and steps to be run aren't specified, the following default sections and steps are executed:

   Default Sections:

   Section 3 Identify
   Section 5 Selftest
   Section 6 Request Status
   Section 8 Description

   Additional Sections:

   Section 9 Rollcall
   Section 10 Subchannel Hardware Status

   Enter HELP to provide a summary of the DUI commands to be printed.

4. Type EXIT to exit CADIAG and control returns to the Online Diagnostic System.

PSI Device Adapter Diagnostic (PSIDAD)

PSIDAD tests Programmable Serial Interface cards on an HP Precision Architecture (HPPA) computer system which supports the Online Diagnostic subsystem.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN PSIDAD <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If the sections and steps to be run aren't specified, the following default sections and steps are executed:

   Default Sections:

   Section 3 Identify
   Section 5 Selftest
   Section 6 Status

   Additional Sections:

   Section 1 More Help
   Section 2 Reset
   Section 8 Internal Hardware
   Section 9 External Hardware
   Section 10 Manufacturing Utilities

   Enter HELP to provide a summary of the DUI commands to be printed.

4. Type EXIT to exit CADIAG and control returns to the Online Diagnostic System.

AFI Device Adapter Diagnostic (AFIDAD)

The AFI Device Adapter Diagnostic (Asynchronous FIFO Interface Device Diagnostic, AFIDAD) tests the HP 27114A AFI. This diagnostic runs on the HP 9000 Series 800 Computer System.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   /usr/diag/bin/sysdiag
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN AFIDAD <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If sections to be run are not specified, the default sections are executed.

   Default Section:

   Section 3 Identify

   Additional Sections:

   Section 1 More Help
   Section 2 Reset
   Section 4 Hardware Test
   Section 5 Loopback Test
   Section 6 Status
   Section 7 Control

4. To exit AFIDAD, type EXIT.

HP-IB Device Adapter Diagnostic (HPIBDIAG)

The HP-IB Device Adapter Diagnostic (HPIBDIAG) is a diagnostic system program that provides the capability to test online the functionality of the HP-IB Device Adapter, which is itself a Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN HPIBDIAG <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If specific sections and steps are not specified, the default sections and steps are executed based on the following diagnostic system modes:

   Default Sections:

   Section 3 Identify
   Section 4 Loopback
   Section 5 Selftest

   Additional Sections:

   Section 6 Request Status
   Section 12 Rollcall

4. To exit HPIBDIAG type EXIT. Control returns to the Online Diagnostic System.

HP-FL Device Adapter Diagnostic (HPFLDIAG)

The HP-FL Device Adapter Diagnostic (HPFLDIAG) is a diagnostic system program that provides the capability for online testing of the Device Adapter, which is itself a Field Replaceable Unit (FRU).

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN HPFLDIAG < RUN Command Options >
   ```

3. The diagnostic responds with a header and welcome message.

   If sections and steps to be run are not specified, the default sections and steps are executed. The default sections are Sections 10 and 11.

   Default Sections:

   Section 10 Verification Trouble Tree
   Section 11 Diagnostic Trouble Tree

   Additional Sections:

   Section 2 Clear
   Section 3 Identify
   Section 4 Loopback
   Section 6 HP-FL Interface Global Status
   Section 12 On-site Trouble Tree

4. To exit HPFLDIAG, type EXIT. Control returns to the Online Diagnostic System.

Memory Array Diagnostic (MEMDIAG)

The Memory Array Diagnostic (MEMDIAG) tests and verifies the memory controllers and memory arrays online from the System Console or a remote maintenance terminal.

The Memory Array Diagnostic provides three diagnostic functions and one verifier function. The diagnostic functions consist of a total pattern test of memory, a partial pattern test of memory, and an interactive section.

Mini-Operating Instructions:

1. Enter the following commands:

   ```
   /usr/diag/bin/sysdiag
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN MEMDIAG <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If specific sections and steps are not specified, the following default sections and steps are executed based on the diagnostic mode which has been selected by the Online subsystem.

   Default Sections:

   Section 10 Full Automatic Memory Test (all steps)
   Section 11 Partial Automatic Memory Test (all steps)

4. To exit MEMDIAG type EXIT. Control returns to the Online Diagnostic System.

Six Channel Mux Diagnostic (MUXDIAG)

The Asynchronous Six Channel Multiplexer Diagnostic (MUXDIAG) is a diagnostic subsystem program that checks the functionality of the HP 27140A Asynchronous Six Channel Multiplexer Interface card, which is itself a Field Replaceable Unit (FRU).

Minimum Configuration

The hardware required to run the diagnostic is different for the MPE XL or HP-UX operating system.

When running the HP-UX operating system, ensure that the following hardware is present:

- At least two MUX (6 channel) cards for running the diagnostic from a terminal attached to one card to test the other card.
- A System Console to run diagnostics for the other MUX card.

When running the MPE XL operating system, ensure that the following hardware is present:

- One MUX card (6 channel).
- A configured and functional LAN system.
- A configured and functional Distributed Terminal Control (DTC) system.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)
   ```

   Typing HELP to the prompt displays a summary of the available RUN commands.

2. Enter the following to the DUI prompt:

   ```
   DUI1> MODE SUM                          <Go into Single User Mode>
   Single User Mode (SUM)                  <Displayed by SYSDIAG>
   DUI2> RUN MUXDIAG dev=/dev/diag/mux*    <RUN Command Options>
   ```

3. The diagnostic responds with a header and welcome message.

   If specific sections and steps are not specified, the default sections and steps are executed based on the following diagnostic system modes:

   Default Sections:

   Section 1 State
   Section 3 Identify
   Section 4 Loopback

   Additional Sections:

   Section 2 Clear
   Section 5 Selftest
   Section 10 Write/Read

4. To exit MUXDIAG type EXIT.

Local Area Network Device Adapter Diagnostic (LANDAD)

The Local Area Network Device Adapter Diagnostic (LANDAD) tests HP 36921A LAN Links (used on HP 3000/925 Computer Systems) and HP 98194A LAN Links (used on HP 9000/825/835 Computer Systems). LANDAD is capable of detecting a failure in one or more Field Replaceable Unit (FRU). An FRU for LANDAD is the LAN interface card (LANIC), the LANIC connector cable, the attachment unit interface (AUI) cable, the medium attachment unit (MAU), and the medium interface (MDI).

Mini-Operating Instructions:

1. Enter the following command to the system prompt.

   ```
   :SYSDIAG (for MPE XL)

   /usr/diag/bin/sysdiag (for HP-UX)

                  ONLINE DIAGNOSTIC SUBSYSTEM
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                     Version xx.yy
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI1> RUN LANDAD PDEV=8.4
   ```

   Where PDEV is the physical device number. The first digit is the Midbus number (usually 8) and the second digit is the CIB slot number in which LANIC is located.)

3. The diagnostic responds with a header and welcome message.

   The diagnostic requests a routine which allocates the LANIC and displays the following sections which can be run:

   Default Sections:

   Section 3 Identify
   Section 4 Local Loopback (to LANIC and back)
   Section 6 Status

   Additional Sections:

   Section 1 More Help
   Section 2 Reset
   Section 5 Selftest
   Section 7 Link Statistics
   Section 8 External Loopback
   Section 9 Remote Node Test
   Section 10 Remote XID Test
   Section 11 AUI Cable Fault Isolation Test
   Section 12 Offline MAU Test

Caution For MPE XL, never abort LANDAD when Sections 3, 4, 9, or 10 are specified. This can cause the diagnostic to lose functionality the next time the diagnostic is run.

4. To access the HELP facility for LANDAD, enter HELP to the DUI prompt.

   LANDAD is not an interactive diagnostic, and contains no user accessible commands.

5. Type EXIT to terminate the LANDAD diagnostic. Control returns to the Online Diagnostic System.

HP98720A Graphics Processor Diagnostic (GP3DDIAG)

The HP98720A Diagnostic (HPFLDIAG) tests the HP98720A Graphics Display Station.

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   /usr/diag/bin/sysdiag
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN GP3DDIAG < RUN Command Options >
   ```

   Refer to the DUI section for details concerning RUN command options. The diagnostic responds with a header and welcome message. If the user does specify which section to run, then the default is "all".

   Because some sections may be either disruptive or destructive, the diagnostic subsystem grants the highest mode available based on the user's security level. Only those users with level 1 or 0 security are able to execute all default sections.

   Default Sections:

   Section 11 Refresh Bus
   Section 12 Z-Buffer
   Section 13 Repeat Pattern
   Section 14 Dither
   Section 15 Transparency
   Section 16 Frame Buffer RAM via LGB
   Section 17 Transform Board Registers
   Section 18 Simple Test WCS
   Section 19 IEEE Writeable Control Store Memory
   Section 20 Writeable Control Store Memory Walking Bit
   Section 21 Transform Board Sequencer
   Section 22 Transform Board ALU
   Section 23 Transform Board Pointer RAM
   Section 24 Transform Board Data RAM
   Section 25 Transform Board Floating Point Chip
   Section 26 Command Data RAM Path
   Section 27 DC RAM via LGB
   Section 28 DC RAM via uCode
   Section 29 ACE Register
   Section 30 Color Map
   Section 31 ID Font/ROM
   Section 32 Frame Buffer Controller Shadow RAM
   Section 33 Frame Buffer RAM
   Section 34 Frame Buffer Controller Write Enable
   Section 35 Frame Buffer Controller Folded/Normal Mode Addressing
   Section 36 Frame Buffer Controller Window Move
   Section 37 Frame Buffer Controller Slow Window Move
   Section 38 ACE Chip
   Section 39 Real Time Measurements
   Section 40 Transform Board Spin

3. When the specified/default sections have been completed, the diagnostic terminates and the following prompt is displayed:

```
DUI>
```

4. To exit the DUI, type EXIT. Control returns to the Online Diagnostic System.

Graphics Subsystem Diagnostic (GS2DDIAG)

The A1020A 2D Graphics Subsystem (GS2DDIAG) tests and verifies any A1020As configured as system consoles or workstations on any HPPA computer.

Mini-Operating Instructions:

1. Enter the following to the system prompt:

   ```
   /usr/diag/bin/sysdiag
   ```

2. Enter the following to the DUI prompt:

   ```
   DUI> RUN GS2DDIAG < RUN Command Options >
   ```

   Refer to the DUI section for details concerning RUN command options. The diagnostic responds with a header and welcome message. If the user does specify which section to run, then the default is "all".

   Because some sections may be either disruptive or destructive, the diagnostic requires that all sections be run in Single User Mode (SUM). Only those users with level 0 security will be able to execute all sections.

   Default Sections:

   Section 10 Cycle Type Register Test
   Section 11 Address Register Test
   Section 13 CATSEYE ID ROM Checksum Test
   Section 14 Word Mode Access Test
   Section 15 Byte Mode Access Test
   Section 16 Long Word Mode Access Test
   Section 22 Register R/W Test
   Section 23 Color Map Initialization
   Section 24 Frame Buffer Read/Write Test
   Section 25 BARC Chip(s) Test
   Section 26 RUG Chip Test
   Section 27 Final Pattern Generation and IRIS Color Map Read/Write Test

3. When the specified/default sections have been completed, the diagnostic terminates and the following prompt is displayed:

   ```
   DUI>
   ```

4. To exit the DUI, type EXIT. Control returns to the Online Diagnostic System.

I/O Test Tool (IOTT)

The I/O Test Tool (IOTT) is intended for online diagnosis of I/O related problems from any system terminal. Numerous commands, instructions, and program statements are available as inputs through I/O Test Tool.

Mini-Operating Instructions:

Before attempting to run the utility, ensure that the user has diagnostic level 0 security.

1. Enter the following command to the MPE XL prompt:

   ```
   :SYSDIAG
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> RUN IOTT <RUN Command Options>
   ```

   Refer to the Section on DUI for details concerning the RUN command options and the detailed IOTT command options in this section.

3. The diagnostic responds with a header and welcome message.

   Once the I/O Test Tool is invoked, the following message are displayed indicating an input request:

   ```
   IOTT>
   ```

   The four categories of input commands and the five categories of input Buffer Manipulation Instructions available for I/O Test Tool are provided in this section.

4. To exit IOTT type EXIT. Control returns to the Online Diagnostic System as shown by the appearance of the DUI prompt:

   ```
   DUI>
   ```

Command Summary

The four categories of input commands available with IOTT are listed as follows:

1. **Control Commands (CC)**

   The following commands are used to control the current execution mode of I/O Test Tool:

   ```
   ABORT
   EXIT
   RESUME
   RUN[count]
   SUSPEND
   ```

2. **User Program File Commands (UPFC)**

   The following commands are available to utilize user program files:

```
LOAD (filename)
PURGE (filename)
SAVE (filename)
SHOWFILE [file specifier string]
```

3. **Program Editing Commands (PEC)**

   The following commands can be used to manipulate the contents of the Program Storage Area:

```
DELETE [linenumber]
DELETE [linenumber]/[linenumber]
DELETE ALL
LIST [linenumber]
MODIFY [linenumber]
MOVE [linenumber]/[linenumber] TO [linenumber]
MOVE [linenumber] TO [linenumber]
RENUMBER [value]
```

4. **Miscellaneous Commands (MC)**

   The following commands are available for general use:

```
HELP [command, instruction, or statement name][:SYNTAX]    REDO
```

Instruction Summary

The five categories of input Buffer Manipulation Instructions available for IOTT are as follows:

1. **Test Environment Instructions (TEI)**

   The following instructions are used to set the environment for the use of I/O Test Tool:

```
ERRPAUSE ON
ERRPAUSE OFF
RELDEVICE LDEV=[ldev]
RELDEVICE PDEV=[pdev]
SETDEVICE LDEV=[logical device number]
SETDEVICE PDEV=[CA#][.DA#[.Device#[.Unit#]]
SETTIMER {value}
SHOWDEV
```

2. **Buffer Manipulation Instructions (BMI)**

Buffer function instructions provide the availability to fill, modify, and display data which was used for the I/O request. The two types of buffers used are integer buffers (32 bit entities) and byte buffers (8 bit entities). For functions which involve two buffers, both buffers must be of the same type. The available instructions are:

```
ADJBUFF [buffer name]([index]),[value],[count]
ALTBUFF [buffer name]([index]),[value],[value]
ALTBUFF [buffer name]([index]),"ascii text"
COMPBUFF [buffer](index]),[buffer]([index]),[length],[count]
         [diff   ]:[display mode]
          similar
COPYBUFF {buffer}({index}),{buffer}({index}),{length},[count]
DBUFF {buffer name} [:display mode]
DBUFF {buffer name} [index] [:display mode]
DBUFF {buffer name} [index/index] [:display mode]
DEFBUFF {buffer name},{length},{BYTE} [:STATUS]
DEFBUFF {buffer name},{length},{WORD} [:STATUS]
FILLBUFF [buffer]([index]),[value],[count]
FINCBUFF {buffer name}({index}),{start},{end}[,inc]
RELBUFF {buffer name}
SHOWBUFF
```

3. **Predefined I/O Request Instructions (PIORI)**

The following instructions give all information needed for the predefined I/O request:

```
FDABORTIO
EINCADDR {value}
EXECUTE {function}[,count][: UNBLOCK]
DSTATUS
INCADDR {value}
RESETIO
SETADDR CLY={cylinder};HEAD={head};SECT={sect}
SETADDR {value}
SETDATA {buffer},{length}
SETOPTION {option}[,option]
SHOWPARM
```

4. **HP-IB Device Adapter Program Instructions (HPIBPI)**

I/O Test Tool provides instructions for creating unique HP-IB device adapter programs. This allows more control over the protocol between the HP-IB device adapter and a peripheral device. The instructions available are as follows:

```
{line number} CASEJUMP {value},{line number}[,line number]
CLEAR {value}
{line number} CRCCOMP {line number}
CRCINIT
CRCWRITE
{line number} DSJ {sindex},{line number},[line number],[line number]
ENDHPIB
HALT {status length},{hstat}
IDENTIFY {sindex}
{line number} JUMP {line number}
ONTIMEOUT [timeout],[sindex],[line number]
PINDEX {value}
RBURST {secondary},{buffer name},{length},{#burst},{burstlen}
RDATA {secondary},{sindex},{length}
RDMA {secondary},{buffer name},{length}
SETHPIB
SHOWHPIB [:display mode]
TIMEOUTOFF
TIMESTAMP {sindex}
UNLOCK
WAITPOLL [:nobreak]
WBURST {secondary},{buffer name},{length},{#burst}[:eoi]
WDATA {secondary},{buffer name},{length}[:eoi]
WDMA {secondary},{buffer name},{length} [:eoi]
WINTERF {buffer name},{length}
```

5. **HP-CIO DMA Chain Instructions (HPCIOI)**

I/O Test Tool provides the following instructions to control the protocol across the HP-CIO:

```
ADDQUAD {order ID},{buffer name},{length}[:hpcio optional]
ADDQUAD {cmd value},{buffer name},{length}
ENDHPCIO
SETHPCIO
SHOWHPCIO [:display mode]
```

Program Statement Summary

The following are program command statements available in IOTT:

```
COMMENT
DO-LOOPTO
GOTO
IF-THEN/IFN-THEN
PAUSE
PRINT
STOP
```

System and Memory Log Analysis Tool (LOGTOOL)

The system and memory log analysis tool (LOGTOOL) provides capability to perform various operations on the system log files. Error logs may be identified, deleted, and created. Timing intervals for background log analysis may be displayed and reset.

Mini-Operating Instructions:

1. Enter the following command to the MPE XL prompt:

   ```
   :SYSDIAG
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> run logtool
   ```

3. The utility responds with a header and welcome message.

   Once LOGTOOL has been invoked the following prompt is displayed indicating an input request:

   ```
   LOGTOOL>
   ```

4. Respond by entering a logtool command along with any necessary data, parameter(s), or options. Entering HELP accesses the logtool HELP facility and display a complete list of logtool commands.

   The three categories of input commands available are:

   - System Log File Commands (SFL).
   - Memory Log File Commands (MLF).
   - Miscellaneous Commands (MC).

   The following commands listed with their command category are available in LOGTOOL:

   ```
   DISPLAYLOG (MC)        PURGESYSLOG (SLF)
   EXIT (MC)              PURGEWORK (SLF)
   HELP (MC)              REDO (MC)
   LAYOUT (SLF)           SELECT (SLF)
   LIST (SLF)             STATUS (SLF)
   MEMCLR (MLF)           SUSPEND (MC)
   MEMRPT (MLF)           SWITCHLOG (SLF)
   MEMTIMER (MLF)         TYPES (SLF)
   ```

5. Type EXIT to leave the HELP facility or to terminate any current logtool process.

System Map (SYSMAP)

The System Map (SYSMAP) utility provides information concerning these three areas of the HP Precision Architecture Computer System: Input/Output System (IOMAP), Central Processing Unit(s) (CPUMAP), and System Memory (MEMMAP). Maps of these three areas are available only on the host system.

Mini-Operating Instructions:

1. Enter the following command to the MPE XL prompt:

   ```
   :SYSDIAG
   ```

2. Enter the following command to the DUI prompt:

   ```
   DUI> run sysmap
   ```

3. The utility responds with a header and welcome message.

   SYSMAP has no RUN command options. Once SYSMAP has been invoked the following prompt is displayed indicating an input request:

   ```
   ENTER MAP>
   ```

4. Typing HELP causes SYSMAP to list a menu of the following global SYSMAP commands:

   ```
   IOMAP
   CPUMAP
   MEMMAP
   CONFIRM (ON/OFF)
   TIMEOUT
   SUSPEND
   EXIT
   ```

   Respond with one of the above seven commands.

5. Type EXIT to terminate any current mapping process or to leave the HELP facility.

MPE XL Online Diagnostic Installer (DIAGINST)

The MPE XL Online Diagnostic Installer (DIAGINST) utility permits online updating of the online diagnostic subsystem and its directory. This utility serves as a remote and on site support tool.

Mini-Operating Instructions:

1. Enter the following command to the MPE XL prompt:

   ```
   :run diaginst.diag.sys;lib=g
   ```

   After the introductory message is displayed at initialization, the following main menu is displayed:

   Available Commands:

   ```
   ADD
   CORRECT
   EXIT
   LIST
   REMOVE
   SHOWMSG
   SYSTEM
   XCHECK
   INSTALLATION TASK (select by command name) >
   ```

2. Enter HELP to any prompt for assistance on the use of this program. Another facility available is HELP "GENERAL/COMMANDS/HELP/RECOVER".
3. To leave this program, enter EXIT as displayed in the main menu of available commands.

HP-UX Logging Facility

The HP-UX Logging Facility provides a means of obtaining and decoding Diagnostic Event Messages (DEMs). The acquisition of the event messages is handled by the HP-UX DELOG (Diagnostic Event Logger) program. To decode these messages, use the HP-UX DECODE (Diagnostic Event Decoder) program.

Mini-Operating Instructions:

1. Enter the following command to the system prompt:

   ```
   /usr/diag/bin/sysdiag
   ```

   The system responds with a header and welcome message. Enter HELP for assistance.

   ```
   DUI (n)>
   ```

2. Enter desired command by preceding each command entry with an exclamation point:

   ```
   DUI (n)> ! delog or
   ```

   ```
   DUI (n)> ! decode
   ```

   Use the DELOG command when the altering operation of the Delog background log process deamon is desired. Use the DECODE command when decoding and displaying a particular Diagnostic Event Message (DEM).

3. Type EXIT to terminate program or to leave the HELP facility.

Using the Online Diagnostics

The implementation of the Online Diagnostic Subsystem is slightly different for the HP-UX and MPE XL operating systems. Refer to Table 5–5 for system-dependent features.

Use the *HP-UX System Administrator's Manual* (92453-90004) to look up information concerning HP-UX Online Diagnostic subsystem security, the Online Diagnostic subsystem directory tree, Diagnostic special files, and DUI permissions.

Use the *MPE XL System Configuration Manual* (32650-90042) to look up information concerning MPE XL system tables and configuration.

System-Dependent Features

Table 5-5. System-Dependent Features

Description	HP-UX	MPE XL
Maximum USE file nesting level:	10	10
Maximum processes per DUI:	system dependent	10
User Interrupt Key:	CTRL c	CTRL y
Command (REDO) Stack depth:	10	5
Input/Output Files:	character string (80 max)	80 character records unnumbered
Directory "path":	/dir/dir.../file	file.group.acct
Monitor Version:	n/a	xx.yy

Offline Diagnostics Overview

The Offline Diagnostics System provides a means of testing System Processor Unit (SPU) hardware Field Replaceable Units (FRUs) and interrogating low-level hardware register contents. It includes a standard operating environment complete with a library of common procedures, program macros, and command set/feature functionality. For more information about the Offline Diagnostics, read the *Offline Diagnostics System* (P/N 30190-90010).

The ISL-based Offline Diagnostics and Utilities are implemented via the Support Tape on either an open reel (P/N 92454-13503) or Cartridge tape (P/N 92452-13303) format.

Note Throughout this section, references to the Model 825/925 also apply to the Model 835. Exceptions are specifically noted.

To find out what offline diagnostics are available, call up the processor diagnostic by entering `A1002AP` to the ISL prompt. Ask the program for a description of the commands by typing:

```
ISL> help

?            Help Facility
HELP         Help Facility
LISTF        List ISL Utilities
LS           List ISL Utilities
AUTOBOOT     Set or clear autoboot flag in stable storage
AUTOSEARCH   Set or clear autosearch flag in stable storage
PRIMPATH     Modify primary boot path in stable storage
ALTPATH      Modify alternate boot path in stable storage
CONSPATH     Modify system console path in stable storage
DISPLAY      Display boot and console path in stable storage
LSAUTOFL     Lists contents of autoboot file
LISTAUTOFL   Lists contents of autoboot file
READNVM      Displays contents of one word of NVM
READSS       Displays contents of one word of stable storage

Utilities on this system are:

HPUX
IOMAP
CAEXR
SADPATCH
A1002AI
A1002AM
A1002AP
A11002AI
A11002AM
A11002AP
CLKUTIL
```

Table 5-6. Available Offline Diagnostics

Name	SPU	Systems	Description
A1002AP	A1002A/A1035A	825/835/925	A1002A SPU Proc. Diag
A1100AP	A1100A	850S/950	A1100A SPU Proc. Diag
A1002AM	A1002A/A1035A	825/835/925	A1002A SPU Memory Diag
A1100AM	A1100A	850S/950	A1100A SPU Memory Diag
A1002AI	A1002A/A1035A	825/835/925	A1002A SPU I/O Diag
A1100AI	A1100A	850S/950	A1100A SPU I/O Diag
IOMAP	all HPPA SPUs	all HPPA systems	Input/Output Map Utility
CAEXR	all HPPA SPUS	all HPPA systems	Channel Exerciser Utility

System Components

The Offline Diagnostics System is composed of the User Interface (UI) and diagnostic programs. Because they run from the ISL environment rather than MPE XL or HP-UX, the system is unavailable for normal use. This user interface cannot be accessed directly by the user but functions automatically whenever any of the above programs are invoked. The Offline utility programs IOMAP and CAEXR contain their own user interface.

User Interface

The User Interface (UI) is the communication link between the user and the various diagnostic programs. It sends messages to the user from diagnostic programs, and returns user replies.

Diagnostic Programs

The Diagnostic Programs are a comprehensive set of software to test FRUs for Processor, Memory and I/O functionality on the HP Model 825/925 or A1100A SPUs. These diagnostics determine which of the field replaceable units (FRUs) need replacement.

Utility Programs

Offline Utility programs cannot isolate defective FRUs, but can verify which functions of a device are operating correctly. Input/Output Map (IOMAP) and Channel Exerciser (CAEXR) help determine the cause of device failure by providing stress simulation and diagnostic information.

SPU Processor Diagnostic (A1002AP, A1100AP)

The Series HP A1002A/A1100A SPU Processor Diagnostic tests the VLSI chip set of the HP A1002A (825/925), HP A1035A (835) or HP A1100A (850S/950) Central Processing Unit (CPU) for FRU failures.

Minimum Configuration

The minimum hardware/software configuration required to load and run the offline diagnostics system consists of the following functional hardware, firmware, and software items:

- HP A1002A/A1100A SPU
- Boot device and boot path hardware (such as a magtape drive)
- System console
- Initial System Load Code (ISL)
- Offline Diagnostics Software

Table 5-7. SPU Processor Diagnostic Test Sets

Set	Name of Test	Sections	Tests
1	CPU Data Path	1/6	6
2	SIU Data Path	7/10	4
3	CCU0 Data Path	11/18	8
4	CCU1 Data Path	19/26	8
5	TCU Data Path	27/40	14
6	CPU Instruction	41/93	53
7	CPU Extended	94/102	9
8	Floating Point	103/126	23

Because test sets three and four are identical, there are seven actual sets of processor tests.

Unique Commands

Three additional commands are available to determine diagnostic information:

Table 5-8. Additional Commands

Command	Description
PSTAT	Displays the chip revision number and cache line lockout status.
CREGISTER	Displays the contents of the control registers as of the end of the previously executed test section.
PROC n	Selects 1 to 4 processors to test (A1100AP only).

Test Sections

The processor diagnostic consists of 126 test sections and a control program. The control program manages execution order and interfacing of common procedures provided by the user interface (UI).

Test Sequence

At the ISL prompt, enter the Processor diagnostic name (A1002AP for 825/835/925 or A1100AP for 850S/950). The system displays:

```
A1002AP/A1035AP System Processor Unit Diagnostic Version x.x
There are 126 sections in this diagnostic - 1 through 126

PROC>
```

The system is now waiting for user commands to:

- Select which processors to test
- Select which sections to run
- Enable activity printouts
- Enable error and isolation messages
- Enable error or isolation pauses
- Enable looping

Table 5-9. Default Parameters

Parameter	State
test sections	all
activity indicators	enabled
error and isolation messages	enabled
pause after isolation message	enabled
looping or hardcopy	no

To begin execution using default parameters, type:

```
PROC> RESUME
```

The first message to appear after the RESUME command is given, assuming processor 1 is enabled, is:

```
DIAGNOSTIC STARTED ON PROCESSOR# 1
```

The following message is displayed after the last test has been executed:

```
DIAGNOSTIC COMPLETED ON PROCESSOR# 1
```

SPU Memory Diagnostic (A1002AM, A1100AM)

The HP A1002A/A1100A SPU Memory Diagnostic tests the Memory Control or Array hardware of the HP A1002A (825/925), HP A1035A (835) or HP A1100A (850S/950) Processing Unit (CPU) for failures of FRU's.

Minimum Configuration

The minimum hardware configuration required to load and run the offline diagnostics system consists of the following functional hardware, firmware, and software items:

- HP A1002A/A1100A SPU with Main Memory and Processor Dependent Code (PDC)
- Boot device and boot path hardware
- System console
- Initial System Load Code (ISL)
- Offline Diagnostics Software

Unique Commands

The memory diagnostic supports two commands not found in the diagnostic subsystem: CARD and DECODE.

Table 5-10. Memory Diagnostic Commands

Command	Description
CARD	*{space / integer:0 ... 31 / integer integer /integer/integer / [integer] [integer/integer]}* Permits selecting the memory array to be tested by setting a 32-bit bit mask. It also performs range checking on the integer(s) supplied. If an out of range integer is supplied, then the command is rejected and the message **`Parameter out of range`** is displayed. Memory arrays 0-7 correspond to controller 0, 8-15 correspond to controller 1. If the first parameter exceeds the second, the message **`Illegal order`** is displayed. When no parameter is provided, the card select bit mask value is displayed in hexadecimal.
DECODE	*{integer: 0 ... FF}*. Permits converting an error syndrome code into a single bit error, double bit error or no error. It produces one of three messages: **`No Error`**, **`Single bit error in bit position NN`**(NN may range from 00 to 63), **`Double bit error`**. An error syndrome code is the checksum difference between the bits stored and generated during the read.

Test Sections

The organization and coverage of the SPU Memory Diagnostic is arranged by test section number in ascending order. There are a total of 18 sections. Table 5–11 below lists these tests sections according to number, name, whether or not the test is functional or parametric, and the major hardware area tested.

Table 5-11. Memory Diagnostic Organization and Coverage

Section #	Test Name	Test Class	Hardware Area
1	MID_ BUS lines	Functional	MID_ BUS
2	Read, Hammer, Write	Parametric	MID_ BUS
3	Write, Hammer, Read	Parametric	MID_ BUS
4	Data Square Wave	Parametric	MID_ BUS
5	Semaphore Wave	Functional	Mem. Cntrlr.
6	Single Bit Error	Functional	Mem. Cntrlr.
7	Force Syndrome	Functional	Mem. Cntrlr.
8	Double Bit Error	Functional	Mem. Cntrlr.
9	Double Bit Parametric	Parametric	Mem. Cntrlr.
10	Directed Reset	Functional	Mem. Cntrlr.
11	Cas Only	Functional	Mem. Array
12	RAM Address Lines	Functional	Mem. Array
13	RAM Chips	Functional	Mem. Array
14	Read, Hammer, Write	Parametric	Mem. Array
15	Write, Hammer, Read	Parametric	Mem. Array
16	Column Strife Test	Parametric	Mem. Array
17	Static Soccer	Parametric	Mem. Array
18	Moving Inversions	Both	MC. and MA.

Test Sequence

To select the Memory Diagnostic, type **A1002AM** for 825/835/925 or **A1100AM** for 850S/950. After the ISL banner appears, the diagnostic identification banner appears, as shown below:

```
HP 9000/825 Memory Diagnostic, Version x.x

The HPA of the processor is FFF80000
The processor model is A.0.4.01.

MEM>
```

The system is now waiting for user commands to:

- Select which sections to run
- Enable activity printouts
- Enable error and isolation messages
- Enable error or isolation pauses
- Enable looping
- Enable hardcopy printout (Not supported on the A1002A SPU).

Table 5-12. Default Parameters

Parameter	State
default sections	1/17
activity indicators	enabled
error and isolation messages	enabled
pause after error and isolation message	enabled
looping or hardcopy	no

To begin execution using the default parameters, type:

```
MEM> RESUME
```

The first message to appear is:

```
SECTION 001
000 001
  (ETC.)
    :
    :
```

The following message appears after the last test has been executed:

```
DIAGNOSTIC COMPLETED
MEM>
```

SPU I/O Diagnostic (A1002AI, A1100AI)

The HP A1002A/A1100A SPU I/O Diagnostic tests the internal SPU I/O hardware of the HP A1002A (825/925), HP A1035A (835) or HP A1100A (850S/950) Processing Unit (CPU), to detect and isolate FRU failures.

Minimum Configuration

The minimum hardware configuration required to load and run the offline diagnostics system consists of the following functional hardware, firmware, and software items:

- HP A1002A/A1100A SPU with Main Memory and Processor Dependent Code (PDC)
- Boot device and boot path hardware
- System console
- Initial System Load Code (ISL)
- Offline Diagnostics Software
- CIO Device Adapter(s)
- Channel Adapter(s)

Limitations

The tests conducted by the I/O diagnostic are functional only. Intermittent errors require the use of the ISL based Channel Exerciser utility (CAEXR) to reveal stress-related faults.

Remapping (A1100A SPU only)

The A1100AI diagnostic remaps I/O space as a means of detecting I/O mapping errors. If such an error occurs while the diagnostic executes, the diagnostic will attempt to detect and report the error. However, in this case the integrity of the diagnostic itself cannot be guaranteed, since an I/O device may map over the memory controller where program memory resides.

Unique Commands

The following command information applies to this diagnostic only. Some examples are Bus Converter dependent while others relate to a specific SPU I/O hardware implementation:

Table 5-13. Unique Commands

Command	Description
path(A1100A only)	{SMB fixed field}/{MID_ BUS ff}.{HP-CIO slot}. {HP-IB addr.} "path" elements right of MID_ BUS fixed field are currently ignored.
	Example = '2' : SMB MODULE 2 Example = '2/' : BC-X Example = '2/4' : MID_BUS-X, SLOT 1 Example = '2/8' : MID_BUS-X, SLOT 2 Example = '2/4.1.0' : Same as 2/4.
EVPR	Enables the verbose report.
SVPR	Suppresses the verbose report.
IORE[GISTERS]{ path}	Displays SMB and MID_ BUS device registers.
IODC{ path}	Displays SMB and MID_ BUS IODC headers. Displays and decodes the first 16 bytes of the module's IODC.
HPAM[AP]	Displays PROCESSOR's, BC's & CA's pertinent I/O address.
FILL[BUFR]{ function}{ pattern} (A1100A only)	Fills the Write buffer(W_ buf) with a sequence of 256 32 bit data patterns.
	{function} : { ALLO[S]}: Fills buffer with all zeros. { ALL1[S]}: Fills buffer with all ones. { ALLS[AME]}{ pat}: Fills buffer with all one {pat}. { RAND[OM]}{ seed}: Fills buffer with a sequence of pseudo random patterns. { SEQU[ENCE]}{ [pats=n}{ pat1, .patn}{ [fill]=pat}:}
COMP[AREBUF] (A1100A only)	Compares the Read buffer(R_ buf) to the Write buffer(W_ buf).

Test Sections

Table 5-14. I/O Diagnostic Organization and Coverage

Section	Diagnostic	Test Section Name
1	A1100AI	Bus Converter Reset test
2	Both	Channel Adapter initialization test
3	Both	Channel Adapter register test
4	Both	Channel Adapter ram stack test
5	Both	Channel Adapter flex field addressing and DIO loopback test
6	Both	Channel Adapter SRQ test
7	Both	Channel Adapter ARQ test
8	Both	Channel Adapter flex field addressing and DMA loopback test
9	A1100A	Channel Adapter error status test
10	A1100AI	Terminal Mux Selftest
11	A1100AI	AP Selftest through Terminal Mux (S0) test
12	A1100AI	AP Selftest through PDH Direct Port (DP) test
13	A1100AI	Read HEX DISPLAY from AP, through Terminal Mux
14	A1100AI	Read HEX DISPLAY from AP, through PDH Direct Port
15	A1100AI	AP loopba-k: DP to console to S0
16	A1100AI	AP loopback: S0 to console to DP
17	A1100AI	Logical Module Selftest
123	A1100AI	SPA WRITE scope loop
124	A1100AI	SPA READ scope loop
125	Direct I/O scope loop	126 DMA scope loop

Test Sequence

To select the Offline I/O Diagnostic, type `A1002AI` for 825/835/925 or `A1100AI` for 850S/950.

To begin execution, type: `I/O> RESUME`

The diagnostic banner displays on the console.

```
HP A1002A/A1035A (I/O Diagnostic Version x.x

The HPA of the processor is FFF80000
The processor model is 8.0.4.01.

I/O>
```

The system is now waiting for user commands to:

- Select which sections to run
- Enable activity printouts
- Enable error and isolation messages
- Enable error or isolation pauses
- Enable looping
- Enable hardcopy printout (A1100AI only).

Table 5-15. Default Parameters

Parameter	State
sections (HP A1002A (825/925) SPU)	1/8
sections (HP A1100A (850S/950) SPU)	1/126
activity indicators	enabled
error and isolation messages	enabled
pause after error and isolation messages	enabled
looping or hardcopy	no

To begin execution using the default parameters, type **RESUME**.

A table of all I/O found in the system is then printed, with the following information for each controller.

```
THE FOLLOWING IS A DISPLAY OF THE I/O AS CURRENTLY CONFIGURED.

HPA used in PDC_IODC call = X'xxxxxxxx
 : description          -- MID_BUS SLOT=x -- path= x.x.x
```

The following then displays the current Processor, Bus Converter, and Channel Adapter configuration:

```
<this example illustrates output for A1002AI>

CPU HPA = X'xxxxxxxx

CPU HPA = X'xxxxxxxx : CA SPA = X'xxxxxxxx

The following are the default sections : 2 3 4 5 6 7 8
```

Input/Output Map Utility (IOMAP)

IOMAP displays the configuration of all devices attached to a Hewlett-Packard A1408A/09740A/A1002A/A1100A SPU and the connected modules and adapters. This utility runs on both the MPE XL and HP-UX variants of these SPUs. IOMAP provides identification, selftest, and loopback tests on each component capable of such tests.

Minimum Configuration

The minimum hardware necessary for IOMAP to load and run consists of:

- Any HP Precision Architecture computer and PDC
- Functioning boot path
- Front panel hex/LED display

Table 5-16. IOMAP Test Modes

Mode	Description
Identify	This test attempts to identify each component in every I/O path to the component, component name, component ID number, component software model number(if applicable), firmware revision (if applicable), hardware revision (if applicable), and an indication of which test modes are available for the component. Configuration data is determined by PDC calls. Path information is obtained from PDC calls, direct I/O (DIO), and DMA transactions.
Loopback	This test performs component dependent loopback tests where feasible. The result of this test is reported as a pass, fail, unimplemented or untestable status.
Selftest	This test initiates the internal selftest of each component where feasible. The result of this test is reported as a pass, fail, unimplemented or untestable status.
View	This test examines the version code of each board on the system (A1100A only). The display appears on the console only, not the hex display. When running IOMAP in "Silent Mode", no output appears.

Default Tests

The default IOMAP test consists of the following:

1. Display the current configuration of the processor, including the presence of Co-processor boards and Analyzer Cards, the memory sizes of Cache and TLB cards, the processor model number, and the PDC firmware revision.
2. Check all possible I/O paths to determine the components present and identify them: module, bus converter, adapter, device or unit. IOMAP then displays a table showing all configured components.

Selftest or loopback diagnostic tests can be specified for all testable components and are performed after mapping. Error messages are printed for any component that fails a test. The user may also limit the identify, selftest, loopback and view tests to specified path.

Limitations on Selftest and Loopback

IOMAP performs selftest and/or loopback tests on all components with those capabilities. IOMAP currently cannot test the following:

- Boards lacking these features (such as Channel Adapter, Memory Controller or Parallel Card).
- Hewlett Packard Precision Bus (HPPB) modules on A1408A (such as HP-IB and the serial controller) which are not part of the console or boot path.
- Devices attached to ports of the terminal multiplexor (such as terminals, printers and datacomm lines).

Special Test Requirements

Use the HPPB device adapter test requirements given below.

Table 5-17. Test Requirements

Test	Requirements
HPPB LAN Device Adapter	Before running selftest and loopback: Terminate the external link Attach a terminated T-connector to the LAN connector of the MAU. Connect it to the currently configured MAU (internal or external).
HPPB GPIO Device Adapter	Before running the external loopback test: Attach a loopback test hood
HPPB Serial Controller Device Adapter	Before running selftest or external loopback test: Attach a loopback test hood
User Interface	The user interface is divided into input and output sections. Each of these sections can operate in different modes, as specified by the user. To obtain online help for IOMAP enter `iomap help` at the `ISL>` prompt.

User Input

While running IOMAP, a user can enter "Break Mode", which suspends program operation. The Break Mode "debug" facility permits trained support personnel to examine and modify status and registers.

Caution While Break Mode can allow the user to harmlessly display IOMAP internal variables, it also invokes a powerful debug facility. If inadvertently used, it may hang the SPU and cause an HPMC.

Commands and Syntax

The default run command is:

```
ISL>iomap <optional parameters/keywords>
```

Table 5-18. Default Test Settings

Command	State
debug	not enabled
defaults	no (see note below)
errcount	infinite (0)
erronly	false
help	false
loop	once
noerrpause	false
path	all
silent	false
tests	identify only

Note

The defaults listed above are *only* enabled if `defaults` is entered on the command line. If one or more commands (other than `defaults`) are input to configure specific settings, the remaining settings take on default values. If no parameter commands are entered, IOMAP automatically invokes the interactive mode.

Hex Display

The following lists and defines the IOMAP error codes sent to the Hex display.

Table 5-19. IOMAP Error Codes

Code	Source	Cause
C580	PDC/IODC	ISL is waiting for the boot media to become ready.
CE00	ISL	ISL is loading IOMAP or another ISL utility.
CE01	ISL	ISL is loading IOMAP or another ISL utility automatically as directed by the autoboot file.
CE13	ISL	Console input error.
CE14	ISL	Console output error.
CE15	ISL	ISL cannot find the specified utility (name misspelled, file not found).
CE80	CAEXR	CAEXR is executing.
CE81	IOMAP	IOMAP is executing.
CE82-CE8F		Reserved.

Channel Exerciser Utility (CAEXR)

The Channel Exerciser Utility (CAEXR) is a diagnostic that exercises the 19744A Channel Adapter (CA) board set or equivalent hardware in the HP 9740A, A1002A, or A1100A SPU, including VLSI versions of the CA.

Minimum Configuration

CAEXR requires the following hardware and software:

- Any HPPA SPU with Main Memory and PDC. Memory requirements are: 3 Mbyte (09740A), 8 Mbyte (A1002A), 16 Mbyte (A1100A)
- Functioning boot path
- Front panel Hex/LED display
- System Console (it is desirable but not necessary for the console to be connected through an AP card)
- One Channel Adapter
- 3 HP-IB cards (2 is minimum but may not saturate the CA)
- Bus Converter (A1100A only)

Commands and Syntax

The default run command is:

```
ISL> caexr  <optional parameters/keywords>
```

Table 5-20. Default Parameters

Parameter	State
busy	8.3 16.3 24.3
debug	not enabled
defaults	false
errcount	infinite (0)
erronly	false
expert	false
help	false
loop	indefinitely (0)
memory	3MB and up
mpx	all
noerrpause	false
noswap	false
pair	8.0, 8.2; 16.0,16.2; 24.0,24.2
silent	false

Break Mode

The user can break the program at certain points by using Control C or Control Y. These user interrupts are detected after each loop completes, and for one second after any error message completes.

Note Break mode is not entered by using the console Break key.

Caution The read and write commands represent a true debug facility, which can easily destroy the state of the machine and cause a High Priority Machine Check. These debug commands should only be used by someone with a detailed knowledge of CAEXR and system internals. With explicit instructions (followed exactly), these commands are useful for examining the state of the DMA data buffers.

Hex/LED Display

Hex codes must appear within the range of CE80 - CEBF, using defined and undefined codes, to meet the specifications in the HP Precision Architecture Chassis I/O standard. Hex/LED codes are followed by descriptive "parameter" values. The "class" code (CE80 - CEBF) is displayed for three seconds, followed by the stated number of "parameter" values displayed for two seconds each.

On the A1002A (825/835/925) SPU, Hex display numbers may only be accessible through the AP. These codes are displayed at different times during the execution of CAEXR.

Table 5-21. Hex Codes

Display	Source	Meaning
C580	PDC/IODC	ISL is waiting for the boot media to become ready
CE00	ISL	CAEXR (or any ISL utility) is loading.
CE01	ISL	CAEXR (or another ISL utility) is being loaded automatically, under the control of the autoboot file.
CE13	ISL	Console input error.
CE14	ISL	Console output error.
CE15	ISL	ISL can't find the specified utility (possibly misspelled).
CE80	CAEXR	CAEXR has begun execution.
CE81 - CE8F	CAEXR	Reserved.
CE90	CAEXR	PDC call error.
CE91 - CEB8, CEBC - CEBD	CAEXR	CAEXR configuration and operation errors. See the Configuration Dialog Error message section for more detailed information.
CEB9	CAEXR	Data compare error. See the Data Compare Error Message section for more detailed information.
CEBA - CEBB	CAEXR	DMA execution errors. See the Execution Error Messages section for more detailed information.

HP-UX Support Tape

The support tape (92452-13503 on 1600 BPI tapes and 92452-13303 on cartridge tapes) provides capability to diagnose and fix problems when the HP-UX operating system cannot be booted from system disc. For information on the HP-UX file system to use the support tape, refer to the HP 9000/840 *System Administrator's Manual* (92453-90004).

The minimum hardware configuration to use the support tape is:

- 8 Mb memory.
- Console.
- Magtape drive.
- Input/output paths to the console and tape drive.

Booting Up

If the system has halted and cannot be booted from the system disc, then booting up from the support tape is necessary. The procedure is as follows:

1. Select a tape drive to boot from and determine the drive's physical address. (Typical default alternate path physical addresses for the 825/835 are 4.2.3, 4.0.1, or 4.0.0.1)
2. Load support tape on tape drive and put drive online.
3. Press system reset button and wait about 30 seconds.
4. If autoboot is enabled, the following appears on the console:

```
Autoboot from primary boot path enabled.

To override, press any key within 10 seconds.

When a console key is pressed, this prompt appears on the console:

Boot from primary boot path (Y or N)?>
```

5. Respond by typing [N] to this prompt. The next prompt is:

```
Boot from alternate boot path (Y or N)?>
```

6. Respond to this prompt by typing [Y] if the support tape is loaded on the tape drive that corresponds to the alternate boot path.

   Respond by typing [N] if the support tape is not loaded on the tape drive that corresponds to the alternate boot path and then the following prompt appears:

```
Enter boot path, command or ?>
```

   Respond by entering the physical address of the drive you loaded the support tape onto. After the appropriate response is given, the tape should start spinning and this prompt appears:

```
ISL>
```

Note If autoboot is not enabled, the previously listed sequence of prompts and responses occur with one exception. The first prompt, which allows the primary boot path to be overridden, does not appear.

7. Enter the HP-UX command to the ISL> prompt. An example with the default physical device address is as shown:

   ```
   ISL> hpux tape1(4.2.3;0xa0000,1)
   ```

   The address field of this command is the only part that may vary, but the rest of the command is exactly as shown.

8. After the HP-UX command is entered, the appropriate files from the support tape are loaded and an input/output tree is displayed followed by the message:

   ```
   System needs more CIO channels?
   ```

   The above message can be disregarded since there are usually always more CIO channels than exist on HP-UX systems.

9. After successfully booting, the tape is positioned at the beginning of Section 1. A login prompt, which is login: appears on the System Console. Log in as "root". The password is "support". After logging in, the Support Tape Main Menu is displayed on the console.

Support Tape Main/Utilities Menus

The support tape Main Menu is used by typing a single character followed by a carriage return. If booting from the tape drive address 6/4.3.0, any character may be selected. If booting from an address other than 6/4.3.0, the character "u" must be selected because the tape unit number must be changed to conform to the physical address of the tape drive. The tape unit number is determined by the physical address of the tape drive.

The support tape main menu is:

```
s. Search for file
l. Load a file
d. On line diagnostics
h. Help
u. Utilities
x. Exit to shell

Tape is unit 0
```

The support tape utilities menu is:

```
c. Change tape unit number
p. Try to resynchronize position on tape
t. Table of contents of a tape section
r. Return to previous menu
x. Exit to the shell

Select one of the above:
```

For additional information regarding the Support Tape, refer to the *Support Tape Users Manual* (92453-90010).

6

Adjustments

There are no adjustments required on the HP 9000/825/835 or HP 3000/925 computer.

7

Peripherals

This section lists the peripherals supported on HP 9000/825/835 and HP 3000/925 computer systems. Peripherals supported on the 825/835 are listed first, followed by peripherals supported on the 925.

825/835 Disc Drives

Table 7-1. 825/835 Supported Disc Drives

DISC DRIVE	DESCRIPTION	INTERFACE
7914CT	132MB Disc with 9144A Cartridge Tape	HP-IB
7914ST	132MB Disc with 7974A Tape Unit	HP-IB
7914R/P	132MB Disc with 9140 Cartridge Tape	HP-IB
7933H	404MB Fixed Disc	HP-IB
7935H	404MB Removable Disc	HP-IB
7936H	307MB 8in Disc	HP-IB
7937H	571MB 8in Disc	HP-IB
7936FL	307MB 8in Disc	HP-FL
7937FL	571MB with AMUX	HP-FL

825/835 Tape Units

Table 7-2. 825/835 Supported Tape Units

TAPE UNIT	DESCRIPTION	INTERFACE
7974A	1/2in Start/Stop/Streaming; 1600cpi (PE), 800cpi (NRZI) Tape Unit	HP-IB
7978B	1/2in Start/Stop/Streaming; 6250cpi (GCR), 1600cpi (PE) Tape Unit	HP-IB
9144A	67MB 1/4in Cartridge Tape Unit	HP-IB
35401A	537MB; Autochanger 1/4in Cartridge Tape Unit	HP-IB

825/835 Printers

Table 7-3. 825/835 Supported Printers

2225D	ThinkJet	RS-232
2227A	QuietJet Plus	RS-232
2228A	QuietJet	RS-232
2235A	480cps Draft, 240cps Letter Quality	RS-232, HP-IB
2563A	300lpm	HP-IB
2564B	600lpm Line-Matrix	HP-IB
2565A	600lpm Line-Matrix	HP-IB
2566B	900lpm Line-Matrix	HP-IB
2567B	1200lpm Line-Matrix	HP-IB
2684A	LaserJet 2000, 20ppm	RS-232
2686A	LaserJet, 8ppm	RS-232
2686+	LaserJet Plus	RS-232
2932A	Dot-Matrix, 200cps	RS-232, HP-IB
2934A	Dot-Matrix, 200cps Near Letter Quality	RS-232, HP-IB
3630A	PaintJet, 180dpi Color	RS-232
41063A	Asian Printer, Dot-Matrix	RS-232,HP-IB via NLIO

825/835 Terminals

Table 7-4. 825/835 Supported Terminals

TERMINAL	DESCRIPTION	INTERFACE
2392A	Alphanumeric, Block Mode, ANSI Compatible	RS-232
2393A	Monochrome Vector Graphics	RS-232
2394A	Data Entry, Local Forms	RS-232
2397A	Color Raster Display w/Vector Graphics	RS-232
Emulators	HP 150, 110+, 300, IPC, Vectra	RS-232
45945	Asian PC w/Japanese, Korean, or Chinese Language Support	RS-232

825/835 Consoles

Table 7-5. 825/835 Supported Consoles

SYSTEM CONSOLE	DESCRIPTION	INTERFACE
2392A	Alphanumeric, Block Mode, ANSI Compatible	RS-232
98720A	High Resolution 3D Color Graphics without AP, 825 only	LGB

825/835 Graphics Devices

Table 7-6. 825/835 Supported Graphics Devices

DEVICE	DESCRIPTION	INTERFACE
2393A	Monochrome, Vector Graphics Terminal	RS-232
2397A	Color Raster Display, w/Vector Graphics	RS-232
7440A	Color Plotter, 8 Pen, A4/A Size	RS-232, HP-IB
7475A	Color Plotter, 6 Pen, A3/B Size	RS-232, HP-IB
7550A	Color Plotter, 8 Pen, A4/A and A3/B Size, Auto Cut Sheet Feeder	RS-232, HP-IB
7586B	Drafting Plotter, 8 Pen, A - E Size, Roll Feeder	RS-232, HP-IB
7595A	Draftmaster I Plotter, 8 Pen, A4/A - A0/E Size	RS-232/422, HP-IB
7596A	Draftmaster II Plotter, A4 - A0 Rollfeed	RS-232/422, HP-IB
98720A	High Resolution 3D Color Graphics Processor	LGB

825/835 Datacomm Devices

Table 7-7. 825/835 Supported Datacomm Devices

DEVICE	DESCRIPTION	INTERFACE
2334A	Multimux, 4 Port Modem Control Interface	RS-232
37212A	300/1200 Baud, 212/V22, Auto Dial/Answer	RS-232
92205A	Hayes Smart Modem	RS-232
Racal-Milgo MPS1222	Dial-in Modem	RS-232
U.S. Robotics	2400 Baud Dial-in Modem	RS-232
Bell 212A	Dial-in Modem	RS-232

925 Supported Peripherals

Table 7-8 shows the peripherals currently supported by the Model 925. Peripherals with an asterisk (*), will be supported on MPE XL 1.1.

Table 7-8. Peripherals Supported by the Model 925

Peripheral	Models Supported
Terminals:	
	2392
	2393
	2394
	2397
	2622
	2624B
	2627
	HP150
	Vectra
	Portable Plus
	Vectra CS
	Vectra Portable CS
	Vectra ES & ES12
	Vectra RS
	700/92
	700/94
Consoles:	
	2392
	700/92

Table 7-8 (cont'd). Peripherals Supported by the Model 925

Peripheral	Models Supported
Disc Drives:	
	7933H
	7933XP
	7935H
	7935XP
	7936H(*)
	7936XP(*)
	7937H
	7937FL(*)
	7937XP(*)
Tape Drives:	
	7974
	7978
	7979(*)
	7980(*)
Printers (HP-IB):	
	2563(*)
	2564(*)
	2565A
	2566A/B
	2567(*)
	2680
	2688

Table 7-8 (cont'd). Peripherals Supported by the Model 925

Peripheral	Models Supported
Printers (Serial):	
	2235(*)
	2563B
	2564B
	2567B
	2684
	2686
	2932
	2933(*)
	2934
	33440

8

Replaceable Parts

Introduction

This section provides names and part numbers of Field Replaceable Units (FRUs). The FRUs are divided into two categories, exchange assemblies (refer to Table 8–1) and non-exchange assemblies (refer to Table 8–2). Table 8–3 lists parts for the Small Cabinet (92211R) and Table 8–4 for the Large Cabinet (A1001A).

Note Assemblies that appear in both the exchange and non-exchange lists have different part numbers. When ordering an assembly be sure to order the correct part number.

Ordering Information

To order the service kit or any FRU, address the order to the nearest Hewlett-Packard Sales and Service office. The following information should be included in the order:

- Complete model and serial number
- HP part number of each FRU or kit
- Complete description of each FRU

Exchange Program

A defective PCA or power supply can be exchanged for an operating assembly. For cost and other details contact the nearest HP Sales and Service office.

Exchange Assemblies

Table 8-1. 825/835/925 Exchange Assemblies

Exchange Part No.	Description
SPU	
09850-69510	PCA-Main CPU (825/925)
09850-69511	PCA-System Card (825/925)
09850-69515	PCA-Processor Card (835)
09850-69516	PCA-PDH Card (with 1 CA (835S))
09850-69519	PCA-PDH Card (with 2 CAs (835SE))
09850-69585	PCA-Auxiliary Power Supply (non-BBU version)
08950-69587	PCA-Auxiliary Power Supply (BBU version)
09850-69525	PCA-16 Mbyte Memory Card
09850-69520	PCA-2 Mbyte Memory Card
09850-69521	PCA-8 Mbyte Memory Card
30191-69002	PCA-Channel Adapter (for CIO Expander)
5061-2541	Access Port (AP) Card
09850-69599	Main Power Supply Card
EXPANDER	
0957-0024	Power Supply
98558-69500	PCA-Motherboard
BBU	
98559-69587	PCA-Charger Card
MISC	
27110-60301	HP-IB Card for 825/835 (27110B)
27113-60301	HP-IB Card for 925 (27113B)
27140-69001	MUX Card
27125-69001	LANIC Card
27114-69001	AFI Card

Non-Exchange Assemblies

Table 8-2. 825/835/925 Non-Exchange (new) Assemblies

New Part No.	Description
SPU	
09850-66501	PCA-Motherboard (remote shutdown version)
09850-66587	Auxiliary Power Supply Card (BBU remote shutdown version)
09850-66585	Auxiliary Power Supply Card (non-BBU version)
09850-67902	Key Switch Assembly
09850-67901	AC Cable Assembly
3160-0458	Fan, 12V DC
09850-61604	Cable, BBU
19746-60010	Cable, Channel Adapter
EXPANDER	
98559-66587	PCA-AC Input Card
0950-1822	Power Supply
5180-0410	Cooling Fan
98558-66500	PCA-Motherboard
98558-67901	Line-Filter Cable
19746-60010	Channel Adapter Cable
09740-60804	PCA-Buffer Card
BBU	
98559-67901	12V Battery Pack
1853-0059	PNP Transistor
0340-1175	Transistor Insulator

Table 8-2 (cont'd). 825/835/925 Non-Exchange (new) Assemblies

New Part No.	Description
MISC	
09850-04403	SPU Can 825/835/925
09850-21202	Slide set (long slides)
5041-2428	825/835/925 Front Panel (no label)
09850-84006	Model 925 Nameplate
09850-84014	Model 925LX Nameplate
09850-01209	Center card guide
09850-67902	Keyswitch
09850-25001	Key
1420-0236	Battery, lithium
09850-42101	Battery holder

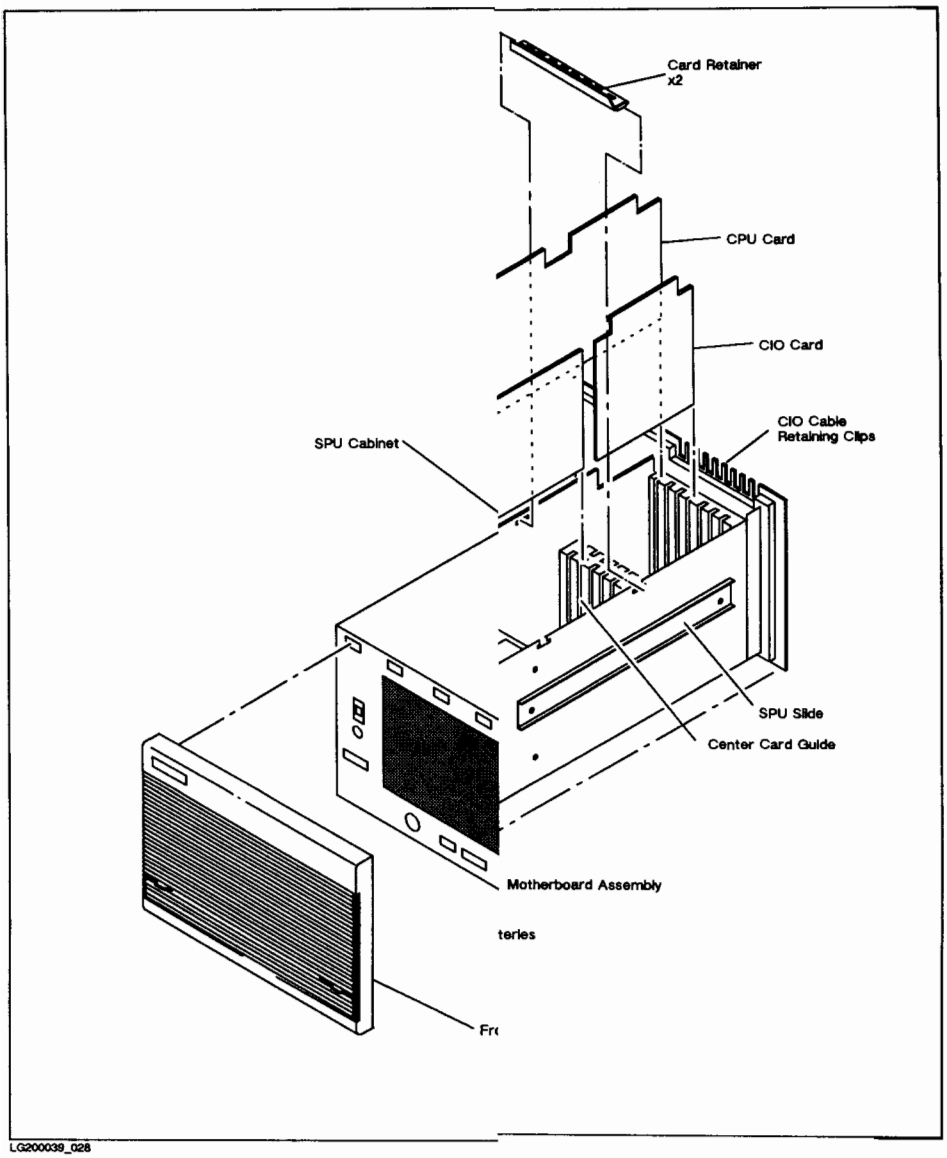


Figure 8–1. SPU Exploded View

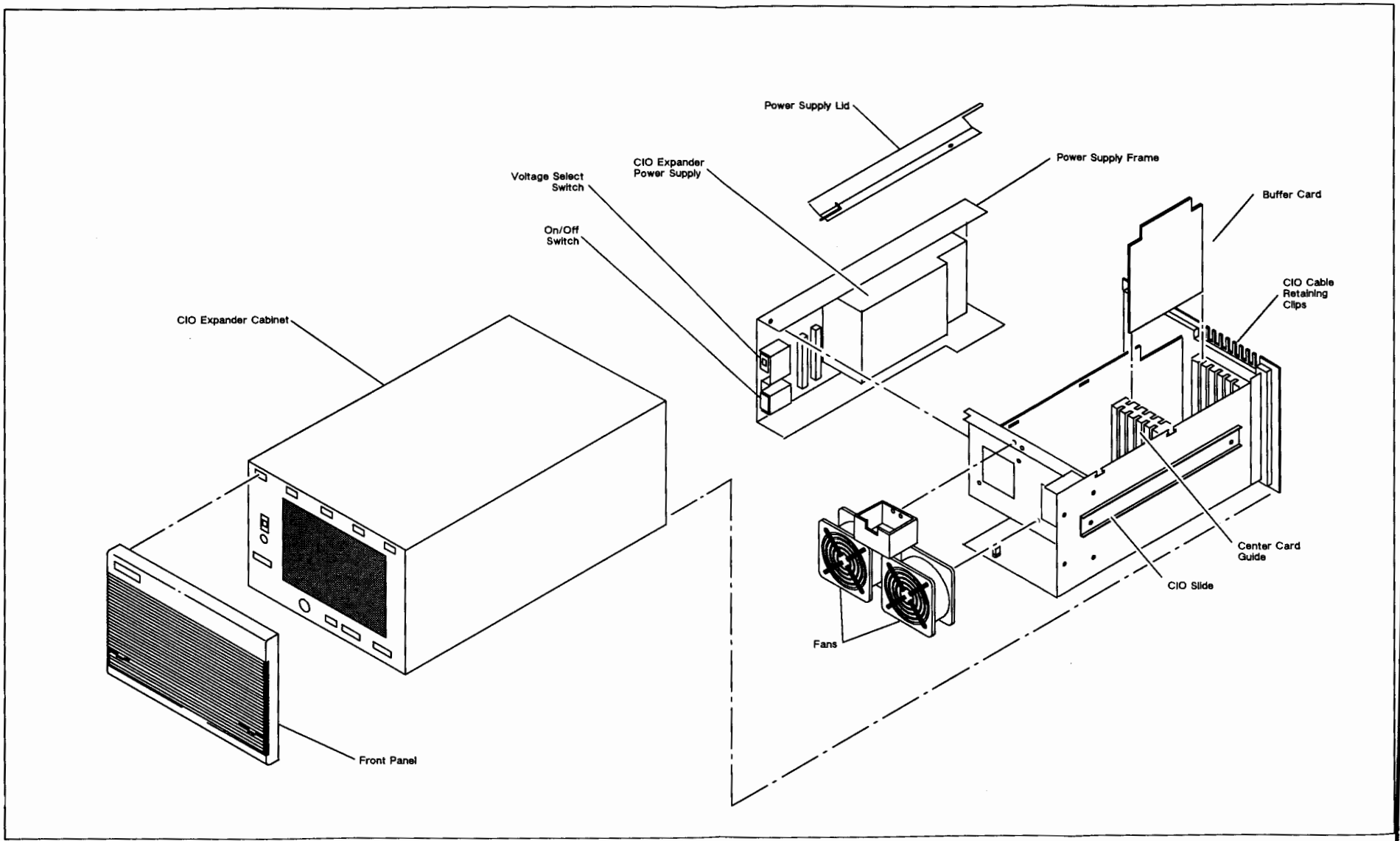


Figure 8–2. Expander Exploded View

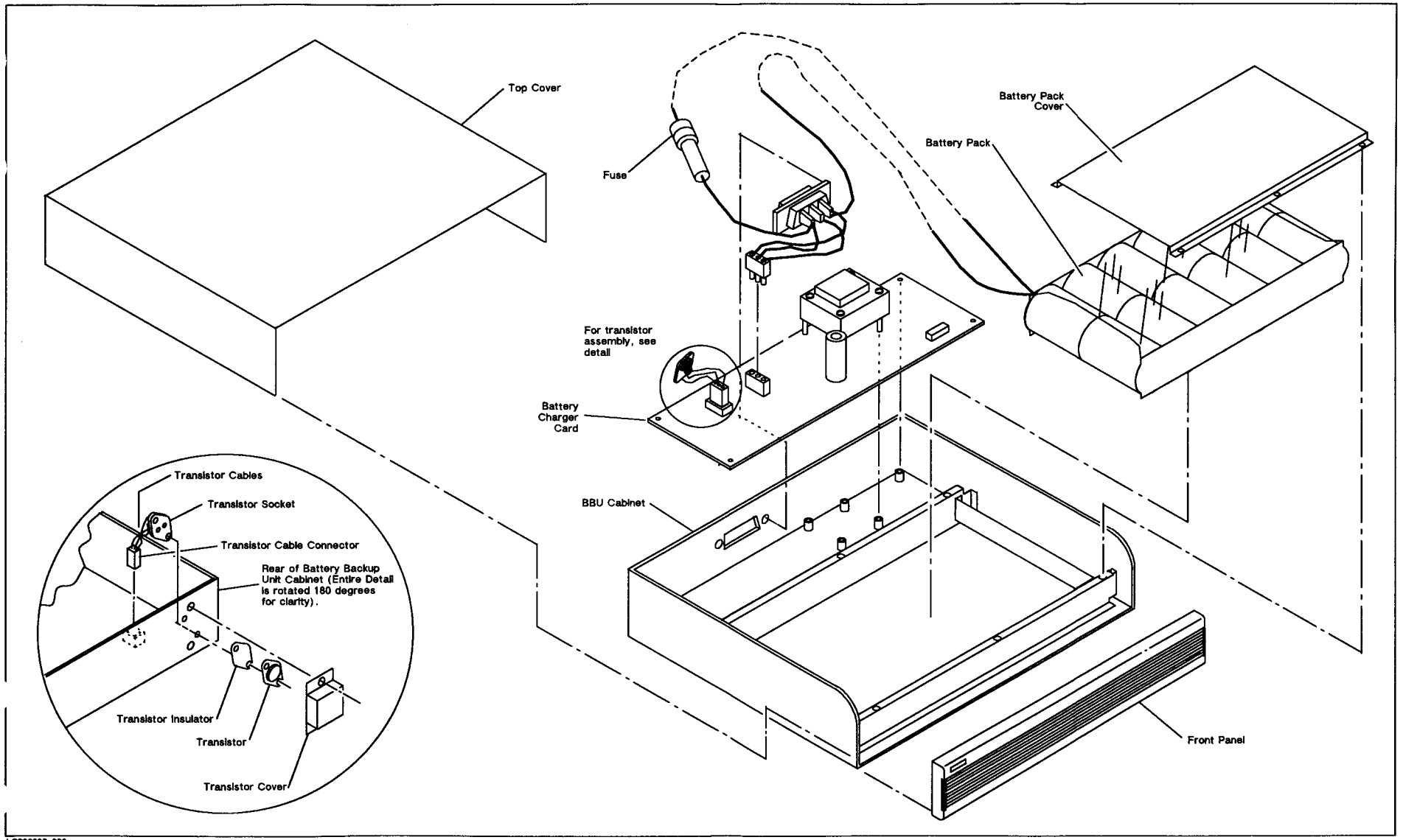


Figure 8-3. BBU Exploded View

Table 8-3. Parts for the 92211R Small Cabinet

Part Number	Description
92211R	Small Cabinet
92211S	Small Cabinet Rail Kit
09850-06601	Spring Rail for 825/835/925 in a small (92211R) cabinet

Table 8-4. Parts for the A1001A/A1001A-0E3 Large Cabinet

Part Number	Description
A1001-24101	Top Door Kit for A1001A Cabinet (includes all parts, such as hinge, industrial ball stud, fastex plug, bumper, hinge kit, door catch)
A1001-24102	Middle Door Kit for A1001A Cabinet, only installed when there is no tape drive (includes all parts, such as industrial ball stud, bumper, hinge, hinge kit, door catch)
A1001-24103	Bottom Door Kit for A1001A Cabinet (includes all parts, such as front striker kit, hinge kit, bumper, lock pawl, lock, window clip, hinge, cyro acrilyte window)
A1001-24104	Rear Door (Sheetmetal only, w/o Labels)
A1001-24105	Rear Door Kit for A1001A Cabinet (120 VAC version) includes PDU, hinges, latches but no labels
A1001-24106	Rear Door Kit for A1001A Cabinet (220/240 VAC version) includes PDU, hinges, latches but no labels
A1001-68501	Fan Assy for A1001A Cabinet (220/240 VAC version) (includes Nidec/Torin fan, heat shrink, AC line cord)
A1001-68502	Fan Assy for A1001A Cabinet (120 VAC version) (includes Nidec/Torin fan, heat shrink, AC line cord)
A1001-67902	PDU for A1001A Cabinet (120 VAC version) (includes JMK 30A line filter, PCC CE-22 receptacle, Kulka barrier block, PCC strain relief, Heinemann breaker, BNC bulkhead, solder lug, hex nut, PDU label, twist lock plug, 3-wire power cord)
A1001-67903	PDU for A1001A Cabinet (220/240 VAC version) (includes JMK 30A line filter, PCC CE-22 receptacle, Kulka barrier block, PCC strain relief, Heinemann breaker, BNC bulkhead, solder lug, hex nut, PDU label)
A1001-04101	PDU Cover (220/240 VAC version)
A1001-04102	PDU Cover (120 VAC version)
A1001-04701	Mounting Bracket for RS-232C Junction Panel
A1001-04301	SPL Trim Panel for 2-Disc Configuration
A1001-66001	Template for A1001A Installation (for mounting sheet metal nuts)

Table 8-4 (cont'd). Parts for the A1001A/A1001A-0E3 Large Cabinet

Part Number	Description
29400-61000	Hinge Kit (All front doors)
29400-61001	Hinge Kit (Rear door)
29400-00012	Striker (Front door)
29400-00013	Striker (Rear door)
1440-0182	Read Door Latch Handle Assembly
1390-0344	Lock with keys (Front bottom door)
5040-8887	Label Bezel
07980-84307	"HP SYSTEMS" Cabinet Label
A1007-84001	Model 925 Label for A1001A Cabinet
A1007-84002	Model 925LX Label for A1001A Cabinet
A1001-84004	Tilt Hazard Label
A1001-84003	Ground Wiring Label
A1001-84008	Transportation Label
0362-0511	Ground Stud
8120-1860	Convenience Cord
0590-0804	Sheetmetal Nut
1492-0095	Caster
0403-0525	Leveling Pad
29453-00002	Side Panel (Right or left)
29400-00001	Top Cap (Waterfall)
A1001-87901	DTC (Avesta) Kit. Includes everything necessary to rackmount the DTC.
19747-00006	DTC Rail
19747-00010	L-Bracket for mounting DTC
A1001-20001	Cable Management Bracket
8120-3616	Remote Shutdown Coax Cable
1150-1172 (97099A)	Model 925 SPU/CIO Expander Rack Mount Kit (includes shelf and large struts)
7101-0794 (A1019A)	BBU Rack-mount Kit (includes shelf and large struts)
40100A	Anti-tip feet (includes 2 feet, hex head bolts, hex key)

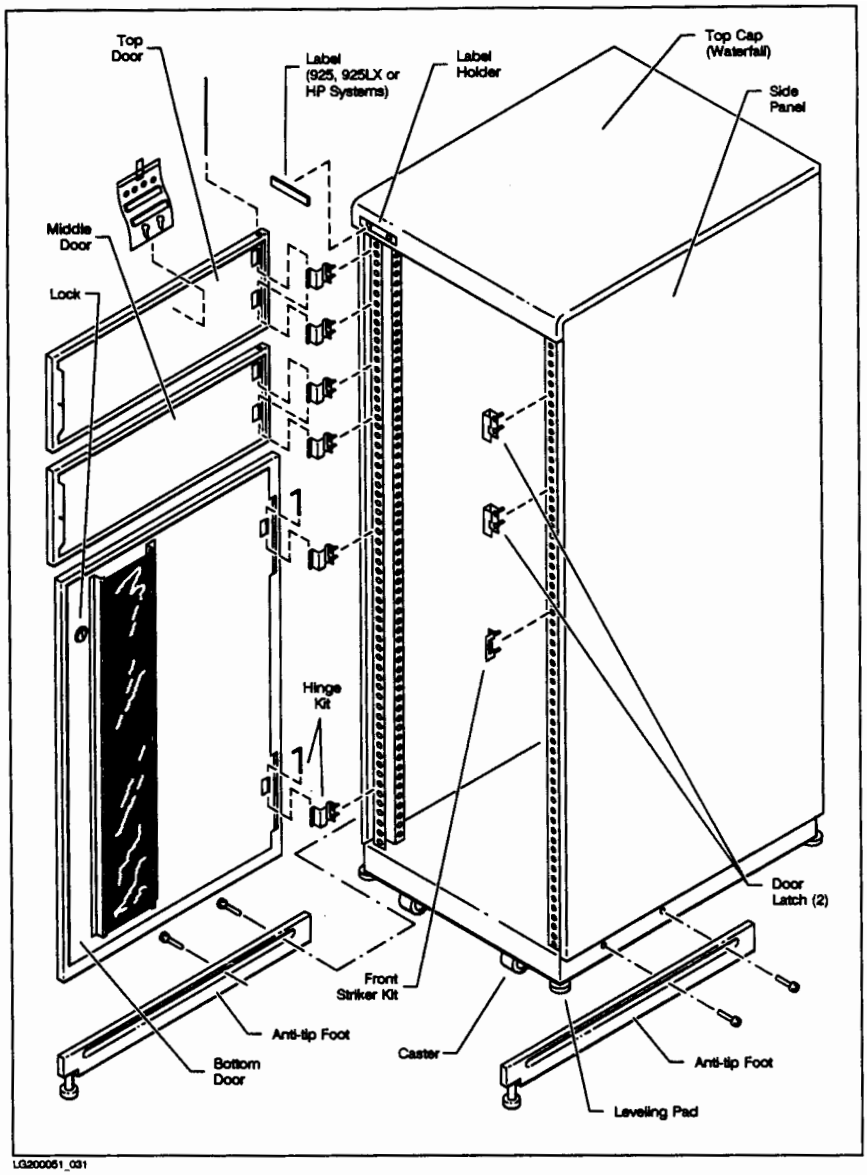
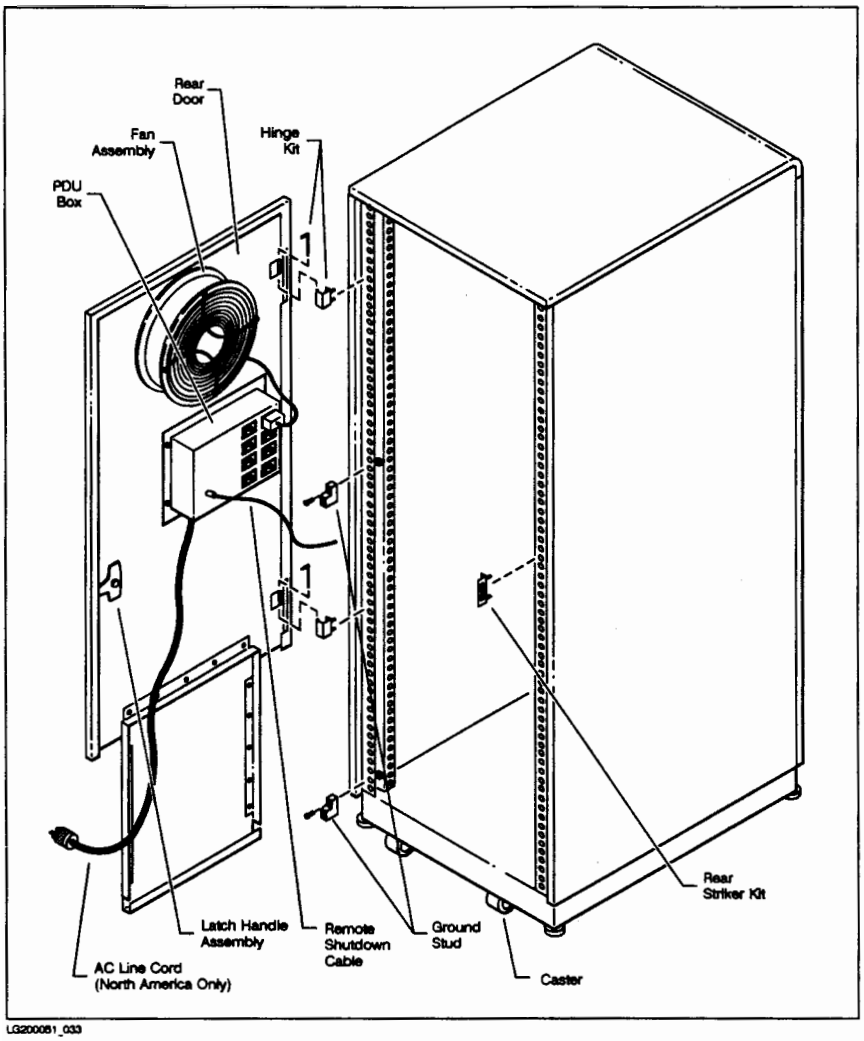


Figure 8–4. Front of the A1001A Large Cabinet



LG200051_033

Figure 8-5. Rear of the A1001A Cabinet

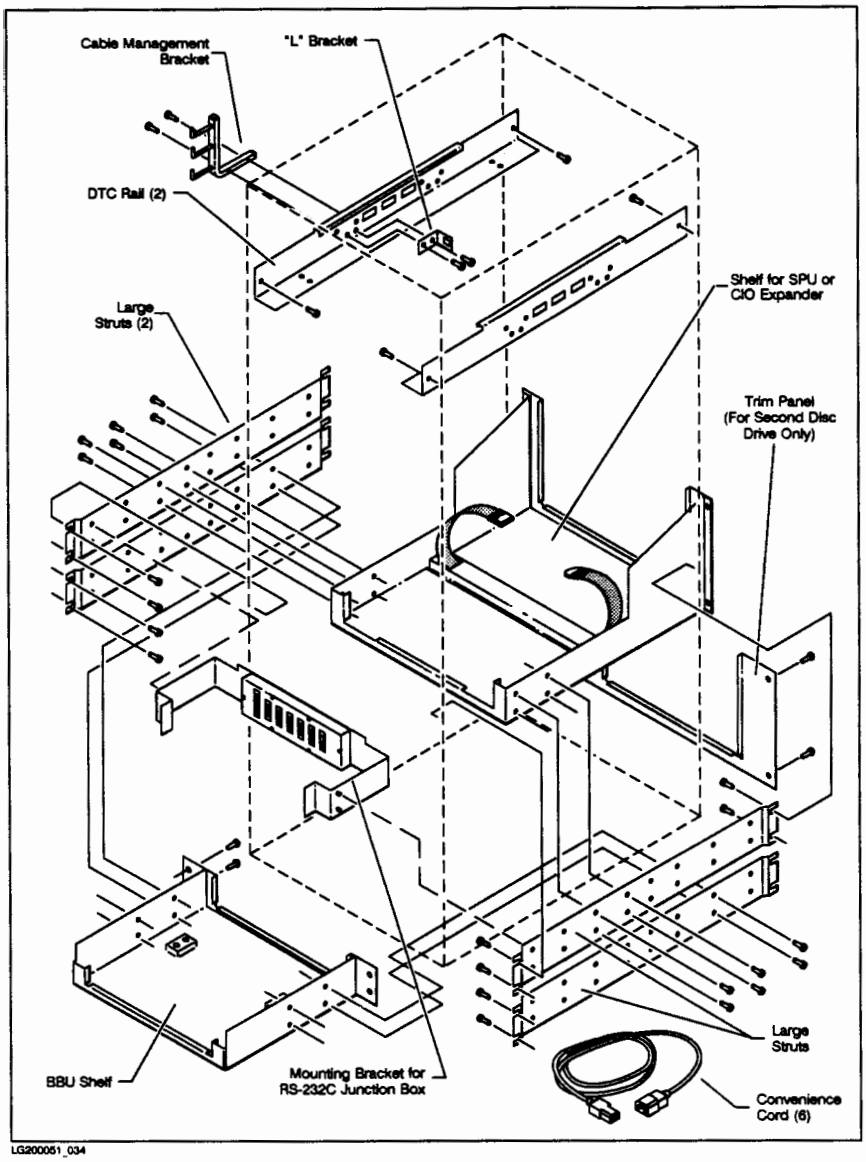
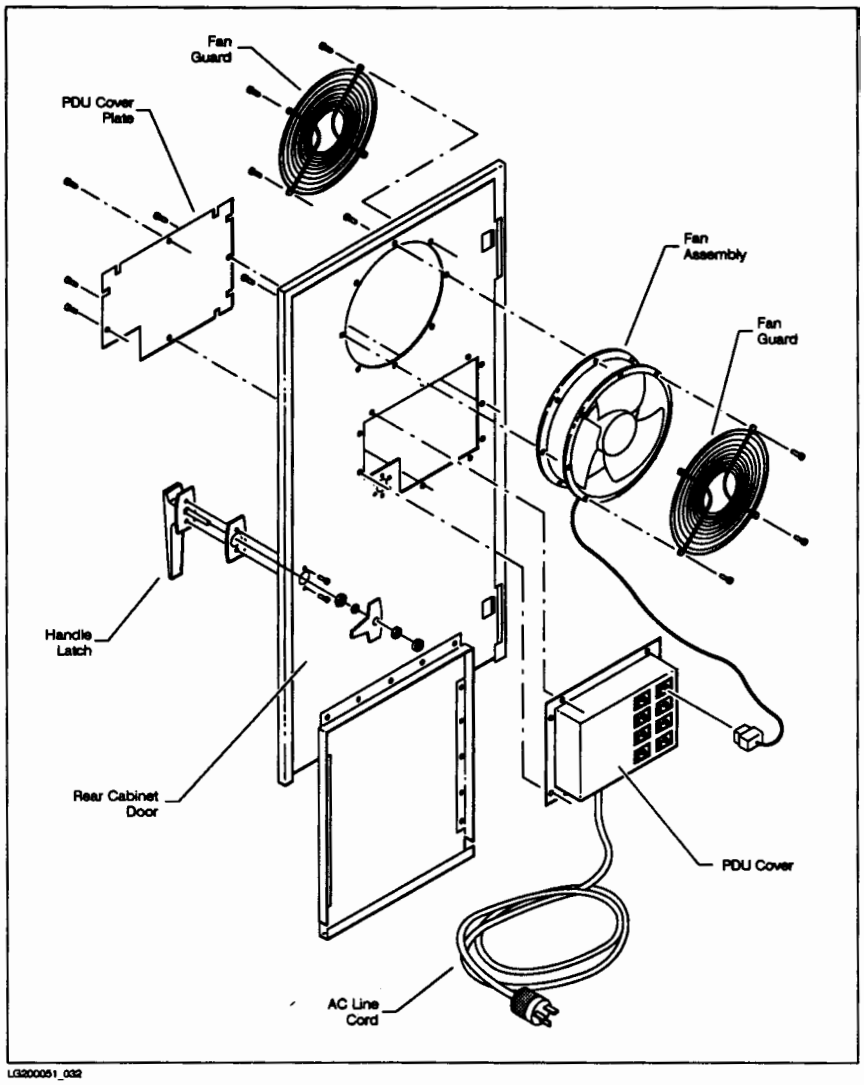


Figure 8-6. Mounting Hardware of the A1001A Large Cabinet



LG3200051_032

Figure 8-7. Rear Door of the A1001A Large Cabinet

9

Diagrams

This section provides diagrams to aid the CE in troubleshooting the 825/925 systems.

825/925 System Block Diagram

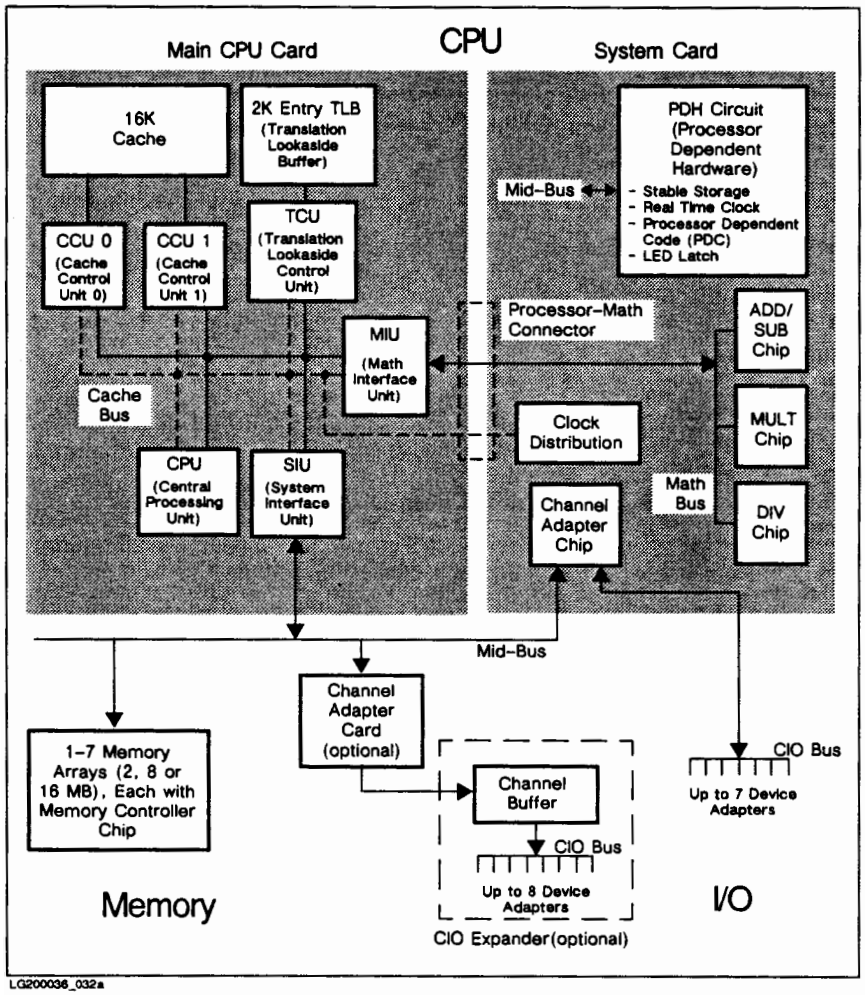


Figure 9-1. 825/925 System Block Diagram

825/925 Cache Subsystem Block Diagram

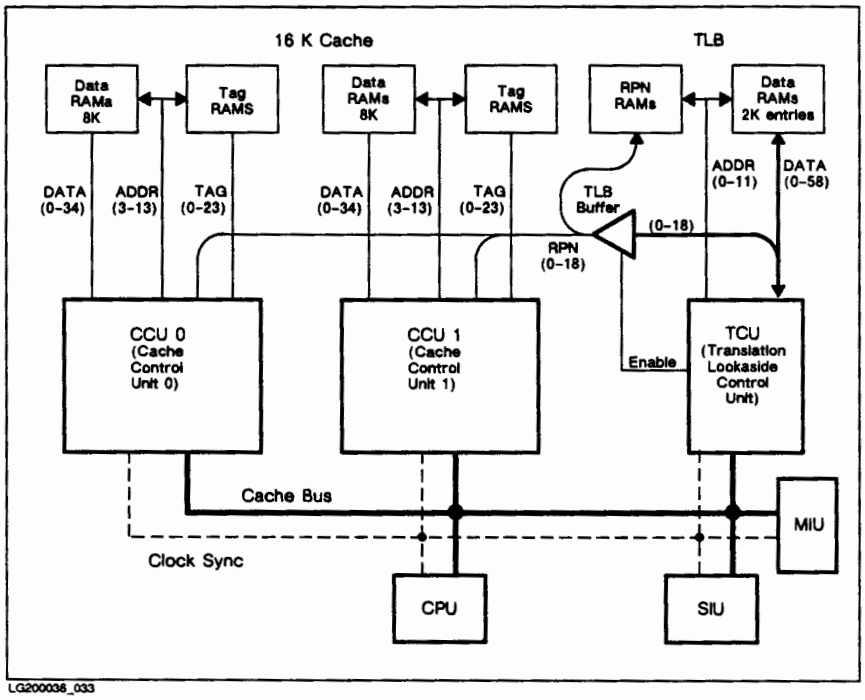


Figure 9-2. 825/925 Cache Subsystem Block Diagram

835 Processor Card Block Diagram

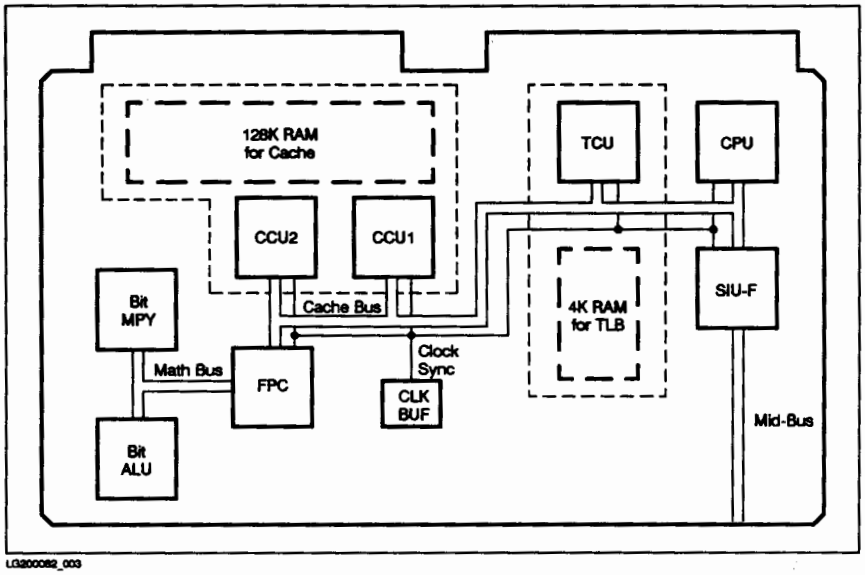


Figure 9-3. 835 Processor Card Block Diagram

835 PDH Card Block Diagram

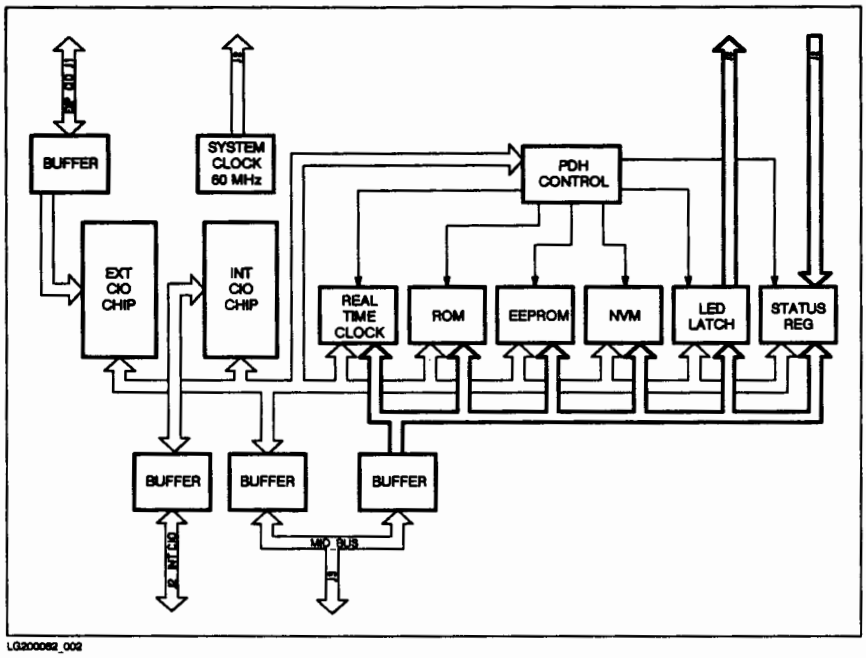


Figure 9-4. 835 PDH Card Block Diagram

825/925 MIU Chip Simplified Block Diagram

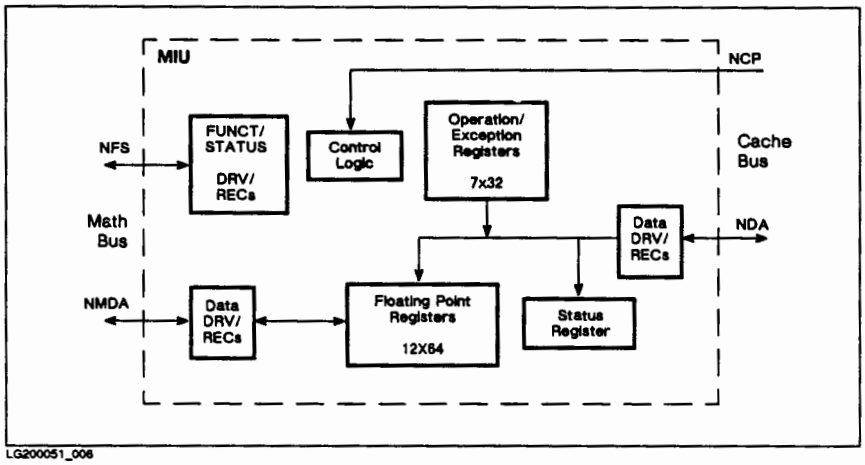


Figure 9-5. 825/925 MIU Chip Simplified Block Diagram

825/925 CCU Chip Simplified Block Diagram

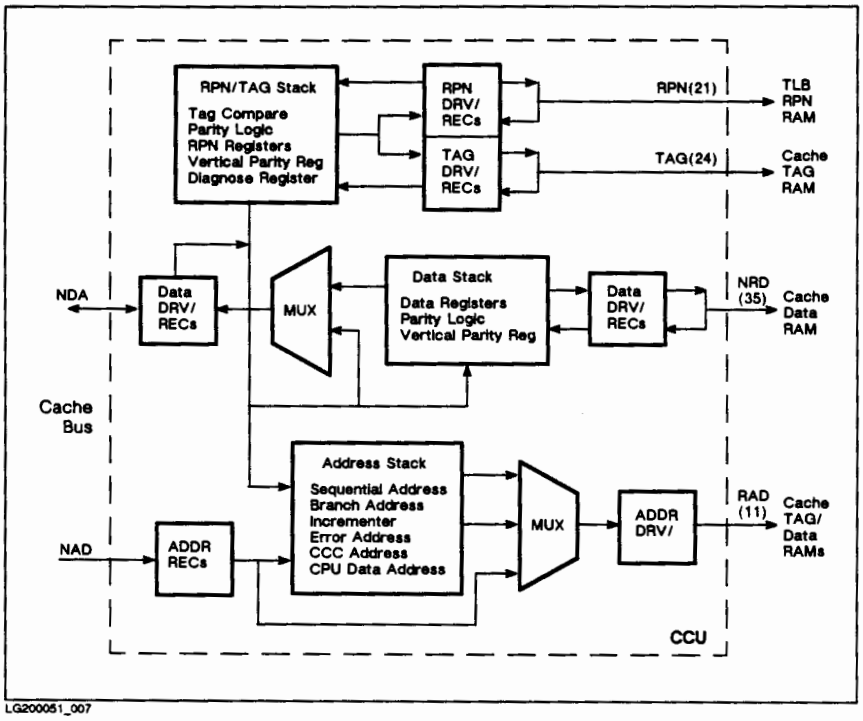


Figure 9-6. 825/925 CCU Chip Simplified Block Diagram

825/925 TCU Chip Simplified Block Diagram

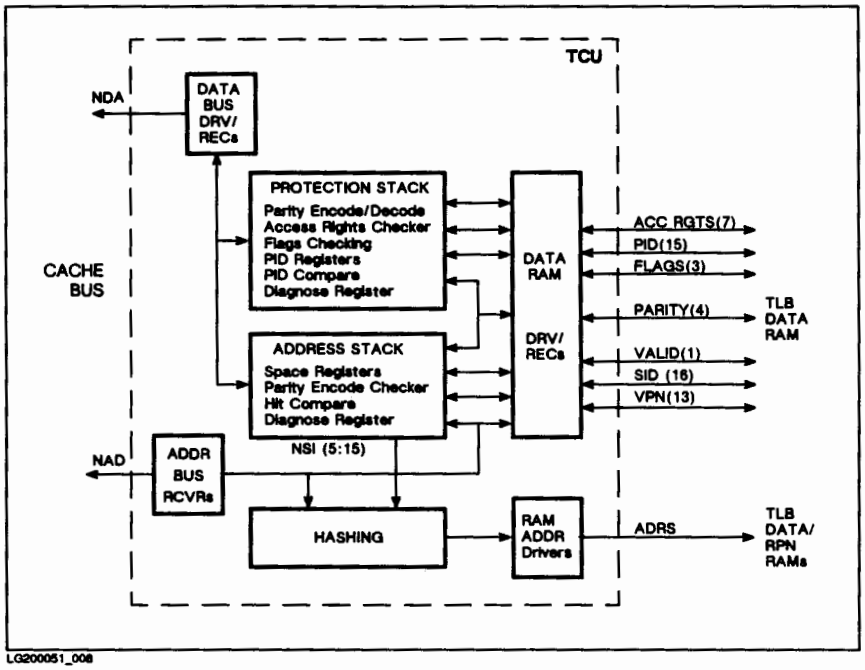


Figure 9-7. 825/925 TCU Chip Simplified Block Diagram

825/925 CPU Chip Simplified Block Diagram

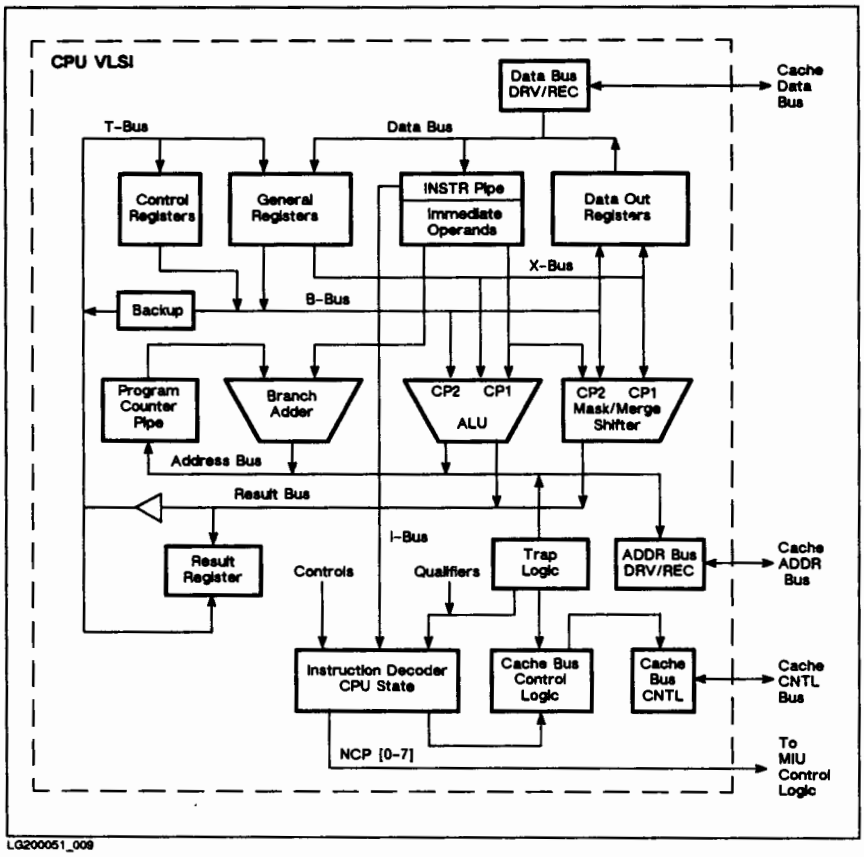


Figure 9-8. 825/925 CPU Chip Simplified Block Diagram

825/925 SIU Chip Simplified Block Diagram

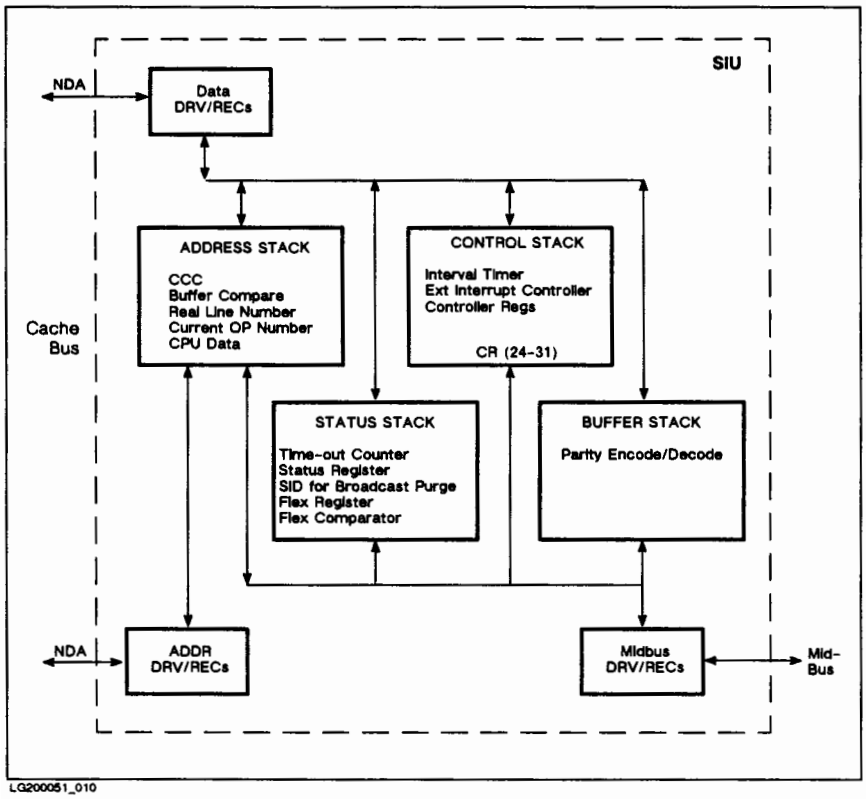


Figure 9-9. 825/925 SIU Chip Simplified Block Diagram

825/925 Math Chip Simplified Block Diagram

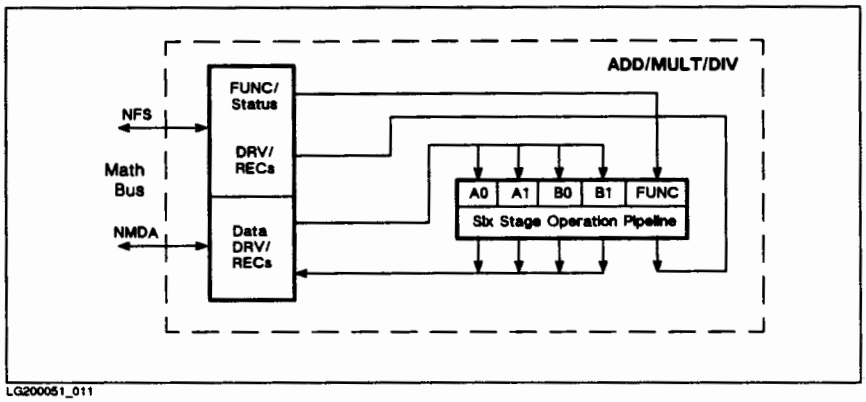


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Figure 9-10. 825/925 Math Chip Simplified Block Diagram

825/925 Address Decomposition

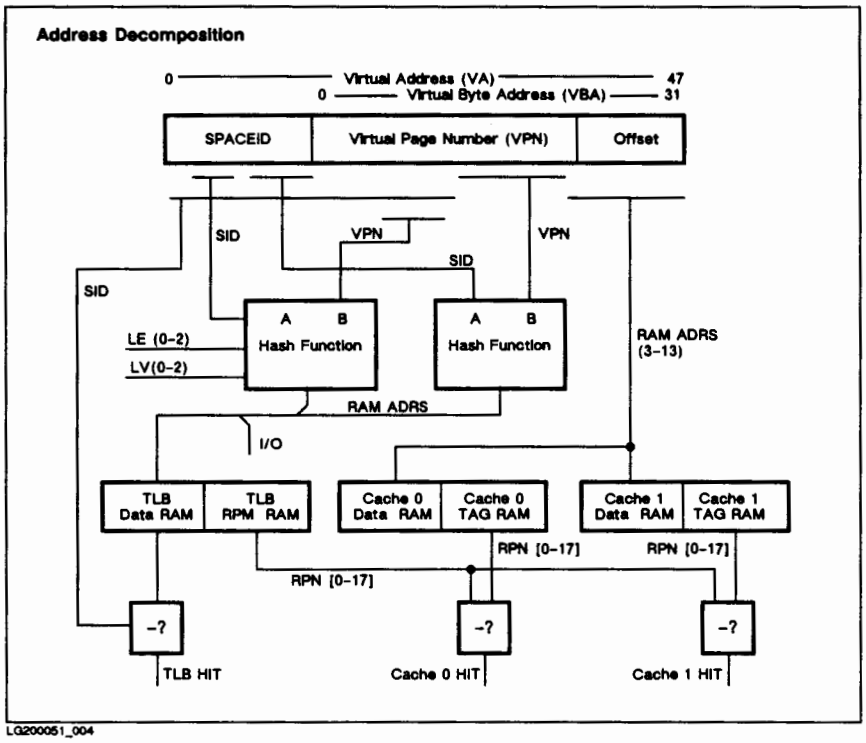

Figure 9-11. 825/925 Address Decomposition

10

Reference

This section contains reference material to aid in troubleshooting HP Precision Architecture products. An ASCII Code Chart is listed first followed by common HP acronyms in Table 10–2.

ASCII Code Chart

Use the ASCII Code Chart to determine the ASCII code for a particular character. The following acronyms are used in the ASCII Code Chart.

Table 10-1. ASCII Acronyms

Acronym	Description	Acronym	Description
NUL	Null	SOH	Start of Heading
STX	Start of Text	ETX	End of Text
EOT	End of Transmission	ENQ	Enquiry
ACK	Acknowledge	BEL	Bell
BS	Backspace	HT	Horizontal Tab.
LF	Line Feed	VT	Vertical Tab.
FF	Form Feed	CR	Carriage Return
SO	Shift Out	SI	Shift In
NAK	Negative Ack.	SYN	Synchronous Idle
CAN	Cancel	EM	End of Medium
SUB	Substitute	ESC	Escape
FS	File Separator	GS	Group Separator
RS	Record Separator	US	Unit Separator
SP	Space (Blank)	DEL	Delete
DC2	Device Control 2	DC4	Device Control 4
DC1	Device Control 1(X-ON)	DC3	Device Control 3(X-OFF)
ETB	End of Transmission Block	DLE	Data Link Escape

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
NUL	0	000	00	NUL
SOH	1	001	01	SOH
STX	2	002	02	STX
ETX	3	003	03	ETX
EOT	4	004	04	PF
ENQ	5	005	05	HT
ACK	6	006	06	LC
BEL	7	007	07	DEL
BS	8	010	08	
HT	9	011	09	
LF	10	012	0A	SMM
VT	11	013	0B	VT
FF	12	014	0C	FF
CR	13	015	0D	CR
SO	14	016	0E	SO
SI	15	017	0F	SI

Figure 10-1. ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
DLE	16	020	10	DLE
DC1	17	021	11	DC1
DC2	18	022	12	DC2
DC3	19	023	13	TM
DC4	20	024	14	RES
NAK	21	025	15	NL
SYN	22	026	16	BS
ETB	23	027	17	IL
CAN	24	030	18	CAN
EM	25	031	19	EM
SUB	26	032	1A	CC
ESC	27	033	1B	CU1
FS	28	034	1C	IFS
GS	29	035	1D	IGS
RS	30	036	1E	IRS
US	31	037	1F	IUS
SP space	32	040	20	DS
!	33	041	21	SOS
"	34	042	22	FS
#	35	043	23	
$	36	044	24	BYP
%	37	045	25	LF
&	38	046	26	ETB
'	39	047	27	ESC
(	40	050	28	
)	41	051	29	
*	42	052	2A	SM
+	43	053	2B	CU2
,	44	054	2C	
-	45	055	2D	ENQ
.	46	056	2E	ACK
/	47	057	2F	BEL

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
0	48	060	30	SYN
1	49	061	31	
2	50	062	32	
3	51	063	33	PN
				RS
4	52	064	34	UC
5	53	065	35	EOT
6	54	066	36	
7	55	067	37	
8	56	070	38	
9	57	071	39	CU3
:	58	072	3A	
;	59	073	3B	DC4
				NAK
<	60	074	3C	
=	61	075	3D	SUB
>	62	076	3E	
?	63	077	3F	SP
@	64	100	40	
A	65	101	41	
B	66	102	42	
C	67	103	43	
D	68	104	44	
E	69	105	45	
F	70	106	46	
G	71	107	47	
H	72	110	48	
I	73	111	49	
J	74	112	4A	¢
K	75	113	4B	.
L	76	114	4C	<
M	77	115	4D	(
N	78	116	4E	+
O	79	117	4F	|

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
P	80	120	50	&
Q	81	121	51	
R	82	122	52	
S	83	123	53	
T	84	124	54	
U	85	125	55	
V	86	126	56	
W	87	127	57	
X	88	130	58	
Y	89	131	59	
Z	90	132	5A	!
[	91	133	5B	$
\	92	134	5C	*
]	93	135	5D	)
^	94	136	5E	;
_	95	137	5F	^
`	96	140	60	-
a	97	141	61	/
b	98	142	62	
c	99	143	63	
d	100	144	64	
e	101	145	65	
f	102	146	66	
g	103	147	67	
h	104	150	68	
i	105	151	69	
j	106	152	6A	|
k	107	153	6B	,
l	108	154	6C	%
m	109	155	6D	_
n	110	156	6E	>
o	111	157	6F	?

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
p	112	160	70	
q	113	161	71	
r	114	162	72	
s	115	163	73	
t	116	164	74	
u	117	165	75	
v	118	166	76	
w	119	167	77	
x	120	170	78	‘
y	121	171	79	‘
z	122	172	7A	:
{	123	173	7B	#
|	124	174	7C	@
}	125	175	7D	’
~	126	176	7E	=
DEL	127	177	7F	"
	128	200	80	
	129	201	81	a
	130	202	82	b
	131	203	83	c
	132	204	84	d
	133	205	85	e
	134	206	86	f
	135	207	87	g
	136	210	88	h
	137	211	89	i
	138	212	8A	
	139	213	8B	
	140	214	8C	
	141	215	8D	
	142	216	8E	
	143	217	8F	

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
	144	220	90	
	145	221	91	j
	146	222	92	k
	147	223	93	l
	148	224	94	m
	149	225	95	n
	150	226	96	o
	151	227	97	p
	152	230	98	q
	153	231	99	r
	154	232	9A	
	155	233	9B	
	156	234	9C	
	157	235	9D	
	158	236	9E	
	159	237	9F	
	160	240	A0	
	161	241	A1	~
	162	242	A2	s
	163	243	A3	t
	164	244	A4	u
	165	245	A5	v
	166	246	A6	w
	167	247	A7	x
	168	250	A8	y
	169	251	A9	z
	170	252	AA	
	171	253	AB	
	172	254	AC	
	173	255	AD	
	174	256	AE	
	175	257	AF	

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
	176	260	B0	
	177	261	B1	
	178	262	B2	
	179	263	B3	
	180	264	B4	
	181	265	B5	
	182	266	B6	
	183	267	B7	
	184	270	B8	
	185	271	B9	
	186	272	BA	
	187	273	BB	
	188	274	BC	
	189	275	BD	
	190	276	BE	
	191	277	BF	
	192	300	C0	{
	193	301	C1	A
	194	302	C2	B
	195	303	C3	C
	196	304	C4	D
	197	305	C5	E
	198	306	C6	F
	199	307	C7	G
	200	310	C8	H
	201	311	C9	I
	202	312	CA	
	203	313	CB	
	204	314	CC	
	205	315	CD	
	206	316	CE	
	207	317	CF	

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
	208	320	D0	}
	209	321	D1	J
	210	322	D2	K
	211	323	D3	L
	212	324	D4	M
	213	325	D5	N
	214	326	D6	O
	215	327	D7	P
	216	330	D8	Q
	217	331	D9	R
	218	332	DA	
	219	333	DB	
	220	334	DC	
	221	335	DD	
	222	336	DE	
	223	337	DF	
	224	340	E0	\
	225	341	E1	
	226	342	E2	S
	227	343	E3	T
	228	344	E4	U
	229	345	E5	V
	230	346	E6	W
	231	347	E7	X
	232	350	E8	Y
	233	351	E9	Z
	234	352	EA	
	235	353	EB	
	236	354	EC	
	237	355	ED	
	238	356	EE	
	239	357	EF	

Figure 10-1 (cont'd). ASCII Code Chart

ASCII	Character Code Values			EBCDIC
Control/ Graphic	Decimal Value	Octal Value	Hexadecimal Value	Control/ Graphic
	240	360	F0	0
	241	361	F1	1
	242	362	F2	2
	243	363	F3	3
	244	364	F4	4
	245	365	F5	5
	246	366	F6	6
	247	367	F7	7
	248	370	F8	8
	249	371	F9	9
	250	372	FA	
	251	373	FB	
	252	374	FC	
	253	375	FD	
	254	376	FE	
	255	377	FF	

Figure 10-1 (cont'd). ASCII Code Chart

HP System Acronyms

Table 10-2. HP System Acronyms

Acronym	Description
AP	Access Port
ACD	Architecture Control Document
AFI	Asynchronous FIFO Interface Card
BBU	Battery Back-up Unit
CA	Channel Adapter
CCU	Cache Control Unit
CIO	Channel I/O
CPU	Central Processor Unit
DA	Device Adapter
DIO	Direct I/O
DMA	Direct Memory Access
DUI	Diagnostic User Interface
ECC	Error Correction Circuitry
ECL	Emitter Coupled Logic
FRU	Field Replaceable Unit
HP-IB	Hewlett-Packard Interface Bus
HPMC	High Priority Machine Check
HP-PA	Hewlett-Packard Precision Architecture
HP-UX	Hewlett-Packard UNIX
IB	Internal Bias
IC	Integrated Circuit
I/O	Input/Output
IODC	I/O Dependent Code
IPL	Initial Program Loader
ISL	Initial System Loader

Table 10-2 (cont'd). HP System Acronyms

Acronym	Description
LAN	Local Area Network
LANIC	Local Area Network Interface Controller
LED	Light Emitting Diode
LPMC	Low Priority Machine Check
LRU	Least Recently Used
LUT	Look Up Table
MAU	Media Attachment Unit
MIU	Math Interface Unit
MUX	Multiplexer
NMOS	N-channel enhancement Metal-Oxide Semiconductor
NS	Network Services
OS	Operating System
PDC	Processor Dependent Code
PDH	Processor Dependent Hardware
PFR	Powerfail Recovery
PON	Power On
RAM	Random Access Memory
RISC	Reduced Instruction Set Computer
ROM	Read Only Memory
RS-232C	Standard for Serial Communication Interface
RSI	Remote Support Interface
RTC	Real Time Clock
SIU	System Interface Unit
SPU	System Processor Unit
TC	Transfer of Control
TCU	Translation lookaside Control Unit
TLB	Translation Lookaside Buffer
TOC	Transfer of Control
TTL	Transistor/Transistor Logic
VLSI	Very Large Scale Integration

11

Service Notes

Notes

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A

HP-UX Quick Reference

The purpose of this section is to give experienced HP-UX personnel a quick look-up guide. If you already know what to do, but you just want to look up the syntax or find the right command, this guide's for you. If you are not familiar with HP-UX, this guide's not for you; read the *HP 9000 Series 800 System Administrator's Manual* and other HP-UX documentation.

Warning **Commands listed in this chapter can seriously effect your system. Do not use commands if you don't know how the system will respond.**

HP-UX Directory Structure

Table A-1. HP-UX Directories

Directory	Description
/	root
/bin	Public commands
/dev	Special files (device files)
/etc	Commands and files for System Administration
/etc/conf	Contains object code and header files for driver generation and system configuration
/etc/conf/gen	Contains the S800 file
/etc/newconfig	Contains new versions of configuration files and shell scripts after an update.
/lib	Contains frequently used object code libraries and related utilities
/hp-ux	Contains the HP-UX operating system (kernel)
/tmp	Contains temporary files
/mnt	User home directories

Table A-1 (cont'd). HP-UX Directories

Directory	Description
/usr	Contains less frequently used commands and other miscellaneous files
/usr/lib	Overflow for /lib. Additional system material and utility data files
/usr/mail	Mail directory, used for depositing mail files
/usr/man	Manual pages from the HP-UX reference manual
/usr/man/man1...man8,manlm	Contains the unformatted version of **man** pages
/usr/man/cat1...cat8,catlm	Contains the formatted version of **man** pages
/usr/spool/uucppublic	Used for free access of files to other systems via uucp or LAN
/usr/spool	Spooled (queued) files for various programs
/usr/spool/uucp	Queued work files, lock files, log files, status files, and other files for uucp
/usr/spool/cron	Spooled jobs for **cron** and **at**
/usr/spool/lp	Control and working files for the **lp** spooler
/usr/tmp	Alternate place for temporary files
/usr/contrib	Contains any contributed files and commands
/usr/contrib/bin	Contains contributed commands
/usr/contrib/lib	Contains contributed object libraries
/usr/contrib/man	Online documentation for any contributed files
/usr/news	Directory that contains news items about your system
/usr/diag/bin/sysdiag	Online diagnostics
/usr/include	High level C language header files
/usr/include/sys	Low level (kernel related) C language header files
/usr/lib/uucp	Configuration files for **uucp**
/usr/adm	System administrative data files

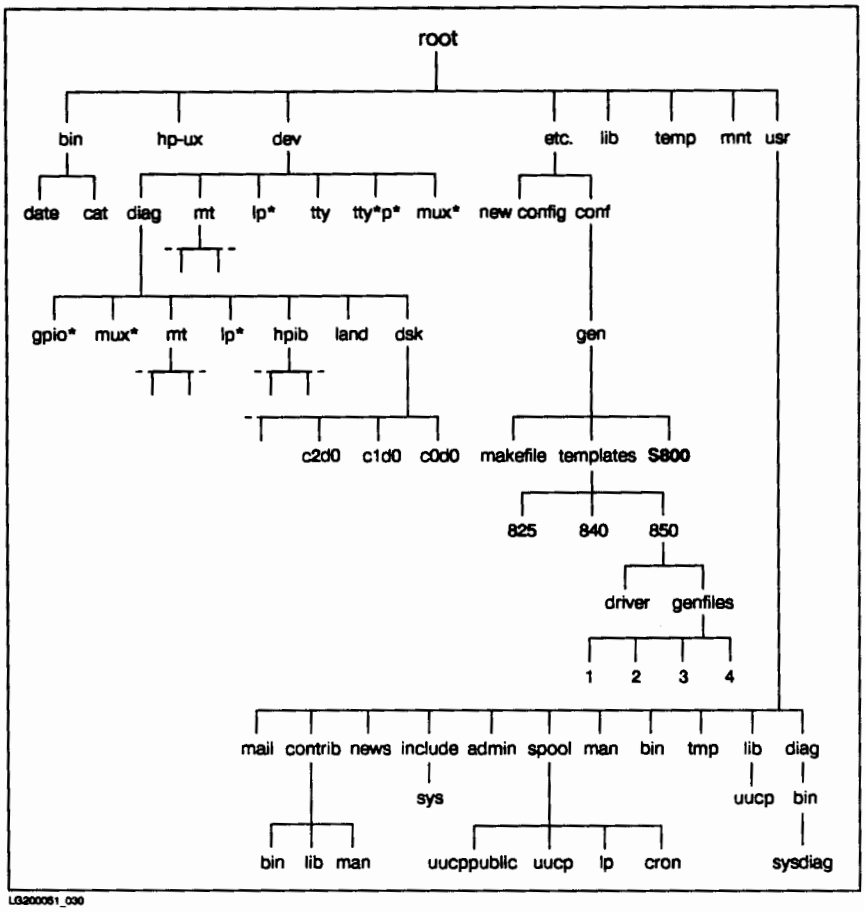

Figure A-1. Directory Structure

HP-UX Commands

Refer to the *HP 9000 Series 800 System Administrator's Manual* or other HP-UX documentation for more information about HP-UX commands.

Table A-2. HP-UX File Commands

File Commands	
`cat` *file1*	Displays the contents of *file1* on screen
`more` *file2*	Displays the contents of *file2* on screen
`q`	Quits display and returns to command line when using `more`
Return	Displays one more line when using `more`
Space	Displays another screen when using `more`
`cat >` *newtest*	Takes what you type at your terminal and puts it into the new file *newtest*, until you type CTRL d
`cat >>` *oldtest*	Takes what you type at your terminal and adds it to the existing file *oldtest*, until you type CTRL d
`cat` *file1 file2 > file3*	Combines *file1 and file2* and puts them in *file3* with *file1* first.
`grep` *berlina alpha*	Displays the lines in which the string *berlina* occurs in the file *alpha*.
`cp` *rick rack*	Makes a copy of the file *rick* and calls it *rack*. (If *rack* is a directory, a copy of *rick* is put in that directory.)
`mv` *grey black*	Changes the name of *grey* to *black*. If *black* is a directory, the *grey* file is moved into it
`sort` *acct*	Sorts *acct* and displays on screen. Default is alphabetical order.
`rm` *taxes*	Deletes the file *taxes*
`lp` *stuff*	Sends the file *stuff* to the system line printer
`vi` *tutorial.5*	Creates or edits the file *tutorial.5* with the vi screen editor
`diff` *myfile myfile1*	Displays the differences between *myfile* and *myfile1*
`chown` *sam acct*	Changes the ownership of your file *acct* to *sam*
`chgrp` *pubfiles sec1*	Changes your group ID of *sec1* to *pubfiles*
`chmod go-rwx` *dates*	Removes read,write, and execute permission on the file *dates* for users in your group and for all other users (See "Using chmod" on next page)
`chmod ugo+rwx` *pubfiles*	Opens the existing subdirectory *pubfiles* so that anyone can read, write, or execute the files in it. See "Using chmod" on the next page.

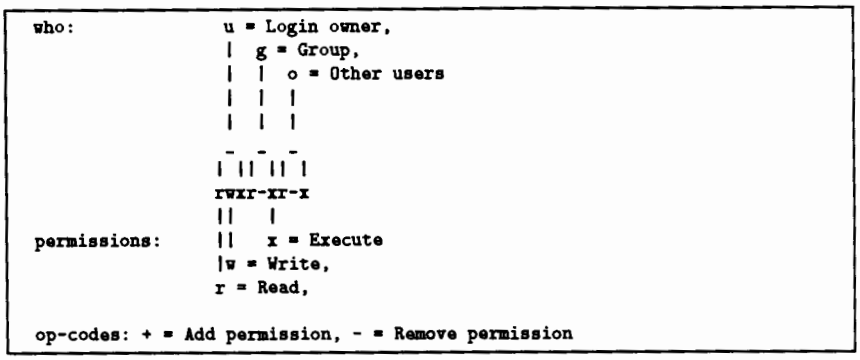

Figure A-2. Using chmod

Table A-3. HP-UX Directory Commands

Directory Commands	
`ls`	Lists the files and subdirectories in the current directory
`ls -??`	Lists all contents, flags directories (/) and executable files (*)
`ls -l`	Gives a "long" listing of the current directory with complete information on each file
`ls` *acct?*	Directory list of files named *acct* plus one other character
`ls` *acct**	Directory list of files named *acct* plus 0 or more characters
`lssf` */dev/diag/**	Lists all tbe special files in directory */dev/diag.*
`file *`	Lists all files in current directory and tells file type
`ll`	Lists all the contents of the current directory,
`ll` *sue*	Lists the contents of the directory *sue* in the long format showing all the protection codes and information
`ll` *sue &| lp*	Lists the contents of the directory *sue*, sends them to the line printer.
`pwd`	Displays the name of files in the current directory
`cd`	Returns you to your home directory
`cd` */user/sue*	Moves you to the directory */user/sue*
`cd ..`	Moves you to the parent directory. If you were in **sue**, this command would put you in **user** directory, as above
`mkdir` *Chap4*	Creates a new subdirectory in your current directory called *Chap4*
`rm -r *`	Removes all files in current directory - DANGEROUS. Make sure you know what directory you're in before typing this command.
`rmdir` *budget87*	Deletes the directory *budget87* (only if the directory contains no files)

Table A-3 (cont'd). HP-UX Directory Commands

`find . -name` *test.1* `-print`	Finds *test.1* and displays its path name
`find` */users/tmp* `-user` *pubfiles* `-print`	Searches from */users/tmp* and displays all files belonging to user *pubfiles*
`find / -user` *sue* `-print`	Finds all files belonging to *sue* and displays them

Table A–4. HP-UX System Commands

System Commands	
`who`	Displays the users currently logged onto the system and the ports used
`ps`	Displays the processes you are currently running
`ps -a`	Displays the processes being run by all users on the system
`man` *ls*	Displays information about the *ls* command and its options
`man -k` *mail*	Lists the HP-UX commands that relate to the keyword *mail*
`kill` *4507*	Terminates the background process number *4507*
`history`	Lists the last 20 commands entered from last to first
`!!`	Repeats the last command entered (c-shell only)
`login` *moondog*	Login as user *moondog*
`logout`	Logout
`df`	Shows disc space
`du`	Shows disc usage
`lpstat -t`	Shows status of print spooler
`write`	Writes to users already logged on
`wall`	System wide announcement to all users
`echo` *message*	Displays message on the screen
`hpux -is`	Boots HP-UX, system comes up in single user mode
`init s`	Changes run level from multiuser to single user
`init 2`	Changes run level from single user to multiuser
`mount`	Lists what file systems are mounted
`mount -a`	Mounts all the file systems listed in */etc/checklist*
`umount` */dev/dsk/c1d0s11*	Manually unmounts */dev/dsk/c1d0s11* file system

Table A-5. HP-UX Command Keys

Command Keys	
CTRL c or DEL	Interrupt. Stops a command currently being executed
CTRL d	Removes you from the current environment. At the $, #, or % prompts, these keys log you off the system (if you are in your Primary Shell)
CTRL h or Backspace	Deletes the previous character
CTRL s	Temporarily halts the output from the current command being executed (halts terminal scrolling, for instance)
CTRL q	Resumes the output that was halted by CTRL s.

Table A-6. HP-UX Wildcard Characters

Wildcard Characters	
*	Designates all files in the current directory.
s*	Designates all files beginning with s in the current directory.
*.c	Designates all files ending with .c in the current directory.
????	Designates any 4 character filename in the current directory.
s???	Designates any 4 character filename beginning with s in the current directory.
??.c	Designates any 4 character filename ending with .c in the current directory.

Using vi

Use `vi` as a screen-oriented editor to edit a file. The following commands take effect as soon as the keys are pressed.

Table A-7. VI Enter/Exit Commands

`vi` *file1*	Enter `vi` to edit *file1*
ESC	Enter command mode in `vi`
`:q`	Quit `vi` if no writes since last save
`:q!`	Quit `vi` without saving current changes to file
`:wq`	Save file and quit `vi`
`:w` *file1*	Save *file1*
`ZZ`	Save file and quit `vi`

Table A-8. VI Move Cursor Commands

	First, press ESC to enter Command Mode
arrow keys	Move in key direction
`H`	Move to top of screen
`L`	Move to bottom of screen
`^`	Move to beginning of line
`$`	Move to end of line
`nG`	Move to `nth` line of file

Table A-9. VI Edit Commands

	First, press ESC to enter Command Mode
`a`	Add after cursor
`A`	Enters text at the end of current line
`i`	Insert before cursor
`I`	Enters text to the left of the first character that is not a blank on the current line
`o`	Add a line below cursor
`O`	Add a line above cursor
`cw`	Changes one word starting at cursor position

Table 4-9 (cont'd). VI Edit Commands

`dw`	Delete word
`ndw`	Delete n words
`dd`	Delete line
`ndd`	Delete n lines
`r`	Replaces character at cursor position
`R`	Replaces only those characters that are typed over with new text
`x`	Delete character
`nx`	Delete n characters
`J`	Join with next line
`np`	Retrieve nth last delete
`yy`	Yank, copies line to temporary storage. To insert blank line, move cursor to desired position and press Return.
`y 3`	Yank. Copy the next 3 lines to temporary storage
`p`	Put the "yanked" lines here (at the cursor)

Table A-10. VI Move Screen Commands

CTRL f	Moves to the next screen
CTRL b	Moves to the previous screen

Table A-11. VI Search Commands

Search	
`/acct`	Search forward in file for the string *acct*
`? asparagus`	Search backward in file for string *asparagus*
`n`	Repeat search, same direction
`N`	Repeat search, other direction

Table A-12. VI Miscellaneous Commands

`u`	Undo last change
`U`	Restore current line
`:set nu`	Temporarily display line numbers with file
`.`	Repeats action initiated by last command

System Backup

tar

Tar is used to save and restore files on magnetic tapes or flexible discs. For more information on `tar` refer to the man pages on the system. (Type: `man tar`)

Syntax:

```
# tar -[key] [modifier] [file(s)]
```

Key	
r	Add files to end of archive
x	Extract (restore) named files from archive
u	Update only
c	Create a new archive
t	Terminal. Lists contents of archive
Modifiers	
v	Displays names of files archived
w	tar will print action and file name, then wait for you to reply y or n
f	Allows you specify another device other than /dev/rmt

Examples:

From `/users`, copy all of the files under `/users` to tape:

```
cd users
tar -cv users
```

Display file names on archive:

```
tar -vt
```

From `/users`, restore file `test` from archive to disk under `/users`:

```
cd users
tar -xvf /dev/mt/test users
```

From `/users`, copy file `/users/test` to the end of `/dev/mt/1m`:

```
cd users
tar -crf /dev/mt/1m users/test
```

cpio

The cpio command copies files in and out of an archive. An archive may be a file or a raw device. For more information on cpio refer to the man pages on the system. (Type: `man cpio`)

Options	
`-o`	Reads *stdin* to obtain a list of path names and copies those files onto *stdout*
`-i`	Extracts from *stdin* those files that match patterns
`-p`	Used to copy files between directories instead of between devices
`-d`	Create directories if needed
`-t`	Print table of contents only
`-v`	List names as they are copied

Examples:

Copies all files from `/olddir` to `/newdir`:

```
mkdir newdir
cd olddir
find /user/local -print | cpio -pd newdir
```

Copies current directory to tape:

```
find . -print | cpio -o >  /dev/rmt/0m
```

Displays files on tape:

```
cpio -it <  /dev/rmt/0m
```

Cookbook Procedure for Installing HP-UX

Install HP-UX on the Model 825/835 by following these steps:

1. Install the computer hardware, including peripheral devices.
2. Determine the boot paths for the installation device (magnetic or cartridge tape drive) and for the destination disc drive. (Default is 4.2.3 for the installation device, and 4.0.0 for the destination disc.)
3. Load the INSTALL tape on the installation device.
4. Power up the SPU.
5. The console displays the primary and alternate boot paths. Select the boot path for the installation device (tape drive), or enter it from the keyboard. A typical boot path is `4.2.3`. (If the default boot paths are different than the paths for your system, it's a good idea to change them with the **PRIMPATH**, **ALTPATH**, and **CONSPATH** commands at the ISL prompt.)
6. Enter an ISL command like the following:

   ```
   ISL> hpux copy tape1(4.2.3;0x0a0000,1) disc0(4.0.0;0x1)
   ```

   This command downloads a temporary HP-UX kernel onto the system disc. (The exact command you enter depends on the configuration of the system on which you're installing HP-UX, and whether you're installing from magnetic tape or cartridge. Note that the Module Number in the boot paths is normally "4" on the Model 825 rather than "8" as it is on the Model 840.)
7. Enter a command like the following:

   ```
   ISL> hpux disc0(4.0.0;0x1)hp-ux.inst
   ```

   This command boots the temporary HP-UX operating system from the system disc, and begins the installation utility.
8. When the program prompts you, enter information about the destination and installation devices.
9. The program creates the file systems, and copies the minimum system software (core system) to the system disc. The console displays the installation execution trace. The program pauses to give you time to write down the superblock back-up numbers as they are displayed. A record of superblock back-up numbers is very helpful in case the superblock later becomes corrupted. (To repair a damaged file system with a corrupted superblock, use the utility **fsck**.)
10. When the installation trace is completed, the system automatically reboots. Do not override the autoboot process (do not press any key).
11. The Update main menu appears on the console. Remove the INSTALL tape and mount the first of the tapes containing the HP-UX subsystems. Enter the menu selections required. The Update program then copies a large number of files from the tape drive onto the destination disc. Afterwards, the program asks several questions about system configuration (this is new with HP-UX 1.1). The system then generates a new kernel, and reboots one last time, this time in the "normal" fashion. The installation is complete.

For full instructions on installing HP-UX, you can refer to two manuals:

- The *Series 800 System Administrator's Manual* (PN 92453-90004). See Chapter 2 and the section entitled "Updating the HP-UX System" in Chapter 5.
- The *HP 9000/825/835 Installation and Configuration Guide* (PN A1002-90000). The explanation in Chapter 4 of this guide is an abbreviated version of that in the System Administrator's Manual.

Typical Console Paths.

Configuration	Console Path
RS-232C (non-graphics) terminal for the console; no AP	4.1.0
RS-232C (non-graphics) terminal for the console; AP	4.3.0
Graphics terminal for the console; Graphics Interface card in Mid-bus slot 2	8.0.0
Graphics terminal for the console; Graphics Interface card in Mid-bus slot 3	12.0.0

Cookbook Procedure for Modifying HP-UX

This section briefly describes the steps to modify HP-UX for a new I/O configuration. Refer to the Appendix B of the *825/835 Installation and Configuration Guide* or *HP 9000 Series 800 System Administrator's Manual* for a complete explanation.

1. At the HP-UX prompt, issue the command:

   ```
   cd /etc/conf/gen
   ```

1. Copy the existing S800 `file` to a different name, so that you will have a backup copy in case of problems. For example:

   ```
   cp S800 S800BACKUP
   ```

1. Edit the S800 `file` so that it contains the device drivers and hardware addresses for the new I/O configuration. (See the previous section, "How to Read an S800 File.") You can use the `vi` screen editor to edit the file. For example:

   ```
   vi S800
   ```

2. Recompile the kernel with `uxgen`, using the edited S800 `file` as input:

   ```
   /etc/uxgen S800
   ```

3. Copy the old kernel `/hp-ux` in the root (/) directory and the old devices file `/etc/devices`. Write down the names of these files in case the new kernel does not boot. For example:

   ```
   cp /hp-ux /SYSBCKUP
   cp /etc/devices /etc/DEVBACKUP
   ```

4. Change the working directory:

   ```
   cd /etc/conf/S800
   ```

5. Move `hp-ux` to `/hp-ux` and `devices` to `/etc/devices`, by entering the commands:

   ```
   mv hp-ux /hp-ux
   mv devices /etc/devices
   ```

6. Create the special files (device files) for the new configuration. To do this the easy way, enter:

   ```
   cd /dev
   /etc/insf
   ```

7. Shut down the system and turn off system power:

   ```
   cd /
   shutdown -h 0
   ```

8. Install cards in the desired slots.
9. Turn on the system and reboot.

Setting Up A Print Spooler

To set up a particular printer to be used with the LP Spooler, you can either edit and use the **/etc/mklp** script, or type in the commands directly from the keyboard. Refer to the *Series 800 System Administrator's Manual* section "Configuring the LP Spooler" for more information.

1. Log in as superuser (root) and shut down the LP scheduler:

   ```
   /usr/lib/lpshut
   ```

2. Execute the **lpadmin** command with the **-p** option. Repeat the command for each printer you want to configure.

   ```
   /usr/lib/lpadmin -plp -v/dev/lp0 -mhp2934a -h
   ```

Parameter	Description
-plp	names the printer **lp** (logical destination)
-v/dev/lp0	specifies the full path name of the printer's (lp0) special file, the physical destination.
-mhp2934a	specifies the printer model hp2934a from the **/usr/spool/lp/model** directory.
-h	means the printer is "hard-wired."

3. For each of the printers defined with **lpadmin**, execute **accept** and **enable** to allow requests to reach the printer:

   ```
   /usr/lib/accept lp
   /usr/bin/enable lp
   ```

4. Select a printer as the system default:

   ```
   /usr/lib/lpadmin -dlp
   ```

5. Restart the LP scheduler and see if it's running properly:

   ```
   /usr/lib/lpsched
   lpstat -t
   ```

6. If the scheduler is not running properly, remove the file **schedlock**. You may also need to remove the file **fifo**. Then repeat Step 5.

System Shut Down

It's wise to shut down HP-UX before turning off power. If you turn off power while HP-UX is running, you can damage the file system. Follow these steps to properly shut down the system:

1. Login as the superuser `root`.
2. Move to the root directory of the file system by entering the command `cd /` at the prompt.
3. Enter the `shutdown -h 0` command to shut down and halt the system immediately. (If you are already in single-user mode, you can enter `reboot -h` instead.)
4. You can turn off power when the console displays a message like:

   ```
   Halting (in tight loop) -- OK To Hit Reset Button
   ```

   For more information, see the section "Shutting Down the System" in the *Series 800 System Administrator's Manual.*

You can also turn off the system at the ISL prompt.

Creating a New File System

Refer to the *Series 800 System Administrator's Manual* section "Creating a New File System" for more information.

1. Make sure a device file exists on the disc where the file system is to reside.

   ```
   lssf /dev/dsk/*
   ```

2. Make sure the model of the disk drive you want to use exists in **/etc/disktab** along with correct default assignments for your system.

   ```
   more /etc/disktab
   ```

3. Run **newfs** to create a new file system. For example, on a HP 7935 using c1d0s11 (section 11):

   ```
   newfs /dev/rdsk/c1d0s11 hp7935
   ```

   Record superblock numbers as they are displayed on the screen.

4. Create a directory where the new file system will be mounted.

   ```
   mkdir /disc1
   ```

5. If you want the new file system mounted automatically, update **/etc/checklist** to include information about your new file system. When you type the following command all of the file systems listed in **/etc/checklist** will be mounted.

   ```
   mount -a
   ```

   You can also mount the file system manually by using the following command:

   ```
   mount /dev/dsk/c1d0s11 /disc1
   ```

   You can unmount the file system by using the following command:

   ```
   umount /dev/dsk/c1d0s11 /disc1
   ```

Checklist File

Refer to the *Series 800 System Administrator's Manual* Chapter 7, under "The Checklist File" for more information.

The `etc/checklist` file lists all file systems and swap devices:

```
special_file directory options pass_number backup_freq comment
```

Parameter	Description
`special_file`	A required field that specifies a block special file name.
`directory`	Name of the root mounted file system.
`options`	One or more options:
`defaults`	use all default options
`rw`	read-write (default)
`ro`	read-only
`suid`	set user ID execution allowed (default)
`nosuid`	set user ID execution not allowed
`pass_number`	Used by `fsck` to determine the order to check file systems (when -p is used)
`backup_freq`	Reserved for future use.
`comment`	Optional comment field beginning with # and ending with Return.

Example:

```
/dev/dsk/c1d0s11 /disc  rw  4  0  #  /user
```

fsck

For more information, see Appendix C "Using the fsck Command" in the *Series 800 System Administrator's Manual.*

Requirements

- Single-user mode
- Quiescent or can cause loss of data
- Uses directory /lost+found
- **fsck** should be executed using a character special device file, not a block special device file except when run on the root file system, **must** use the block device (for example, **/dev/dsk/c0d0s0**).
- If **fsck** makes changes to the root file system, the system must be rebooted.

Modes

The following modes are supported with **fsck**.

Mode	Description
default	allows you to choose to perform each action or not.
-b	specify alternate superblock
-p	fixes the following automatically and never removes data: unreferenced inodes unreferenced pipes and fifos link counts in inodes too large missing blocks in the free list wrong counts in the superblock clean byte marked wrong
-P	operates same as -p, except ignores file systems marked clean by commands like **umount** and **reboot**.
-n	causes **fsck** to answer NO to all questions that might remove data. Can be used in multiuser (though not recommended), single-user, or in background.
-q	prints only the message that require a response.
-y	causes **fsck** to answer YES to all questions. Might remove data.

Caution The **fsck -y** command can remove data automatically. Use with Caution.

Setting Up a New User

For more information, see "Adding a New User" in the *Series 800 System Administrator's Manual.*

1. Log in to root.
2. Edit **/etc/passwd** to add a new user to the last line of the file:

```
vi /etc/passwd
carol ::101:1 comment :/mnt/carol:/bin/csh
```

3. Edit **/etc/group** to add the user carol to an existing group:

```
vi /etc/group
nfl::11:todd,jerry,carol
```

4. Create directory for new user:

```
mkdir /mnt/carol
```

5. Change ownership for new user:

```
chown carol /mnt/carol
```

6. Have the System Administrator customize the user environment for the new user.

CE Handbook

HP 3000/925/935 and HP 9000/825/835 Computer Systems

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Notice

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Printing History

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update; the edition does not change when an update is incorporated.

The software code printed alongside the date indicates the version level of the software product at the time the manual or update was issued. Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual updates.

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List of Effective Pages

The List of Effective Pages gives the date of the current edition and of any pages changed in updates to that edition. Within the manual, any page changed since the last edition is indicated by printing the date the changes were made on the bottom of the page. No information is incorporated into a reprinting unless it appears as a prior update.

Effective Pages	Date
All	September 1988
Title Page	September 1989
ii - vii	September 1989
Contents	September 1989
Tables	September 1989
Figures	September 1989
Appendix B	September 1989

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, ergonomics, acoustics, 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 47CFR Subpart J, of Part 15) has specified that the following notice be brought to the attention of the users of this product:

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Japanese Radio Frequency Interference

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

この装置は，第一種情報装置(商工業地域において使用されるべき情報装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Japanese Radio Frequency Notice

Warning

UNITED KINGDOM TELECOM WARNING

(United Kingdom Only)

Interconnection of ports marked "UNITED KINGDOM TELECOM WARNING: Connect only apparatus complying with BS 6301 to these ports" with ports not so marked may produce hazardous conditions on the network and advice should be obtained from a competent engineer before such a connection is made.

Connect only apparatus complying with BS 6301 to the ports marked with the above warning.

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 hazardous voltages.

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

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.

Contents

Figures

Tables

B

Additional SPU Configurations

This appendix provides product information for additional SPU configurations available with HP-UX Release 7.0.

HP 9000 Model 834CH Workstation

The Model 834CH Workstation is a two-dimensional, high-resolution, color workstation based on the Model 835 SPU. Graphics cards are functionally identical to the graphics cards for the Model 835CHX 2-D Graphics Workstation, but they are installed directly in the SPU. This workstation is customer-installable.

Features include:

- Full-size Mid-bus graphics cards, including a 2-D graphics card, a graphics interface card, and an optional 2D integer accelerator
- 8 MB RAM standard, 48 MB RAM maximum
- Restricted 2-user HP-UX license that permits only 2 distinct users to be logged in at any one time, either directly or by LAN. This license cannot be upgraded to a higher level.
- HP 98752A 19-Inch High-Resolution Color Monitor (1280 by 1024)
- HP 46021A Keyboard
- HP 46060A 2-Button Mouse
- HP 46081A Extension/Speaker Module
- HP 46084A ID Module
- HP B1733 X Window System
- Starbase Graphics Library

The following Model 835CHX features are not available in the 834CH Workstation:

- Access port
- HP-FL interface
- Three of the CIO slots
- HP-PB adapter
- Configuration files

SPU Configuration

The base system configuration for the Model 834CH SPU is shown in Figure B-1.

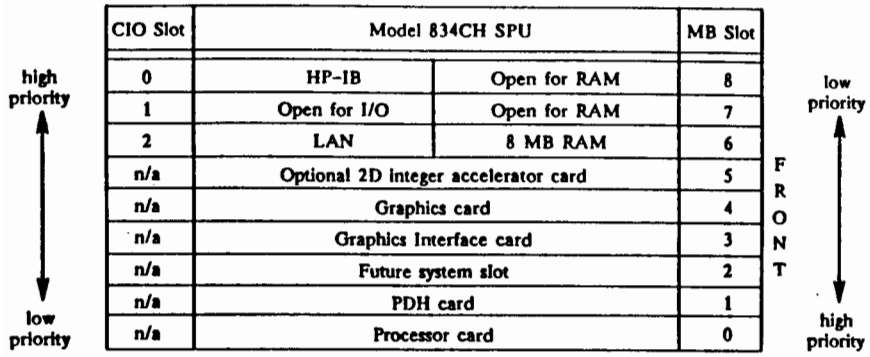

Figure B-1. Model 834CH SPU Configuration

Options

Options that can be added to the Model 834CH base system are:

- HP 98196A 6-Channel Mux
- HP-UX pre-installed on the HP 7959B Disk Drive with pre-configured X Windows environment
- 2D integer accelerator card
- Replace the HP 98752A 19-Inch Color Monitor with an HP 98789A 16-Inch Color Monitor
- HP-UX operating system on cartridge tape and documentation set (HP recommends that the customer purchase 1 set per site)
- Option 515 - substitute 16 MB memory card for 8 MB memory card
- Option 003 - HP 30241A ThickMAU
- Option 004 - HP 28641A ThinMAU

Orientation

The backplane connectors on CIO slots 3, 4, and 5 of the Model 834CH Workstation are removed and the backplane connectors for Mid-bus slots 4 and 5 are modified so that they no longer accept standard Mid-bus cards. The graphics card and the 2D integer accelerator installed in these slots do not communicate with the Mid-bus. Only the interface card installed in Mid-bus slot 3 accesses the Mid-bus. The graphics card, the 2D integer accelerator, and the graphics interface card communicate via a bridge board, which is installed across Mid-bus slots 3, 4, and 5 (refer to Figure B-2). A single cable connected to the graphics card provides HIL, RGB, and audio (labeled SPKR on the graphics card). Figure B-3 shows the location of the graphics card connectors.

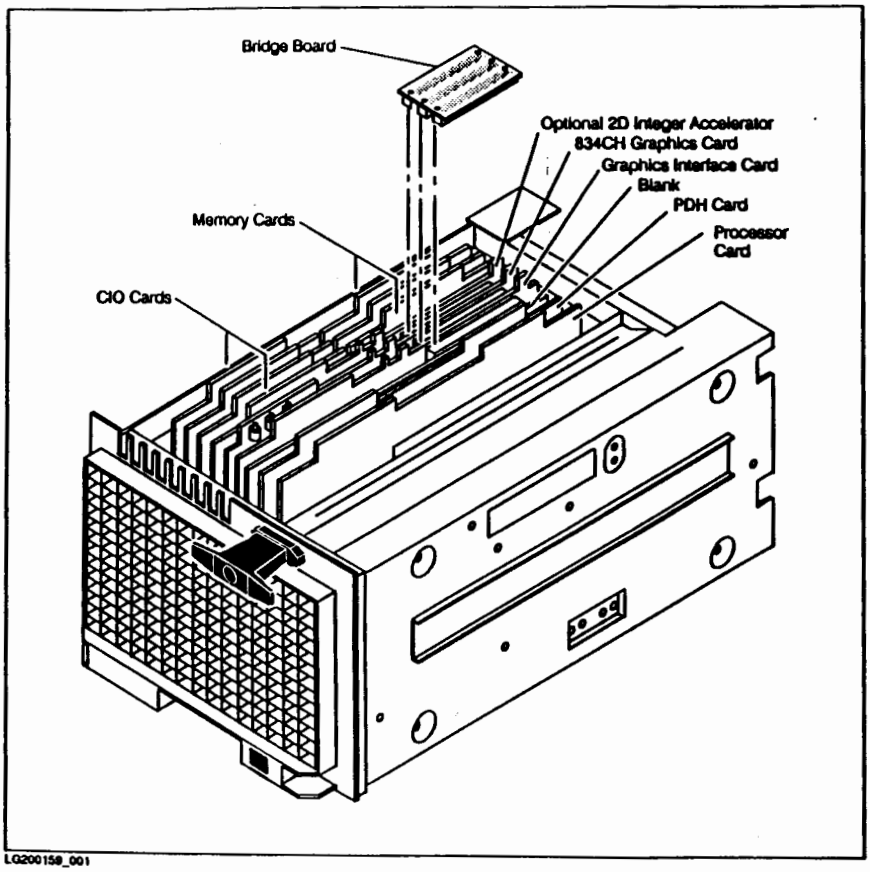

Figure B-2. Model 834CH SPU Orientation

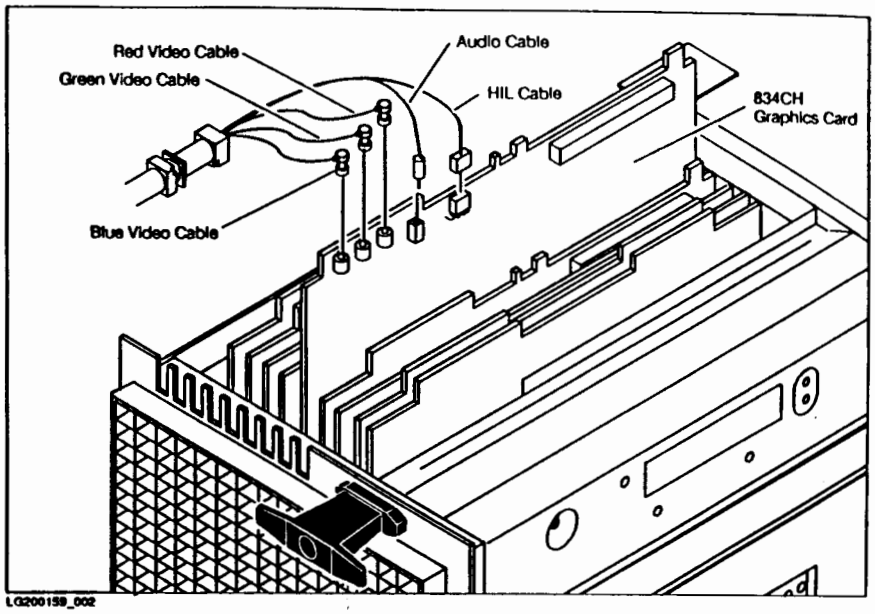

Figure B-3. Model 834CH Graphics Card Connectors

Boot Paths

The boot paths for the Model 834CH system are:

- Primary Boot Path: 4.0.0
- Alternate Boot Path: 4.0.3
- Console Boot Path: 12.0.0

Note

If the console path in stable storage is not 12.0.0 (which indicates that the graphics interface card is installed in Mid-bus slot 3), use the *console path* command at the ISL prompt to input the correct path. Then execute a soft reset.

S800 Configuration File

The S800 configuration file generated when HP-UX 7.0 is installed reflects the configuration shown in Figure B-1, with one exception: CIO slot 1 is configured for the HP98196A 6-Channel Mux. If any other I/O card is installed in this slot, the S800 file must be modified. Refer to the section "Cookbook Procedure for Modifying HP-UX" in appendix A of this handbook for instructions.

Part Numbers

Part numbers for the base system components of the 834CH SPU are listed in Table B-1.

Table B-1. Model 834CH Part Numbers

Description	HP Part Number Non-Exchange (new)	HP Part Number Exchange
8 MB memory card	09850-66521	09850-69521
HP-IB card	27110-60301	5062-3303
Graphics interface card	98720-66590	98720-69590
High-resolution (1280 by 1024) color display graphics card	98550-66574	98550-69574
2D integer accelerator	98556-66571	98566-69571
835 processor card	09850-66515	09850-69515
PDH card	09850-66516	09850-69516
27125B LAN card	5062-3313	5062-3331
Mid-bus to LGB converter	98720-66590	n/a
Interconnect board	A1056-66503	n/a
Video/HIL cable	A1056-61600	n/a

Documentation

For further information about the Model 834CH, refer to the following documents:

Installation Instructions for Model 834CH Workstation, HP part number A1056-90601. This picture guide includes instructions for customer installation of a 834CH Workstation shipped with a disk drive on which the HP-UX operating system and X Windows have been factory-installed.

Installation Instructions for Model 834CH Workstation, HP part number A1056-90602. This picture guide includes instructions for customer installation of a 834CH Workstation that has a customer-supplied disk drive. HP-UX is supplied on a cartridge tape.

System Administration Notes for the HP9000/834 Workstation, HP part number A1056-90600.