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# **Service Handbook**

**Model 712 Workstations**

HP Part Number. A2615-90039



**Hewlett-Packard Company**

3404 East Harmony Road, Fort Collins, CO. 80525

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## Printing History

New Editions of this manual incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

September 1993    Edition 1

December 1993    Edition 2

June 1995        Edition 3

## Emissions Regulations

### Federal Communications Commission (FCC)

The Federal Communications Commission of the U.S. government regulates the radio frequency energy emanated by computing devices through published regulations. These regulations specify the limits of radio frequency emission to protect radio and television reception. All HP Apollo nodes and peripherals have been tested and comply with these limits. The FCC regulations also require that computing devices used in the U.S. display the agency's label and that the related documentation include the following statement:

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

Compliance to these regulations requires the use of shielded cables.

### Canadian Department of Communications (DOC)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Requirements of the Canadian Department of Communications.

Compliance to these regulations requires the use of shielded cables.

## VCCI Class 1 ITE

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。

VCCI基準に適合する為に、シールドされたケーブルをご使用下さい。

## Emissions Regulations Compliance

Any third-party I/O device installed in HP Apollo system(s) must be in accordance with the requirements set forth in the preceding Emissions Regulations statements. In the event that a third-party noncompliant I/O device is installed, the customer assumes all responsibility and liability arising therefrom.

Compliance to these regulations requires the use of shielded cables.

## Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions when unpacking and installing the board.

- Stand on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge discharges from your body to ground.
- Connect all equipment together, including the static-free mat, static straps, routing nodes, and peripheral units.
- Keep uninstalled printed circuit boards in their protective antistatic bags.
- Once you have removed the printed circuit boards from their protective antistatic bags, handle them by their edges.

## **Laser Safety Statement (For U.S.A. Only)**

(For workstations that have a CD-ROM drive installed.)

The CD-ROM mass-storage system is certified as a Class-1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the *Radiation Control for Health and Safety Act* of 1968.

This means that the mass-storage system does not produce hazardous laser radiation. Because laser light emitted inside the mass-storage system is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

## **LASERTURVALLISUUS**

### **LUOKAN 1 LASERLAITE**

### **KLASS 1 LASER APPARAT**

**HP A2655A** CD-ROM-lukulaite sisältää laitteensisäisen CD-ROM-yksikön, joka on laserlaite.

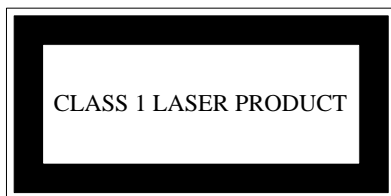
Kyseinen CD-ROM-yksikkö on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalisissa käytössä yksikön suojakotelo estää lasersäteen pääsyn laitteen ulkopuolelle.

CD-ROM-yksikön on tyyppihyväksynyt Suomessa laserturvallisuuden osalta Työministeriön työsuojeluosasto. Laitteen turvallisuusluokka on määritetty valtioneuvoston päätöksen N:o 472/1985 ja standardin SFS-EN 60825 (1992) mukaisesti.

Tiedot CD-ROM-yksikössä käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 790 nm  
Teho 1,1  $\mu$ W  
Luokan 1 laser

## IEC 825 Class 1 Laser Labels







## Warnings and Cautions

**WARNING:**

Removing device cover may expose sharp edges in equipment chassis. To avoid injury, use care when installing customer add-on devices.

**WARNUNG:**

Das Entfernen der Geräteabdeckung legt die scharfen Kanten im Inneren des Gerätes frei. Um Verletzungen zu vermeiden, seien Sie vorsichtig beim Einbau von zusätzlichen Bauteilen, die vom Kunden selber eingebaut werden können.

**AVERTISSEMENT:**

Des bords tranchants du châssis de l'équipement peuvent être exposés quand le cache de l'unité n'est pas en place. Pour éviter des blessures, faire très attention lors de l'installation de modules supplémentaires par le client.

**WARNING:**

Disconnect power plug from wall outlet or source power before moving or removing the device, or installing add-on components.

**WARNUNG:**

Entfernen Sie die Stromzuführung von der Steckdose oder der Stromquelle bevor Sie das Gerät bewegen, abbauen, oder zusätzliche Bauteile installieren.

**AVERTISSEMENT:**

Débrancher la fiche de la prise de courant ou de la source d'alimentation électrique avant de déplacer ou de retirer l'unité, ou avant d'installer des modules supplémentaires.



## Warnings and Cautions (Cont.)

**WARNING:**

Use only power supply Model ETYHP127MM with A2656A Tape Drive.

**AVERTISSEMENT:**

Utiliser seulement le bloc d'alimentation ETHYP127MM pour le dérouleur de bande A2656A.

**WARNING:**

Use only power supply Model ETYHP127MM with A2655A CD-ROM Drive.

**AVERTISSEMENT:**

Utiliser seulement le bloc d'alimentation ETHYP127MM pour le lecteur de CD-ROM A2655A.

**WARNING:**

Use only power supply Model ETYHP127MM with A2657A Hard Disk Drive.

**AVERTISSEMENT:**

Utiliser seulement le bloc d'alimentation ETHYP127MM pour le disque dur A2657A.

**CAUTION:**

System power cord must be plugged into an accessible dedicated ac mains receptacle.

**VORSICHT:**

Das System-Netzanschlußkabel muß an eine zugängliche spezielle Wechselstrom-Hauptzuführungssteckdose angeschlossen werden.

**ATTENTION:**

Le fil d'alimentation électrique du système doit être branché dans une prise de courant c.a. spécialisée accessible.





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# Table of Contents

<b>Product Information</b>	<b>1-1</b>
Product Description	1-1
System Unit Front Panel Controls and LEDs	1-3
System Power Switch	1-4
System Power LED	1-4
Floppy Drive Eject Button	1-4
Floppy Drive Activity LED	1-4
System Unit Rear Panel Connectors	1-4
Power Cord Connector	1-5
802.3 Network Connectors	1-6
RS-232 Serial Input/Output Connector	1-6
Monitor Connector	1-6
SCSI Connector	1-6
PS2 Connectors	1-7
HP Parallel I/O Connector	1-7
Audio Connectors	1-7
Optional TeleShare Board Connectors	1-7
Optional Expansion Board Connectors	1-7
Monitor Controls, Connectors, and Indicators	1-8
Keyboard	1-13
Operating System Overview	1-16
<b>Environmental/Installation/PM</b>	<b>2-1</b>
Environmental Specifications	2-1
Regulatory Requirements	2-2
Safety	2-2
Ergonomics	2-2
EMI and ESD	2-2
Installation	2-2
Preventive Maintenance	2-3

<b>Configuration</b>	<b>3-1</b>
Workstation Configurations	3-1
FRU Configurations	3-1
Mass Storage Configurations	3-1
Memory	3-14
High Resolution Graphics	3-15
Monitor-Type Selection	3-15
<b>Troubleshooting</b>	<b>4-1</b>
Identifying LED-Indicated Conditions	4-4
Dealing with an HPMC (Uncorrectable) Error	4-4
HPMC Caused by a Multi-Bit Memory Parity Error	4-5
HPMC Caused by a Data Cache Parity Error	4-9
Dealing with a Boot Failure	4-10
Running Self Test	4-12
Running System Verification Tests	4-14
Running ODE-Based Diagnostics	4-16
<b>Field Replaceable Units</b>	<b>5-1</b>
Exchange and Nonexchange Part Numbers	5-1
System Unit FRUs	5-2
Monitors, Keyboards, and Mouse	5-5
External Storage Unit FRUs	5-6
Hard Disk Drive (A2657A/C2963/64A)	5-7
DDS-Format Tape Drive (A2656A/C2954A)	5-9
CD-ROM Drive (A2655A/C2943A)	5-11
System Unit FRU Removal and Replacement	5-13
Stand	5-14
Top Cover	5-15
Memory Board Removal	5-16
Memory Board Installation	5-18
VRAM (Video RAM)	5-19
TeleShare Option Board	5-20
I/O Expansion and Boards	5-21
Battery	5-22
CPU Board	5-23
Floppy Disk	5-25
Hard Disk	5-26
Speaker	5-28
Power Supply Cover	5-29

Fan .....	5-31
Power Supply .....	5-32
Power Supply Button .....	5-34
LED Cable Assembly .....	5-35
External Storage Devices .....	5-36
Hard Disk (A2657A/C2963/64A) .....	5-37
DDS-Format Tape (A2656A/C2954A) .....	5-41
CD-ROM Drive (A2655A/C2943) .....	5-45
<b>Diagrams</b> .....	<b>6-1</b>
System Power .....	6-1
System Block Diagram .....	6-4
<b>Reference</b> .....	<b>7-1</b>
Installation Manual .....	7-1
Service Manuals .....	7-1
Reference Manuals .....	7-1
<b>Service Notes</b> .....	<b>8-1</b>
HP A2094 Color Monitors .....	8-3
Cables .....	8-4
Timing .....	8-4
<b>Boot Console User Interface</b> .....	<b>9-1</b>
Accessing the Boot Console User Interface .....	9-1
Entering the Boot Administration Mode .....	9-2
Boot Administration Commands .....	9-2
Stable Storage .....	9-3
ISL Environment .....	9-3
Invoking the ISL Environment from a SCSI Device .....	9-4
ISL User Commands .....	9-5
Updating System Firmware with ODE .....	9-5

## Figures

1-1	System Unit Front Panel Controls and LEDs	1-3
1-2	System Unit Rear Panel Connectors	1-5
1-3	12-Inch Flat Panel 1024x768 Display (Model A2882A)	1-9
1-4	15-Inch Color 1024x768 Monitor (Model D1196A)	1-10
1-5	17-Inch Color 1024x768 Monitor (Model A2287)	1-11
1-6	19-Inch Color 1280x1024 Monitor (Model A2094)	1-12
3-1	Quantum 120-MB Winchester Drive Jumpers	3-2
3-2	Quantum 270-MB Winchester Drive Jumpers	3-3
3-3	Quantum 525-MB Winchester Drive Jumpers	3-4
3-4	Hewlett-Packard 1-GB Winchester Drive Jumpers	3-5
3-5	Hewlett-Packard 1-GB/2-GB Low Profile Drive Jumpers	3-6
3-6	Seagate 525-MB/Seagate 1-GB Winchester Drive Jumpers	3-7
3-7	Seagate 1-GB/2-GB Low Profile Disk Drive Jumpers	3-8
3-8	Quantum 1-GB and 2-GB Low Profile Disk Drive Jumpers	3-9
3-9	Micropolis 1-GB Winchester Drive Jumpers	3-10
3-10	CD-ROM SCSI Address Jumper Settings	3-11
3-11	DDS Tape SCSI Address Jumper Settings	3-12
3-12	Floppy Jumper	3-13
3-13	Memory Connectors	3-14
3-14	Model 712/100 Memory Connectors	3-15
4-1	LED Not Lit	4-2
4-2	Troubleshooting the Model 712	4-3
5-1	System Unit Illustrated Parts Breakdown	5-2
5-2	External Hard Disk Illustrated Parts Breakdown	5-7
5-3	External DDS Tape Illustrated Parts Breakdown	5-9
5-4	External CD-ROM Illustrated Parts Breakdown	5-11
5-5	Removing the System Unit from the Stand	5-14
5-6	Opening the System Unit	5-15
5-7	Memory Board Location	5-16
5-8	Removing Memory Boards	5-17
5-9	Installing Memory Boards	5-18
5-10	Removing the VRAM Board	5-19
5-11	Removing the TeleShare Board	5-20
5-12	Removing an Expansion Board	5-21
5-13	Removing the Calendar Battery	5-22
5-14	Removing the CPU Board	5-23
5-15	Removing the Floppy Drive	5-25
5-16	Removing the Disk Retaining Bracket	5-26



## Figures

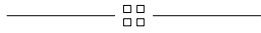
5-17	Removing the Hard Disk	5-27
5-18	Removing the Speaker	5-28
5-19	Removing the Power Supply Cover	5-29
5-20	Removing the Fan from the Power Supply Cover	5-30
5-21	Disconnecting the Fan Cable	5-31
5-22	Removing the Power Supply	5-32
5-23	Removing the Power Supply Button	5-34
5-24	External Disk Drive	5-37
5-25	Removing the Cover (Disk)	5-38
5-26	Removing the Fan/LED Assembly (Disk)	5-39
5-27	External DDS-Format Tape Drive	5-41
5-28	Removing the Cover (DDS Tape Drive)	5-42
5-29	Removing the Fan/LED Assembly (DDs Tape Drive)	5-43
5-30	External CD-ROM Drive	5-45
5-31	Removing the Cover (CD-ROM)	5-46
5-32	Removing the Fan/LED Assembly (CD-ROM)	5-47
6-1	Power Distribution Diagram	6-1
6-2	System Unit Functional Block Diagram	6-4
8-1	HP A2094 Monitor	8-3

## Tables

1-1	Serial I/O Pins	1-6
1-2	PC Keyboard to ITF Keyboard Equivalent Keys	1-14
2-1	Environmental Specifications for Model 712	2-1
3-1	Default SCSI IDs	3-1
4-1	PIM Action Table	4-5
4-2	Multi-Bit Memory Parity Error	4-6
4-3	Memory Address Ranges	4-7
4-4	Processor Module Error (Data Cache Parity)	4-9
5-1	System Unit Exchange Assemblies	5-3
5-2	System Unit Nonexchange Assemblies	5-4
5-3	Optional I/O Expansion Boards	5-4
5-4	Monitors	5-5
5-5	Keyboard and Mouse Model Numbers	5-5
5-6	External Hard Disk Exchange Assemblies	5-8

## Tables

5-7 External Hard Disk Nonexchange Assemblies .....	5-8
5-8 External DDS Tape Exchange Assemblies .....	5-10
5-9 External DDS Tape Nonexchange Assemblies .....	5-10
5-10 External CD-ROM Exchange Assemblies .....	5-12
5-11 External CD-ROM Nonexchange Assemblies .....	5-12
6-1 CPU Board Power Pinouts .....	6-2
6-2 Floppy Drive Power Pinouts .....	6-2
6-3 Hard Disk Drive Power Pinouts .....	6-3
6-4 Fan Power Pinouts .....	6-3
6-5 LED Power Pinouts .....	6-3



**For:root**

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# Product Information 1

This chapter introduces the Model 712 workstation, including its controls and indicators. Included in this chapter are the following topics:

- Product description
- System unit controls
- Understanding the LEDs
- System unit rear panel connectors
- Monitor controls, connectors, and indicators

---

## Product Description

The Model 712 workstation contains the following key features:

- Operating System: Native HP/UX (version 9.03 and later, version 9.05 and later for 712/100)
- Source and binary code compatible with Series 700 product family
- Main Memory: 16–128 MB (16–192 MB in 712/100)
- Mass Storage (Optional)
  - One 3.5-inch hard disk drive, internal, SCSI:
    - 2-GB
    - 1-GB
    - 525-MB
    - 270-MB

**Note:** Hard disk drives use special firmware to optimize performance.

- One 3.5-inch floppy disk drive, internal, non-SCSI
    - 2-MB unformatted
    - Formats include 1.44 MB and NEC 1.2 MB
  - C2963A hard disk drive, 1-GB, external
  - C2964A hard disk drive, 2-GB, external
  - C1530B DDS-format tape drive, 2-GB uncompressed, 3.5-inch, external
  - C2943A CD-ROM disc drive, 5.25-inch, external
- Network
  - Autoselection
  - IEEE 802.3
  - AUI and twisted pair connectors
  - ThinLAN requires an external transceiver
  - 10 Mbit/second

- Graphics
  - Built-in 8-plane graphics with the following resolutions:
    - 1024 x 768 at multiple frequencies
    - 1280x1024 at multiple frequencies
    - 800 x 600 at 75 Hz
    - 640 x 480 at 75 Hz
    - (15-inch color monitors are not supported on the 712/100)
  - 1024 x 1280 resolution requires Video RAM board on the system CPU board
  - Graphics are configured at initial power-up and retained in stable storage on the CPU board
  - PC standard 15-pin female VGA-type connector
- Standard I/O
  - Serial interface
    - EIA RS-232C
    - CCITT V.24/V.28 460.8 Kbps with CTS/RTS hardware flow control
    - 9-pin male DTE, PC standard connector
  - Parallel interface
    - 25-pin female, PC standard connector
    - Centronics
    - 300+ Kb/second with DMA
    - 200 Kb sustained
  - SCSI-2 interface
    - 8-bit, single-ended
    - 5 Mb/second synchronous
    - 1.5 Mb/second asynchronous
    - Supports 7 devices
    - ALT-1 of SCSI-2, 50-pin high density connector
    - Terminator not required when no cable attached. Active terminator required when cable is attached.
  - PS2 keyboard and mouse ports
    - Standard “mini-din” connectors
  - Audio
    - Channels: 2 in, 2 out
    - Resolution: 16 bits
    - Sampling Rate: Up to 48 KHz
    - Connectors: 1/8” Stereo head set out
    - 1/8” Stereo line in
    - 1/8” Mono microphone input with 5v “phantom voltage” for Electret type microphones
- Optional I/O (supported by single expansion slot)
  - IBM Token Ring board
    - 802.5
    - 4 and 16 Mbps\*
    - STP:DB9 connector
  - Serial Interface board
    - Logically identical to the workstation’s standard serial interface
  - Serial Interface and LAN AUI board
    - Serial interface is logically identical to the workstation’s built-in serial interface
    - 802.3 LAN is functionally identical to the workstation’s built-in LAN AUI
    - LANIC IDs are stored in stable storage on the system’s processor board
    - Two-headed external cable allows simultaneous use of both functions

**\*Note:** 16 Mbps on un-shielded twisted pair requires specific external transceivers

- Serial Interface and X.25 board
  - Serial interface is logically identical to the workstation's built-in serial interface
  - X.25 supports 1.2 to 19.2kps
  - X.25 supports implementation of the LAP-B data-link protocol
  - Two-headed external cable allows simultaneous use of both functions
- Graphics card
  - Supports additional monitor, same type as system unit's
- Optional I/O (supported by single TeleShare slot)
  - TeleShare board: integrates the telephone into the workstation environment

---

## System Unit Front Panel Controls and LEDs

Before powering on the system, you should become familiar with the system unit controls.

Figure 1-1 shows the locations of the system unit front panel controls and LEDs.

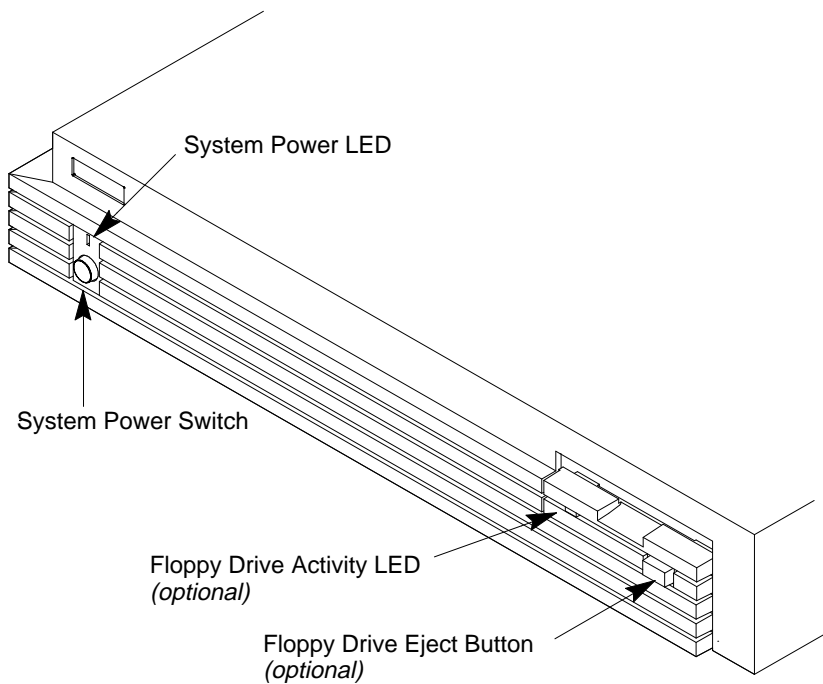


Figure 1-1. System Unit Front Panel Controls and LEDs

## System Power Switch

Use the Power switch to power the system unit on and off. The Model 712 workstation automatically shuts down HP-UX when powered off.

## System Power LED

The Power Light Emitting Diode (LED) is located on the left side of the front panel. It lights when the system unit power is on and flashes until the OS is booted. A flashing pattern may indicate a problem with the CPU board (see Chapter 4).

## Floppy Drive Eject Button

If a floppy drive is installed in the workstation, an eject button is located on the right side of the front panel. This button removes floppy diskettes from the drive.

## Floppy Drive Activity LED

If a floppy drive is installed in your workstation, an activity LED is located on the right side of the front panel. This LED flashes to indicate use.

---

## System Unit Rear Panel Connectors

This section describes the following connectors on the system unit's rear panel:

- Power cord connector
- 802.3 AUI LAN connector
- 802.3 TP (Twisted Pair) LAN connector
- RS-232C serial input/output connector
- monitor connector
- SCSI connector
- PS2 keyboard and mouse connectors
- HP parallel I/O connector
- Audio Mic/IN, Head/OUT, and line in connectors
- Optional TeleShare board connectors
- Optional expansion board connectors

**NOTICE:** To maintain FCC/EMI compliance, verify that all cables are fully seated and properly fastened.

Figure 1-2 shows the locations of the connectors on the system unit's rear panel.

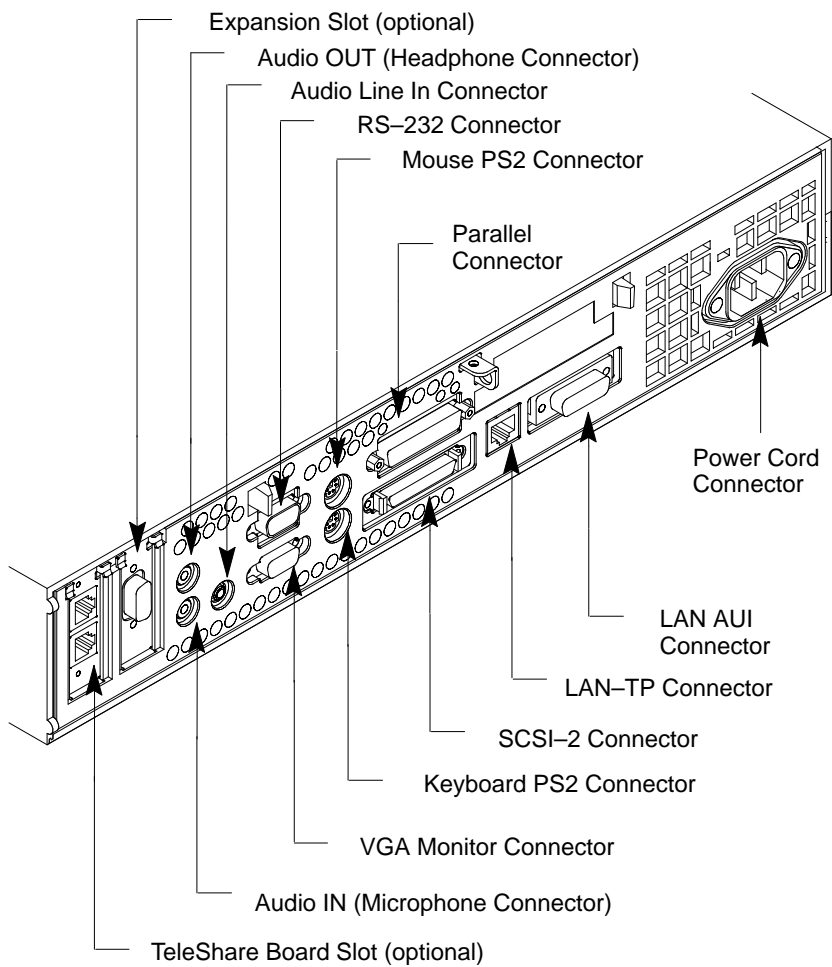


Figure 1-2. System Unit Rear Panel Connectors

## Power Cord Connector

Plug the workstation's power cord into the power cord connector to provide ac power to the system.



## 802.3 Network Connectors

The workstation has built-in ThickNet LAN AUI and TP (Twisted Pair) connectors for the 802.3 (ETHERNET) network. Connections to ThinLAN networks require an external transceiver. The workstation automatically selects the correct network setting.

## RS-232 Serial Input/Output Connector

You can attach a variety of peripheral devices to the RS-232 Serial Input/Output (SIO) port on the workstation. These peripheral devices include printers, plotters, modems, and scanners. Consult the documentation that accompanies each peripheral device for specific information concerning its use.

The SIO port is programmable. You can set functions such as bit rate, character length, parity, and stop bits. The SIO Port is used as an interface for serial asynchronous devices to the CPU. The port operates at up to a 19.2 K baud rate.

Table 1-1 shows the SIO connector pin listings. The serial connector is a 9-pin D-sub connector. Signal names are those specified in the EIA RS-232 standard.

*Table 1-1. Serial I/O Pins*

Pin No.	Signal	Description
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

## Monitor Connector

Connect the monitor's video cable to the monitor connector on the workstation.

## SCSI Connector

Use the SCSI connector to connect external SCSI devices such as DDS-format tape drives and CD-ROM drives.

**NOTICE:** When attaching external SCSI devices, be sure to terminate the last device on the external SCSI bus. If no external devices are attached, the SCSI connector does not need to be terminated.

## **PS2 Connectors**

The PS2 connectors provide an interface for the system's keyboard and mouse.

## **HP Parallel I/O Connector**

The 25-pin HP Parallel I/O interface uses Centronics interface protocols to support peripheral devices such as printers and plotters.

## **Audio Connectors**

The workstation has audio input and output capability through external input and output connectors on the rear panel and through an internal speaker. The rear panel contains the Audio/Headphone OUT, Audio/Mic IN, and Line IN connectors.

The Audio/Headphone OUT connector is a stereo headphone output. The Audio/Mic IN connector is a mono microphone input. The ring connector of the microphone jack supplies +5 volts dc for microphones that require it. The audio line in connector is a standard stereo audio mini-jack and uses audio "line" levels. For more information on the audio capability of the workstation see the *Audio Users Guide*.

## **Optional TeleShare Board Connectors**

The workstation has a slot for an optional TeleShare board. The external connectors for the TeleShare board are accessible in this location. This board has dual line, FAX, modem, and telephone features (caller ID, call progress decoder, ringback busy, fast busy, and call waiting, for example).

## **Optional Expansion Board Connectors**

The system has an expansion board slot for an additional I/O board. HP offers a variety of I/O expansion boards that support graphics, 802.5 IBM token ring, RS-232 SIO, LAN AUI, and X.25 data link (HDLC) connections.

---

## Monitor Controls, Connectors, and Indicators

This section describes the controls, connectors, and indicators for the supported monitors.

The Power-On LED, when lit, indicates that the monitor has ac power applied. Use the following controls to adjust the monitor:

- The Power-On button turns the monitor's power on and off.
- The Brightness control adjusts the brightness of the display.
- The Contrast control adjusts the light-to-dark and dark-to-light contrast of the display.
- The Degauss control demagnetizes the color monitor. Degaussing disperses any accumulated magnetic charge from the face of the monitor. Magnetic disturbances such as picture distortion or color impurity can be caused by either moving the monitor from one place to another or swiveling the monitor on its base.

Refer to the manual that came with the monitor for information on any other controls that may be present on the monitor.

The following figures illustrate the monitors for the workstation.

Figure 1-3 shows the 12-inch, 1024x768, flat panel display.

**NOTICE:** The 12-inch, 1024x768, flat panel display is not supported on the Model 712/100.

Figure 1-4 shows the 15-inch, 1024x768, color monitor.

**NOTICE:** The 15-inch, 1024x768, color monitor is not supported on the Model 712/100.

Figure 1-5 shows the 17-inch, 1024x768, color monitor.

Figure 1-6 shows the 19-inch, 1280x1024, color monitor.

- 1 Power ON/OFF Button
- 2 Power LED
- 3 Brightness Toggle

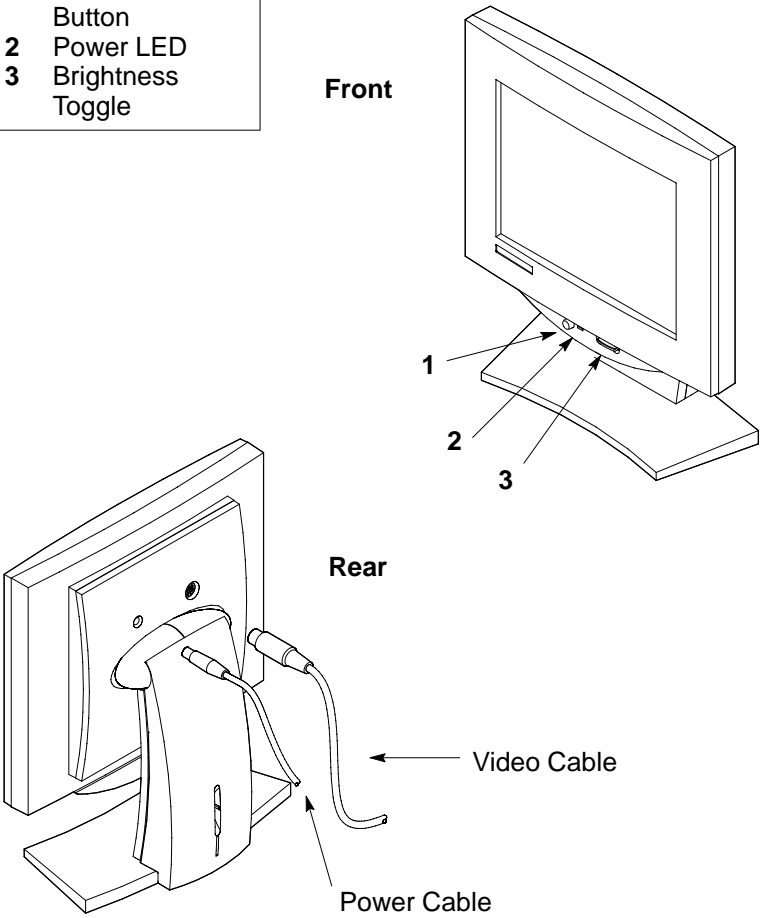


Figure 1-3. 12-Inch Flat Panel 1024x768 Display (Model A2882A)

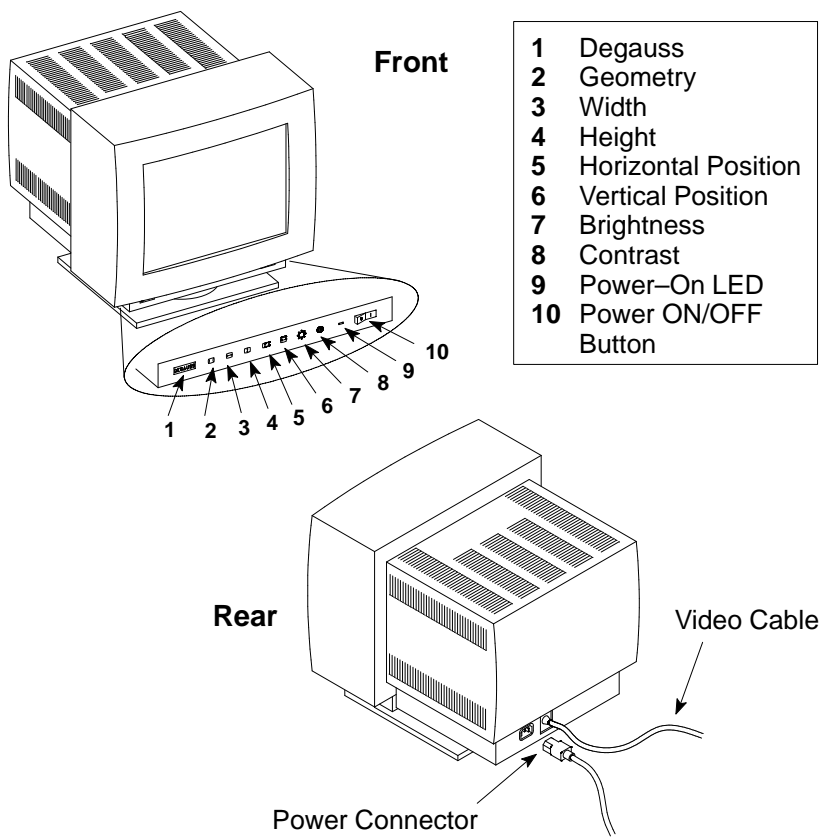


Figure 1-4. 15-Inch Color 1024x768 Monitor (Model D1196A)

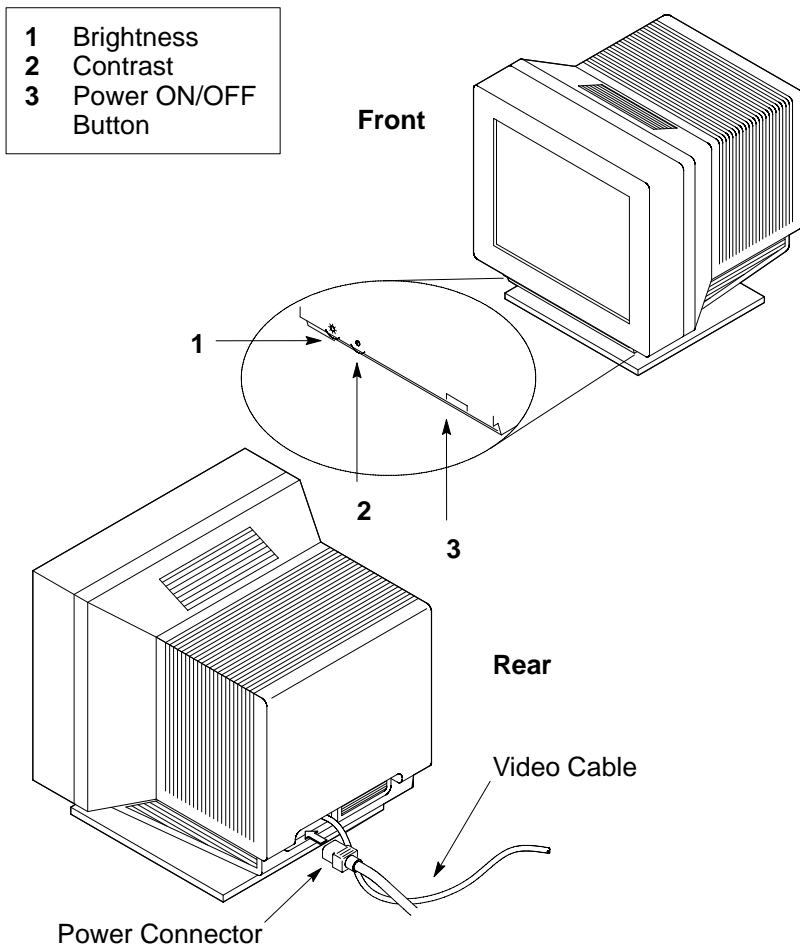


Figure 1-5. 17-Inch Color 1024x768 Monitor (Model A2287A, A2287B)

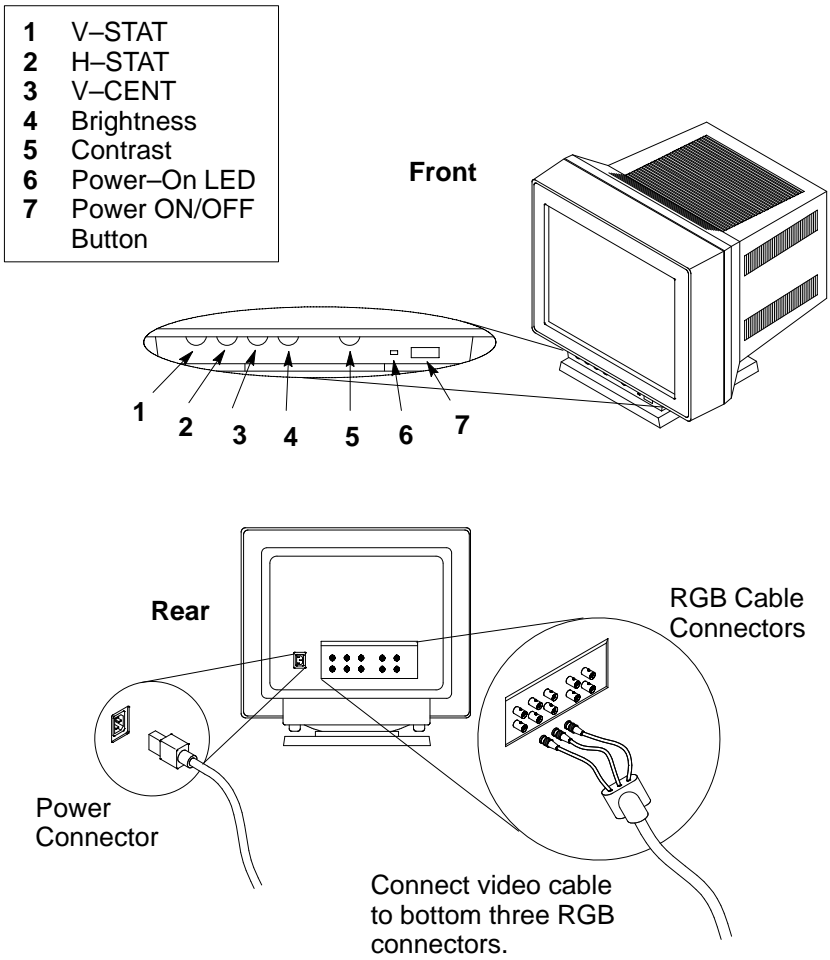


Figure 1-6. 19-Inch Color 1280x1024 Monitor (Model A2094A, A2094B)

---

## Keyboard

The Model 712 workstation uses a Hewlett–Packard PC keyboard.

You may need to know the differences between the PC Keyboard and the Hewlett–Packard ITF Keyboard (HP 46201A/B Keyboard). Aside from the obvious difference in the appearance of these keyboards due to the different arrangement of the keys, there is also a difference in the keys and their output codes. Some keys on one keyboard (the ITF keyboard for example) may not exist on the other keyboard. These keys generate codes which also may not exist as output from the other keyboard (or may be generated by a different key). Codes that are generated when a key is pressed are called *keycodes*.

Some applications expect to use keycodes generated by keys existing on one of the keyboards (the ITF keyboard for example). Since the keys do not exist on the other keyboard (the PC keyboard for example), an accommodation must be made if the PC keyboard is to be used. In most cases, it is still possible to use some other key that is equivalent (generates the same keycode from a different keycap). To do this, it is necessary to know which keys are equivalent on the two keyboards. Table 1–2 compares the equivalent keys on the ITF and PC keyboards.

**NOTICE:** Keyboard keys not mentioned in Table 1–2 are the same on both keyboards.



Table 1–2. PC Keyboard to ITF Keyboard Equivalent Keys

<b>PC Keycap Symbol</b>	<b>ITF Keycap Symbol</b>
<b>F9</b>	blank1 (left)
<b>F10</b>	blank2
<b>F11</b>	blank3
<b>F12</b>	blank4 (right)
<b>PrintScreen / SysReq</b>	<b>Menu</b>
<b>Scroll Lock</b>	<b>Stop</b>
<b>Pause / Break</b>	<b>Break / Reset</b>
<b>Page Up</b>	<b>Prev</b>
<b>Num Lock</b>	<b>System / User</b>
<b>End</b>	<b>Select</b>
<b>Page Down</b>	<b>Next</b>
<b>Enter</b>	<b>Return</b>
<b>Alt (left)</b>	<b>Extend Char (left)</b>
<b>Alt (right)</b>	<b>Extend Char (right)</b>
No Equivalent	<b>Clear Line</b>
No Equivalent	<b>Clear Display</b>
No Equivalent	<b>Insert Line</b>
No Equivalent	<b>Delete Line</b>
No Equivalent	<b>Print / Enter</b>
No Equivalent	, (number pad)
No Equivalent	<b>Tab (number pad)</b>

(Continued)

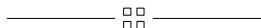
Table 1–2. PC Keyboard to ITF Keyboard Equivalent Keys (cont.)

<b>PC Keycap Symbol</b>	<b>ITF Keycap Symbol</b>
<b>Esc</b>	<b>Esc / Del</b>
<b>Insert</b>	<b>Insert Char</b>
<b>Home</b>	▼
<b>Delete</b>	<b>Delete Char</b>
<b>Caps Lock</b>	<b>Caps</b>
<b>Esc Shifted</b>	<b>Esc / Del Shifted</b>
<b>Pause / Break Shifted</b>	<b>Break / Reset Shifted</b>
<b>Num Lock Shifted</b>	<b>System / User Shifted</b>
<b>0 / Ins</b> (number pad)	<b>0</b> (number pad)
<b>1 / End</b> (number pad)	<b>1</b> (number pad)
<b>2 / ▼</b> (number pad)	<b>2</b> (number pad)
<b>3 / Pg Dn</b> (number pad)	<b>3</b> (number pad)
<b>4 / ◀</b> (number pad)	<b>4</b> (number pad)
<b>6 / ▶</b> (number pad)	<b>6</b> (number pad)
<b>7 / Home</b> (number pad)	<b>7</b> (number pad)
<b>8 / ▲</b> (number pad)	<b>8</b> (number pad)
<b>9 / Pg Up</b> (number pad)	<b>9</b> (number pad)
<b>./ Del</b> (number pad)	<b>.</b> (number pad)
<b>Ctrl</b> (left)	<b>Ctrl</b>
<b>Ctrl</b> (right)	No Equivalent

---

## Operating System Overview

The Model 712 workstation uses the HP-UX operating system, version 9.03 or later. The Model 712/100 uses HP-UX version 9.05 or later. Instant Ignition systems (systems with preloaded software) have X-windows and a Hewlett-Packard graphical user interface, such as HP VUE or RTW, installed and configured. See the user's guide for more information.



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**Document:chap\_2**

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# Environmental/ Installation/PM

## 2

This chapter lists the environmental specifications and regulatory requirements for the system. Installation and preventive maintenance information, if applicable, is also provided.

---

### Environmental Specifications

Table 2–1 lists the environmental specifications for the Model 712 workstation.

*Table 2–1. Environmental Specifications for Model 712*

Type	Specification
Operating Temperature	+5 to +40° C (+41 to 104° F)
Non-Operating Temperature	–40 to +60° C (–40 to 140° F)
Humidity	15–85% maximum operating @ 40° C
Operating Altitude	3050 m
Acoustic	5° C to 30° C: 4.4 BELS, sound power 30° C to 40° C: 5.2 BELS, sound power
Electrical Input	90 to 132 Vac or 198 to 264 Vac 47 to 66 Hz 110 W Max Input Input Current: 115 V Range – 2.7 A RMS max. 230 V Range – 1.2 A RMS max.

---

## Regulatory Requirements

This section lists the regulatory approvals met by the Model 712 workstation.

### Safety

- UL 1950
- CSA22.2 950–M
- TUV EN60950
- Finland TSH
- EMKO TUE (74) DK203

### Ergonomics

- TUV ZH–1/618
- ISO9241
- 90/270 EEC

### EMI and ESD

- FCC 47 cfr, part 15 sub–part J, Class A
- VCCI Class 1
- EN55022/CISPR 22 Class A

---

## Installation

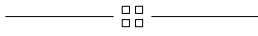
Refer to the following manuals for system installation information:

- *Hardware Installation Guide Model 712* (Part Number A2615–90600)
- The user’s guide that shipped with the workstation

---

## Preventive Maintenance

The system unit requires no preventive maintenance. Some removable media storage devices require operator preventive maintenance. Refer to the *Model 712 Owner’s Guide* (Part Number A2615–90616) for more information.



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# Configuration

# 3

This chapter provides details about setting up and changing the system configuration.

---

## Workstation Configurations

Refer to the *HP Apollo 9000 Series 700 Configuration Guide* for a complete list of supported accessories, peripherals, and operating systems for the Model 712 workstation.

---

## FRU Configurations

This section provides information for setting up or changing the configuration of the system Field Replaceable Units (FRUs).

## Mass Storage Configurations

Table 3-1 lists the recommended SCSI IDs for some Model 712 internal and external storage devices. Figure 3-1 through Figure 3-11 show the SCSI ID settings for the Model 712 internal hard disk, and the external C2943A CD-ROM, C2963/4A hard disk, and C2954A DDS Tape mass storage devices. Figure 3-12 shows the jumper configuration for the floppy drive, which is not a SCSI device.

**NOTICES:** The SCSI terminators must be removed from all internal SCSI devices. An external terminator is not required on the system unit if there are no external devices attached.

These SCSI IDs are the recommended IDs for each storage device. If an existing device already uses an ID, select an alternate ID.

*Table 3-1. Default SCSI IDs*

<b>Internal System Drives:</b>	
Hard Disk Drive:	ID 6
<b>External Drives:</b>	
C2943A CD-ROM Drive:	ID 2
C1530B DDS Tape Drive:	ID 3
C2963/4A Hard Disk Drive:	ID 5

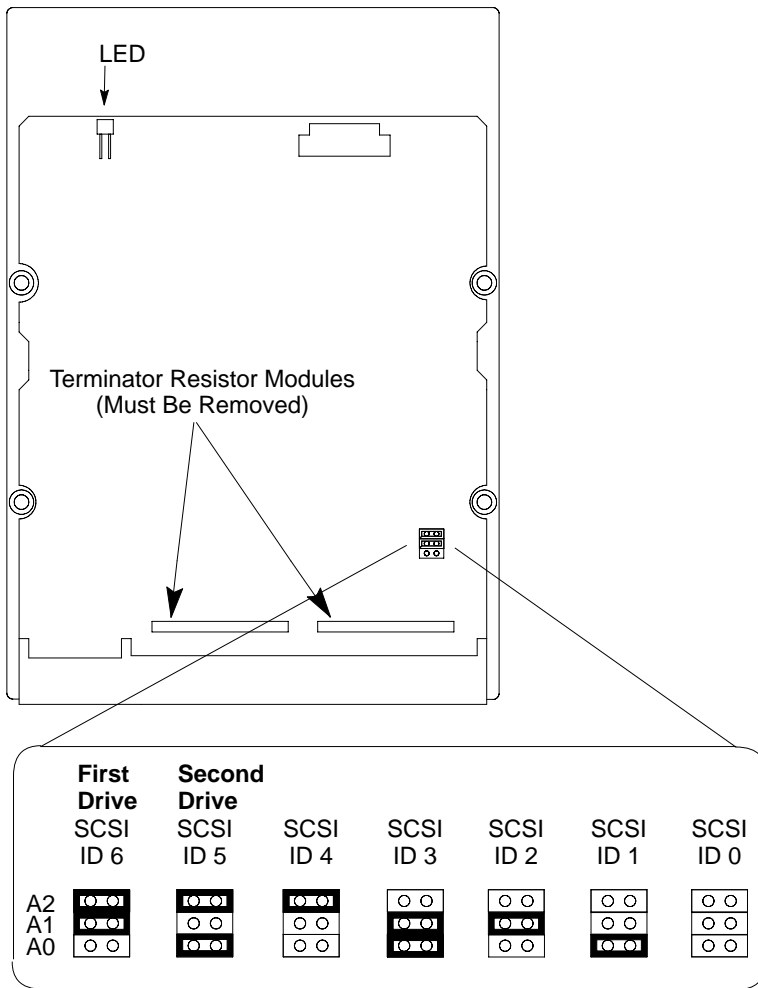
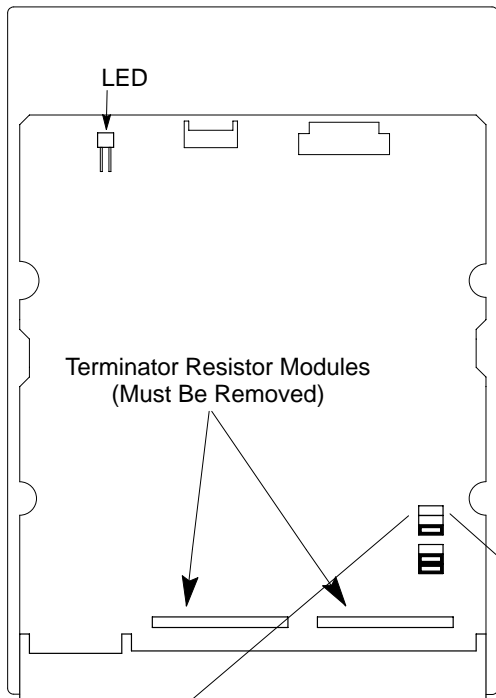


Figure 3-1. Quantum 120-MB Winchester Drive Jumpers



**NOTICE:** Jumpers **A0**, **A1**, and **A2** are the SCSI ID jumpers. The jumper **Product Option** should be *in place*.

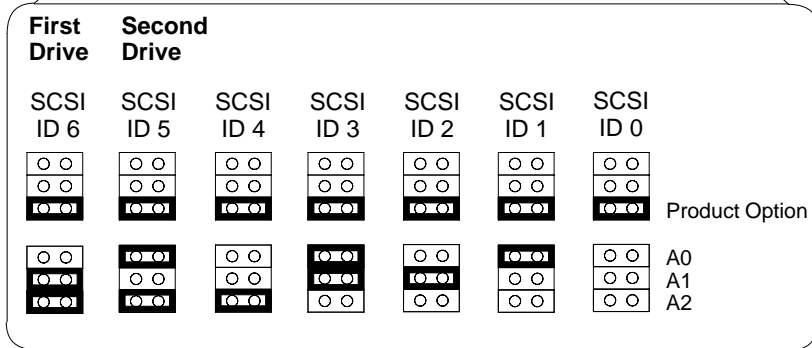


Figure 3-2. Quantum 270-MB Winchester Drive Jumpers

**NOTICE:** A0, A1, and A2 are the SCSI ID jumpers. The jumpers **Sync Spindle**, **Term Enable**, and **WS** should be *removed*, and the jumper **Enable Parity** should be *in place*.

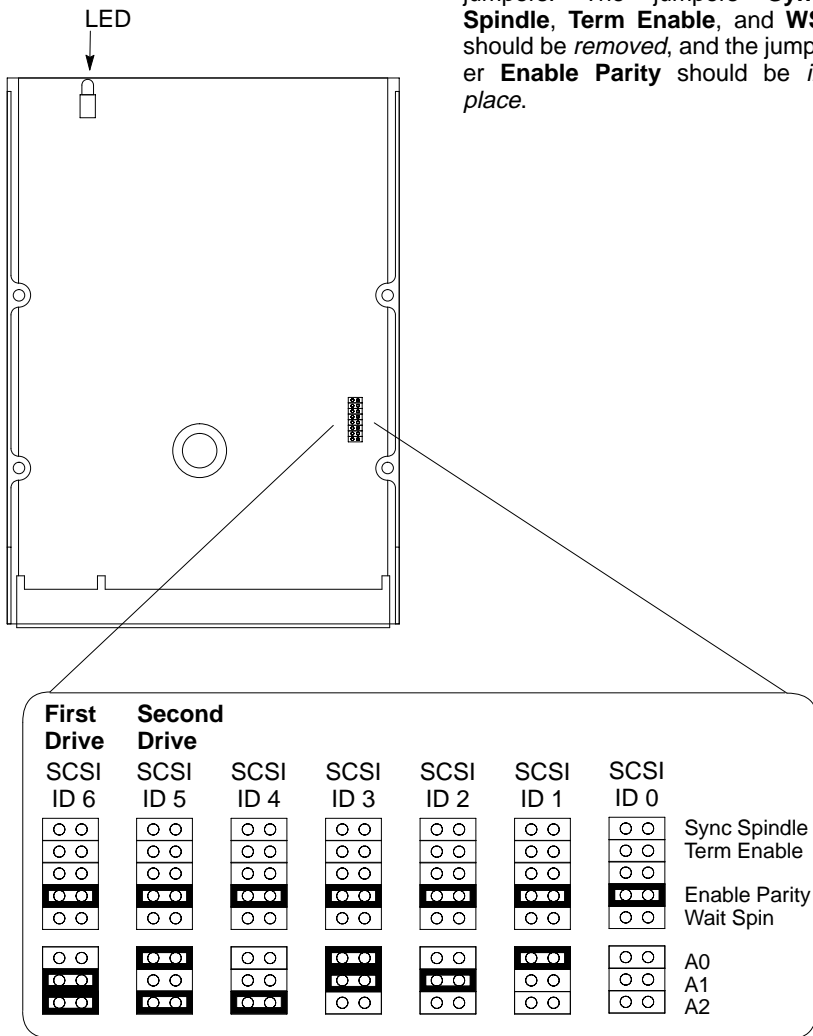
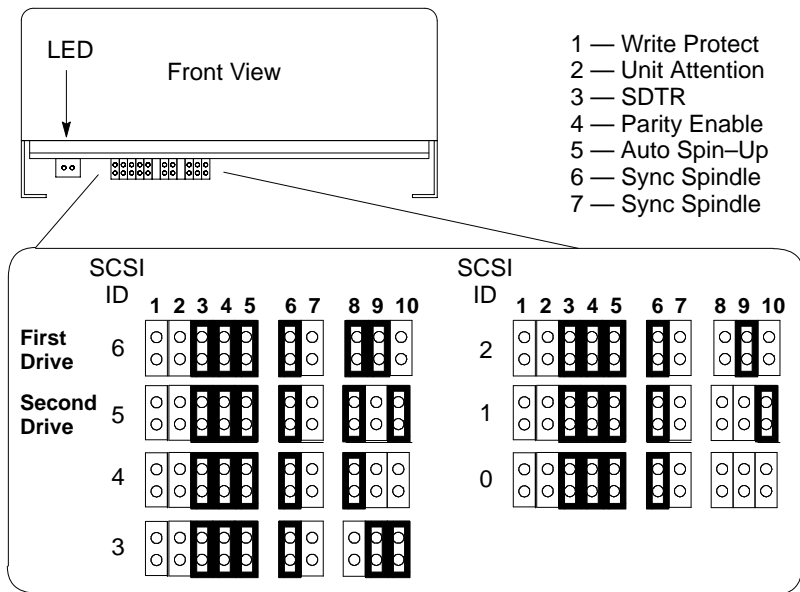


Figure 3-3. Quantum 525-MB Winchester Drive Jumpers



**NOTICE:** The last three jumpers (8, 9, and 10) are the SCSI ID jumpers. Jumpers 1, 2, and 7 should be *removed*, and jumpers 3, 4, 5, and 6 should be *in place*.

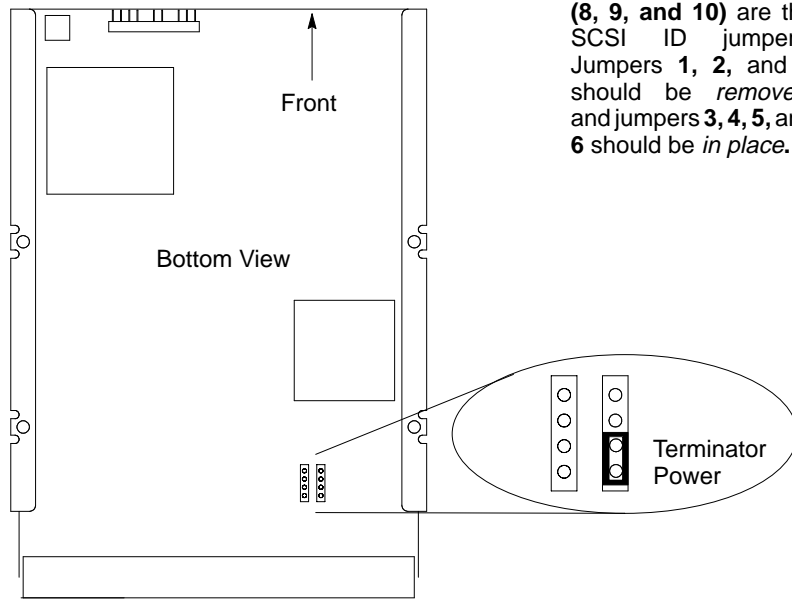


Figure 3-4. Hewlett-Packard 1-GB Winchester Drive Jumpers

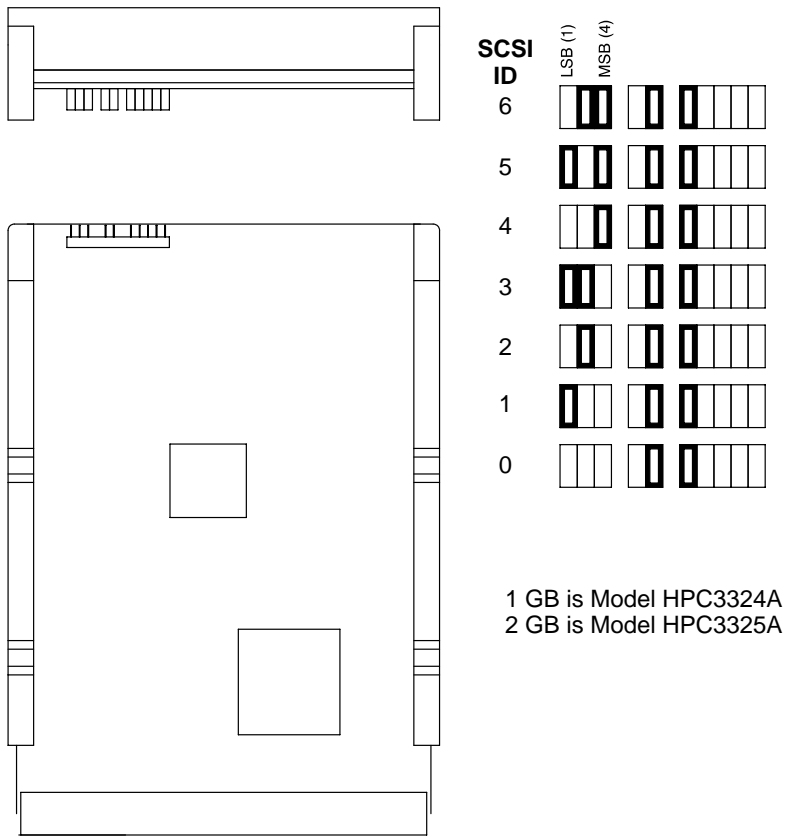


Figure 3-5. Hewlett-Packard 1-GB and 2-GB Low Profile Drive Jumpers

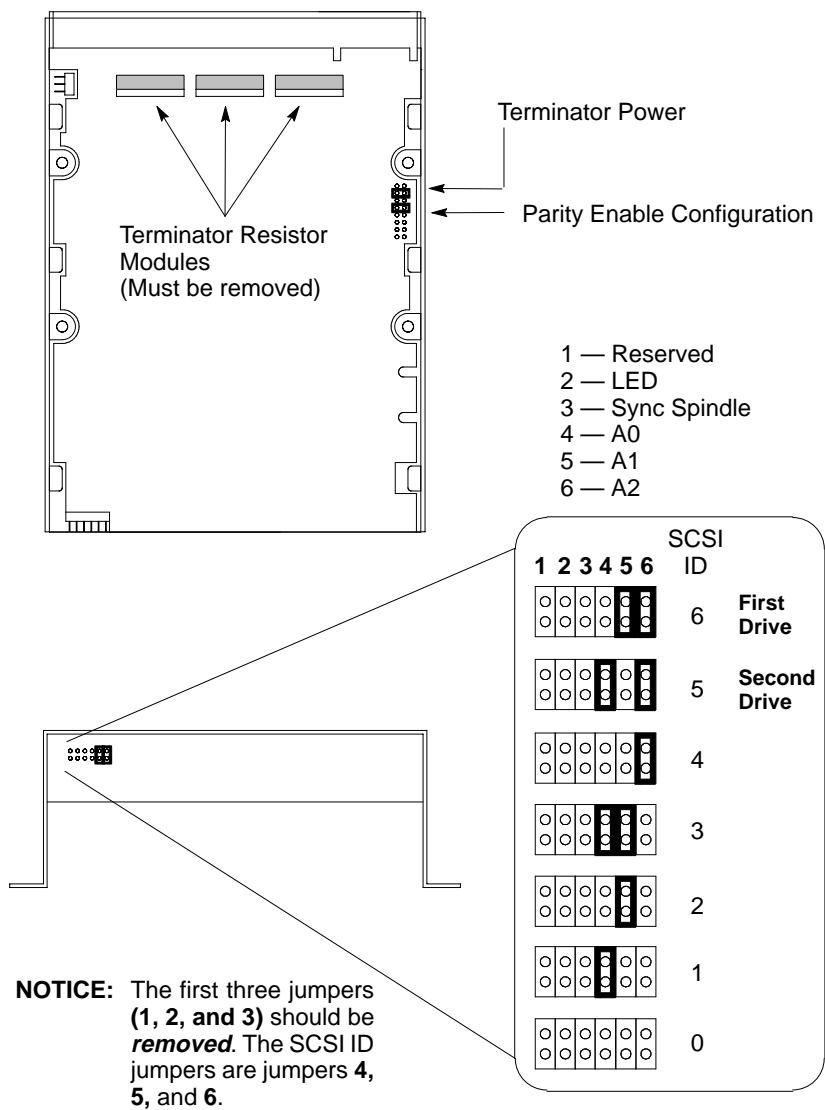


Figure 3-6. Seagate 525-MB or Seagate 1-GB Winchester Drive Jumpers

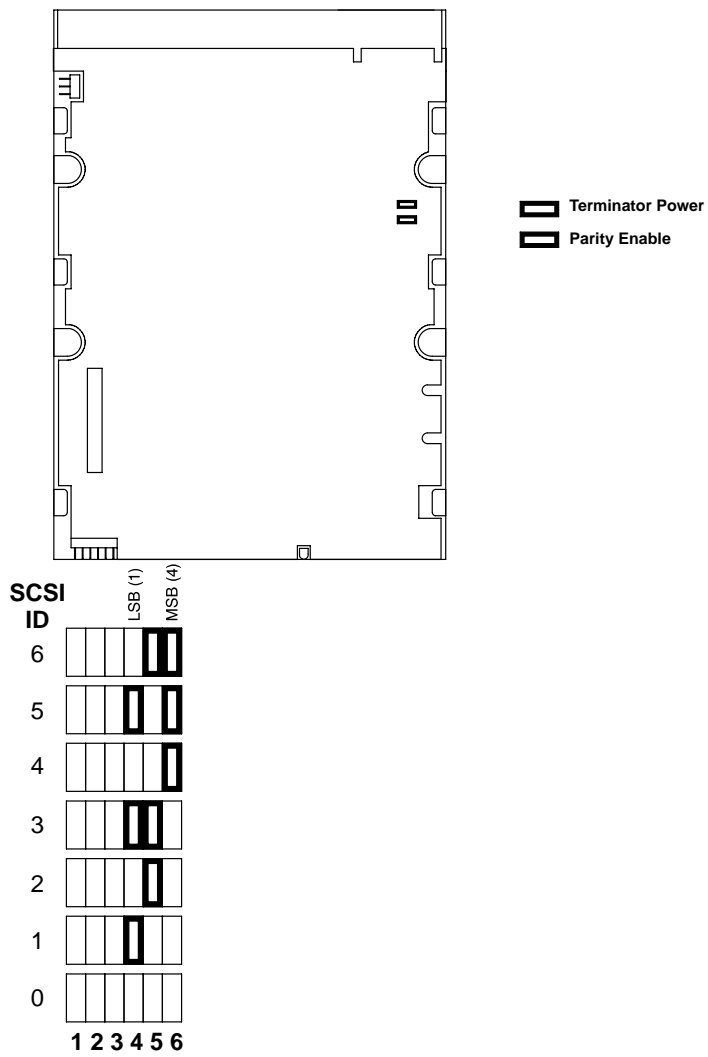


Figure 3-7. Seagate 1-GB and 2-GB Low Profile Disk Drive Jumpers



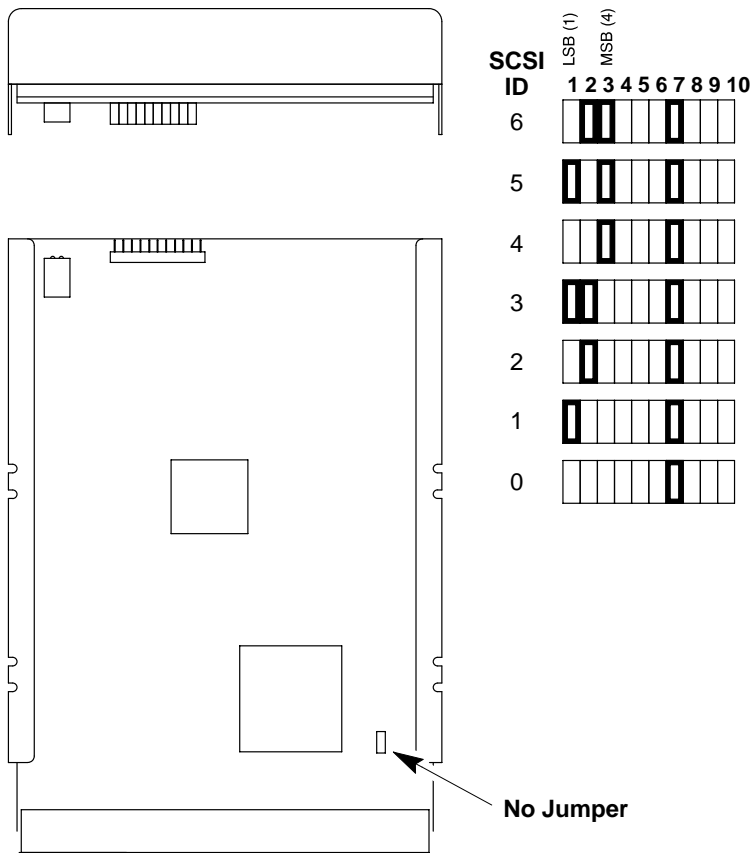
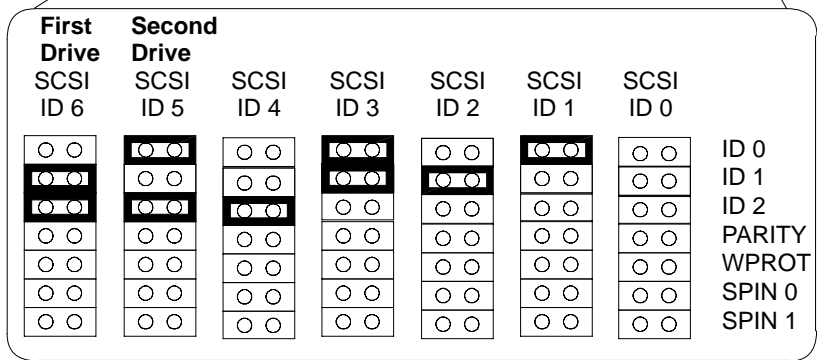
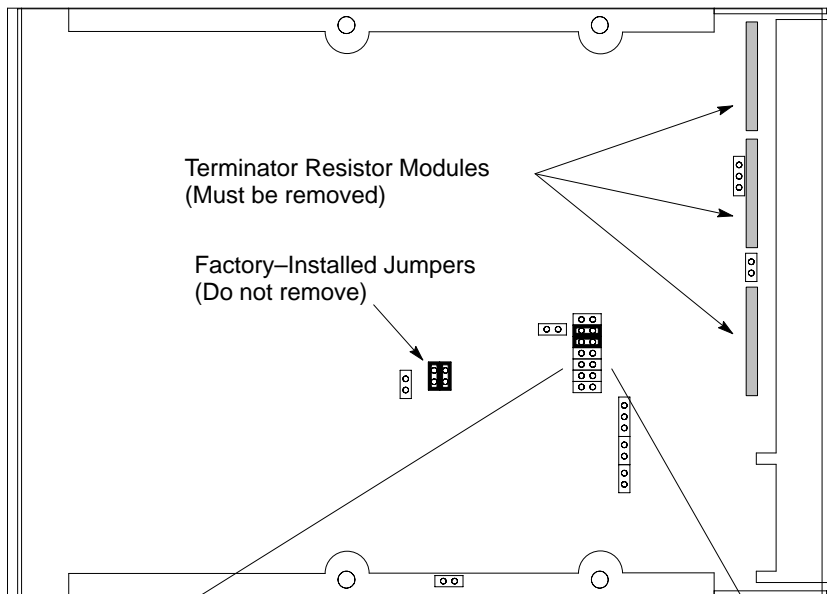
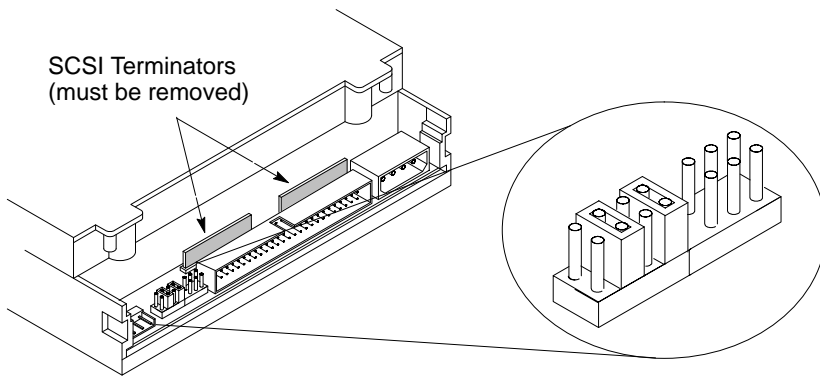


Figure 3-8. Quantum 1-GB and 2-GB Low Profile Disk Drive Jumpers



**NOTICE:** ID 0, ID 1, and ID 2 are the SCSI ID jumpers.  
The jumpers **PARITY**, **WPROT**, **SPIN 0**, and **SPIN 1** should be **removed**.

Figure 3-9. Micropolis 1-GB Winchester Drive Jumpers



Jumpers								Jumpers							
Target ID	ID1	ID2	ID4	PRTY	PRV/ALW	TEST	TERM	Target ID	ID1	ID2	ID4	PRTY	PRV/ALW	TEST	TERM
0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 (Default)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								

Figure 3-10. CD-ROM SCSI Address Jumper Settings

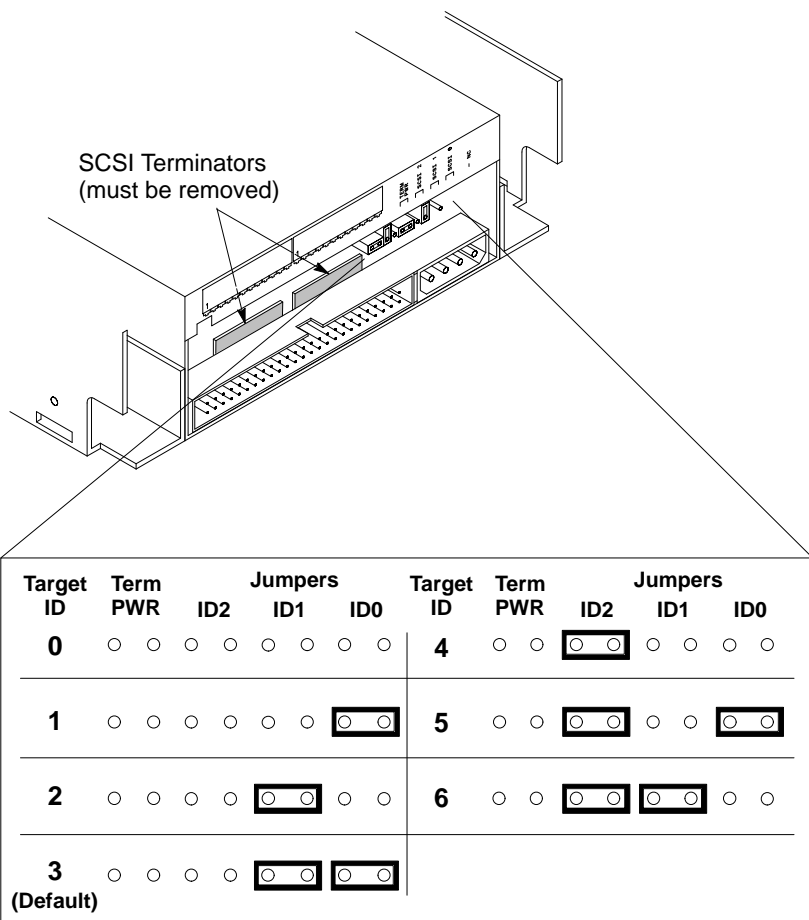
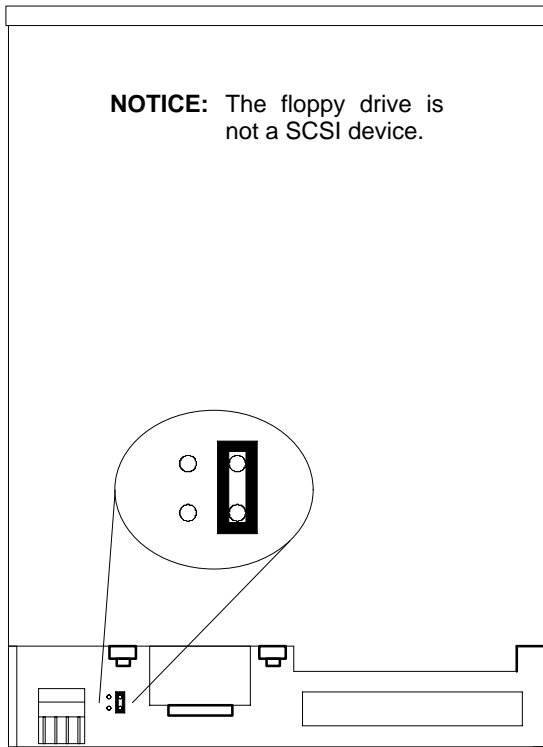


Figure 3-11. DDS Tape SCSI Address Jumper Settings



The jumper must always be in the position shown.

*Figure 3-12. Floppy Jumper*

## Memory

The system has two pairs of memory connectors, labeled Slot 0 and Slot 1 for Pair 0, and Slot 2 and Slot 3 for Pair 1, as shown in Figure 3–13. The model 712/100 has a third pair of connectors labeled Slot 4 and Slot 5, as shown in Figure 3–14. Install memory boards according to the following guidelines:

- Install memory boards in pairs of the same memory capacity.
- Board Pair 0 may have a different memory capacity than Board Pair 1. For example, if the Pair 0 has 16-MB memory boards, Pair 1 may have 4-MB memory boards. Always put the largest capacity memory boards in the lowest numbered slots.
- Install the first pair of memory boards in the connectors labeled **0** and **1** (Pair 0) and the second pair, which is optional, in the connectors labeled **2** and **3** (Pair 1). In the 712/100 add the third pair in the connectors labeled **4** and **5** (Pair 2).

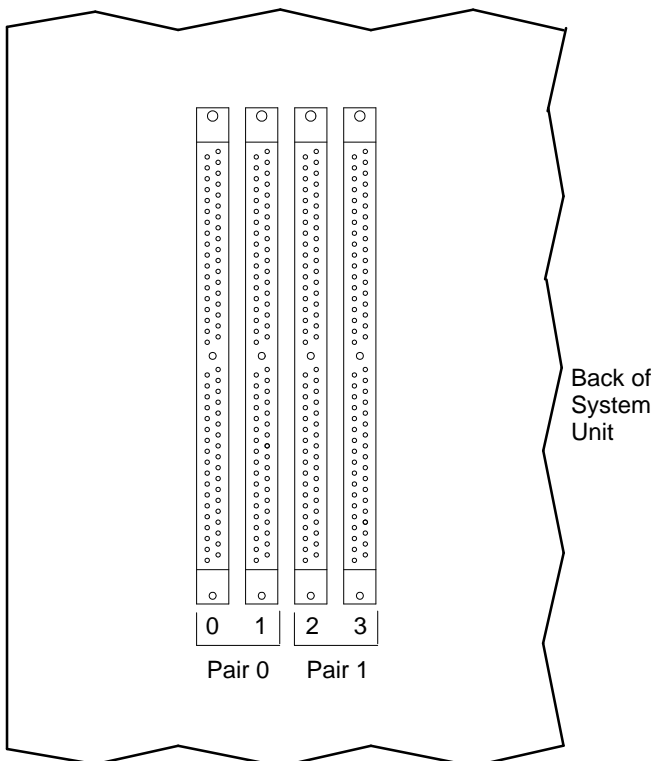


Figure 3–13. Memory Connectors

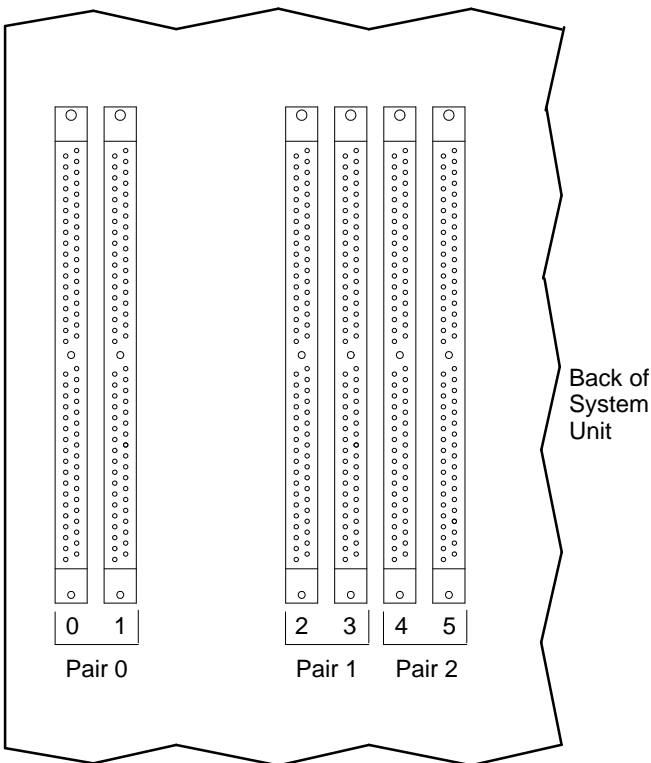


Figure 3-14. Model 712/100 Memory Connectors

See chapter 5 of this manual for details on installing memory modules.

## High Resolution Graphics

The Model 712 workstation requires an optional VRAM board and the Model A2094A/B 19-inch color monitor to support 1280 x 1024 high resolution graphics. See chapter 5 of this manual for a detailed description of installing and replacing the VRAM module.

## Monitor-Type Selection

The Model 712 workstation is configured to use a monitor with a specific resolution and frequency. If you replace the workstation's monitor with a different type of monitor, you must reconfigure the workstation to support the new monitor by one of the following means:

## Setting the Monitor Type from the Boot Administration Mode

Use this method to change the workstation's graphics parameters *before* you replace the monitor.

1. Enter the Boot Administration Mode as described in the section "Entering the Boot Administration Mode" in Chapter 4.
2. Enter the following command to display the current monitor configuration for the system:

```
BOOT_ADMIN> monitor 
```

The screen displays the available options and the current monitor configuration, similar to the following:

Type	Monitor Choices Resolution	Frequency	
----	-----	-----	
1	1280x1024	72Hz	
2	1024x768	75Hz	
3	1024x768	70Hz	
4	1024x768	72Hz	Flat Panel
5	1280x1024	60Hz	
6	1024x768	60Hz	
7	640x480	60Hz	
8	1280x1024	75Hz	VESA
9	1024x768	75Hz	VESA
10	800x600	75Hz	VESA
11	640x480	75Hz	VESA
12	1280x1024	72Hz	Greyscale
13	1280x1024	50Hz	
Current Monitor Type is			
2	1024x768	72Hz	

BOOT\_ADMIN>

3. To change the monitor configuration of the system, type the following:

```
BOOT_ADMIN> monitor type 
```

where *type* is the number in the Type column. For example, to select monitor **Type 1 Resolution 1280x1024 Frequency 72Hz**, type the following:

```
BOOT_ADMIN> monitor 1 
```



The screen displays your new monitor selection, similar to the following:

```

Monitor Choices
Type      Resolution      Frequency
-----
1         1280x1024         72Hz
2         1024x768          75Hz
3         1024x768          70Hz
4         1024x768          72Hz      Flat Panel
5         1280x1024         60Hz
6         1024x768          60Hz
7         640x480           60Hz
8         1280x1024         75Hz      VESA
9         1024x768          75Hz      VESA
10        800x600           75Hz      VESA
11        640x480           75Hz      VESA
12        1280x1024         72Hz      Greyscale
13        1280x1024         50Hz

Current Monitor Type is
1         1280x1024         72Hz

BOOT_ADMIN>

```

### Setting the Monitor Type at Power On

You must set the workstation's graphics parameters for either of the following circumstances:

- You have replaced the system's CPU board
- You have replaced the workstation's monitor with a different monitor type, and you have *not* set the workstation's graphics parameters by using the **monitor** command before doing so.

Press **Tab** after the keyboard's lights flash during the boot process to initiate the automatic monitor selection process.

**NOTICE:** On some PS2 keyboards, the LEDs flash when power is first applied, then flash again when the keyboard is initialized. Press the **Tab** key after the LEDs flash the second time.

The system will query you for the new monitor type, similar to the following:

```

Type      Resolution      Frequency
-----
2         1024x768          70Hz

Press <Enter> to select this monitor type.

```

When you press **Enter**, the system queries you to confirm your selection:

```

Type      Resolution      Frequency
-----
2         1024x768          70Hz

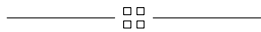
```

Press <y> to save this monitor type.

If you don't select the monitor type that's displayed, the system will cycle through the other monitor types, some of which the monitor won't display. Wait for the workstation to display the correct monitor type again, then select it.

**NOTICES:** Some multisync monitors will "lock up" if you do not select the monitor type on the first cycle. In this case, power cycle the monitor to resume the selection process.

Unsupported monitors may "lock up" if they can not sync to a scan rate.



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# Troubleshooting

# 4

This chapter provides information about isolating a failing component, known as a Field Replaceable Unit (FRU), in a Model 712 workstation.

To troubleshoot a Model 712 workstation, you must be familiar with the operating system and be able to start and stop processes. You should also be familiar with the boot ROM diagnostics, ISL diagnostics, and the SupportWave online tests, which we describe in this chapter.

To troubleshoot the Model 712 workstation, first check that the power LED on the front of the system unit comes on. If the LED doesn't light, follow the instructions in the flowchart in Figure 4-1. If the LED comes on, follow the instructions in the flowchart in Figure 4-2 to isolate a failing Field Replaceable Unit (FRU).

**NOTICE:** The CPU board contains a surface-mount fuse that fuses +5 volts from the system to the keyboard. This fuse (1) blows if an overvoltage occurs and (2) protects the system if the keyboard is shorted. Therefore, if the keyboard fails a diagnostic or won't function, replace the keyboard and the CPU board.

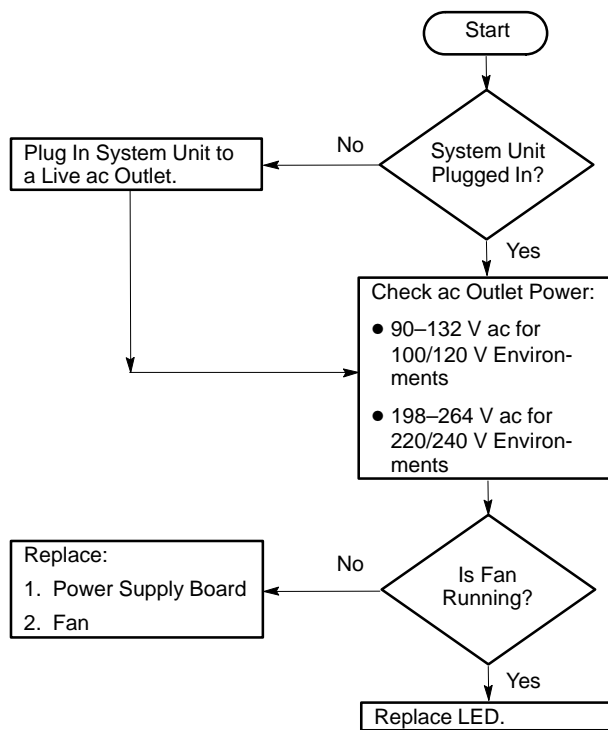


Figure 4–1. LED Not Lit

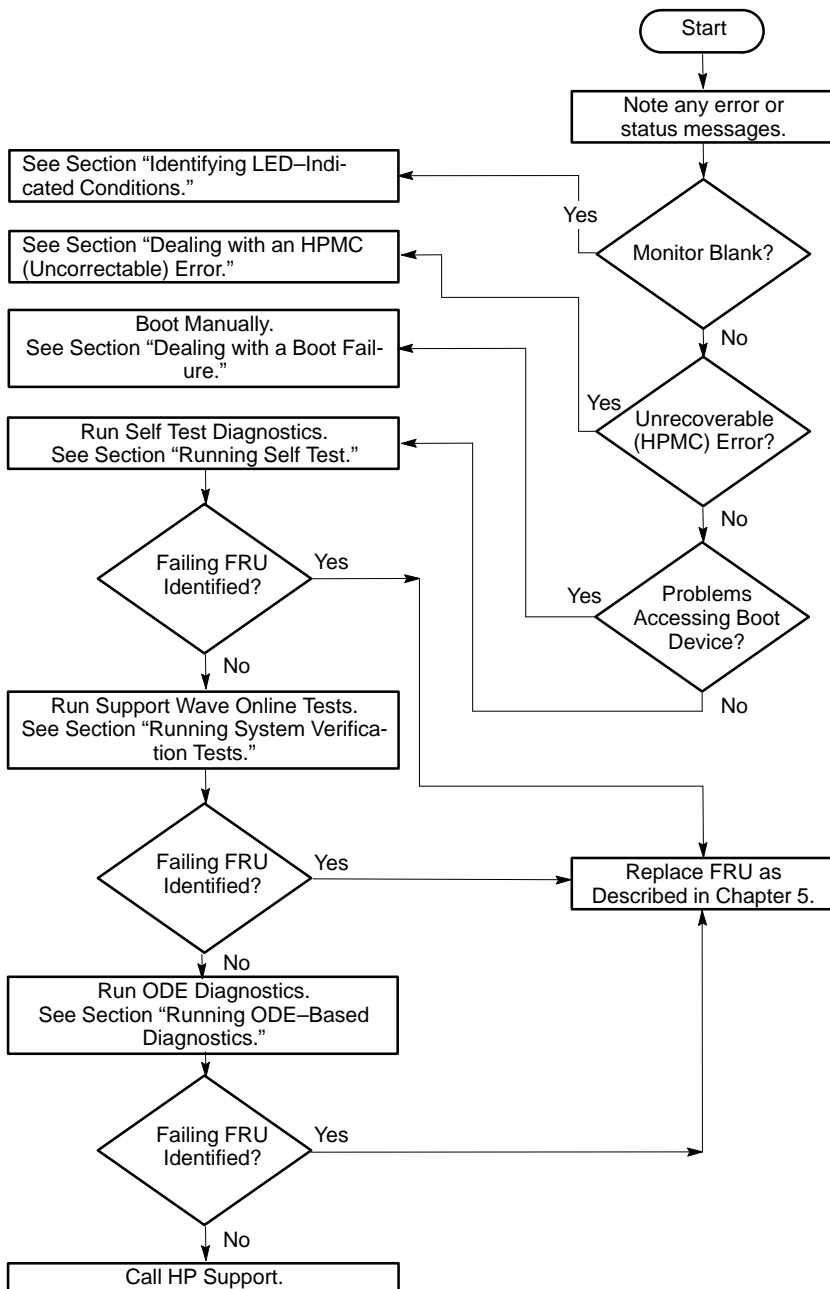


Figure 4-2. Troubleshooting the Model 712

**NOTICE:** For a complete description of using ISL diagnostics and SupportWave, see the *Precision Architecture RISC HP Apollo 9000 Series 700 Diagnostics Manual*.

---

## Identifying LED-Indicated Conditions

If your monitor remains blank when you power on your workstation, your system unit's power LED may flash to indicate an error condition:

- A 3/4-second flash indicates the CPU board is defective.
- A three quick flash, pause, three quick flash pattern indicates a problem with the graphics hardware. Check the monitor connections before replacing the CPU board or the VRAM board.

---

## Dealing with an HPMC (Uncorrectable) Error

When the hardware detects an unrecoverable (HPMC) error in the HP-UX environment, it displays an error message on the monitor. The hardware writes the state of the system to main memory and dumps the entire contents of main memory to the swap area on the system disk.

The system logs the HPMC error information, referred to as PIM (Processor Internal Memory), into Stable Storage. You can display the HPMC error information from the Boot Administration environment by using the **pim** command.

To identify the failed FRU(s) after an HPMC, follow these steps:

1. Examine the 12 words listed under Other Processor Data of the data returned from a **pim** command. These words represent the following data:

```
Other Processor Data
IIA Space      IIA Offset   Check Type   CPU State
Reserved      Cache Check  TLB Check    Bus Check
Assists Check  Reserved     Assist State System Responder Address
```

2. Compare the words identified in **bold** with those shown in Table 4-1 and take the appropriate action.

Table 4-1. PIM Action Table

Check Type Word	Cache Check Word	Bus Check Word	System Responder Word	Action * See Note 1
0x80000000	0x40000000	N/A	N/A	Replace Motherboard
0x20000000	N/A	0X00210000	0X00000000 0xEFFFFFFF	Replace SIMM See Note 2
0x20000000	N/A	0x00310000	0xF0000000 0xF01FFFFF	Replace Motherboard
0x20000000	N/A	0x00310000	0xF0200000 0xFFBFFFFFFF	Replace Optional I/O Card
0x20000000	N/A	0x00310000	0xFFFBF000 0xFFFFFFFF	Replace Motherboard
Note 1	When more than one failed FRU is identified, run the appropriate diagnostics to isolate the failed FRU.			
Note 2	While Architected Main Memory space is from 0x00000000 through 0xEFFFFFFF, the Model 712 can only use up to 128 MB (192 MB for the 712/100). With this limitation any memory address from 0x10000000 (0X14000000 for the 712/100) through 0xEFFFFFFF is invalid, and, if given in the System Responder word, the Motherboard should (usually) be replaced. If the error occurs again, there is a probable Kernel problem. See <i>HPMC Caused by a Multi-Bit Memory Parity Error</i> for information on identifying the failed SIMM.			

## HPMC Caused by a Multi-Bit Memory Parity Error

An HPMC interruption is forced when a multi-bit memory parity error is detected during a “DMA read” operation of fetching an I/D cache line (32 bytes).

Examine the 12 words listed under Other Processor Data of the data returned from a **pim** command during the Boot Administration environment. These words represent the following data:

```

Other Processor Data
IIA Space          IIA Offset      Check Type      CPU State
Reserved          Cache Check     TLB Check       Bus Check
Assists Check     Reserved        Assist State    System Responder Address
    
```

Table 4-2 shows an example of the values for these words:



Table 4-2. Multi-Bit Memory Parity Error

Word	Value
Check Type	0x20000000
CPU State	0x9e000004
Cache Check	0x00000000
TLB Check	0x00000000
Bus Check	0x00210000
Assists Check	0x00000000
Assists State	0x00000000
System Responder Address	0x00nnnnnn

### Interpreting the Table

The values in the Bus Check and System Responder Address words indicate that a multi-bit memory parity error was detected by logic in the memory module.

The System Responder contains the SPA of the faulty SIMM pair. To determine the pair, you need to know the following information:

- The SIMM pair sizes and their locations (for example, 16 MB SIMMs in Pair 1 and 8 MB SIMMs in Pair 0)
- The total memory size in HEX

### Determining the Faulty SIMM

The System Responder Address is stated as if the memory is contiguous. This procedure assumes the following:

- memory boards are installed in pairs of the same memory capacity
- memory boards are installed first in Pair 0 (Slots 0 and 1)
- there are no empty slots between memory boards

To determine the faulty SIMM, perform the following steps.

1. Using Table 4–3, determine the HEX value address range for each SIMM pair in the system.

Table 4–3. Memory Address Ranges

Memory Size (MB)	Address Range
1 MB	0x00000000 – 0x000FFFFF
2 MB	0x00000000 – 0x001FFFFF
4 MB	0x00000000 – 0x003FFFFF
8 MB	0x00000000 – 0x007FFFFF
16 MB	0x00000000 – 0x00FFFFFF
32 MB	0x00000000 – 0x01FFFFFF
64 MB	0x00000000 – 0x03FFFFFF
128 MB	0x00000000 – 0x07FFFFFF
192 MB	0x00000000 – 0x13FFFFFF

For example, if the system configuration is:

Pair 1: 16 MB SIMMs = 32 MB total for pair = 0x01FFFFFF  
Pair 0: 8 MB SIMMs = 16 MB total for pair = 0x00FFFFFF

The SIMM address ranges are:

Pair 1: Addresses 0x00000000 – 0x01FFFFFF  
Pair 0: Addresses 0x02000000 – 0x02FFFFFF

2. Determine the SIMM pair (starting with Pair 1) that contains the System Responder Address (as shown using the **ED** command) within its range. Evaluate the SIMM pairs as follows:

**NOTICE:** Addressing starts at Pair 1, not Pair 0.

- A. If the System Responder Address (as shown using the **pim** COMMAND) is between 0x00000000 and 0x01FFFFFF:

Error in Pair 1

- B. If the System Responder Address is between 0x02000000 and 0x02FFFFFF:

Error in Pair 0

- C. If the System Responder Address is between 0x02100000 and 0x0FFFFFFF:

Address Space Not Filled, (Probable) Motherboard Failure

- D. If the System Responder Address is between 0x10000000 and 0xEFFFFFFF:

Invalid Address Space, (Probable) Motherboard Failure

3. Without the actual failed bit number, the failed pair number is as close a determination as possible. To try to locate the faulty (individual) SIMM, reboot the system. Turn FASTBOOT OFF at the BOOT\_ADMIN prompt and power cycle again.

If the (destructive) memory selftest locates the faulty SIMM, the corresponding Chassis Code is shown on the monitor. Replace the faulty SIMM. Otherwise, replace the SIMM pair identified in this procedure. Return the system state (e.g., FASTBOOT) to original condition.

## HPMC Caused by a Data Cache Parity Error

An HPMC interruption is forced when a data parity error is detected during a Load instruction to the memory address space or during a data cache flush operation.

Examine the 12 words listed under Other Processor Data of the data returned from a **pim** command during the Boot Administration environment. These words represent the following data:

```
Other Processor Data
IIA Space          IIA Offset    Check Type    CPU State
Reserved          Cache Check  TLB Check     Bus Check
Assists Check     Reserved     Assist State  System Responder Address
```

Table 4-4 shows an example of the values for these words:

*Table 4-4. Processor Module Error (Data Cache Parity)*

Word	Value
Check Type	0x80000000
CPU State	0x9e000004
Cache Check	0x40000000
TLB Check	0x00000000
Bus Check	0x00000000
Assists Check	0x00000000
Assists State	0x00000000
System Responder Address	0x00000000

The value in the CPU State word indicates that register values and addresses stored in Stable Storage at the time of the HPMC were saved.

The value on the Cache Check word identifies that logic in the processor module detected a (data) cache parity error.

Replace the Motherboard.

---

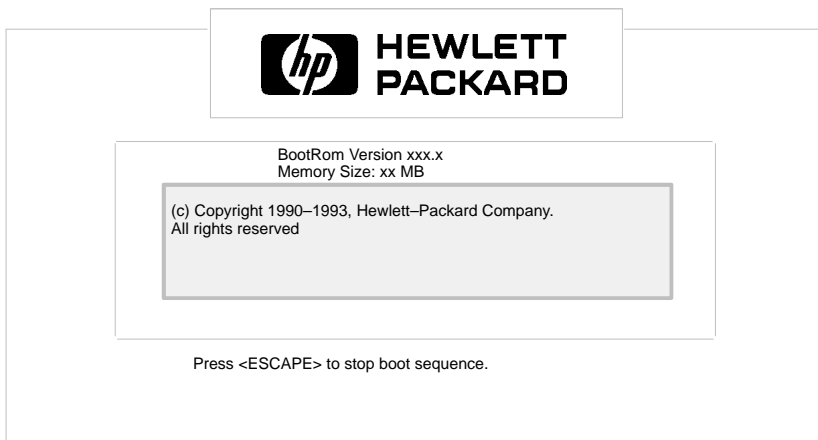
## Dealing with a Boot Failure

If the usual boot device (typically a disk) is not responding as it should, you must attempt to boot from the disk (or another boot device) by selecting it manually.

To boot a device manually, follow these steps:

1. Turn off the power to your workstation for a few seconds.
2. Turn the power back on.

The monitor displays the following screen:




Press and hold the **Esc** button as soon as the screen appears.

3. Release **Esc** when the screen displays the boot administration command menu followed by the `BOOT_ADMIN>` prompt.
4. List devices that contain bootable media by typing the following at the `BOOT_ADMIN>` prompt:

```
BOOT_ADMIN> search Enter
```

This causes your workstation to search *exhaustively* for bootable media.

5. Boot from one of the listed devices by typing the following command line at the `BOOT_ADMIN>` prompt:

```
BOOT_ADMIN> boot device 
```

where *device* is the **hardware path** to the device, specified in Mnemonic Style Notation, such as **scsi.5.0**

6. If your workstation still fails to boot, there is either something wrong with the file system or with the hardware. If you suspect a file system failure, see the manual *Using HP-UX* for help on dealing with file system failures. If you think that something is wrong with the hardware, contact your designated service representative.

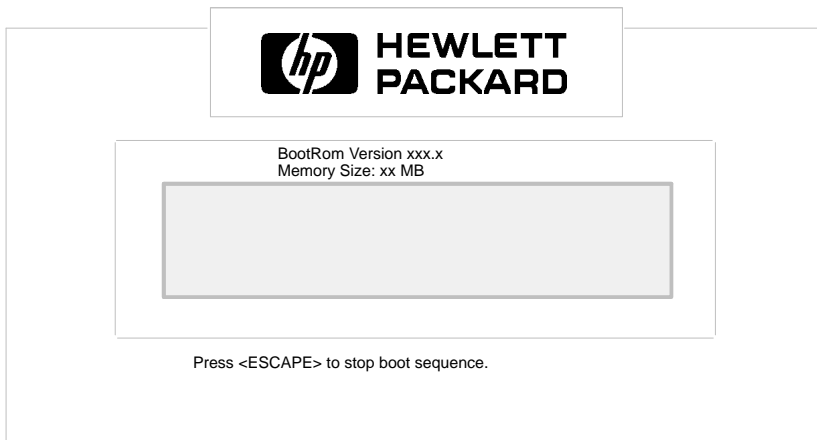
---

## Running Self Test

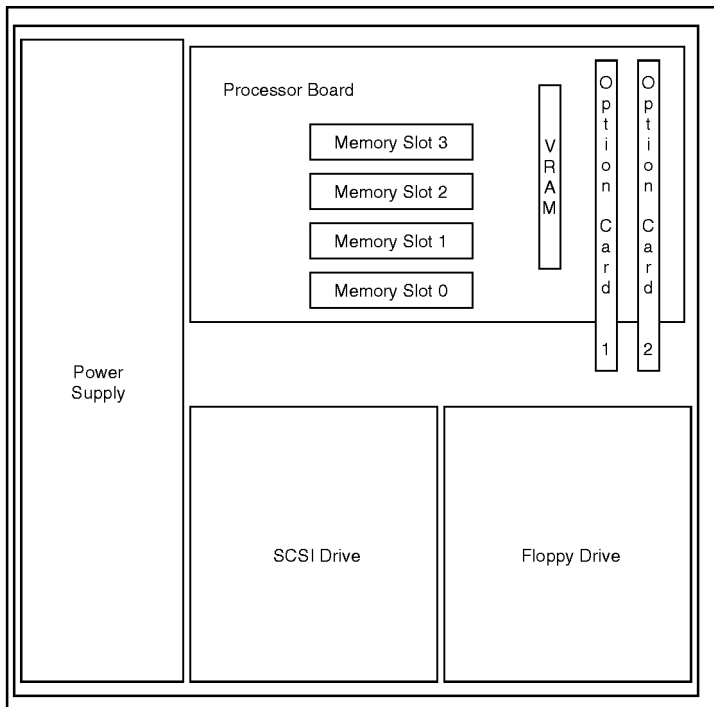
This section explains how to identify a failing FRU through the Self Test graphical display.

When you power on the Model 712 workstation, the system runs a series of diagnostic tests, called Self Test, to check the hardware configuration. These tests check all FRUs in the system, including any I/O board in the Expansion Slot.

The system displays a screen, similar to the following, while the tests run:



If an error occurs during the self test, the system displays a second screen depicting an overview of the system unit components, similar to the following:



The 712/100 screen will depict the additional memory slots.

The defective component is highlighted on the screen. To the right of the diagram, the self test calls out the defective component. Go to Chapter 5 for instructions about replacing the failed FRU.

If the self test fails to identify a failed FRU, and you still suspect a problem, run system verification tests, as described in the “Running System Verification Tests” section.



---

## Running System Verification Tests

HP-UX uses a diagnostics product called SupportWave. SupportWave contains the Support Tools Manager so that you can verify the system operation.

You can access the Support Tools Manager while in a terminal window. If you are using HP VUE as your interface, you can also access the Support Tools Manager through the `sys_admin` directory.

Three interfaces are available with the Support Tools Manager: a command line interface (accessed through the `cstm` command), a menu-driven interface (accessed through the `mstm` command), and the graphical user interface (accessed through the `xstm` command).

For more information on SupportWave user interfaces, see the online man pages by entering the following at a command line prompt:

```
man cstm 
```

```
man mstm 
```

```
man xstm 
```

To run SupportWave from either HP VUE or the HP-UX command line shell, perform the following steps:

1. In a terminal window, type the following at the # prompt to invoke the command line interface:

```
# cstm -m 
```

2. The following screen appears:

```
*****
*****
*****          SUPPORT TOOLS MANAGER          *****
*****          *****
*****          Command Line Interface          *****
*****          *****
*****          Version  x.xx.xx                *****
*****          *****
*****          Part Number  xxxxx-xxxxx        *****
*****          *****
*****          (C) Copyright Hewlett Packard Co. xxxx
*****          All Rights Reserved            *****
*****          *****
*****
Please Wait. System mapping in progress . . .
Please type HELP or ? to list available commands.

CSTM>
```

3. At the `CSTM>` prompt, you can enter several commands. For a list of these commands, type the following at the `CSTM>` prompt:

```
CSTM> help 
```

4. To verify the system operation, type the following at the `CSTM>` prompt:

```
CSTM> verify all 
```

Messages similar to the following appear:

```
Verification has started on device (CPU).  
Verification has started on device (FPU).
```

```
CSTM>Verification of (FPU) has completed.  
CSTM>Verification of (CPU) has completed.
```

5. Type  to return to the `CSTM>` prompt after all test results are reported.
6. To exit the Support Tools Manager, enter the following:

```
CSTM> exit 
```

If any tests failed, run Self Test and ISL diagnostics to isolate the problem.

---

## Running ODE-Based Diagnostics

The Offline Diagnostic Environment (ODE) consists of diagnostic modules for testing and verifying system operation. ODE provides all the necessary functions for the user to load specified tests and interact with those tests.

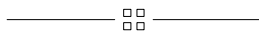
ODE is an ISL utility. To boot ODE:

1. Invoke the ISL environment from the system disk.
2. Type **ode**  after the `ISL>` prompt to invoke ODE from the LIF directory on the system disk. The prompt changes to `ODE>`.

Not all of the test modules are available on all systems. To see what test modules are available to run on your system, type **ls** at the `ODE>` prompt. The available modules include the following:

- **lasidiag** – tests and verifies the core-I/O functionality within the LASI chip. The diagnostics test the SCSI interface, LAN interface logic, parallel interface, audio, RS-232, PS/2 keyboard and mouse interface, real time clock, and the PC floppy interface and drive.
- **ldiag** – tests and verifies the basic functionality of the PCX-L chip. This tool tests the CPU, cache, TLB and floating point functions.
- **memtest** – tests and verifies the memory arrays. If an error is detected, the diagnostic reports the memory card and its slot number that needs replacement. Memtest also provides a map of the memory configuration so that the user can identify the type of memory and its slot location.
- **update** – updates the system's Processor Dependent Code (PDC) firmware on the FEPRM.
- **mapper** – identifies the configuration of HPPA systems. It displays path, identification, and revision information of I/O components, configuration of memory controllers, processors, co-processors, cache, and TLB, as well as processor board component revisions and values of various HPPA system identifiers, revisions and capabilities.

For further information on the various ODE commands and a complete listing of the command set, type **help**  at the `ODE>` prompt or at the prompt of one of the test modules.



**For:root**

**Printed on:Wed, Sep 4, 1996 13:52:01**

**From book:sh\_a2615\_90617**

**Document:chap\_5.new**

**Last saved on:Fri, Jun 23, 1995 10:30:27**

# Field Replaceable Units 6

This chapter lists the Model 712 Field Replaceable Units (FRUs) and provides procedures for their removal and replacement.

Use the following tools for FRU removal and replacement:

- Light-duty flat blade screwdriver with 150-mm (6-in.) blade
- #1 Posi-Drive driver
- Needlenose pliers
- ESD equipment (see the “ESD Precautions” section in the Preface for detailed information)

**WARNING:** For each of the removal procedures in this chapter, you **must** power off the system and unplug the power cord from the wall.

**NOTICE:** To maintain FCC/EMI compliance, verify that all covers are replaced and that all screws are properly seated.

---

## Exchange and Nonexchange Part Numbers

In this chapter we refer to *exchange* and *nonexchange* part numbers.

You must return FRUs with exchange part numbers in exchange for a replacement FRU. Do not return FRUs with nonexchange part numbers. You may discard them.

---

## System Unit FRUs

Refer to Figure 5-1 for an illustrated parts breakdown of the system unit. Table 5-1 lists the exchange FRU assemblies for the Model 712, Table 5-2 lists the nonexchange FRU assemblies, and Table 5-3 lists the optional I/O expansion boards. The numbered callouts in Figure 5-1 correspond to the numbered FRUs in these tables.

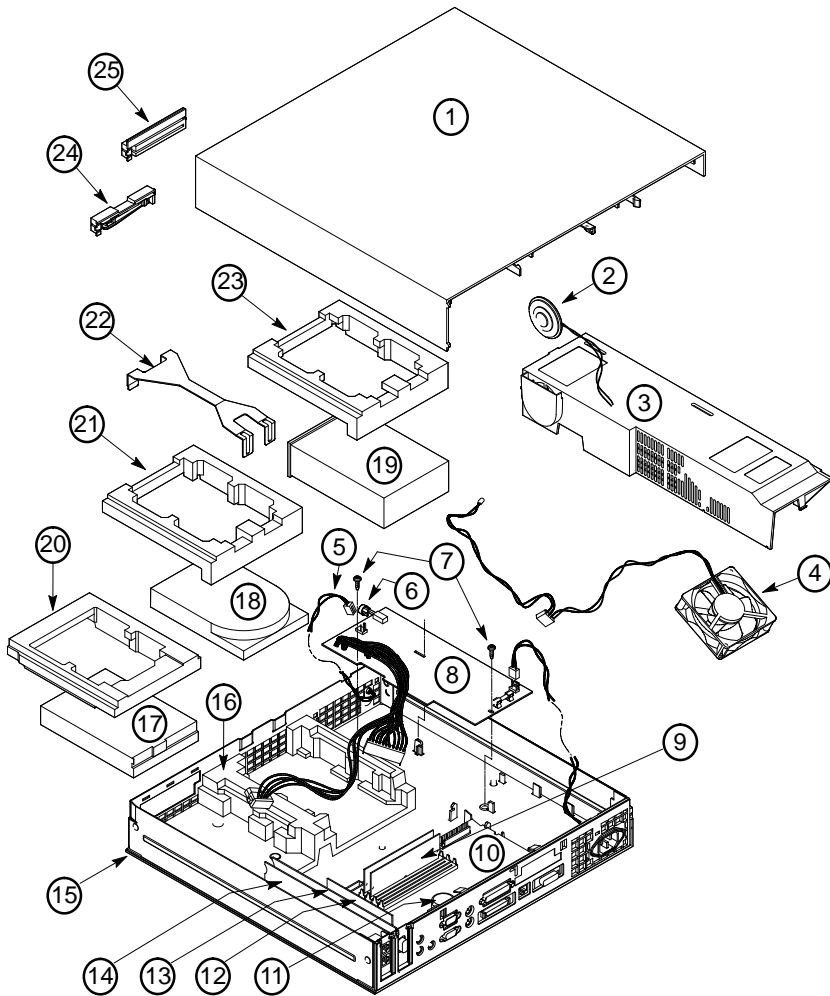


Figure 6-1. System Unit Illustrated Parts Breakdown

*Table 6-1. System Unit Exchange Assemblies*

No.	Exchange Part Number	Description
10	A2263-69510	CPU 60 MHz
10	A2263-69511	CPU 80 MHz
10	A2263-69515	CPU 100 MHz
9	A2577-69001	4-MB Simm
	A2578-69001	8-MB Simm
	A2576-69001	16-MB Simm
	A2575-69001	32-MB Simm
	A2615-69001	270-MB Disk
18	A2084-69001	525-MB Disk
18	A4022-69009	2-GB Disk
19	A2084-69002	1-GB Disk

Table 6-2. System Unit Nonexchange Assemblies

No.	Part Number	Description
17	0950-2377	3.5" Floppy Drive
18	0950-2370	120-MB Hard Disk
11	1420-0314	Battery
15	A2263-62036	Chassis Assembly (Filler Bezel, Power Supply Cover, Top Cover, Main Chassis)
4	A2263-62003	Fan Assembly
25		Filler Bezel
24	A2263-62037	Floppy Bezel
*	A2263-62005	Floppy Cable
*	A2263-00009	Floppy EMI Shield
21	A2263-40018	Hard Disk 1/2 Hi HP PAC
22	A2263-00019	Hard Disk Bracket
23	A2263-40019	Hard Disk Full Hi HP PAC
16	A2263-40016	HP PAC (Bottom)
20	A2263-40017	HP PAC (Floppy)
*	A2840-60201	Keyboard
5	A2263-62017	LED Cable Assembly
*	A2839A	Mouse
8	0950-2356	Power Supply (70 W)
6	A2263-40048	Power Supply Button
3		Power Supply Cover
7	0515-0211	Power Supply Screw
*	A2263-40049	Rubber Feet (4)
*	A2263-62004	SCSI Disk Cable
2	A2263-62007	Speaker Assembly
*	A2263-40047	Stand
1		Top Cover Assembly
12	A2263-66520	VRAM Assembly
* Not Shown		

Table 6-3. Optional I/O Expansion Boards

No.	Nonexchange Part Number	Description
14	2263-69538	A2878A Graphics
14	A2263-66531	IBM Token Ring
14	A2263-66535	RS-232
14	A2263-66536	RS-232/LAN
14	A2263-66537	RS-232/X.25
13	A2263-66530	TeleShare (Domestic)
13	A2263-66534	TeleShare (International)



---

## Monitors, Keyboards, and Mouse

Table 5-4 lists part numbers for the system monitors. Table 5-5 lists model numbers for the keyboards and mouse.

*Table 6-4. Monitors*

Part Number	Description	Exchange (e) Nonexchange
A2287-69001	A2287A 1024x768 17" (Northern Hemisphere)	e
A2090-0309	A2287B 1024x768 17" (Southern Hemisphere)	n
A4032-69001	A4032A 1280x1024 17" (Northern Hemisphere)	e
2090-0503	A4032B 1280x1024 17" (Southern Hemisphere)	n
A2094-69001	A2094A 1280x1024 19" (Northern Hemisphere)	e
2090-0315	A2094B 1280x1024 19" (Southern Hemisphere)	n

*Table 6-5. Keyboard and Mouse Model Numbers*

Model Number	Description
A2840A #xx*	Keyboard
A2839A	Mouse
* xx represents the localization designator	

---

## External Storage Unit FRUs

This section provides illustrated parts breakdowns and FRU listings for the C2963/64A, C1530B/C2954A and C2943A external storage units.

**NOTICE.:** The A2655A, A2656A, and A2657A have been replaced with the C2963/64A, C1530B/C2954A and C2943A external storage units.

## Hard Disk Drive (A2963/64A)

The numbered callouts in Figure 5-2 correspond to the numbered FRUs in Table 5-6 and Table 5-7.

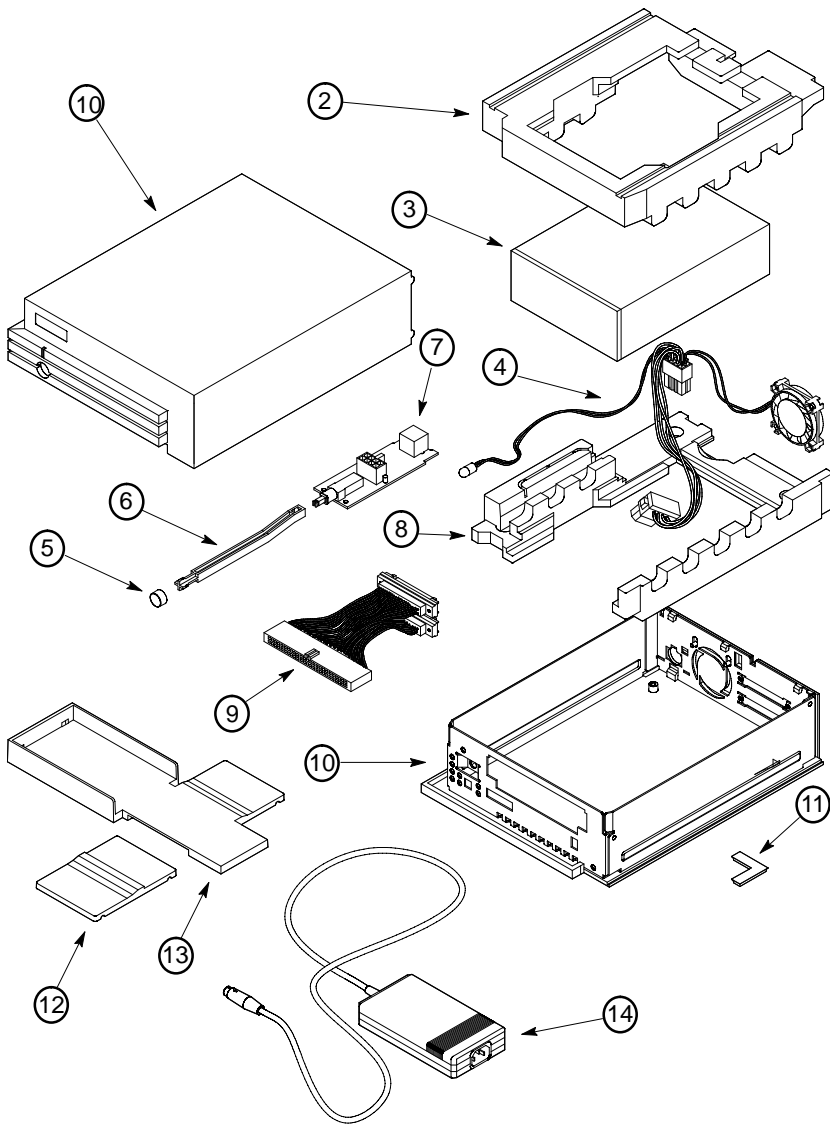


Figure 6-2. External Hard Disk Illustrated Parts Breakdown

Table 6-6. External Hard Disk Exchange Assemblies

No.	Exchange Part Number	Description
3	A2084-69002	1.0-GB Disk Drive

Table 6-7. External Hard Disk Nonexchange Assemblies

No.	Nonexchange Part Number	Description
7	A2655-66500	Power Board
8	A2656-40007	DAT/Disk HP PAC Bottom
2	A2655-40003	Disk HP PAC Top
11	A2263-40049	Rubber Foot
5	A2655-40019	Power Button
6	A2655-40007	Plunger
4	A2656-62005	Fan/LED Cable
9	A2655-62003	SCSI Ribbon Cable
10	A2657-62007	Chassis Assembly with Top Cover, Disk
14	20876	External Power Module
13	A2656-40014	Stand
12	A2655-40021	Plastic Foot
*	C2908A	SCSI Cable
*	C2904A	SCSI Terminator
* Not shown		

## DDS-Format Tape Drive (C1530B/C2954A)

The numbered callouts in Figure 5-3 correspond to the numbered FRUs in Table 5-8 and Table 5-9.

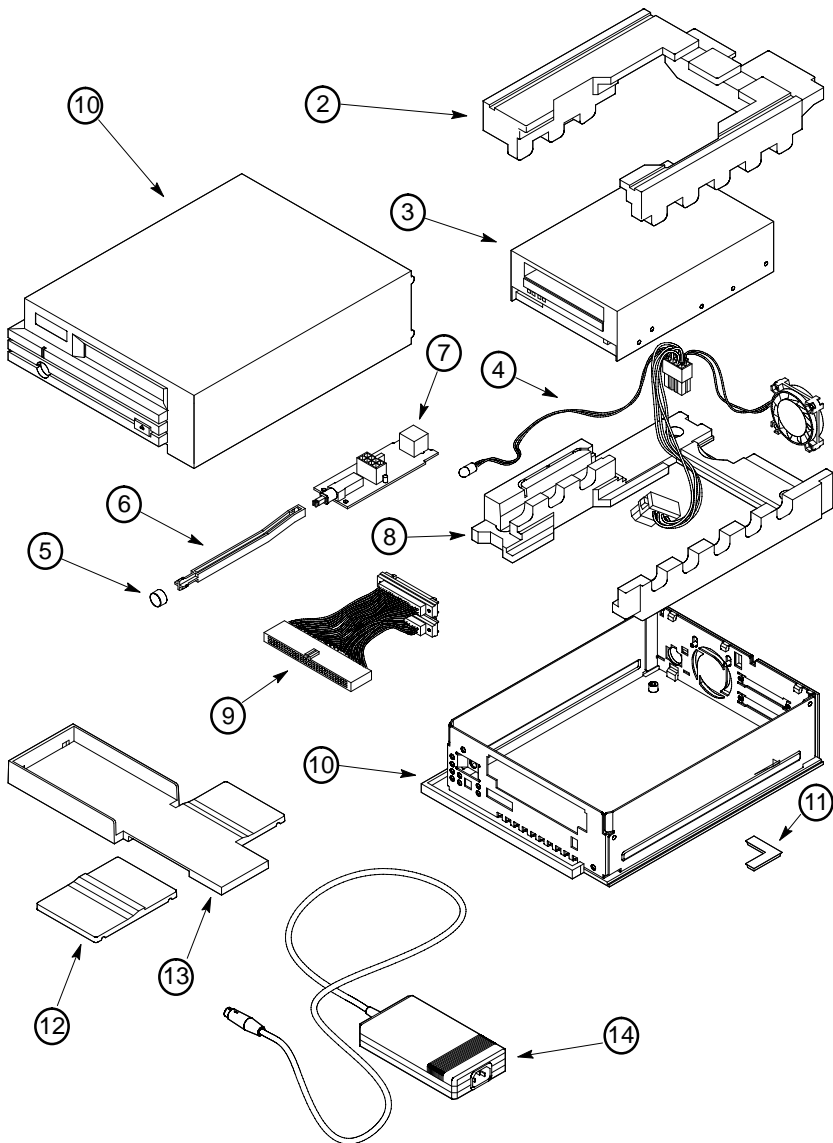


Figure 6-3. External DDS Tape Illustrated Parts Breakdown

Table 6–8. External DDS Tape Exchange Assemblies

No.	Exchange Part Number	Description
3	C1503–69201	DDS–Format Tape Drive

Table 6–9. External DDS Tape Nonexchange Assemblies

No.	Nonexchange Part Number	Description
7	A2656–66500	Power Board
8	A2656–40007	DAT/Disk HP PAC Bottom
2	A2656–40008	DAT HP PAC Top
11	A2263–40049	Rubber Foot
5	A2655–40019	Power Button
6	A2655–40007	Plunger
4	A2656–62005	Fan/LED Cable
9	A2655–62003	SCSI Ribbon Cable
10	A2656–62006	Chassis Assembly DAT with DAT Cover
14	20876	External Power Module
13	A2656–40014	Pedestal
12	A2655–40021	Plastic Foot
*	C2908A	SCSI Cable
*	C2904A	SCSI Terminator
* Not shown		

## CD-ROM Drive (C2943A)

The numbered callouts in Figure 5-4 correspond to the numbered FRUs in Table 5-11.

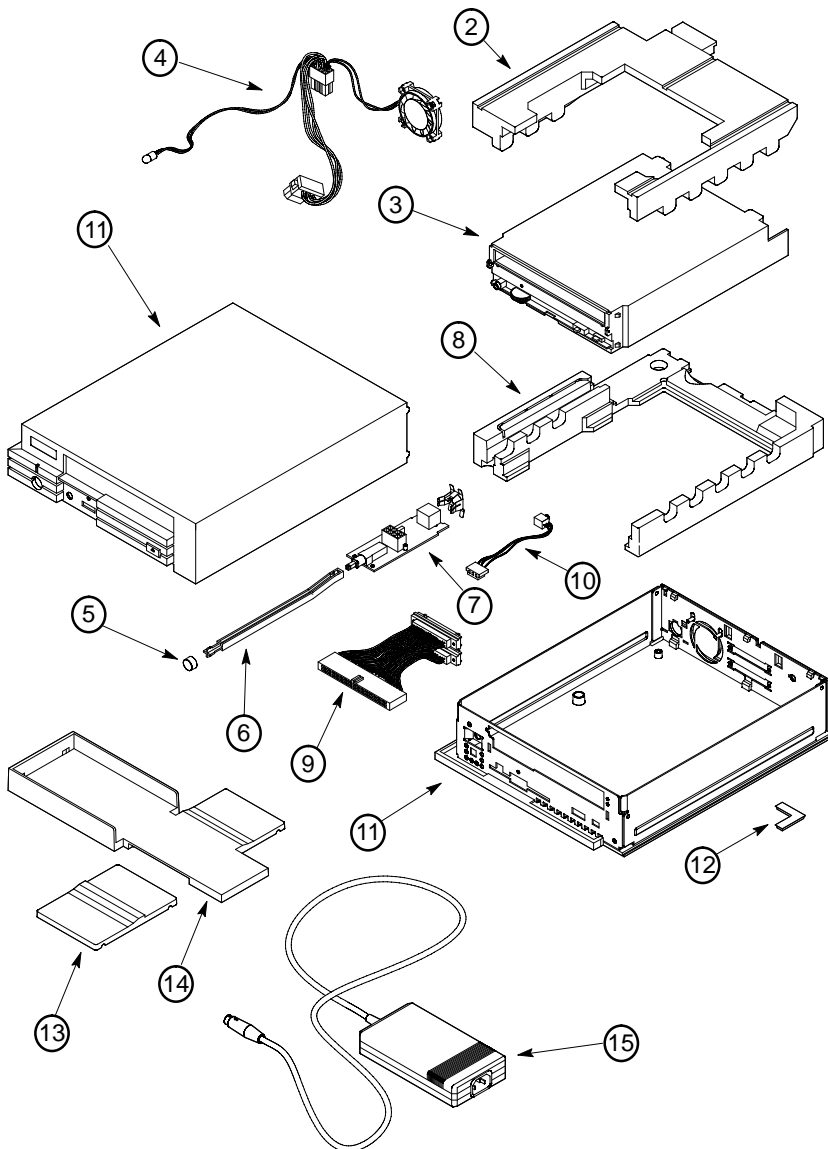


Figure 6-4. External CD-ROM Illustrated Parts Breakdown

Table 6-10. External CD-ROM Exchange Assemblies

No.	Exchange Part Number	Description
3	A1658-69001	CD-ROM Drive

Table 6-11. External CD-ROM Nonexchange Assemblies

No.	Nonexchange Part Number	Description
7	A2655-66500	Power Board
8	A2655-40009	CD-ROM HP PAC Bottom
12	A2263-40049	Rubber Foot
5	A2655-40019	White Power Button
6	A2656-40006	Plunger
4	A2656-62005	Fan/LED Cable
9	A2655-62003	SCSI Ribbon Cable
11	A2655-62008	Chassis Assembly CD-ROM with CDROM Cover
10	A2655-62007	CD Audio Cable
15	20876	External Power Module
14	A2656-40014	Stand
13	A2655-40021	Plastic Foot
*	C2908A	SCSI Cable
*	C2904A	SCSI Terminator
* Not shown		



---

## System Unit FRU Removal and Replacement

The procedures in this section illustrate how to remove system unit FRUs. Observe any notices and prerequisites for removing a FRU. Replacement is the reverse of removal, unless noted.

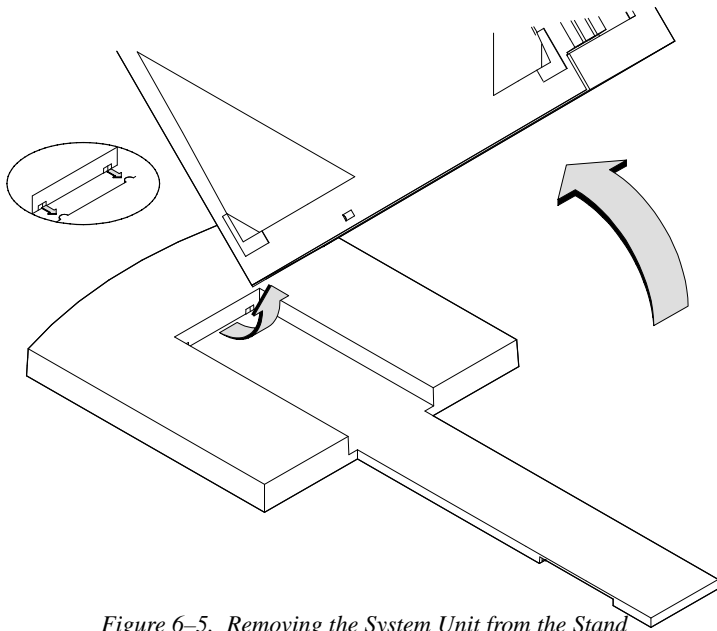
Before performing the following procedures, observe the following precautions:

11. Power off the system, the monitor, and any peripheral devices.
12. Unplug the system unit power cord and the power cord of any peripheral devices from ac wall outlets.
13. Unplug the system unit power cord from the ac input connector.

**NOTICE:** Your workstation automatically shuts down the operating system before terminating the power.

## Stand

Tilt up the front of the system unit and lift it out of the stand, as shown in Figure 5-5.



*Figure 6-5. Removing the System Unit from the Stand*

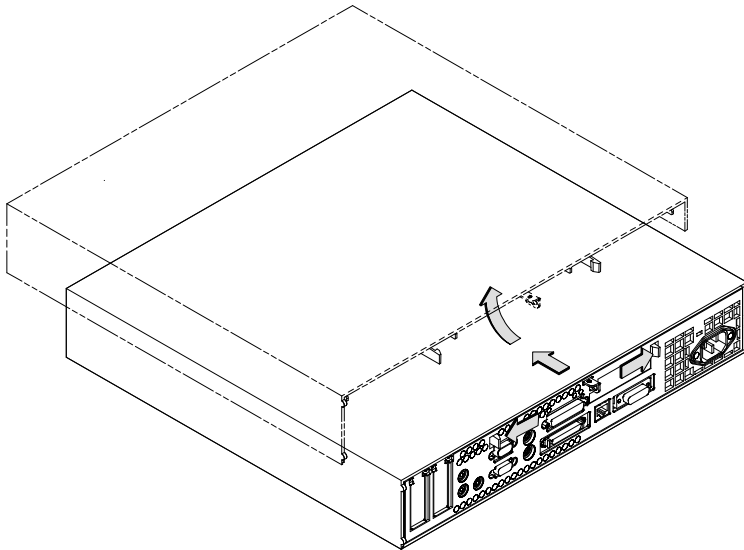
## Top Cover

Before removing the top cover, remove the stand.

**CAUTION:** Do not attempt to operate the workstation with the top cover removed. The cover is needed for proper air flow for system cooling.

Perform the following steps to open the system unit:

1. Lay the system unit on a flat surface, such as a table top.
2. Attach the static-grounding wrist strap by following the instructions on the package. Attach the the sticky end of the wrist strap to bare metal of the system unit.
3. Release the top cover by pushing the two locking tabs at the rear of the system unit toward the outside of the unit and then forward, as shown in Figure 5-6.
4. Slide the cover forward about two inches, then carefully lift to remove it, as shown in Figure 5-6.



*Figure 6-6. Opening the System Unit*

## Memory Board Removal

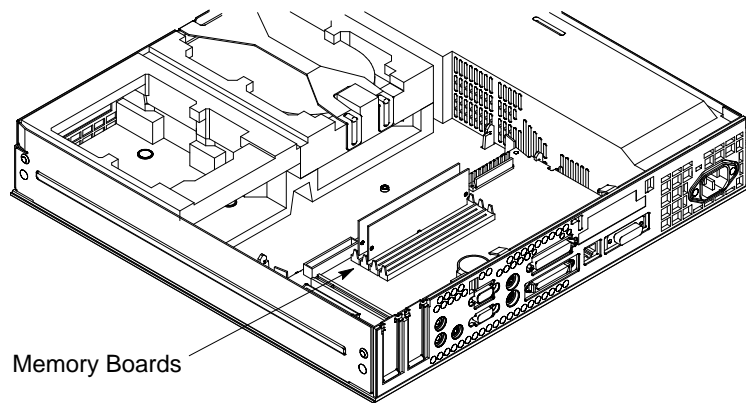
Before removing memory boards, perform the following tasks:

- Remove the stand.
- Open the system unit.

In the 712/100 there are 6 memory slots (3 pairs.)

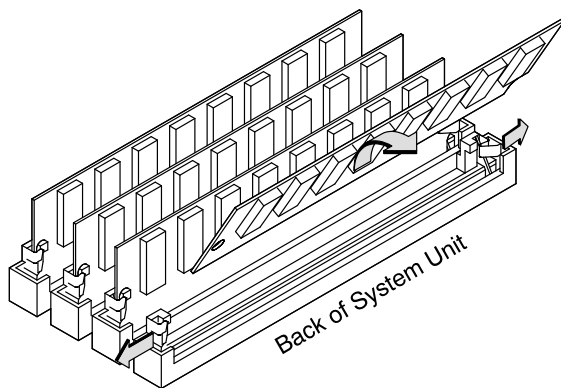
Figure 5-7 shows the memory board locations. Figure 5-8 shows how to remove the memory boards. Perform the following steps to remove a memory board from the system unit:

1. Locate the memory boards in the system unit, shown in Figure 5-7.



*Figure 6-7. Memory Board Location*

2. Push the two slot clips out and tilt the top of the memory board toward the back of the system unit, as shown in Figure 5–8. Lift the board from the connector, and place it on a static-free surface.



*Figure 6–8. Removing Memory Boards*

3. Go to the following section, “Memory Board Installation,” to install the replacement board.

## Memory Board Installation

Before replacing memory boards, perform the following procedures:

- Remove the stand.
- Open the system unit.

In the 712/100 there are 6 memory slots (3 pairs.)

Refer to Chapter 3 for information about memory board configurations.

Angle the board with the top edge tilted toward the rear of the system unit, and insert it into the connector, as shown in Figure 5-9. Note that the memory board is notched on one end to fit the keyed connector. Snap the board into place by moving it to a vertical position. If the board is installed properly, the plastic alignment pins on either end of the connector align with the holes on the memory board.

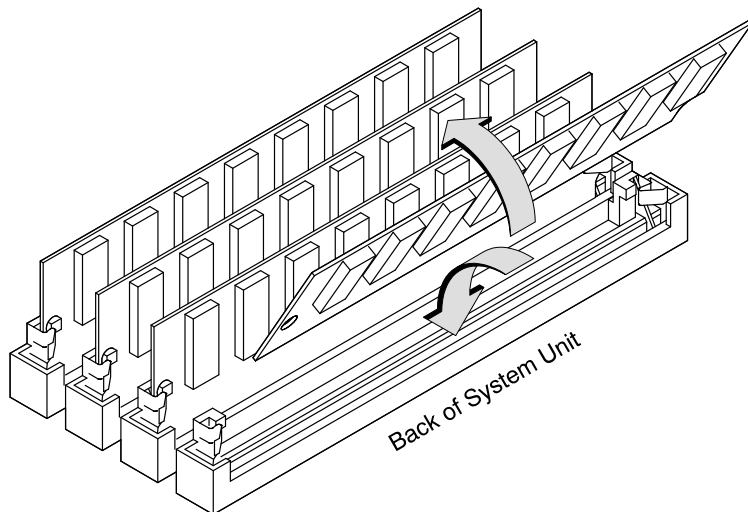


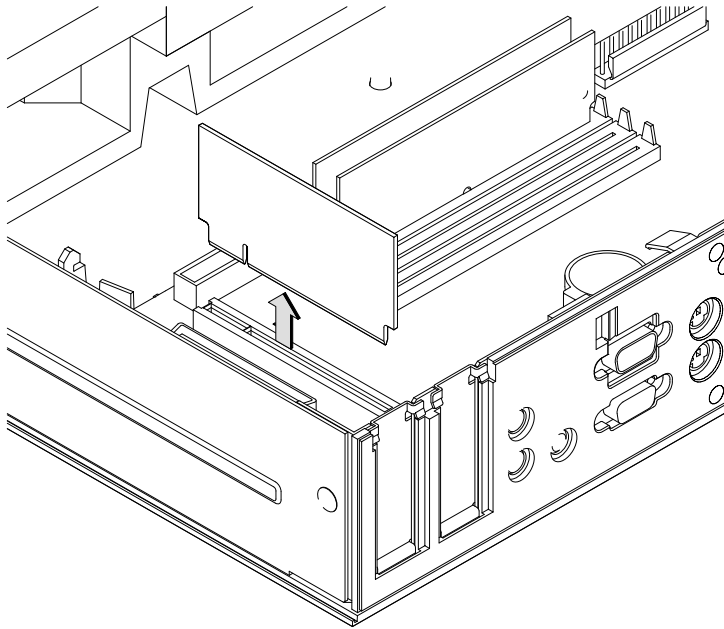
Figure 6-9. Installing Memory Boards

## VRAM (Video RAM)

Before removing the VRAM, perform the following procedures:

- Remove the stand.
- Open the system unit.

Grasp the VRAM board firmly at both ends and pull it straight up, as shown in Figure 5-10.



*Figure 6-10. Removing the VRAM Board*

## TeleShare Option Board

Before removing the TeleShare board, perform the following procedures:

- Remove the stand
- Open the system unit

Perform the following steps to remove the TeleShare board:

1. Disconnect any cables from the board.
2. Grasp the board firmly at both ends and pull it straight up, as shown in Figure 5-11.

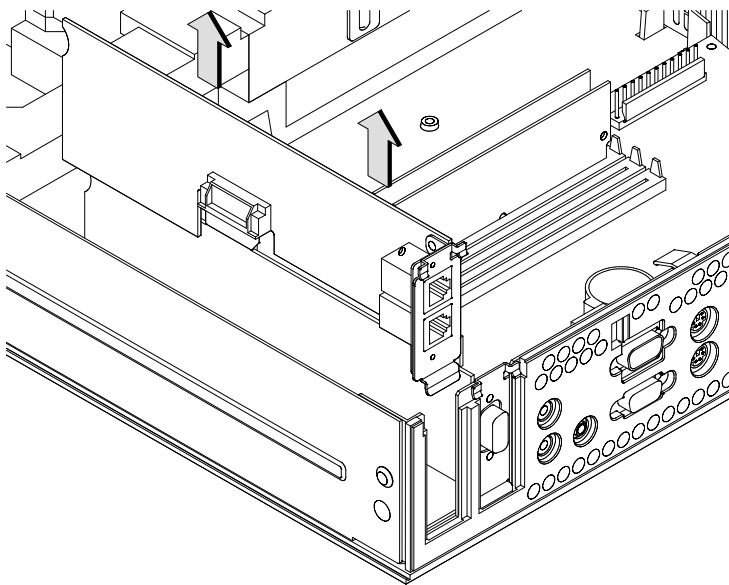


Figure 6-11. Removing the TeleShare Board



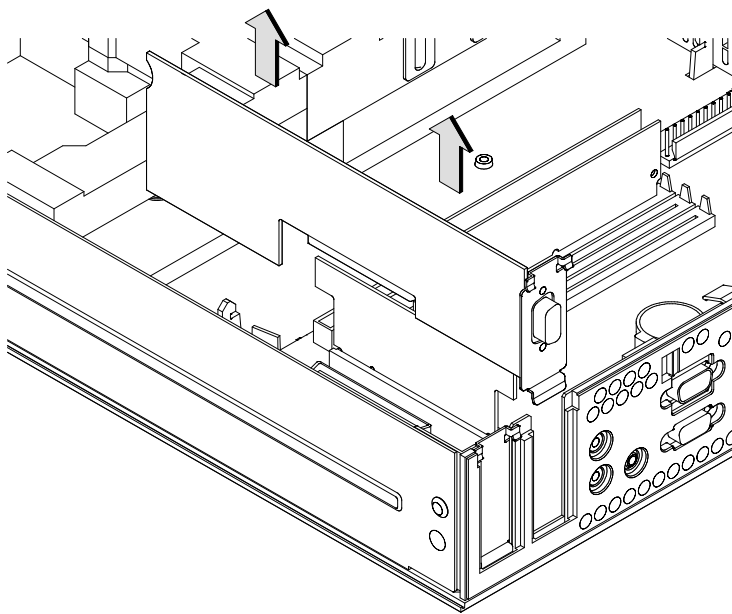
## I/O Expansion and Boards

Before removing an optional I/O expansion board, perform the following procedures:

- Remove the stand
- Open the system unit

Perform the following steps to remove the board:

1. Disconnect the cable from the board.
2. Grasp the expansion board firmly at both ends and pull it straight up, as shown in Figure 5-12.



*Figure 6-12. Removing an Expansion Board*

## Battery

Before removing the battery, perform the following procedures:

- Remove the stand.
- Open the system unit.

Remove the battery as shown in Figure 5-13.

**WARNING:** Lithium batteries may explode if mistreated. Do not put lithium batteries in fires or try to recharge or disassemble them.

Replace battery only with Matsushita Electric BR-2325 three-volt lithium battery (HP part number 1420-0314)! Use of any other battery may cause fire or explosion.

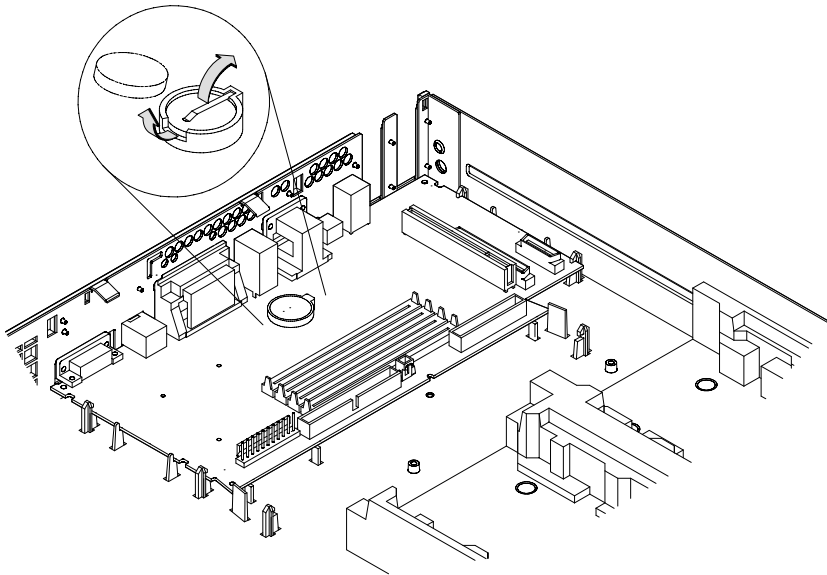


Figure 5-13. Removing the battery

## CPU Board

Before removing the CPU board, perform the following procedures:

- Note the two LANIC IDs of the workstation from the label on the PROM (see Figure 5-14.) The system will prompt you to enter the IDs when you boot the workstation with the new CPU board installed.

**NOTICE:** If you lose the LANIC IDs, call the response center and provide the system serial number and model number to find out the LANIC IDs.

- Remove the stand and open the system unit.
- Remove the memory boards, and all of the other boards from the CPU board.
- Disconnect the cables from the CPU board. Remove the retaining screw holding the 100MHz CPU (see Figure 5-14).

Perform the following steps to remove the CPU board:

1. Push out the retaining clips and slide the CPU board toward the front of the system, as shown in Figure 5-14.
2. Align the notches on the edge of the CPU board edges with the retaining pins, and lift the CPU board straight up.

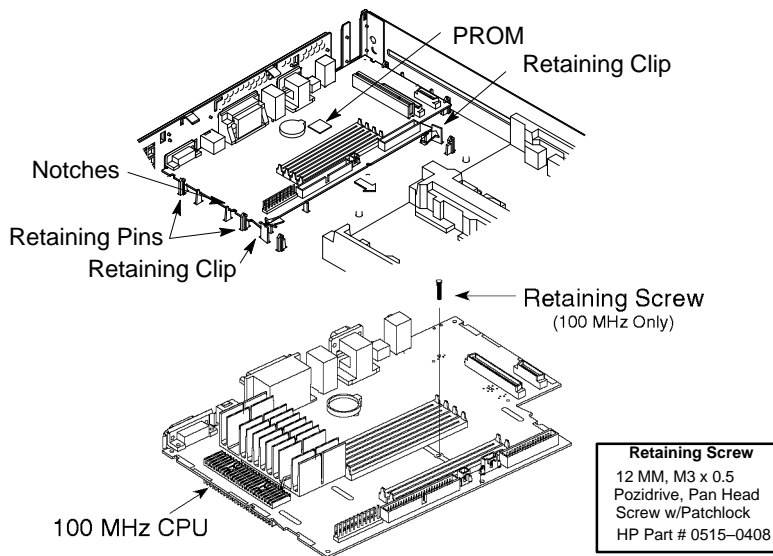


Figure 6-14. Removing the CPU Board

3. Reverse this procedure to install the new CPU board.
4. When you turn on the workstation with the new CPU board installed, set the monitor configuration, as described in the section “Setting the Monitor Type at Power On” in Chapter 3.
5. The system prompts you to enter two LANIC IDs.

**CAUTION:** If you enter an incorrect LANIC ID, you must use the `ss_config` utility to change it.

Perform one of the following choices:

- a. If you're not sure if the CPU board is the cause of the system problem, enter the dummy LANIC ID 080009–EEEEEE. This will allow you (1) to continue testing to verify if the CPU board is the solution, and (2) to restock the board if it doesn't solve the problem. Once you verify that the CPU board solves the problem, reboot the workstation and continue to Substep b.
- b. Enter the workstation's two LANIC IDs when prompted by the system. The LANIC IDs shown on the PROM label are 5–digit numbers, for example 96354 and 96355. (The second ID is always one number larger than the first ID.) When entering the IDs at the prompt, precede the 5–digit LANIC ID number with 080009–, which is a fixed number in all workstations. For the above example, at the prompt enter 080009–96354 and 080009–96355.

## Floppy Disk

Before removing the floppy disk drive, perform the following procedures:

- Remove the stand.
- Open the system unit.

Perform the following steps to remove the floppy disk drive:

1. Disconnect the two cables from the floppy drive.
2. Remove the HP PAC from the top of the floppy drive, as shown in Figure 5–15.
3. Lift the drive straight up, as shown in Figure 5–15.
4. Check any jumper settings on the replacement drive, as shown in Chapter 3.

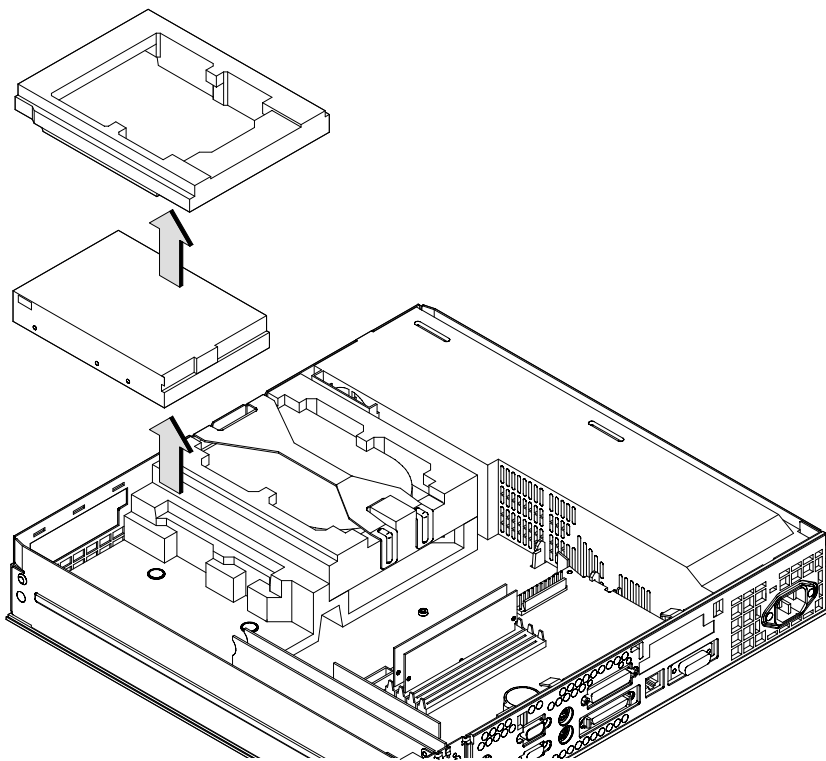


Figure 6–15. Removing the Floppy Drive

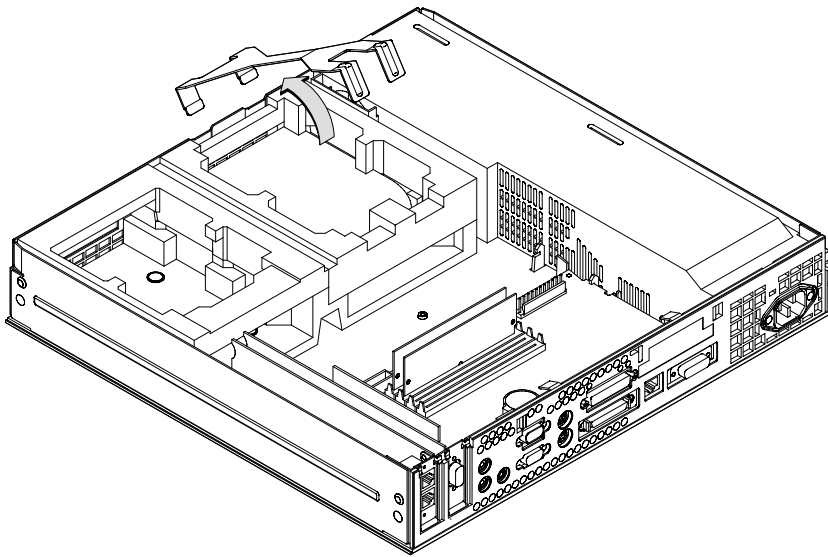
## Hard Disk

Before removing the hard disk, perform the following procedures:

- Remove the stand.
- Open the system unit.

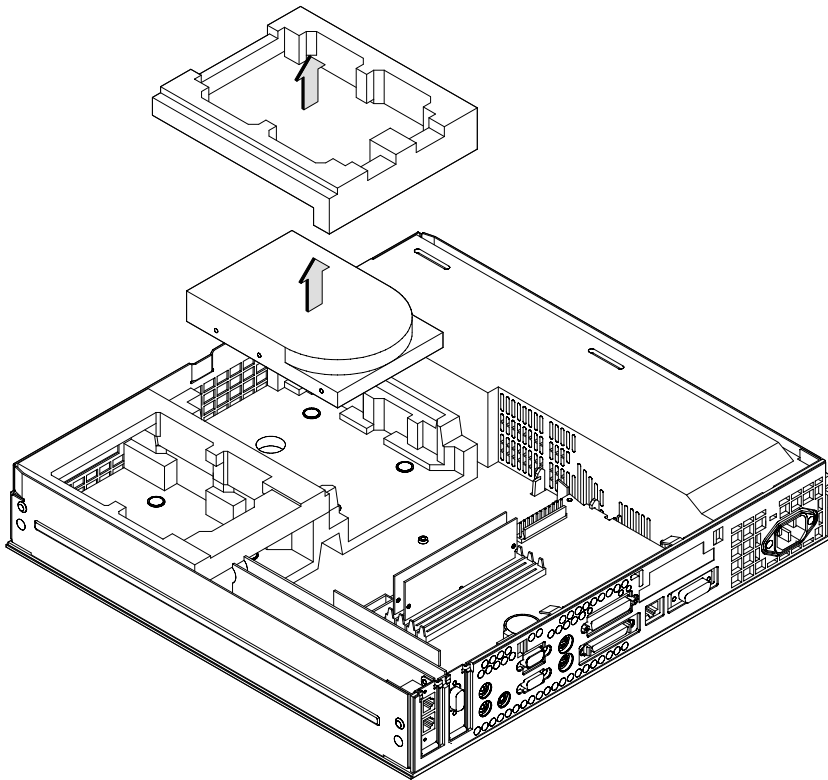
Perform the following steps to remove the disk drive:

1. Disconnect the SCSI and power cables from the hard disk.
2. Remove the disk retaining bracket by lifting the end closest to the rear of the system unit and rotating it toward the front of the system unit, as shown in Figure 5-16.



*Figure 6-16. Removing the Disk Retaining Bracket*

3. Remove the HP PAC from the top of the disk drive, as shown in Figure 5-17.
4. Lift the drive straight up, as shown in Figure 5-17.



*Figure 6-17. Removing the Hard Disk*

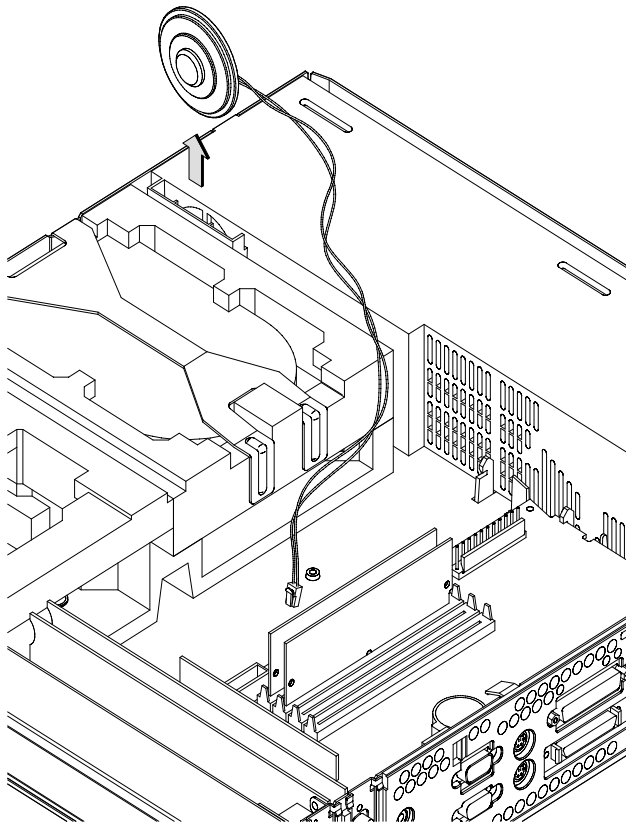
5. Check the SCSI ID and any other jumper settings on the replacement drive, as shown in Chapter 3.

## Speaker

Before removing the speaker, perform the following steps:

- Remove the stand.
- Open the system unit.

Disconnect the speaker cable from the CPU board and lift out the speaker, as shown in Figure 5–18.



*Figure 6–18. Removing the Speaker*



## Power Supply Cover

Before removing the power supply cover, perform the following procedures:

- Remove the stand.
- Open the system unit.
- Remove the speaker.

**WARNING:** Do not turn on the workstation with the power supply cover removed.

Perform the following steps to remove the power supply cover:

1. Disengage the power supply cover locking tab by pushing a small flat blade screwdriver into the slot on the rear panel, as shown in Figure 5–19.

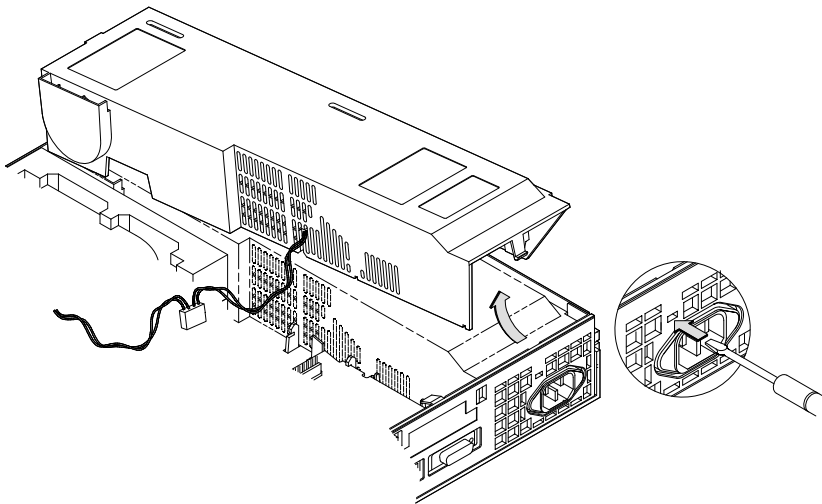
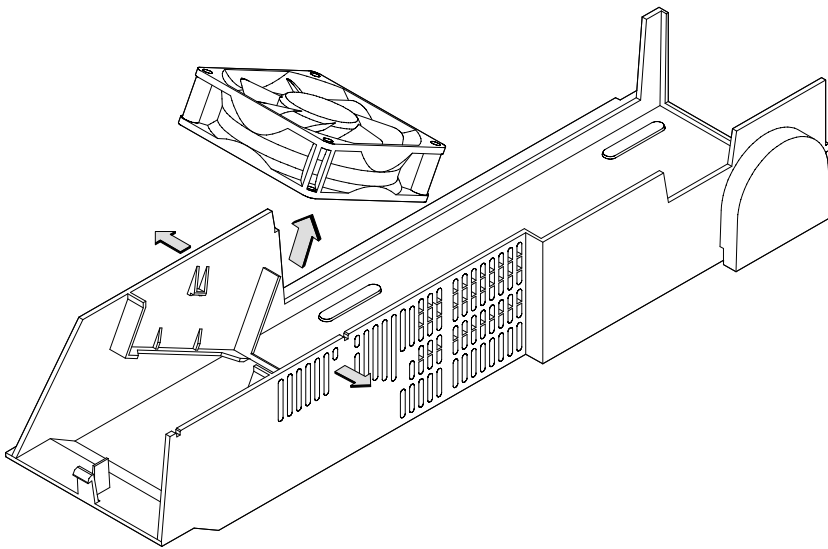


Figure 6–19. Removing the Power Supply Cover

2. Pull the sides of the power supply cover away from the fan and lift the fan from the cover, as shown in Figure 5-20.



*Figure 6-20. Removing the Fan from the Power Supply Cover*

**CAUTION:** To prevent damage to the ac power cable, make sure the cable is secured between the side of the system unit chassis and the tabs on the bottom of the system unit before you replace the power supply cover.

## Fan

Before removing the fan, perform the following procedures:

- Remove the stand.
- Open the system unit.
- If present, remove the hard disk and floppy drives.
- Remove the power supply cover.

Lift the HP PAC from the system unit, as shown in Figure 5–21.

Note how the fan cable connects to the CPU board, then snakes under four hold-down tabs to the thermistor at the front of the system unit. Disconnect the fan cable from the CPU board, and remove the cable from the hold-down tabs in the base of the system unit.

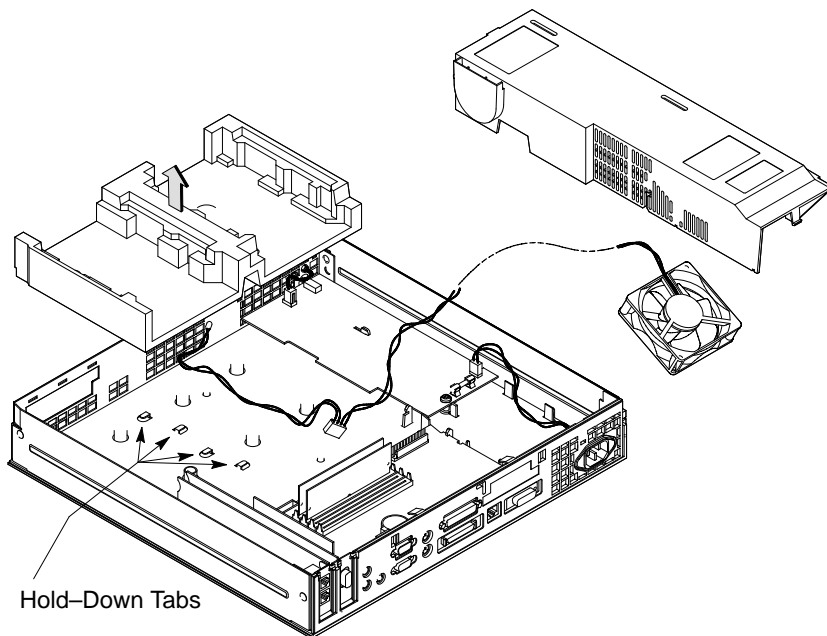


Figure 6–21. Disconnecting the Fan Cable

**CAUTION:** To prevent damage to the ac power cable, make sure the cable is secured between the side of the system unit chassis and the tabs on the bottom of the system unit before you replace the power supply cover.

## Power Supply

Before removing the power supply, perform the following steps:

- Remove the stand
- Open the system unit
- Remove the power supply cover

Perform the following steps to remove the power supply:

1. Disconnect all power supply connectors and cables, as shown in Figure 5–22.

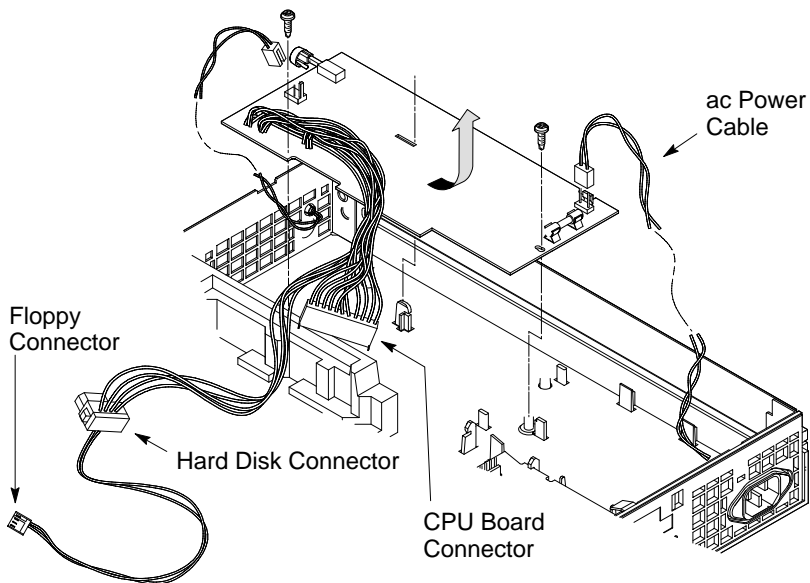


Figure 6–22. Removing the Power Supply

2. Remove the screws and lift the power supply from the chassis, as shown in Figure 5–22.

3. Pull the power supply button straight out until it disengages from the power switch, as shown in Figure 5-23. To allow easier installation of the new power supply, attach the power supply button to the power switch on the new power supply after you install the power supply into the system unit.

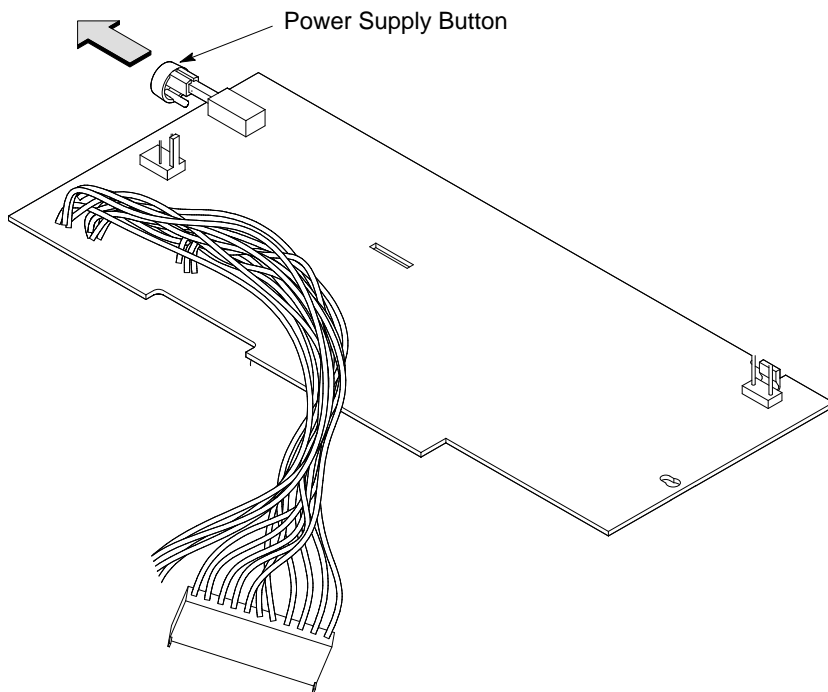
**CAUTION:** To prevent damage to the ac power cable, make sure the cable is secured between the side of the system unit chassis and the tabs on the bottom of the system unit.

## Power Supply Button

Before removing the power supply button, perform the following steps:

- Remove the stand
- Open the system unit
- Remove the power supply cover
- Remove the power supply

Pull the power supply button straight out until it disengages from the power switch, as shown in Figure 5-23.



*Figure 6-23. Removing the Power Supply Button*

To allow easier installation of the power supply, attach the power supply button to the power supply's power switch after you install the power supply into the system unit.

## **LED Cable Assembly**

Before removing the cable assembly, perform the following procedures:

- Remove the stand.
- Open the system unit.
- Remove the power supply cover.
- Remove the power supply.

From the front of the system unit, push in the LED until it disengages from the chassis.

---

## External Storage Devices

This section describes how to remove FRUs from the external storage devices. Models A2657A, A2656A and A2655A have been replaced by Models C2963/64A, C2943A and C1530B respectively. Observe any notices and prerequisites when removing a FRU. Replacement is the reverse of removal, unless noted.

The numbered callouts in the following illustrations correspond to step numbers in the associated procedure.

Before performing the following procedures, observe the following precautions:

- Power off the system, the monitor, and any peripheral devices.
- Unplug the system unit power cord and the power cord of all external devices from their ac wall outlets.
- Disconnect all cables from the external storage devices.

**NOTICE:** Your workstation automatically shuts down the operating system before terminating the power.

**WARNING:** Use only power supply Model ETYHP127MM with Model A2657A/C2963/64A Hard Disk Drives, A2656A/C1530B/C2954A DDS Tape Drives, and A2655A /C2943A CD-ROM Drives.



## Hard Disk (C2963/64A)

Refer to Figure 5-24 for an illustration of each FRU. The number identifiers in Figure 5-24 correspond to the step numbers in the following FRU removal procedure.

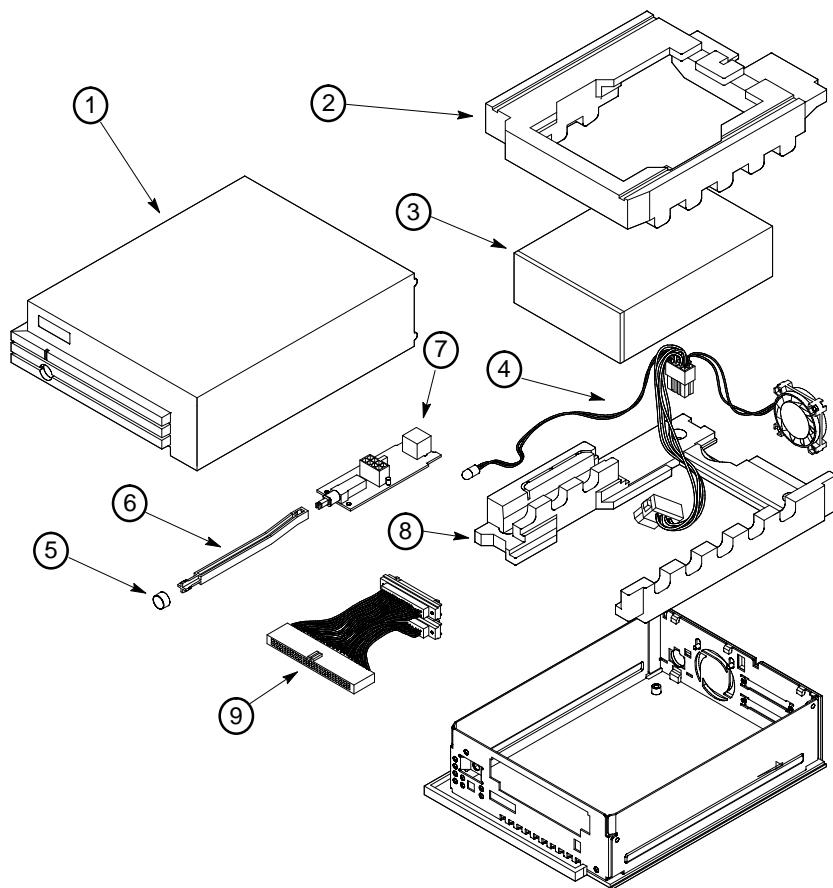
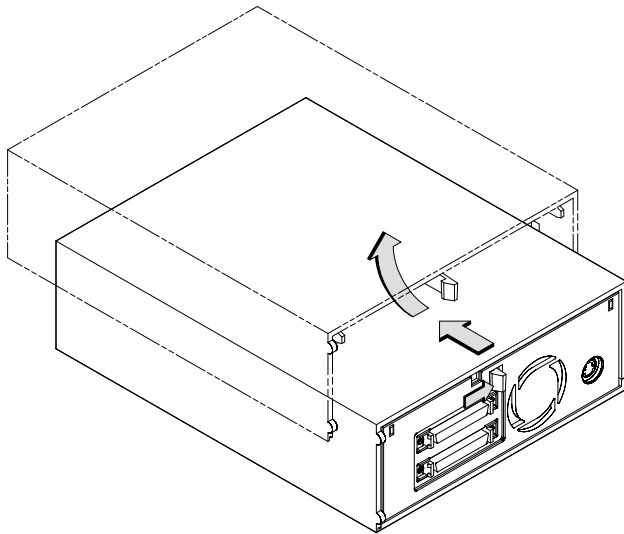


Figure 6-24. External Disk Drive

Remove the drive's components in the following order until you've removed the desired FRU:

1. Remove the cover.

Push the locking latch to the side, slide the cover forward about an inch, and lift off (see Figure 5-25).



*Figure 6-25. Removing the Cover (C2763/64A Disk)*

2. Lift out the top HP PAC.
3. Remove the drive.

Lift the rear of the drive slightly and disconnect the power and SCSI cables.

Lift the drive from the chassis.

**NOTICE:** When replacing the drive, make sure the jumpers are set to the correct SCSI ID, as described in Chapter 3.

4. Remove the Fan/LED assembly.

Squeeze the clip on the side of the Fan/LED assembly cable connector to disconnect it from the power supply.

From the front of the unit, push in the LED until it disengages from the chassis.

Tilt the top of the fan toward the front of the unit until it disengages from the mounting pins, then remove the Fan/LED assembly, as shown in Figure 5–26.

**NOTICE:** When replacing the fan, make sure that the arrow on its side points toward the rear of the unit.

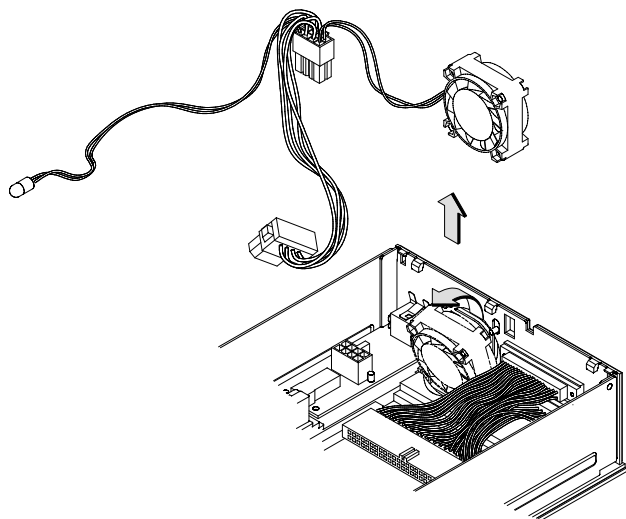


Figure 6–26. Removing the Fan/LED Assembly (C2963/64A Disk)

5. Remove the power button.

Pull the power button straight off the end of the plunger.

6. Remove the plunger.

Pull the plunger straight out until it disengages from the power board switch.

Slide the plunger from the chassis.

7. Remove the power board.

Lift the front of the power board, then pull it toward the front of the unit until it disengages from the grounding clip.

**WARNING:** Use only power supply Model ETYHP127MM with the A2657A /C2963/64A Hard Disk Drive.

8. Remove the bottom HP PAC.

9. Remove the SCSI ribbon cable.

From the back of the unit, use a small flat-blade screwdriver to remove the four screws that hold the SCSI ribbon cable connectors in place.

## DDS-Format Tape (C1530B/C2954A)

Refer to Figure 5-27 for an illustration of each FRU. The number identifiers in Figure 5-27 correspond to the step numbers in the following FRU removal procedure.

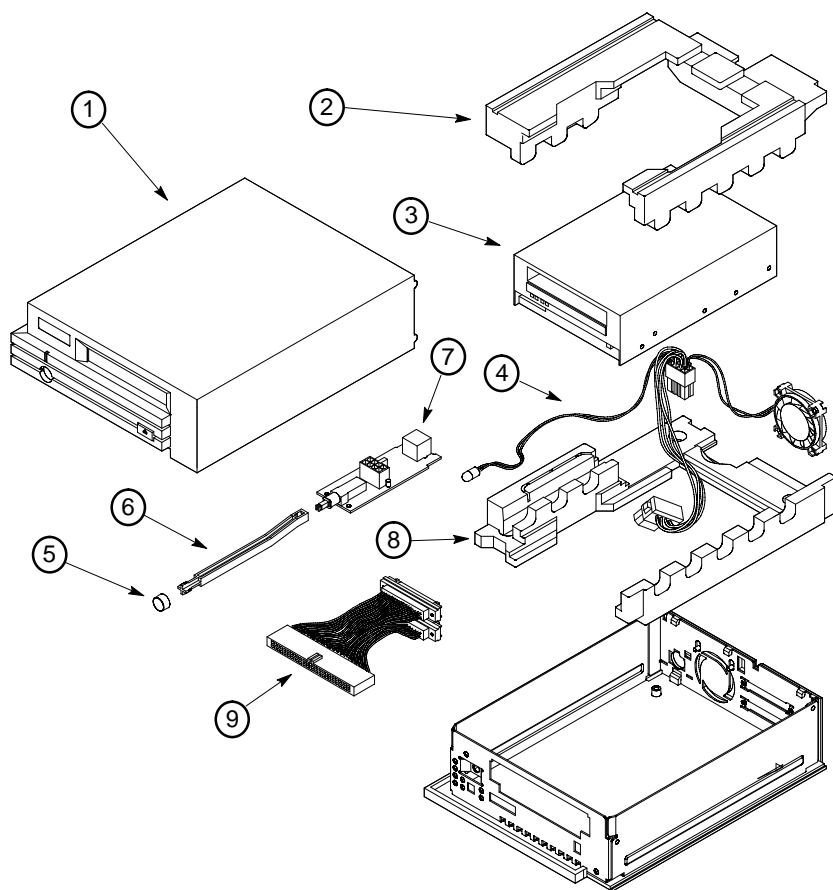
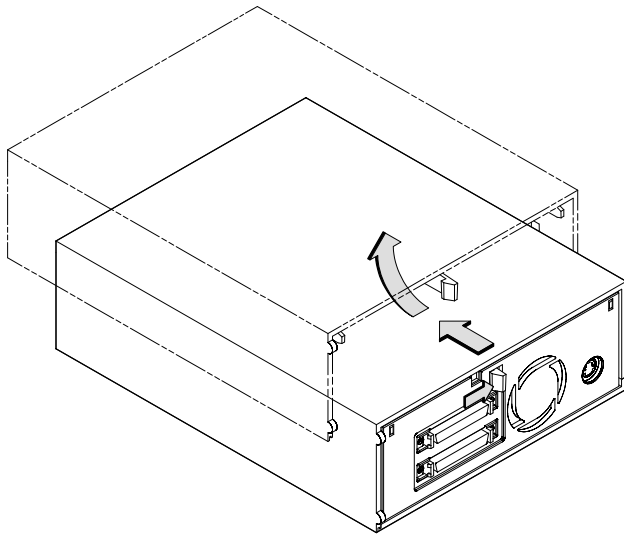


Figure 6-27. External DDS-Format Tape Drive

Remove the drive's components in the following order until you've removed the desired FRU:

1. Remove the cover.

Push the locking latch to the side, slide the cover forward about an inch, and lift off (see Figure 5-28).



*Figure 6-28. Removing the Cover (C1530B/C2954A Tape Drive)*

2. Lift out the top HP PAC.
3. Remove the drive.

Lift the rear of the drive slightly and disconnect the power and SCSI cables.

Lift the drive from the chassis.

**NOTICE:** When replacing the drive, make sure the jumpers are set to the correct SCSI ID, as described in Chapter 3.

4. Remove the Fan/LED assembly.

Squeeze the clip on the side of the Fan/LED assembly cable connector to disconnect it from the power supply.

From the front of the unit, push in the LED until it disengages from the chassis.

Tilt the top of the fan toward the front of the unit until it disengages from the mounting pins, then remove the Fan/LED assembly, as shown in Figure 5–29.

**NOTICE:** When replacing the fan, make sure that the arrow on its side points toward the rear of the unit.

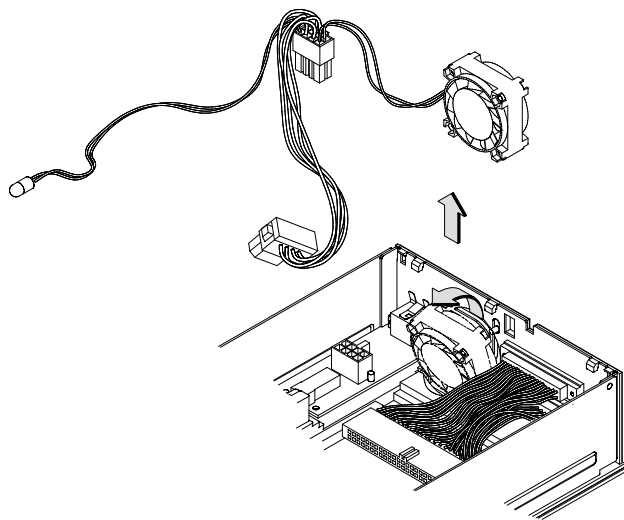


Figure 6–29. Removing the Fan/LED Assembly (C1530B/C2954A Tape Drive)

5. Remove the power button.

Pull the power button straight off the end of the plunger.

6. Remove the plunger.

Pull the plunger straight out until it disengages from the power board switch.

Slide the plunger from the chassis.

7. Remove the power board.

Lift the front of the power board, then pull it toward the front of the unit until it disengages from the grounding clip.

**WARNING:** Use only power supply Model ETYHP127MM with the A2656A/C1530B/C2954A DDS Tape Drive.

8. Remove the bottom HP PAC.
9. Remove the SCSI ribbon cable.

From the back of the unit, use a small flat-blade screwdriver to remove the four screws that hold the SCSI ribbon cable connectors in place.



## CD-ROM Drive (C2943A)

Refer to Figure 5-30 for an illustration of each FRU. The number identifiers in Figure 5-30 correspond to the step numbers in the following FRU removal procedure.

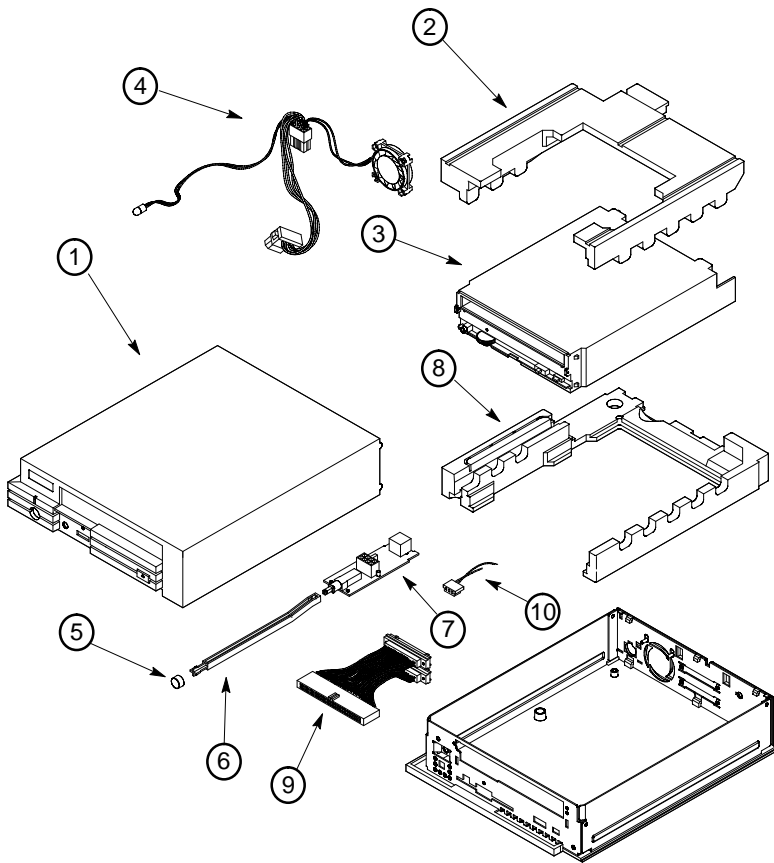
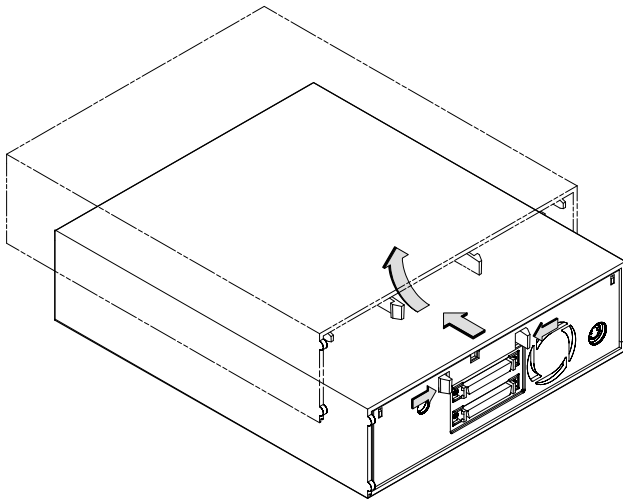


Figure 6-30. External CD-ROM Drive

Remove the drive's components in the following order until you've removed the desired FRU.

1. Remove the cover.

Push the locking latches toward each other, slide the cover forward about an inch, and lift off (see Figure 5-31).



*Figure 6-31. Removing the Cover (C2943A CD-ROM)*

2. Lift out the top HP PAC.
3. Remove the drive.

Lift the rear of the drive slightly and disconnect the power, SCSI, and audio cables.

Lift the drive from the chassis.

**NOTICE:** When replacing the drive, make sure the jumpers are set to the correct SCSI ID, as described in Chapter 3.

4. Remove the Fan/LED assembly.

Squeeze the clip on the side of the Fan/LED assembly cable connector to disconnect it from the power supply.

From the front of the unit, push in the LED until it disengages from the chassis.

Tilt the top of the fan toward the front of the unit until it disengages from the mounting pins, then lift out the Fan/LED assembly, as shown in Figure 5–32.

**NOTICE:** When replacing the fan, make sure that the arrow on its side points toward the rear of the unit.

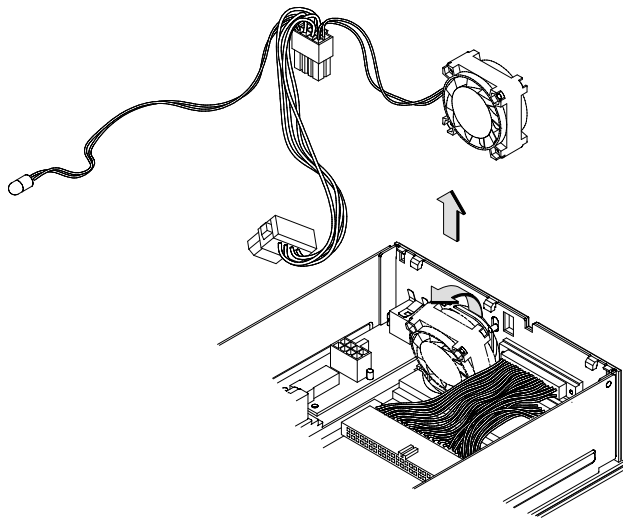


Figure 6–32. Removing the Fan/LED Assembly (C2943A CD-ROM)

5. Remove the power button.

Pull the power button straight off of the end of the plunger.

6. Remove the plunger.

Pull the plunger straight out until it disengages from the power board switch.

Slide the plunger from the chassis.

7. Remove the power board.

Lift the front of the power board, then pull it toward the front of the unit until it disengages from the grounding clip.

**WARNING:** Use only power supply Model ETYHP127MM with the A2655A/C2943A CD-ROM Drive.

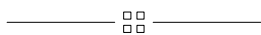
8. Lift out the bottom HP PAC.

9. Remove the SCSI ribbon cable.

From the back of the unit, use a small flat-blade screwdriver to remove the four screws that hold the SCSI ribbon cable connectors in place.

10. Remove the CD-ROM audio cable.

Use needle-nose pliers to unscrew the nut securing the audio connector to the rear of the unit.



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**Document:chap\_6**

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# Diagrams

# 7

This chapter provides functional information about the system.

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## System Power

Figure 7-1 shows the system power distribution.

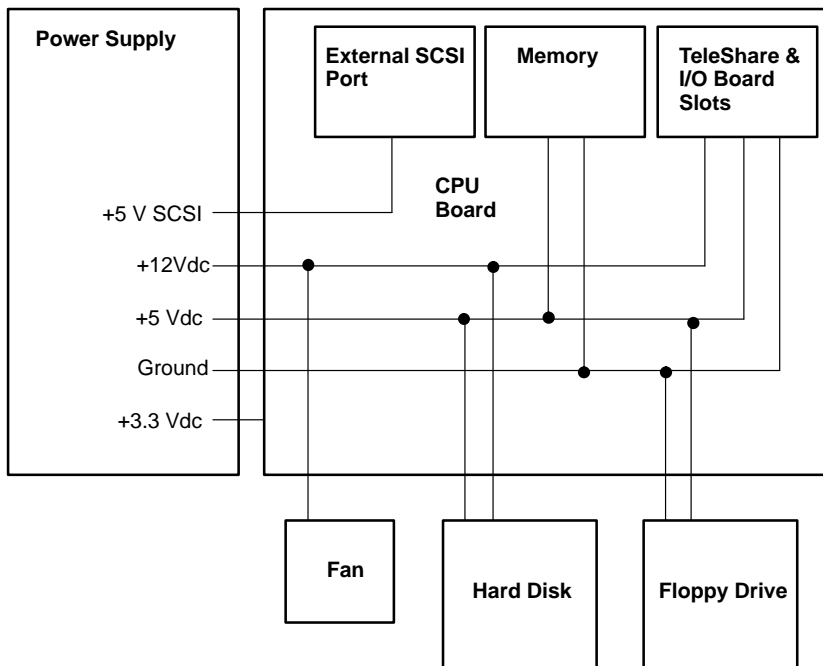


Figure 7-1. Power Distribution Diagram

The power supply distributes power through the following connectors:

- CPU Board Connector (11-pin)
- Floppy Drive Connector (2-pin)
- Hard Disk Drive Connector (4-pin)
- Fan Connector on CPU board (2-pin)

Table 7-1 lists the pinouts for the power supply connector to the CPU board:

*Table 7-1. CPU Board Power Pinouts*

<b>Pin Number</b>	<b>Description</b>	<b>Wire Color</b>
1	START_PWR_DOWN_L	white
2	POWER_ON_L	blue
3	+5V	orange
4	GROUND	black
5	+12V	red
6	GROUND	black
7	+5V	orange
8	+3.3V	yellow
9	+5V (SCSI)	violet
10	GROUND	black
11	+5V	orange

Table 7-2 lists the pinouts for floppy drive power:

*Table 7-2. Floppy Drive Power Pinouts*

<b>Pin Number</b>	<b>Description</b>	<b>Wire Color</b>
1	+5V	orange
2	GROUND	black

Table 7-3 lists the pinouts for hard disk drive power:

*Table 7-3. Hard Disk Drive Power Pinouts*

<b>Pin Number</b>	<b>Description</b>	<b>Wire Color</b>
1	+12V	red
2	GROUND	black
3	GROUND	black
4	+5V	orange

Table 7-4 lists the pinouts for fan power:

*Table 7-4. Fan Power Pinouts*

<b>Pin Number</b>	<b>Description</b>	<b>Wire Color</b>
1	+12V	N/A
2	GROUND	N/A

Table 7-5 lists the pinouts for the LED connector:

*Table 7-5. LED Power Pinouts*

<b>Pin Number</b>	<b>Description</b>	<b>Wire Color</b>
1	Cathode (-)	N/A
2	Anode (-)	N/A



# System Block Diagram

Figure 7-2 shows the system unit block diagram.

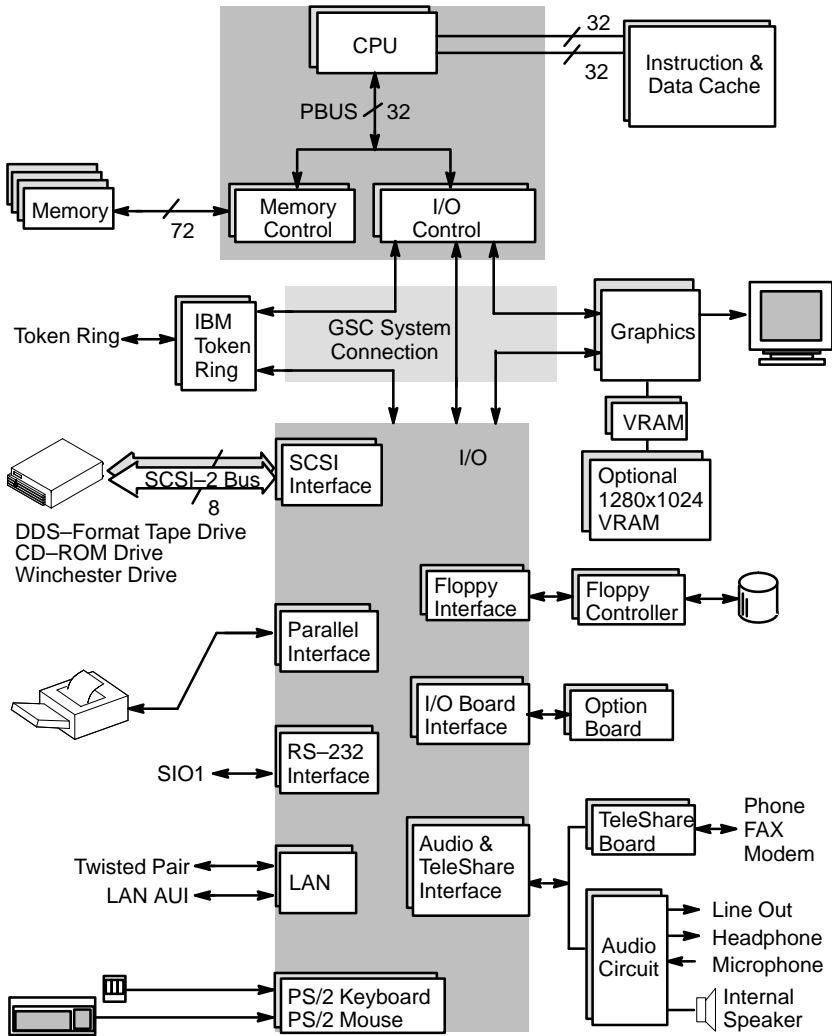


Figure 7-2. System Unit Functional Block Diagram



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**From book:sh\_a2615\_90617**

**Document:chap\_7**

**Last saved on:Wed, May 31, 1995 09:48:34**

# Reference

# 8

This chapter provides part numbers and titles to reference documents.

## Installation Manual

A2615–90600 *Hardware Installation Guide Model 712*

## Service Manuals

09740–90041 *Precision Architecture RISC: HP Apollo 9000 Series 700  
Diagnostic Manual*

B2355–90040 *System Administration Tasks Manual HP Apollo 9000 Series 700*

5960–1511 *Servicing Hewlett–Packard Workstation Monitors*

## Reference Manuals

A2615–90616 *Model 712 Owner's Guide*

A2615–90607 *A2809A/A2813A Disk Drive Installation Guide*

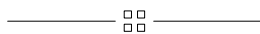
A2615–90606 *A2814A Floppy Disk Drive Installation Guide*

C2963–90001 *Installing the C2963A 1GB. and C2964A 2 GB  
SCSI Disk Drives.*

C2954–90001 *Installing the A2954A DDS–Format Tape Drive*

A2943–90004 *Installing the A2943A SCSI Disk Drive*

A2615–90608 *Installing the HP A4012A TeleShare Communications Board in  
Your Model 712 Workstation (Domestic Kit)*



**For:root**

**Printed on:Wed, Sep 4, 1996 13:52:53**

**From book:sh\_a2615\_90617**

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**Printed on:Wed, Sep 4, 1996 13:53:01**

**From book:sh\_a2615\_90617**

**Document:index-Real**

**Last saved on:Thu, May 25, 1995 09:40:21**

# Index

## A

Audio connectors  
  headphone OUT, 1-7-1-16  
  microphone IN, 1-7-1-16

## B

Battery, removal and replacement, system unit, 5-22  
Block diagram of system, 6-4  
Boot administration mode, 9-2  
Boot console user interface  
  accessing, 9-1  
  **auto** command, 9-2  
  **autoselect** command, 9-2  
  boot administration mode, 9-2  
  **boot** command, 9-2  
  **chassis** command, 9-2  
  **date** command, 9-2  
  **diagnostic** command, 9-2  
  **fastboot** command, 9-2  
  **help** command, 9-2  
  **information** command, 9-2  
  **lanaddress** command, 9-2  
  **path** command, 9-2  
  **pim** command, 9-2  
  **reset** command, 9-3  
  **search** command, 9-3  
  **secure** command, 9-3  
Boot failure, 4-10-4-16

## C

CD-ROM drive, removal and replacement, external storage unit, 5-45  
Configurations  
  FRU, 3-1-3-12  
  mass storage, 3-1-3-18

memory, 3-14-3-18  
workstation, 3-1-3-12

## Connectors

monitor, 1-8-1-16  
system unit  
  ac power, 1-5  
  audio headphone OUT, 1-7-1-16  
  audio microphone IN, 1-7-1-16  
  expansion board, 1-7  
  keyboard, 1-7  
  monitor, 1-6  
  mouse, 1-7  
  network, 1-6  
  parallel I/O, 1-7  
  PS2, 1-7  
  rear panel, 1-4  
  RS-232, 1-6  
  SCSI, 1-6  
  serial, 1-6  
  TeleShare, 1-7

## Controls

monitor, 1-8-1-16  
system unit  
  floppy eject button, 1-4  
  front panel, 1-3  
  power switch, 1-4

CPU board, removal and replacement, system unit, 5-23

**cstm** command, 4-14

## D

DDS tape drive, removal and replacement, external storage unit, 5-41

Description of product. *See* product description

Diagnostics, ODE, 4-16

Diagrams

- power distribution, 6-1
- system unit functions, 6-4

Documentation

- installation manual, 7-1
- reference manuals, 7-1
- service manuals, 7-1

## **E**

Environmental specifications,  
2-1

Exchange part numbers, 5-1

**exit** command, SupportWave,  
4-15

Expansion board connectors,  
1-7

External storage unit FRUs

- CD-ROM drive, 5-11-5-13
- DDS tape drive, 5-9-5-11
- hard disk drive, 5-7-5-9

## **F**

Fan, removal and replacement,  
system unit, 5-31

Floppy disk, removal and re-  
placement, system unit,  
5-25

Flowchart

- LED Not Lit, 4-2
- troubleshooting, 4-3

FRU configurations, 3-1-3-12

FRUs

- external storage unit

  - CD-ROM drive,  
5-11-5-13
  - DDS tape drive, 5-9-5-11
  - hard disk drive, 5-7-5-9

- removal and replacement
- external storage devices,  
5-36
- external storage units

  - CD-ROM drive, 5-45

- DDS tape drive, 5-41
- hard disk drive, 5-37
- system unit, 5-13
- battery, 5-22
- CPU board, 5-23
- fan, 5-31
- floppy disk, 5-25
- hard disk, 5-26
- I/O expansion boards,  
5-21
- LED cable assembly,  
5-35
- memory board, 5-16,  
5-18
- power supply, 5-32
- power supply button,  
5-34
- power supply cover,  
5-29
- speaker, 5-28
- stand, 5-14
- TeleShare board, 5-20
- top cover, 5-15
- VRAM, 5-19
- required tools, 5-1
- system unit, 5-2-5-4

Functional diagram of system,  
6-4

## **G**

Graphics, high resolution, 3-15

## **H**

Hard disk, removal and replace-  
ment, system unit, 5-26

Hard disk drive, removal and  
replacement, external stor-  
age unit, 5-37

HPMC error, 4-4

- data cache parity error, 4-9
- multi-bit memory parity er-  
ror, 4-5



## I

- I/O expansion boards, removal and replacement, system unit, 5-21
- ID, jumpers, floppy drive, 3-13
- Indicators
  - LEDs, system unit, 1-3, 1-4
  - monitor, 1-8-1-16
- ISL diagnostics, **ode** command, 9-5
- ISL environment, 9-3-9-6
  - altpath** command, 9-5
  - conspath** command, 9-5
  - display** command, 9-5
  - help** command, 9-5
  - listautofl** command, 9-5
  - lsautofl** command, 9-5
  - primpath** command, 9-5
  - readss** command, 9-5
  - support** command, 9-5

## J

- Jumpers
  - ID, floppy drive, 3-13
  - SCSI ID
    - CD-ROM drive, 3-11
    - DDS-format tape drive, 3-12
    - Hewlett-Packard 1-GB drive, 3-5
    - Hewlett-Packard 1-GB low profile drive, 3-6
    - Micropolis 1-GB drive, 3-10
    - Quantum 1-GB and 2-GB low profile drive, 3-9
    - Quantum 120-MB drive, 3-2
    - Quantum 270-MB drive, 3-3
    - Quantum 525-MB drive, 3-4
    - Seagate 1-GB and 2-GB low profile drive, 3-8

- Seagate 525-MB and 1-GB drive, 3-7

## K

- Keyboard connector, 1-7
- Keyboard model numbers, 5-5
- Keyboards
  - key equivalents, 1-14-1-15
  - PC and ITF, 1-13

## L

- LED cable assembly, removal and replacement, system unit, 5-35
- LED-indicated conditions, 4-4
- LEDs, system unit, 1-3, 1-4

## M

- Manuals
  - installation, 7-1
  - reference, 7-1
  - service, 7-1
- Mass storage configurations, 3-1-3-18
- Memory board, removal and replacement, system unit, 5-16, 5-18
- Memory configuration, 3-14-3-18
- Model number, mouse, 5-5
- Model numbers, keyboard, 5-5
- Monitor
  - 12-inch color, 1-9
  - 15-inch color, 1-10
  - 17-inch color, 1-11
  - 19-inch color, 1-12
  - connectors, 1-8-1-16
  - controls, 1-8-1-16
  - indicators, 1-8-1-16
  - part numbers, 5-5
- Monitor connector, system unit, 1-6

Monitor-type selection, 3-15  
  at power on, 3-17  
  from boot administration  
  mode, 3-16  
Mouse connector, 1-7  
Mouse model number, 5-5

## N

Network connectors, 1-6  
Nonexchange part numbers,  
  5-1

## O

ODE, 9-5-9-6  
  running diagnostics, 4-16  
  test modules  
    lasdiag, 4-16  
    ldiag, 4-16  
    mapper, 4-16  
    memtest, 4-16  
    updater, 4-16  
  updating system firmware, 9-5  
**ode** command, 4-16  
  ISL diagnostics, 9-5  
Online help, **estm** command,  
  4-14

## P

Parallel I/O connector, 1-7  
Part numbers  
  exchange and nonexchange,  
  5-1  
  monitors, 5-5  
  system unit FRUs, 5-3-5-5  
Power connector, 1-5  
Power distribution diagram,  
  6-1  
Power supply, removal and re-  
  placement, system unit,  
  5-32

Power supply button, removal  
  and replacement, system  
  unit, 5-34  
Power supply cover, removal  
  and replacement, system  
  unit, 5-29  
Power supply pinouts  
  CPU, 6-2  
  fan, 6-3  
  floppy disk drive, 6-2  
  hard disk drive, 6-3  
  LED, 6-3  
Product description, 1-1-1-3  
PS2 connectors, 1-7

## R

Reference manuals, 2-2, 7-1  
Regulatory requirements, 2-2  
Removal and replacement, ex-  
  ternal storage devices,  
  5-36  
RS-232  
  connector, 1-6  
  pinout, 1-6

## S

SCSI connector, 1-6  
SCSI devices  
  default SCSI IDs, 3-1  
  terminators, 3-1  
SCSI IDs, jumpers  
  CD-ROM drive, 3-11  
  DDS-format tape drive,  
  3-12  
  Hewlett-Packard 1-GB  
  drive, 3-5  
  Hewlett-Packard 1-GB low  
  profile drive, 3-6  
  Micropolis 1-GB drive,  
  3-10  
  Quantum 1-GB and 2-GB  
  low profile drive, 3-9  
  Quantum 120-MB drive,  
  3-2

- Quantum 270-MB drive, 3-3
- Quantum 525-MB drive, 3-4
- Seagate 1-GB and 2-GB low profile drive, 3-8
- Seagate 525-MB and 1-GB drive, 3-7
- Self test, 4-12
- Serial connector, 1-6
- Serial connector pinout, 1-6
- Service notes, 8-1
- Speaker, removal and replacement, system unit, 5-28
- Specifications, environmental, 2-1
- Stable storage, 9-3
- Stand, removal and replacement, system unit, 5-14
- SupportWave, 4-14
- Switches
  - floppy eject button, 1-4
  - power, 1-4
- System unit
  - FRUs
    - part numbers, 5-3-5-5
    - removal and replacement, 5-13-5-36
  - functional block diagram, 6-4
  - illustrated parts breakdown, 5-2
  - installation information, 2-2
  - preventive maintenance, 2-3
- System verification, commands
  - cstm, 4-14

- exit, 4-15
- verify, 4-15

## T

- TeleShare board, removal and replacement, system unit, 5-20
- TeleShare connectors, 1-7
- Terminators, 3-1
- Tools required for service, 5-1
- Top cover, removal and replacement, system unit, 5-15
- Troubleshooting, 4-1
  - boot failure, 4-10-4-16
  - HPMC error, 4-4-4-16
  - ISL environment, 9-3-9-6
  - ODE, 9-5-9-6
  - self test, 4-12
  - system verification tests, SupportWave, 4-14

## V

- verify** command, 4-15
- VRAM, removal and replacement, system unit, 5-19

## W

- Workstation configurations, 3-1-3-12