HP NetServer Product Line
Service Reference Guide

Volume 2
Mid-Range

Version 2

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Audience Assumptions

The guide is for HP authorized service personnel who install, administer, and troubleshoot HP NetServers. The Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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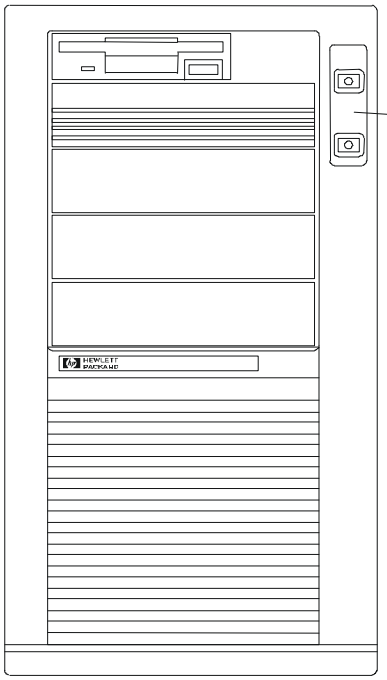
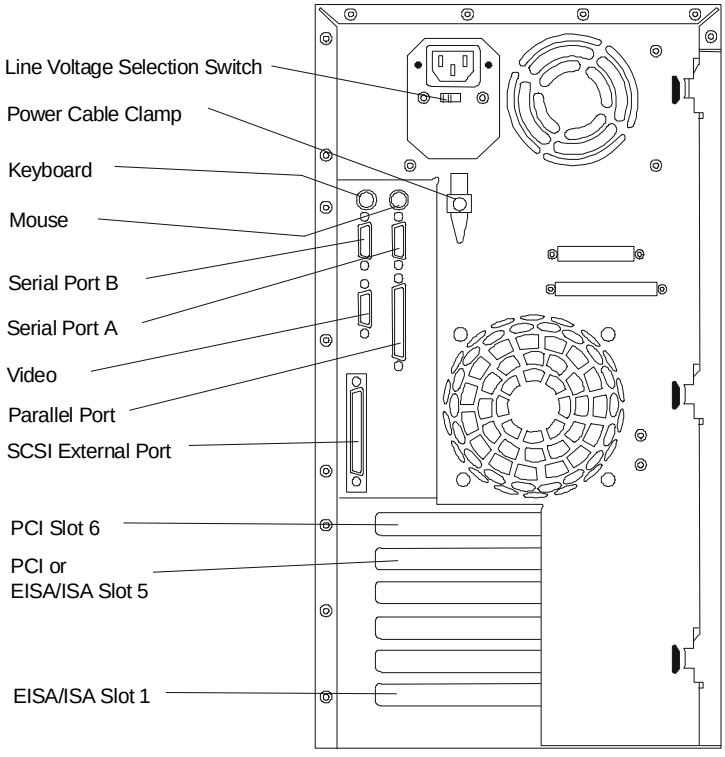
HP NetServer LC

System Views





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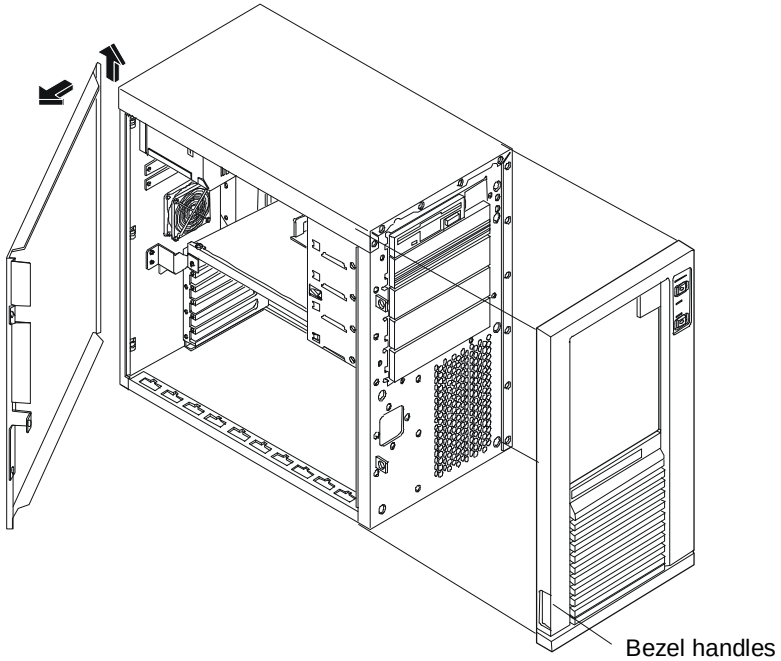
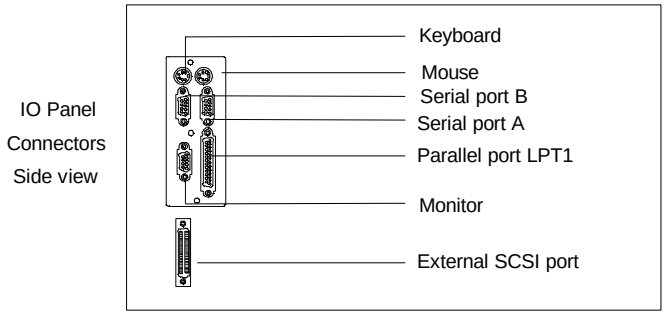
Front Bezel and Cover



System Board



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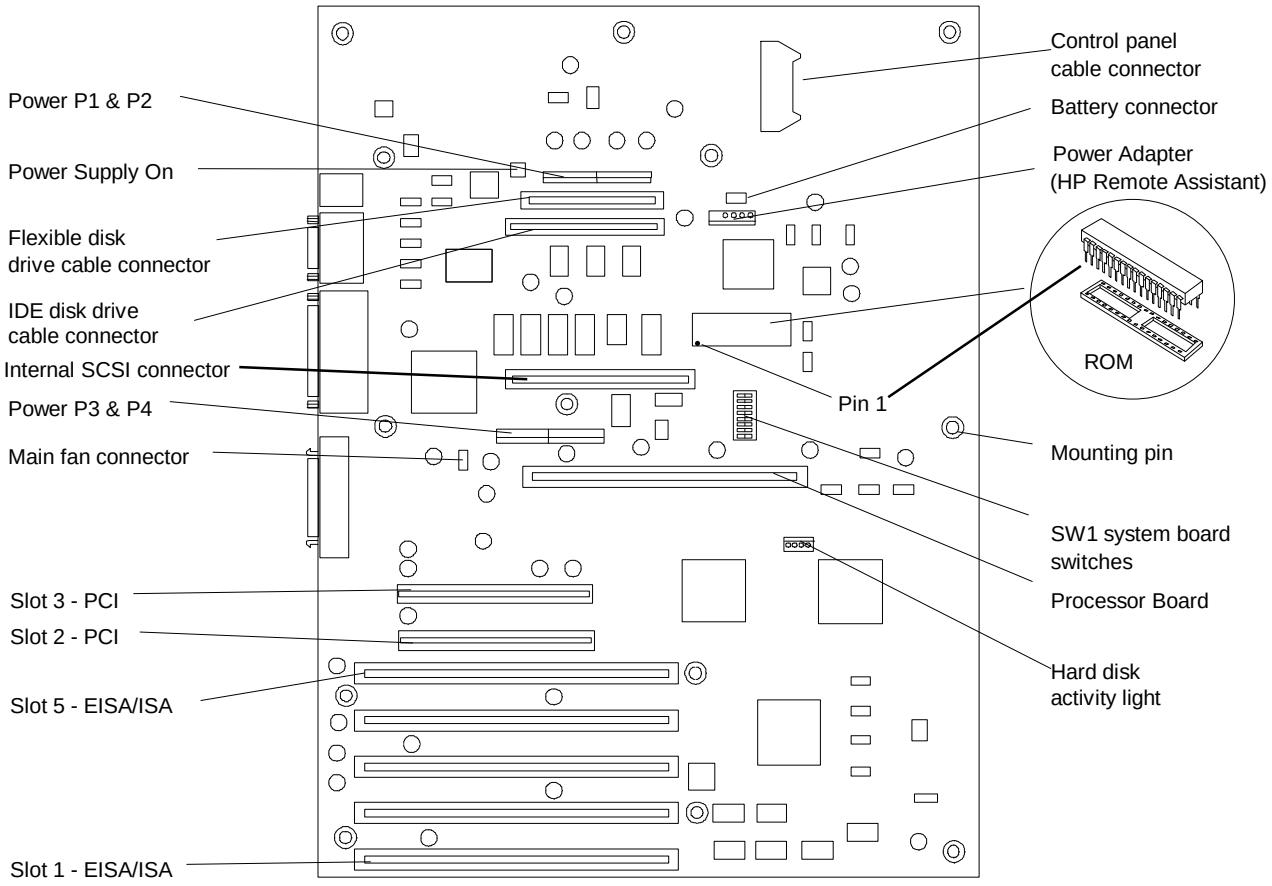

System Board

System Board Connectors, Switches, and Jumpers

The table below explains the system board markings for all connectors.

Connector	Number	Connector	Number
IDE disk drive cable	J9	Flexible disk drive	J6
Keyboard (bottom)	J4	Mouse (top)	J4
Video	J10	Parallel	J10
Serial	J8	SCSI port A	J11
SCSI port B	J13	EISA/ISA slots	J19, J20, J21, J22, J24
PCI slots	J17, J18	Fan	J14
Power supply	J2 (P1, P2) J12 (P3, P4)	Remote power supply	J7
Battery	J5	Front panel	J1
Processor board slot	J15	ROM	U23
Power supply on	J3	Hard disk activity light	J16
Extra fan (not used)	J23	Not used	J23

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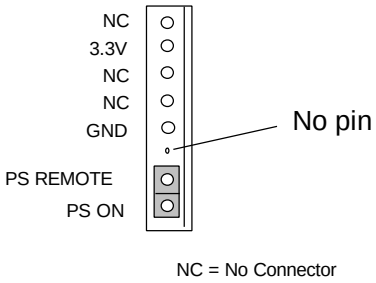
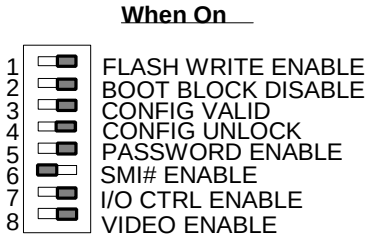
System Board Connector J7

This connector is used by the HP Remote Assistant Accessory -- a 32-bit EISA Bus Master board used to remotely monitor server functionality. For additional information on this product, see the documentation that comes with it. When you install the HP Remote Assistant cable, you will need to remove the jumper on PS REMOTE and PS ON. If you remove HP Remote Assistant from the server, remember to re-install the jumper.

WARNING If the HP Remote Assistant is not installed and there is no jumper on PS REMOTE and PS ON, the system will NOT power up.



SW1 Switch and Default Settings



Switch	Function	Default
1	**FLASH WRITE ENABLE:** Enables or disables one of the two levels of flash ROM write protection (the other level of protection is controlled by the HP Update Utility). ON: The BIOS can be updated by the HP Update Utility. OFF: The BIOS is locked and cannot be updated.	ON
2	**BOOT BLOCK DISABLE:** Reserved. Must be set to ON for system to operate properly.	ON
3	**CONFIG VALID**: Saves or erases the current configuration information in NVRAM and CMOS. **ON:** Saves the current configuration. **OFF:** Erases the current system configuration.	ON
4	**CONFIG UNLOCK**: Prevents or allows the current system configuration maintained in NVRAM and CMOS to be changed. **ON**: Unlocked. Allows the current system configuration to be changed. **OFF**: Locked. Prevents the current system configuration from being changed.	ON

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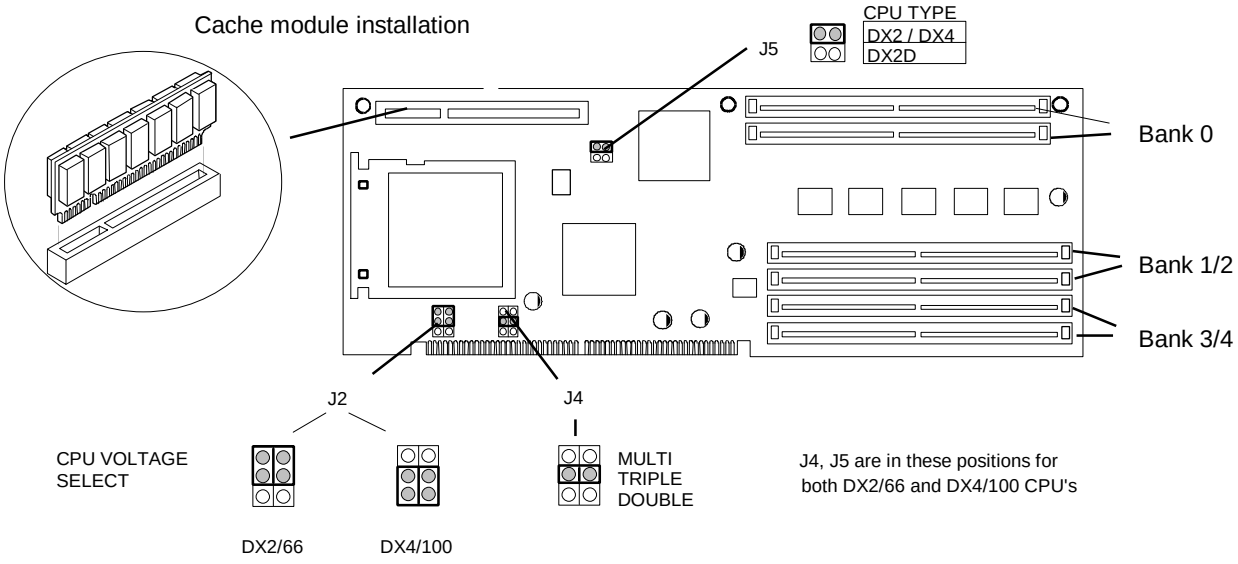
5	**PASSWORD ENABLE**: Enables or erases the power-on password maintained in NVRAM. **ON**: Power-on password functional. **OFF**: Erases the current power-on password.	ON
6	**SMI# ENABLE: Not used - leave in default position** **OFF:** Prevents SMI interrupt.	OFF
7	**IO CTRL ENABLE**: Enables or disables onboard flexible disk drive controller, IDE controller, and serial and parallel ports. **ON**: I/O controller enabled. **OFF**: I/O controller disabled.	ON
8	**VIDEO ENABLE:** Enables or disables built-in video. Disable the built-in video only if you have a separate video board installed in the server. **ON**: Enables built-in video. **OFF**: Disables built-in video.	ON

Processor Boards

Intel 486 Processor Board with Optional 256 KB Cache



Pentium™ Processor Board

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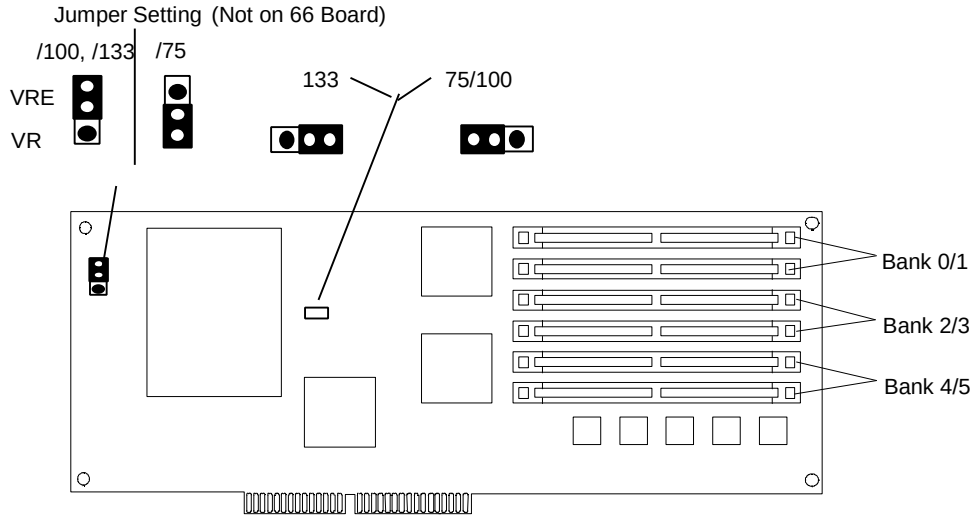
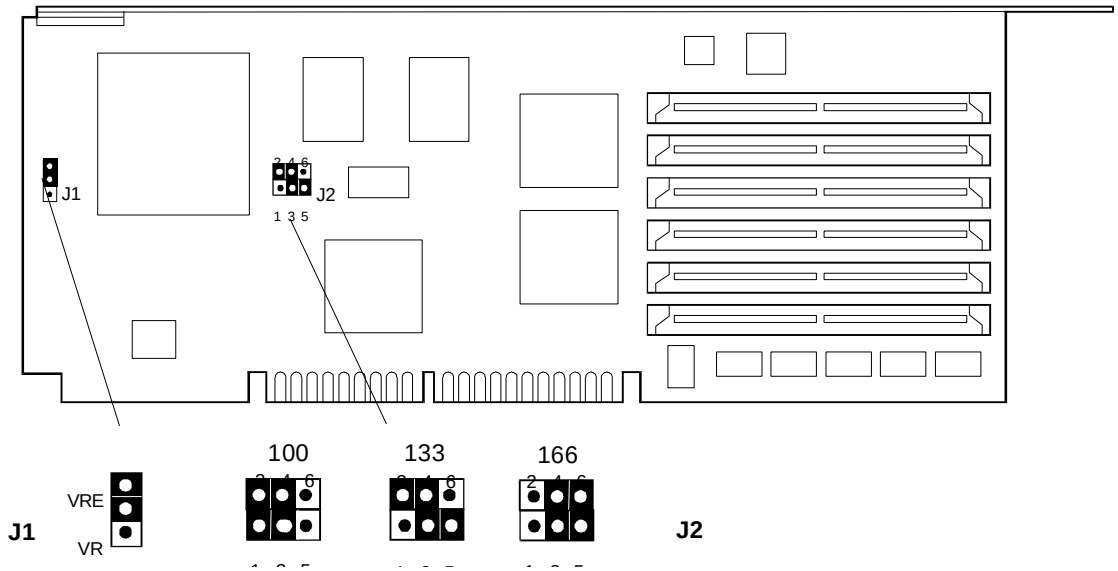


5/100, 5/133, 5/166 Pentium™ Processor Board

Before installing this board, verify that jumper setting J1 is set to VRE and jumper setting J2 is set to the correct speed for your chip as shown in the illustration below.



Memory

The Intel 486 processor board has 8 MB of single-density base memory installed. This memory is not customer removable and **can only be single-density**. There are two banks (four sockets) available for expansion memory that can be single or double density. The maximum memory supported is 136 MB (4 x 32 MB + 8 MB).

The Pentium 66/75 processor has 16 MB of removable base memory installed. The Pentium 100/133 processor has 32 MB of removable base memory installed. There are two more banks (four sockets) available for expansion. The maximum memory supported is 192 MB (6 x 32 MB).

There are some basic rules to remember when installing SIMMs on the processor board.

- The server supports 4 MB and 8 MB (must be 70 ns) and 16 MB and 32 MB (must be 60 or 70 ns) SIMMs.

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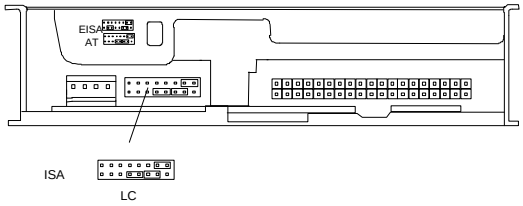
- You must install SIMMs in pairs (called banks) of matching size; however, the banks can be of different sizes.
- To achieve large memory configurations (greater than 144 MB) with the Pentium processor, you must remove and replace the SIMMs that are already installed in the server.
- If you obtain SIMMs from other sources, for 16 MB and 32 MB SIMMs, the speed must be 60 or 70 ns.

Video Memory - DRAM

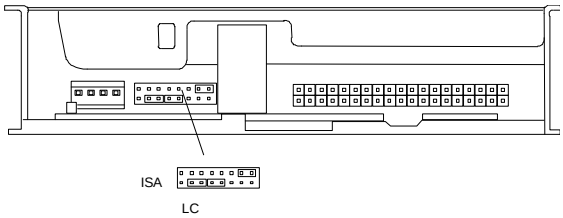
No additional video memory can be installed in the HP NetServer LC. Current video memory is 512 KB.

Flexible Disk Drive Guidelines

If you need to replace the flexible disk drive with the replacement part noted in the parts list, make sure that the jumpers on the back of the drive are set as following:



Replacement Flexible Disk Drive



Original Installed LC Flexible Disk Drive

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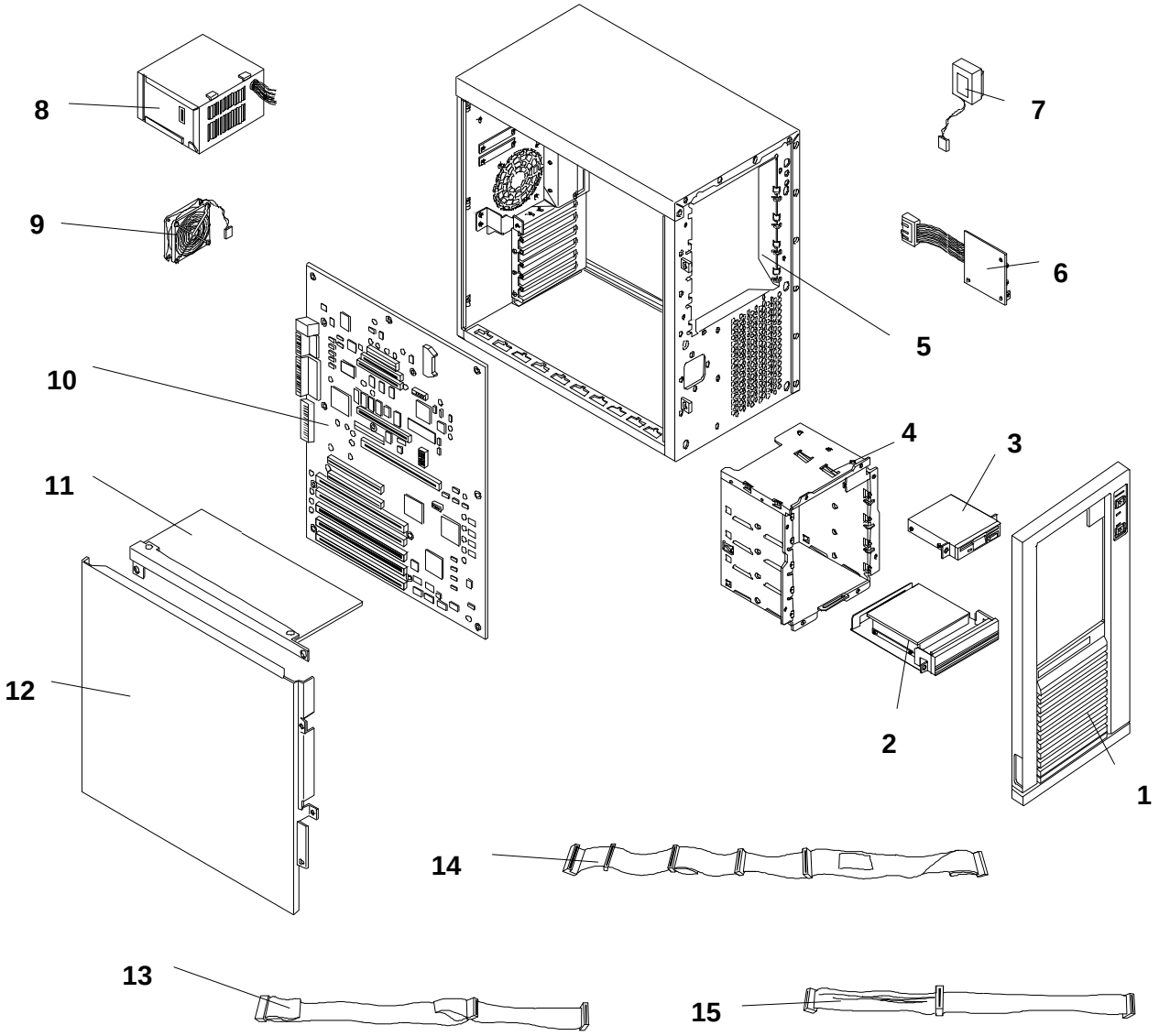
Exploded View



Parts List

Fig	Description	Replacement	Exchange
1	Front bezel	5063-5617	
2a	535 MB SCSI HDD	D2075-60003	D2075-69001
	540 MB SCSI HDD	D2386-63001	D2386-69001
2b	1 GB SCSI HDD	D2076-63102	D2076-69002
2c	2.1 GB HDD	D2077-63100	D2077-69001
3	1.44 MB 3.5" Flexible disk drive	D2035-63004	
4	Mass storage cage	5063-0397	

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Fig	Description	Replacement	Exchange
5	Chassis with door, fan, mass storage cage	5064-0744	
6	Control Panel PCA	5063-5607	
7	Battery (4.5 volt alkaline)	1420-0502	
8	Power supply (200w)	5063-5689	
9	Fan	3160-0860	
10a	System Board -- no ROM	D3310-63006	D3310-69006
10b	System ROM 486	D3310-80201	
10c	System ROM P/66	D3314-80201	
10d	System ROM P5/75, 100, 133 ROM	D3594-80205	
11a	CPU Board Pentium 486/66 board -- no processor, SIMMs, cache	D3310-63002	
	CPU Board Pentium 486/100 board -- no processor, SIMMs, cache	D3312-63001	
11b	256 KB asynch write-back cache	0960-0899	
11c	CPU Board NS LC P5 -- no processor or SIMMs	D3314-63002	
11d	CPU Board Pentium 75 *	D3353-63001	D3353-69001
11e	CPU Board Pentium 100/133 *	D4959-63001	D3356-69001
11f	CPU Board Pentium 166 *	D4859-63001	D4859-69001
11g	CPU 486SL/66 with heat sink	5062-1360	
11h	CPU P/66	1821-1734	
11I	486SL/100 with heat sink	5063-5640	
11j	CPU P/75	1821-2293	
11k	CPU P/100	1821-2294	
11l	CPU P/133	1821-2295	
11m	CPU P/166	1821-2604	
11n	486 LC/LH Heat Sink	1205-0826	
11o	P5 Heat Sink	1205-0832	
12	Door Assembly	5063-5609	
13	Internal IDE-HDD Cable	5182-0080	
14	Internal SCSI Cable	5182-0081	
15	Internal Floppy Cable	5182-0079	
*	Internal SCSI cable terminator	0960-0888	
*	4 MB SIMM 70ns	D2974-63001	
*	8 MB SIMM 70ns	D3577-63001	D3577-69001
*	16 MB SIMM 70ns	D2297-63001	D2297-69001
*	32 MB SIMM 70ns	D2298-63001	D2298-69001
*	CD-ROM Drive	5064-1920	
*	3.5" drives 3-pack Hard Disk Tray	HP D2198A	
*	5.25" drives 3-pack Removable Media Trays	HP D2199A	
*	DeskDirect Combo NIC	J2970-61001	

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Fig	Description	Replacement	Exchange
*	DeskDirect NIC	J2973-61001	
*	HP Navigator CD-ROM	D3600A **	
*	NS Server Saver Test Disk	5010-8878	
*	Diagnostic Assistant Diskette	5063-8343 **	

* This part is not on an exploded view.

* * This part number is constantly revised. When you order the CD-ROM, you will be sent the latest revision.

Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Danish	C1405-60316
Arab/French	C1405-60325	Fr-Canada	C1405-60302
Portuguese	C1405-60327	German	C1405-60303
Cyrillic	C1405-60330	Spanish	C1405-60304
Japan/Kanji	C3755-60224	French	C1405-60305
Italian	C1405-60317	Norway	C1405-60309
Arab/English	C1405-60320	Swiss	C1405-60311
Korea/Hangu	C1405-60321	Swedish	C1405-60312
Taiwan	C1405-60323	UK	C1405-60313

Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

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Specifications

Power Supply	100 to 127 VAC ~ 6.0 A or 200 to 240 Volts AC ~ 3.14 A at 50 to 60 Hertz
Power Availability	224 watts peak, 200 watts continuous
Power Consumption	301/351 watts peak with 110-volt line maximum voltage 291/337 watts peak with 220-volt line maximum voltage
System Dimensions	16.7 in. high x 9.3 in. wide x 17.6 in. deep 42.4 cm high x 23.6 cm wide x 44.7 cm deep
System Weight	Weight: 40 pounds Model 1* (18.1 Kg)
Operating Altitude	10,000 feet (3048 meters)
Operating Temperature	+5 degrees to +40 degrees C (+41 degrees to +104 degrees F) 486 system +5 degrees to +35 degrees C (+41 degrees to +95 degrees F) Pentium system
Operating Humidity	20 % to 80% relative humidity
BTU's	764.3 BTUs/hour maximum peak
Acoustic	Sound level (LpA): <58 dB(A)

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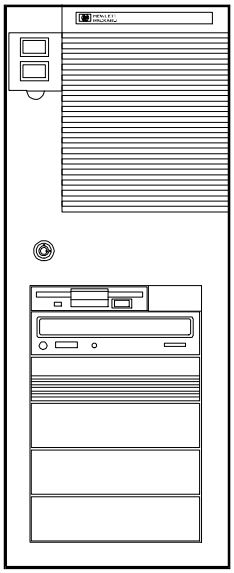
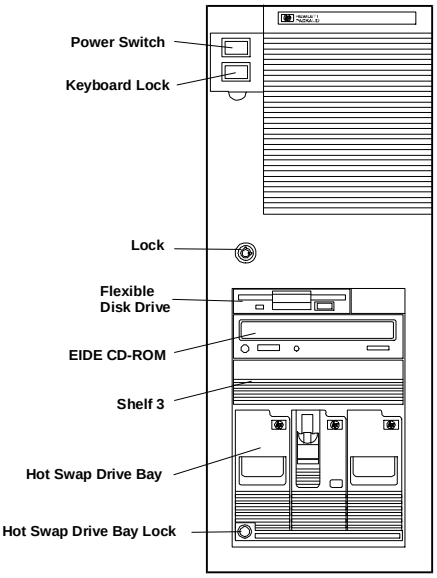
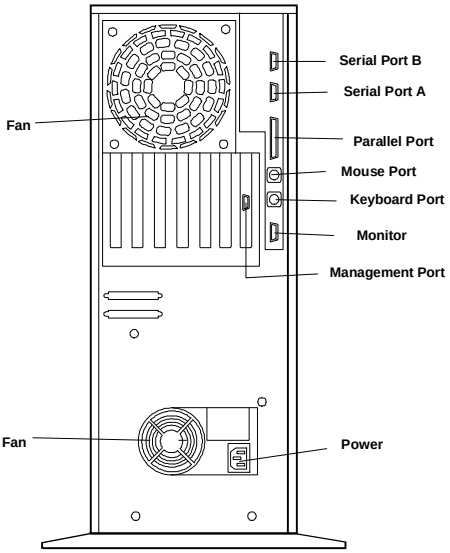
HP NetServer LC 3

System Views

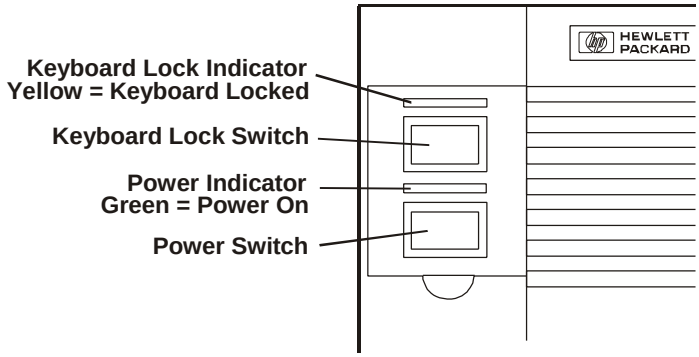






Front Control Panel

Power Switch	Turns the NetServer on and off. Note that when the NetServer is turned off, the power to the internal circuitry and mass storage devices is disabled; however, AC power is still applied to the power supply. **Always disconnect the power cord before removing the cover.**
Power Indicator	Lights green when the NetServer is on.
Keyboard Lock Switch	Prevents unauthorized use of the keyboard. Press the keyboard lock button to lock the keyboard. Enter the password to unlock the keyboard.
Keyboard Lock Indicator	Lights yellow when the keyboard is locked.



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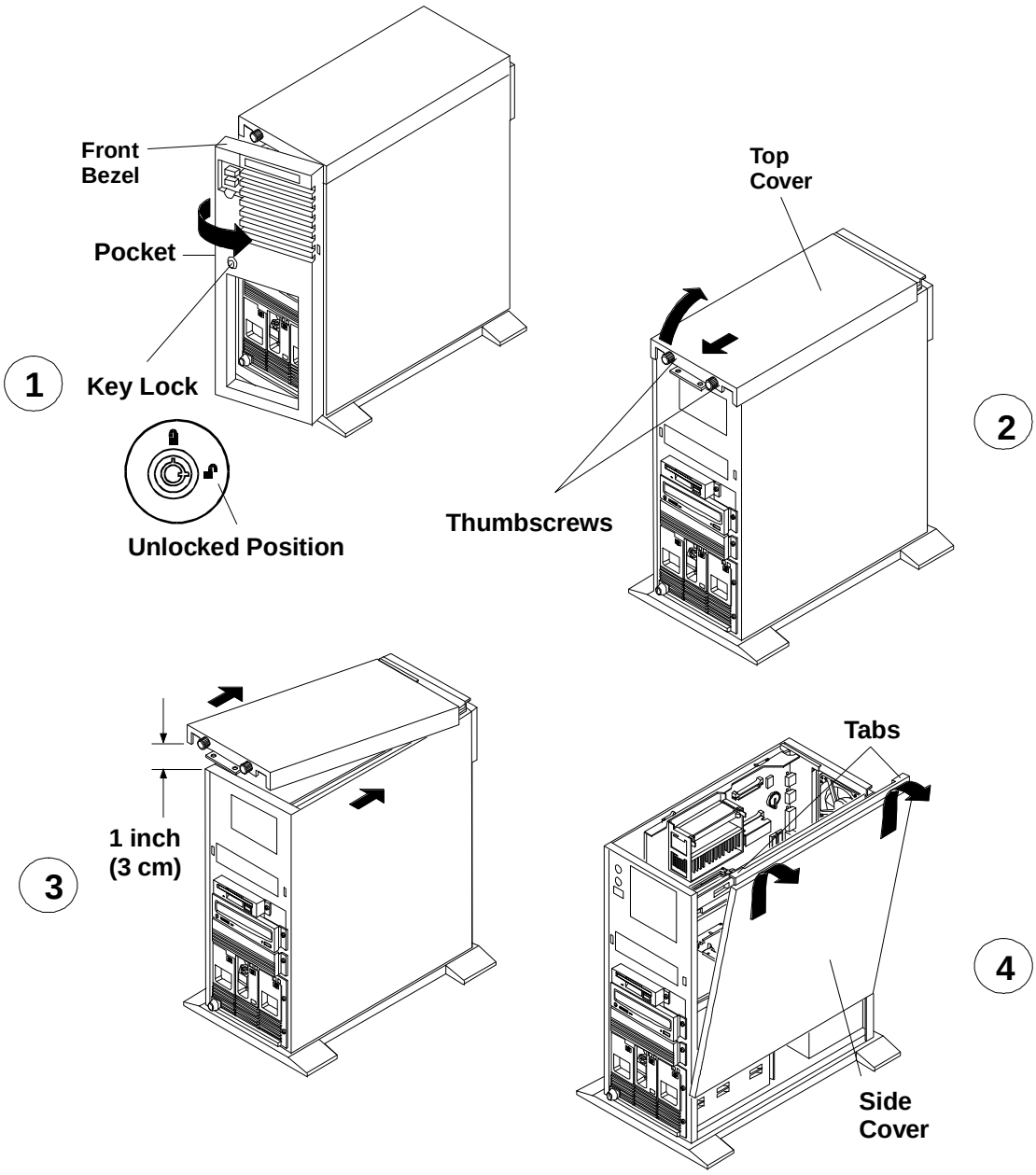
Covers

CAUTION	The covers are an integral part of the server. The server must be operated with the covers in place to ensure proper airflow for continued reliability and to maintain compliance with radio frequency interference and safety standards.



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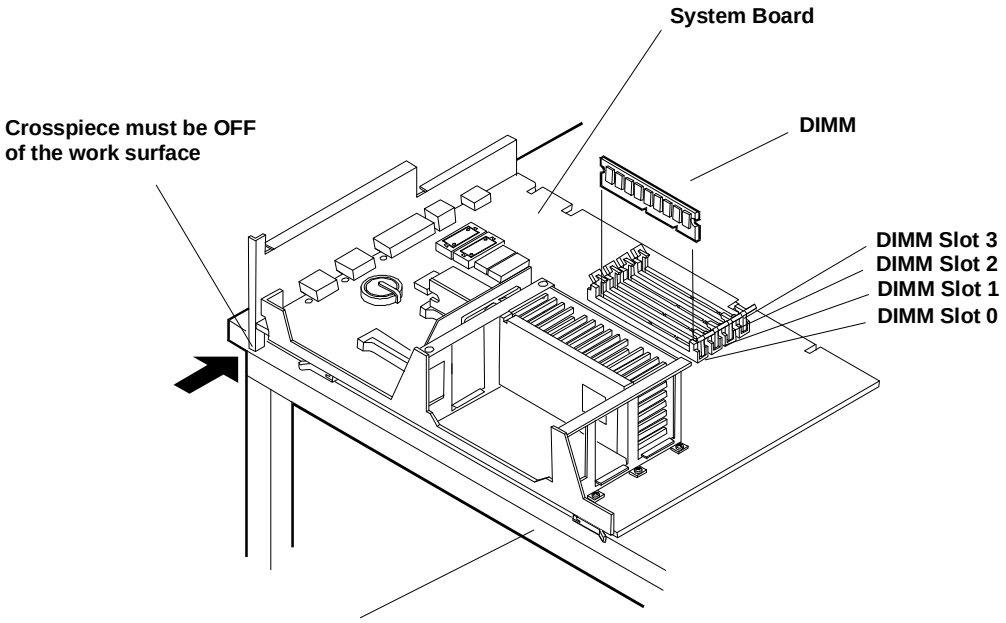
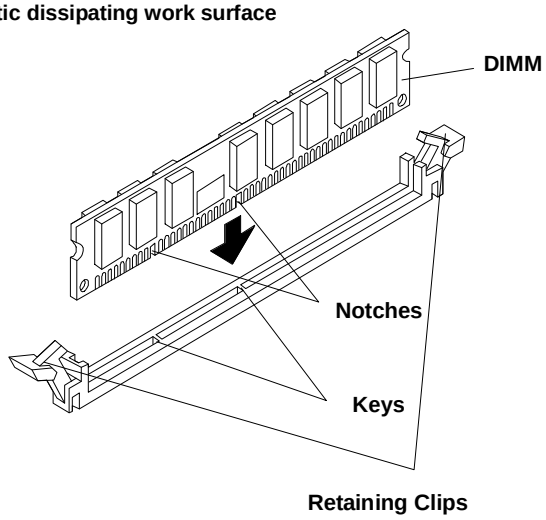
Memory

There are four DIMM sockets on the system board for memory expansion Follow these simple rules when you plan to install additional memory DIMMs:

- Use only HP DIMMs listed on the Technical Reference Label located inside the HP NetServer top cover, in Information Assistant, or in Order Assistant.
- DIMMs can be 32 MB, 64 MB, or 128 MB in any combination.
- DIMMs can be installed in any order in any of the four DIMM sockets.





CAUTION	Only install DIMMs on a system board that is lying flat on a static-dissipating work surface. Do not rock the DIMM into place, but apply firm and even pressure directly downward.

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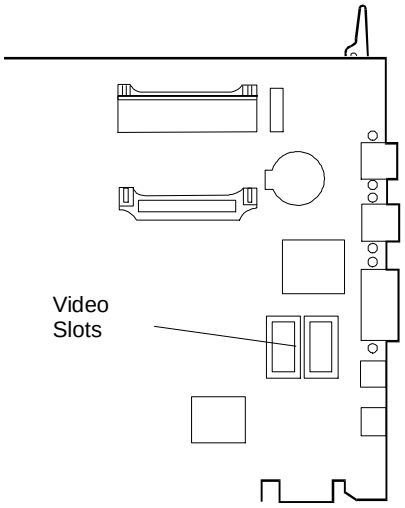
Video Memory

Expand video memory by installing two 256 K x 16 (512 KB), 70 Ns, 40-pin SOJ package DRAM ICs.

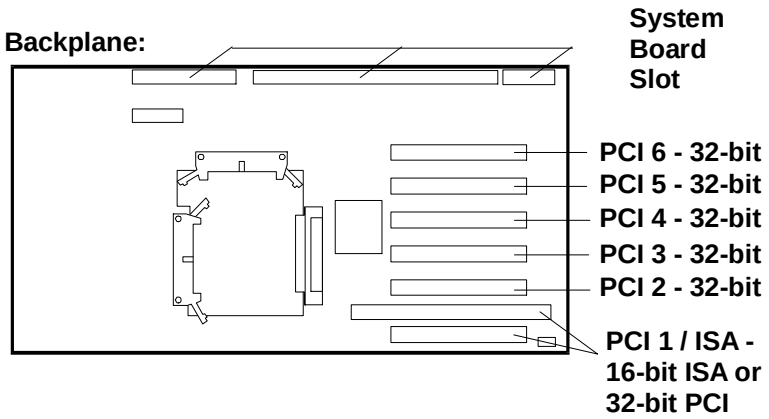
CAUTION	Install the chip in the correct orientation. Failure to do so will destroy the DRAM..



Boot Device Priority

The boot device priority is controlled by the Boot Device Ordering submenu of the Configuration menu of the Setup utility.

- IDE CD-ROM drive with bootable CD-ROM
- Flexible Disk with bootable flexible disk
- Embedded SCSI controller
- PCI boards in slots in the following order: 6, 5, 4, 3, 2, 1.
- **Hard Drive Priority:** Allows you to rearrange the order in which hard disk drives are searched for the operating system. All hard disk drives in the system are listed, as well as any bootable ISA board.



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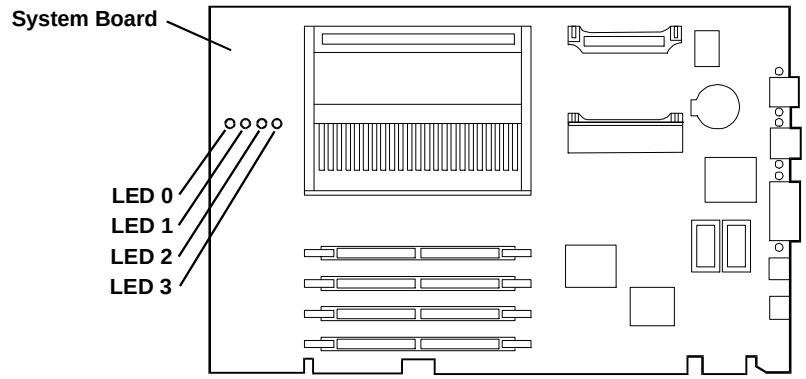
DIMM Slot LED Blink Codes



Processor Error Codes

Processor errors are indicated by blinking patterns of the DIMM slot LEDs that alternate at 1 Hz, as listed below:

Processor Error Status Indications						
✧ = LED off O = LED on LED 0	LED 1	LED 2	LED 3	Error Condition	Action
✧	O	O	O	Voltage Regulator Module for Primary CPU Bad	Check that primary voltage regulator module (VRM) is correctly seated. If problem persists, replace VRM.
O	✧	✧	✧		
O	✧	O	O	Voltage Regulator Module for Secondary CPU Bad	Check that secondary voltage regulator module (VRM) is correctly seated. If problem persists, replace VRM.
✧	O	✧	✧		
✧	O	O	✧	CPU Over Temperature	Check fan for function. Turn off system, wait 20-25 minutes for system to cool, and restart system.
O	✧	✧	O		
O	O	✧	✧	CPU or Terminator Board Not Installed	Install CPU in primary CPU slot and CPU or terminator board in secondary CPU slot.
✧	✧	O	O		

DIMM Status Error Codes

When no processor error condition exists, the DIMM slot LEDs display the status of the DIMMs in the corresponding slots, as follows:

- **OFF:** no DIMM installed
- **Flashes ON and OFF at 1 Hz in 50/50 proportion of time:** uncorrectable error or inappropriate DIMM
- **Flashes ON and OFF at 1 Hz in 90/10 proportion of time:** non-HP DIMM installed
- **ON:** HP DIMM installed

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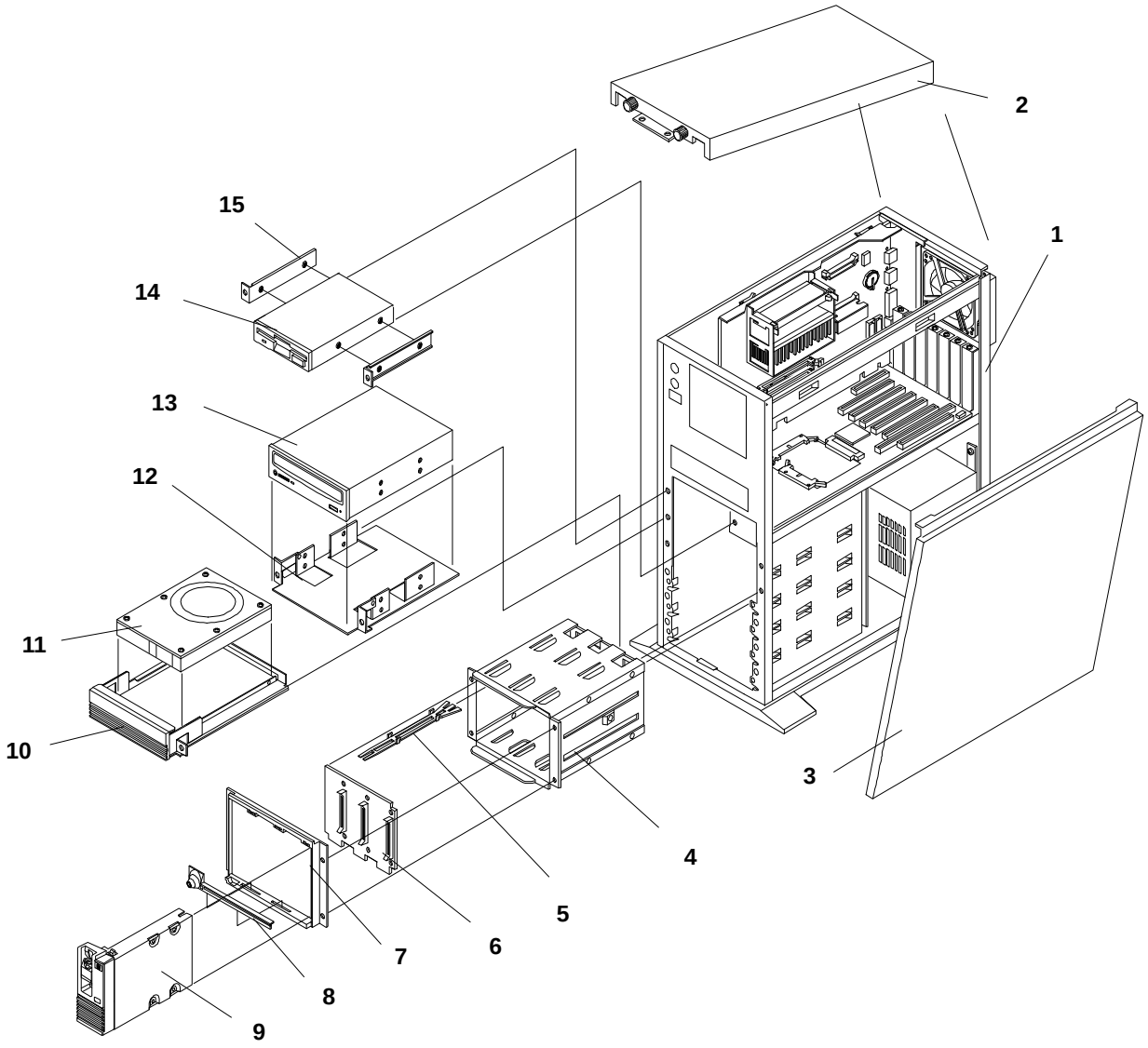
Exploded Views



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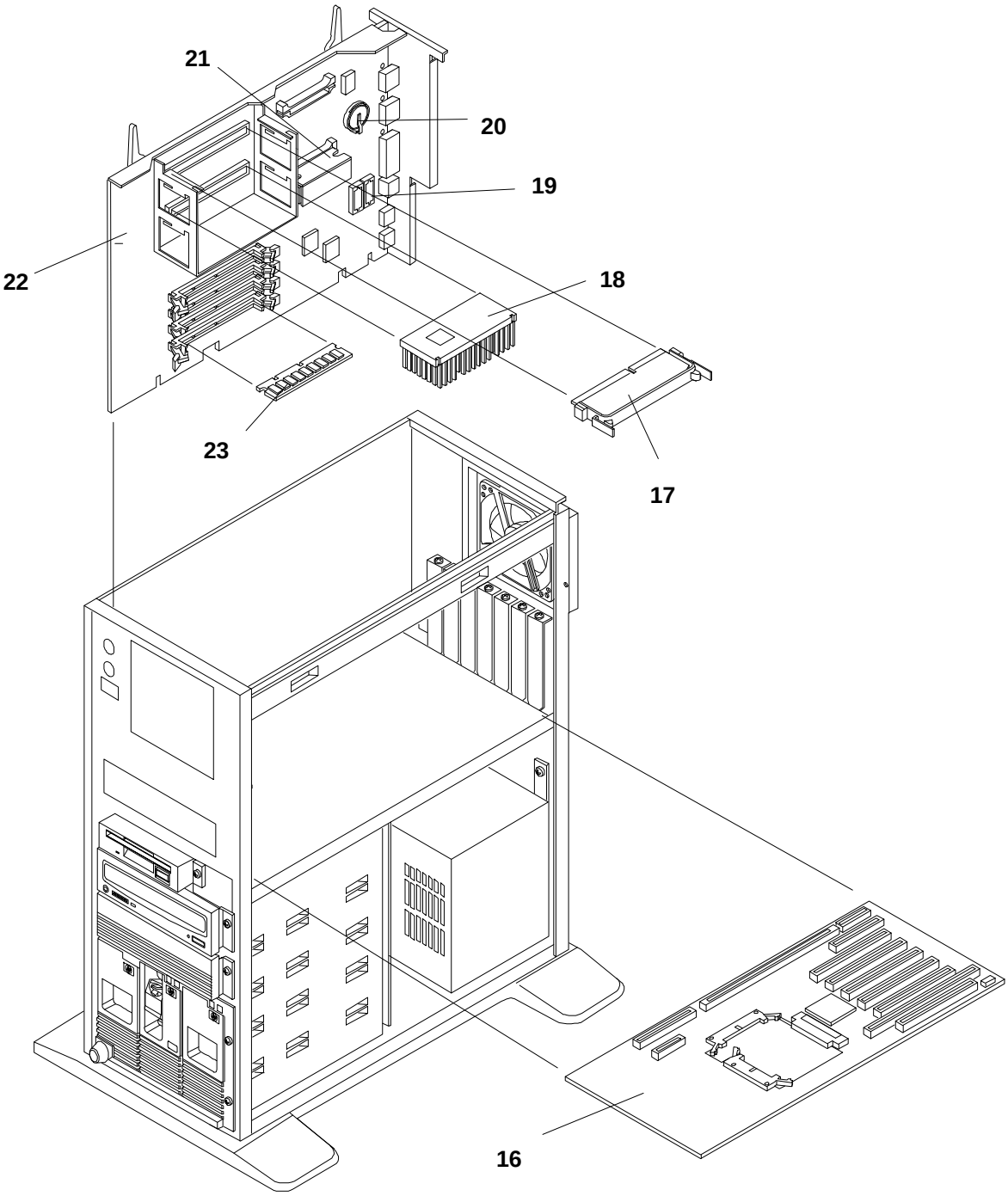

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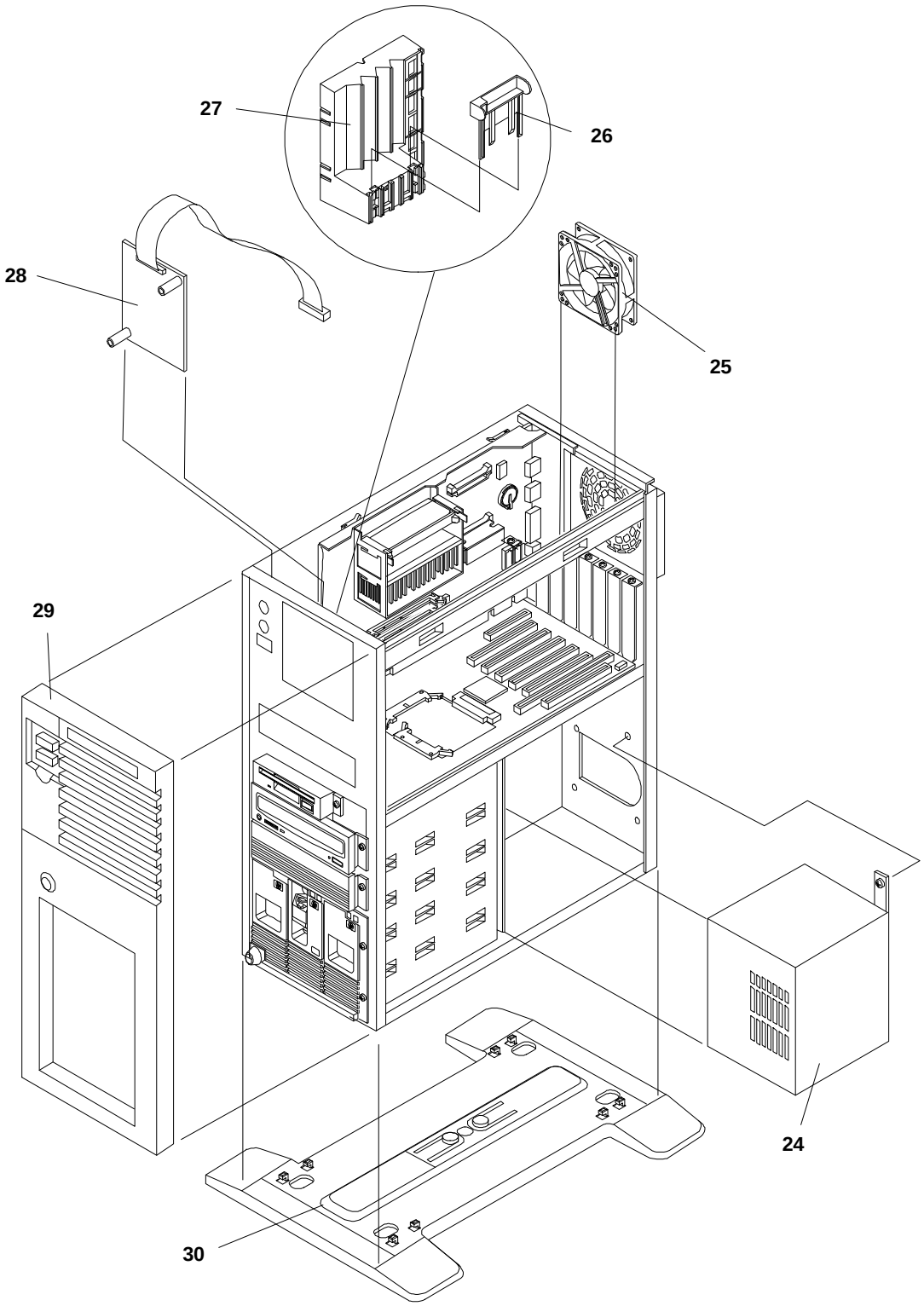

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Parts List

Fig	Description	Replacement	Exchange
1	Chassis Assembly	Not orderable	
2	Top Cover	5064-1987	
3	Side Cover	5064-1986	
4	Cage Assy, Hot-Swap Mass Storage	5063-5671	
5	Light Pipe	5041-1099	
6	Backplane PCA, Hot-Swap Cage	D3604-63003	
7	Hot Swap Cage Bezel	5042-2108	
8	Hot Swap Cage Bezel lock	5064-3503	
9	tray, Hot Swap,	D3349B	D3583-69004
10	5 1/4 inch tray, HDD	D2198B 3 pack	C2260-60078 Single
11a	4.2 GB SCSI HDD	D4910-63001	D4910-69001
11b	9.1 GB SCSI HDD	D4911-63001	D4911-69001
12	5 ¼", removable media	D2199A 3 pack	5002-3748 Single
13	CD-ROM Drive	D4383-60041	
14	1.44 MB 3.5" Floppy Disk Drive	D2035-60282	
15	3.5 inch rail kit	D2198B	
16	Backplane PCA	D4906-63002	D4906-69002
17	Terminator PCA, Processor Slot	5183-3418	
18a	Pentium II 350 Processor Chip	1821-4201	
18b	Pentium II 400 Processor Chip	1821-4202	
18c	Pentium II 450 Processor Chip	1821-4203	
*****	Heatsink	5183-2471	
*****	Heatsink clip	5183-2472	
19	Video Memory, 256Kx16, 50ns	1818-6527	
20	Battery 3 volts	1420-0356	
21	Voltage Regulator Module (VRM)	0950-2848	
22a	LC 3 System Board PCA	D6123-63000	D6123-69000
22b	Stiffener, System Board, w/extractors	5064-3501	
23a	Memory SDRAM, 64MB, ECC, 100MHZ	D6097-63000	D6097-69000
23b	Memory SDRAM, 128MB, ECC, 100MHZ	D6098-63000	D6098-69000
23c	Memory SDRAM, 256MB, ECC, 100MHZ	D6099-63000	D6099-69000
24	Power Supply	5064-1942	5064-1941
25	System Fan	5064-1954	
*****	Rivets, Plastic, for mounting fan	5042-2110	
26	Retainer for Adapter Board Guide	5042-2163	
27	Guide, Adapter Board	5042-2163	

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28	Control Panel PCA	5064-1979	
29	Front Bezel Assy.	5064-1961	
30	Pedestal	5041-5339	
*	Cable, Non-Hot-Swap SCSI (Wide)	5183-2182	
*	Cable, IDE CD-ROM Drive	5183-2411	
*	Cable, Floppy Disk Drive	5183-2410	
*	Cable, Hot-Swap SCSI (Wide)	5183-2484	
	Cable, Array SCSI (Wide)	5183-3488	
*	Cable, I^2C	5182-6730	
*	Cable, Serial Management	5064-1957	
*	Network Adapter PCA, 100BaseT	D5013-63002	
*	Filler Assy, Hot-Swap	5063-8391	
*	Upper Drive Filler Panel	5063-8389	
*	Hot Swap Cage key	5182-4534	
*	External Battery, 3.6V	1420-0559	
**	HP Navigator CD-ROM		
**	Diagnostic Assistant Diskette		

***** This part is not on the exploded view.

** This part number is constantly revised. When you order the CD-ROM, you will be sent the latest revision.

Keyboards

Language	Part Number	Language	Part Number
US	D4950-63001	Danish	D4950-63016
Arab/French	D4950-63025	Fr.Canadian	D4950-63002
Portuguese	D4950-63027	German	D4950-63003
Cyrillic	D4950-63030	Spanish	D4950-63004
Belgian/Flemish	D4950-63014	French	D4950-63005
Italian	D4950-63017	Norwegian	D4950-63009
Arab/English	D4950-63020	Swiss	D4950-63011
Korea/Hangu	D4950-63021	Swedish	D4950-63012
Taiwan	D4950-63023	UK	D4950-63013
Poland	D4950-63035	Czech	D4950-63036
Hungarian	D4950-63037	Greek	D4950-63032
Turkish	D4950-63035	Dutch	D4950-63006

Power Cords

Country	Part Number	Country	Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753

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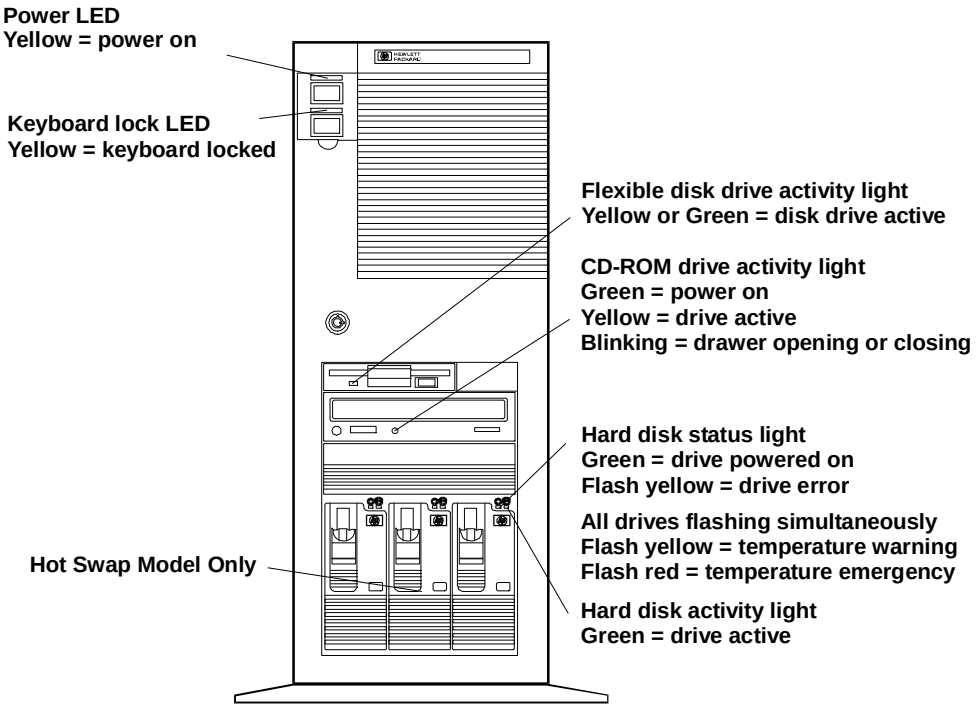
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

Mass Storage Cables

Cabling Label	Location	Description	Part Number
A	System backplane SCSI connector to upper-shelf SCSI devices	5-connector, wide (68-pin) SCSI cable w/built-in terminator	5183-2412
B	System backplane IDE connector to IDE devices (CD-ROM or other)	3-connector IDE cable	5183-2411
C	System backplane floppy connector-to-floppy disk drive	2-connector floppy disk cable	5183-2410
D	System backplane (or NetRAID controller) SCSI connector-to- hot-swap backplane	3-connector, wide (68-pin) SCSI cable	5183-2484
E	I^2C cable, system backplane to hot-swap backplane	2-connector I^2C (3-pin) cable	5182-6730
F	System backplane SCSI connector-to-upper shelf SCSI devices	2-connector, wide (68-pin) SCSI cable w/built-in terminator	Available with NetRAID controller only
G	For connecting any 68-pin SCSI cable to 50-pin device	SCSI wide (68-pin)-to-narrow (50-pin) adapter	5183-4550

Hot-Swap Hard Disk Drive LED Status and Activity Indicators



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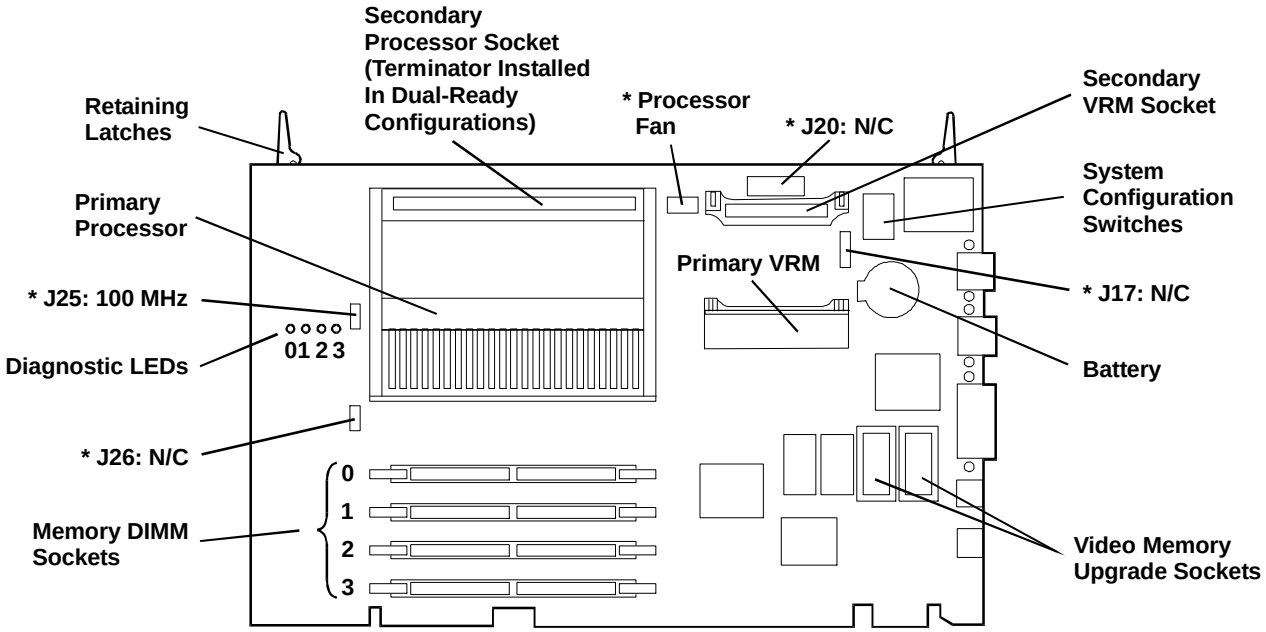
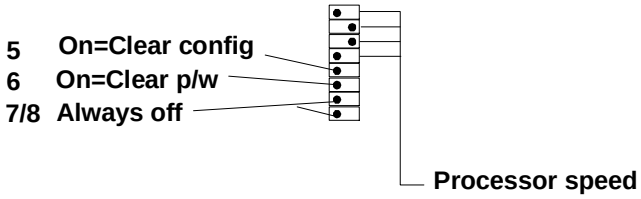
System Board



*** Cable connectors labeled with function.**
Configuration jumpers labeled with default setting.
N/C = no jumper header or cable installed.

CAUTION:	**Jumper settings other than those displayed here may result in unreliable performance or component damage.**

System Switches



		100 MHz Bus Speed			
Processor Speed		300	350	400	450
Switch	1	OFF	OFF	OFF	OFF
	2	OFF	OFF	ON	ON
	3	ON	ON	OFF	OFF
	4	OFF	ON	OFF	ON

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Specifications

Operating Temperature	5° to 35° C (41° to 95° F)
Non-operating Temperature	-40° to +70° C (-40° to +158° F)
Operating Humidity (noncondensing)	20% to 80% relative humidity
Non-operating Humidity (noncondensing)	90% relative humidity
Operating Altitude	3,045 m (10,000 ft)
Non-operating Altitude	12,180 m (40,000 ft)
Height	530 mm (21 in)
Width	217 mm (8.6 in)
Depth	580 mm (23 in)
Weight	22 - 25 kg (48 - 55 lb.) depending on configuration
Power supply input voltage	Auto-Ranging Power Supply 100 to 127 VAC at 4.7amps 200 to 240 VAC; 2.3 amps at 47/63 Hertz
Power supply output	350 Watts maximum
Power Consumption	470 Watts maximum
BTUs	1604 BTU/per hour maximum

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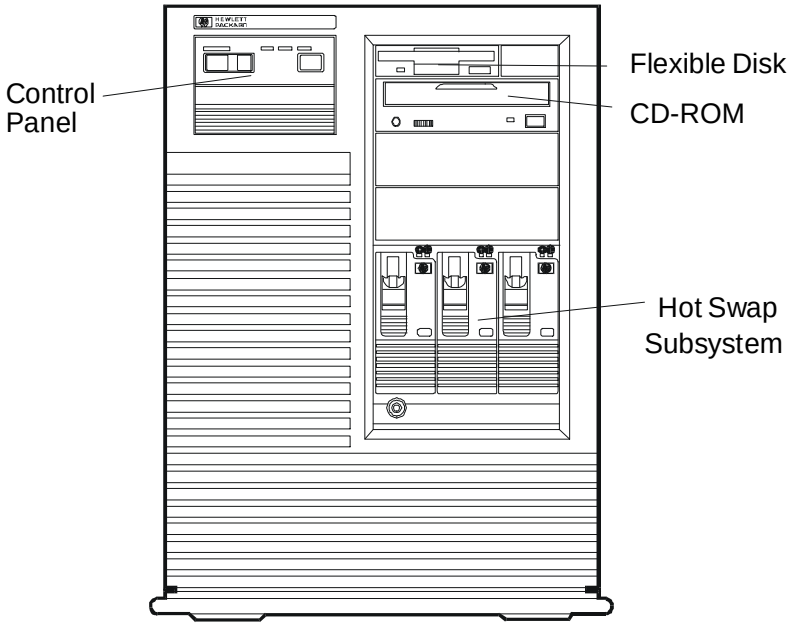
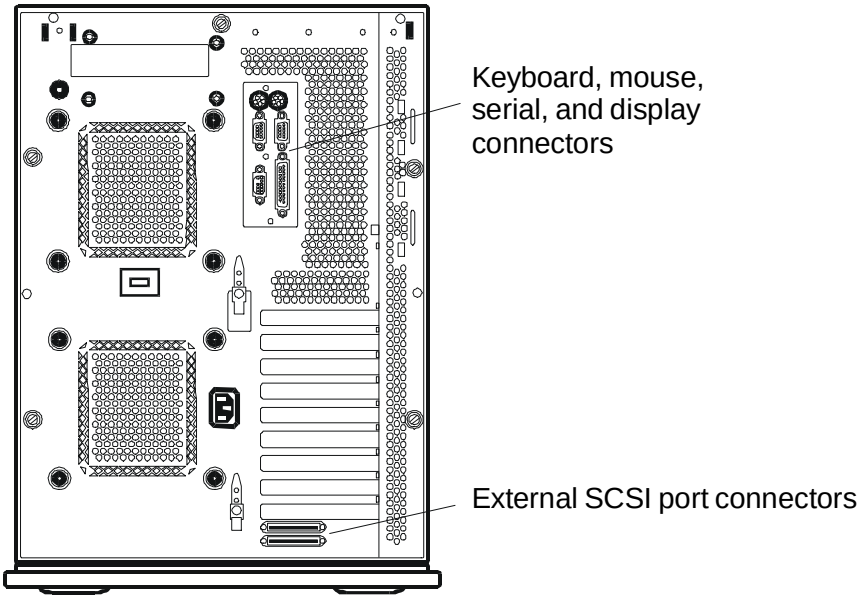
System Views





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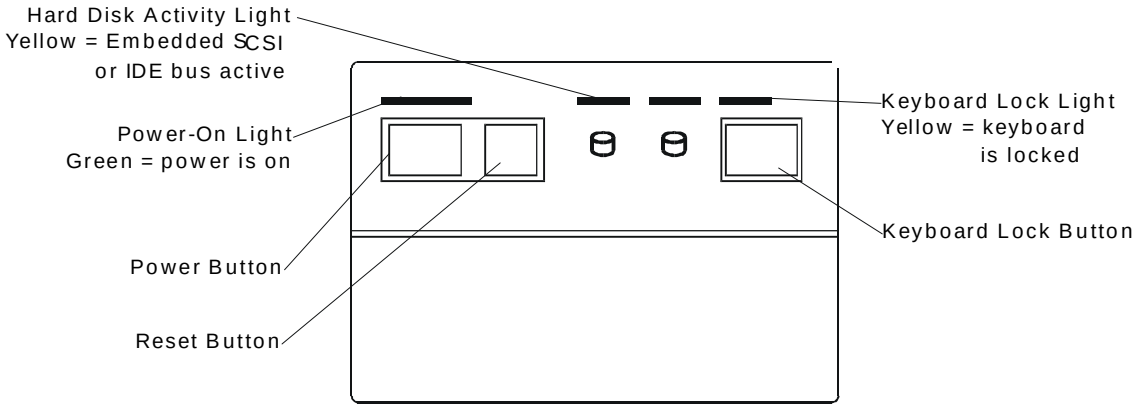
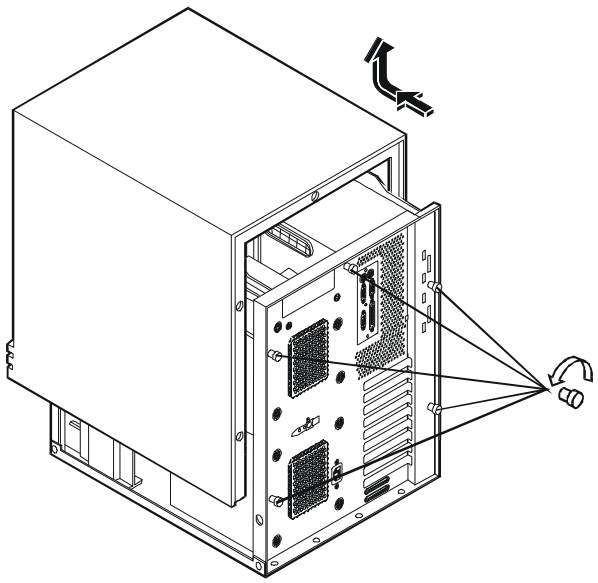
Control Panel



Power Button	Turns the HP NetServer on and off. Note that when the HP NetServer is turned off, the power to the internal circuitry and mass storage devices is disabled; however, AC power is still applied to the power supply. **Always disconnect the power cord before removing the cover.**
Power-On Light	Green when the HP NetServer is on.
Reset Button	Restarts the HP NetServer. You can press this button if the HP NetServer "hangs" or "locks up"—it has the same effect as turning the HP NetServer off and on. Save any work before pressing the reset button. Any information not saved is lost when the HP NetServer shuts down.
Hard Disk Activity Light 1	Yellow indicates activity on the Embedded SCSI bus or IDE bus.
Keyboard Lock Button	Prevents unauthorized use of the keyboard. Press the keyboard lock button to lock the keyboard. Enter the password to unlock the keyboard.
Keyboard Lock Light	Yellow when the keyboard is locked.

Cover



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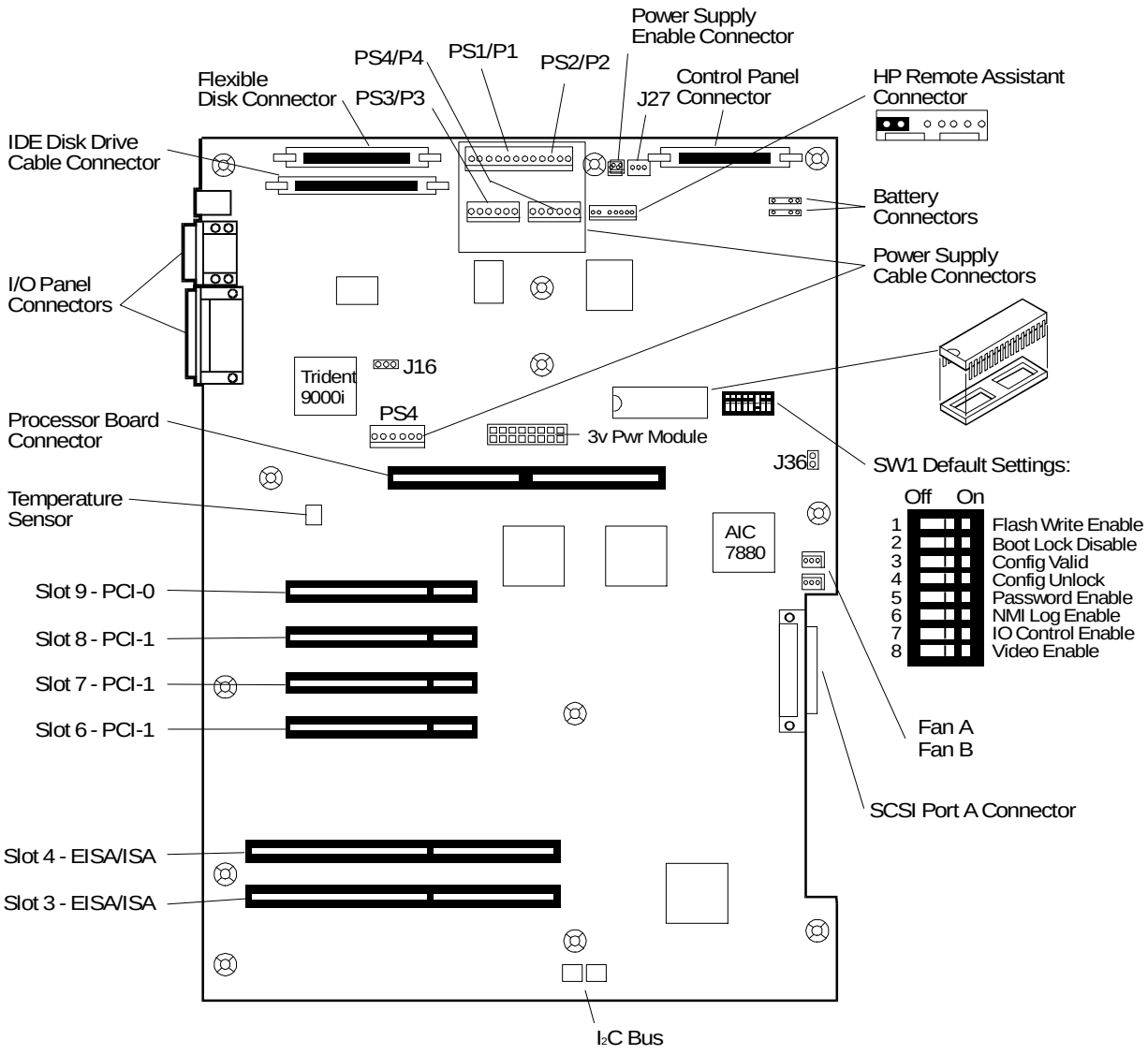
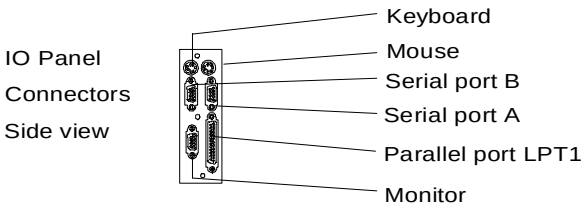
System Board and Connectors





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System Board Connectors, Switches, and Jumpers

The table below explains the system board markings for all connectors.

Connector	Number
IDE disk drive cable	J9
Keyboard	J1
Serial (2)	J2
Video	J3
PCI slots	J11—J14
EISA/ISA slots	J6—J7
Fans A, B	J34, J35
Power supply on A	J26
Power supply	PS1: J19 PS2: J19
PS3: J20 P4: J122 PS4: J17	
Processor board slot	J18
Fast/Ultra SCSI Port A Jumper (No jumper = Ultra)	J36
System ROM	U39
System Switches	SW1
Flexible disk drive	J15
Mouse	J1
Parallel	J3
Battery A	J30
Battery B	J31
Control panel	J28
Remote Assistant	J25
I^2C 1	
I^2C 2	J23
J24	
SCSI Port A Connector	J26
Color/Monochrome	J16
Power supply on B	J27
-3v Power Module	J21

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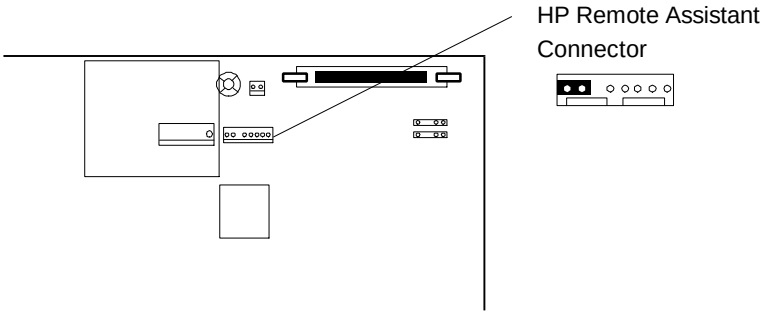
System Switches and Jumper Descriptions

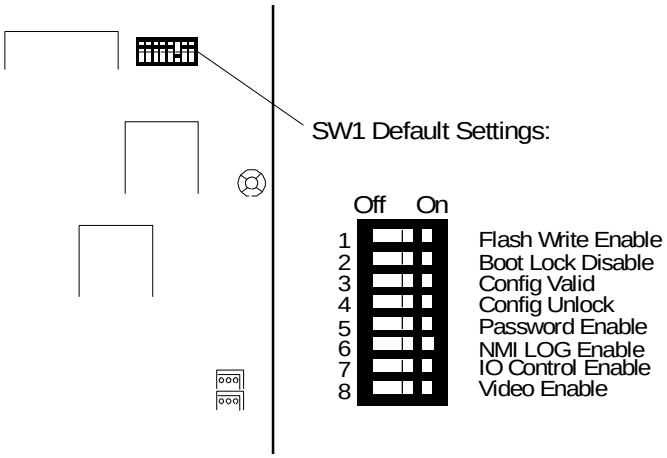
Remote Assistant Connector J25

This connector is used by the HP Remote Assistant Accessory, a 32-bit EISA Bus Master board used to remotely monitor server functionality. For additional information on this product, see the documentation that comes with it. When you install the HP Remote Assistant cable, you will need to remove the jumper on **PS REMOTE** and **PS ON**. If you remove HP Remote Assistant from the server, remember to re-install the jumper.



WARNING If the HP Remote Assistant is not installed and there is no jumper on PS REMOTE and PS ON, the system will NOT power up.

System Board Switch SW1



Switch	Function	Default
1	**FLASH WRITE ENABLE**: Enables or disables one of the two levels of flash ROM write protection (the other level of protection is controlled by the HP Update Utility). ON: The BIOS can be updated by the HP Update Utility. OFF: The BIOS is locked and cannot be updated.	ON
2	**BOOT BLOCK DISABLE:** Reserved. Must be set to ON for system to operate properly.	ON

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Switch	Function	Default
3	**CONFIG VALID:** Saves or erases the current configuration information in NVRAM and CMOS. ON: Saves the current configuration. OFF: Erases the current system configuration.	ON
4	**CONFIG UNLOCK:** Prevents or allows the current system configuration maintained in NVRAM and CMOS to be changed. ON: Unlocked. Allows the current system configuration to be changed. OFF: Locked. Prevents the current system configuration from being changed.	ON
5	**ENABLE:** Enables or erases the power-on password maintained in NVRAM. ON: Power-on password functional. OFF: Erases the current power-on password.	ON
6	**NMI LOG ENABLE:** Allows or prevents system from generating SMI interrupt when NMI event occurs. **ON:** Enables NMI event to generate SMI interrupt. **OFF:** Disables NMI event from generating SMI interrupt.	ON
7	**IO CTRL ENABLE:** Enables or disables onboard flexible disk drive controller, IDE controller, and serial and parallel ports. ON: I/O controller enabled. OFF: I/O controller disabled.	ON
8	**VIDEO ENABLE**: Enables or disables built-in video. Disable the built-in video only if you have a separate video board installed in the server. ON: Enables built-in video. OFF: Disables built-in video.	ON

Memory

The processor board in this NetServer has 4 memory sockets which accept DIMM memory modules. Up to 512 MB of memory can be configured. When installing additional memory, note the following:

- Only these HP DIMMs are supported:

DIMM Type	HP Product Number
16 MB DIMM	D4294A
32 MB DIMM	D4295A
64 MB DIMM	D4296A
128 MB DIMM	D4297A

- Any combination of DIMMs, listed above, may be used.

NOTE The H-P warranty does not cover performance problems, equipment problems, or service calls resulting from the use of non-HP DIMMs.

Select “Step 5: Save and exit” and follow the instructions to save your configuration. When the configuration is saved, the Reboot screen appears, describing what action you should take next. The EISA Configuration Utility will automatically update the system memory configuration.

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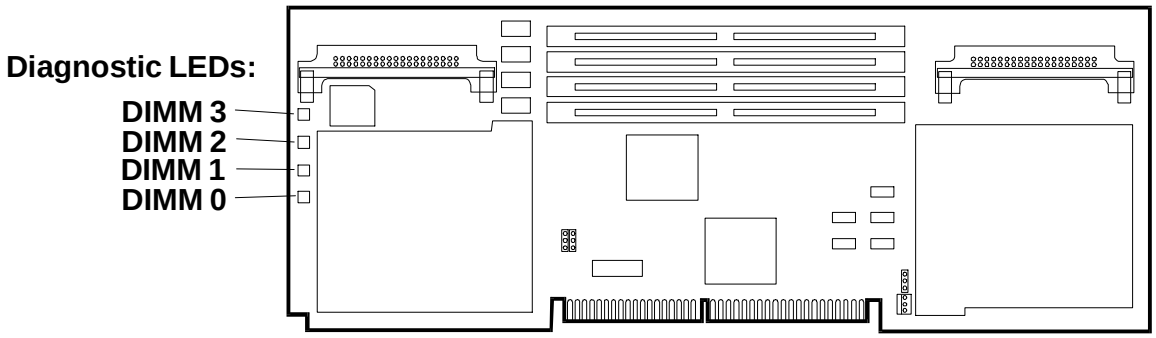
Processor Board LED Blink Codes

The processor board in the NetServer LD Pro contains LEDs that can indicate memory errors and processor errors. When a memory error exists, the LEDs are either on, off, or flash repeatedly a constant memory error code. The table below describes each of these codes. If the memory error indicates a failed DIMM, replace the DIMM. When a processor error exists, the LEDs alternate between two codes (i.e., ON-OFF-OFF-OFF and OFF-ON-ON-ON).

On = Steady green
Flash = Regular, slow flash (1 Hz)
Blink = Regular, fast flash
Double-blink = Irregular, double-flash

The diagnostic LEDs are located on the processor board, are labeled DIMM 0 through 3, and correspond to DIMM sockets 0 through 3. The LEDs are visible from either side of the board, and can also be viewed through the NetServer's rear panel cooling perforations.



Memory Error Codes

LED Code	Definition	Action
Off	No DIMM installed or	N/A (normal)
	Non-EEPROM DIMM installed	Reseat the DIMM or Move it to another socket or Replace DIMM
On	HP DIMM installed	N/A (normal)
Flash	Inappropriate HP DIMM installed or	Replace with appropriate HP DIMM or Run Diagnostic Assistant to find the problem
	Hard memory error	Run Diagnostic Assistant to find the problem
Blink	Non-HP DIMM installed	N/A (normal for non-HP DIMM)
Double Blink	Inappropriate non-HP-DIMM installed or Hard memory error	Replace with appropriate DIMM or Run Diagnostic Assistant to find the problem Run Diagnostic Assistant to find the problem
	Hard memory error	Run Diagnostic Assistant to find the problem

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LED Processor Error Codes

Alternating LED Codes: LED 0 LED 1 LED 2 LED 3	Definition	Action
ON-OFF-OFF-ON & OFF-ON-ON-OFF	Processor chip overtemperature	Check fans for function. Wait for system to cool down (20-25 minutes) and press the Reset button
OFF-OFF-ON-ON & ON-ON-OFF-OFF	Primary processor chip (processor #1) not installed	Install processor chip in primary socket
ON-OFF-OFF-OFF & OFF-ON-ON-ON	Primary Voltage Regulator Module fault	Replace primary Voltage Regulator Module
OFF-ON-OFF-OFF & ON-OFF-ON-ON	Secondary Voltage Regulator Module fault	Replace secondary Voltage Regulator Module
OFF-OFF-OFF-ON & ON-ON-ON-OFF	System bus regulator fault	Replace processor board

NOTE If the processor overtemperature error is not corrected within a few minutes, the system will shut down automatically to avoid damage. To recover from this condition, wait for the system to cool down (20-25 minutes) and press the Reset button.

Boot Device Priority

The following is the search path in order of the highest boot device priority:

1. CD-ROM drive with bootable CD-ROM
2. Flexible disk drive with bootable flexible disk
3. IDE drive
4. The first mass storage device attached to the EISA, ISA or PCI (embedded or added) controller set to the lowest BIOS address. The lowest BIOS address is usually C8000h.

To Boot From a PCI Controller Board

Systems with only PCI boards (No EISA or ISA Boards)

Your system uses the following **default PCI boot priority order**:

1. Embedded SCSI A
2. PCI slots in the following order: 9, 8, 7, and 6.

If you have drives attached to the SCSI A connector, you must change the PCI boot priority order in the EISA Configuration Utility so that the PCI slots precede SCSI A:

To change the PCI boot priority order, perform the following:

1. Go to the EISA Configuration Utility.
2. Select "Step 3: View or edit details."
3. Select "PCI SCSI Boot Priority Order" and press **Enter**.
4. Set to "PCI adapters before SCSI A" and press **Enter**.
5. Exit and save the configuration.

Systems with PCI and EISA or ISA boards

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If you have a system with a mixture of PCI and ISA or EISA boards perform the following:

1. Install the PCI controller board in slot 9.
2. Go to the EISA Configuration Utility.
3. Select "Step 3: View or edit details."
4. Select "PCI 9 - PCI SCSI Controller" and press **F6**.
5. Set the top Memory Address resource to "0C8000h" and press **F10**.
6. Press **F7** and select "Lock/unlock boards." Select the PCI board in slot 9 and lock.
7. Exit and save the configuration.

To Boot From an Embedded PCI Controller (SCSI A)

Systems with only PCI boards (No EISA or ISA Boards)

If you only have PCI boards in your NetServer, your system uses the following **default PCI boot priority order**:

1. Embedded SCSI A
2. PCI slots in the following order: 9, 8, 7, and 6.

Systems with PCI and EISA or ISA boards

If you have a system with ISA or EISA boards, you must set the BIOS and other memory resources for those boards to the top of the D0000h range.

To Boot From an ISA Controller Board

Set the BIOS address to C8000h.

To Boot From an EISA Controller Board

1. Go to the EISA Configuration Utility.
2. Select "Step 3: View or edit details."
3. Set the controller's BIOS to C8000h.

SCSI Controller Boot Order

During boot, the system BIOS performs the following:

1. The system BIOS will start searching for BIOS ROMs at 0C8000h.
2. If an ISA, EISA or locked PCI BIOS controller is found, the system will call that BIOS to initialize. The controller BIOS that is called first will normally be the boot controller.
3. If the memory range at 0C8000h is not being used, the system will search through the list of PCI devices for the first PCI BIOS that will fit in the open memory range. The system will search the PCI devices in the following order: Embedded SCSI A, PCI slot 9, slot 8, slot 7, slot 6. If the system BIOS finds a PCI BIOS that fits in the open memory range, that PCI BIOS will be shadowed at 0C8000h and called to initialize.
4. After calling the BIOS ROM, the system will continue searching for BIOS ROMs at the address immediately following the BIOS ROM just called (repeat steps 2 through 4).

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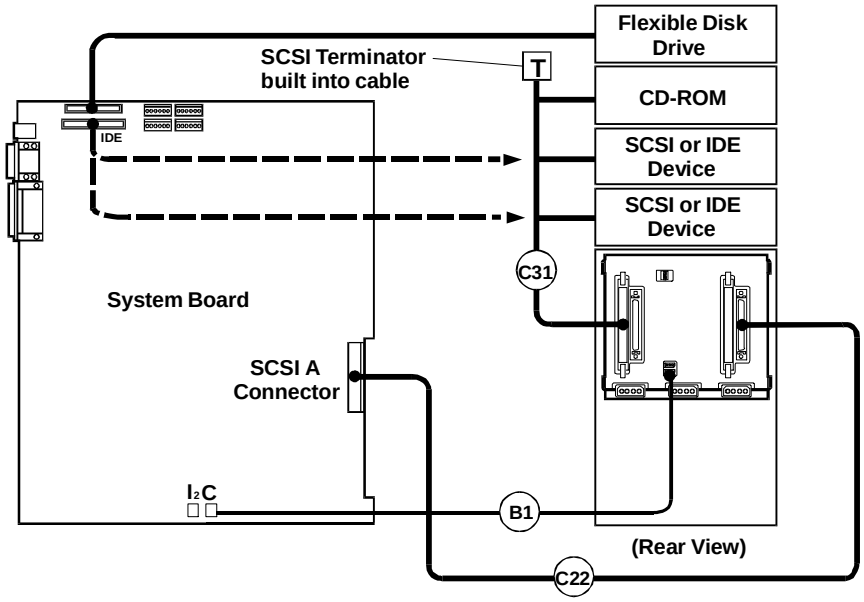
NOTE	In order to optimize PCI board BIOS installation, you need to leave the largest open range of memory possible. Group the EISA and ISA board BIOSs at either the beginning or end of the 0C8000h through 0DFFFFh range.

Cabling Configurations

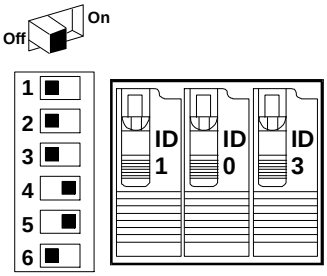
Duplex, Non-Disk Array Model with Internal Controller

This is a standard mass storage configuration as shipped from HP.

NOTE	If you are installing Ultra SCSI mass storage devices in this NetServer, you must enable Ultra SCSI.



Default Switch Settings



This is the default SCSI switch setting for this configuration. SCSI ID 2 is reserved for an optional DAT (Digital Audio Tape) drive that can be installed in upper drive tray 3 or 4. The standard CD-ROM drive is shipped with SCSI ID 5.

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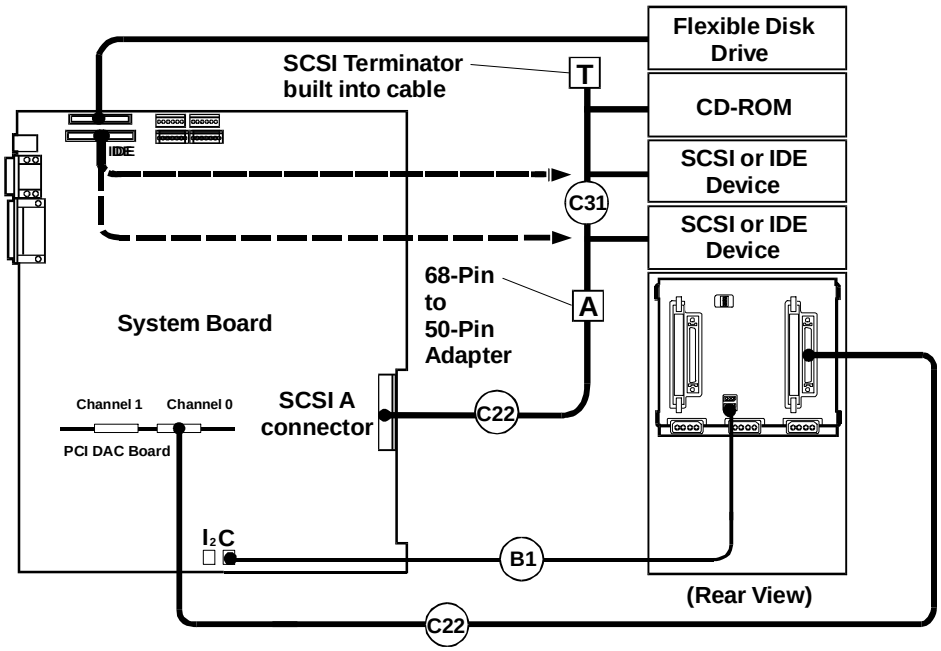
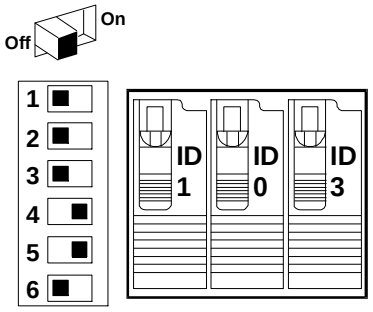
Duplex Disk Array Configuration with Dual Channel PCI Controller Board

This is one of several possible optional mass storage configurations. You are not limited to the configurations shown on this CD-ROM; this is only given as an example.



Default Switch Settings



This is the default SCSI switch setting for this configuration. SCSI ID 2 is reserved for an optional DAT (Digital Audio Tape) drive that can be installed in upper shelf 3 or 4. The standard CD-ROM drive is shipped with SCSI ID 5.

Configuring Switch Settings on the Hot Swap Subsystem

Switches 3 and 4 determine the SCSI address of each of the shelves. Possible switch settings are given in the table below.

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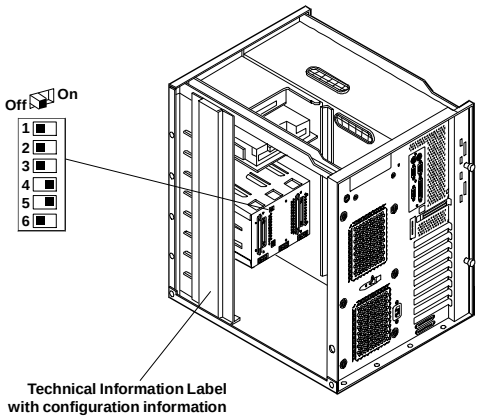

Always set switches 1, 2 and 6 to Off.

Switch	Function	Settings
1	**I^2C Bus Setting**	Always set to **Off**
2	**I^2C Bus Setting**	Always set to **Off**
3	**High/Low Addresses** Sets SCSI addresses for upper or lower eight addresses Set to Off if not using Fast-Wide (68 pin) SCSI	**On** Sets drives to upper eight SCSI addresses. **Off** Sets drives to lower eight SCSI addresses.
4	**SCSI Address Zero** Sets middle shelf in hot-swap cage to SCSI ID 0.	**On** Sets middle shelf in the cage (shelf 2) to SCSI ID 0. **Off** Sets middle shelf to SCSI ID 2.
5	**Remote Start** Determines control of the hot swap disk module power-on sequence.	**On** Internal control: cage is set to delayed start. *Recommended setting.*
6	**Reserved**	Always set to **Off**

Hot Swap Subsystem SCSI Address Settings

Switches 3 and 4 determine the SCSI address setting for each shelf in the hot swap subsystem. The table below lists the possible SCSI addresses for each shelf.

NOTE For information on changing the CD-ROM drive SCSI address setting, see the Technical Information Label on the CD-ROM drive.

Hot-Swap Shelf SCSI Address Settings

Switch		
3	**4**	**SCSI Address**
Off	Off	Shelf 1 = ID 1 Shelf 2 = ID 2 Shelf 3 = ID 3
Off	On	Shelf 1 = ID 1 Shelf 2 = ID 0 Shelf 3 = ID 3

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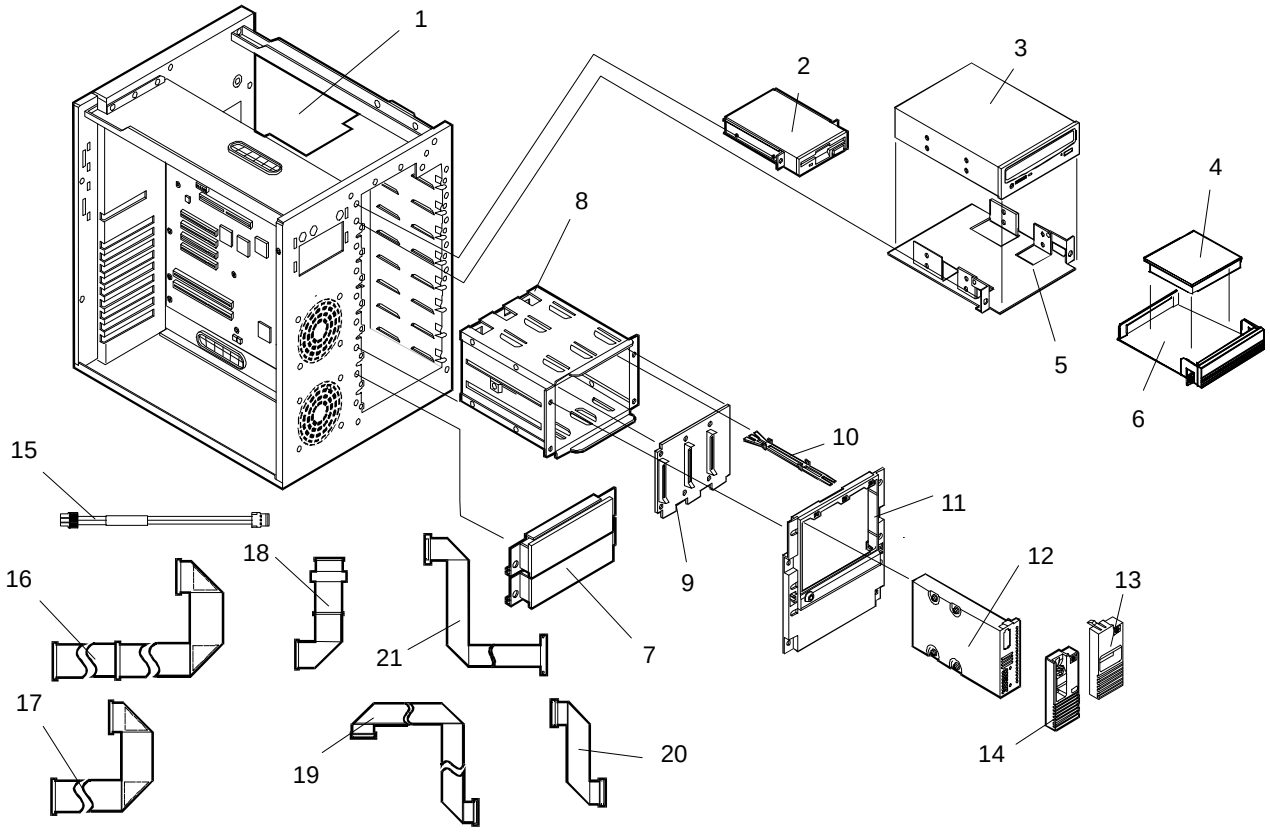
On	Off	Shelf 1 = ID 9 Shelf 2 = ID 10 Shelf 3 = ID 11
On	On	Shelf 1 = ID 9 Shelf 2 = ID 8 Shelf 3 = ID 11

Exploded Views



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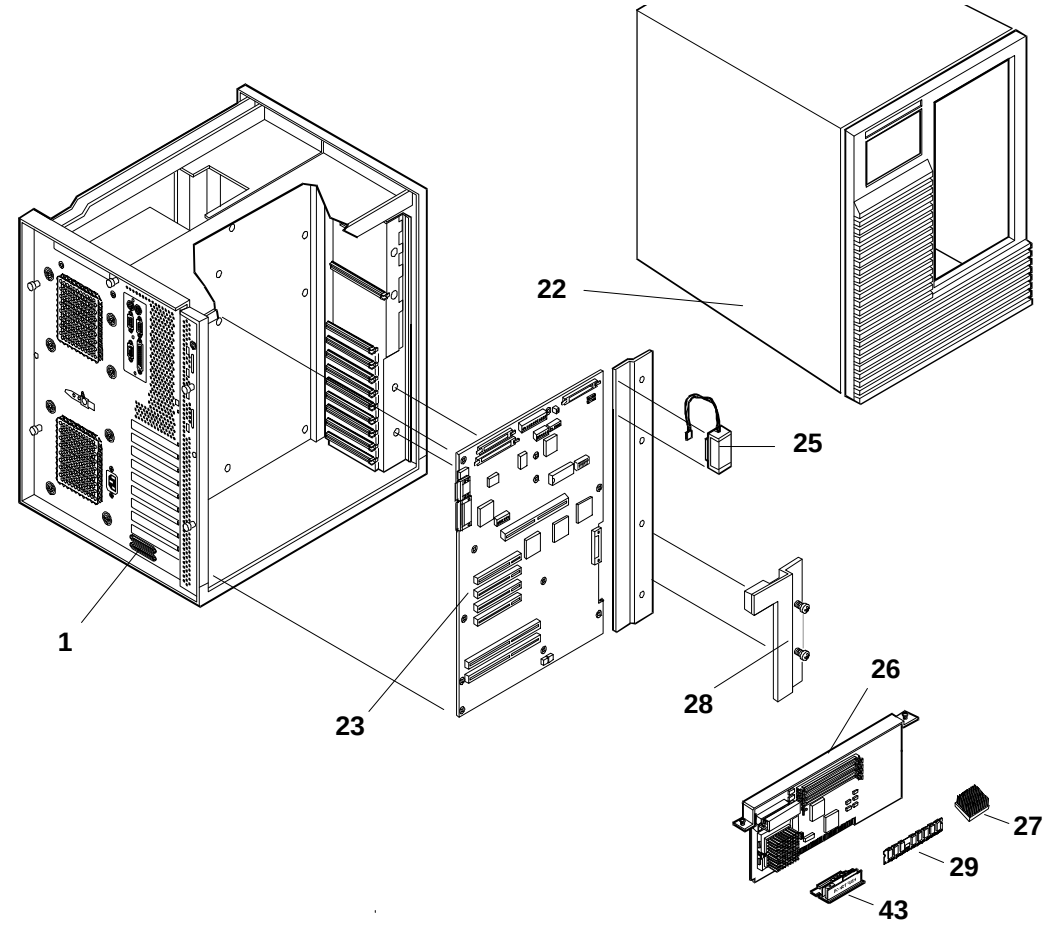

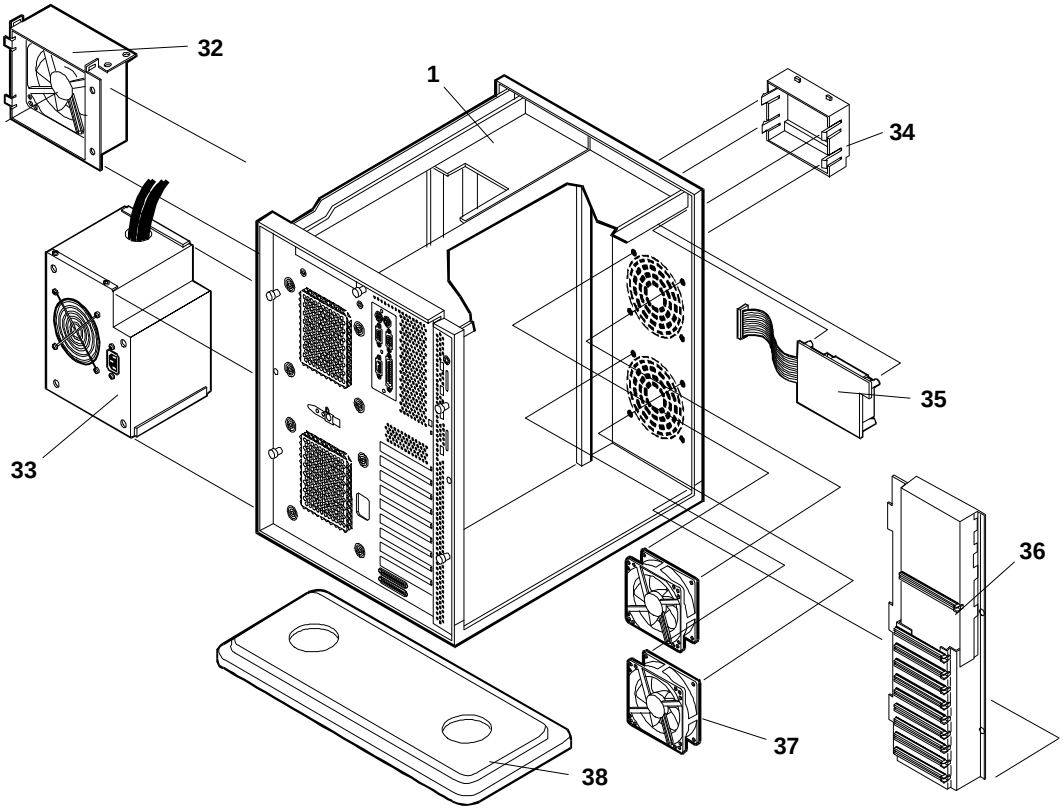

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Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number.

If a system board needs to be replaced, remove processor board and any added accessory boards, and keep them with the server under repair.

***** This part is not on an exploded view.

Fig	Description	Replacement	Exchange
1	Chassis Assembly	Not orderable	
2	1.44 MB 3.5" Flexible Disk Drive	D2035-63121	
3	CD-ROM Drive	5064-1920	
4a	2 GB SCSI HDD	D2077-63100	D2077-69001
4b	4 GB SCSI HDD	D4956-63001	D4956-69001
5	5 1/4 inch tray	D2199A	
	Tray CD-ROM	C2260-60078	
6	3 1/2 inch tray	D2198B	
	Tray HDD - non hot swap	C2260-00025	
*****	Tray Bezel - new color	5064-0715	
7	Upper Drive Slot Cover	5063-8389	
8	Hot Swap Cage	5063-5671	
9	Hot Swap Cage PCA	5064-0717	
10	Hot Swap Light Pipe	5041-1099	
11	Hot Swap Cage Bezel w/lock	5064-1909	
12	Disk module tray kit	D3349B	
13	Hot Swap Module Slot Cover	5063-8391	
14	Hot Swap Disk Module Cover Lock Replacement	5063-8398	
15	I^2C cable B1	5182-4535	
16	Internal Flexible Disk Cable	5182-6789	
17	Internal IDE-HDD Cable	5182-6788	
18	Cable, Internal SCSI Extension C31	5182-9423	
19	Cable, Internal SCSI (Wide) C22	5182-6746	
20	Cable, Internal SCSI Bridge C14	5182-6747	
21	Cable, External SCSI Port C23	5182-6749	
22	Cover	5064-1901	
23	System Board	D4946-63001	4946-69001
24	System Board Extender	5002-3722	
25	Battery	1420-0513	
26	Pentium Processor Board	D4944-63001	D4944-69001

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Fig	Description	Replacement	Exchange
	Pentium P6 180 Processor Chip	1821-3450	
	Pentium P6 200 Processor Chip	1821-3449	
	Dual Pentium Pro/200 processor board upgrade kit	D4959A	
27	Heat Sink	5182-9378	
	Heat Sink Clip	5182-9344	
29a	16 MB - DIMM	D4294-63001	D4294-69001
29b	32 MB - DIMM	D4295-63001	D4295-69001
29c	64 MB - DIMM	D4296-63001	D4296-69001
29d	128 MB -DIMM	D4297-63001	D4297-69001
32	Rear Fan Cage	5064-0701	
33	Power Supply	5064-0795	
34	Control Panel Bezel	5063-8380	
35	Control Panel PCA	5063-0382	
36	Card guide Assembly	5063-5697	
37	Front Fan	5063-8386	
38	Chassis Foot	5042-2122	
39	Power Management Board	D4840-60001	
40	Mass Storage Power Supply Cable	5182-6800	
43	Processor Board Voltage Regulator Module	0950-3066	
*	Hot Swap 2 GB HDD	D3582-63004	D3582-69004
*	Hot Swap 4 GB HDD	D3583-63004	D3583-69004
*	Key Lock Assembly	5063-5683	
*	System BIOS ROM	D4944-60005	
*	Hot Swap Cage key	5182-4534	
**	HP Navigator CD-ROM		
**	Diagnostic Assistant Diskette		
*	Mouse	C3751-60201	

** This part number is constantly revised. When you order the CD-ROM, you will be sent the latest revision.

Mass Storage Cables

Some configurations need additional cables. Additional cables can be obtained by ordering the HP Cable Kit - Part Number D3588-60001. Only the following HP cables are supported:

Cable Diagram	Location	Description	Part Number
C31	Hot swap SCSI backplane-to-CD-ROM or other device	Narrow SCSI (50 pin) cable with built-in terminator	5182-9423
C22	Internal SCSI port-to-hot swap backplane	Fast/wide SCSI (68 pin) cable	5182-6746
A	Internal narrow (50-pin) to wide (68-pin) adapter	Fast/wide SCSI adapter (50 pin to 68 pin)	5182-4550

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B1	I^2C cable, system board to hot-swap backplane	3-pin I^2C cable	5182-4535

Keyboards

Language	HP Part Number	Language	HP Part Number
US	D4950-63001	Danish	D4950-63016
Arab/French	D4950-63025	Fr-Canadian	D4950-63002
Portuguese	D4950-63027	German	D4950-63003
Cyrillic	D4950-63030	Spanish	D4950-63004
Belgian/Flemish	D4950-63014	French	D4950-63005
Italian	D4950-63017	Norwegian	D4950-63009
Arab/English	D4950-63020	Swiss	D4950-63011
Korea/Hangu	D4950-63021	Swedish	D4950-63012
Taiwan	D4950-63023	UK	D4950-63013
Poland	D4950-63035	Czech	D4950-63036
Hungarian	D4950-63037	Greek	D4950-63032
Turkish	D4950-63035	Dutch	D4950-63006

Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

Specifications

Power Supply	Auto-Ranging Power Supply 100 to 120 VAC~ 9 A 200 to 240VAC ~ 5.5 A at 47/63 Hz
Power Availability	350 W continuous 386 W peak
Operating Temperature	5° to 35° C (41° to 95° F)
Non-Operating Temperature	-40° to +70° C (-40° to +158° F)
Operating Humidity	20% to 80% relative humidity
Non-Operating Humidity	90% relative humidity
Altitude Operating	3,046 m (10,000 ft)
Altitude Non-operating	12,200 m (40,000 ft)
System Dimensions	19.3” H x 13.7” W x 18.1” D (49cm H x 34.8cm W x46cm D)

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Server Footprint	369 x 474.71 mm (14.53 x 18.89 in)
System Weight	50-70lb (22.7-31.8kg), depending on configuration

Keyboard

Height	3.4 cm (1.4 in)
Width	46.8 cm (18.4 in)
Depth	19.8 cm (7.8 in)
Weight	1.9 kilograms (4.2 lb.)

Cable Length

Keyboard cable	3 m (9.9 ft)

Ventilated Clearance

Sides and Top	1 inch (3 cm)
Front	36 inches (1 m)
Back	6 inches (15 cm)

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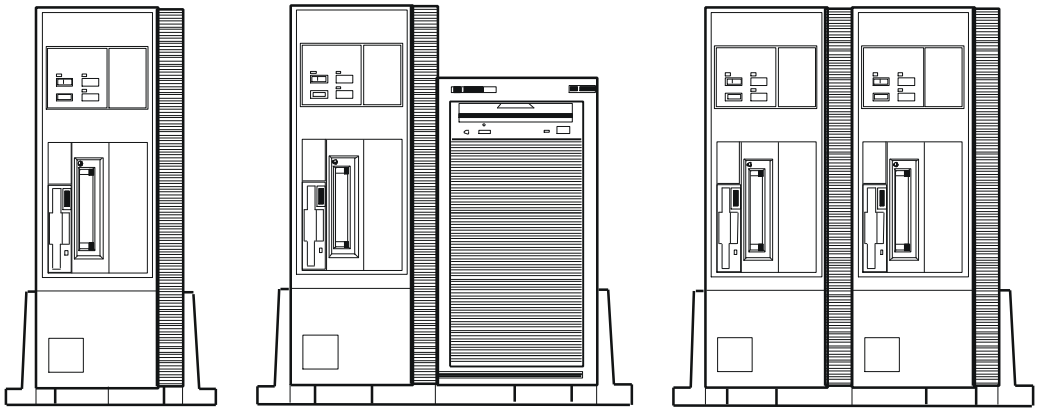
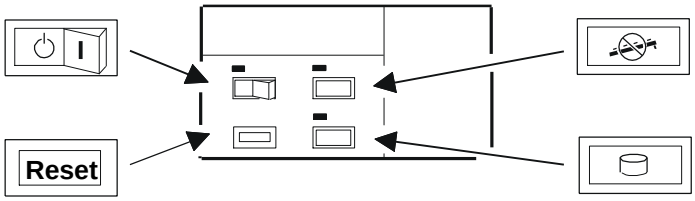
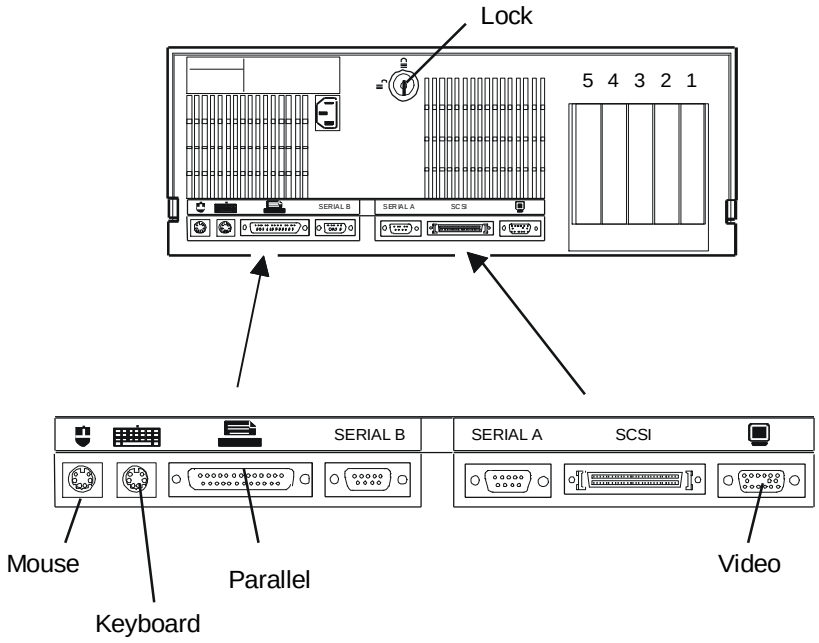
System Views



Control Panel Detail



Desktop Position:



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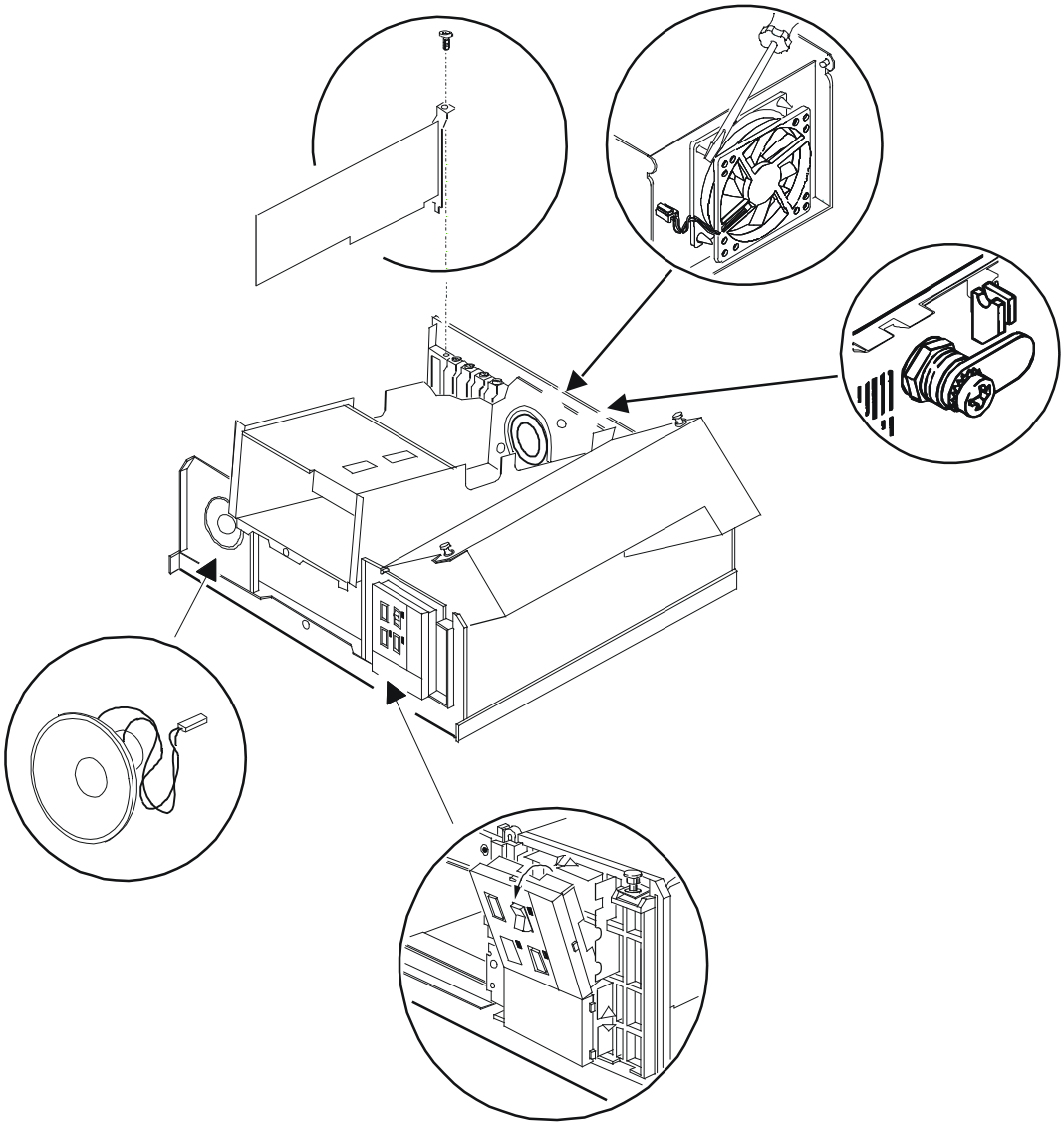
Installation View



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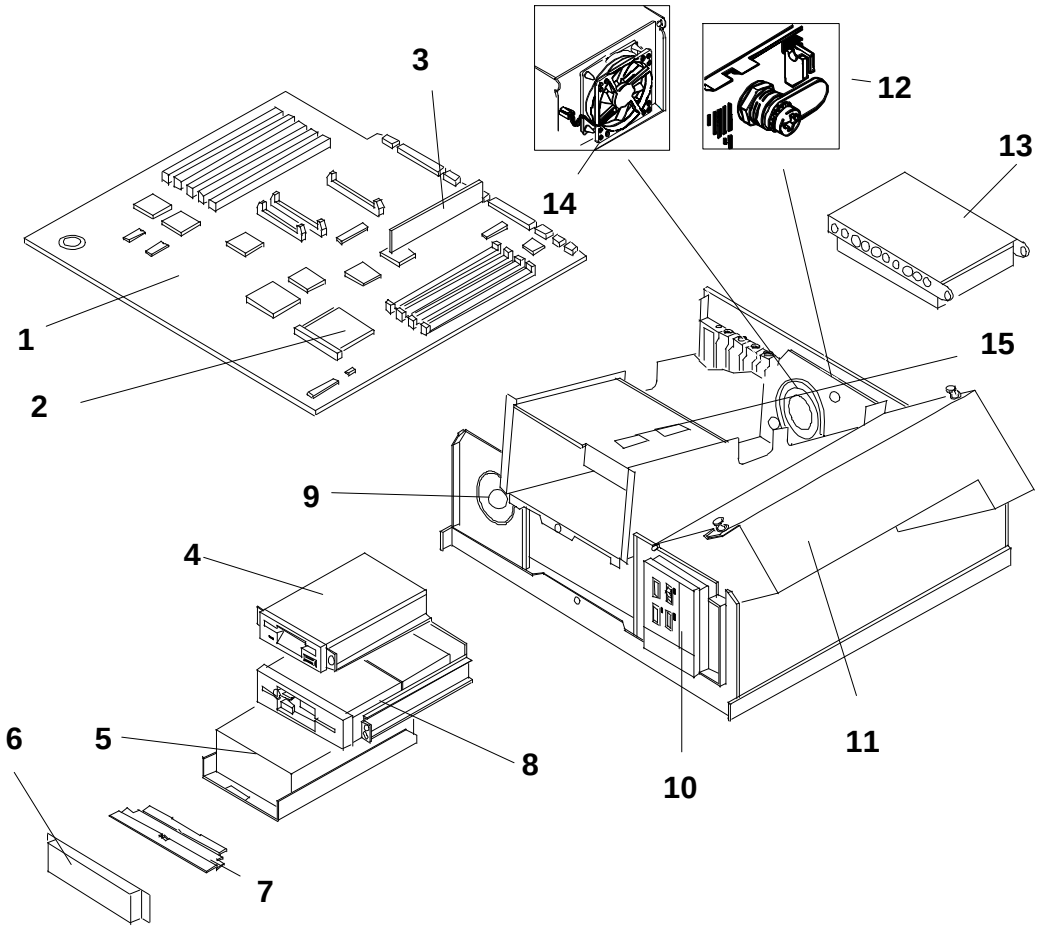
Exploded View



HP NetServer LE Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, remove RTC module, any video DRAM chips, memory modules, processor board, any added accessory boards, and keep them with the server under repair.

Fig	Item Description	Exchange	Replacement
1	LE 4s/33 System Board	D2335-69001	D2334-63001
	LE 4/33 & 4d/66 System Board	D2342-69001	D2342-63001
2a	486DX/33 Processor		1820-7615
2b	486DX2/66 Processor		1821-0859

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Fig	Item Description	Exchange	Replacement
3	4 MB SIMM 80 ns 1x4 MB module	D2156-69001	D2156-63001
	8 MB SIMM 80 ns 1x8 MB module	D2152-69001	D2152-63001
	16 MB SIMM 70 ns 1x16 MB module	D2297-69001	D2297-63001
	32 MB SIMM 70 ns 1x32 MB module	D2298-69001	D2298-63001
4	3.5" 1.44 MB Floppy Disk Drive	N/A	D2035-63004
5a	535 MB SCSI-2 Disk Drive	D2075-69001	D2075-60003
5b	1000 MB SCSI-2 Disk Drive	D2076-69001	D2076-63102
5c	3.5" Drive Tray		D2198A
5d	5.25" CD-ROM tray		D2199A
6	5.25" Filler Panel Assembly	N/A	5062-5597
7	Retainer Plate	N/A	5063-0340
8	5.25" 1.2 MB Floppy Disk Drive	N/A	D2881-63001
9	Speaker assembly	N/A	02620-60016
10a	Control Panel	N/A	5062-5600
10b	Control Panel Filler Assembly	N/A	5063-0303
11	220 W Power supply assembly	N/A	5063-0339
12	Key Lock Assembly	N/A	5062-5599
13a	240 MB IDE Disk Drive	D1697-69007	D1697-60009
13b	5.25" Tray (3 pack) for flexible disk drives	N/A	
14	Fan Assembly	N/A	5063-0307
15	Bridge/Lid Assembly	N/A	5063-0306
*	Door/stand assembly	N/A	D2335-60003
*	SCSI Cable Kit for LE	N/A	D2079-60001
*	Cable 2740 SCSI	N/A	5182-0047
*	3.5" Tray (5 pack) for hard drives	N/A	D2037A
*	Optional Battery	N/A	1420-0513
*	Cardguide	N/A	5041-1066
*	Cover/Bezel Assembly	N/A	5062-5593
*	3.5" Flexible Disk Rail Mount Kit (3 pack)	N/A	5063-0309
*	Base Assembly	N/A	5062-5592
*	Flexible disk drive cable	N/A	5182-4516
*	Hard disk drive cable	N/A	5181-0392

* Not on exploded view

HP NetServer LE Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Danish	C1405-60316
Fr-Canada	C1405-60302	Italian	C1405-60317
German	C1405-60303	Arab/English	C1405-60320

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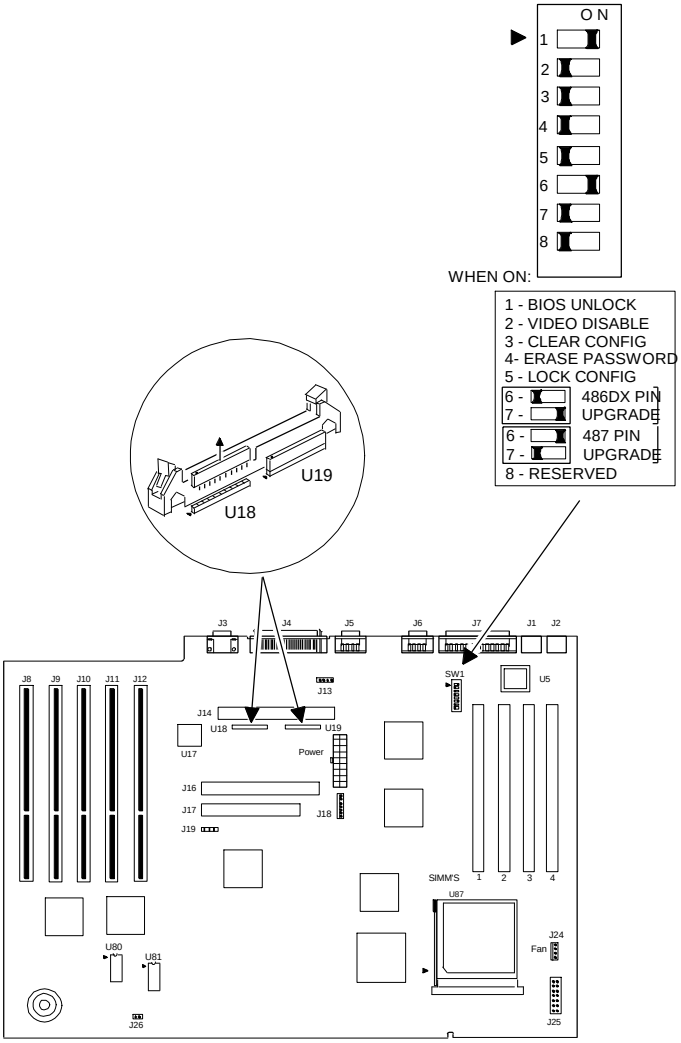
Spanish	C1405-60304	Korea/Hangul	C1405-60321
French	C1405-60305	Taiwan	C1405-60323
Norway	C1405-60309	Arab/French	C1405-60325
Swiss	C1405-60311	Portuguese	C1405-60327
Swedish	C1405-60312	Cyrillic	C1405-60330
UK	C1405-60313	Japan/Kanji	C1414-60001

HP NetServer LE Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

System Board and Connectors



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System Board Jumpers and Switches

The following table explains all connector points, sockets, and switches on the system board.

Num.	Purpose	Num.	Purpose
J1	Keyboard	J2	Mouse Connector
J3	Video Connector	J4	External SCSI connector
J5	Serial A	J6	Serial B
J7	Parallel	J8-J12	Accessory Boards Slots
J13	Optional Battery	J14	Internal SCSI Connector
J15	Power Connector	J16	Flexible Disk Drive Connector
J17	Embedded AT (IDE) Controller Hard Drive Connector	J18	Control Header (*)
J19	HD Activity Light	J20-J23	Memory Sockets (SIMMs)
J24	CPU Fan Connector (**)	J25	Control Panel Connection
J26	Speaker Connection		
U18, U19	SCSI Terminator	U87	ZIF Microprocessor Socket
U80, U81	Video DRAM Sockets	SW1	System Board Switches

(*) make sure pins 1 and 2 are jumpered
(**) not used at this time

Processors

			Switch Block SW1	
Processor	**HP or Intel P/N**	**Pin Type**	**Switch 6**	**Switch 7**
~~486/33DX~~	~~D2169A (HP)~~	~~DX~~	~~OFF~~	~~ON~~
~~OverDrive/33~~	~~D2172A (HP)~~	~~487~~	~~ON~~	~~OFF~~
i486DX2/66	A80486DX2-66	DX	OFF	ON
SX OverDrive/66	ODP486SX-66	487	ON	OFF
DX OverDrive/66	ODPR486DX-66	DX	OFF	ON
DX OverDrive/66	ODP486DX-66	487	ON	OFF

This manual downloaded from http://www.manualowl.com

Memory Configuration

You can install any HP supported 4 MB, 8 MB, 16 MB, and 32 MB SIMMs in any socket and any arrangement.

Video Memory - DRAM

Install two additional DRAM chips to upgrade the server to 512 KB of RAM which lets the display use resolutions of 640x480 with 256 colors and 800x600 with 256 colors.

Use video memory DRAM chips that are 16-pin DIP (Dual Inline Package) 256 KBx4 Fast Page Mode DRAM and run at 80 nanoseconds or faster. The chips must be compatible with the Trident TVGA 9000B controller chip.

Trident has tested the following DRAM:

Vendor	Part Number	Vendor	Part Number
Goldstar	GM71C256A-80 9103	NMBS	AAA1M304P-08 9130
Intel	P2101-09 K049A	Samaung	MK44C256AP-8 104
Mitsubishi	M5M44256AP-8 8492	Vitalic	V52C104AP-80 9105
NEC	D424256C-80 8939		

HP NetServer LE System Updates

These notes reflect changes for the HP NetServer LE which could not be included with the service manual or were changed at a later date. Service manuals are not updated and the information, if any, in this section is the latest information available.

Loading DOS in a 640K environment if the base memory size is set to 512K.

When the base memory size is set to 512K, you will not be able to run the "Configure computer" option from SAM. To create the proper operating environment so that "Configure computer" option will run, you must modify the CONFIG.SYS file found on the NetServer #1 diskette.

The System Administration Manager CONFIG.SYS file on NetServer #1 diskette originally contains the following lines:

```
COUNTRY=001, , A:\COUNTRY.SYS
DEVICE=A:\DISPLAY.SYS CON:=(, 437, 2)
DEVICE=HIMEM.SYS
SHELL=A:\SAM.EXE /P
```

Using the editor of your choice, modify the CONFIG.SYS file so it appears as follows:

```
DEVICE=A:\SET640K.SYS
COUNTRY=001, , A:\COUNTRY.SYS
DEVICE=A:\DISPLAY.SYS CON:=(, 437, 2)
DEVICE=HIMEM.SYS
SHELL=A:\SAM.EXE /P
```

Save the file when you finish.

Creating the Proper Operating Environment

1. Insert NetServer #1 diskette in drive A.

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2. Make a backup copy of your current CONFIG.SYS file by entering;
   COPY CONFIG.SYS CONFIG.BAK
3. Copy the SET640K.SYS file from NetServer #2 diskette to NetServer #1 diskette by entering;

   COPY B:SET640K.SYS A:\
   (If you do not have a second flexible disk drive, DOS treats drive A as both drive A and

   drive B and prompts you to insert disks.)
4. Using the editor of your choice, modify the CONFIG.SYS file so that SET640K.SYS file is the first file on line 1, as shown above.
5. Save the file when you are done editing.

When you next boot from the NetServer #1 diskette, if the base memory size is 512K you are prompted to press Enter when the banner appears. If the base memory size is set to 640K, the utility displays only the driver banner with no prompt. The function of this driver does not change the base memory size setting selected in the EISA configuration Utility.

Specifications

Power Supply	Auto ranging: 90 to 132 VAC, or 198 to 264 VAC at 47-63Hz
Power Availability	227W continuous, 245W peak
Power Consumption	376/354W maximum with 110/220V supply 405/382W peak with 110/220V supply
System Dimensions	18.5 in. high x 10.2 in wide x 16.5 in deep (47 cm high x 26 cm wide x 42 cm deep)
System Weight	25 lbs (11.3 kg), depending on configuration
Operating Temperature	41 to 104 degrees F (5 to 40 degrees C)
Operating Humidity	15% to 80% non-condensing

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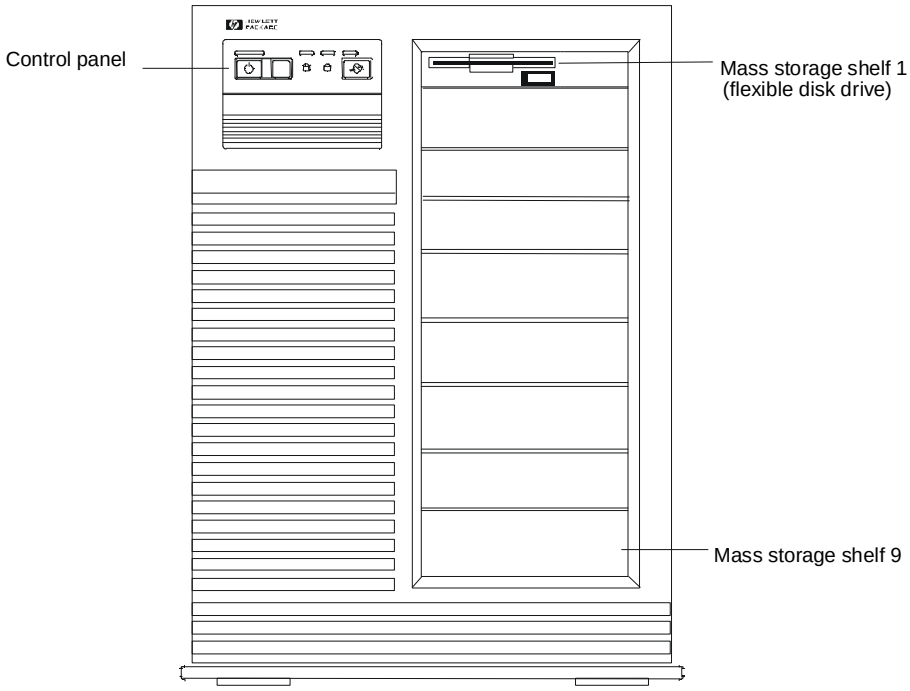
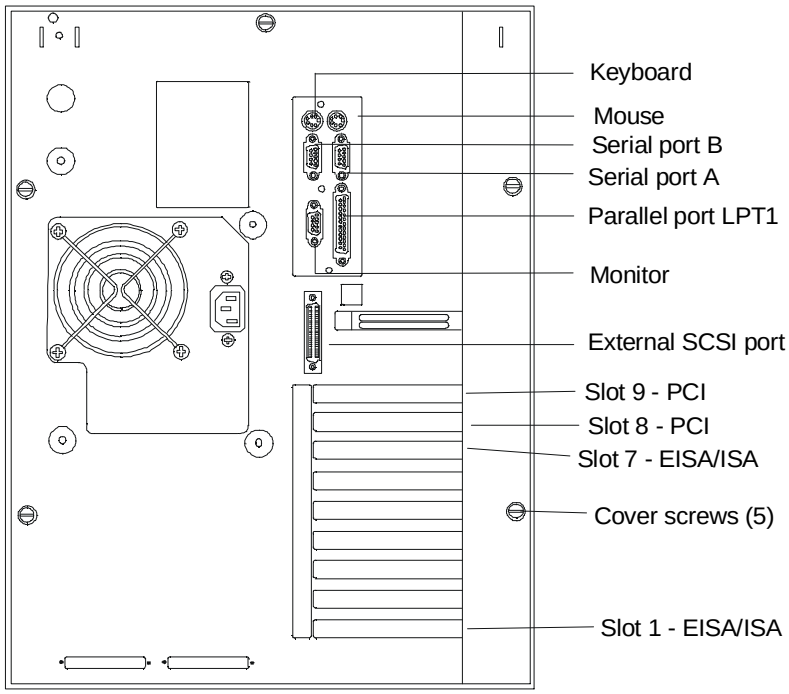
System Views





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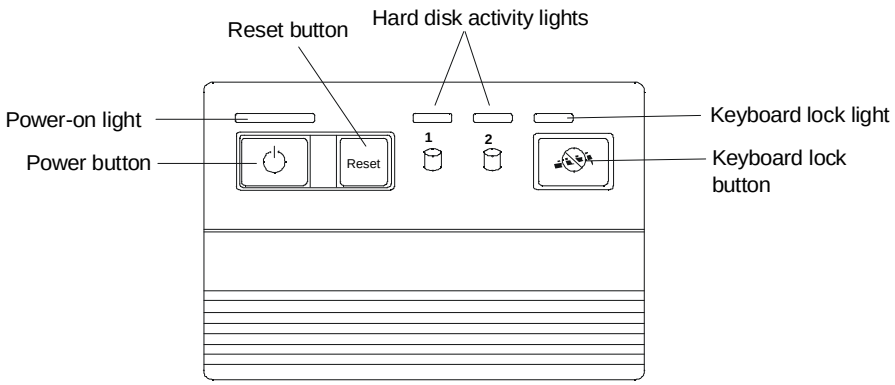
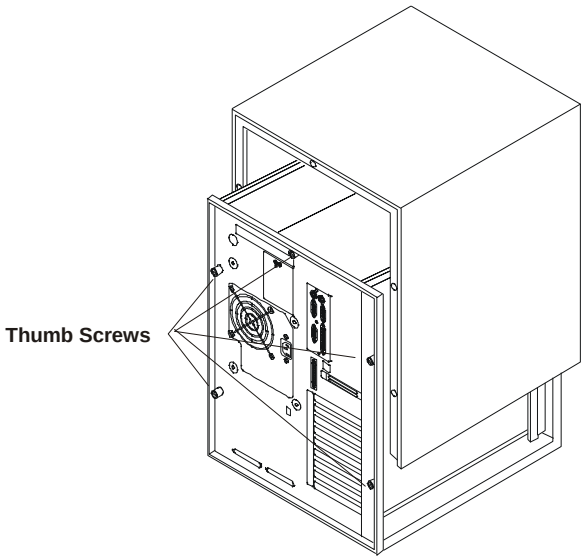
Control Panel



Power button	Turns the server on and off. Note that when the server is turned off, the power to the internal circuitry and mass storage devices is disabled; however, AC power is still applied to the power supply. Always disconnect the power cord before removing the cover.
Power-on light	Green when the server is on.
Reset button	Restarts the server. You can press this button if the server “hangs” or “locks up”—it has the same effect as turning the server off and on. Save any work before pressing the reset button. Any information not saved is lost when the server shuts down.
Hard disk activity light 1	Yellow when an internal SCSI storage system (channel A) or an IDE hard disk drive is busy.
Hard disk activity light 2	Yellow when an external SCSI hard disk drive (channel B).
Keyboard lock button	Prevents unauthorized use of the keyboard. Press the keyboard lock button to lock the keyboard. Enter the password to unlock the keyboard.
Keyboard lock light	Yellow when the keyboard is locked.

Cover



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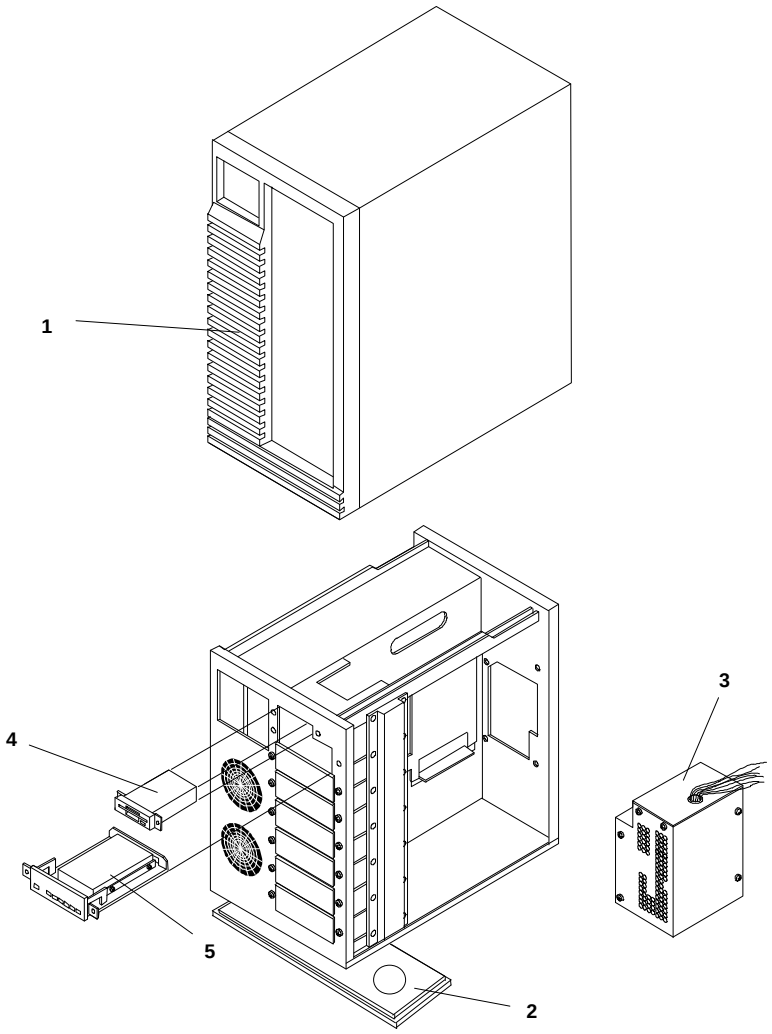
Exploded Views



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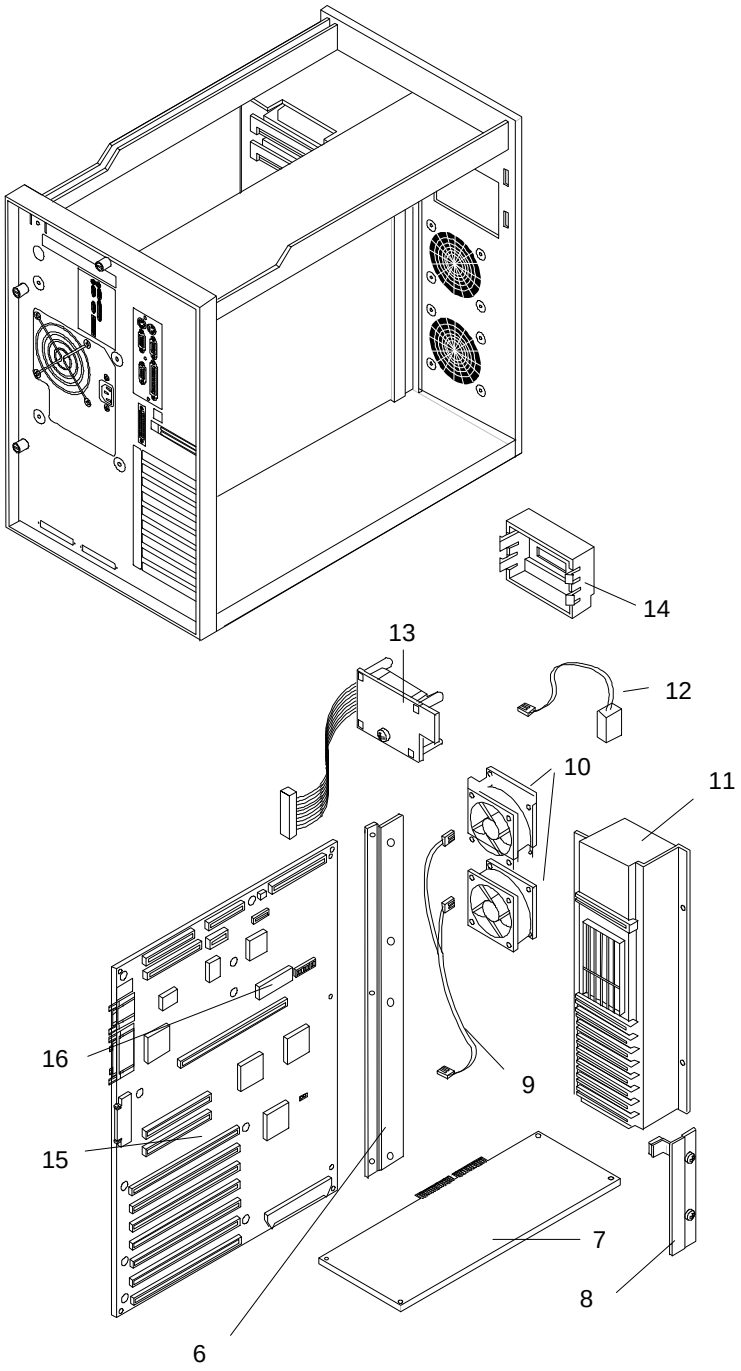

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Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, remove the ROM chip, processor board, any added accessory boards, and keep them with the server under repair.

Fig	Description	Replacement	Exchange
1	LF Cover Assembly	5063-0384	
2	LF Chassis foot	5041-1082	
3	Power Supply (350w)	5063-5690	
4	1.44 MB 3.5" Flexible disk drive	D2035-63004	
5	1 GB SCSI HDD	D2076-63102	D2076-69002
5b	3-pack Hard Disk Drive Trays, 3.5"	D2198A	
5c	3-pack Removable Media Trays,5.25"	D2199A	
6	LF System Board extender	5002-3205	
7a	NS LF 486/66 board w/SIMMs	D3310-63006	D3310-69006
7b**	NS LF/ LC 486/100 Processor Board	D3312-63001	
7c	LF P5 board - no processor or SIMMs	D3314-63002	
7d	256 KB Cache Module	0960-0899	
7*	Bracket - CPU Board	5002-3243	
8	LF EISA/PCI hold down plate	5002-3214	
9	Cable for 2 Fans	5182-0007	
10	Fan Assembly	5063-0307	
11	LF Card Guide Assembly	5063-0385	
12	Battery	1420-0513	
13	LF Control Panel PCA	5063-0382	
14	LF Control panel Assembly	5063-0381	
15	LF SYS Board - non ROM	D2976-63001	D2976-69004
16a	486 System ROM	D3310-80201	
16b	LF P5 System ROM (Pentium)	D3314-80201	
*	486 DX2/66 with heat sink	5063-5606	
*	486 DX4 100	5063-5640	
*	Pentium/66 chip	1821-1734	
*	4 MB SIMM 70ns	D2974-63001	
*	8 MB SIMM 70ns	D2975-63001	D2975-69001
*	16 MB SIMM 70ns	D2297-63001	D2297-69001
*	32 MB SIMM 70ns	D2298-63001	D2298-69001
*	CD-ROM Drive	D2992-63003	
*	Internal Floppy Cable	5182-0015	

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Fig	Description	Replacement	Exchange
*	Internal IDE-HDD Cable	5182-0016	
*	LF SCSI Cable	5182-0066	
*	LF SCSI terminator (Slick)	0960-0888	
*	Diagnostic Assistant Diskette	5011-1941	

* Not on exploded view

** Directly replaces 486/66 Processor Board in later model systems. For earlier systems (Serial No. xxxxS8xxxx or xxxxS0xxxx) use this board, plus 256 KB cache (0960-0899), plus bracket (5002-3243)

Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Danish	C1405-60316
Arab/French	C1405-60325	Fr-Canada	C1405-60302
Portuguese	C1405-60327	German	C1405-60303
Cyrillic	C1405-60330	Spanish	C1405-60304
Japan/Kanji	C1414-60001	French	C1405-60305
Italian	C1405-60317	Norwegian	C1405-60309
Arab/English	C1405-60320	Swiss	C1405-60311
Korea/Hangu	C1405-60321	Swedish	C1405-60312
Taiwan	C1405-60323	UK	C1405-60313

Power Cords

Language	HP Part Number	Language	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

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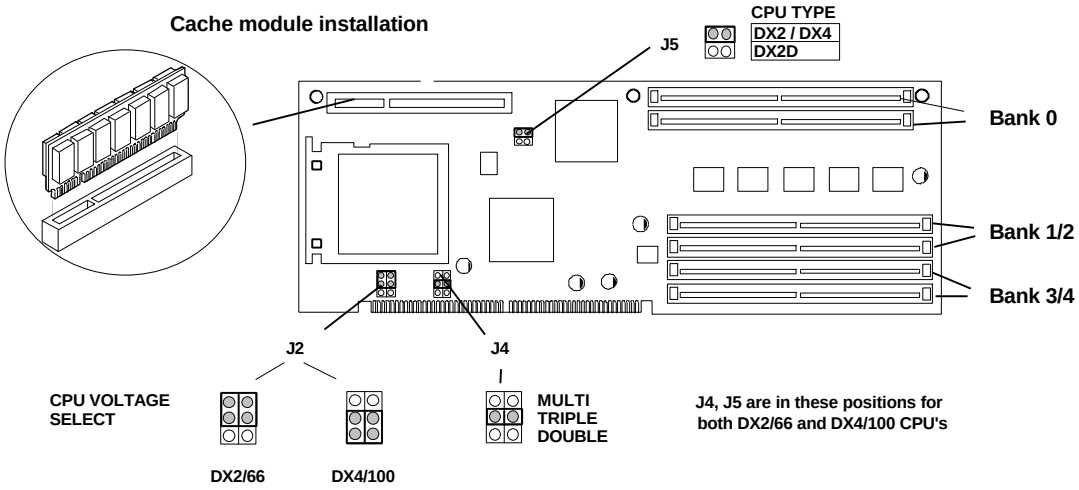
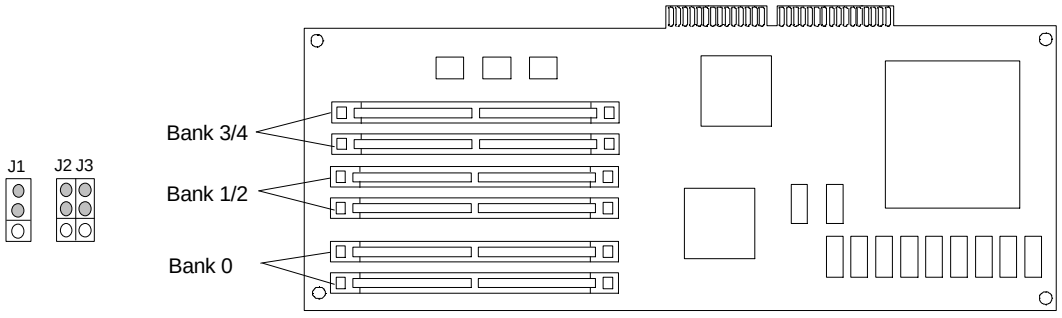
Processor Boards

New 486/66 Processor Board



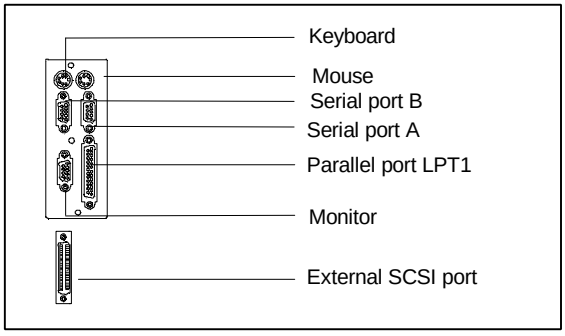
Old 486/66 Processor Board



Note: No options on the Pentium/66 Board

System Board

IO Panel
Connectors
Side view



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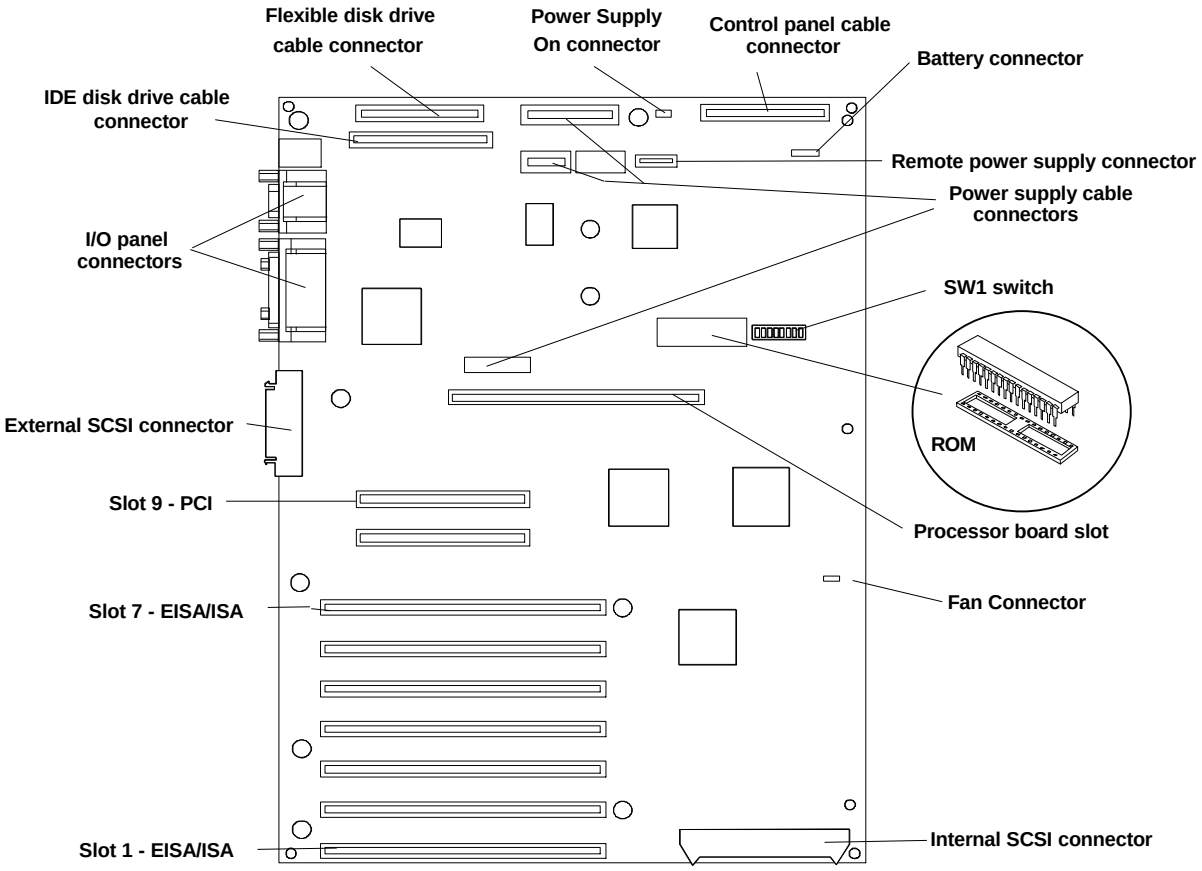

Connectors

Connector	Number	Connector	Number
IDE disk drive cable	J21	Flexible disk drive	J22
Keyboard	J25	Mouse	J25
Video	J26	Parallel	J24
Serial	J26, J24	SCSI port A	J1
SCSI port B	J27	EISA/ISA slots	J11-J17
PCI slots	J19-J20	Fan	J2
Power supply	J9, J18, J23	Remote power supply	J6
Battery	J4	Control panel	J3
Processor board slot	J25	ROM	U14
Power supply on	J7		

System Board Connector J6

This connector is used by the HP Remote Assistant Accessory, a 32-bit EISA Bus Master board used to remotely monitor server functionality. For additional information on this product, see the documentation that comes with it. When you install the HP Remote Assistant cable, you will need to remove the jumper on PS REMOTE and PS ON. If you remove HP Remote Assistant from the server, **you must reinstall the jumper for the server to boot**.

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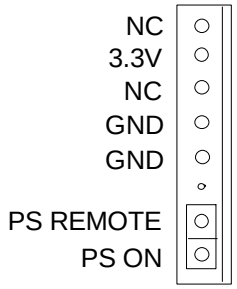
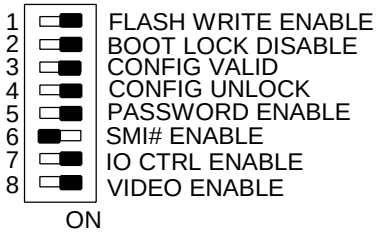


SW1 Switch and Default Settings



Switch	Function	Default
1	**FLASH WRITE ENABLE:** Enables or disables one of the two levels of flash ROM write protection (the other level of protection is controlled by the HP Update Utility). **ON:** The BIOS can be updated by the HP Update Utility. **OFF:** The BIOS is locked and cannot be updated.	ON
2	**BOOT BLOCK DISABLE:** Reserved. Must be set to ON for system to operate properly.	ON
3	**CONFIG VALID**: Saves or erases the current configuration information in NVRAM and CMOS. **ON:** Saves the current configuration. **OFF:** Erases the current system configuration.	ON
4	**CONFIG UNLOCK**: Prevents or allows the current system configuration maintained in NVRAM and CMOS to be changed. **ON**: Unlocked. Allows the current system configuration to be changed. **OFF**: Locked. Prevents the current system configuration from being changed.	ON
5	**PASSWORD ENABLE**: Enables or erases the power-on password maintained in NVRAM. **ON**: Power-on password functional. **OFF**: Erases the current power-on password.	ON
6	**SMI# ENABLE: Not used. Leave set on default.** **OFF:** Prevents SMI interrupt.	OFF
7	**IO CTRL ENABLE**: Enables or disables onboard flexible disk drive controller, IDE controller, and serial and parallel ports. **ON**: I/O controller enabled. **OFF**: I/O controller disabled.	ON
8	**VIDEO ENABLE:** Enables or disables built-in video. Disable the built-in video only if you have a separate video board installed in the server. **ON**: Enables built-in video. **OFF**: Disables built-in video.	ON

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Memory

Memory for the HP NetServer LF is installed on the processor board. The Intel 486 processor board has 8 MB of single-density base memory installed in bank 0. This memory is not customer removable and **can only be single-density**. There are two banks (four sockets) available for expansion memory which can be single or double density. The maximum memory supported is 136 MB (4 x 32 MB + 8 MB).

The Pentium processor board has 16 MB of removable base memory installed. There are two more banks (four sockets) available for expansion. The maximum memory supported is 192 MB (6 x 32 MB).

- The server supports 4 MB, 8 MB, 16 MB, and 32 MB (70 ns) SIMMs.
- You must install SIMMs in pairs (called banks) of matching size; the banks, however, can be of different sizes.
- To achieve large memory configurations (greater than 144 MB) with the Pentium processor, you must remove and replace the SIMMs that are already installed in the server.

Video Memory

No additional video memory can be installed in the HP NetServer LF. Current video memory is 512 KB.

Specifications

Power Supply	Auto-ranging 90 to 132 VAC, or 198 to 264 VAC at 47-63Hz
Power Availability	386W continuous; 458W peak
Power Consumption	551/529W maximum with 110/220V supply 654/627W peak with 110/220V supply
System Dimensions	19.3 in. high x 13.7 in wide x 18.1 in deep (49 cm high x 34.8 cm wide x 46 cm deep)
System Weight	50-70 lbs depending on configuration (22.7-31.8 kg)
Operating Temperature	41 to 95 degrees F (5 to 35 degrees C)
Operating Humidity	20% to 80% non-condensing

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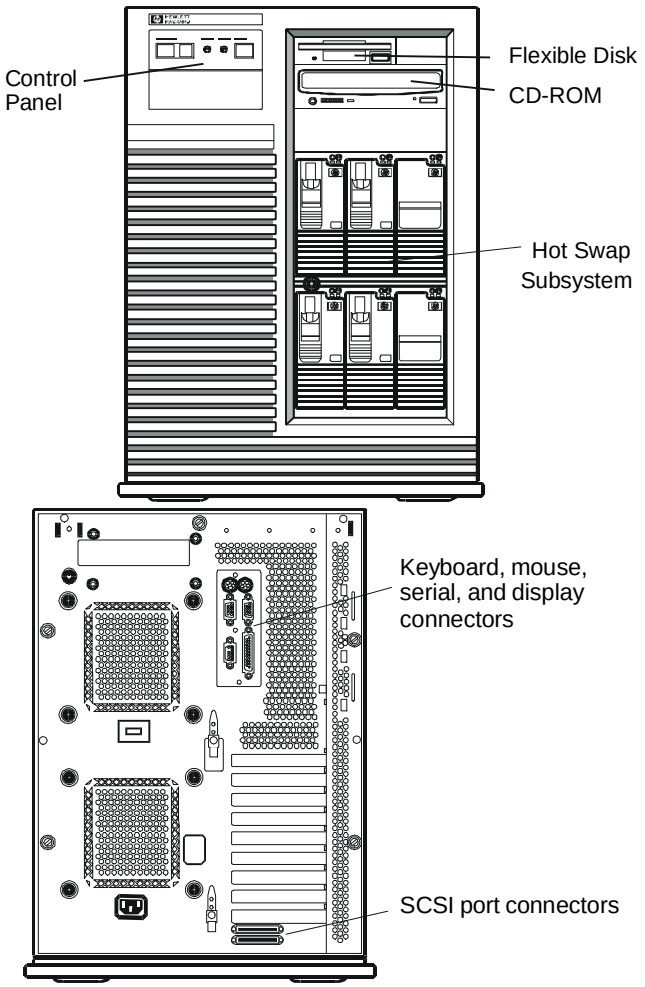
System Views



HP NetServer LH Pro

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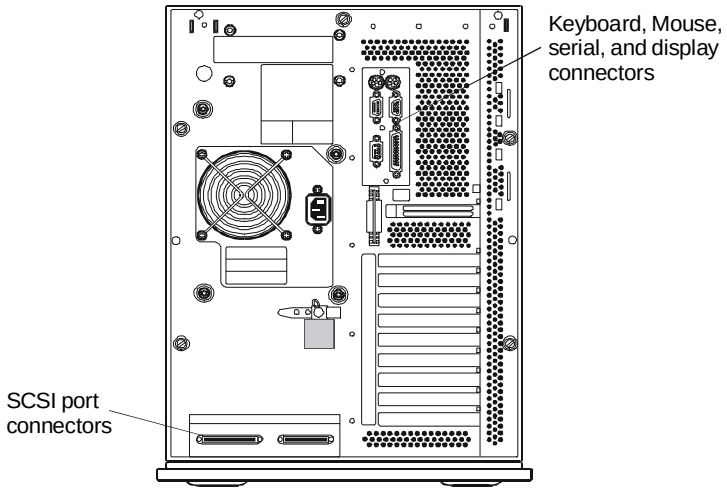
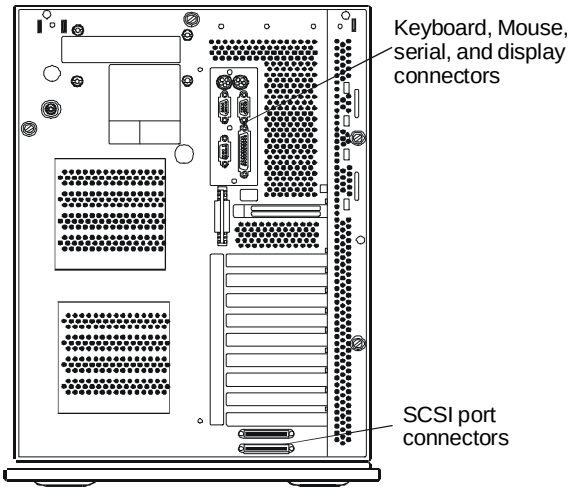


HP NetServer LH



HP NetServer LH Plus

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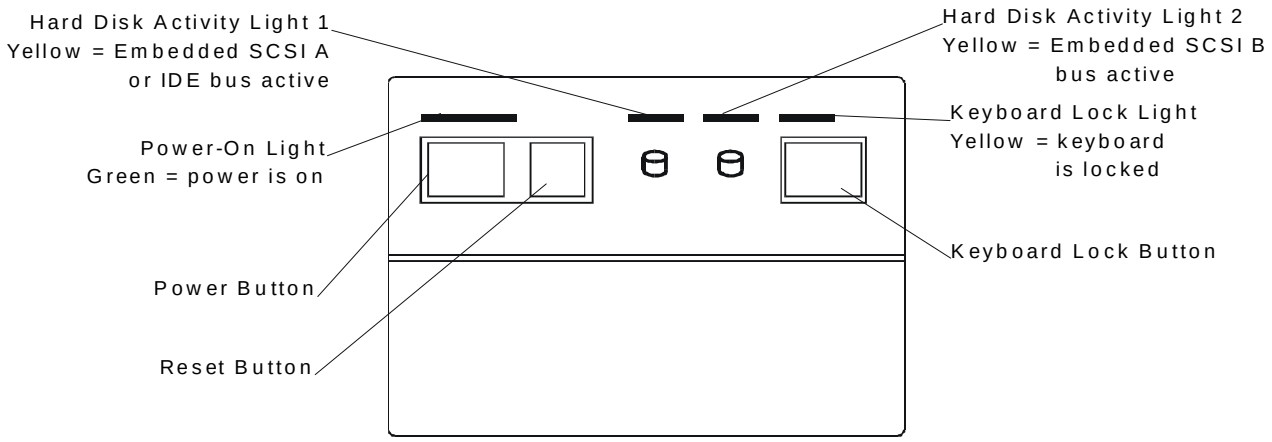
Control Panel



The following list describes each item on the control panel.

Power Button	Turns the HP NetServer on and off. Note that when the HP NetServer is turned off, the power to the internal circuitry and mass storage devices is disabled; however, AC power is still applied to the power supply. **Always disconnect the power cord before removing the cover.**
Power-On Light	Green when the HP NetServer is on.
Reset Button	Restarts the HP NetServer. You can press this button if the HP NetServer "hangs" or "locks up"—it has the same effect as turning the HP NetServer off and on. Save any work before pressing the reset button. Any information not saved is lost when the HP NetServer shuts down.
Hard Disk Activity Light 1	Yellow indicates activity on the Embedded SCSI A bus or IDE bus.
Hard Disk Activity Light 2	Yellow indicates activity on the Embedded SCSI B bus.
Keyboard Lock Button	Prevents unauthorized use of the keyboard. Press the keyboard lock button to lock the keyboard. Enter the password to unlock the keyboard. For more information, see **Setting Keyboard Lock Button**.
Keyboard Lock Light	Yellow when the keyboard is locked.

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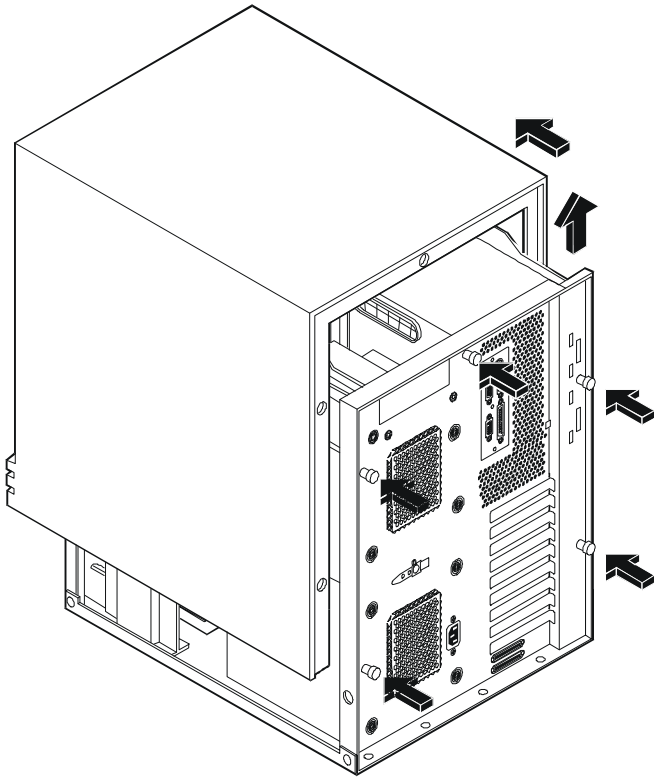
Cover

CAUTION	The cover is an integral part of the server. The server must be operated with the cover in place to ensure proper airflow for continued reliability and to maintain compliance with radio frequency interference and safety standards.



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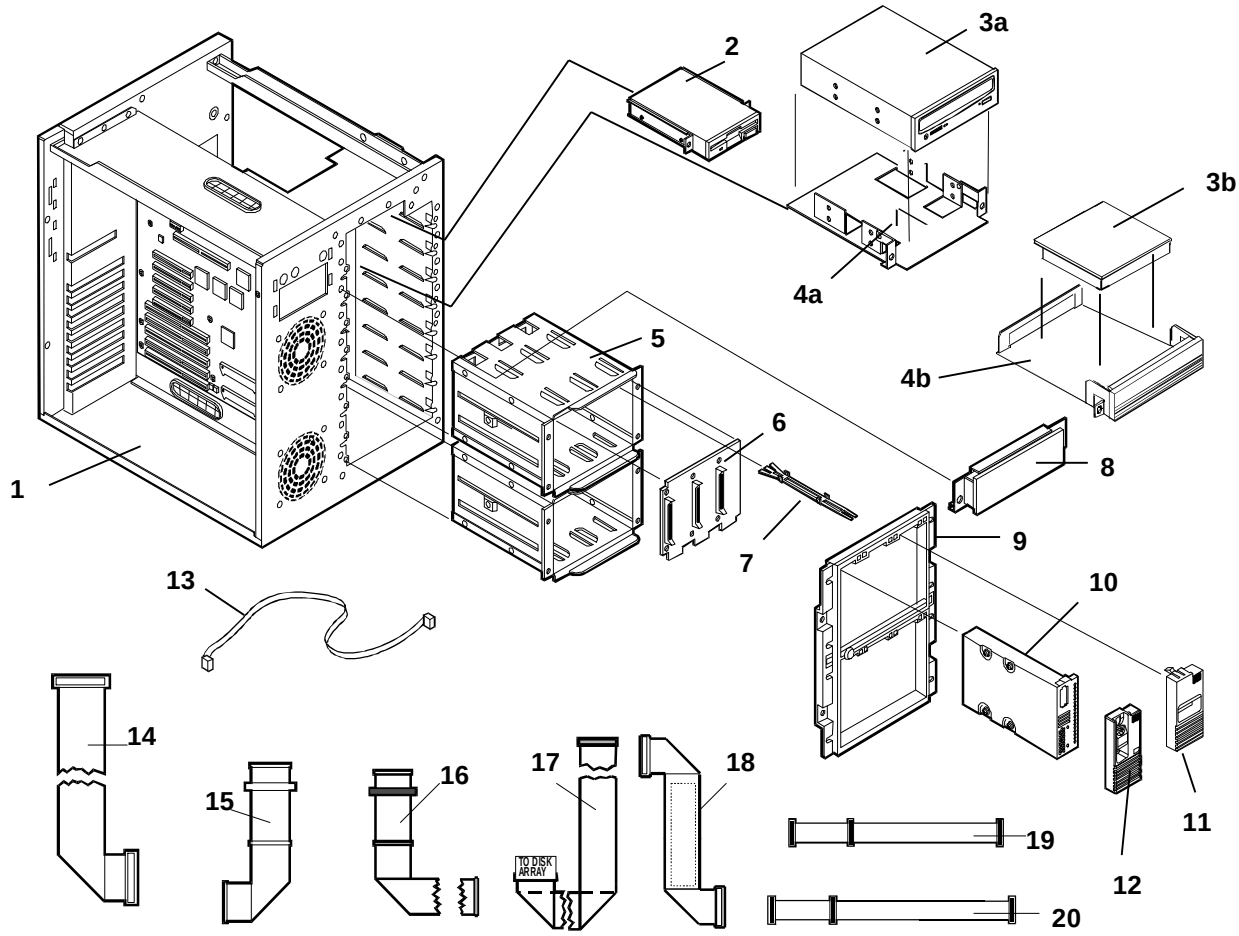
HP NetServer LH Exploded Views



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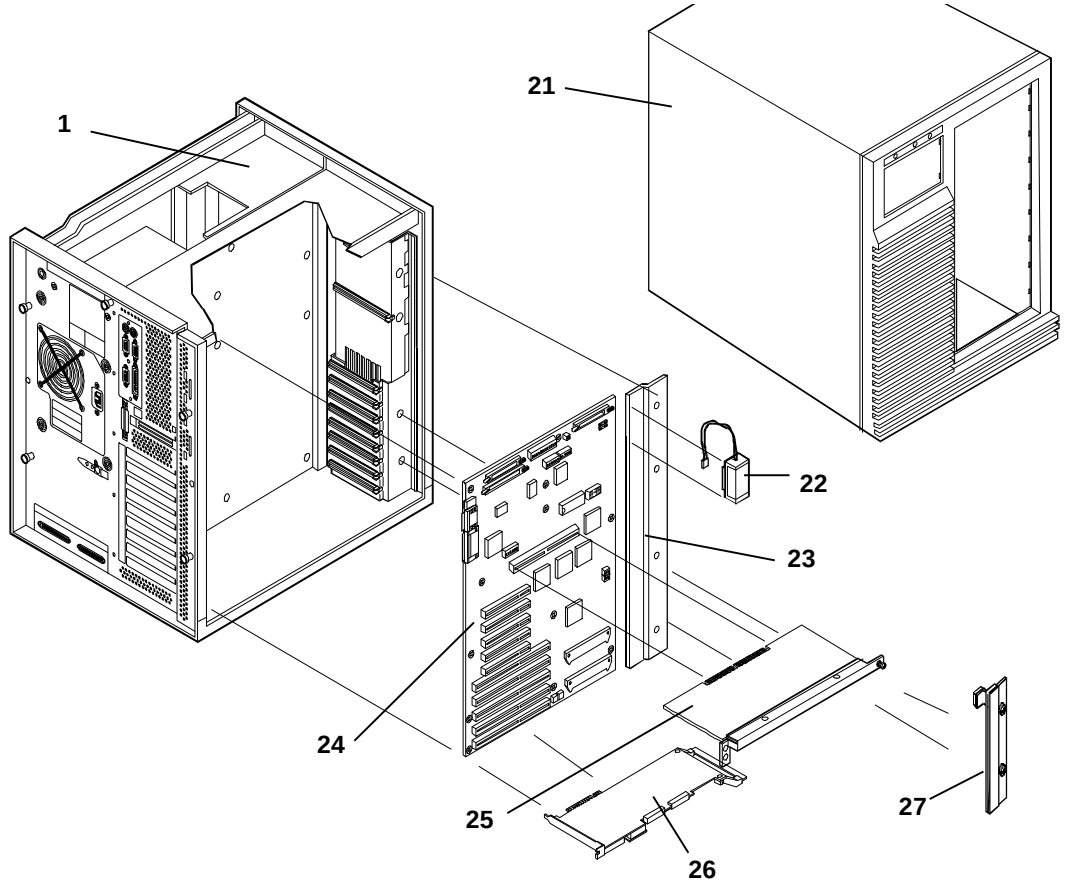

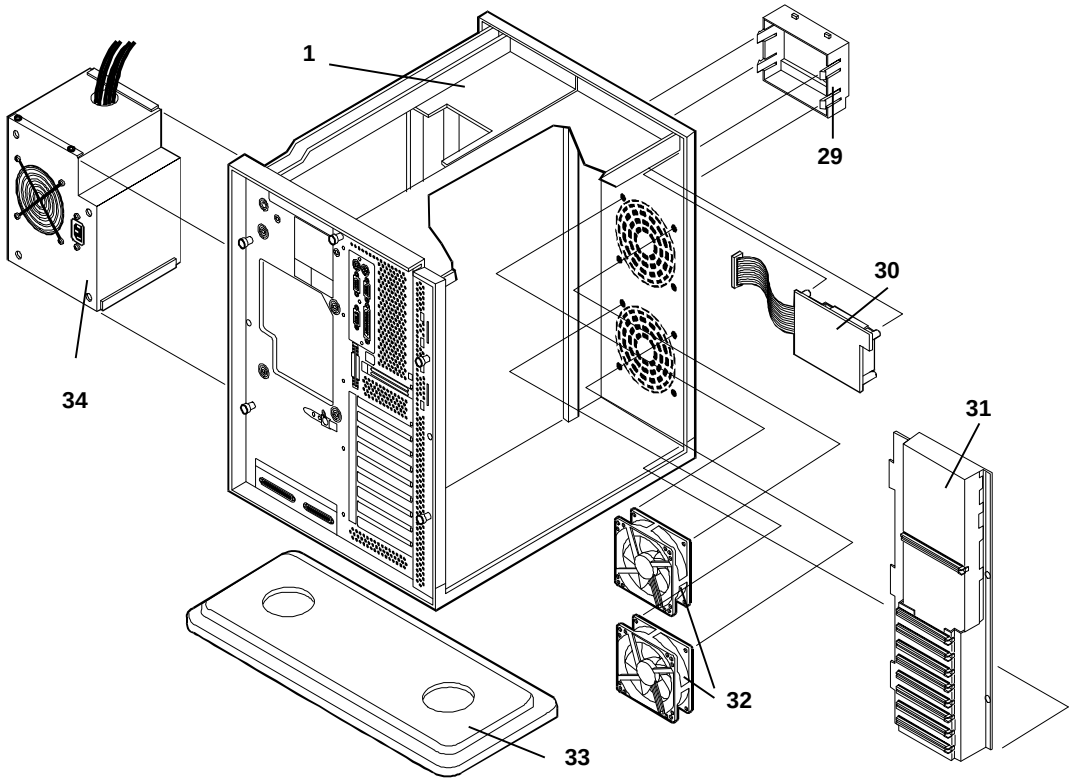

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HP NetServer LH Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number.

If a system board needs to be replaced, remove processor board and any added accessory boards, and keep them with the server under repair.

***** This part is not on an exploded view.

Fig #	Description	Replacement	Exchange
1	Chassis Assembly	Not orderable	
2	1.44 MB 3.5" Flexible Disk Drive	D2035-60004	
3a	CD-ROM Drive	D2992-63003	
3b	1 GB SCI HDD	D3581-63001	D3581-69001
3b	2 GB SCSI HDD	D3582-63001	D3582-69001
3b	4 GB SCSI HDD	D3583-63001	D3583-69001
4a	5 1/4 inch tray	D2199A	
4b	3 1/2 inch tray	D2198A	
5	Hot Swap Cage	5063-5671	
6	Hot Swap Cage PCA	5063-5672	
7	Hot Swap Light Pipe	5041-1099	
8	Upper Drive Slot Cover	Not orderable	
9	Hot Swap Cage Bezel w/lock	5063-5673	
10	Disk module tray kit	D3349A	
11	Hot Swap Module Slot Cover	5063-5676	
12	Hot Swap Disk Module Cover Lock Replacement	5603-8301	
13	I^2C cable	5182-4535	
14	Wide 68-Pin Internal SCSI Cable (C2)	5182-4521	
15	Narrow 50-Pin SCSI-2 Cable with terminator (C1)	5182-4522	
16	Narrow 50-Pin SCSI-2 Cable (C6)	5182-4564	
17	Narrow 50-Pin Channel A/B SCSI-2 Cable (C5)	5182-4552	
18	Wide 68-Pin SCSI-2 Cable(C4)	5182-4523	
19	Internal Flexible Disk Cable	5182-0015	
20	Internal IDE-HDD Cable	5182-4570	
21	Cover	5063-0384	
22	Battery	1420-0502	
23	System Board Extender	5002-3205	
24	LH System Board	D3350-63001	D3350-69001
25	LH 100 MHz Pentium Processor Board	D3356-63001	D3356-69001
25	LH 100D Dual Pentium Processor Board	Future release	

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Fig #	Description	Replacement	Exchange
	Bracket-CPU Mount	5002-3243	
26	HP DAC Controller Board		
27	PCI Hold Down Bracket	5002-3279	
29	LH Control Panel Bezel	5063-0381	
30	LH Control Panel PCA	5063-0382	
31	Cardguide Assembly	5063-5697	
32	Fan Assembly	3160-1004	
33	Chassis Foot	5041-1082	
34	Power Supply - 350W	5063-5690	
*	LH System ROM	D3353-80204	
*	LH P75 CPU Chip	1821-1717	
*	LH P100 CPU Chip	1821-1669	
*	LH ZIF Heat Sink	1205-0812	
*	LH SAZ Heat Sink	Future release	
*	4 MB Parity SIMM	D2974-63001	D2974-69001
*	8 MB Parity SIMM	D3577-63001	D3577-69001
*	16 MB Parity SIMM	D2297-63001	D2297-69001
*	32 MB Parity SIMM	D3578-63001	D3578-69001
*	8 MB ECC-on-SIMM	D3597-63001	D3597-69001
*	16 MB ECC-on-SIMM	D3592-63001	D3592-69001
*	32 MB ECC-on-SIMM	D3593-63001	D3593-69001
*	Hot Swap Cage key	5182-4534	
*	LH SCSI Cable Kit	D3588-60001	
*	HP Navigator CD-ROM	5063-8343 **	
*	Diagnostic Assistant Diskette	5011-1926	

** This part number is constantly revised. When you order this CD-ROM, you will be sent the latest revision.

Mass Storage Cables

Some configurations need additional cables. Additional cables can be obtained by ordering the HP Cable Kit - Part Number D3588-60001. Only the following HP cables are supported:

Cable	Part Number	Included in Kit
Narrow SCSI (50 pin) cable with built-in terminator	5182-4522	No
Fast wide SCSI (68 pin) cable	5182-4521	Yes
Fast wide SCSI (68 pin) cable	5182-4523	Yes
Narrow SCSI (50 pin) internal cable	5182-4552	No
Narrow SCSI (50 pin) internal cable with built-in terminator	5182-4564	Yes
Narrow SCSI (50 pin) cable with external connector	5182-4565	Yes

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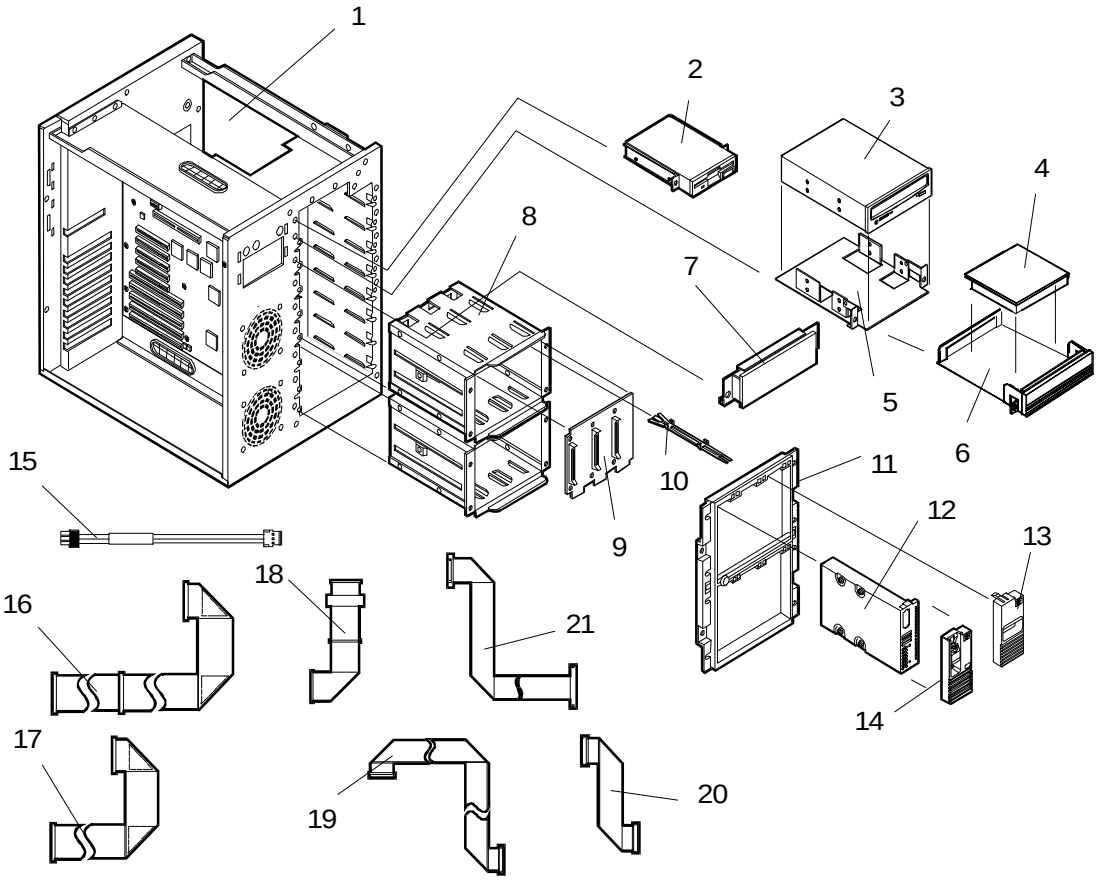
HP NetServer LH Plus Exploded Views



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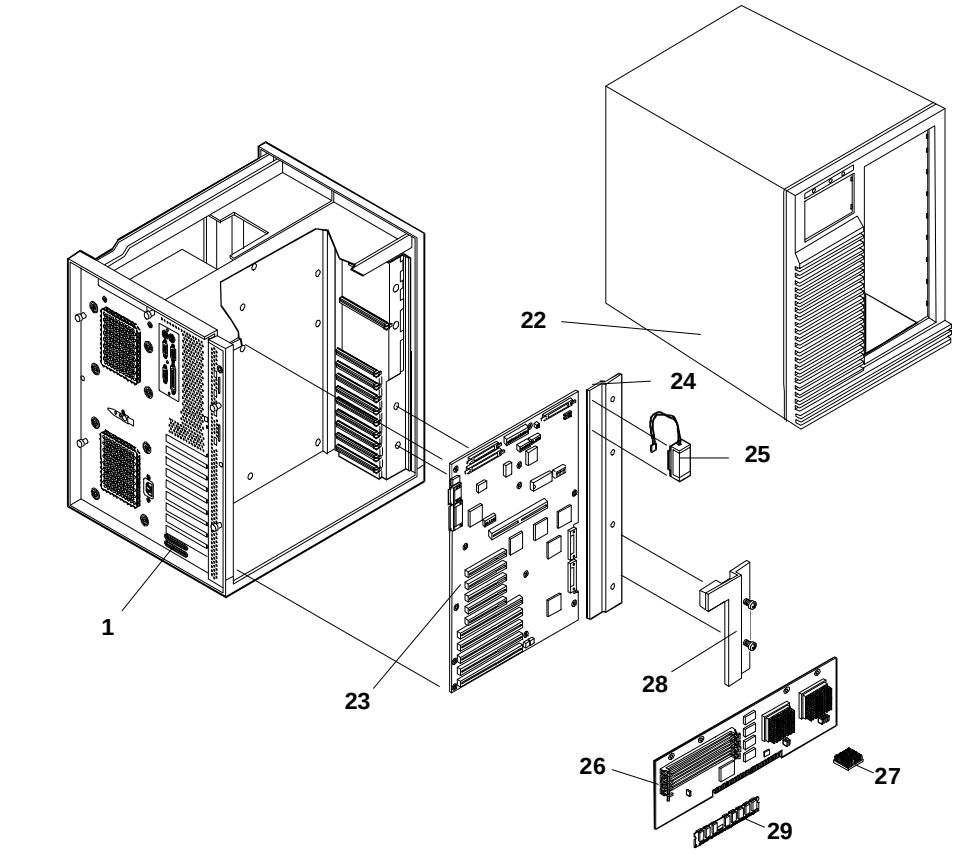

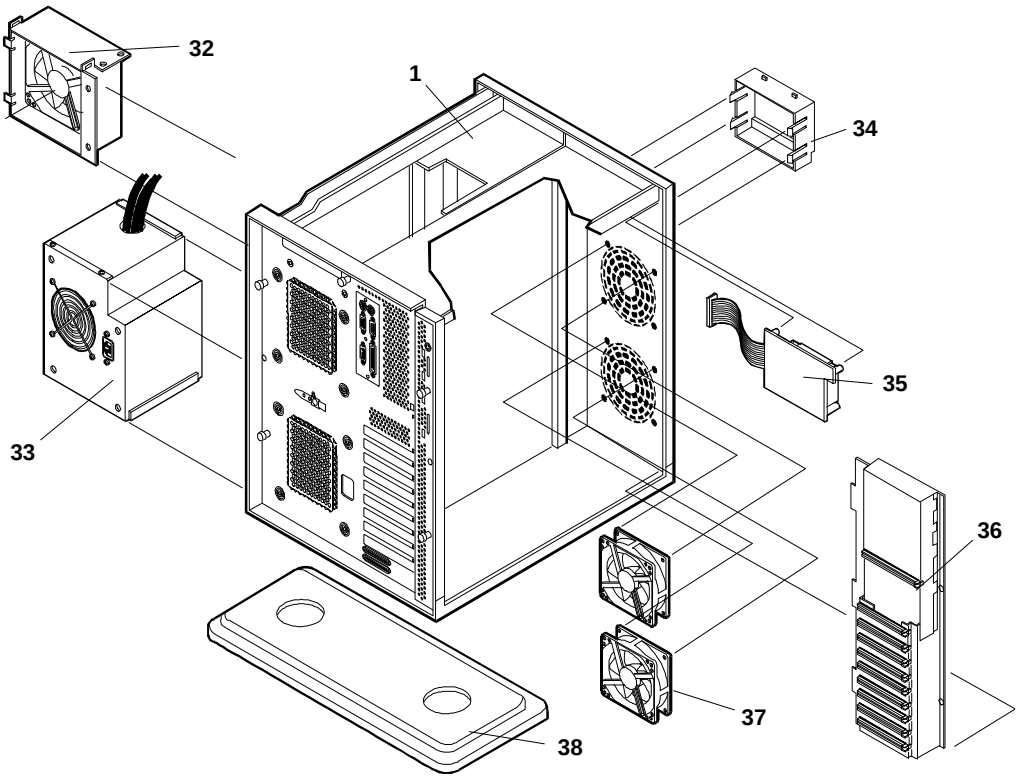

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HP NetServer LH Plus Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, remove processor board and any added accessory boards, and keep them with the server under repair.

Fig	Description	Replacement	Exchange
1	Chassis Assembly	Not orderable	
2	1.44 MB 3.5" Flexible Drive	D2035-63121	
3	CD-ROM Drive	D2992-60004	
4a	2 GB SCSI HDD	D2077-63110	D2077-69001
4b	4 GB SCSI HDD	D3341-63001	D3341-69001
5	5 1/4 inch tray	C2260-00025	
	Tray CD-ROM	D2199A	
6	3 1/2 inch tray	D2198B***	
	Tray HDD - non hot swap	C2260-60078	
*	Tray Bezel - new color	5064-0715	
7	Upper Drive Slot Cover	5063-8389	
8	Hot Swap Cage	5063-5671	
9	Hot Swap Cage PCA	5063-5672	
10	Hot Swap Light Pipe	5041-1099	
11	Hot Swap Cage Bezel w/lock	5063-8390	
12	Disk module tray kit	D3349B	
13	Hot Swap Module Slot Cover	5063-8391	
14	Hot Swap Disk Module Cover Lock Replacement	5063-8398	
15	I^2C cable B1	5182-4535	
16	Internal Flexible Disk Cable	5182-6789	
17	Internal IDE-HDD Cable	5182-6788	
18	Cable, Int SCSI Extension C11	5182-6748	
19	Cable, Int SCSI (Wide) C22	5182-6746	
20	Cable, Intl SCSI Bridge C14	5182-6747	
21	Cable, External SCSI C23	5182-6749	
22	Cover	5063-8378	
23	System Board	D4248-63001	4248-69001
24	System Board Extender	5002-3722	
25	Battery	1420-0502	
26	Dual Pentium Board	D4256-63001	D4256-69001
*	Pentium P133 Chip	1821-2295	
*	Pentium P166 Chip	1821-2244	

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Fig	Description	Replacement	Exchange
27	Processor Heat Sink/clip	1205-0832	
28	PCI Hold Down Bracket	5063-3279	
29a	16 MB - DIMM	D4294-63001	D4294-69001
29 b	32 MB - DIMM	D4295-63001	D4295-69001
29c	64 MB - DIMM	D4296-63001	D4296-69001
29 d	128 MB -DIMM	D4297-63001	D4297-69001
32	Rear Fan Cage	5064-0701	
33	Power Supply - 350W	5063-8369	
34	Control Panel Bezel	5063-8380	
35	Control Panel PCA	5063-0382	
36	Card guide Assembly	5063-5697	
37	Front Fan	5063-8386	
38	Chassis Foot	5042-2122	
39	Power Management Board	D4840-60001	
*****	Hot Swap 2 GB HDD	D3582-63002	D3582-69002
*****	Hot Swap 4 GB HDD	D3583-63002	D3583-69002
*****	Key Lock Assembly	5063-5683	
*****	HP PCI DAC Board	C3610-63050	C3610-69050
*****	System ROM	D4248-80203	
*****	Hot Swap Cage key	5182-4534	
******	HP Navigator CD-ROM		
******	Diagnostic Assistant Disk		
*****	Mouse	C3751-60201	

* This part is not on the exploded view.

** This part number is constantly revised. When you order this CD-ROM, you will be sent the latest revision.

*** The B version will be available fourth quarter 1997.

HP NetServer LH Plus Mass Storage Cables

Cabling Label	Location	Description	Part Number	Cable Kit D4845A
C11	Hot swap SCSI backplane to-CD-ROM or other device	Narrow SCSI (50 pin) cable with built-in terminator	5182-6748	No
C14	Intl hot swap backplane-to-backplane	Fast/wide SCSI (68 pin) cable	5182-6747	Yes
C22	Intl SCSI port to hot swap backplane	Fast/wide SCSI (68 pin) cable	5182-6746	Yes
C23	Intl SCSI port to extl SCSI port cable	Fast/wide SCSI (68 pin) extl connector	5182-6749	No

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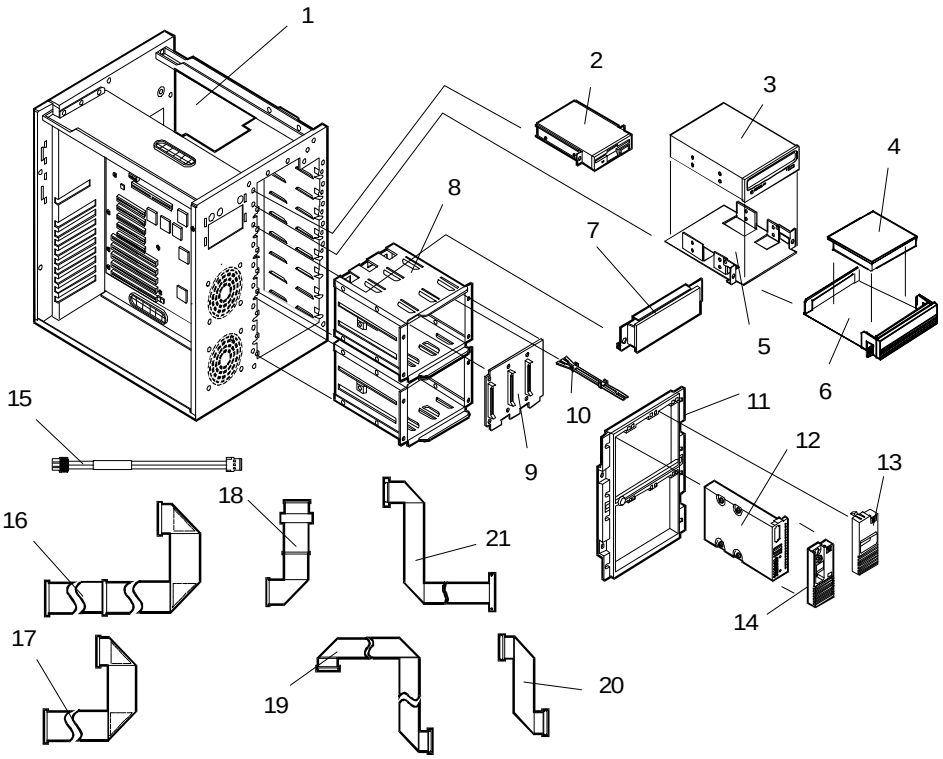
A	Intl narrow (50-pin) to wide (68-pin) adapter	Fast/wide SCSI adapter (50 pin to 68 pin)	5182-4550	Yes
B1	I^2C cable, system board to hot-swap backplane	3-pin I^2C cable	5182-4535	No

HP NetServer LH Pro Exploded Views



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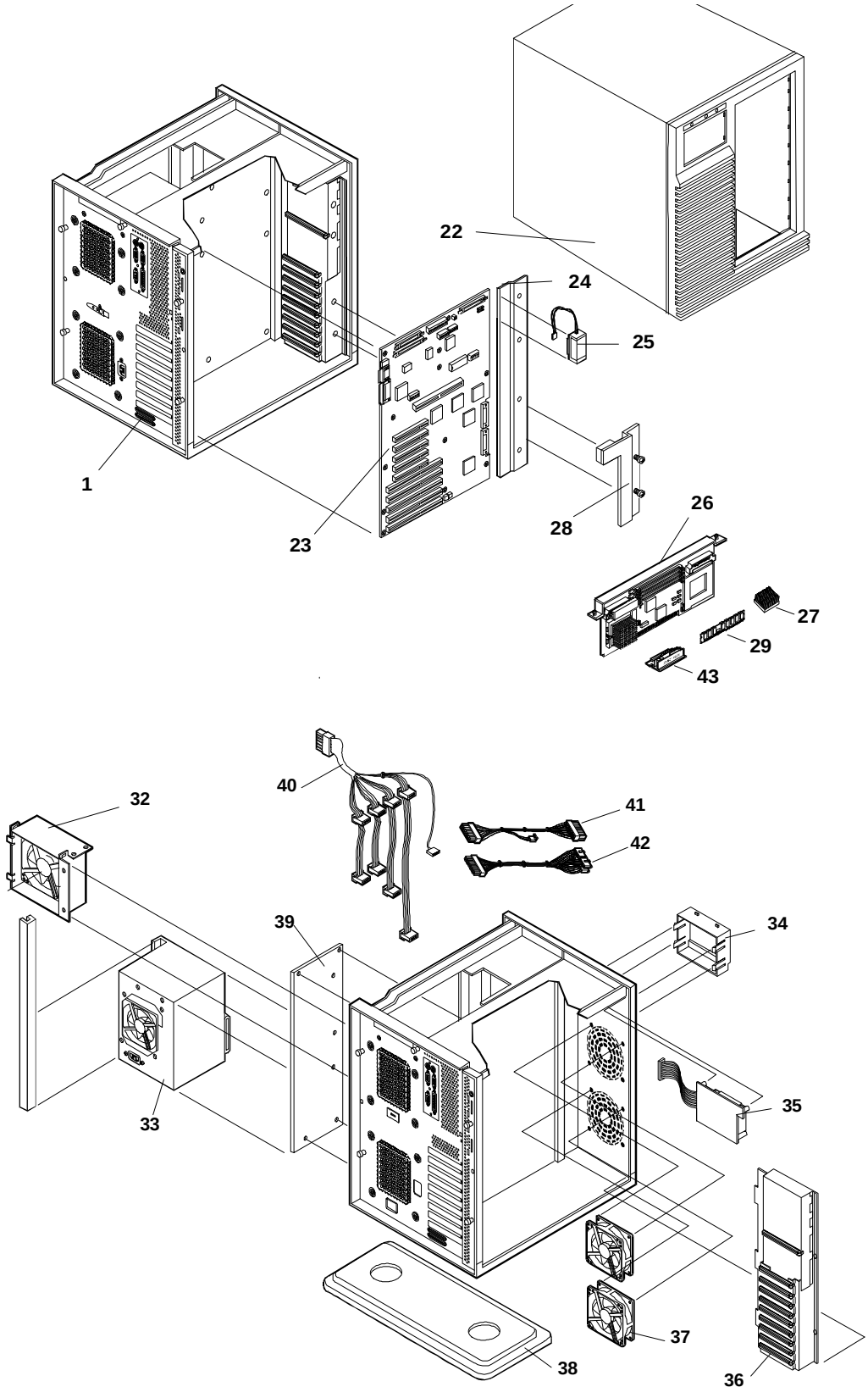

HP NetServer LH Pro Replaceable Parts List

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Fig	Description	Replacement	Exchange
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2	1.44 MB 3.5" Flexible Disk Drive	D2035-63121	
3	CD-ROM Drive	D2992-60004	
4a	2 GB SCSI HDD	D2077-63110	D2077-69001
4b	4 GB SCSI HDD	D3341-63001	D3341-69001
5	5 1/4 inch tray	D2199B	
	Tray CD-ROM	C2260-60078	
6	3 1/2 inch tray	D2198B***	
	Tray HDD - non hot swap	C2260-00025	
*	Tray Bezel - new color	5064-0715	
7	Upper Drive Slot Cover	5063-8389	
8	Hot Swap Cage	5063-5671	
9	Hot Swap Cage PCA	5063-5672	
10	Hot Swap Light Pipe	5041-1099	
11	Hot Swap Cage Bezel w/lock	5063-8390	
12	Disk module tray kit	D3349B	
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14	Hot Swap Disk Module Cover Lock Replacement	5063-8398	
15	I^2C cable B1	5182-4535	
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19	Cable, Internal SCSI (Wide) C22	5182-6746	
20	Cable, Internal SCSI Bridge C14	5182-6747	
21	Cable, External SCSI Port C23	5182-6749	
22	Cover	5063-8378	
23	System Board	D4248-63001	D4248-69001
24	System Board Extender	5002-3722	
25	Battery	1420-0502	
26	Dual Pentium Processor Board	D4842-63001	D4842-69001
	Pentium P6 200 Processor Chip	1821-2528	
27	Heat Sink	5182-9378	
	Heat Sink Clip	5182-9344	
28	PCI Hold Down Bracket	5063-3279	
29a	16 MB - DIMM	D4294-63001	D4294-69001

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Fig	Description	Replacement	Exchange
29b	32 MB - DIMM	D4295-63001	D4295-69001
29c	64 MB - DIMM	D4296-63001	D4296-69001
29d	128 MB -DIMM	D4297-63001	D4297-69001
32	Rear Fan Cage	5064-0701	
33	Power Supply - 410W (upper or lower location)	5063-8367	
34	Control Panel Bezel	5063-8380	
35	Control Panel PCA	5063-0382	
36	Card guide Assembly	5063-5697	
37	Front Fan	5063-8386	
38	Chassis Foot	5042-2122	
39	Power Management Board	D4840-60001	
40	Mass Storage Power Supply Cable	5182-6800	
41	System Board Power Cable (18-pin)	5182-6799	
42	System Board Power Cable (24-pin)	5182-6798	
43	Processor Board Voltage Module	0950-3066	
*****	Hot Swap 2 GB HDD	D3582-63002	D3582-69002
*****	Hot Swap 4 GB HDD	D3583-63002	D3583-69002
*****	Key Lock Assembly	5063-5683	
*****	HP PCI DAC Board	C3610-63050	C3610-69050
*****	System ROM	D4840-80202	
*****	Hot Swap Cage key	5182-4534	
******	HP Navigator CD-ROM		
******	Diagnostic Assistant Diskette		
*****	Mouse	C3751-60201	

***** This part is not on the exploded view.

** This part number is constantly revised. When you order the CD-ROM, you will be sent the latest revision.

*** The B version will be available fourth quarter 1997.

HP NetServer LH Pro Mass Storage Cables

Label	Location	Description	Part Number	Cable Kit D4845A
C14	Intl hot swap backplane-to-backplane	Fast/wide SCSI (68 pin) cable	5182-6747	Yes
C22	Intl SCSI port to hot swap backplane	Fast/wide SCSI (68 pin) cable	5182-6746	Yes
A	Intl narrow (50-pin) to wide (68-pin) adapter	Fast/wide SCSI adapter (50 pin to 68 pin)	5182-4550	Yes
B1	I^2C cable, system board to hot-swap backplane	3-pin I^2C cable	5182-4535	No

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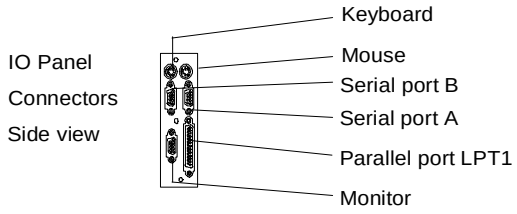
HP NetServer LH Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Danish	C1405-60316
Arab/French	C1405-60325	Fr-Canada	C1405-60302
Portuguese	C1405-60327	German	C1405-60303
Cyrillic	C1405-60330	Spanish	C1405-60304
Japan/Kanji	C1414-60001	French	C1405-60305
Italian	C1405-60317	Norway	C1405-60309
Arab/English	C1405-60320	Swiss	C1405-60311
Korea/Hangu	C1405-60321	Swedish	C1405-60312
Taiwan	C1405-60323	UK	C1405-60313

HP NetServer LH Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

HP NetServer LH System Board and Connectors



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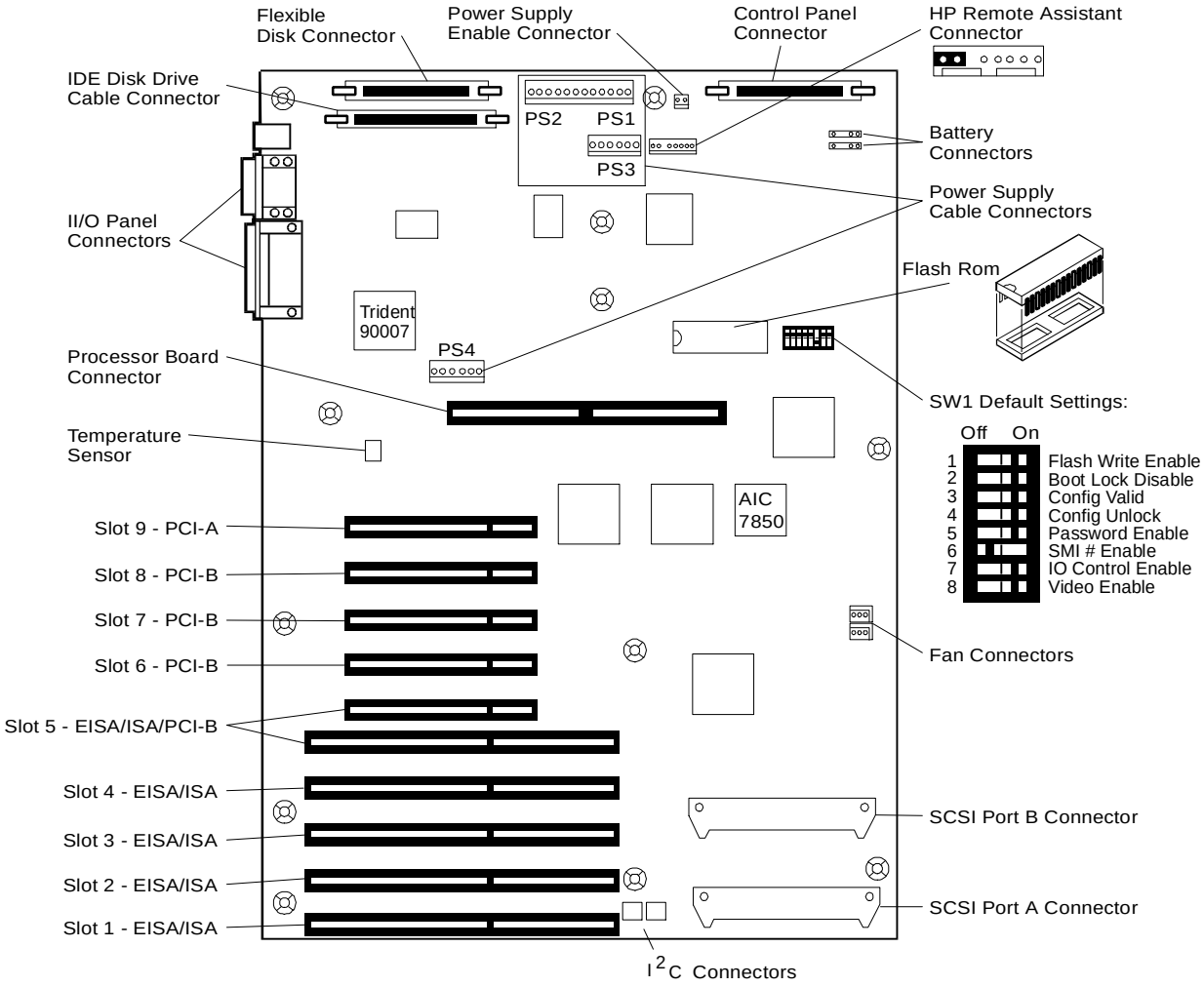

HP NetServer LH System Board Connectors, Switches, and Jumpers

Connector	Number	Connector	Number
IDE disk drive	J9	Flexible disk drive	J15
Keyboard	J3	Mouse	J3
Video	J1	Parallel	J1
Serial	J2	SCSI port A	J26
SCSI port B	J25	Battery	J28, J29
PCI slots	J10 - J14	EISA/ISA slots	J4 - J8
Fans	J30, J31	Control panel	J27
Power supply on	J24	Remote Assistant	J22
Power supply	PS1-J18, PS2-J18, PS3-J19, PS4-J16	I^2C 1, I^2C 2, I^2C	J20, J21, J23
Processor board	J17		

HP NetServer LH Plus/Pro System Board and Connectors

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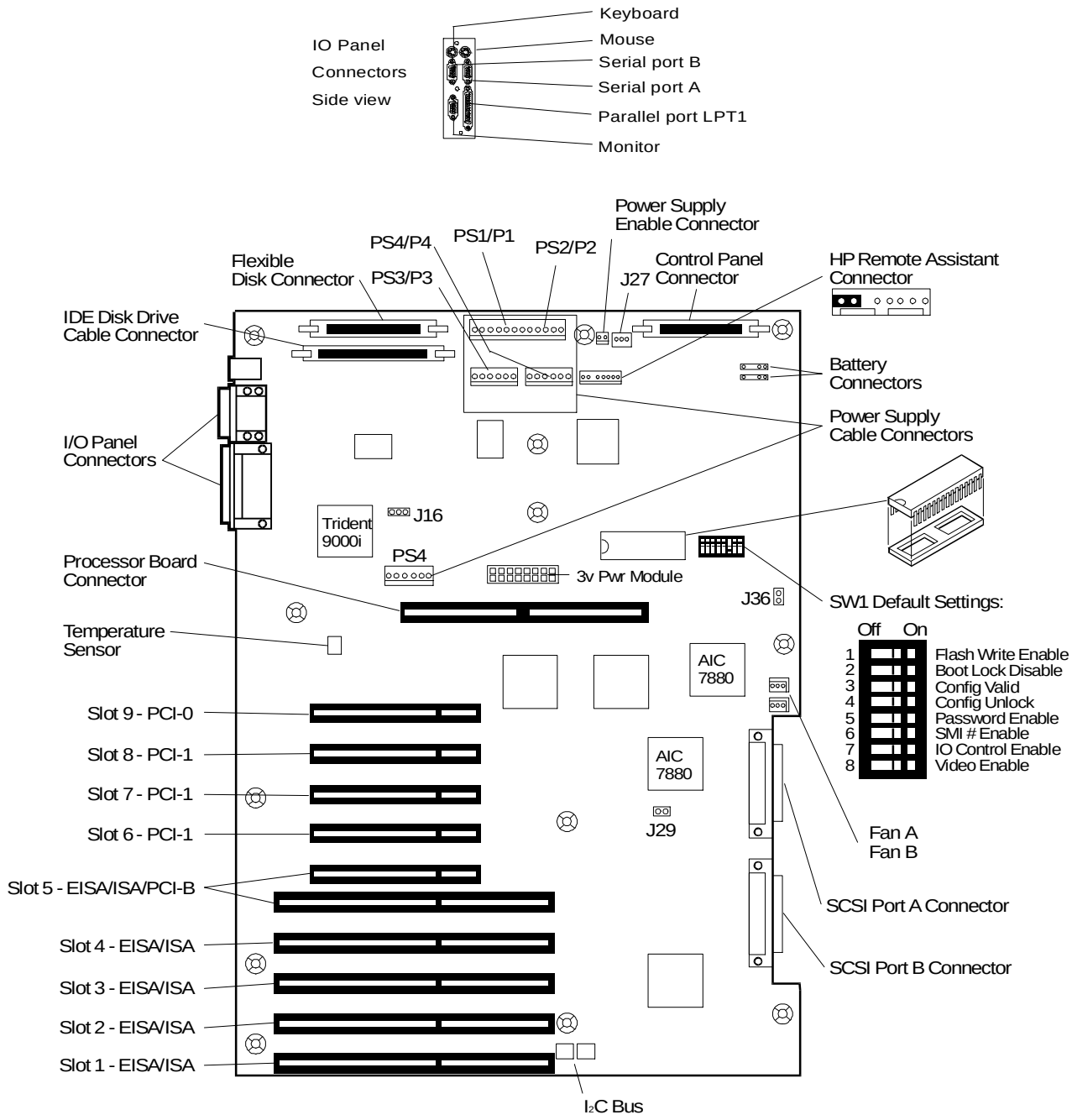

HP NetServer LH Plus / LH Pro System Board Connectors

Connector	Number	Connector	Number
IDE disk drive cable	J9	Flexible disk drive	J15
Keyboard	J1	Mouse	J1
Serial (2)	J2	Parallel	J3
Video	J3	SCSI port A	J33
SCSI port B	J32	Battery A and B	J30, J31
PCI slots	J10 - J14	EISA/ISA slots	J4 - J8
Fans A, B	J34, J35	Control panel	J28

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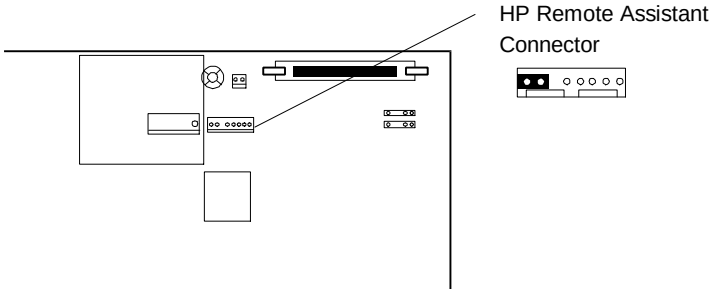
Power supply on A	J26	Remote Assistant	J25
Power supply	PS1-J19, PS2-J19	SCSI A (IN=FAST)	J36
PS3-J20, P4-J122		Color/Monochrome	J16
PS4-J17	I^2C 1	Power supply on B	J27
I^2C 2	J23	-3v Power Module	J21
J24		System Switches	SW1
Processor board	J18	System ROM	U39
SCSI B (IN=FAST)	J29		

System Switches and Jumper Descriptions

Remote Assistant Connector - J22 (LH) and J25 (LH Plus/LH Pro)

This connector is used by the HP Remote Assistant Accessory, a 32-bit EISA Bus Master board used to remotely monitor server functionality. When you install the HP Remote Assistant cable, you need to remove the jumper on **PS REMOTE** and **PS ON**. If you remove HP Remote Assistant from the server, remember to re-install the jumper.



WARNING	If the HP Remote Assistant is not installed and there is no jumper on PS REMOTE and PS ON, the system will NOT power up.

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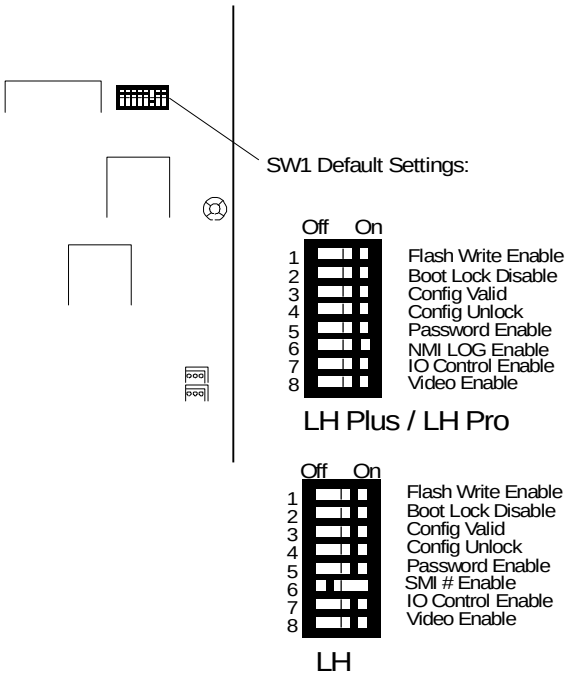
System Board Switch SW1



Switch	Function	Default
1	**FLASH WRITE ENABLE**: Enables or disables one of the two levels of flash ROM write protection (the other level of protection is controlled by the HP Update Utility). ON: The BIOS can be updated by the HP Update Utility. OFF: The BIOS is locked and cannot be updated.	ON
2	**BOOT BLOCK DISABLE:** Reserved. Must be set to ON for system to operate properly.	ON
3	**CONFIG VALID:** Saves or erases the current configuration information in NVRAM and CMOS. ON: Saves the current configuration. OFF: Erases the current system configuration.	ON
4	**CONFIG UNLOCK:** Prevents or allows the current system configuration maintained in NVRAM and CMOS to be changed. ON: Unlocked. Allows the current system configuration to be changed. OFF: Locked. Prevents the current system configuration from being changed.	ON
5	**PASSWORD ENABLE:** Enables or erases the power-on password maintained in NVRAM. ON: Power-on password functional. OFF: Erases the current power-on password.	ON
6	**SMI# ENABLE:** Not used; leave in the default position.	OFF (LH) ON (LH Plus/Pro)

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Switch	Function	Default
7	**IO CTRL ENABLE:** Enables or disables onboard flexible disk drive controller, IDE controller, and serial and parallel ports. ON: I/O controller enabled. OFF: I/O controller disabled.	ON
8	**VIDEO ENABLE**: Enables or disables built-in video. Disable the built-in video only if you have a separate video board installed in the server. ON: Enables built-in video. OFF: Disables built-in video.	ON

HP NetServer LH Memory Configuration

- The following HP SIMMs are supported:

Type	Product Number
8 MB ECC SIMM	D3597A
16 MB ECC SIMM	D3592A
32 MB ECC SIMM	D3593A

- SIMMs must be installed in pairs.
- SIMMs must be installed in sequential order starting with Banks 0/1.

HP NetServer LH Plus/Pro Memory Configuration

The processor board has 4 memory sockets which accept DIMM memory modules. Up to 512 MB of memory can be added. When installing additional memory, note the following:

- Only these HP DIMMs are supported:

DIMM Type	HP Product Number
16 MB DIMM	D4294A
32 MB DIMM	D4295A
64 MB DIMM	D4296A
128 MB DIMM	D4297A
256 MB DIMM	D4926A

- Any combination of DIMMs, listed above, may be used.

NOTE The HP warranty does not cover performance problems, equipment problems, or service calls resulting from the use of non-HP DIMMs.

LH Plus/Pro Processor Board LED Blink Codes

The Processor board in the NetServer LH Plus or Pro contains LEDs that can indicate memory errors and processor errors. When a memory error exists, the LEDs are either on, off, or flash repeatedly a constant memory error code. The table below describes each of these codes. If the memory error indicates a failed DIMM, replace the DIMM. When a processor error exists, the LEDs alternate between two codes (i.e., ON-OFF-OFF-OFF and OFF-ON-ON-ON).

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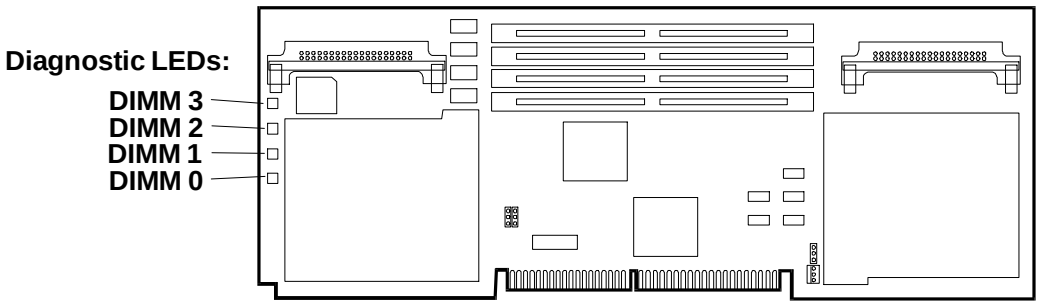
On = Steady green
Flash = Regular, slow flash (1 Hz)
Blink = Regular, fast flash
Double-blink = Irregular, double-flash

The diagnostic LEDs are located on the the processor board, are labeled DIMM 0 through 3, and correspond to DIMM sockets 0 through 3. The LEDs are visible from either side of the board, and can also be viewed through the NetServer's rear panel cooling perforations.



Memory Error Codes

LED Code	Definition	Action
Off	No DIMM installed or	N/A (Normal)
	Non-EEPROM DIMM installed	Reseat the DIMM or Move it to another socket or Replace DIMM
On	HP DIMM installed	N/A (normal)
Flash	Inappropriate HP DIMM installed or	Replace with appropriate HP DIMM or Run Diagnostic Assistant to find the problem
	Hard memory error	Run Diagnostic Assistant to find the problem
Blink	Non-HP DIMM installed	N/A (normal for non-HP DIMM)
Double Blink	Inappropriate non-HP-DIMM installed or Hard memory error	Replace with appropriate DIMM or Run Diagnostic Assistant to find the problem Run Diagnostic Assistant to find the problem
	Hard memory error	Run Diagnostic Assistant to find the problem

LED Processor Error Codes

Alternating LED Codes: LED 0	LED 1	LED 2	LED 3	Definition	Action
ON-OFF-OFF-ON & OFF-ON-ON-OFF				Processor chip overtemperature	Check fans for function. Wait for system to cool down (20-25 minutes) and press the

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		Reset button
OFF-OFF-ON-ON & ON-ON-OFF-OFF	Primary processor chip (processor #1) not installed	Install processor chip in primary socket
ON-OFF-OFF-OFF & OFF-ON-ON-ON	Primary Voltage Regulator Module fault	Replace primary Voltage Regulator Module
OFF-ON-OFF-OFF & ON-OFF-ON-ON	Secondary Voltage Regulator Module fault	Replace secondary Voltage Regulator Module
OFF-OFF-OFF-ON & ON-ON-ON-OFF	System bus regulator fault	Replace processor board

NOTE If the processor overtemperature error is not corrected within a few minutes, the system will shut down automatically to avoid damage. To recover from this condition, wait for the system to cool down (20-25 minutes) and press the Reset button.

Boot Device Priority

The following is the search path in order of the highest boot device priority:

1. CD-ROM drive (if a bootable CD-ROM is installed)
2. Flexible disk drive
3. IDE device
4. SCSI controller board with the following:
    - EISA controller board with the BIOS address set to C8000.
    - ISA controller board with the BIOS address set to C8000.
    - PCI controller board in slot 9 with the BIOS address set and locked at C8000.
5. Embedded SCSI A controller.
6. Embedded SCSI B controller.

To boot from a SCSI controller board, perform the following:

- To boot from an **EISA controller board**, use "Step 3: View or edit details" of the EISA Configuration Utility to set the controller's BIOS to C8000.
- To boot from an **ISA controller board**, set the BIOS address to C8000.
- To boot from a **PCI controller board**, perform the following:
    1. Install PCI controller board in slot 9.
    2. Run EISA Configuration Utility and select "Step 3: View or edit details".
    3. Select "PCI SCSI Controller in Slot 9" and press **F6**.
    4. Set the top Memory Address resource to "0C8000h" and press **F10**.
    5. Press **F7** and select "Lock/unlock boards". Select the PCI board in slot 9 and lock.
    6. Exit and save the configuration.

Cabling Configurations

The HP NetServer comes in two standard models that can be reconfigured by changing the cables. You are not limited to these configurations, but they are given as possible examples.

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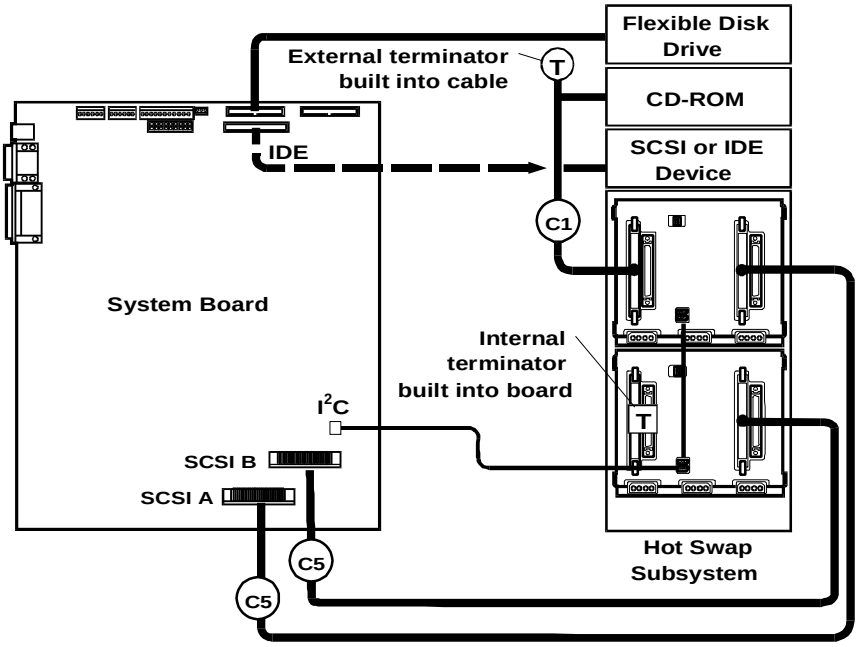
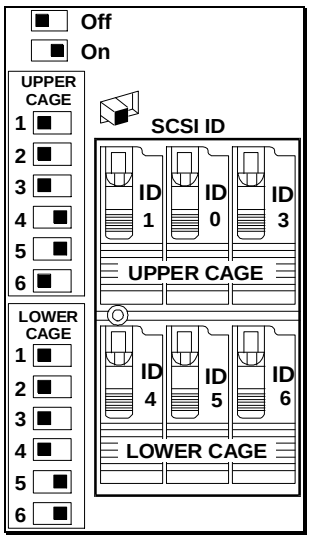
Duplex, non-disk array model with internal controller (standard model)





Default Switch Settings

These are the default SCSI address settings for this model. SCSI ID 2 is reserved for an added DAT (Digital Audio Tape) drive that can be installed in the upper horizontal Shelf 3. The CD-ROM drive is set for SCSI ID 5.

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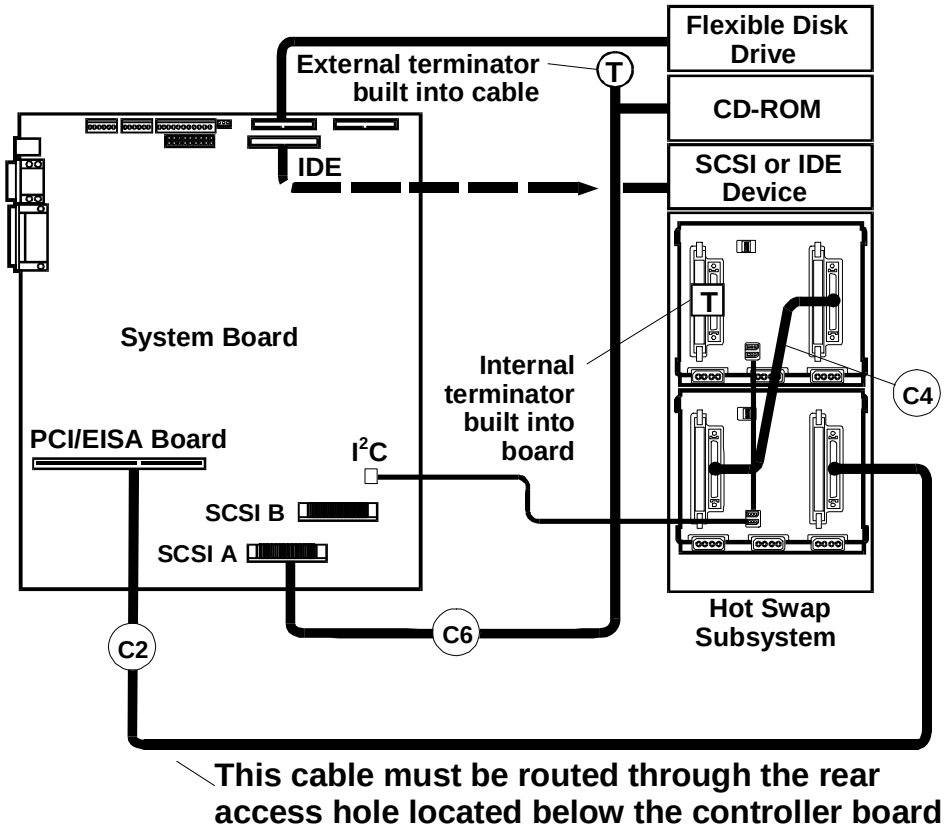
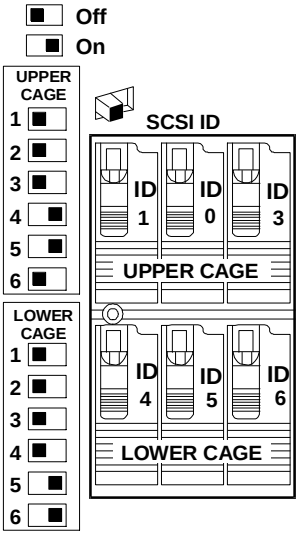
Non-duplex, disk array model with PCI controller board (standard model) or EISA controller board





Default Switch Settings

These are the default SCSI address settings for this model. SCSI ID 2 is reserved for an added DAT (Digital Audio Tape) drive that can be installed in the upper horizontal Shelf 3. The CD-ROM drive is set for SCSI ID 5.

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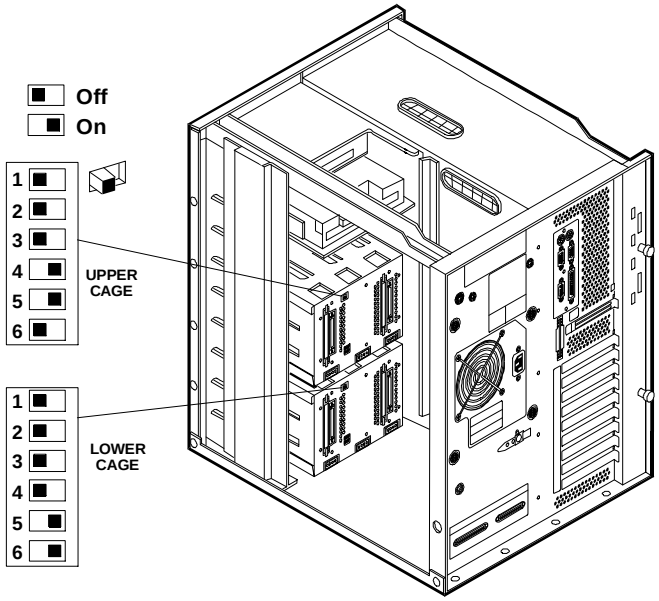
Configuring Switch Settings on the Hot Swap Subsystem

Switch setting combinations are given in the table below.



Switch	Function	Settings
1	I^2C Bus Setting	Always set to Off
2	I^2C Bus Setting	Always set to Off
3	High/Low Addresses	Always set to Off
4	SCSI Address Zero Sets middle shelf in cage to SCSI ID 0.	On: Sets middle shelf in the cage (shelf 2 or shelf 5) to SCSI ID 0. Off: Sets middle shelf to normal SCSI address sequence. See SCSI Address Settings table below for description of settings.
5	Remote Start Determines control of the hot swap disk module power-on sequence.	On: Internal control: Upper cage is set to delayed start and lower cage is set to power-on at startup. Off: Power-on sequence is determined by the disk array controller.
6	Upper/Lower Cage Identifies cage location. This is important information for the SCSI addresses and for the I^2C bus.	On: Lower cage Off: Upper cage See SCSI Address Settings table below for description of settings.

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Hot Swap Subsystem SCSI Address Settings

Switches 4 and 6 determine the SCSI address setting for each shelf in the hot swap subsystem. The following table describes the settings and the resulting shelf SCSI address.

NOTE For information on changing the SCSI address setting on the CD-ROM drive, see the Technical Information Label on the CD-ROM drive.

Upper Cage		Lower Cage	
Switch Settings	**SCSI Address**	**Switch Settings**	**SCSI Address**
3 - Off 4 - Off 6 - Off	Shelf 1 = ID 1 Shelf 2 = ID 2 Shelf 3 = ID 3	3 - Off 4 - Off 6 - On	Shelf 4 = ID 4 Shelf 5 = ID 5 Shelf 6 = ID 6
3 - Off 4 - On 6 - Off	Shelf 1 = ID 1 Shelf 2 = ID 0 Shelf 3 = ID 3	3 - Off 4 - On 6 - On	Shelf 4 = ID 4 Shelf 5 = ID 0 Shelf 6 = ID 6

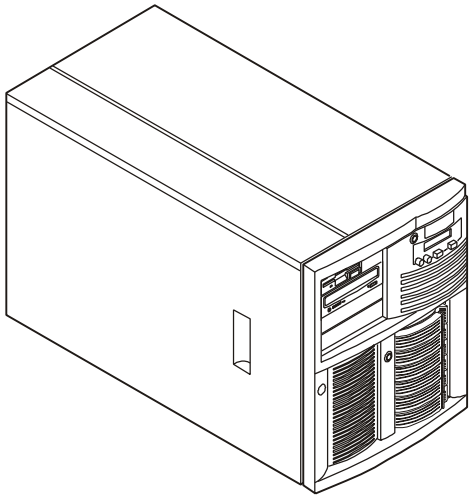
Specifications

Power Supply	Auto-ranging 90 to 132 VAC, or 180 to 264 VAC at 47-63Hz
Power Availability	LH/LH Plus 350W continuous, 386W peak LH Pro 450W continuous
Power Consumption	LH/LH Plus: 499/479W maximum with 110/220V supply 551/528W peak with 110/220V supply LH Pro: 650/600 maximum with 110/220V
System Dimensions	19.3 in. high x 13.7 in wide x 18.1 in deep (49 cm high x 34.8 cm wide x 46 cm deep)
System Weight	50-70 lbs (22.7-31.8 kg), depending on configuration
Operating Temperature	41 to 95 degrees F (5 to 35 degrees C)
Operating Humidity	20% to 80% non-condensing
BTUs	LH/LH Plus: less than 1700 BTUs (430 Kcal) LH Pro: less than 2200 BTUs (560 KCal)

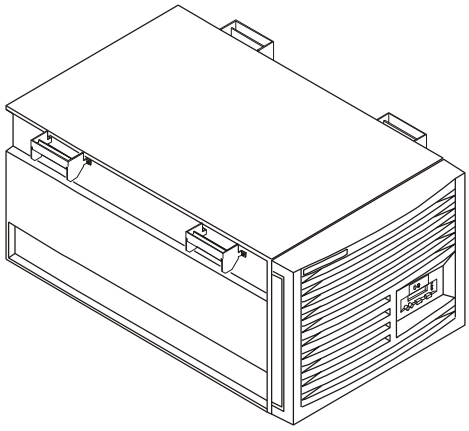
This manual downloaded from http://www.manualowl.com

HP NetServer LH 3 and LH 3r

System Views

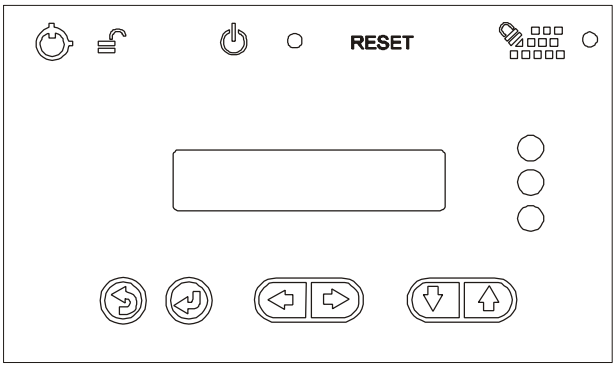


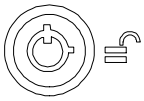
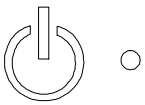
HP NetServer LH 3 (Pedestal)



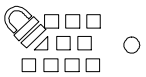
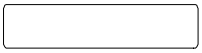
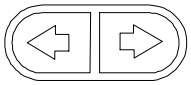
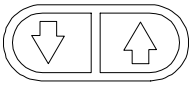
HP NetServer LH 3r (Rack-Optimized

Front Control Panel



Control	Description
	Lock (LH 3 only) Locks system to prevent unauthorized use.
	DC Power Switchand indicator light Turns the NetServer on and off. This switch is behind the protective door on the front panel. Push once to turn on, again to turn off. (To disconnect the NetServer from AC power, remove the AC power cord from the power supply cage on the rear.)

This manual downloaded from http://www.manualowl.com

Control	Description
RESET	Resets the NetServer from internal ROM. This switch is behind the protective door on the front panel.
	**Keyboard lockand indicator light** Locks system keyboard to prevent unauthorized use.
	**Status screen** Reports various types of system status. The buttons below the screen control these menu functions
	Return to a previous selection.
	Select a menu item.
	Reserved for future use.
	Scroll down or up.
	Status LEDs Indicates various types of system status: Green = Normal operation Yellow = Abnormal operation Red = Problem detected

Front Panel Menu, as Shown on Status Screen

System Information	Reports system hardware details and software version numbers.
Field Replaceable Unit Information	Identifies part and revision numbers for components.
Contrast Adjustment	Use the arrow keys to change the LCD contrast for better readability.

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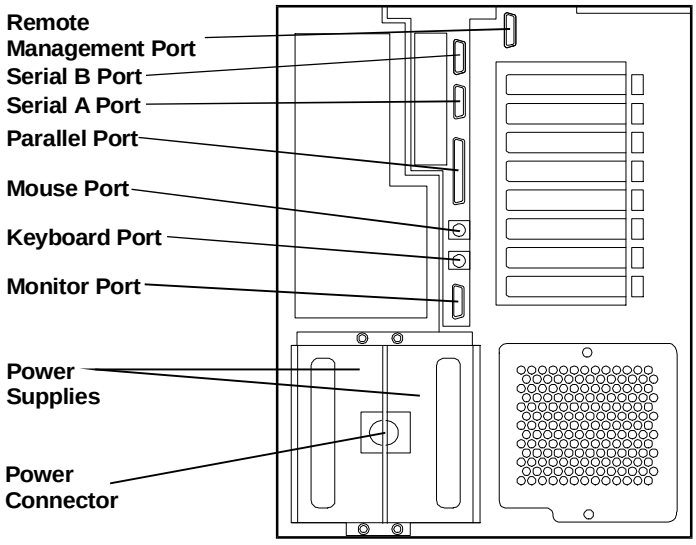
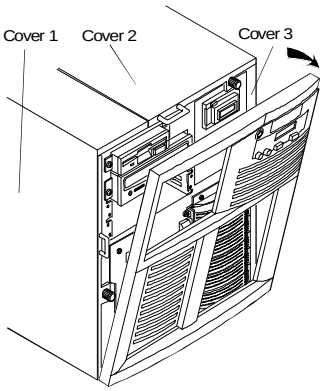
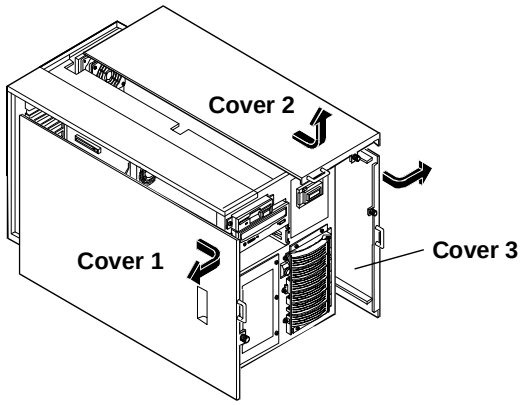
Rear View

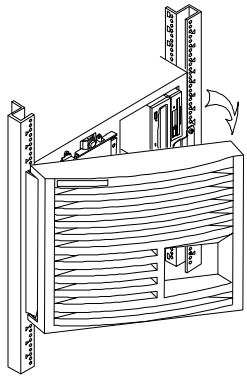


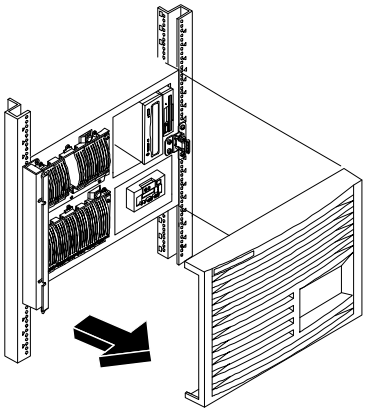
Covers (LH 3)

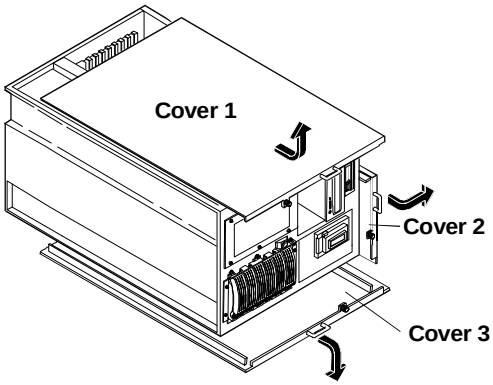




Covers (LH 3r)





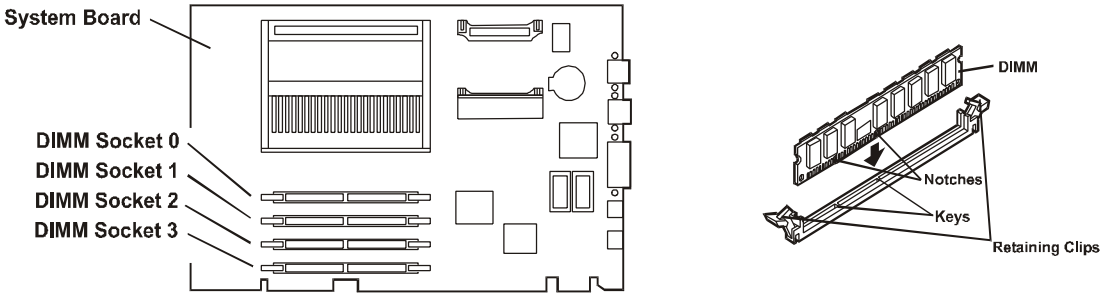


This manual downloaded from http://www.manualowl.com

Memory

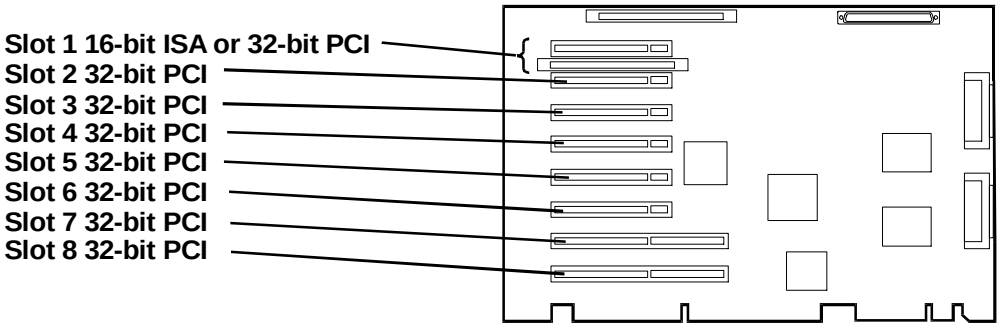
There are four DIMM sockets on the system board for memory expansion. You can use 64 MB, 128 MB, and 256 MB DIMMs for a maximum capacity of 1 GB of RAM.

- The minimum memory configuration for the NetServer LH 3/LH 3r is one 128 MB DIMM.
- The system board DIMM sockets are numbered from 0 to 3.
- DIMMs may be installed in any quantity and in any DIMM socket on the system board. DIMMs that differ in capacity can be mixed.



CAUTION	Do not rock the DIMM into place, but apply firm and even pressure directly downward. If the retaining clips do not close, remove the module and repeat Steps 3 through 5.

Boot Device Priority



Boot order for PCI controllers is determined by slot location. The system searches for a bootable device in the following order:

1. IDE CD-ROM drive with a bootable CD-ROM.
2. Flexible disk drive with a bootable flexible disk.
3. Embedded SCSI controller or embedded DAC.
4. PCI boards in slots in the following order: 8, 7, 6, 5, 4, 3, 2, 1.

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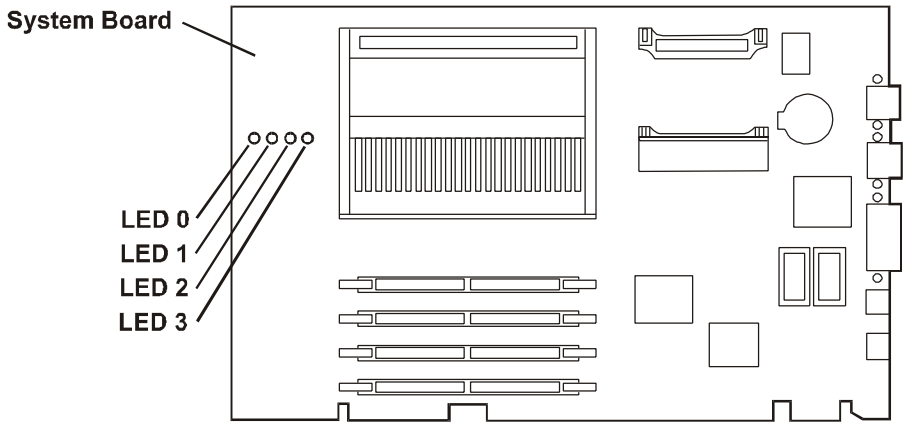
DIMM Slot LED Blink Codes



LED Error Codes		
☼ = LED on ● = LED off Alternating Blink Code: LED 0 LED 1 LED 2 LED 3	Error Condition	Corrective Action
● ☼ ☼ ☼ ☼ ● ● ●	Primary VRM Failure	Check that primary voltage regulator module (VRM) is correctly seated. If problem persists, replace VRM.
☼ ● ☼ ☼ ● ☼ ● ●	Secondary VRM Failure	Check that secondary VRM is correctly seated. If problem persists, replace VRM.
● ☼ ☼ ● ☼ ● ● ☼	Processor Over-Temperature	Check fan for function. Turn off system, wait 20-25 minutes for system to cool, and restart system.
☼ ☼ ● ● ● ● ☼ ☼	Processor or Terminator Board Not Installed	Install processor in primary processor socket and a processor or terminator board in secondary processor socket.

DIMM Status Error Codes

When no processor error condition exists, each diagnostic LED display the status of the DIMM in the corresponding socket, as follows:

- OFF: no DIMM installed
- Flashes ON and OFF at 1 Hz in 50/50 proportion of time: defective or inappropriate DIMM
- Flashes ON and OFF at 1 Hz in 90/10 proportion of time: non-HP DIMM installed
- ON: HP DIMM installed

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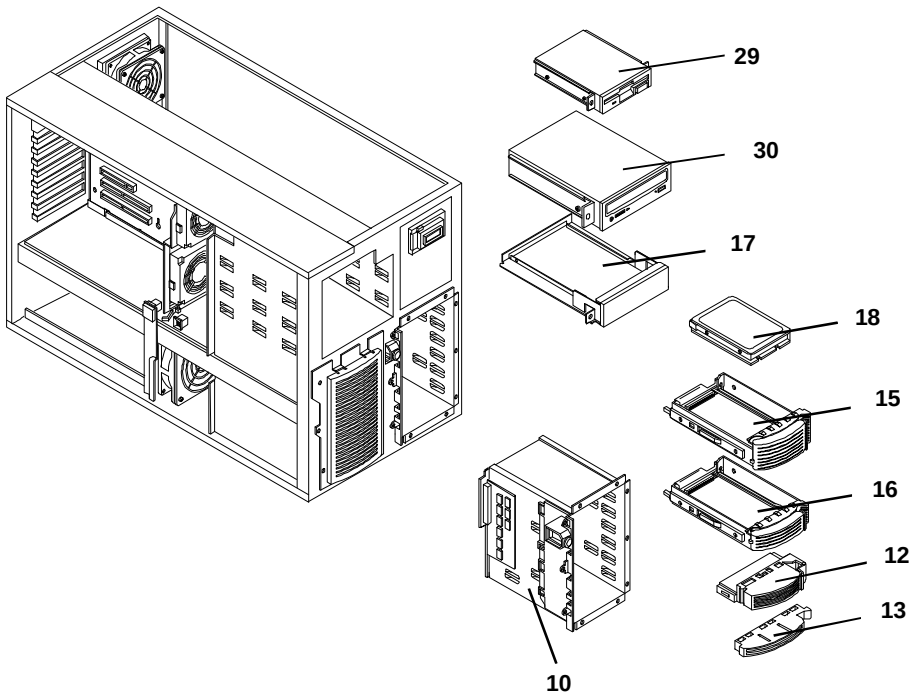
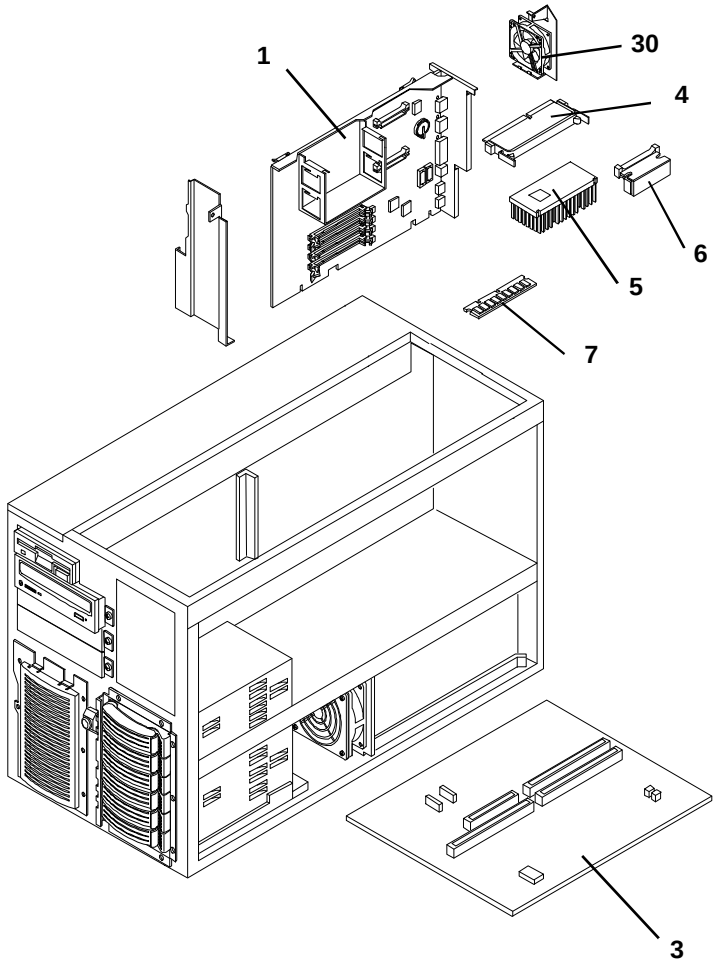
Exploded Views





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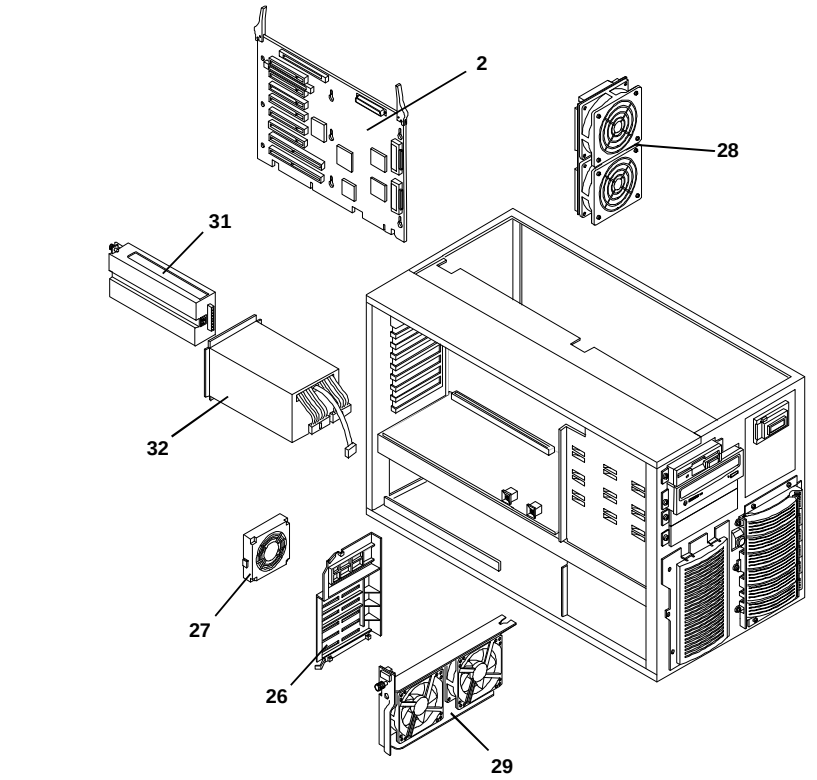

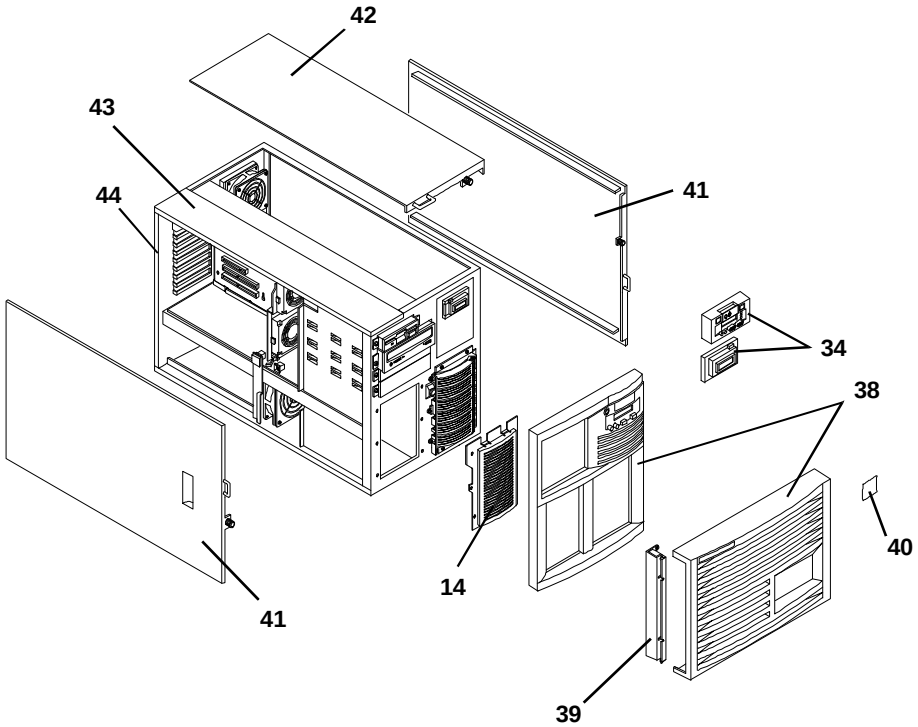

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Parts List

Fig	Description	Replacement	Exchange
1	System board PCA	D5000-60001	D5000-69000
2	I/O PCA	5064-1996	D5000-69001
3	Backplane PCA	D5000-63002	
4	Terminator PCA (plugs in secondary processor slot in dual-ready systems)	5183-3418	
5a	Pentium II 350mhz processor	1821-4201	
5b	Pentium II 400mhz processor	1821-4202	
5c	Pentium II 450 Processor Chip	1821-4203	
*	Heat sink for processor module	5183-2471	
*	Heat sink clip	5183-2472	
6	Voltage Regulator Module (VRM)	0950-2848	
7a	Memory DIMM, 128MB	D6098-63000	D6098-69000
7b	Memory DIMM, 256MB	D6099-63000	D6099-69000
8	Video memory, 256x16, 50ns	D4295-63001	
9	I/O memory, 16MB	1818-7485	
10	Hot-swap mass storage cage (w/PCBs)	D6077-63000	
12	Hot-swap filler	5064-4689	
13	Hot-swap drive spacer	Not Orderable	Not Orderable
14	Hot-swap mass storage expansion bay cover plate	Not Orderable	Not Orderable
15	Hot-swap tray, half-height	D6127A	
16	Hot-swap tray, low-profile	D6128A	
17a	Non-hot-swap tray, hard disk drive (3 ea.)	D2198B	
17b	Non-hot-swap tray, removable media device (2 ea.)	D2199A	
18a	4.2 GB Ultra/Wide SCSI drive, 7200 rpm (for non-hot-swap use)	D4911A	
18b	9.1 GB Ultra/Wide SCSI drive, 7200 rpm (for non-hot-swap use)	D46106A	
18c	9.1 GB low-profile Ultra2 drive, 7200 rpm (for hot-swap use)	D6107A	
19	1.44MB 3.5" floppy drive	D2035-60152	
20	IDE CD ROM drive	D4383-60041	
21	IDE CD ROM drive cable	5183-3442	
22	Floppy cable	5183-3443	
23	SCSI (wide) cable, internal 68-50 pin	5183-3444	
24	SCSI cable, internal	5183-3445	
25	SCSI cable, internal to external	5183-3446	
26	Accessory board guide		
27	Fans (2), w/accessory board guide assy.	5064-4672	

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Fig	Description	Replacement	Exchange
28	Fan assembly, rear chassis	5064-3553	
29	Fan assembly, power supply	5064-3538	
30	Fan assembly, CPU	5064-3531	
31	Power supply module, 300W	5064-6603	
32	Power supply cage	5064-6605	5064-6604
33	Battery 3V	1420-0356	
34a	Front panel assembly, pedestal version	5067-4214	
34b	Front panel assembly, rack version	5064-4639	
*	Installation handles, rack version (4)	5002-5191	
*	Rails for rack mount version (2)	5064-6118	
*	Casters for pedestal version, front (2)	5182-9416	
*	Casters for pedestal version, rear (2)	1490-1007	
38a	Bezel, rack version	5064-5861	
38b	Bezel, pedestal version	5064-4637	
39	Bezel hinge, rack version		
40	Bezel latch plate, rack version		
41	Side Cover (fits either side)	5064-6494	
42	Top Cover (system board side))	5064-4693	
43	Top cover (I/O Board Side)	5064-7906	
44	Chassis	**	**

*This part is not on the exploded view.

** This part is not available.

*** This part number is constantly revised. When you order the CD-ROM, you will be sent the latest revision.

Keyboards

Language	Part Number	Language	Part Number
US	D4950-63001	Danish	D4950-63016
Arab/French	D4950-63025	Fr.Canadian	D4950-63002
Portuguese	D4950-63027	German	D4950-63003
Cyrillic	D4950-63030	Spanish	D4950-63004
Belgian/Flemish	D4950-63014	French	D4950-63005
Italian	D4950-63017	Norwegian	D4950-63009
Arab/English	D4950-63020	Swiss	D4950-63011
Korea/Hangu	D4950-63021	Swedish	D4950-63012
Taiwan	D4950-63023	UK	D4950-63013
Poland	D4950-63035	Czech	D4950-63036
Hungarian	D4950-63037	Greek	D4950-63032
Turkish	D4950-63035	Dutch	D4950-63006

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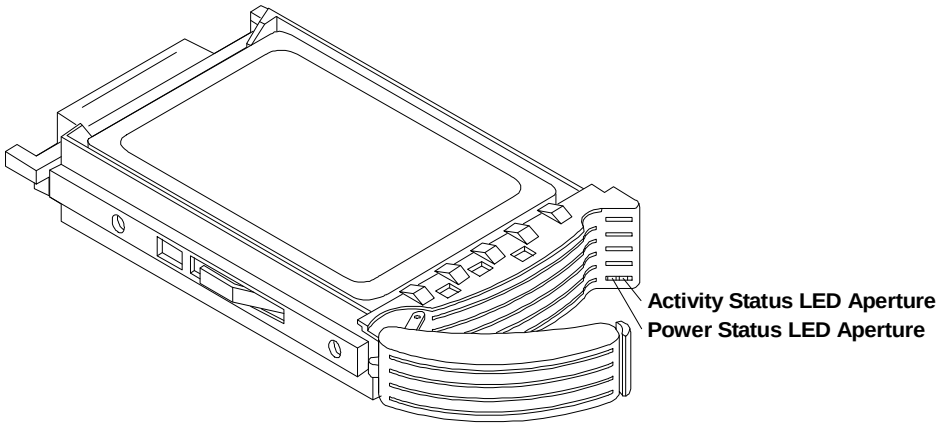
Power Cords

Country	Part Number	Country	Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

Hot-Swap Hard Disk Drive LED Status and Activity Indicators

Each hot-swap hard disk drive module has two LED apertures on its front, one for power status and one for activity status, as shown below.



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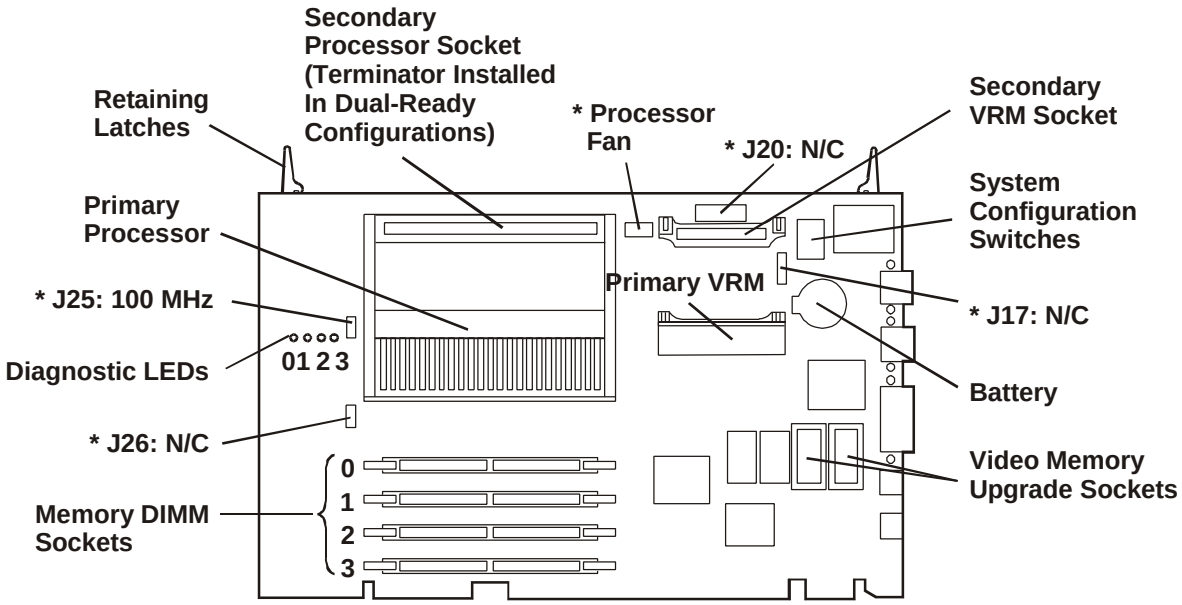
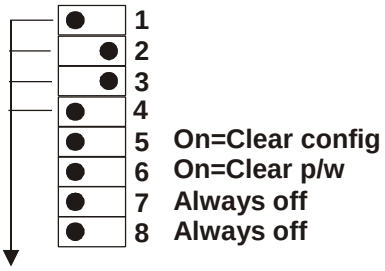
System Board



*** Cable connectors are labeled with function.**
Configuration jumpers are labeled with default setting.
N/C = no jumper header or cable installed.

System Switches



Processor Speed:	300	350	400	450
1	OFF	OFF	OFF	OFF
2	OFF	OFF	ON	ON
3	ON	ON	OFF	OFF
4	OFF	ON	OFF	ON

Note: Only processor speeds for the 100 MHz bus are supported.

This manual downloaded from http://www.manualowl.com

Specifications

Operating Temperature	5° to 35° C (41° to 95° F)
Non-operating Temperature	-40° to +65° C (-40° to +149° F)
Operating Humidity	20% to 80% relative humidity, non-condensing
Non-operating Humidity	5% to 95% relative humidity, non-condensing
Operating Altitude	-30 to 3,000 m (~10,000 ft)
Non-operating Altitude	-30 to 12,000 m (~40,000 ft)
Minimum Clearance	
Front	1 m (39 in)
Sides	2.5 cm (1.0 in)
Top	2.5 cm (1.0 in)
Back	15 cm (6.0 in)
Weight and Dimensions	LH 3
Height	494.8 mm (19.5 in)
Width	350.5 mm (13.8 in)
Depth	724.2 mm (28.5 in)
Weight	35 - 50 kg (77 - 110 lb) **NOTE** A fully-loaded NetServer can weigh up to 160 pounds (73 kg). Follow local safety regulations, and use one person for every 40 pounds (18 kg) of NetServer weight when lifting it.
Weight and Dimensions LH 3r	
Height	354.7 mm (14 in)
Width	482.6 mm (19 in)
Depth	749.2 mm (29.5 in)
Weight	35 - 50 kg (77 - 110 lb) **NOTE** A fully-loaded NetServer can weigh up to 160 pounds (73 kg). Follow local safety regulations, and use one person for every 40 pounds (18 kg) of NetServer weight when lifting it.
Power supply input voltage	Auto-Ranging Power Supply 100 to 127 VAC at 50/60 Hz 200 to 240 VAC at 50/60 Hz 90 to 132 VAC at 47 - 63 Hz 180 to 264 VAC at 47 - 63 Hz
Power supply output	550 W maximum (per module)
Sound pressure (LpA)	55 dB(A), bystander position

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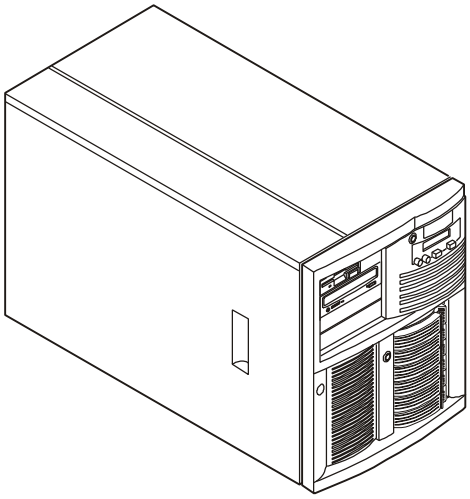
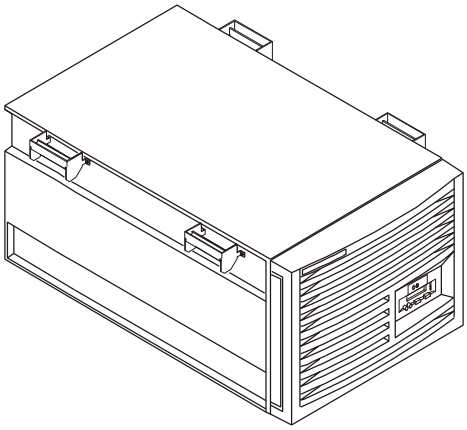
HP NetServer LH 4 and LH 4r System Information

System Views

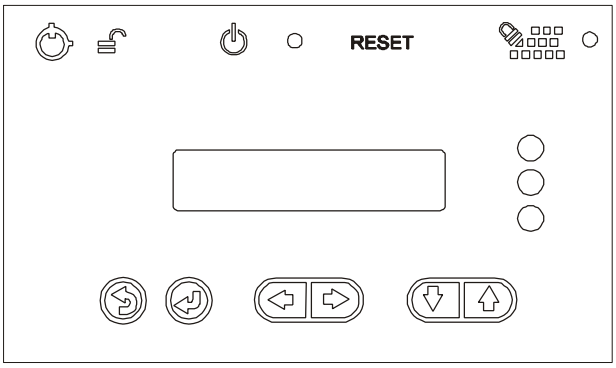


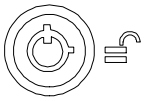
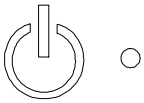
HP NetServer LH 4 (Pedestal)



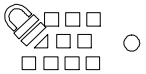
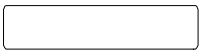
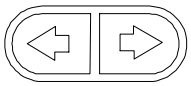
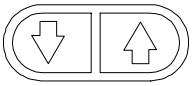
HP NetServer LH 4r (Rack-Optimized)

Front Control Panel



Control	Description
	Lock (LH 4 only) Locks system to prevent unauthorized use.
	DC Power Switchand indicator light Turns the NetServer on and off. This switch is behind the protective door on the front panel. Push once to turn on, again to turn off. (To disconnect the NetServer from AC power, remove the AC power cord from the power supply cage on the rear.)

This manual downloaded from http://www.manualowl.com

Control	Description
RESET	Resets the NetServer from internal ROM. This switch is behind the protective door on the front panel.
	**Keyboard lockand indicator light** Locks system keyboard to prevent unauthorized use.
	**Status screen** Reports various types of system status. The buttons below the screen control these menu functions
	Return to a previous selection.
	Select a menu item.
	Reserved for future use.
	Scroll down or up.
	Status LEDs Indicates various types of system status: Green = Normal operation Yellow = Abnormal operation Red = Problem detected

Front Panel Menu, as Shown on Status Screen

System Information	Reports system hardware details and software version numbers.
Field Replaceable Unit Information	Identifies part and revision numbers for components.
Contrast Adjustment	Use the arrow keys to change the LCD contrast for better readability.

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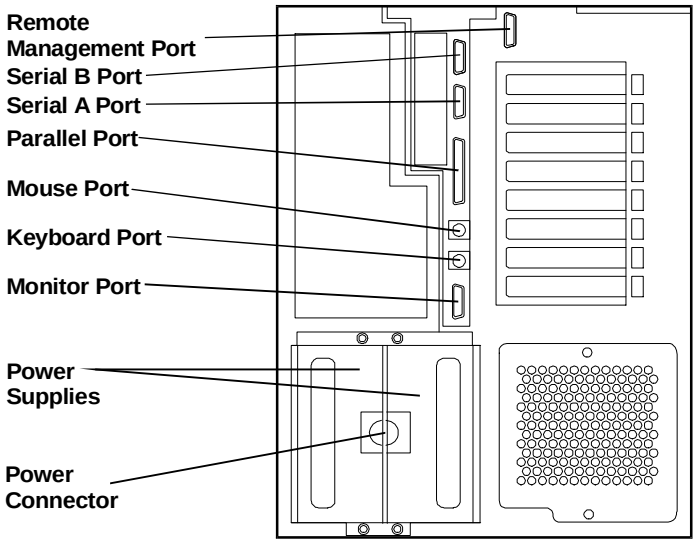
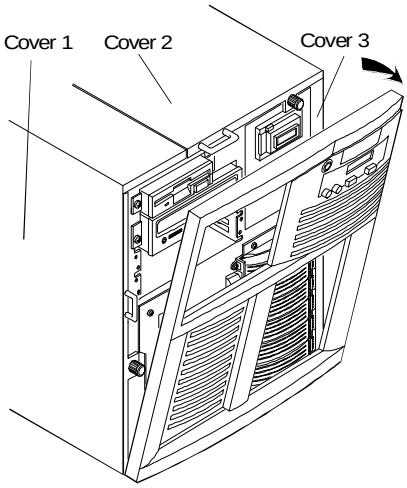
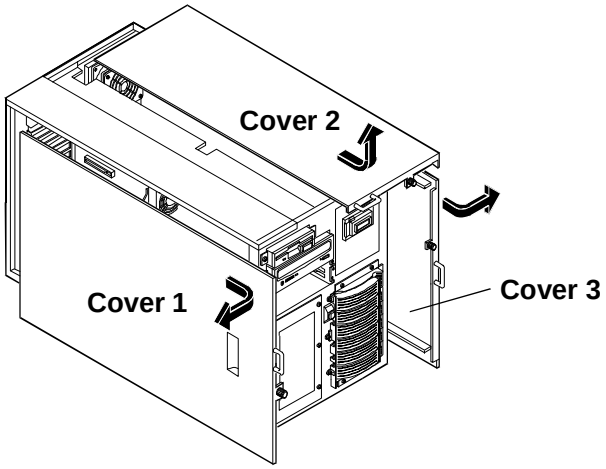
Rear View



Covers (LH 4)





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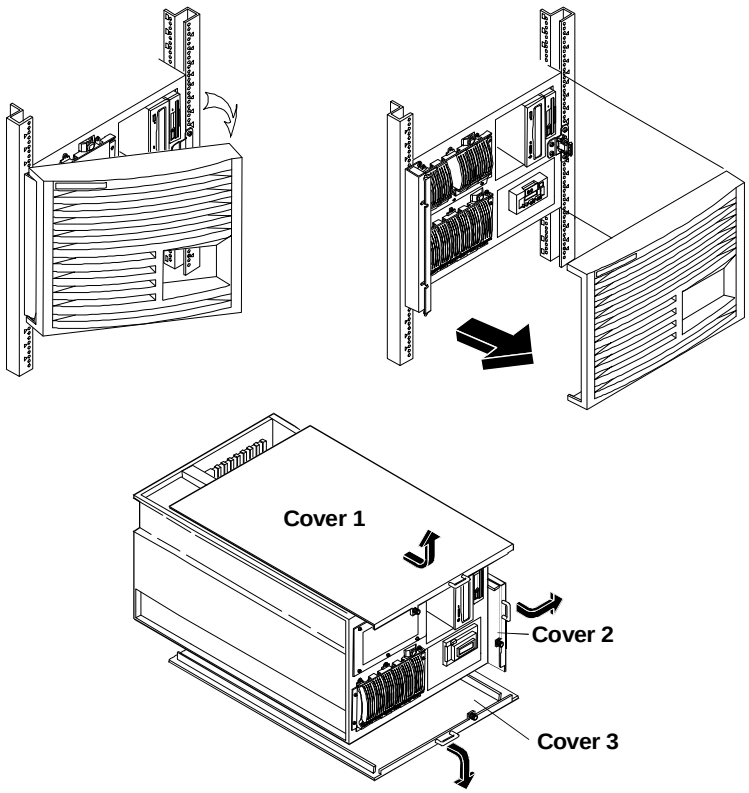
Covers (LH 4r)



Memory

The two memory boards (Memory A and Memory B) are located on the system board assembly, beneath the memory cage cover. Both memory boards are required. Each board has slots for eight DIMMs. The following rules must be observed when adding memory:

DIMMs are added four at a time - two per memory card. The memory cards must be balanced.

DIMMs are installed in banks, 1 through 4.

J1 and J2 of Memory A and B are bank 1

J3 and J4 of Memory A and B are bank 2

J5 and J6 of Memory A and B are bank 3

J7 and J8 of Memory A and B are bank 4

DIMMs must be 64 or 256 Mbytes, EDO buffered TSOP 50 ns.

DIMM types cannot be mixed in a bank.

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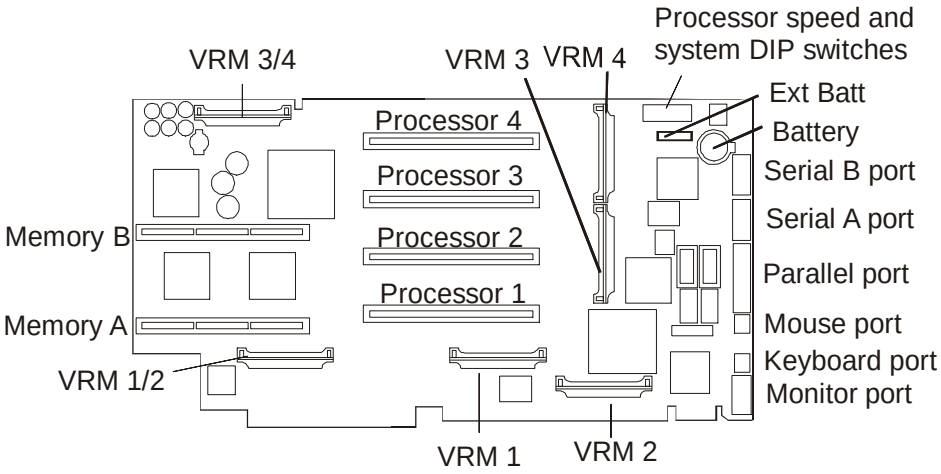
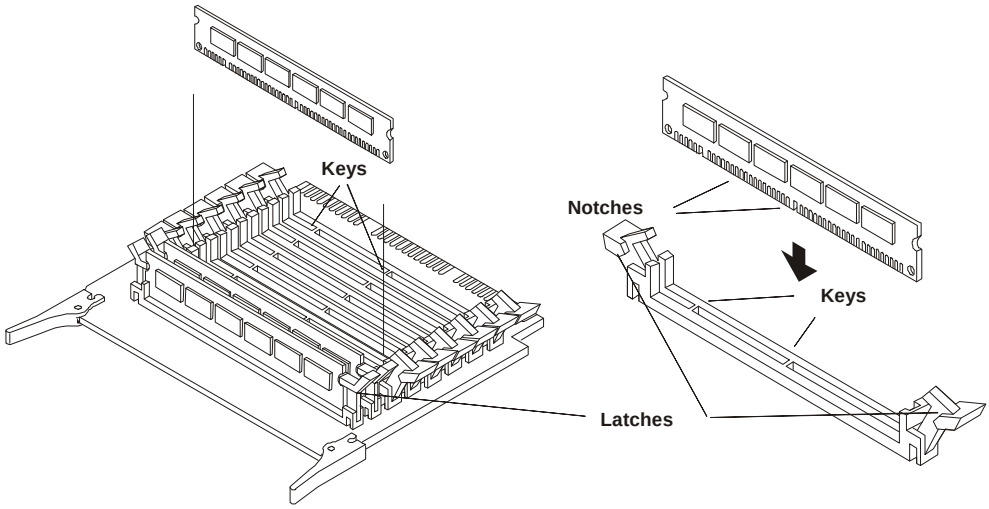


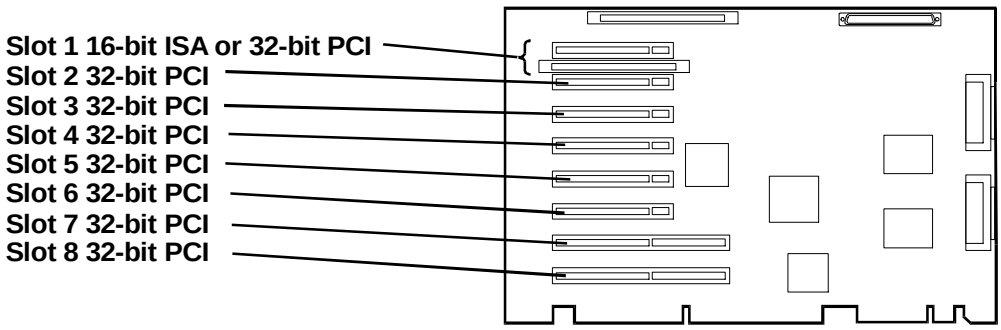
Note: Processor slots without processors have terminators.

NOTE	Use only HP DIMMs listed in HP Information Assistant or HP Order Assistant.



CAUTION	Do not rock the DIMM into place, but apply firm and even pressure directly downward. If the retaining clips do not close, remove the module and repeat Steps 3 through 5.

Boot Device Priority



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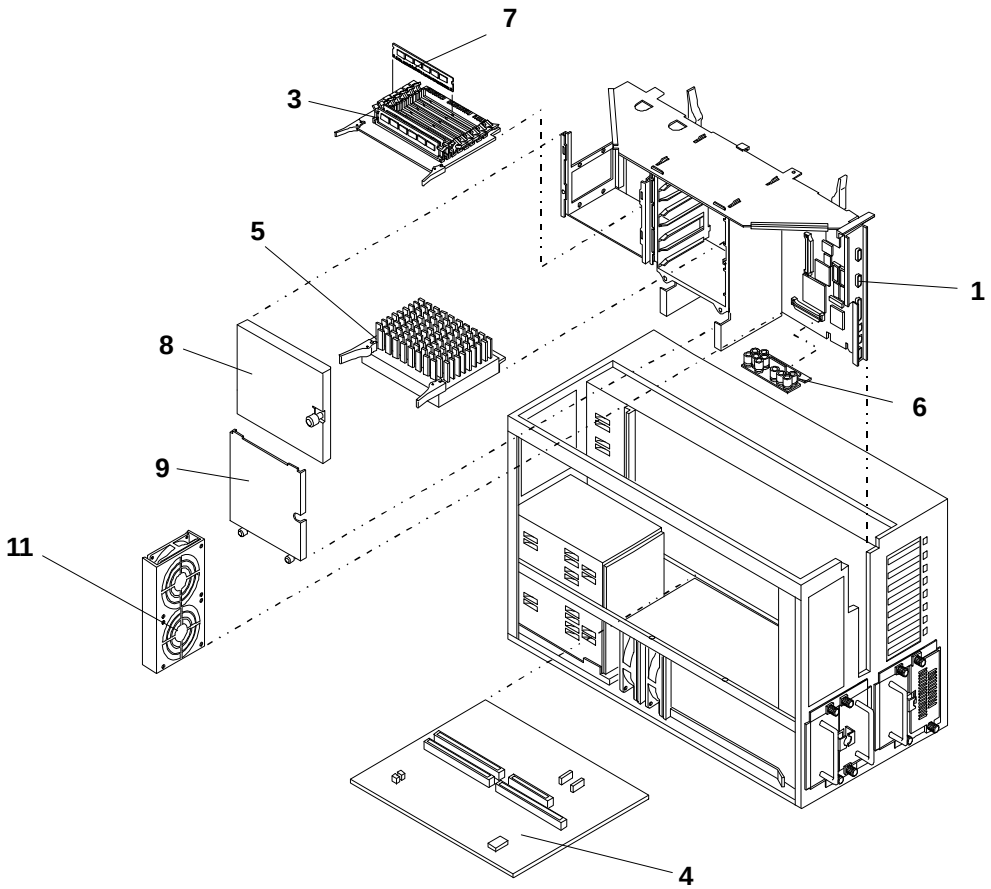
The Boot Device Ordering submenu contains the following options:

- **Floppy check:** Enables or disables verification of flexible disk drive type during boot
- **Summary screen:** Enables or disables display of a screen of system configuration information.
- **Boot Device Priority:** Allows you to rearrange the following default order in which drive types are searched for the operating system:
  - ◊ CD-ROM drive with bootable CD-ROM
  - ◊ Flexible Disk with bootable flexible disk
  - ◊ Hard Drive
- **Hard Drive Priority:** Allows you to rearrange the order in which hard disk drives are searched for the operating system. All hard disk drives in the system are listed, as well as any bootable ISA board.

  Boot order for PCI controllers is determined by slot location. The system searches for a bootable device in the following order:
  1. IDE CD-ROM drive with a bootable CD-ROM.
  2. Flexible disk drive with a bootable flexible disk.
  3. Embedded SCSI controller or embedded DAC.
  4. PCI boards in slots in the following order: 8, 7, 6, 5, 4, 3, 2, 1.

Exploded Views



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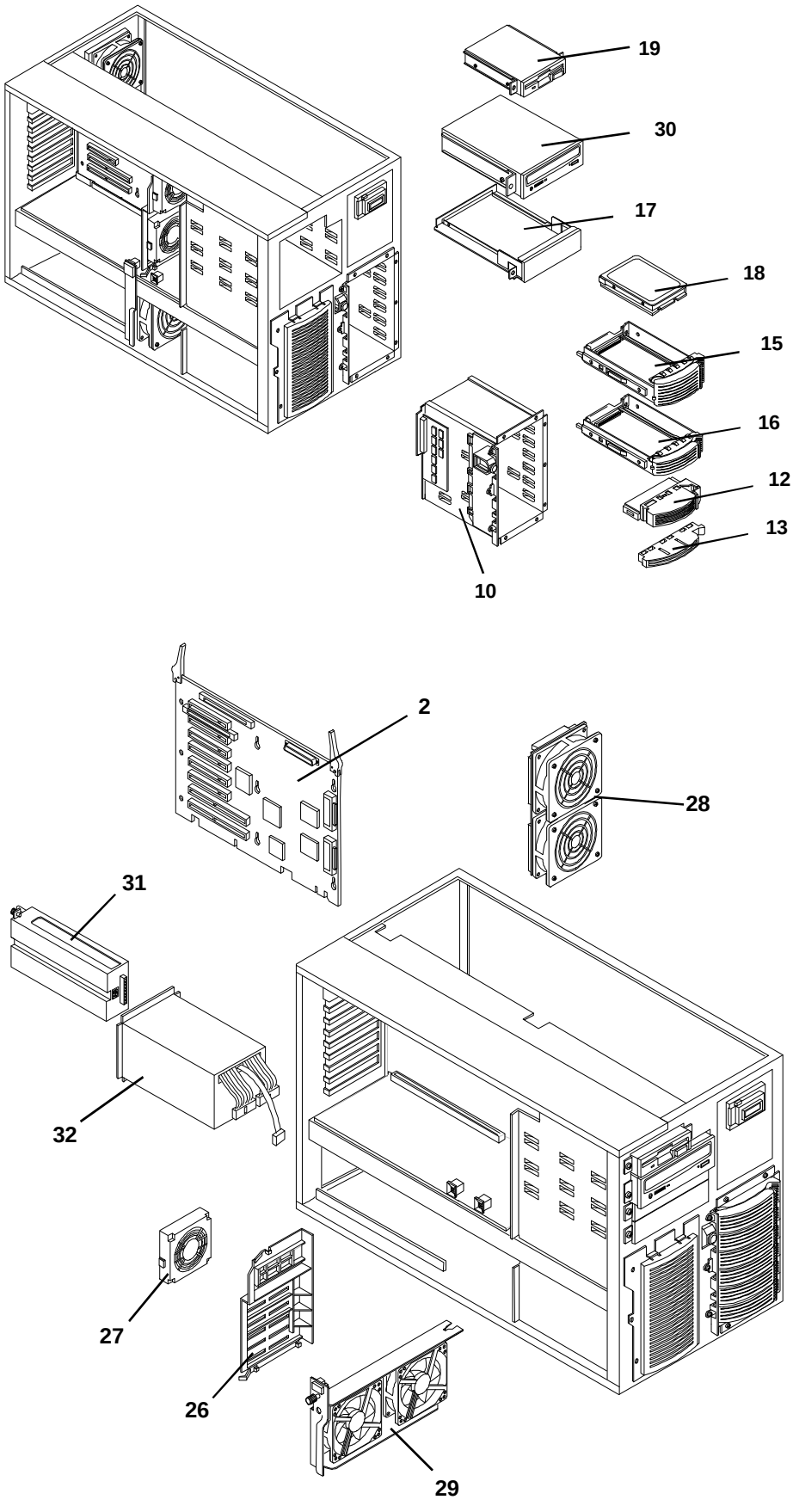

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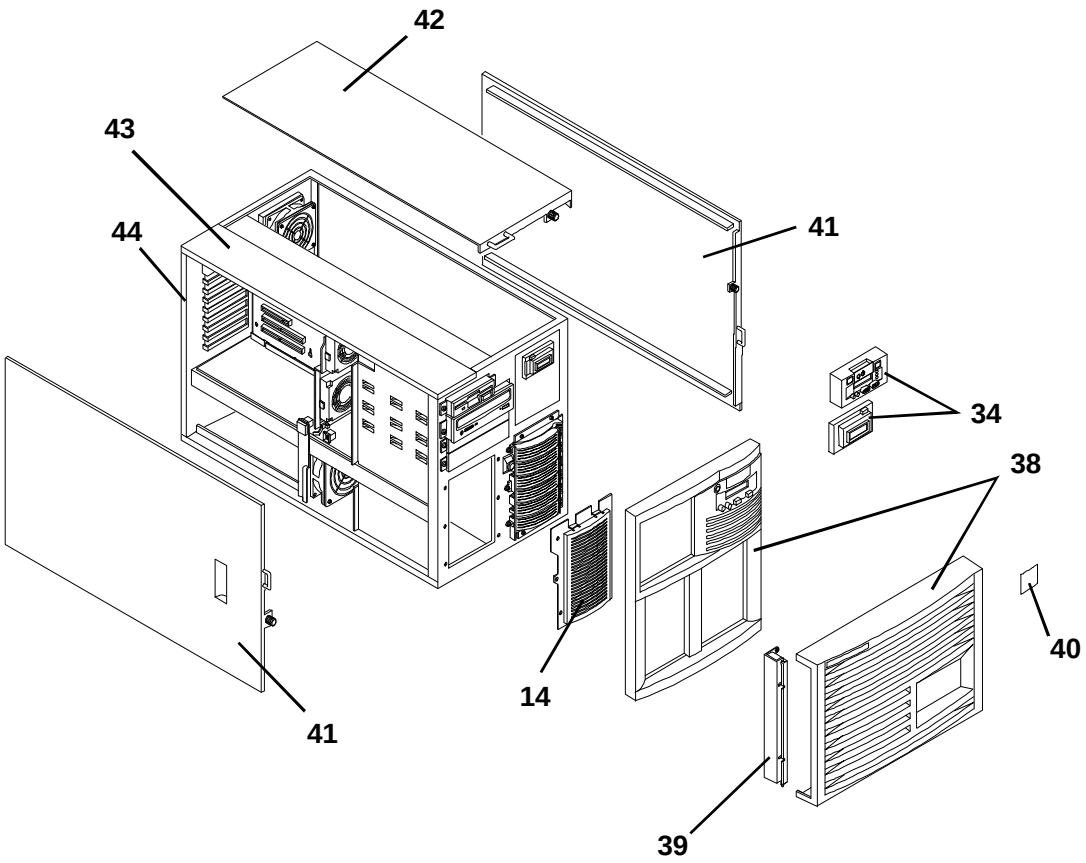

Parts List

NOTE	These part numbers are the numbers available at the time of publication. Part numbers may be revised after the publication date.

Fig	Description	Replacement	Exchange
1	System board PCA (PCA only)	D7014-63001	D7014-69001
2	I/O PCA	D7092-63000	D7092-69000
3	Memory PCA	D6969-63001	D6969-69001
4	Backplane PCA	D5000-63002	
5a	Pentium II Xeon 400MHz/512K processor	D7007-63001	D7007-69001
5b	Pentium II Xeon 400MHz/1MB processor	D6119-63001	D6119-69001
6	Voltage Regulator Module (VRM)	D6021-63046	
7a	Memory DIMM, 64MB	D6112-63000	D6112-69000
7b	Memory DIMM, 256MB	D6114-63000	D6114-69000
8	Memory cover	Not orderable	
9	Processor cover	Not orderable	
10	Hot-swap mass storage cage (w/PCBs)	D6077-63000	
11	Fan assembly, processor	Not orderable	Not orderable

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Fig	Description	Replacement	Exchange
12	Hot-swap filler	Not orderable as replacement	
13	Hot-swap drive spacer	Not orderable as replacement	
14	Hot-swap mass storage expansion bay cover plate	Not orderable	Not orderable
15	Hot-swap tray, half-height	D6127A	
16	Hot-swap tray, low-profile	D6128A	
17a	Non-hot-swap tray, hard disk drive (3 ea.)	D2198B	
17b	Non-hot-swap tray, removable media device (2 ea.)	D2199A	
18a	4.2 GB Ultra/Wide SCSI drive, 7200 rpm (non-hot-swap use)	D4910A	
18b	9.1 GB Ultra/Wide SCSI drive, 7200 rpm (non-hot-swap use)	D4911A	
18c	9.1 GB low-profile Ultra2 drive, 7200 rpm (hot-swap use)	D6106A	
18d	9.1 GB low-profile Ultra2 drive, 10,000 rpm (hot-swap use)	D6107A	
18e	18.2 GB half-height Ultra2 drive, 7200 rpm (hot-swap use)	D6108A	
19	1.44MB 3.5" floppy drive	D2035-60152	
26	Accessory board guide	Not orderable	
27	Fans (2), w/accessory board guide assy.	5064-4672	
28	Fan assembly, rear chassis	5064-3553	
29	Fan assembly, power supply	5064-3538	
30	IDE CD ROM drive	D4383-60041	
31	Power supply module, 300W	5064-6603	
32	Power supply cage	5064-6605	5064-6604
34a	Front panel assembly, pedestal version	5067-4214	
34b	Front panel assembly, rack version	5064-4639	
38a	Bezel, rack version	5064-5861	
38b	Bezel, pedestal version	5064-4637	
41	Side Cover (fits either side)	5064-4694	
42	Top Cover (system board side)	5064-4693	
43	Top cover (I/O Board Side)	5064-7906	
44	Chassis	Not orderable	
*	Heat sink for processor module	5183-2471	
*	Heat sink clip	5183-2472	
*	Terminator PCA	5183-3418	
*	Video memory, 256x16, 50ns	D4295-63001	
*	I/O memory, 16MB	1818-7485	
*	BIOS ROM	D6971-63001	
*	IDE CD ROM drive cable	5183-3442	

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Fig	Description	Replacement	Exchange
*	Floppy cable	5183-3443	
*	SCSI (wide) cable, internal 68-50 pin	5183-3444	
*	SCSI cable, internal	5183-3445	
*	SCSI cable, internal to external	5183-3446	
*	Battery 3V	1420-0356	
*	Installation handles, rack version (4)	5002-5191	
*	Rails for rack mount version (2)	5064-6118	
*	Casters for pedestal version, front (2)	5182-9416	
*	Casters for pedestal version, rear (2)	1490-1007	

* This part is not on the exploded view.

When replacing the system board, remove the processor(s), terminator(s) (where used), and VRM(s) and transfer these to the new system board. Note the switch settings on the original board and transfer them, also, to the replacement board.

Keyboards

Language	Part Number	Language	Part Number
US	D4950-63001	Danish	D4950-63016
Arab/French	D4950-63025	Fr.Canadian	D4950-63002
Portuguese	D4950-63027	German	D4950-63003
Cyrillic	D4950-63030	Spanish	D4950-63004
Belgian/Flemish	D4950-63014	French	D4950-63005
Italian	D4950-63017	Norwegian	D4950-63009
Arab/English	D4950-63020	Swiss	D4950-63011
Korea/Hangu	D4950-63021	Swedish	D4950-63012
Taiwan	D4950-63023	UK	D4950-63013
Poland	D4950-63035	Czech	D4950-63036
Hungarian	D4950-63037	Greek	D4950-63032
Turkish	D4950-63035	Dutch	D4950-63006

Power Cords

Country	Part Number	Country	Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

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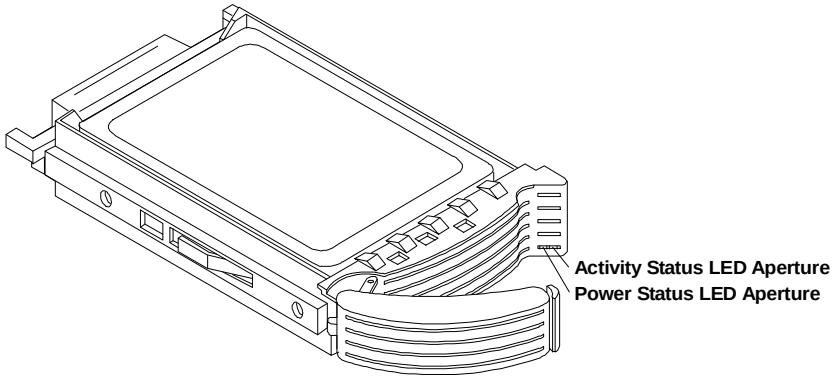
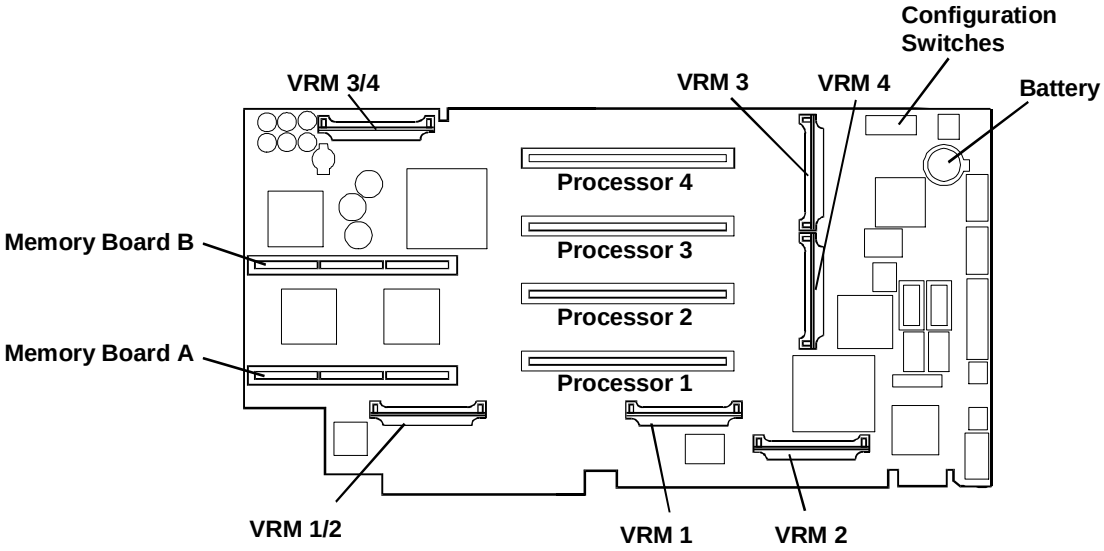
Hot-Swap Hard Disk Drive LED Status and Activity Indicators

Each hot-swap hard disk drive module has two LED apertures on its front, one for power status and one for activity status.



System Board



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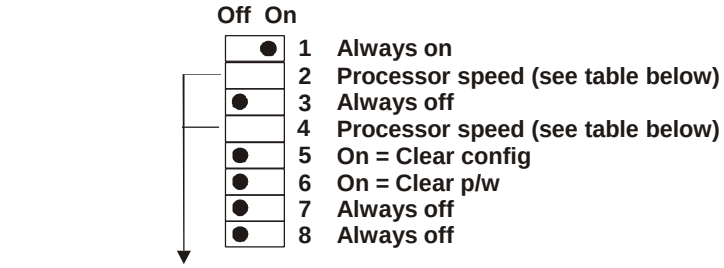
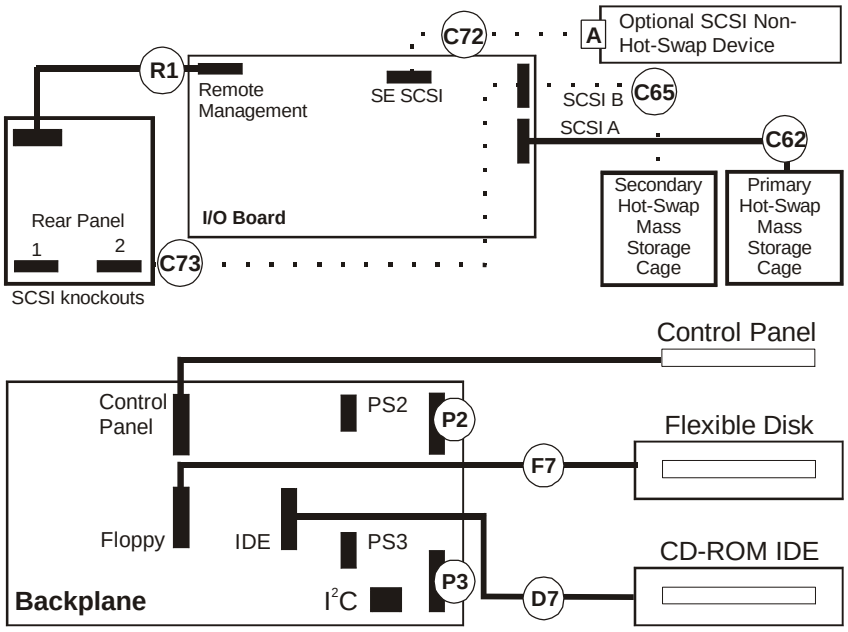
System Switches



Processor Speed:	400	450	500
Switch 2:	ON	OFF	ON
Switch 4:	ON	ON	OFF

Note: Only processor speeds for the 100 MHz bus are supported.

Cabling



Key	
- - - - -	Optional cable
A	68-pin to 50-pin SCSI Adapter
PS2	Primary Power Supply Cage Cable
PS3	Secondary Power Supply Cage Cable

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Cables and Part Numbers

Cable	Description	Part Number
C62	Internal SCSI (Wide) LVD Cable (SCSI A to Primary Mass Storage)	5183-3444
C63	Internal SCSI (Wide) LVD Cable (DAC to Primary Mass Storage)*	5183-6527
C64	Internal SCSI (Wide) LVD Cable (DAC to Secondary Mass Storage)*	5183-6528
C65	Internal SCSI (Wide) LVD Cable (SCSI B to Secondary Mass Storage)	5183-6567
C72	Internal SE SCSI Cable	5183-3445
C73	External SCSI (Wide) LVD Cable (SCSI A or B to Rear Chassis)	5183-3446
D7	IDE CD-ROM Cable	5183-3442
F7	Flexible Disk Cable	5183-3443
P2	Primary Mass Storage Power Cable	5183-3448
P3	Secondary Mass Storage, Non-Hot-Swap Device, CD-ROM, and Flexible Disk Power Cable	5183-3449
R1	Remote Management Cable	5183-2413
	* Optional cable	

Specifications

Temperature

Operating	5° to 35° C (41° to 95° F)
Non-operating	-40° to +65° C (-40° to +149° F)

Humidity (noncondensing)

Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing

Altitude

Operating	-30 to 3,000 m (~10,000 ft)
Non-operating	-30 to 12,000 m (~40,000 ft)

Minimum Clearance

Front	1 m (39 in)
Sides	2.5 cm (1.0 in)
Top	2.5 cm (1.0 in)
Back	15 cm (6.0 in)

Weight and Dimensions - LH 4

NOTE A fully-loaded NetServer can weigh up to 160 pounds (73 kg). Follow local safety regulations, and use one person for every 40 pounds (18 kg) of NetServer weight when lifting it.

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Height	494.8 mm (19.5 in)
Width	350.5 mm (13.8 in)
Depth	724.2 mm (28.5 in)
Weight	35 - 50 kg (77 - 110 lb)

Weight and Dimensions - LH 4r

Height	354.7 mm (14 in)
Width	482.6 mm (19 in)
Depth	749.2 mm (29.5 in)
Weight	36 - 60 kg (79 - 132 lb)

Power Supply

Power supply input voltage	Auto-Ranging Power Supply 100 to 127 VAC at 50/60 Hz 200 to 240 VAC at 50/60 Hz 90 to 132 VAC at 47 - 63 Hz 180 to 264 VAC at 47 - 63 Hz
Power supply output	810 W maximum
Power consumption	1213W / 1180W with 110V/220V input voltage

Acoustic Emissions

Sound pressure (LpA)	<55 dB(A), bystander position

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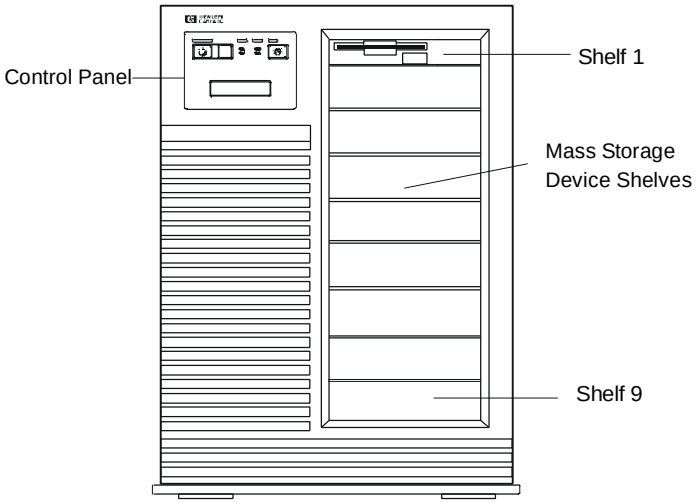
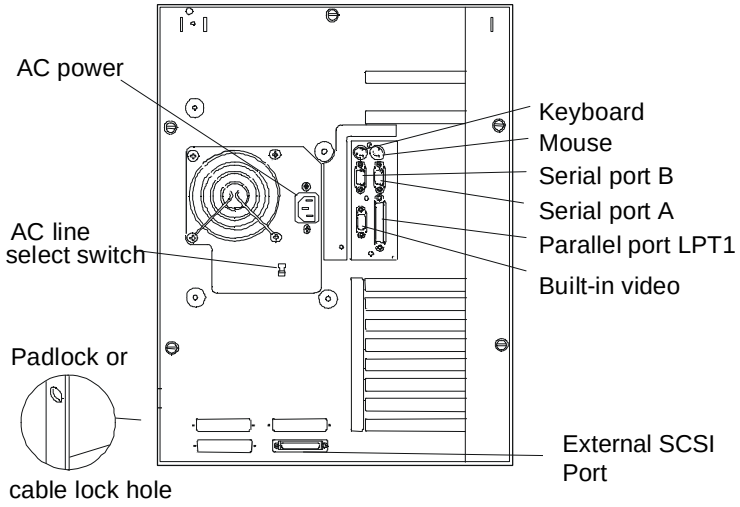
System Views

Front and Rear Views





NOTE:	The server was pre-set at the factory for the AC line voltage in each supported country. If the AC voltage is between 100-127 VAC, the AC line select switch should be set at the 115 V position. If the AC voltage is between 200-240 VAC, the AC line select switch should be set at the 230 V position.

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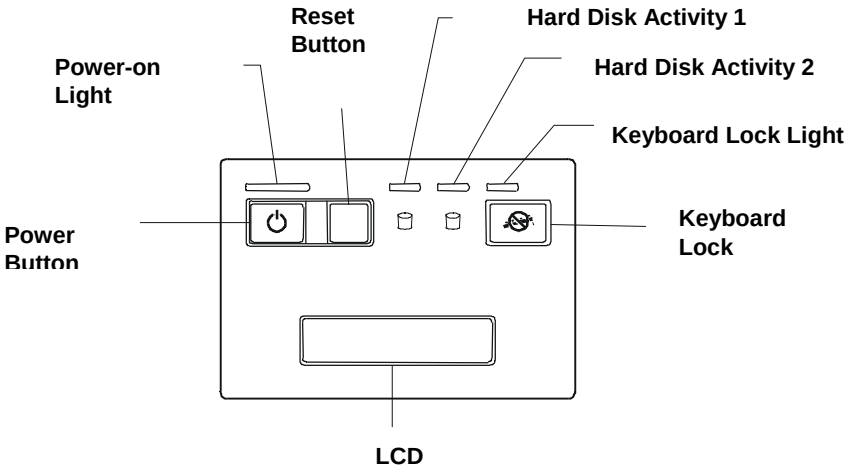
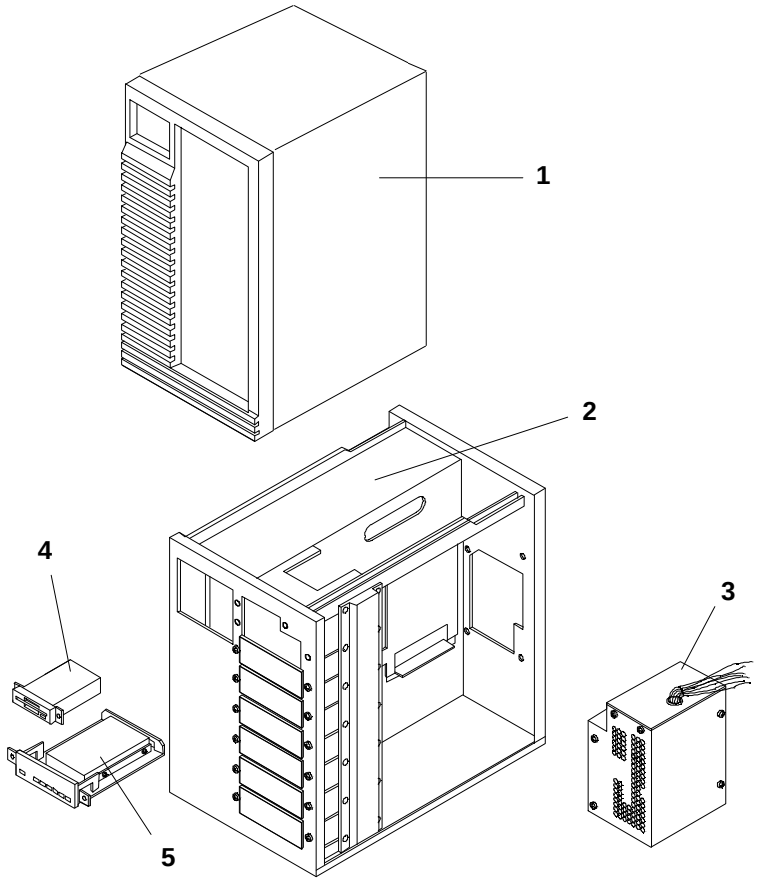
Control Panel



Exploded View



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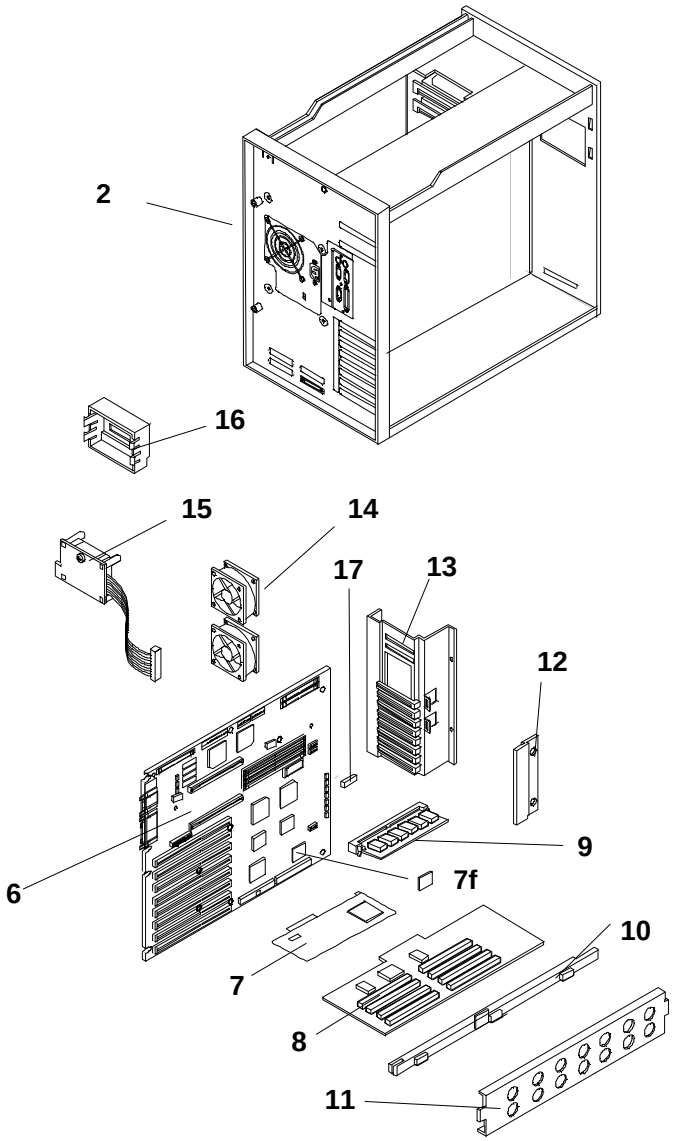

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Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, any video DRAM chips, memory modules, processor board, any added accessory boards, and keep them with the server under repair.

Fig	Description	Replacement	Exchange
1	Cover	5063-0326	
3	Power Supply	0950-2421	5063-0349
4	1.44MB 3.5" Floppy	D2035-63004	
5a	535 MB SCSI HDD	D2075-60003	D2075-69001
5b	1 GB SCSI HDD	D2076-63102	D2076-69002
5c	2 GB SCSI HDD	D2077-63100	D2077-69001
6	System Board	D2182-63006	D2182-69006
	LM BIOS/SCSI Update Kit	D2332-60008	
7a	486/33DX Processor Board	D2182-60002	D2182-69002
7b	486/66DX2 Processor Board	D2186-60001	D2186-69001
7c	Pentium/60 Processor Board	D2194-60001	D2194-69001
7d	Pentium/66 Processor Board	D2993-63001	D2993-69001
	Pentium/90 Processor Board	D2997-63001	D2997-69004
7e	Dual Pentium/66 SMP Processor Board	D2996-63001	D2996-69001
7f	Interrupt Serializer for SMP (APIC)	D2996-80202	
8	Memory Expansion Board	D2954-60001	
9a	4 MB SIMM 70ns	D2974-63001	
9b	8 MB SIMM 70ns	D2975-63001	D2975-69001
9c	16 MB SIMM 70ns	D2297-63001	D2297-69001
9d	32 MB SIMM 70ns	D3578-63001	D3578-69001
10	Stiffner, CPU	5182-0005	
11	Plate, CPU Hold Down	5001-6888	
12	EISA hold down plate	5001-6886	
13	Cardguide Assembly	5063-0331	
14	Fan Assembly	5063-0307	
15	Control Panel PCA	5063-0327	
16	Control Panel Bezel	5063-0328	
17	Real Time Clock/CMOS	1826-2068	
*****	ECC Memory Board	D2971-63006	
*****	HDD Activity Light Cable	5181-5684	
*****	Cable for 2 Fans	5182-0007	
*****	Internal Floppy Cable	5182-0015	

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Fig	Description	Replacement	Exchange
*	Internal IDE-HDD Cable	5182-0016	
*	Internal SCSI-2 Cable	D2079-60002	
*	SCSI-2 Cable (to external port)	5182-0094	
*	SCSI cable (to internal disk array)	C3310-60130	
*	Nameplate 4/33	D2182-40001	
*	Nameplate 4/66	D2186-40001	
*	Nameplate 5/60	D2194-40001	
*	510 MB Disk Module Assembly	C3304-60150	C3304-69150
*	1 GB Disk Module Assembly	C3305-60150	C3305-69150
*	2 GB Disk Module Assembly	C3306-60150	C3306-69150
*	Disk Module Key	5181-7756	
*	Empty Slot RFI Shield Assembly	C3310-60017	
*	Insert Wrap Assembly	C3310-60009	
*	NetServer LM Disk #1	D2332-13014	
*	CDROM Drive	D2992-63002	D2992-69002
*	LM BIOS/SCSI Software Update Kit	D2332-60008	
*	Pentium CPU Processor Board 66Mhz	D2993-69003	D2993-63003
*	3-pack Hard Disk Drive Trays, 3.5"	HP D2198A	
*	3-pack Removable Media Trays, 5.25"	HP D2199A	

* Not on exploded view

Disk Array Parts		
Insert/Backplane assembly		C3310-60009
SCSI Internal Cable		C3310-60130
PC Array Controller	C3310-69124	C3310-60124
510 MB Disk Module assembly	C3304-69150	C3304-60150
1 GB Disk Module assembly	C3305-69150	C3305-60150

HP NetServer LM Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Swedish	C1405-60312
Fr-Canada	C1405-60302	UK	C1405-60313
German	C1405-60303	Danish	C1405-60316
Spanish	C1405-60304	Italian	C1405-60317
French	C1405-60305	Arab/English	C1405-60320
Norway	C1405-60309	Korea/Hangu	C1405-60321
Swiss	C1405-60311	Taiwan	C1405-60323
Arab/French	C1405-60325	Cyrillic	C1405-60330
Portuguese	C1405-60327		
Japanese/Kanji Keyboard (LM2)	C3755-60224		

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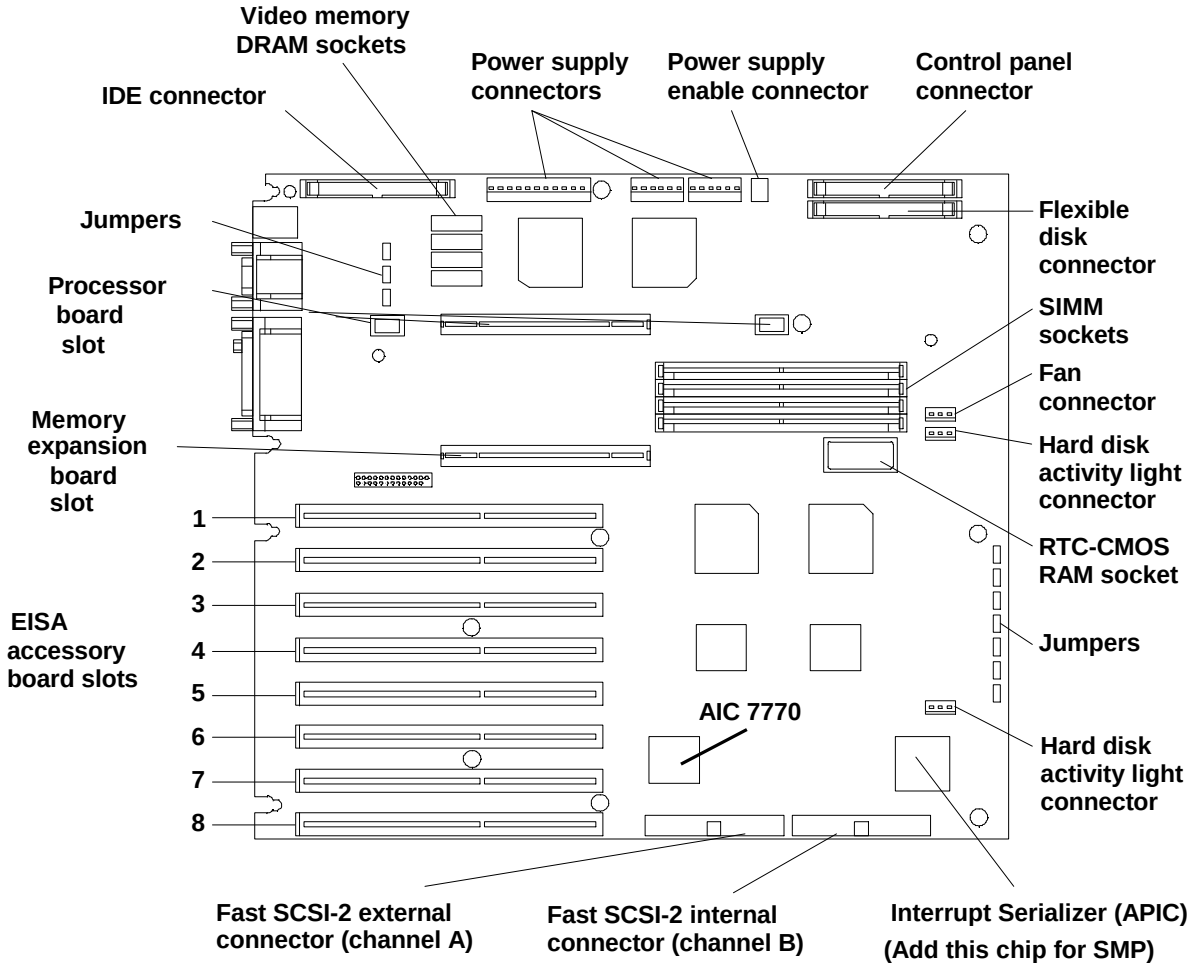
HP NetServer LM Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

System Board



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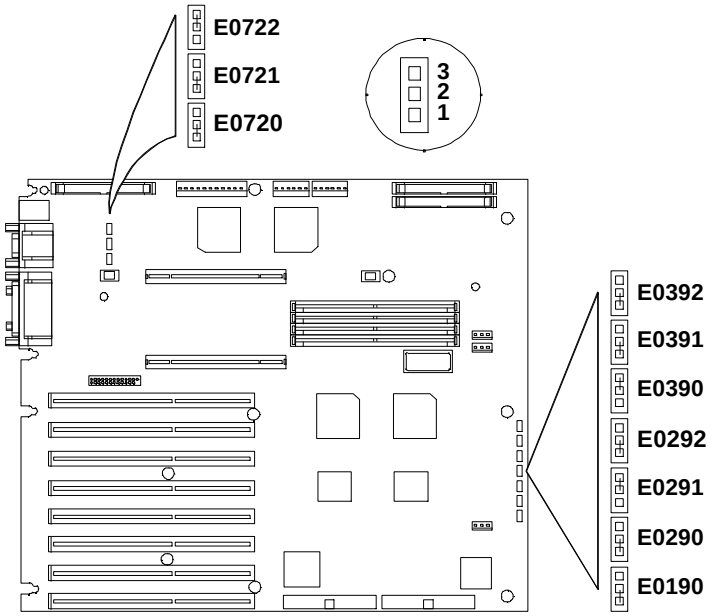
System Board Jumper Locations



System Board Jumper Settings

Jumper	Function	Default
E0190	**Flash BOOT**. When the jumper is on pins 1 and 2, the Flash ROM can be reflashed. If the Flash ROM is corrupt, even reading from the flexible disk drive does not work, move the jumper to 2-3 to allow access to protected code on the Flash EPROM (boot code protected sector) that should allow the Flash from the BIOS.	1 to 2
E0290	**VGA**. When the jumper is on pins 2 and 3, the built-in video is disabled. Disable the built-in video only if a separate video board is installed in the server.	1 to 2
E0291	**Floppy R/W**. When the jumper is on pins 1 and 2, it disables writing to flexible disk drives.	2 to 3
E0292	**NVRAM Clr**. When the jumper is on pins 2 and 3, it erases the current system configuration from NVRAM. The jumper must be on pins 1 and 2 to run the EISA Configuration Utility to reconfigure the server.	1 to 2
E0390	**Password**. When the jumper is on pins 1 and 2, it erases the current power-on password from CMOS. The jumper must be on pins 2 and 3 to use the power-on password.	2 to 3
E0391	**SIMM0 Std**. When the jumper is on pins 1 and 2, memory bank 0 is compatible with 4 MB and 8 MB SIMMs. When the jumper is on pins 2 and 3, memory bank 0 is compatible with 16 MB and 32 MB SIMMs.	1 to 2
E0392	**SIMM1 Std**. When the jumper is on pins 1 and 2, memory bank 1 is compatible with 4 MB and 8 MB SIMMs. When the jumper is on pins 2 and 3, memory bank 1 is compatible with 16 MB and 32 MB SIMMs.	1 to 2

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Jumper	Function	Default
E0720	**VID1**. When the jumper is on pins 2 and 3, it allows four 256 KB x 4-bit DRAMs to be installed in the DRAM sockets for a total of 1 MB of video memory. When the jumper is on pins 1 and 2, it selects 512 KB of onboard video memory.	1 to 2
E0721	**Lock Config.** When the jumper is on pins 2 and 3, it prevents the current system configuration maintained in the Flash BIOS from being changed.	1 to 2
E0722	**3C3VID**. When the jumper is on pins 1 and 2, it changes the starting address of the I/O registers to 46E8H from 03C3H.	1 to 2

NOTE Leave the BIOS Jumper DISABLED. The server stores its system information (BIOS), built-in diagnostics, and other utilities on an erasable, programmable ROM (EPROM) chip. The EPROM chip allows you to update this information from a diskette. An update diskette will contain complete instructions. Leave the BIOS jumper in the DISABLED position unless the HPUpdate Utility instructions direct you to change the jumper to its ENABLED position. This jumper helps prevent any destructive programs (viruses) from writing to the programmable ROM. After you complete the BIOS update, always return the jumper to the DISABLED position.

Memory

- The server supports 4 MB and 8 MB (70 ns or 80 ns) (no 60 ns SIMMs). NEC or Mitsubishi SIMMs can only be 70 ns.
- For 16 MB and 32 MB SIMMs, speed must be 60 or 70 ns (no 80 ns SIMMs).
- You must install memory modules in pairs (called banks) of matching size and speed; however, the banks can be of different sizes and speeds.
- If you install a pair of 16 MB or 32 MB memory modules, you must move the jumper for the corresponding bank to the 2-3 position (Jumpers E0390, E0391, E0392).

Video Memory - DRAM

The video has 512 KB of RAM that allows pixel resolutions of 640 x 480 in 16 colors. You can upgrade the server from 512 KB to 1 MB by installing four, 256 KB x 4 bit, 60 ns DRAMs in the four empty DRAM sockets.

NOTE Only DRAMs from certain manufacturers have been tested for compatibility with the HP NetServer LM Series. Hewlett-Packard does not supply the DRAM upgrade. Consult the HP PC Bulletin Board Service at 1-408-553-3500 for a current list of supported DRAM upgrades.

Recommended Video DRAM Vendors

Vendor	DRAM Part Number
Fujitsu	MB81C4256AP-60
Hitachi	HM51425HP-6
NEC	uP0424256C-60
Samsung	KM44C256BP-6

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Intel	P21014-06
Toshiba	TC514256Ap-60
Texas Instruments	TMS44C256N-60

To take advantage of the upgrade, you must also install the appropriate drivers. Consult the HP PC bulletin board for a list of the required drivers. Hewlett-Packard does not supply or support the drivers.

CAUTION	Apply *gentle* pressure on the pins. They can bend easily. If a pin does not align with a hole, carefully use needle-nose pliers to straighten the pin.

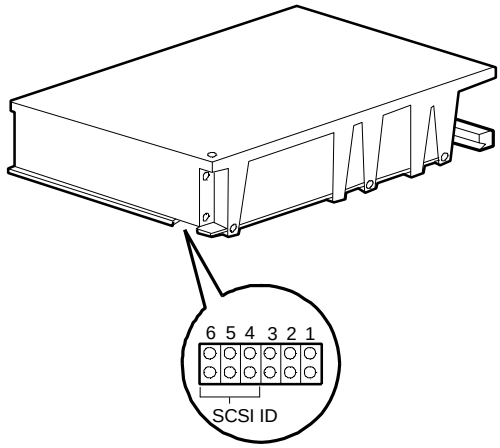
When you reboot the server, the system BIOS shows the video memory size during the Power-On Self-Test (POST) to verify that the additional video memory DRAM is installed correctly. If the video display does not work when you power up the server, remove the upgrade video DRAMs and check the chips for bent pins.

HP NetServer LM System Updates

These notes reflect changes for the HP NetServer LM which could not be included with the service manual or were changed at a later date. Service manuals are not updated and the information, if any, in this section is the latest information available. See also the HP NetServer LM Update, HP Part No. D2332-90009, for additional information on operating systems.

Factory Installed SCSI Hard Drive

Some LM models have a factory installed SCSI hard disk drive. The SCSI hard disk drive has a set of mode select switches located on the rear of the drive. Switches 1, 2, and 3 are not customer adjustable, and factory settings should not be changed. The SCSI hard disk drive comes with the SCSI address set for ID 0.



SCSI Hard Disk Drive ID Jumper Settings

	Jumper 6	Jumper 5	Jumper 4
ID 0			
ID 1			Jumper
ID 2		Jumper	
ID 3		Jumper	Jumper
ID 4	Jumper		
ID 5	Jumper		Jumper

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ID 6	Jumper	Jumper	
ID 7	Not functional		

1740 SCSI Host Adapter Configuration

Configuring a 1740 SCSI adapter (either the HP D2649A or D1681A) may cause a "Shadow RAM diagnostic failed" error message.

The SCSI BIOS uses the last 128 bytes of the 32 KB ROM space as a RAM buffer. In the 1740's .CFG file, there is a "WRITABLE" parameter under each BIOS address option. This parameter can be set to either "YES" or "NO."

To configure the 1740, the "WRITABLE" parameter for the ROM address of where the SCSI BIOS is configured must be set to "YES." Otherwise, the server will not treat that address area as a writable memory area.

You can use any text editor to edit the "WRITABLE" parameter in the following .CFG file:

1740 (D1681A):	!ADP0000.CFG
1740A (D1681A or D2649A):	!ADP0001.CFG

For example, if you are going to use the D0000H area for the SCSI BIOS, perform the following:

1.Find the line that looks like: CHOICE="BIOS Base Address D0000H."

2.Set the "WRITABLE" parameter to "YES."

3.Save the .CFG file, and rerun EISA Config with the new .CFG file.

Selecting Primary SCSI Channel

Starting with the HP *NetServer #1* diskette, version F.01.00, you may select Channel A (external) or Channel B (internal) to be the primary SCSI channel. The system first looks for the boot drive on the primary channel; if one is not found, it then looks on the secondary channel.

SCSI BIOS Address and Boot Device

A system will always boot from the device that is connected to the SCSI adapter with the lowest BIOS address. The lowest BIOS address option for a 1740 Adapter (either the HP D2649A or D1681A) is C8000H, and for a 2740 Adapter (HP D2078A) it is CC000H. For example, if a system uses both a 7770 and a 1740 controller and you want to boot from a device on the 1740, then the video must be shadowed to C0000H. That will put the 7770's BIOS at E0000H, which will always be a higher address than the 1740's BIOS.

Installing Four or More Disk Drives on One SCSI Channel

If you want to connect four or more SCSI drives on the same SCSI channel, you may have excessive spin-up delays in your system. This could result in the SCSI drives with higher addresses not being recognized by the network operating system (NOS).

The default configuration of the HP SCSI 535 MB, 1 GB, and 2 GB hard disk drives has the delayed spin-up feature enabled. The number of seconds the drive waits before spinning up after Power On is related to the drive's SCSI address: the higher the address, the longer the delay. This feature controls the power demand imposed by numerous drives spinning up simultaneously after Power On.

In general, when selecting an address for drives (default address is 0), select the lowest SCSI address possible.

When installing the first three drives in an HP system, only use addresses 0, 1, and 2 and leave the Delayed Spin-Up jumper in place (default setting).

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If more than three drives are installed, remove the Delayed Spin-Up jumper on drives with addresses 3, 4, 5, and 6. To find the Delayed Spin-Up jumper, orient the drive so the circuit board is on top and the power/SCSI connector is facing away from you. The jumper block is two-thirds of the way up the right edge of the circuit board. The jumper is in position 2 from the front of the drive and is labeled "DS" (refer to the "Technical Information" section in the hard disk *Installation Guide*).

The result of this procedure is that several drives will spin up simultaneously. This may draw more current than the power supply can provide. If the system crashes due to a power supply failure, replace the jumpers and command the NOS to wait until the drives are initialized before initializing the network. The spin-up delay is the SCSI address multiplied by 15 seconds. This means that the drive at SCSI address 5 delays 75 seconds (5 x 15 seconds) before initializing. The NOS must wait at least as long as the drive with the longest delay so that it can recognize the drives.

You may also reboot (push the reset button) after a Power On if the system completed its boot sequence before the last drive has spun up.

Boot Problem with Greater than 2 GB HP Disk Array Boot Drive

An array with total capacity greater than 2 GB, such as 3 or 4 drives, may have a boot error while booting the system. This is a BIOS limitation and can occur with any NOS or OS.

If you have more than 2 GB total capacity, you must make the first logical partition less than or equal to 2 GB. Create the other partitions with the remaining capacity. Use the DOS utility for the Disk Array called JETSET.EXE.

For example, if you are loading NetWare, which needs to first boot to DOS, create a small DOS partition (for example, 50 MB) for the first partition in JetSet and then create a second large partition with the remaining capacity.

HP C2260A Storage System and the Built-in SCSI Connector

The server has a built-in SCSI connector (in the back of the unit) which is a Fast SCSI-2 port. The HP C2260A Storage System is not compatible with Fast SCSI-2, and has not been supported on this SCSI connector.

To connect an HP Storage System to the embedded Fast SCSI-2 subsystem, use the HP Fast SCSI-2 Kit (C3607A). The kit contains an active terminator, driver software, and installation instructions to support the HP Storage System on the embedded Fast SCSI-2 subsystem.

Disk Array Controller

Use the EISA Array Controller Card shipped with the Disk Array. This card provides the data protection and hot-spare capabilities of the HP Disk Array. **Do not use the Disk Array storage cabinet with any other controller cards, including the controller integrated server.**

IDE 240 MB (D1697A) or 270 MB (D2894A) Hard Disk Installation and Configuration

If you are installing one or two HP D1697A 240 MB IDE or HP D2894A 270 MB IDE hard disk drives using the IDE hard disk drive cable (P/N 5182-0016), follow these steps:

1. Connect the first (or only) hard disk to the connector labeled "PRIMARY" on the IDE hard disk drive cable.
2. Configure the primary drive to be the master drive by moving the IDE disk drive jumper from the CS position to the DS (master) position. The master drive is usually the first drive, but either drive can be the master.
3. Connect the second disk drive to the connector labeled "SECONDARY" on the IDE hard disk drive cable (P/N 5182-0016) and remove the jumper completely.

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In the EISA Configuration Utility, select the *Hard Drive 1* (or *2*) to be Drive Type 2 or 48 (User Definable) at the end of the list of choices for any IDE hard disk drives installed. Do not use Hard Disk Auto Configuration. Verify these parameters as the drive definition:

Parameter	240 MB	270 MB
Cylinders:	723	944
Heads:	13	14
Sectors:	51	40
Precomp:	-1	-1
Landing Zone:	722	943

Change the setting of "Posted I/O Writes" to Disabled. If the setting is Enabled, the drive operates very slowly.

Specifications

Power Supply	Power select switch: 90 to 132 VAC, or 198 to 264 VAC at 47-63Hz
Power Availability	386W continuous, 458W peak
Power Consumption	551/529W maximum with 110/220V supply 654/627W peak with 110/220V supply
System Dimensions	19.3 in. high x 13.7 in wide x 18.1 in deep (49 cm high x 34.8 cm wide x 46 cm deep)
System Weight	50-70 lbs (22.7-31.8 kg), depending on configuration
Operating Temperature	41 to 95 degrees F (5 to 35 degrees C)
Operating Humidity	20% to 80% non-condensing

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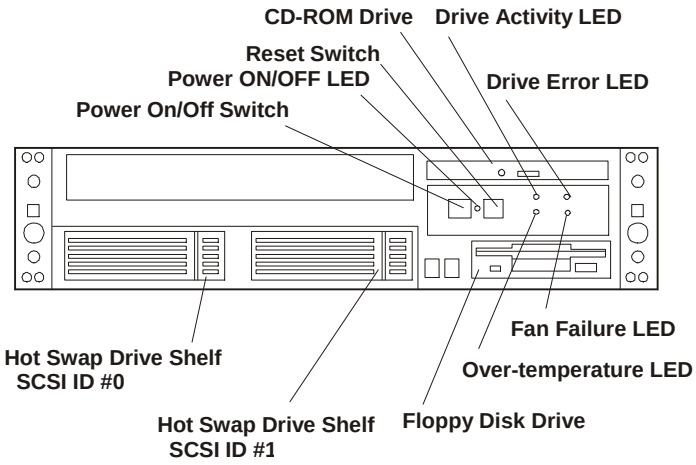
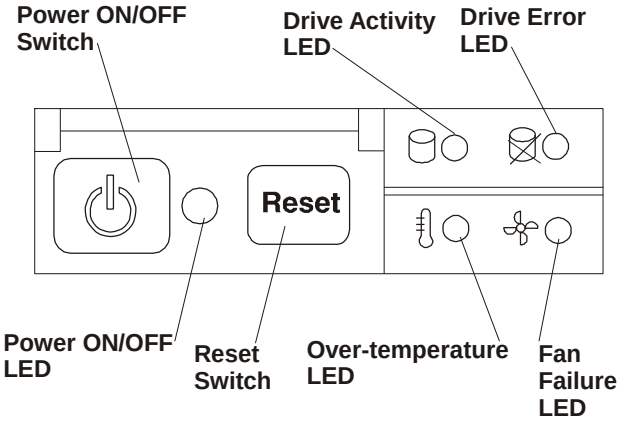
System Views

Front Panel Controls





Control / Indicator	Description / Definition
Power On/Off Switch	Momentary switch. When pressed, moves power status back and forth between System Power and Standby Power. System Power allows full system operation; Standby Power enables remote system monitoring only.
Power On/Off LED	*Green* when System Power on. If this LED does not come on, the system is not getting adequate power or the power supply is malfunctioning.
Reset Switch	Momentary switch. When pressed, creates hard system reset. This is equivalent to a power-on reset.

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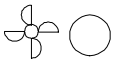
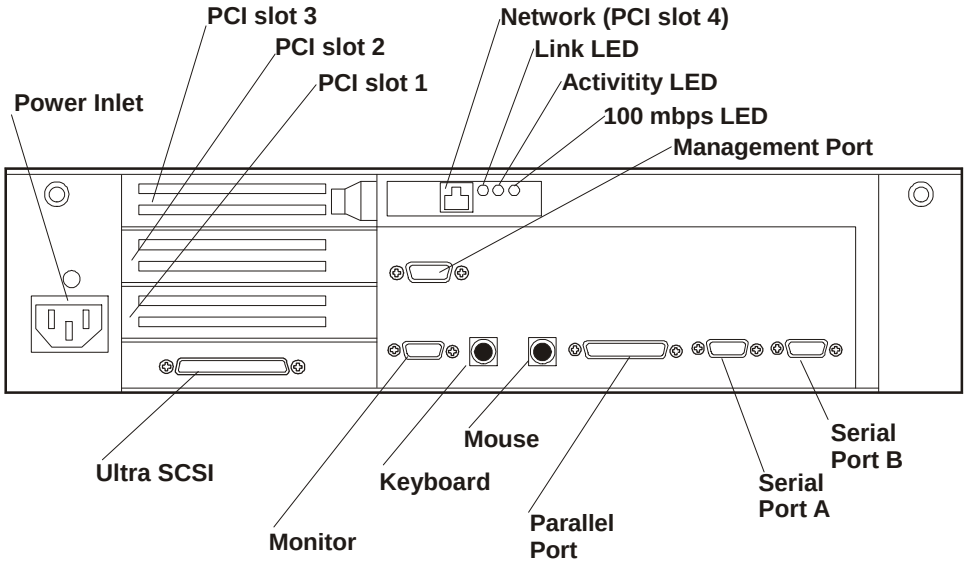
Drive Active LED	LED goes on (*green*) to indicate access over the LPr's embedded SCSI bus. This includes access to both internal and external drives.
Drive Error LED	LED flashes *red* to indicate that one of the two drives in the hot-swap bays has failed and must be replaced. LED flashes *yellow* to indicate that one of the two drives is predicted to fail and should be replaced. You may have time to back up the drive before replacing it. **NOTE**: You may have to remove the front bezel to see the specific drive LEDs and determine which device is in trouble.
Over-Temperature LED	LED flashes *red* when any one of several temperature sensors within the LPr indicates damage to the system is imminent. Power down the system immediately. LED flashes *yellow* to indicate internal temperature is nearing damaging levels. Perform a graceful shutdown and power down the system.
Fan Failure LED 	LED flashes *red* to indicate a fan failure. Power down the system immediately. LED flashes *yellow* to indicate a fan is a lower than normal speed. Unless the over -temperature indicator is flashing *red* or *yellow*, you may perform a graceful shutdown and then power down the system and correct the fan problem. This indicator reports on the power supply fan as well as the three fans in the internal LPr fan pack.

Rear Panel Controls, Ports, and Indicators



Indicator	Definition
Link LED	This LED goes on to indicate that both the network adapter in the LPr and the network switch are receiving power and that they are properly connected.
Activity LED	This LED flashes to indicate data transfers to/from the LPr network adapter. The rate of flashes varies directly with network traffic.
100 mbps LED	This LED goes on to indicate that the LPr network adapter is supporting transfers at the 100 mbps (million bits per second) rate. When off, the LPR is working at 20 mbps.

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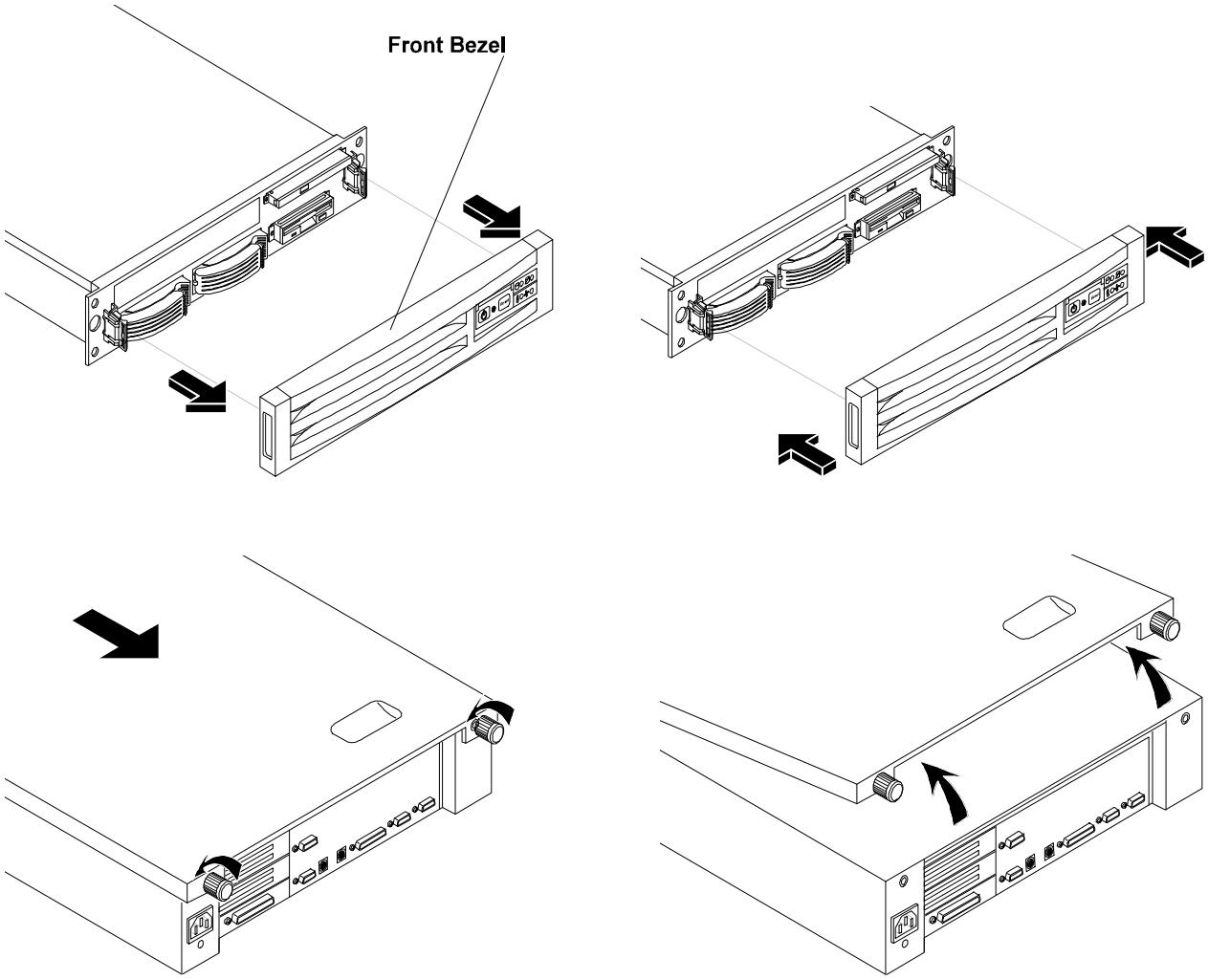
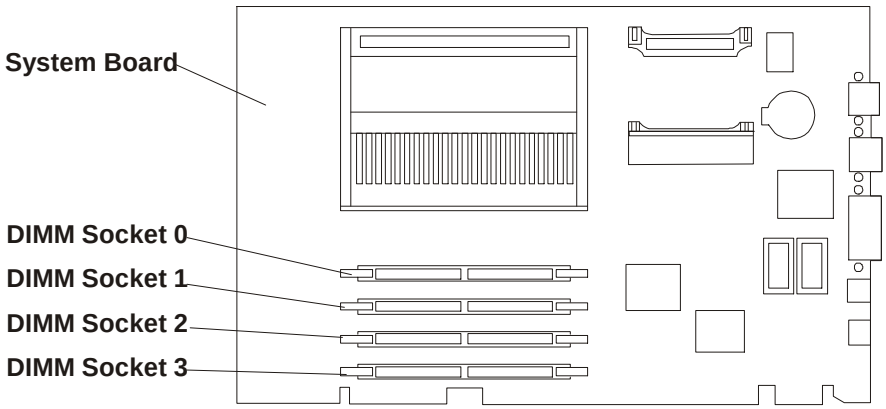
Covers



Memory

The NetServer LPr's main memory is implemented with 5V SDRAM DIMMs (Dual In-Line Memory Modules). The NetServer LPr ships with at least 64 MB of main memory and supports up to 1 GB. Memory is available in the following DIMM capacities: 64, 128, and 256 MB. There are four DIMM sockets on the system board. DIMMs may be installed in any combination in any socket. However, we recommend starting at socket 0 and filling the sockets in numerical order: 1, 2, and 3. Use only HP DIMMs.



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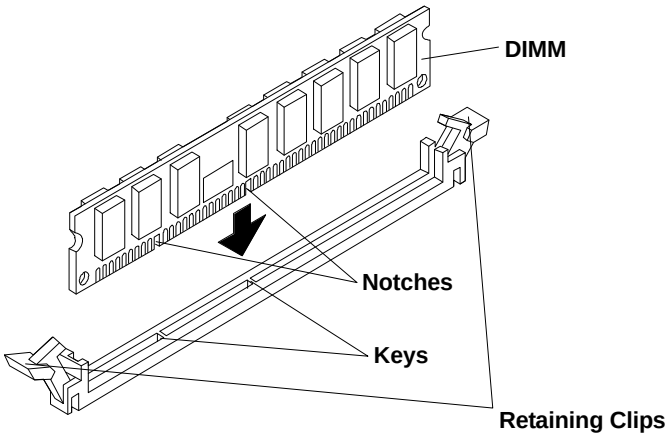
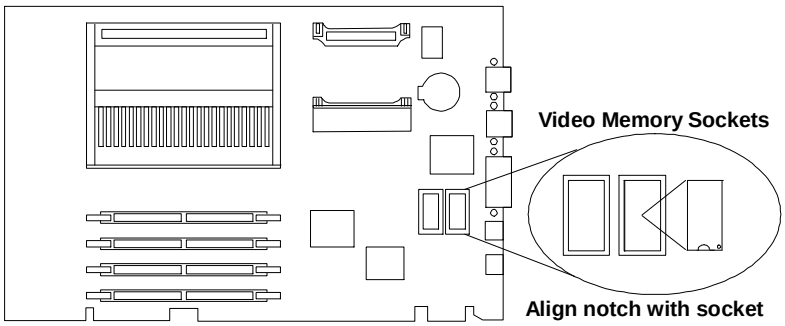


Video Memory

The HP NetServer LPr comes standard with a 1 MB frame buffer to support video displays of 1024 (horizontal pixels) x768 (vertical lines) x 256 (colors per pixel) at refresh rates up to 72 Hz. You can upgrade the frame buffer to 2 MB to support 1280 x 1024 by adding two memory chips.

NOTE The video memory chips must be installed in pairs. To get a higher resolution display, you may have to load additional video drivers for the operating system. Refer to the instructions that accompanied the video memory upgrade kit as well as your NOS documentation.



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Boot Device Priority

By default, the HP NetServer searches for bootable devices in the order shown below. CD-ROM Drive

Floppy Disk Drive

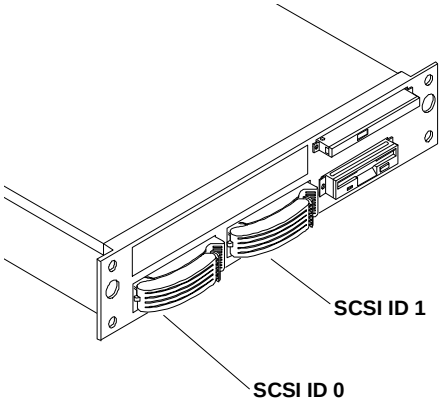
Embedded SCSI Controller, starting with SCSI ID 0

PCI Slots in the order 3, 2, and 1

On each controller, the server scans for a boot device starting at device ID 0 and works up from there. The controller is always SCSI ID 7.

NOTE	This boot order can be changed using the SETUP utility (press [F2] during the boot process).

Hot-Swap Drive Bay Addresses



Accessory Boards

The HP NetServer LPr includes four PCI slots; one (over the system board) is taken by the Network Interface Controller (NIC) but can be used by other small PCI boards.

Interrupt Sharing

In the LPr, PCI slot #3 and the embedded SCSI controller share the same interrupt line. The system is capable of avoiding internal conflicts through interrupt sharing; however, interrupt sharing results in a small performance loss as the operating system has to resolve which of the devices caused the interrupt before it responds. Therefore, if the embedded SCSI controller is enabled, use the other PCI slots before using slot #3.

NOTE	Adding a PCI-to-PCI bridge card to the HP NetServer may alter the server's boot order. This boot order can be changed using the SETUP utility (press [F2] during the boot process). Refer to Chapter 4, "Installing Mass Storage Devices," and see the subsection, "Boot Device Priority."

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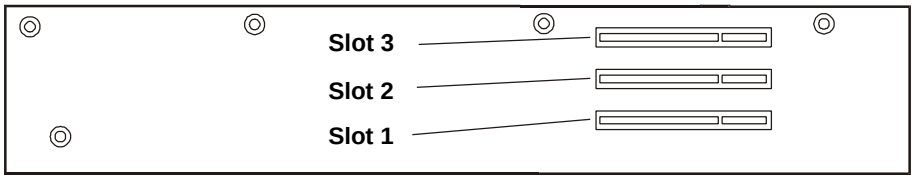
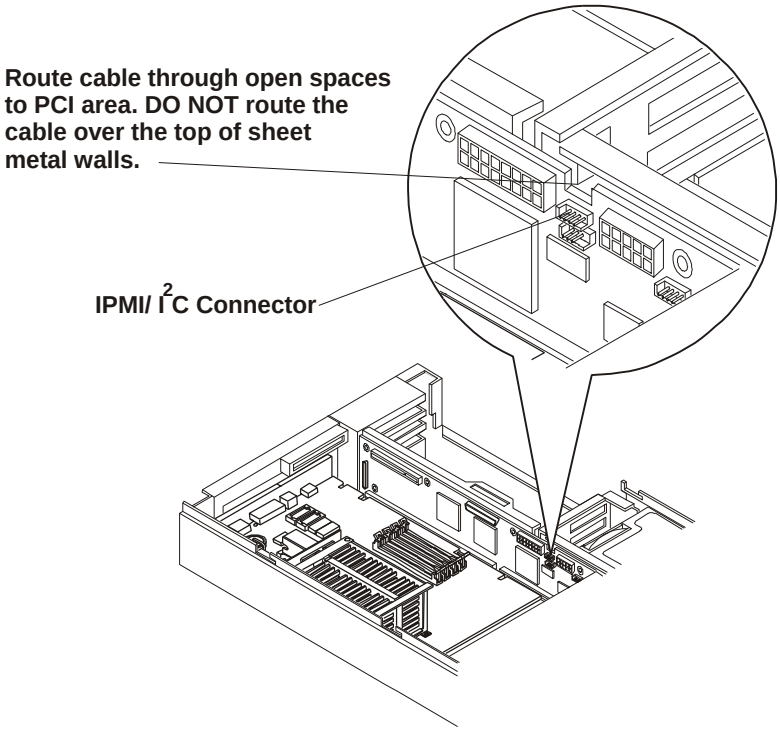


CAUTION	Do not bend the PCI card to fit it into the slot. Check to make sure you removed any handles or board extenders.

Remote Control Card

Refer to the *Top Tools Administration Guide for Remote Control* along with the upgrade kit documentation for information on the remote control card.



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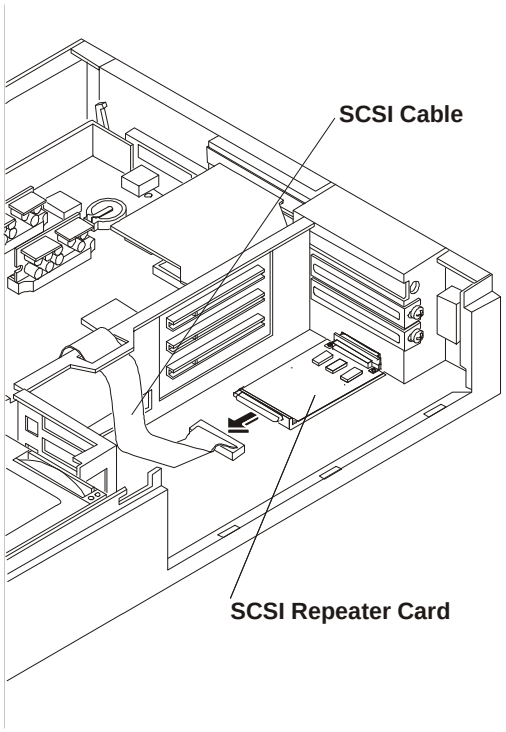
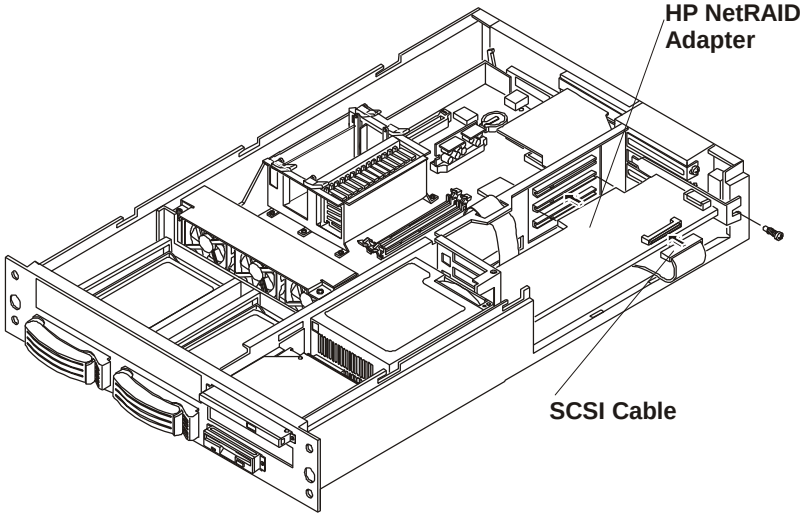
NOTE If there are other SCSI controllers on the PCI bus, the slot will affect boot order. See the Boot Device Priority.





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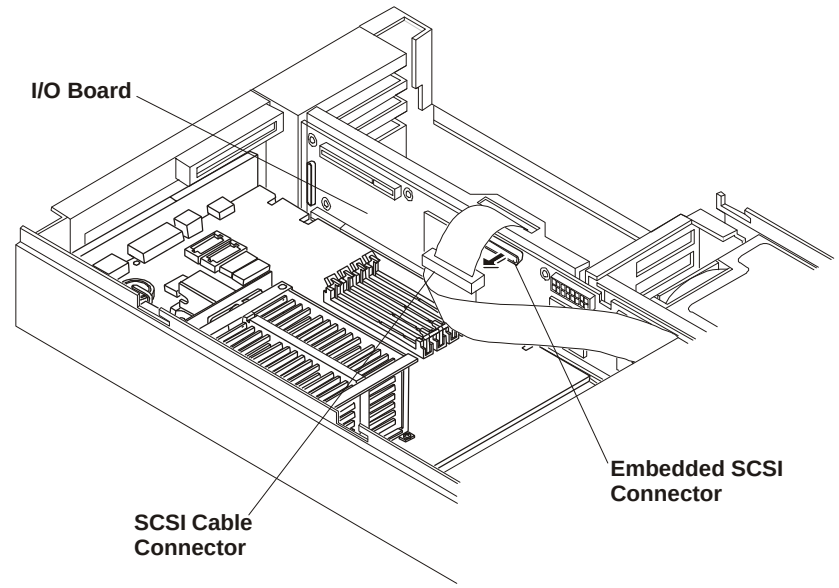

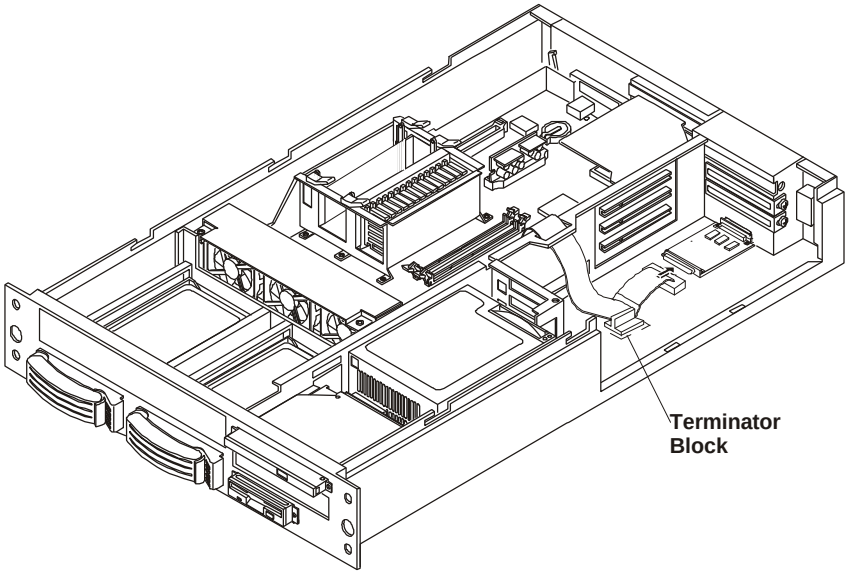

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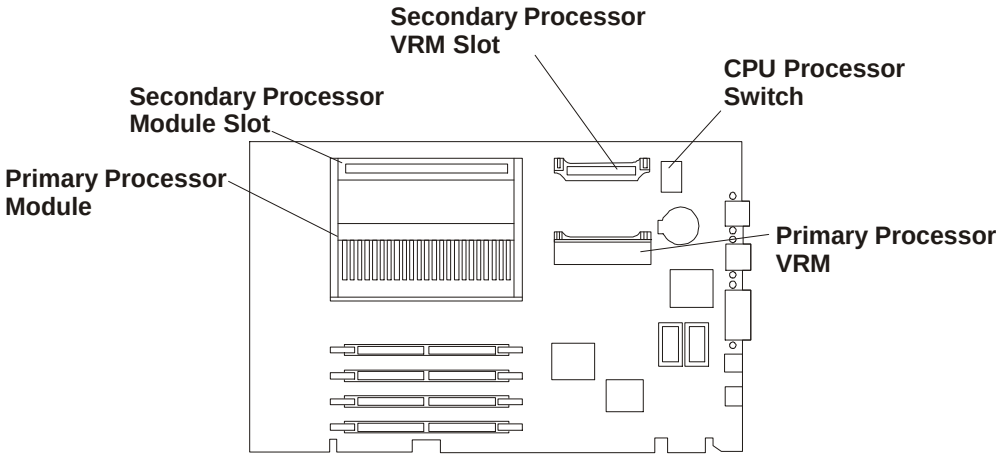
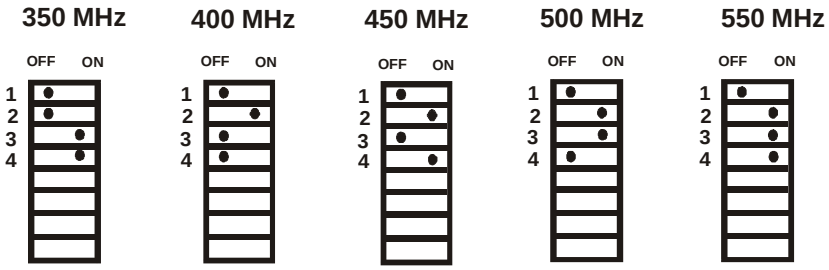
Processor Module

NOTE Be sure that the VRM and the processor module associated with it are both in primary or secondary slots. New processors are added. See the Technical Reference Card for the latest switch settings.





NOTE: Only the first 4 switches set the processor clock.

NOTE If you have two modules in your system with different clock rates, the switch setting must be for the lower of the two.

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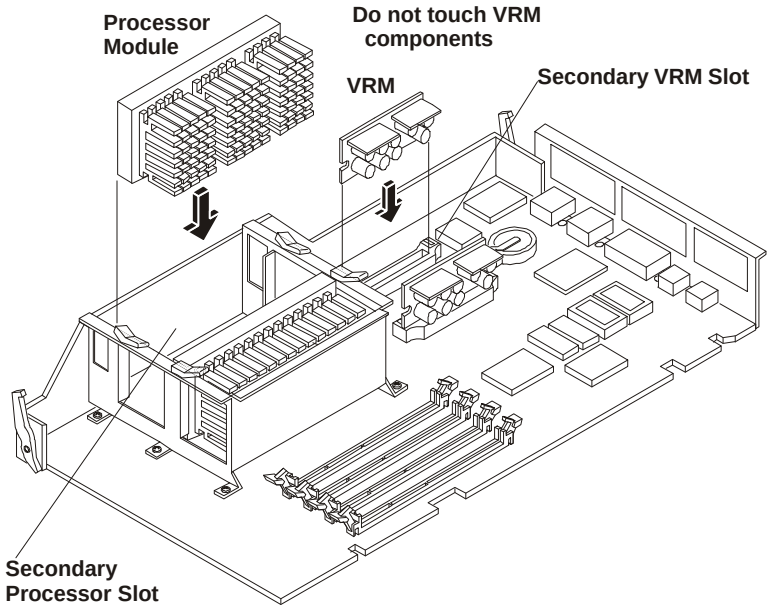
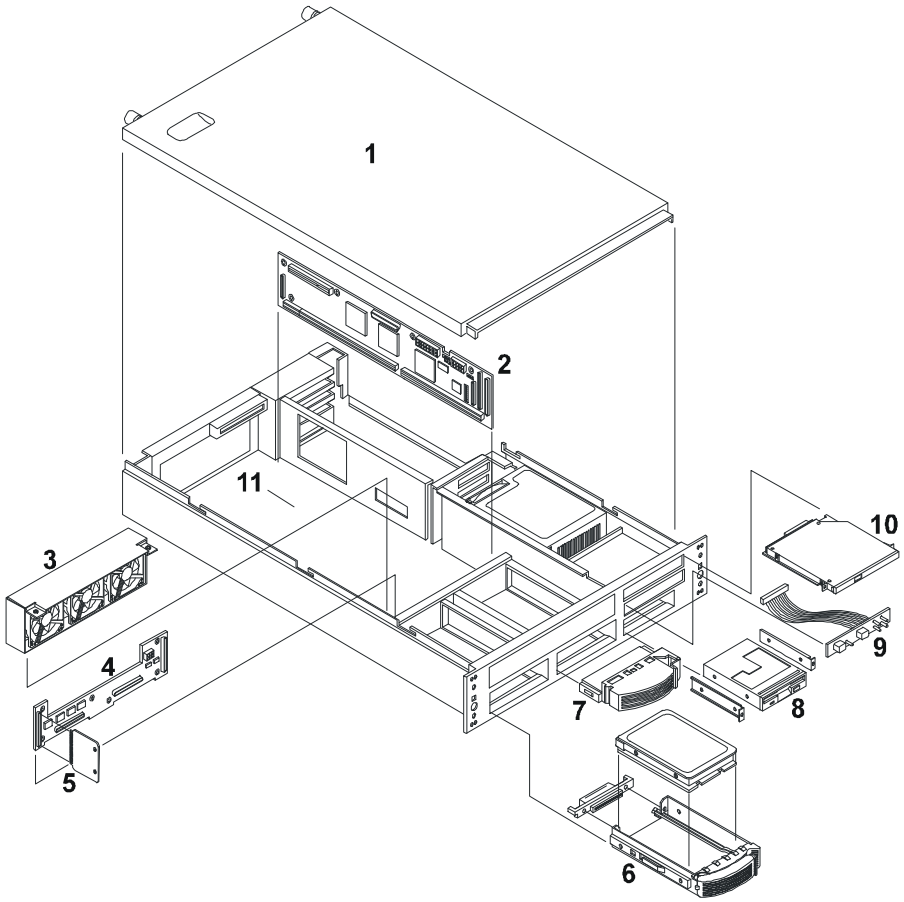


NOTE	Be sure that the VRM and the processor module associated with it are both in primary or secondary slots.

Exploded Views



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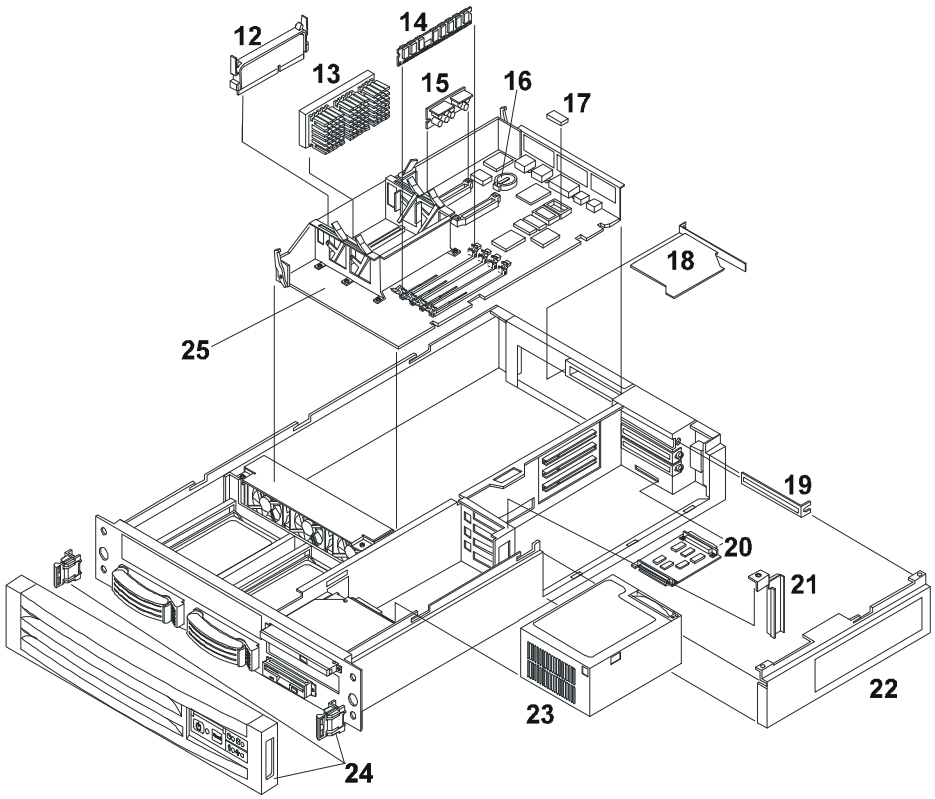

Parts List

* This part is not on an exploded view.

Fig	Description	Replacement	Exchange
1	Top Cover	5064-7036	
2	I/O ("Riser") Board	D6129-63000	D6129-69000
3	Fan pack	5064-5858	
4	SCSI backplane	D6021-63030	
5	SCSI management board	D6021-63031	
6	Hot-swappable SCSI drive Hot-swappable drive kit	orderable as accessories	
7	Hot-swap bay filler panel	(not orderable)	
8	Floppy disk drive	D2035-60282	
9	Control panel	D6129-63005	
10	CD-ROM drive, Slimline	D6021-63067	
11	LPr chassis	(not orderable)	
12	Processor terminator card	5183-3418	
13a	Pentium II, 400 MHz	D6092-63000	D6092-69000
13b	Pentium II, 450 MHz	D7032-63000	D7032-69000
13c	Pentium II, 500 MHz	D7129-63001	D7129-69001
13d	Pentium II, 550 MHz	D8567-63000	D8567-69000
13e	Pentium II, 600 MHz	D9342-63001	D9342-69001

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13f	Pentium II, 650 MHz	D1134-63001	D1134-69001
13g	Pentium II, 700 MHz	D9175-63000	D9175-69000
14a	RDIMM, 64MB	D6097-63001	D6097-69001
14b	RDIMM, 128MB	D6098-63001	D6098-69001
14c	RDIMM, 256MB	D6099-63001	D6099-69001
15	Voltage regulator module	0950-2848	
16	Battery, Lithium, 3V.	1420-0356	
17	Video memory	1818-6527	
18	Network adapter card (NIC)	D5013-63002	D5013-69002
19	Rear panel	(not orderable)	
20	SCSI terminator	D6129-63006	
21	PCI stabilizer	(not orderable)	
22	PCI access door	(not orderable)	
23	Power supply	D6129-63003	D6129-69003
24	Bezel kit (HP pictured) Bezel kit, 3rd party	D6130-60002 D6130-60003	
25	System board	D6129-63008	D6129-69008

Cables

Cable	Part Number
SCSI Terminator Power	5183-7652
I2C	5183-6815
Management Port	5183-6816
IDE, CD-ROM	5183-6817
Control panel	5183-6818
Floppy drive	5183-6819
SCSI	5183-6820
AC internal	5183-6855
External SCSI/Riser Terminal	5183-8312

Footnote

If a system board needs to be replaced, remove processor board and any DIMMs, and keep them with the server under repair.

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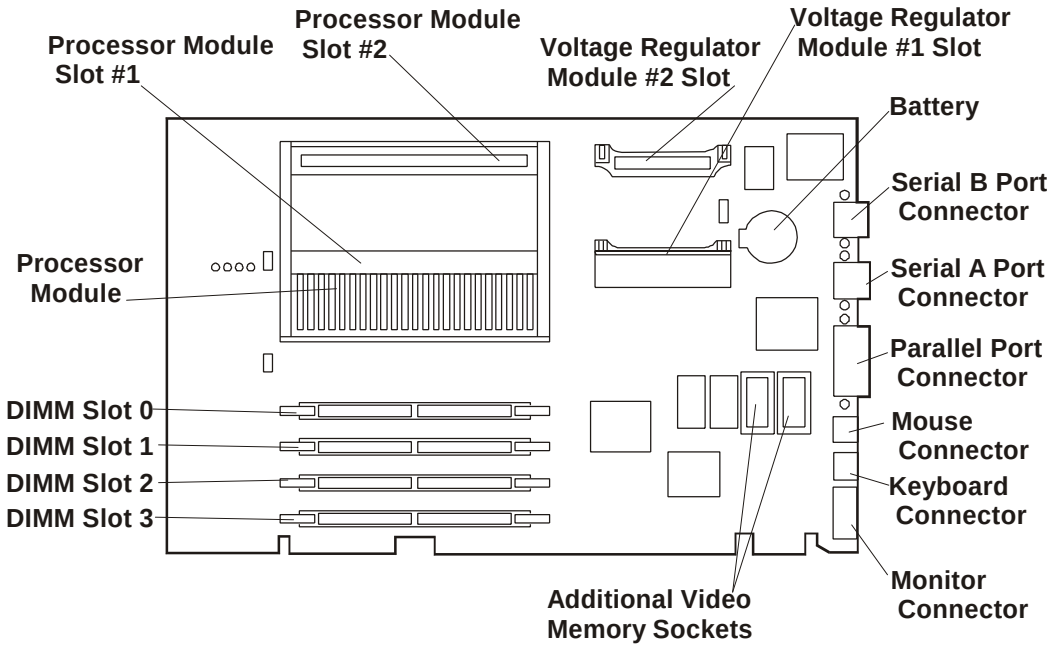
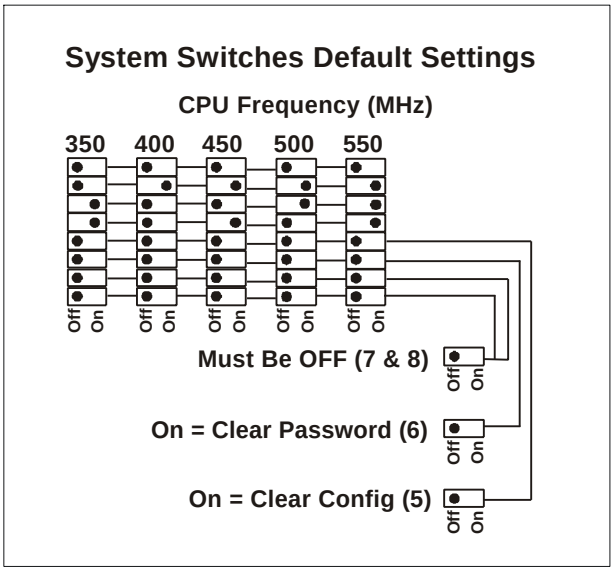
System Board Illustration



System Switches



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Specifications

Temperature

Operating	5° to 35° C (41° to 95° F)
Non-operating	-40° to +65° C (-40° to +149° F)

Humidity (non-condensing)

Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing

Altitude

Operating	-30 to 3,000 m (~ 10,000 ft)
Non-operating	-30 to 12,000 m (~ 40,000 ft)

Thermal Output

Maximum Operating	1041 BTU/hr

Minimum Clearance No requirement in HP racks.

Weight and Dimensions

Weight	Approx. 40 lbs (88 kg)., depending on configuration
Width	17.6 inches (44.7 cm)
Depth	28 inches (71.1cm)
Height	3.5 inches (8.9 cm)

Power Supply Specifications

Type	Auto-ranging
Input - Max.	88 to 140 VAC at 47 - 63 Hz
Operating Current	100 VAC: 5.3
	120 VAC: 4.6 A
	200/208 VAC: 3.2 A
	220/230 VAC: 2.8 A
In-rush Current	25 A
Operating Power	305 W

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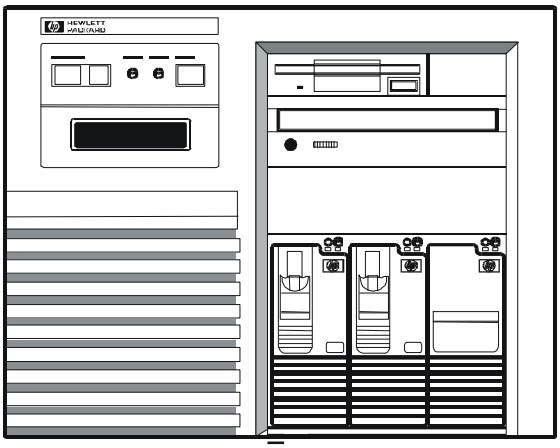
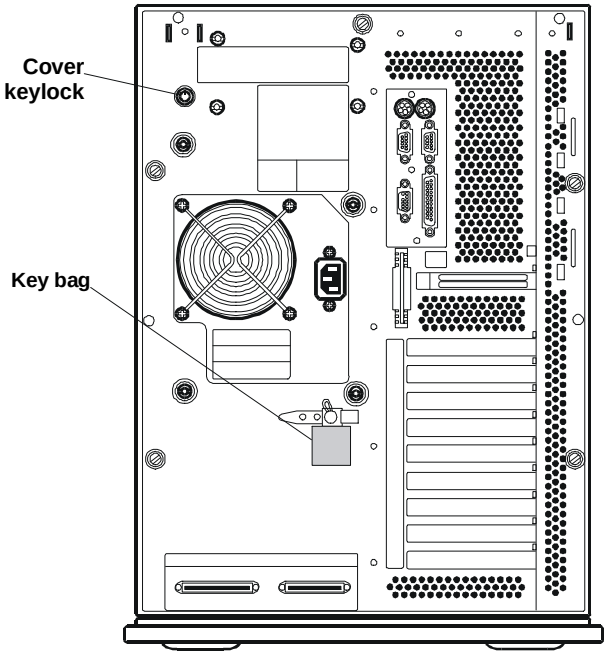
System Views



Front View



Rear View

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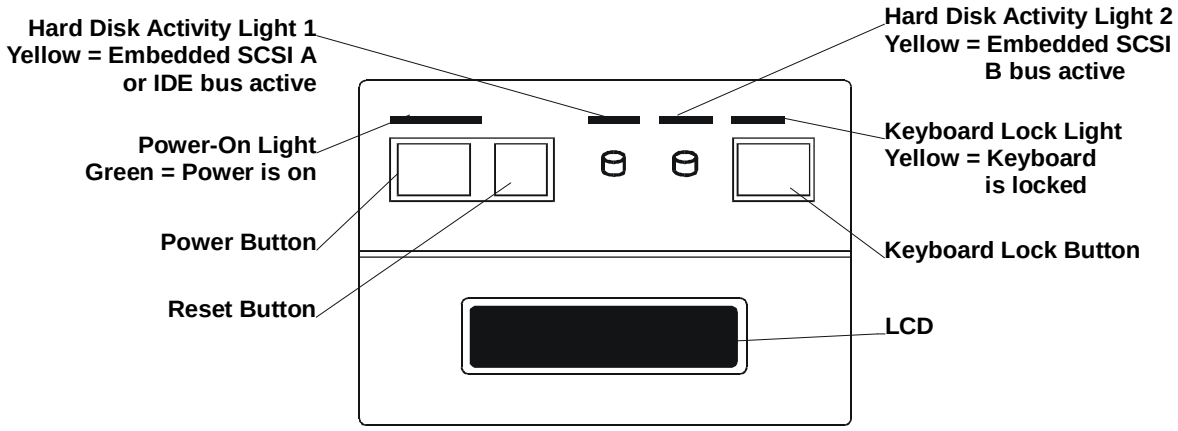
Control Panel Description



Power Button	Turns the NetServer on and off. Note that when the NetServer is turned off, the power to the internal circuitry and mass storage devices is disabled; however, AC power is still applied to the power supply. **Always disconnect the power cord before removing the cover.**
Power-On Light	Turns green when the NetServer is on.
Reset Button	Restarts the NetServer. You can press this button if the NetServer "hangs" or "locks up"—it has the same effect as turning the NetServer off and on. Save any work before pressing the reset button. Any information not saved is lost when the NetServer resets.
Hard Disk Activity Light 1	Yellow indicates activity on the Embedded SCSI A bus or IDE bus.
Hard Disk Activity Light 2	Yellow indicates activity on the Embedded SCSI B bus.
Keyboard Lock Button	Prevents unauthorized use of the keyboard. Press the keyboard lock button to lock the keyboard. Enter the password to unlock the keyboard.
Keyboard Lock Light	Turns yellow when the keyboard is locked.
LCD	Displays the Power-On Self-Test (POST) or system messages.

Control Panel Connector J1

This connector is used by the HP Remote Assistant Accessory, a 32-bit EISA Bus Master board used to remotely monitor server functionality. For additional information on this product, see the documentation that comes with it. When you install the HP Remote Assistant cable, you will need to remove the jumper on **PS REMOTE** and **PS ON**. If you remove HP Remote Assistant from the server, remember to re-install the jumper.

WARNING If the HP Remote Assistant is not installed and there is no jumper on PS REMOTE and PS ON, the system will **NOT** power up.

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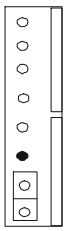
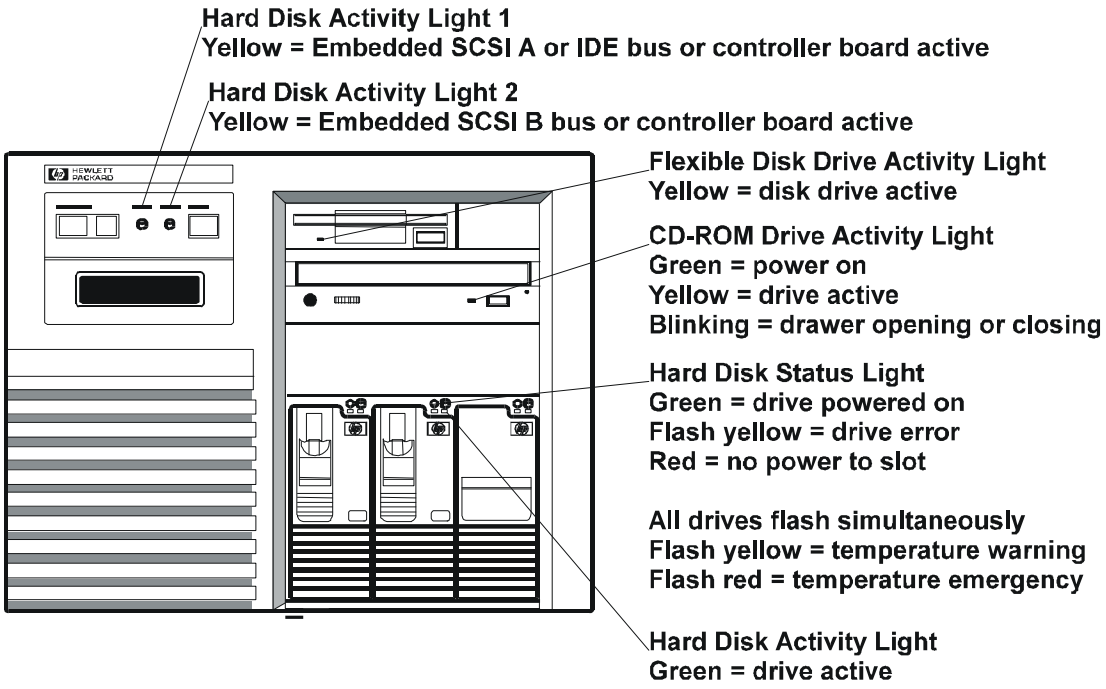


Control Panel J1

Mass Storage Indicator Lights



For some SCSI controller boards, you must connect the hard disk activity light.

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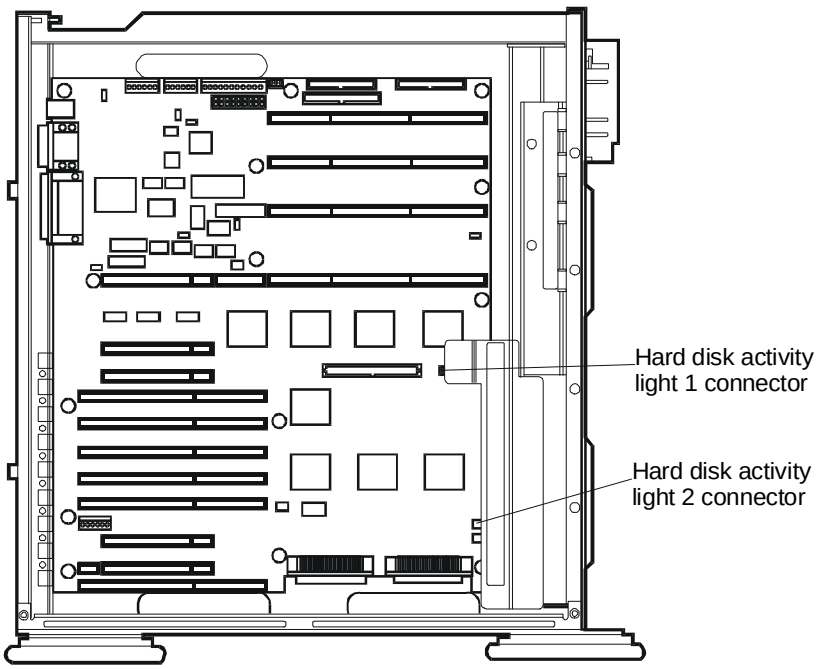
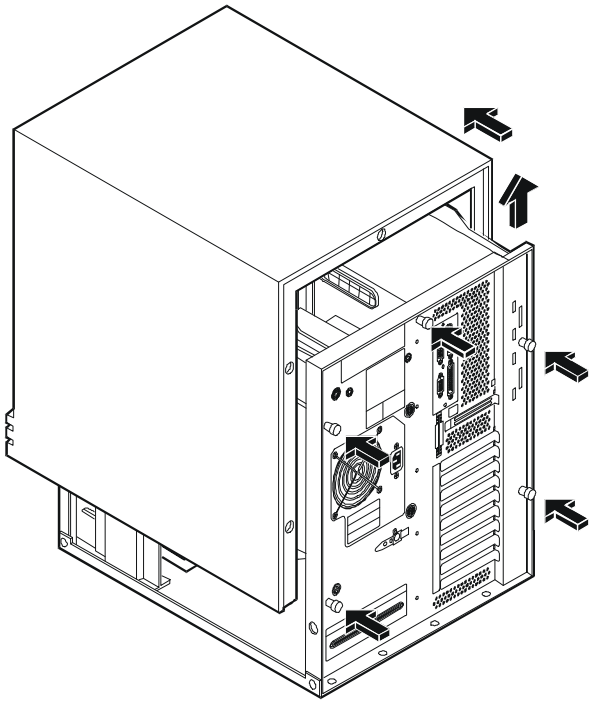


Cover

CAUTION	The cover is an integral part of the NetServer. The NetServer must be operated with the cover in place to ensure proper airflow for continued reliability and to maintain compliance with radio frequency interference and safety standards.



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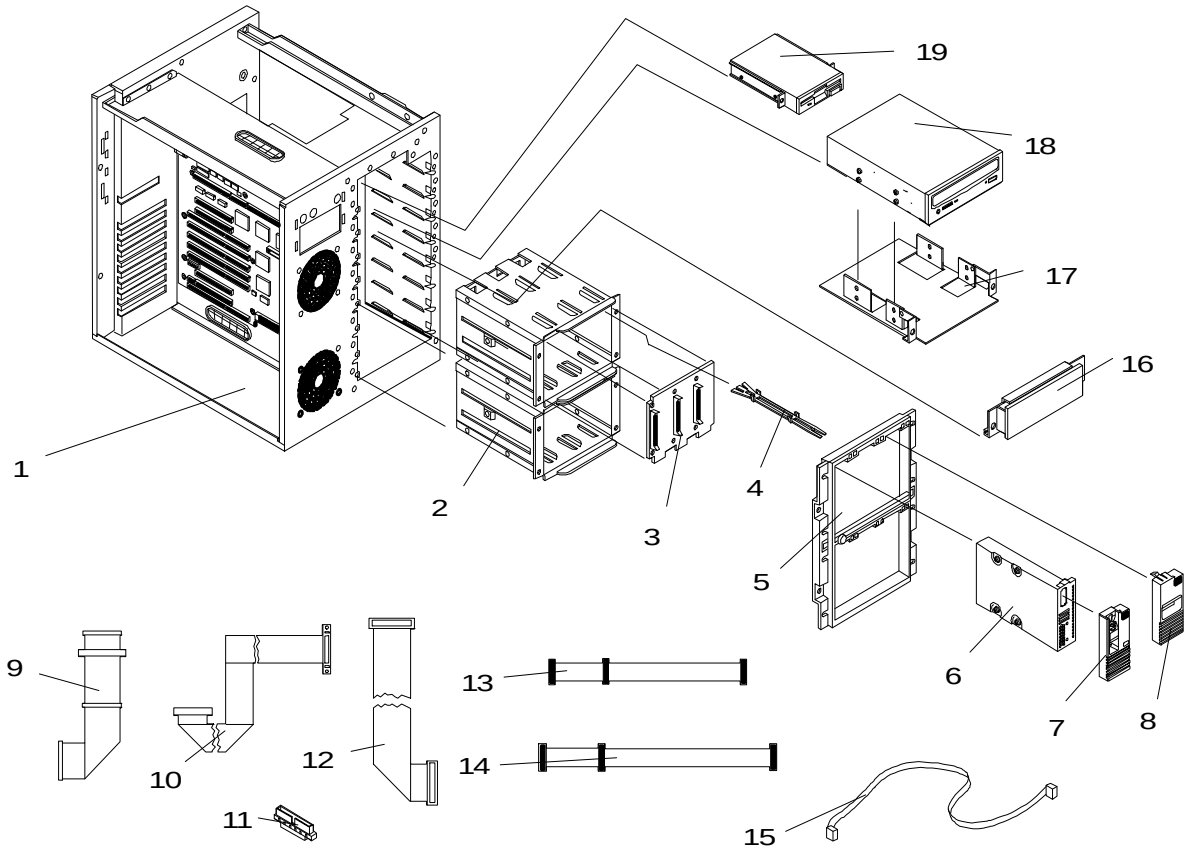
Exploded Views



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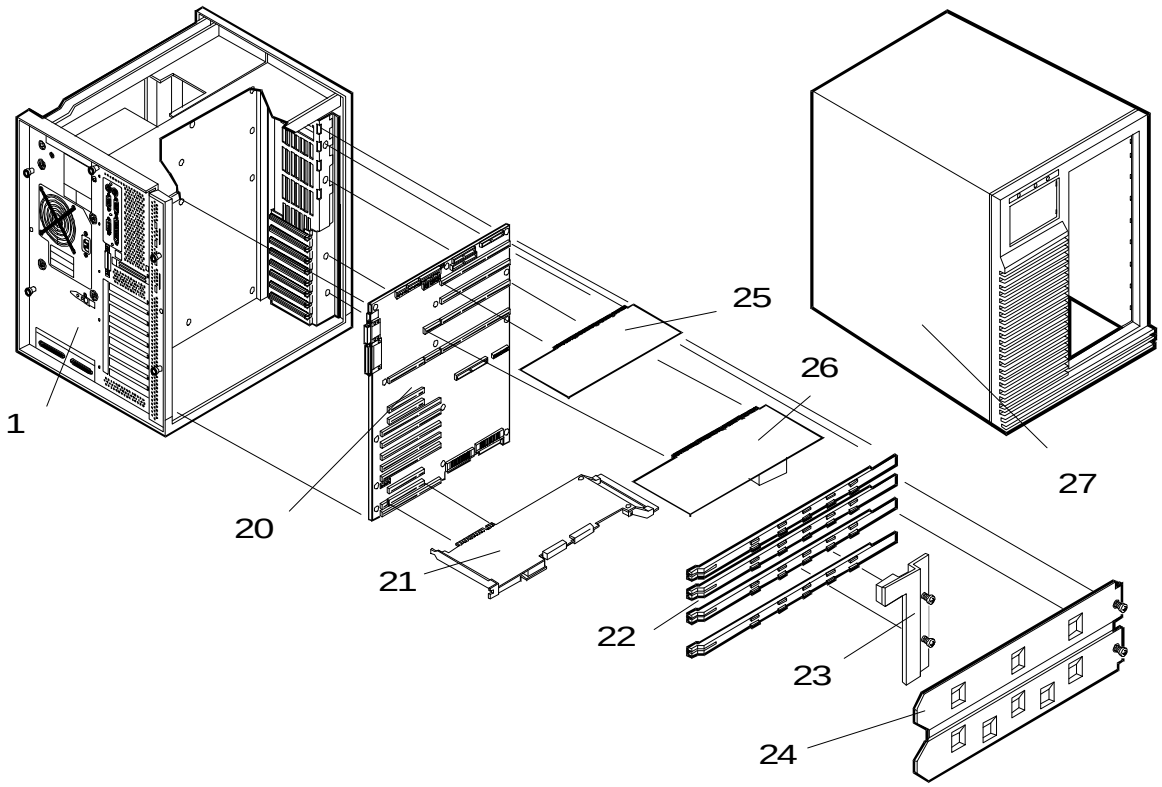

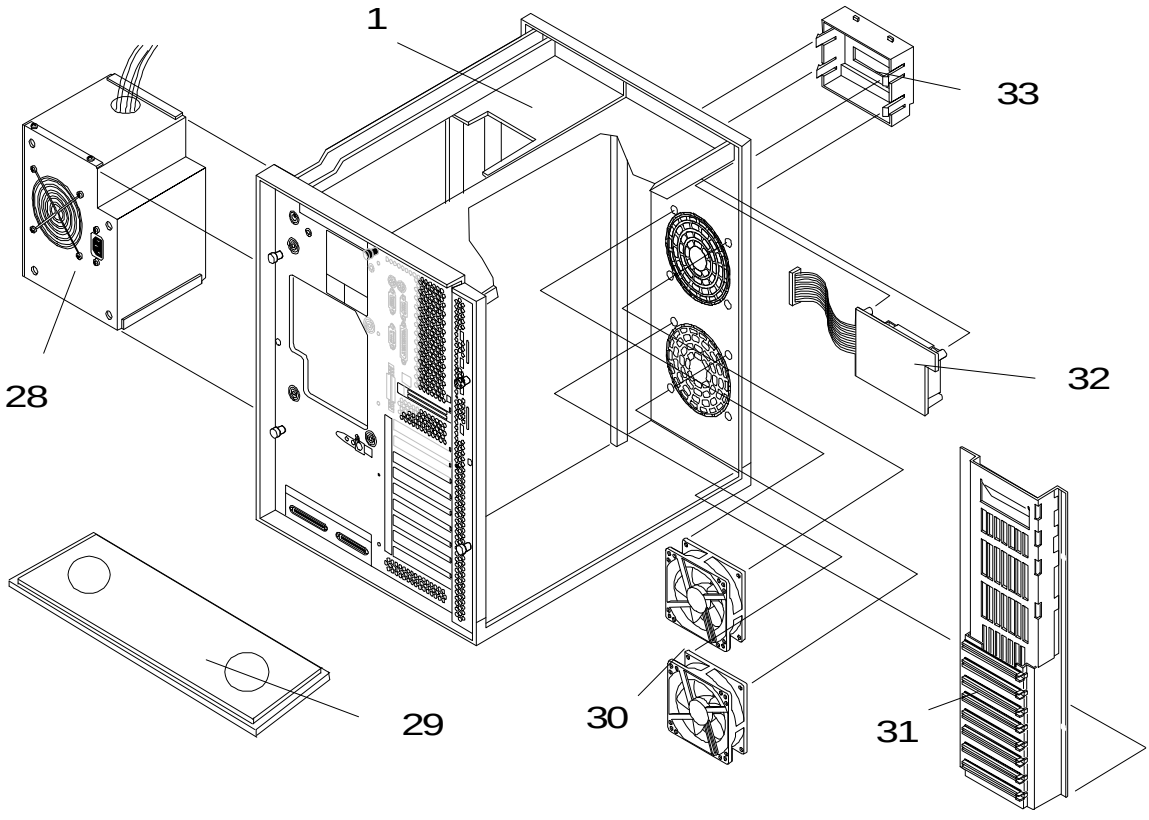

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Parts List

NOTE The part numbers in the list were the ones that were available at the time of publication. Part numbers may change after publication. HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, remove processor board and any added accessory boards, and keep them with the server under repair.

Fig	Description	Replacement	Exchange
1	Chassis Assembly	not orderable	
2	Hot Swap Cage	5063-5671	
3	Hot Swap Cage PCA	5063-5672	
4	Hot Swap Light Pipe	5041-1099	
5	Hot Swap Cage Bezel w/lock	5063-5673	
6	Disk module tray kit	D3349A	
6	1 GB Hot Swap SCSI HDD	D3581-63001	D3581-69001
6	2 GB Hot Swap SCSI HDD	D3582-63001	D3582-69001
6	4 GB Hot Swap SCSI HDD	D3583-63001	D3583-69001
6	9.1 GB Hot Swap Ultra SCSI HDD	D4289-63004	D4289-69004
7	Hot Swap Disk Module Cover Lock Replacement	5063-8301	
8	Hot Swap Module Slot Cover	5063-5676	
9	(C1) Narrow SCSI-2 Cable	5182-4522	
10	(C3) Wide External SCSI cable	5182-6734	
11	(A) Wide to Narrow SCSI Adapter	5182-4550	
12	(C2) Wide Internal SCSI Cable	5182-4521	
	(C4) Fast wide SCSU 68-pin cable	5182-4523	
13	Internal Flexible Disk Cable	5182-0015	
14	Internal IDE-HDD Cable	5182-4570	
15	I^2C cable	5182-4535	
16	Upper Drive Slot Cover	not orderable	
17a	5 ¼ inch tray (3 pack)	D2199A	
17b	3 ½ inch tray (3 pack)	D2198A	
18	CD-ROM Drive	D2992-63003	
18	1.05 GB SCSI HDD	D2076-63102	D2076-69002
18	2.1 GB SCSI HDD (5400 RPM)	D2077-63100	D2077-69001
18	2.1 GB SCSI HDD (7400 RPM)	D3340-63100	D3340-69001
18	4.2 GB SCSI HDD	D3341-63001	D3341-69001
19	1.44 MB 3.5" Flexible Disk Drive	D2035-60021	
20	LS System Board	D3330-63011	D3330-69011
21	HP SCSI PCI Controller Board	C3610-63050	C3610-69050
22	PCB Support Rail	not orderable	

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Fig	Description	Replacement	Exchange
23	EISA/PCI Hold Down Plate	not orderable	
24	CPU Metal Hold Down Plate	not orderable	
25	ECC Memory Board	D2971-63006	
26a	LS 100 Mhz Processor Board	D3574-63001	D3574-69001
26b	LS 100D Dual Processor Board	D3575-63001	D3575-69001
*	LS 133 Processor Board	D3613-63001	D3613-69001
*	LS 133 Dual Processor Board	D3614-63001	D3614-69001
*	P5/166 LS Processor Board	D4300-63001	D4300-69001
*	P5/166 LS Dual Processor Board	D4304-63001	D4304-69001
27	Cover	5063-0384	
28	Power Supply 470W	5063-5634	5063-5635
29	Chassis Foot	5041-1082	
30	Fan Assembly	3160-1004	
31	Card Guide Plastic Assembly	5041-6342	
32	LS Control Panel PCA	5064-0739	
33	LS Control Panel Bezel	5063-0328	
*	LS DC-DC Converter	D3575-63002	
*	4 MB Parity SIMM	D2974-63001	
*	8 MB Parity SIMM	D3577-63001	D3577-69001
*	16 MB Parity SIMM	D2297-63001	D2297-69001
*	32 Parity MB SIMM	D3578-63001	D3578-69001
*	Hot Swap Cage key	5182-4534	
*	Real Time Clock/CMOS Battery Module	D3330-63002	
*	Rear Lock Assembly	5063-5683	
*	Video DRAM **	5182-9404	
*	LS SCSI Cable Kit	D3330-60010	
*	HP Navigator CD-ROM***	5063-8346	
*	Diagnostic Assistant Diskette	5011-1941	

* This part is not on an exploded view.
** See Video Memory - DRAM section
*** This part number is constantly revised for each new release. When you order using this number you will be sent the current revision of the CD-ROM.

Keyboards

Language	HP Part Number	Language	HP Part Number
US	C1405-60301	Danish	C1405-60316
Arab/French	C1405-60325	French/Canada	C1405-60302
Portuguese	C1405-60327	German	C1405-60303
Cyrillic	C1405-60330	Spanish	C1405-60304
Japan/Kanji	C1414-60001	French	C1405-60305
Italian	C1405-60317	Norwegian	C1405-60309

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Arab/English	C1405-60320	Swiss	C1405-60311
Korea/Hangu	C1405-60321	Swedish	C1405-60312
Taiwan	C1405-60323	UK	C1405-60313

Power Cords

Country	HP Part Number	Country	HP Part Number
Australia/New Zealand	8120-1369	India/South Africa	8120-4211
Canada/United States	8120-1751	Japan	8120-4753
Denmark	8120-2956	Switzerland	8120-2104
Europe	8120-1689	United Kingdom	8120-1351

Mass Storage Cables

If you need additional cables, the cables are not available separately, but only by ordering the HP Cable Kit - Part Number D3330-60010. Only the following HP cables and adapter are supported:

Cabling Label	Cable	Part Number	In Kit
C1	Narrow SCSI (50 pin) cable with built-in terminator	5182-4522	No
C2	Fast wide SCSI (68 pin) cable	5182-4521	No
C3	Fast wide SCSI (68 pin) cable with external connector	5182-6734	Yes
C4	Fast wide SCSI 68-pin cable	5182-4523	Yes
C5	Narrow SCSI 50-pin internal cable	5182-4552	No
A	Fast wide SCSI (68 pin) to narrow SCSI (50 pin) Adapter	5182-4550	Yes

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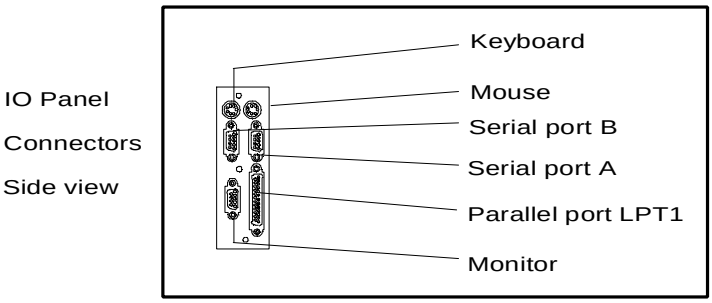
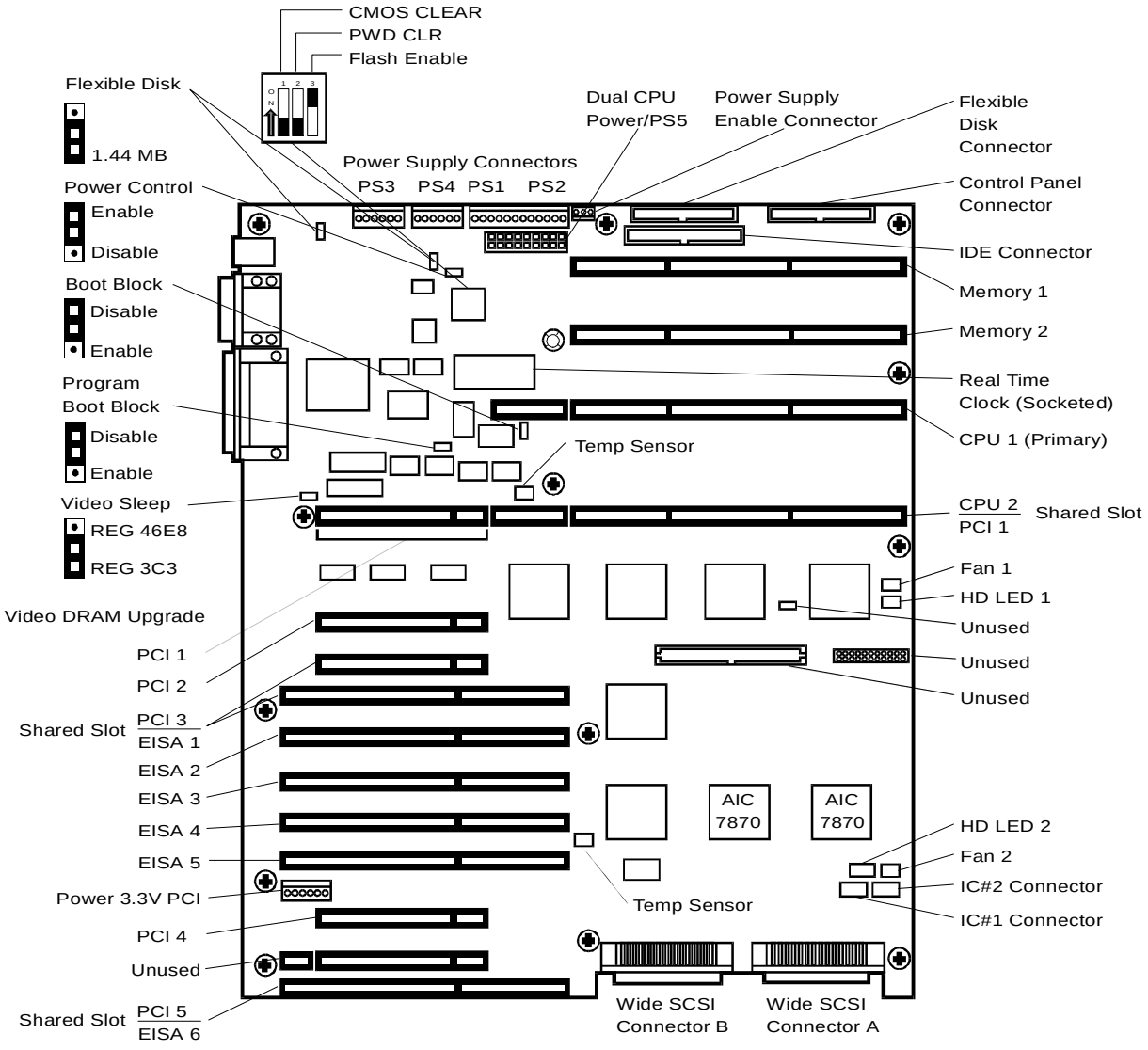
System Board





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System Board Connectors

Connector	Number	Connector	Number
IDE disk drive cable	J9F1	Flexible disk drive	J9F2
Keyboard	J9A1	Mouse	J9A1
Video	J7A1	Parallel	J7A1
Serial	J8A1	SCSI port A	J0J1
SCSI port B	J0G2	Battery (Clock Module)	U7D1
PCI slots	P2-2, P2-1 P1-1, P1-2, P1-3	EISA/ISA slots	M6, M5, M4, M3, M2, M1
Fan	J1J1, J4J3	Control panel	J9H1
Power supply	PS3 (J9B2) PS4 ((J9C2 PS1-PS2 (J9O2)	Processor board slots	CPU 1 - J7J1 CPU 2 - J6J1
ECC memory slots	MEM 1 - J9J1 MEM 2 - J8J1	I^2C 1 I^2C 2	J0J3 J0J2
Power supply on	J9E1	Remote power supply	J1
Hard Disk Activity	J1J2, J4J2		

System Switches and Jumpers

Switch/ Jumper	Description	Default
J9B1	Floppy Drive 1	Not used
J9C1	Floppy Drive 0	Not used
J9C3	**Power Control** - Disables or enables real-time clock power control. This jumper enables power supply maintenance voltage control using the real-time clock.	Disabled
J7D2	**Boot Block** (BIOS Recovery) - The flash memory contains a protected area that cannot be corrupted. Code in this area is used to boot the server from drive A if the BIOS gets corrupted during a BIOS update procedure. Enable this switch to use boot block recovery, then redo the BIOS update.	Disabled
J4H1	TDV	Not used
J6A1	**Video Sleep** - Determines which I/O port the onboard Cirrus Logic super VGA controller uses for its internal AT mode setup port.	REG 3C3
J7C1	**Program Boot Block** - lets a qualified service technician update the boot block.	Disabled

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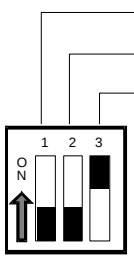
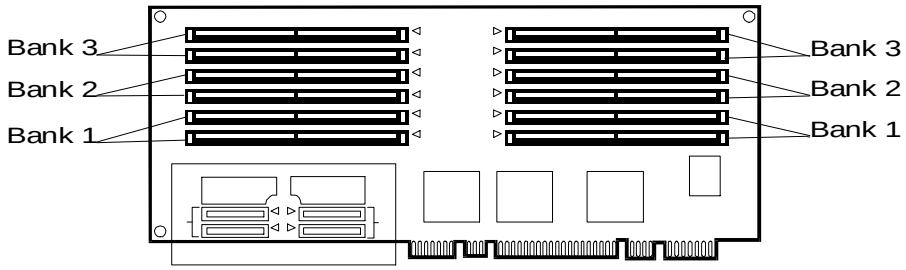
Switch/ Jumper	Description	Default
S8C1	Configuration Switches **- Switch S8C1**  **CMOS Clea**r: Setting this switch to ON clears CMOS and set the real-time clock (RTC) to the manufacturing defaults. **Password Clear**: Setting this switch to ON clears the password when the system reboots. Set to OFF to re-enter the password. **Flash Enable**: Setting this switch to ON lets the user update the contents of flash memory (BIOS) with the HPUpdate Utility.	ON OFF - default ON OFF - Default ON - Default OFF

Memory Configuration

Each ECC memory board has 12 SIMM sockets supporting 2 MB-32 MB, 70 ns or faster approved, fast-page parity SIMMs. You can install any size SIMM in any bank; however, all four SIMMs within a bank must be the same size.



When installing additional memory, note the following:

- The following HP SIMMs are supported:

Type	Product Number
4 MB SIMM (70 ns)	D2974A
8 MB SIMM (70 ns)	D3577A
16 MB SIMM (70 ns)	D2297A
32 MB SIMM (70 ns)	D3578A

- SIMMs must be installed in sets of four.
- SIMMs must be installed in sequential order starting with Bank 1.

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Video Memory - DRAM

Video memory can be increased to 1 MB. The built in video subsystem comes with a Cirrus Controller with 512 KB of internal video memory. The internal, integrated Cirrus super VGA controller is fully compatible with these video standards: CGA, EGA, Hercules Graphics, MDA, and VGA. The standard system configuration comes with 512 KB of onboard video memory allowing pixel resolutions of 640 x 480 and 800 x 600 in 256 colors, and 1024 x 768 x 16 colors. The SVGA controller supports only analog monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace interlaced frequency of 87 Hz.

Increasing the video memory buffer size to 1 MB with a 256 K x 16 (512 KB), 70 ns, 40-pin SOJ package DRAM allows the controller to support 132-column text modes and high resolution graphics.

Boot Device Priority

If you are installing a SCSI controller board, the priority of the controllers (where the BIOS will search for the boot drive) is set by the slot location where the board is installed. It is recommended that you install the boards in the lower slots to ease the routing of cables.

The following is the search path in order of the highest boot device priority:

1. CD-ROM drive
2. Flexible disk drive
3. IDE device
4. All EISA and ISA slots
5. PCI 1 slot
6. PCI 2 slot
7. PCI 3 slot
8. PCI 4 slot
9. Embedded SCSI A controller
10. Embedded SCSI B controller
11. PCI 5 slot

Cabling

The hot swap subsystem comes in two standard models that can be reconfigured by changing the cables and switches located on the rear of the subsystem. You are not limited to these configurations, but they are given as possible examples.

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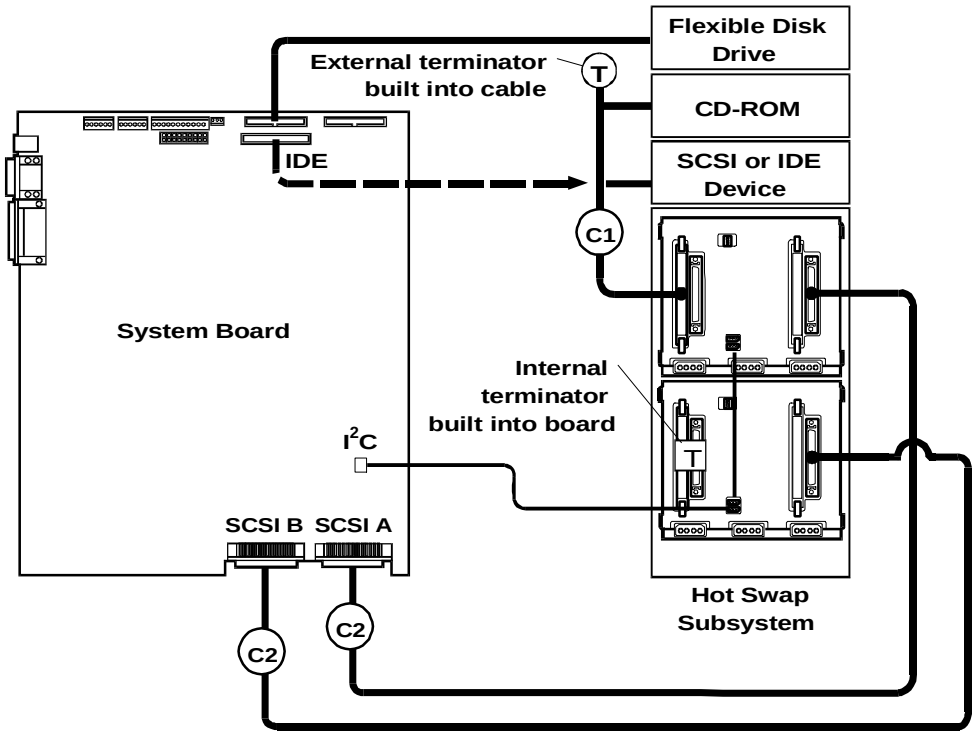
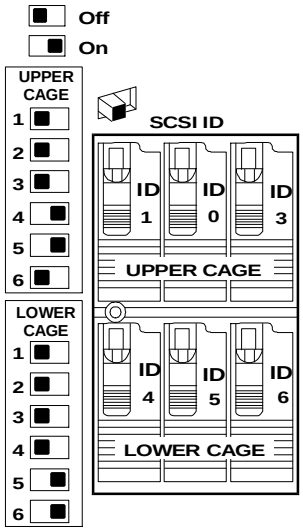
Duplex, non-disk array model with internal controller (standard model)





Default Switch Settings

These are the default SCSI address settings for this model. SCSI ID 2 is reserved for an added DAT (Digital Audio Tape) drive that can be installed in the upper horizontal Shelf 3. The CD-ROM drive is set for SCSI ID 5.

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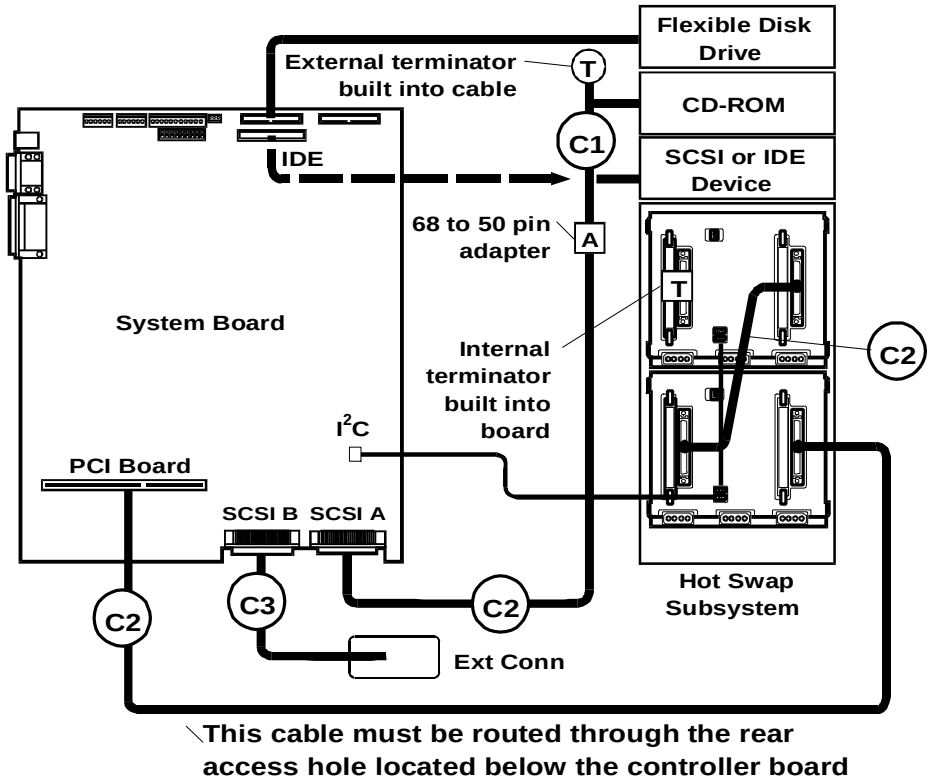
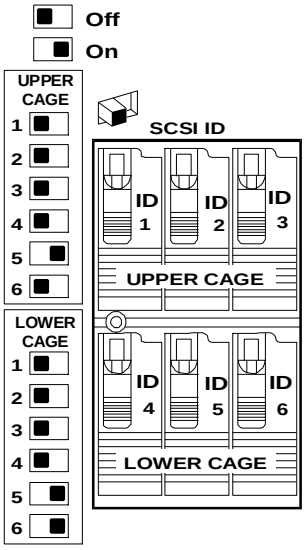
Non-duplex, disk array model with PCI controller board (standard model)





Default Switch Settings

These are the default SCSI settings that come with this model. The standard model includes a PCI controller board. The CD-ROM drive is set for SCSI ID 5. To change the SCSI addresses, see **Configuring Switch Settings on the Hot Swap Subsystem**.

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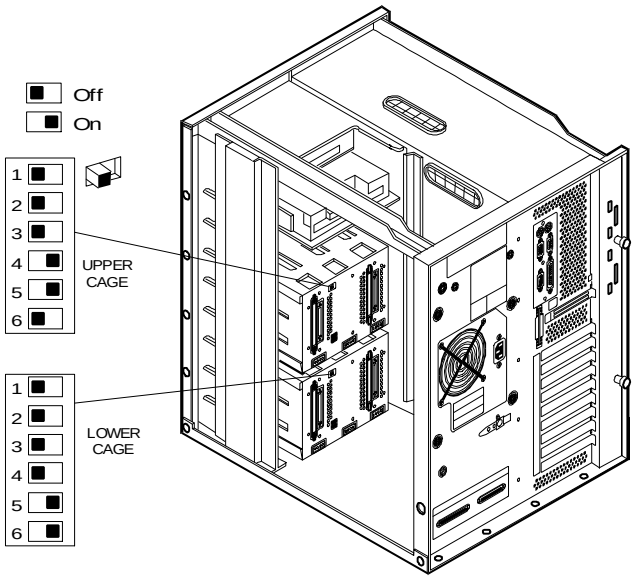
Configuring Switch Settings on the Hot Swap Subsystem

Switches 3, 4 and 6 determine the SCSI address of the shelf.



The switch 6 setting determines upper and lower cage functionality. Switches 1 and 2 are always set to Off.

Switch	Function	Settings
1	**I^2C Bus Setting**	Always set to **Off**
2	**I^2C Bus Setting**	Always set to **Off**
3	**High/Low Addresses** Fast-Wide (68 pin) SCSI Only Sets SCSI addresses for upper or power eight addresses	**On** Sets drives to upper eight SCSI addresses. **Note:** this setting may cause time-out problems with your NOS due to delayed start. **Off** Sets drives to lower eight SCSI addresses.
4	**SCSI Address Zero** Sets middle shelf in cage to SCSI ID 0 or ID 8. ID number depends on the setting of switch 3.	**On** Sets middle shelf in the cage (shelf 2 or shelf 5) to SCSI ID 0 or ID 8. **Off** Sets middle shelf to normal SCSI address sequence.
5	**Remote Start** Determines control of the hot swap disk module power-on sequence.	**On** Internal control: Upper cage is set to delayed start, and lower cage is set to power-on at startup. **Off** Power-on sequence is determined by the disk array controller. **Not supported by HP SCSI controller boards.**
6	**Upper/Lower Cage** Identifies cage location. This is important information for the SCSI addresses and for the I^2C bus.	**On** Lower cage **Off** Upper cage

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Hot Swap Subsystem SCSI Address Settings

Switches 3, 4, and 6 determine the SCSI address setting for each shelf in the hot swap subsystem. The following table describes the settings and the resulting shelf SCSI address.

NOTE For information on changing the SCSI address setting on the CD-ROM drive, see the Technical Information Label on the CD-ROM drive.

Upper Cage		Lower Cage	
Switch Settings	**SCSI Address**	**Switch Settings**	**SCSI Address**
3 - Off 4 - Off 6 - Off	Shelf 1 = ID 1 Shelf 2 = ID 2 Shelf 3 = ID 3	3 - Off 4 - Off 6 - On	Shelf 4 = ID 4 Shelf 5 = ID 5 Shelf 6 = ID 6
3 - Off 4 - On 6 - Off	Shelf 1 = ID 1 Shelf 2 = ID 0 Shelf 3 = ID 3	3 - Off 4 - On 6 - On	Shelf 4 = ID 4 Shelf 5 = ID 0 Shelf 6 = ID 6
3 - On 4 - Off 6 - Off	Shelf 1 = ID 9 Shelf 2 = ID 10 Shelf 3 = ID 11	3 - On 4 - Off 6 - On	Shelf 4 = ID 12 Shelf 5 = ID 13 Shelf 6 = ID 14
3 - On 4 - On 6 - Off	Shelf 1 = ID 9 Shelf 2 = ID 8 Shelf 3 = ID 11	3 - On 4 - On 6 - On	Shelf 4 = ID 12 Shelf 5 = ID 8 Shelf 6 = ID 14

Specifications

Power Supply	Auto-ranging 90 to 135 VAC, or 180 to 265 VAC at 50-60Hz
Power Availability	470W continuous, 530W peak
Power Consumption	723W maximum with 110/220V supply 815W peak with 110/220V supply
System Dimensions	19.3 in. high x 13.7 in wide x 18.1 in deep (49 cm high x 34.8 cm wide x 46 cm deep)
System Weight	50-70 lbs (22.7-31.8 kg), depending on configuration
Operating Temperature	41 to 95 degrees F (5 to 35 degrees C)
Operating Humidity	20% to 80% non-condensing

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Notes

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