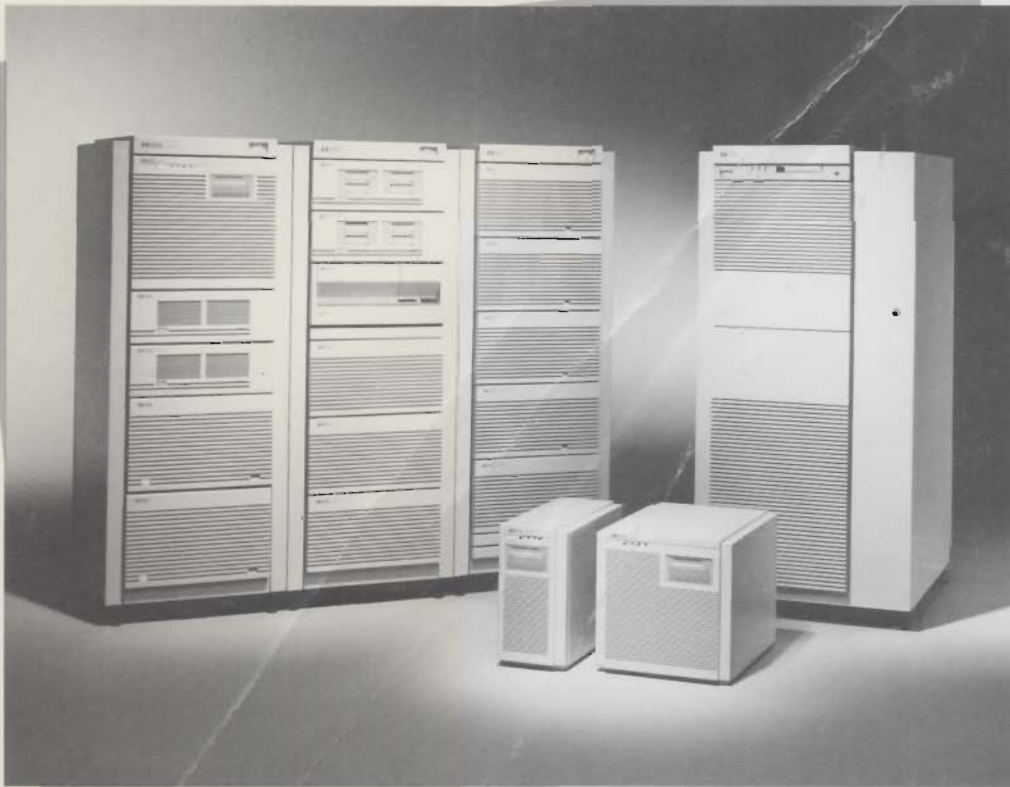

HP 9000 Series 800 Business Servers

Configuration Guide

December 1992



HP 9000
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BUSINESS**

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Section 1 Introduction

How To Use This Guide

The Configuration Guide is organized to follow the logical steps necessary to fully configure Series 800-based solutions. It begins with system details, followed by sections on I/O and networking, peripherals, HP-UX, system software, and support. A few sample configurations are also included. The beginning of this guide contains a "Business Servers at-a-Glance" table of specifications. By following this guide through each section, you should be able to configure a Series 800 solution for a customer quote or order quickly and accurately.

CONRAD On-line Configuration Tool

Another excellent source for configuration guidance is the CONRAD on-line configuration advisor. CONRAD is a knowledge-based system that helps its users identify the necessary, optional, and compatible components of HP system solutions. It is currently available in sales offices in the U.S. and in many countries throughout the world.

For information about or assistance with CONRAD, a support service is available from 5:30 AM to 5:30 PM PST. Anyone can call CONRAD Support if they have a CONRAD template and an advice file.

The CONRAD Support number is (415) 852-8338. CONRAD Support can also be contacted via HPDESK (CONRAD Support/HP0000) or HP-UX e-mail (Conrad_Support@HP0000.desk.hp.com)

New Products In This Configuration Guide

A2428A Series 800 F Class Business Servers
A2429A Series 800 G Class Business Servers
A2430A Series 800 H Class Business Servers
A2431A Series 800 I Class Business Servers

Products Deleted From This Configuration Guide

A1751B Model 807S Business Server
A1703A Model 817S Business Server
A1765A Model 827S Business Server
A1704B Model 837S Business Server
A1766A Model 847S Business Server
A1706A Model 857S Business Server
A1768A Model 867S Business Server
A1769A Model 877S Business Server
A2307A Model 887S Business Server
A2306A Model 897S Business Server

Additional Information Sources

Specific Series 800 customer-oriented documentation includes:

- HP 9000 Series 800 Integrated Business Server Family (Fxx, Gxx, Hxx, Ixx) Technical Data (5091-5744E)
- Model 890 Corporate Business Server Technical Data (5091-3609E)
- HP-UX 9.0 Operating System Technical Data (5091-3626E)
- HP DCE Developers Environment Data Sheet (5091-5841E)
- HP 9000 High Availability Computing Products (5091-1633E)
- HP Series 6000 SCSI-2 Multiuser Mass Storage Systems Data Sheet (5091-1685E)
- HP Disk Arrays for Multiuser Computer Systems Data Sheet (5091-2856E)

- HP 700/60 Ergonomic Terminal for UNIX® Systems and Multiuser PCs Data Sheet (5091-4509E)
- HP Networking Communication Specification Guide (5091-3821E)
- HP 9000 System Brochure (5091-5686E)

Pricing Information

For U.S. list prices on Series 800 Business Servers, interfaces, peripherals, software, and support refer to the HP 9000 Series 800 Business Servers Price Guide. Outside the U.S. consult your local country's Price Guide for this information.

Configuration Guide Available Via Power Tools

This configuration guide is available electronically via Power Tools, and can be accessed on-line through Internet or on CD-ROM. For Power Tools access instructions, send an HPDesk message to PowerTools/HP6650/AF.

DO NOT discard your previous HP 9000 Series 800 Configuration Guides (P/N 5960-7318 and 5091-4367E)

They contain information on older Series 800 servers that have been deleted from this version.

Business Servers at-a-Glance

	F Series (page 14)	G Series (page 21)	H Series (page 33)	I Series (page 45)
HP-PB Slots	2 SH	4 SH/2 DH	8 SH/4 DH	12 SH/6 DH
Relative OLTP Performance				
Model 10	1	NA	NA	NA
Model 20	1.7	NA	1.7	NA
Model 30	2.0	2.0	2.0	2.0
Model 40	NA	3.0	3.0	3.0
Model 50	NA	4.9	4.9	4.9
Processor Frequency/l x D Cache				
Model 10	32 MHz/32 KB x 64 KB		48 MHz/64 KB x 64 KB	
Model 20	48 MHz/64 KB x 64 KB		48 MHz/256 KB x 256 KB	48 MHz/256 KB x 256 KB
Model 30	48 MHz/256 KB x 256 KB	48 MHz/256 KB x 256KB	64 MHz/256 KB x 256 KB	64 MHz/256 KB x 256 KB
Model 40		64 MHz/256 KB x 256KB	64 MHz/256 KB x 256 KB	64 MHz/256 KB x 256 KB
Model 50		96 MHz/256 KB x 256KB	96 MHz/256 KB x 256 KB	96 MHz/256 KB x 256 KB
Max RAM (requires UX 9.0)	348 MB	512 MB	768 MB	768 MB
Standard RAM	16 MB	32 MB	64 MB	64 MB
Min RAM	8 MB (F10 only)	32 MB	64 MB	64 MB
Memory increments	16 MB (F20 and F30)			
	8, 16, 32, 64, and 128 MB	8, 16, 32, 64, and 128 MB	8, 16, 32, 64, and 128 MB	8, 16, 32, 64, and 128 MB
Max HP-FL array (requires UX 9.0)	N/A	86.4 GB	172.8 GB	172.8 GB
Max HP-FL disk (requires UX 9.0)	N/A	21.4 GB	42.8 GB	42.8 GB
Max SCSI disk (requires UX 9.0)	42 GB	70 GB	70 GB	70 GB
Max HP-IB disk	2.7 GB	5.4 GB	5.4 GB	5.4 GB
Max total disk (max HP-FL + SCSI = total max disk—requires UX 9.0)	42 GB	86.4 GB + 14 GB = 100.4 GB	172.8 GB + 6 GB = 178.8 GB	172.8 GB + 6 GB = 178.8 GB
Base system I/O ports				
SCSI	1	1	1	1
802.3 LAN	1	1	1	1
Console Port	1	1	1	1
Access port (modem-capable RS-232 port)	1	1	1	1
Centronics	0	0	0	0
Max I/O and networking cards				
802.3 LAN	2	4	7	7
802.5 Token ring LAN	2	4	5	5
SCSI/parallel Centronics	2	4	8	12
8 channel MUX	2	4	8	12
16 channel MUX	2	4	8	12
HP-IB	1	2	2	2
FDDI	1	2	2	2
HP-PB FL (28615A)/PBA-FL (A1749A)	0	2/2	4/2	4/2
X.25	2	4	7	7
SNA Link	2	4	8	10
SNAPplus	2	4	8	10
Standard internal tape backup capacity/mech	2 GB/DDS DAT	2 GB/DDS DAT	2 GB/DDS DAT	2 GB/DDS DAT
Max internal tape backup capacity/mech	4-8 GB/DDS DAT	4-8 GB/DDS DAT	4-8 GB/DDS DAT	4-8 GB/DDS DAT
Maximum tape backup drives				
SCSI tape drives	8	8	8	8
HP-IB tape drives	4	8	8	8
Maximum optical disk libraries (GB/devices)	400 GB/4 devices	400 GB/4 devices	400 GB/4 devices	400 GB/4 devices

Business Servers at-a-Glance (cont'd)

	F Series (page 14)	G Series (page 21)	H Series (page 33)	I Series (page 45)
Maximum MUX connects	48	80	144	208
Maximum user connects				
Model 10	1120			
Model 20	1120		1120	
Model 30	1120	1120	1120	1120
Model 40		1850	1850	1850
Model 50		1850	1850	1850
Maximum serial printers supported				
Model 10	20			
Model 20	40		40	
Model 30	40	40	40	50
Model 40		40	40	50
Model 50		40	40	50
Maximum SCSI printers supported	0	0	0	0
Maximum Centronics printers	3	5	9	13
Maximum HP-IB plotters	4	8	8	8
Package height (mm)	430	430	430	430
Package width (mm)	222	444	444	444
Package depth (mm)	533	533	533	533
Weight (kg)	32	50	50	50
Power requirement (watts)	400	800	800	800
Heat dissipation (BTUs/hr)	1385	2770	2770	2770
Site prep/installation included				
Model 10	No			
Model 20	No		Yes	
Model 30	No	Yes	Yes	Yes
Model 40		Yes	Yes	Yes
Model 50		Yes	Yes	Yes

Business Servers at-a-Glance (cont'd)

System/Product Number	890/A1826A (1 to 4 CPUs) (page 70)
OLTP Performance (Relative to the F10)	3.6 to 11.3
Instruction Cache/Data Cache (Kbytes)	2048/2048 to 8192/8192
Clock Speed (MHz)	60
Base Memory (Mbytes)	128
Maximum Memory (Mbytes)	2048
HP-PB I/O Slots/Available Slots	14/8 (expandable to 112 I/O slots maximum)
I/O Ports Included with Base System	
SCSI	1
HP-FL	1
Serial (RS-232)	16
Centronics	1
LAN (802.3)	1
Maximum Number of I/O and Networking Cards	
LAN (802.3)	10
Token Ring (802.5)	5
SCSI	20
8-Channel MUX	64
16-Channel MUX	64
HP-IB	9
FDDI	2
HP-FL	40
X.25	12
SNA Link	0
SNAplus**	12
Maximum External Disk Storage (Gbytes)	
SCSI Disk	168 (84 disks)
HP-IB Disk	8.04 (12 disks, 3 interfaces)
HP-FL Disk	320 (240 disks)†
HP-FL Disk Arrays (RAID 3 Striped Mode)	1300 (240 disks)‡
Optical Disk Libraries (Gbytes/# of Devices)	2000 (using 20 devices)
Total Maximum Supported Disk (Gbytes)	1300
Maximum External Tape Drives Supported	
SCSI Tape Drives	16
HP-IB Tape Drives	8 (with 2 HP-IB cards)
Maximum Number of Printers Supported	
SCSI	8
Serial Printers (RS-232)	250
Centronics Printers	20
Maximum HP-IB Plotters Supported	8 (with 2 HP-IB cards)
Maximum Serial Port Connections (RS-232)	
MUX Connects	1024
DTC Connects	4500† (150DTCs)
Total Connects (MUX and DTC)	4500†
Typical maximum active users with medium workload (commercial OLTP application with relational database)	300 to 930
Package Height (mm)	1620
Package Width (mm)	750
Package Depth (mm)	905
Weight (Kg)	375
Power Requirement (Watts)	2434 (maximum)
Heat Dissipation (BTUs/hour)	8300 (maximum)
Site Prep Included (Y/N)	No
Installation Included (Y/N)	Yes

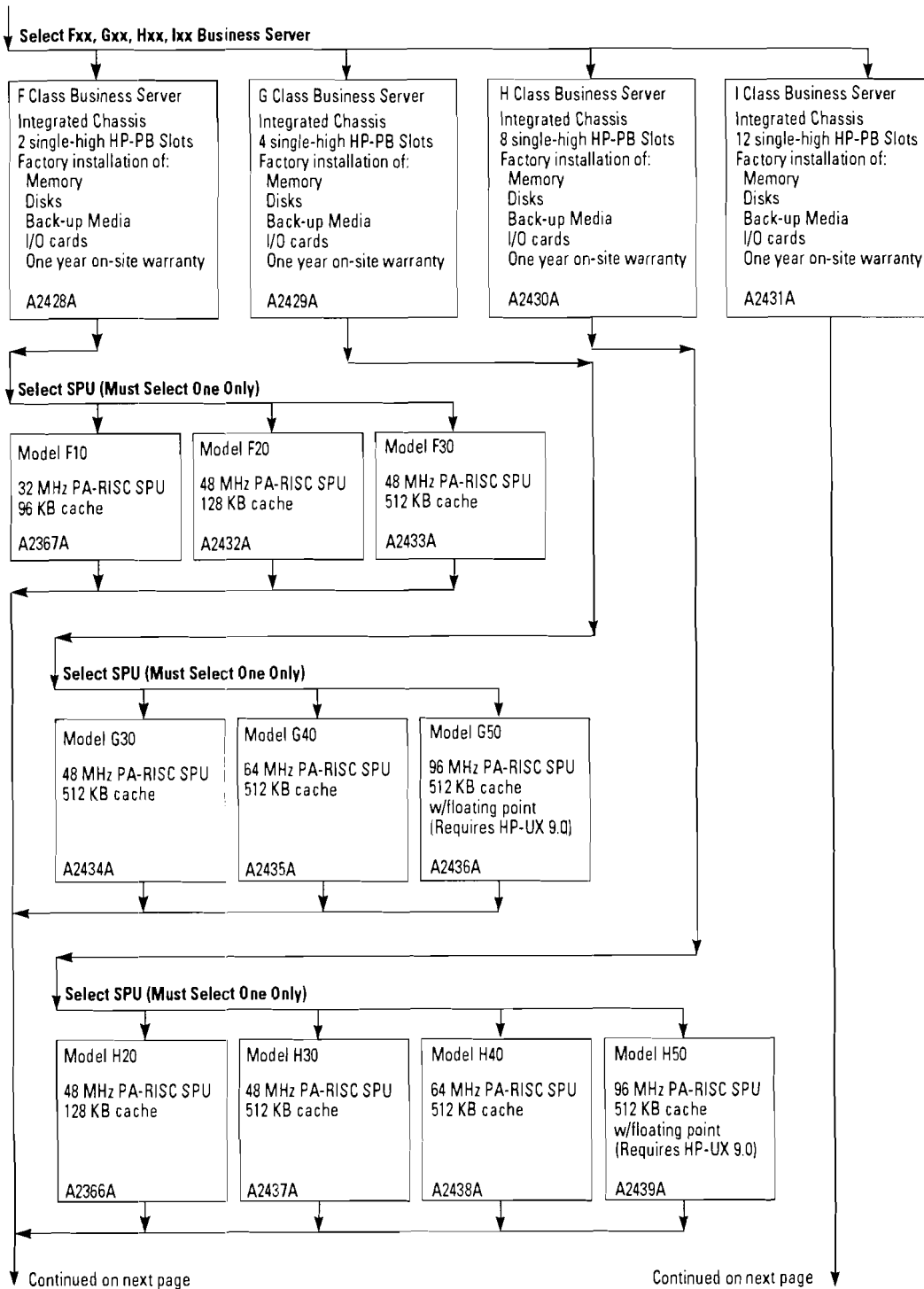
* Must order a system disk

** Only 1 card is supported until the first calendar quarter of 1993.

† Contact the Sales Center if customer requires more than 2000 terminal connections.

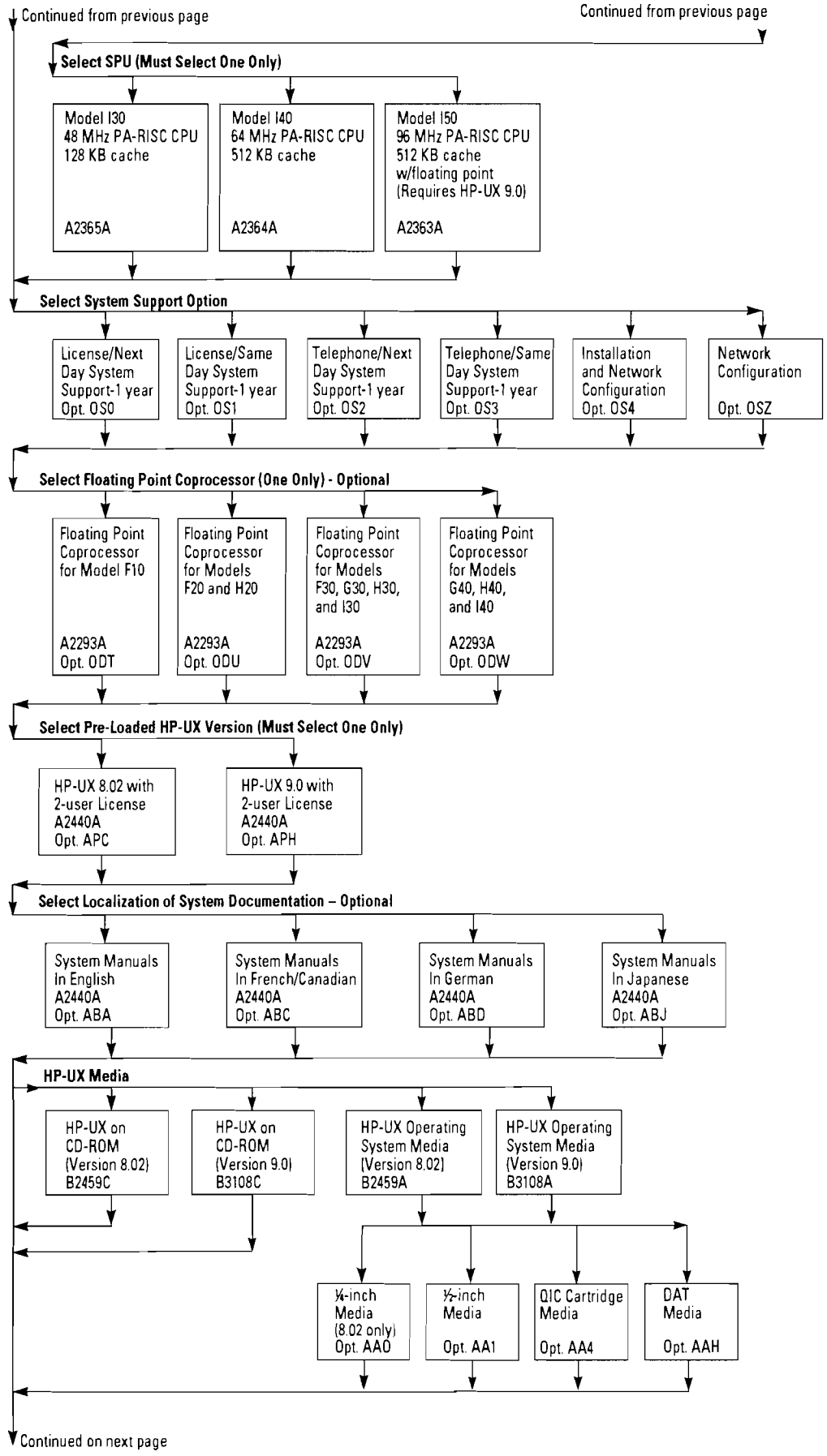
‡ Contact the Sales Center if customer requires more than 130 disk addresses.

Section 2 Models Fxx, Gxx, Hxx, and Ixx Business Servers— Configuration Flow Chart



Section
2

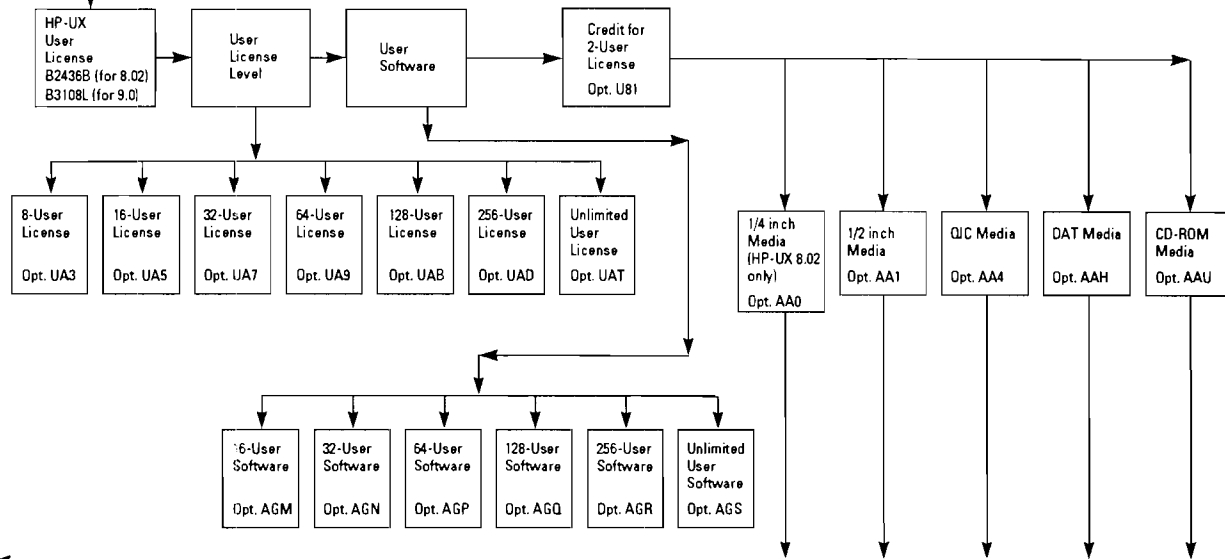
Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)



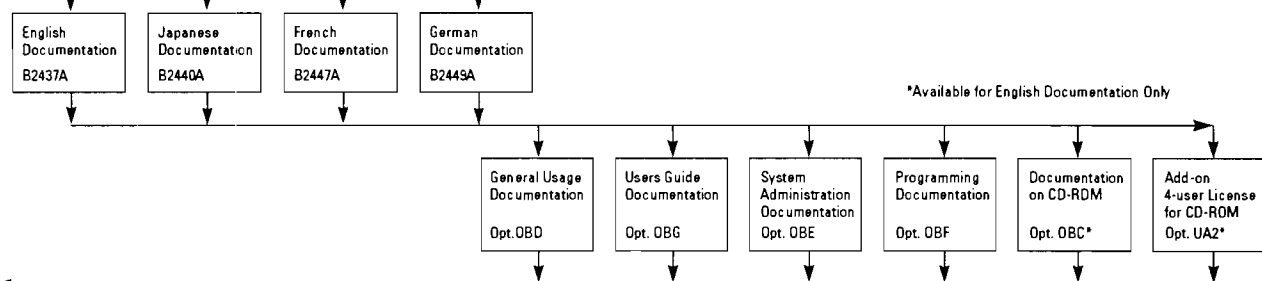
Section 2 — Models Fax, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)

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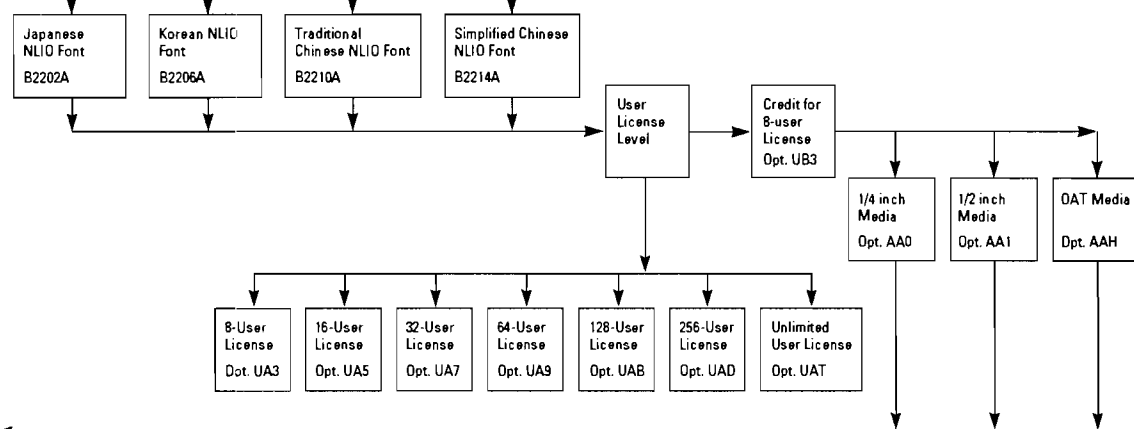
Increased HP-UX User License Levels



HP-UX Documentation

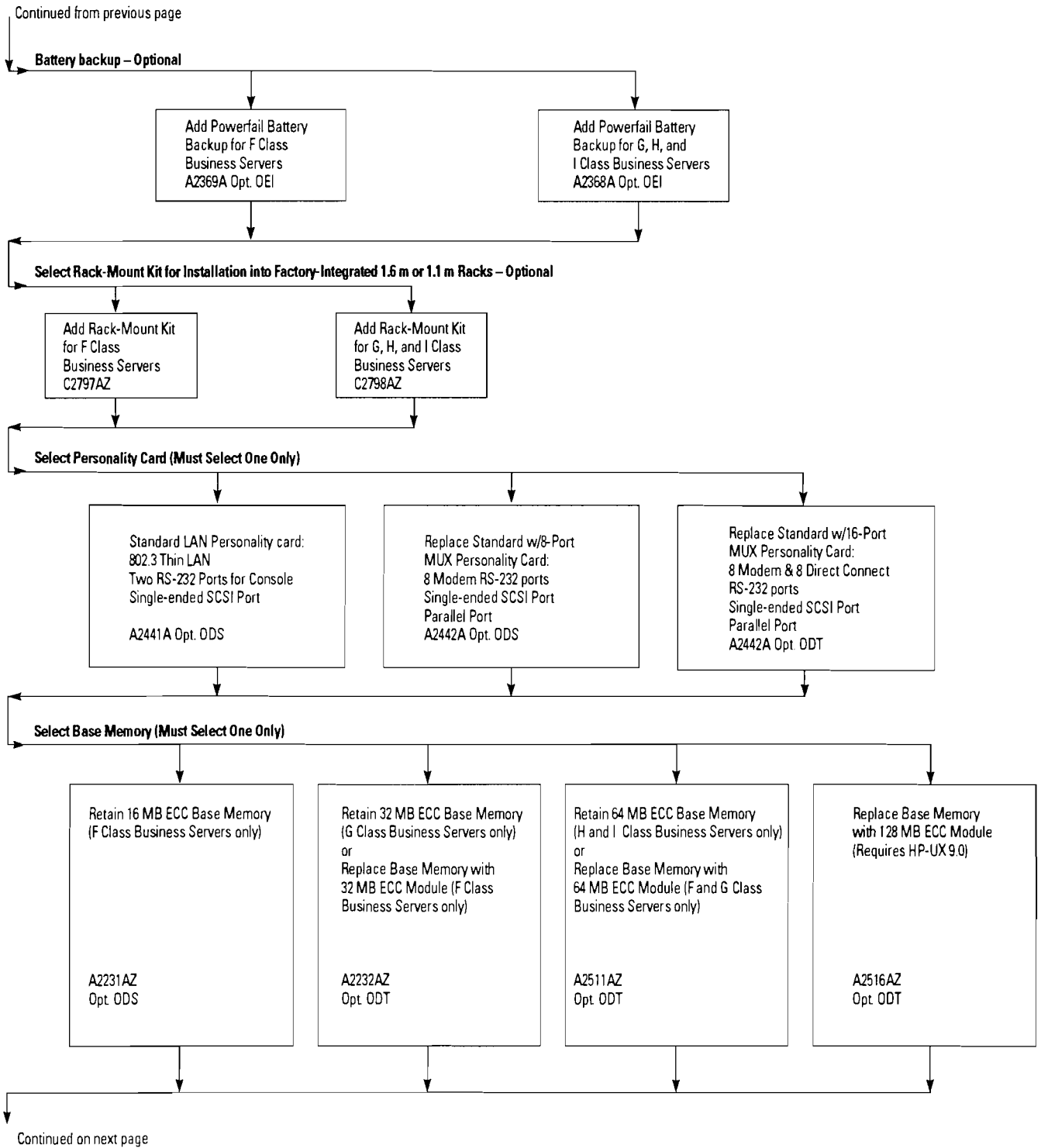


HP-UX Native Language I/O



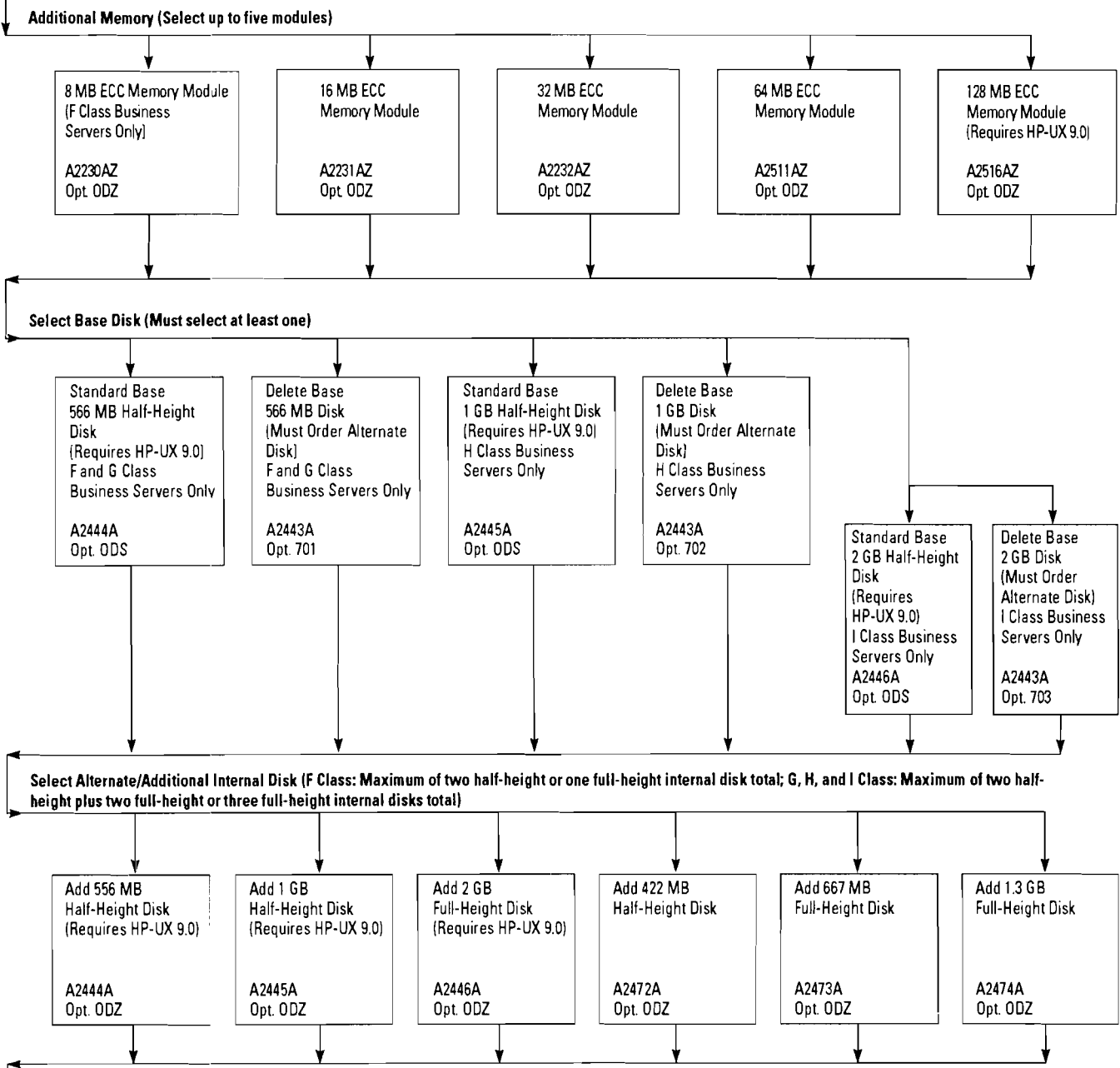
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Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)



Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)

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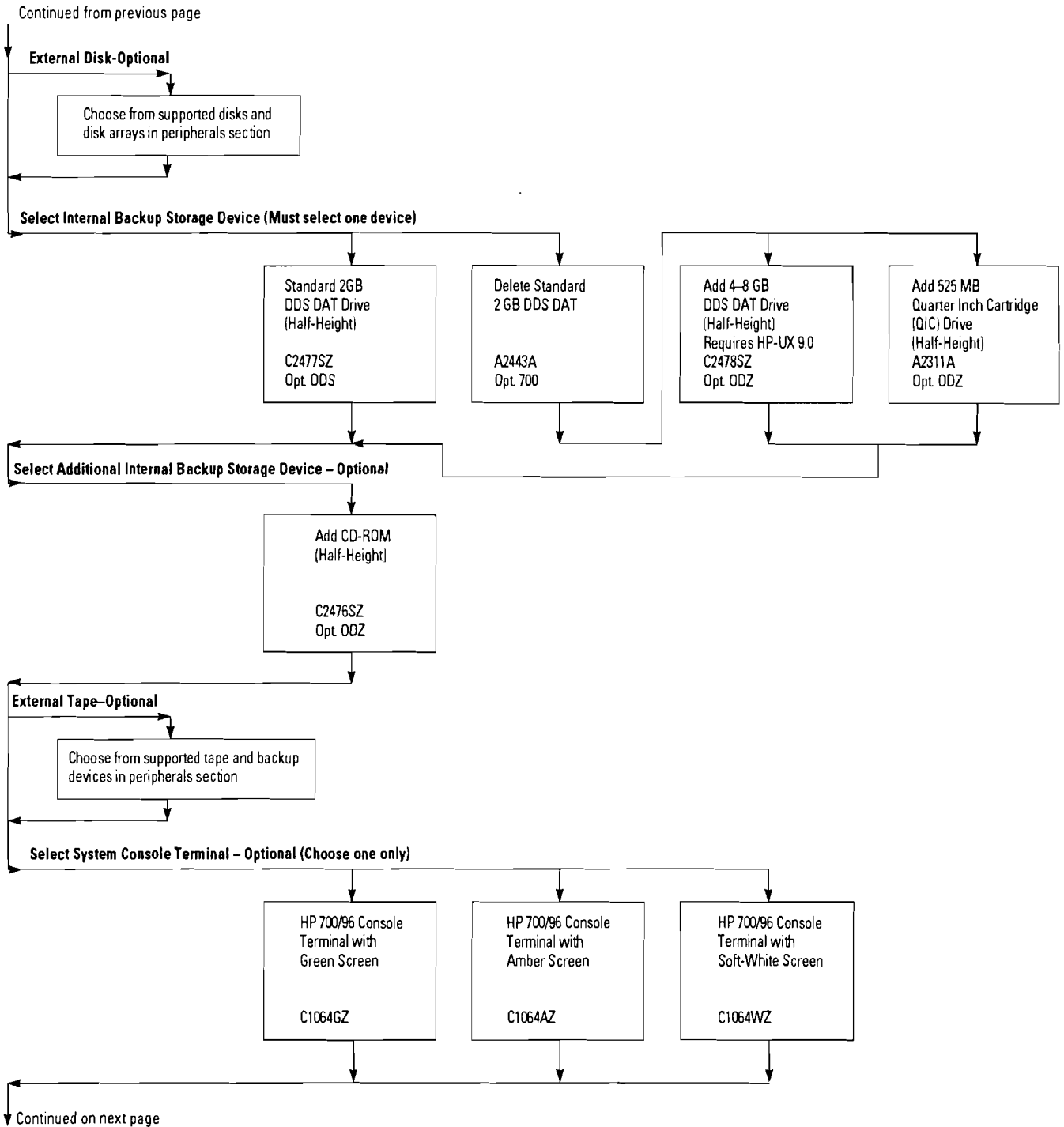


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Business Server	Maximum Memory
F Class	192 MB using 64 MB modules
F Class	384 MB using 128 MB modules
G Class	512 MB
H Class	768 MB
I Class	768 MB

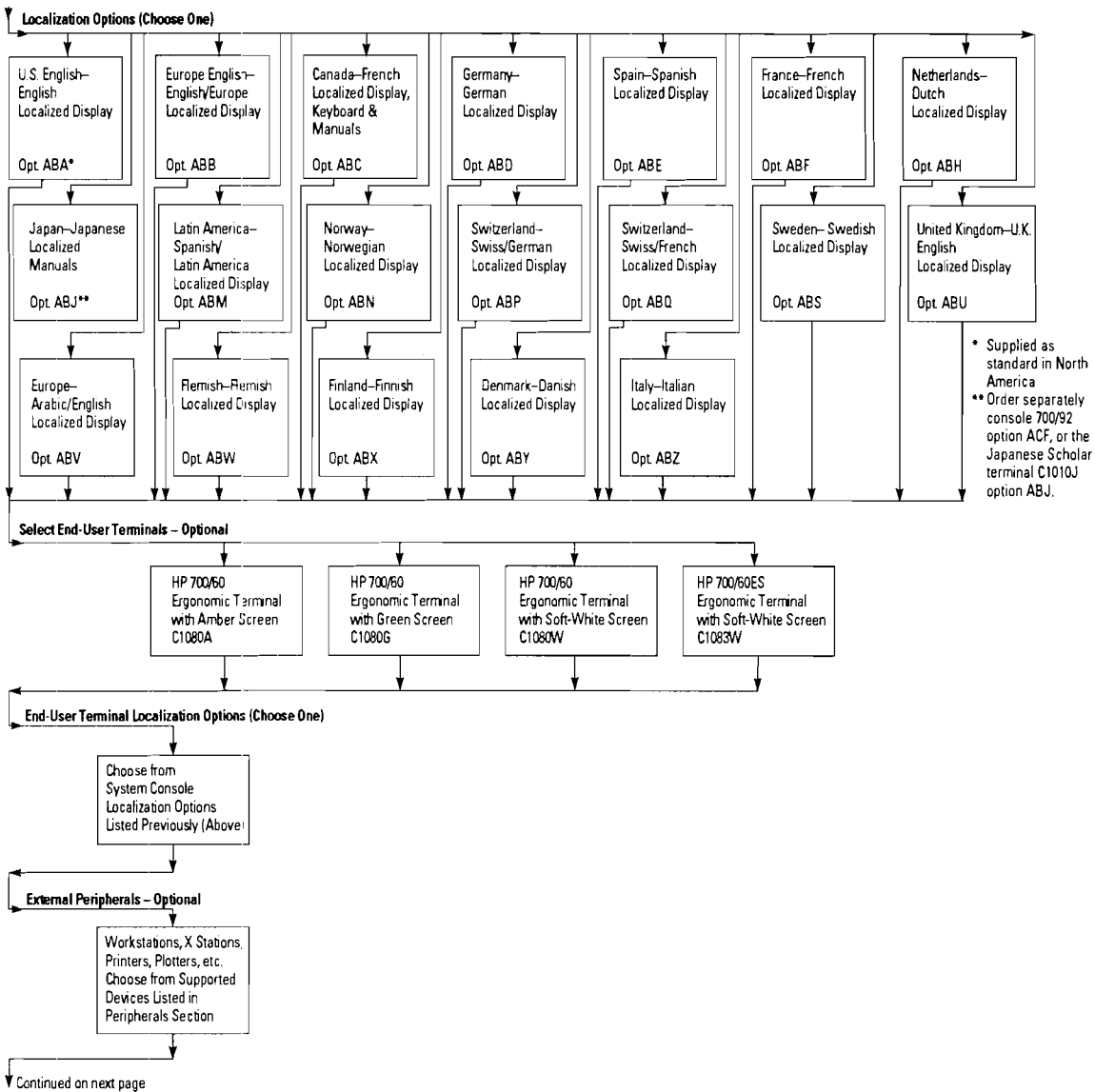
Section 2

Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)



Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)

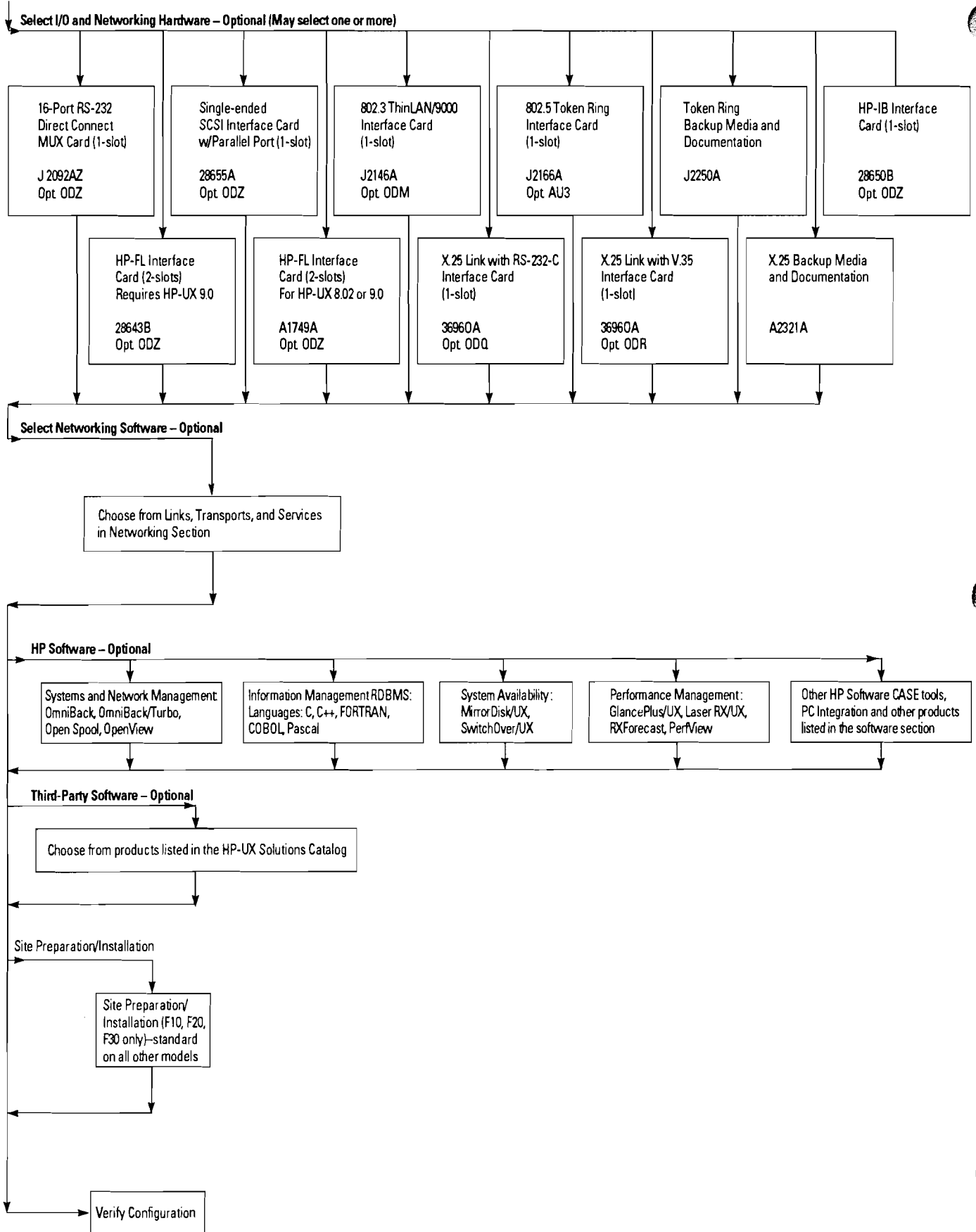
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Section 2

Section 2 — Models Fxx, Gxx, Hxx, and Ixx Business Servers—Configuration Flow Chart (cont'd)

Continued from previous page



Configuration Verification

1. Ensure you have configured enough system memory and disk space.

–Refer to the “Models Fxx, Gxx, Hxx, and Ixx Typical Memory and Disk Configuration Guidelines” section for guidance.

*Note: The recommendations made in the “Models Fxx, Gxx, Hxx, and Ixx Typical Memory and Disk Configuration” section are **guidelines**. Actual memory and disk requirements will vary depending on database, application software, and activity level of connected users. More memory and disk may be required beyond the recommended amount.*

2. Check to make sure you have not exceeded the maximum memory and disk capacity of the Business Server. (See table 2.1.)

3. Check to make sure the Business Server you are ordering has enough available HP-PB slots for the I/O and Networking cards you have configured. (See table 2.1.)

5. Make sure you have ordered cables for the peripherals which do not include them. Refer to the peripherals section for cable information.

6. The SCSI cable length limit is 6 meters. Make sure your configuration topology will not exceed 6 meters for SCSI cabling. For lengths greater than 6 meters a SCSI repeater is required.

Table 2.1 Maximum Disk, Memory, and I/O Capacity

	F Models	G Models	H Models	I Models
Maximum Memory	384 MB*	512 MB	768 MB	768 MB
Maximum Internal Disk	2 GB	6 GB	6 GB	6 GB
Max Disk	42 GB	100.4 GB	178.8 GB	178.8 GB
HP-PB slots	2	4	8	12

*Maximum of 192 MB when 64 MB memory modules are used

4. If ordering the Gxx, Hxx, or Ixx Business Servers, make sure you have not exceeded the power supply capabilities of the HP-PB I/O card cage.

–Refer to the “Power Supply Current Budgeting Table” in the G, H, or I Class Business Server sections for details.

7. Check to make sure you have ordered the appropriate localization options (or products) for the Business Server, HP-UX, and peripherals (if necessary).

8. Verify your final configuration using the CONRAD on-line configuration advisor tool. Access to CONRAD is available in each U.S. sales office and in many others worldwide.

Section 3

Model F10/F20/F30 Integrated Business Servers

Description

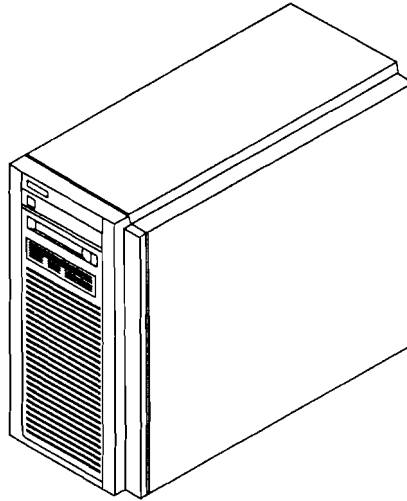
The HP 9000 Models F10, F20, and F30 are entry-level systems in an integrated package (see Figure 3.1). All of these compact systems include a single processor, an embedded disk drive and an embedded Digital Data Storage (DDS) cartridge tape drive. The package (43 cm high, 22.2 cm wide and 53.3 cm deep) has been designed to hold an entire system in a small amount of space, maximizing the utility of office or computer room space.

The Model F10/F20/F30 packages support up to two 422-Mbyte, 566-Mbyte, or 1-Gbyte disk mechanisms or a single 677-Mbyte, 1.36-Gbyte, or 2-Gbyte disk. Maximum internal disk storage is 2 Gbytes. All F Models come standard with a single 566-Mbyte disk mechanism.

Additional disk storage is available using external standalone disk mechanisms. Models F10, F20, and F30 can support 42 Gbytes of SCSI disk storage or 2.7 Gbytes of standalone external HP-IB disk storage. Note that Models F10/F20/F30 do not support HP-FL interface adapters or HP-FL external disk drives.

High capacity cost-effective backup for the F10/F20/F30 is provided with HP's Digital Audio Tape (DAT) unit using the Digital

Figure 3.1 Model F10/F20/F30 Business Server



Data Storage (DDS) format. The standard DDS backup unit, integrated in the deskside package, stores up to 2.0 Gbytes of data in a single DAT cassette, measuring only 7.3 × 5.4 × 1.05 cm. The drive has a transfer rate of 183 Kbytes per second and supports both 60 meter and 90 meter tapes. Optional hardware data compression increases maximum capacity of a 90 meter tape to 8 Gbytes.

Lower capacity backup is also available with a quarter inch cartridge tape drive. This drive reads and writes industry standard QIC formats and has a maximum capacity of 525 MB.

The HP Precision Bus (HP-PB) interfaces the CPU printed circuit assembly (PCA) with I/O cards. The HP-PB synchronously transfers I/O data over a 32-bit data

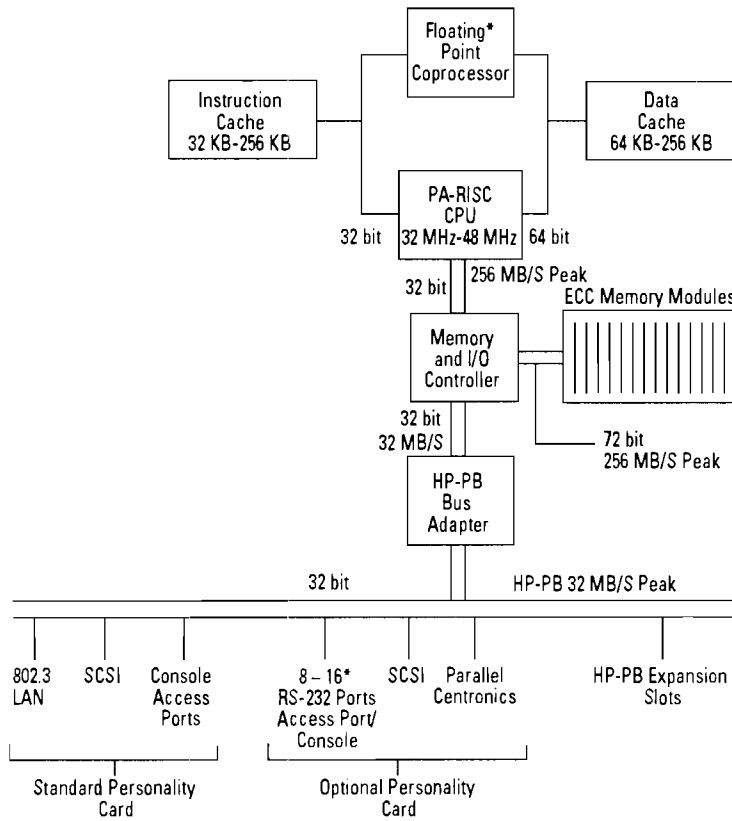
path at a burst peak rate of 32 Mbytes/sec and a sustained rate of 21 Mbytes/sec. The HP 9000 Models F10/F20/F30 have two HP Precision Bus slots available for I/O cards. In compliance with the Eurocard standard, the HP-PB is designed to accommodate single-high and double-high I/O cards. The two HP-PB slots can support one double-high card or two single-high cards. These slots are only accessible from the rear of the package.

The card cage for the Models F10/F20/F30 is shown in Figure 3.5. Each model comes standard with 16 Mbytes of ECC memory. Different CPU cards are used for the Models F10, F20, and F30. In addition, the F models include a personality card providing 802.3 LAN, SCSI, console and remote access interfaces.

Single-high Precision Bus cards include the 8 and 16-channel mux cards, HP-IB, LAN 9000/LINK, Token Ring, X.25/9000 Link, the SCSI adapter, and the SNA Link. One FDDI card is supported on the F10/F20/F30. No other double-high cards are available for F10, F20, and F30 servers.

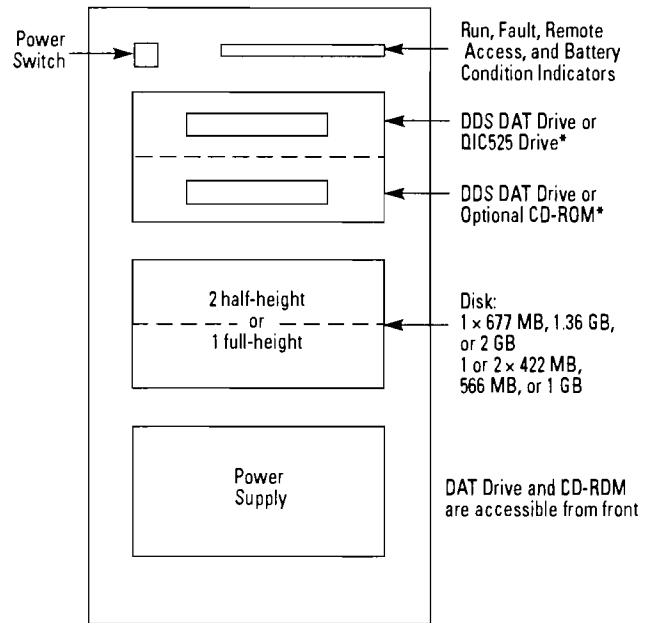
Figure 3.2 Model F10/F20/F30 Business Server Layout

System Architecture – Models F10, F20, F30



* Optional

Front View



*Combination of two half-height disks plus the optional CD-ROM is NOT supported, unless the tape drive is deleted. Maximum of three half-height peripherals allowed in the package.

Section 3 — Model F10/F20/F30 Integrated Business Servers (cont'd)

Figure 3.3 Rear View with Standard LAN Personality Card (A2241A #ODS)

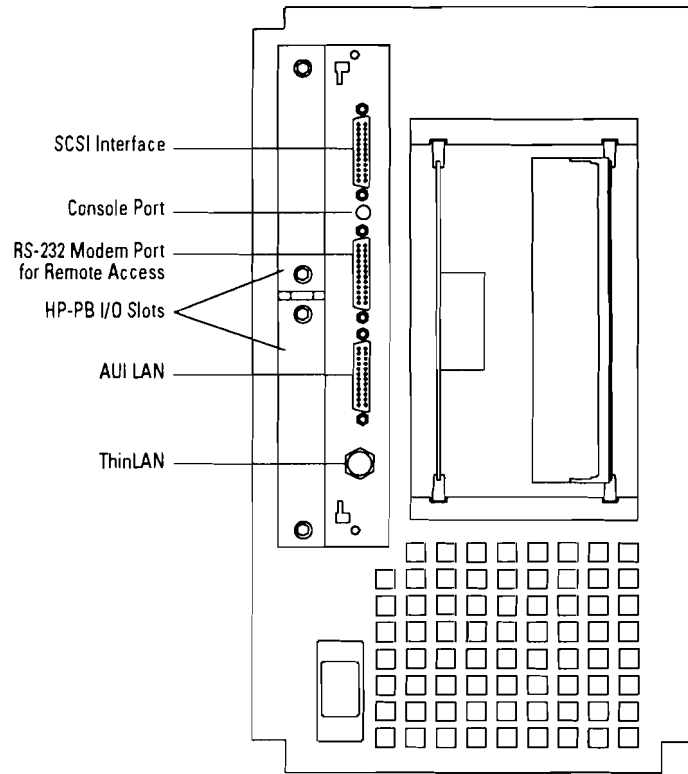


Figure 3.4 Rear View with Optional MUX Personality Card (A2242A #ODS)

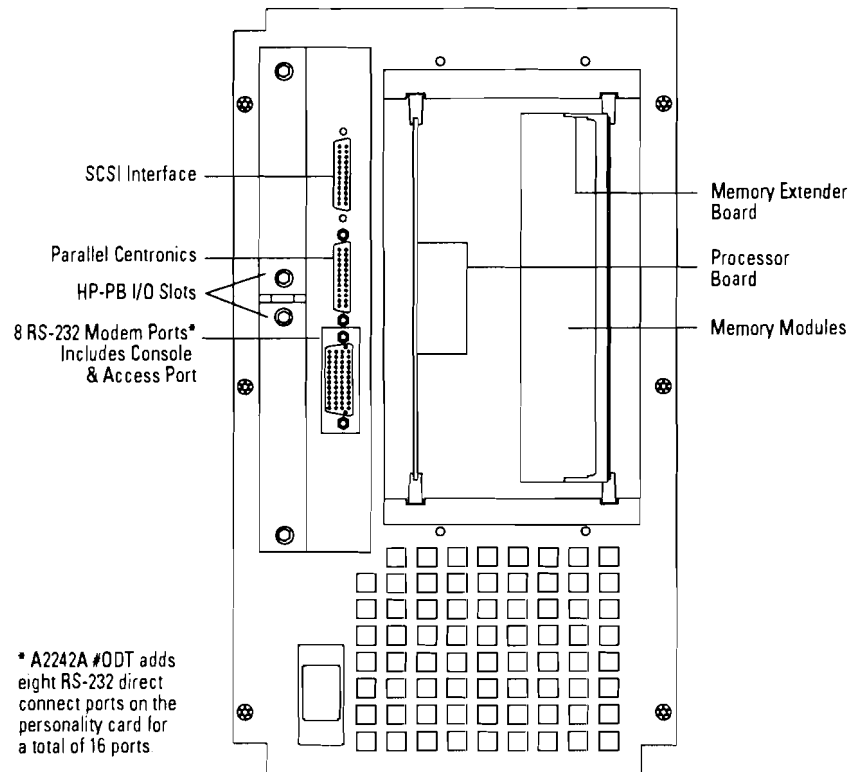
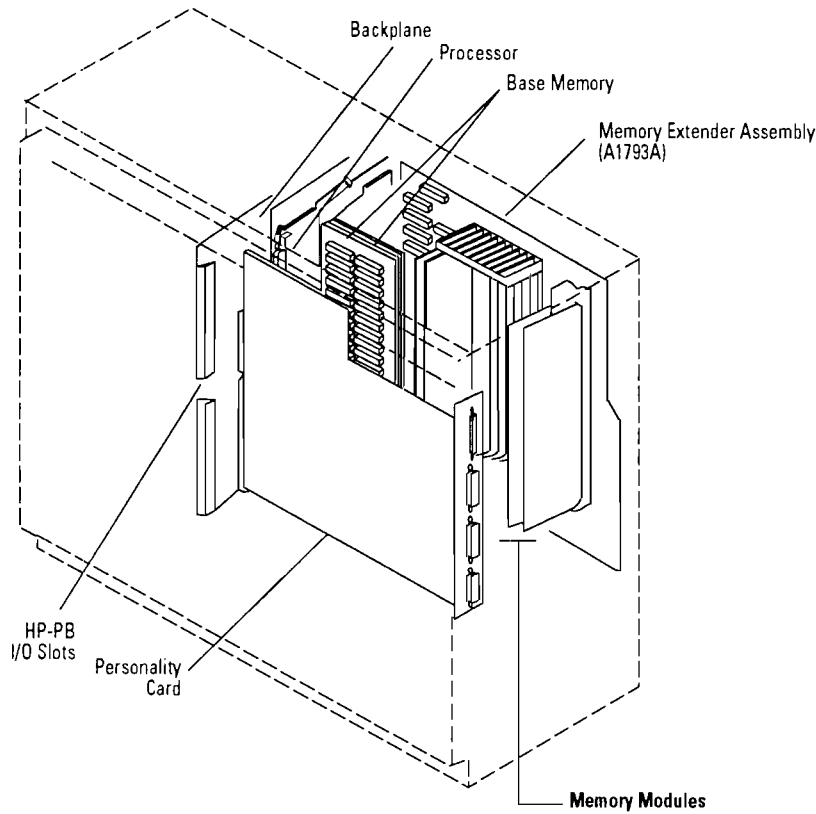


Figure 3.5 Model F10/F20/F30 Memory Array



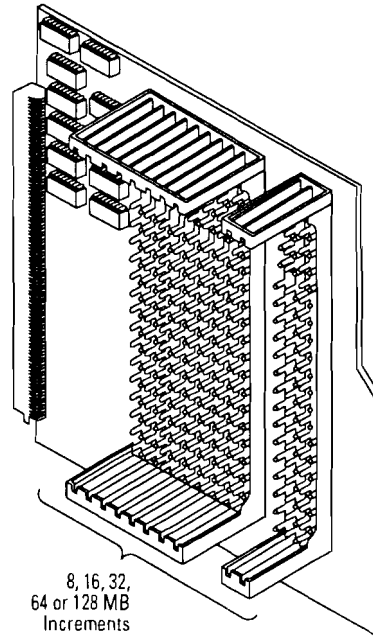
- Memory Modules**
- A2230A – 8 MB (2 x 4 MB)
 - A2231A – 16 MB (2 x 8 MB)
 - A2232A – 32 MB (2 x 16 MB)
 - A2511A – 64 MB (2 x 32 MB)
 - A2516A – 128 MB (2 x 64 MB)

Notes:

1. Each memory module consists of 2 memory cards.
2. Memory cards must be installed in pairs.
3. Each memory module fills 2 of the 12 memory slots.
4. The first pair of memory cards is installed on the backplane.
5. Up to 5 memory modules (10 cards) can be installed on the memory extender.
6. Maximum memory when one or more 64 MB modules (A2511A) are used is 192 MB.
7. Maximum memory when 8, 16, 32, and 128 MB modules (A2230A, A2231A, A2232A, and A2516A)x are used is 384 MB.

Model F10/F20/F30 Memory Extender Board
(A1793A)

Figure 3.6 Model F10/F20/F30 System



Notes:

1. Each memory module occupies two slots.
2. First memory module is on backplane.

Product Summary

Product/ Opt. No.	Description
A2428A	<p>HP 9000/800 F Class Business Servers <i>Standard server includes:</i></p> <ul style="list-style-type: none"> • Integrated chassis with two (2) single high HP-PB slots • Factory installation of memory, disks, back-up media and I/O cards • One year on-site warranty <p><i>Order desired SPU option. The following standard items may be included with the SPU at no extra charge:</i></p> <ul style="list-style-type: none"> • 566 MB embedded disk drive (requires HP-UX 9.0) • 16 MB ECC memory • 2.0 GB DDS drive • Pre-loaded HP-UX operating system with 2-user license plus TCP/IP, ARPA, and NFS services • LAN/SCSI/RS-232 personality card (requires HP-UX 9.0) with: <ul style="list-style-type: none"> – 802.3 ThinLAN interface – Single-ended (S.E.) SCSI interface – 2 RS-232 ports for console terminal and remote access • HP 700/96 console terminal • Owner's Guide and General Usage documentation set <p><i>Refer to the following ordering sections to select standard or alternate items</i></p>
A2367A A2432A A2433A	<p><i>Select SPU (Must select ONE only)</i> Model F10—32 MHz PA-RISC SPU w/32 KB–64 KB cache Model F20—48 MHz PA-RISC SPU w/64 KB–64 KB cache Model F30—48 MHz PA-RISC SPU w/256 KB–256 KB cache</p>
#OS0 #OS1 #OS2 #OS3 #OS4 #OSZ	<p><i>Select a System Support Option</i> License/Next Day System Support—1 yr. License/Same Day System Support—1 yr. Telephone/Next Day System Support—1 yr. Telephone/Same Day System Support—1 yr. Installation and Network Configuration Network Configuration</p>
	<p>Refer to the HP 9000 Series 800 Price Guide for warranty options</p>
A2293A A2393A	<p><i>Optional—Select floating point coprocessor (select ONE only)</i> #ODT 32 MHz floating point coprocessor for Model F10 only #ODU 48 MHz floating point coprocessor for Model F20 only #ODV 48 MHz floating point coprocessor for Model F30 only</p>
A2440A	<p><i>Select pre-loaded HP-UX OS version (Must select ONE only)</i> #APH HP-UX 9.0 with 2-user license #APC HP-UX 8.02 with 2-user license Media must be ordered separately, P/N B3108L. One media copy required per customer site.</p>
#ABA #ABC #ABD #ABJ	<p><i>Select localization of system documentation (Must select ONE only)</i> #ABA System documentation in English #ABC System documentation in German #ABD System documentation in French/Canadian #ABJ System documentation in Japanese</p>
A2369A	<p><i>Pre-selected chassis and optional battery back-up</i> Pre-selected chassis (must order) #OE1 Optional—Add powerfail battery back-up</p>
C2797AZ	<p><i>Optional—select rack-mount kit for factory installation into factory integrated 1.6M or 1.1M racks. (Integrated racks must be ordered on the same P.O./P.O. section)</i> Add rack mount kit</p>
A2441A A2442A A2442A	<p><i>Select personality card (Must select ONE only)</i> #ODS Standard LAN personality card: 802.3 ThinLAN, 2 RS-232 ports for console and remote access, single-ended SCSI. (Requires HP-UX 9.0) #ODS Replace standard with 8-port MUX personality card: 8 modem, RS-232 ports, single-ended SCSI and parallel port. #ODT Replace standard with 16 port MUX personality card: 8 modem, 8 DC RS-232 ports, single-ended SCSI and parallel port. (Note for options ODS and ODT: RS-232 ports include console and access ports.)</p>

Product Summary (cont'd)

Product/ Opt. No.	Description
	<i>Select base memory (Must select ONE only)</i>
A2231AZ #ODS	Standard 16 MB base memory
A2232AZ #ODT	Replace base memory with 32 MB module
A2511AZ #ODT	Replace base memory with 64 MB module
A2516AZ #ODT	Replace base memory with 128 MB module (requires HP-UX 9.0)
	<i>Additional memory (Select up to five modules, total. Maximum 384 MB)</i>
A2230AZ #ODZ	8 MB ECC memory module
A2231AZ #ODZ	16 MB ECC memory module
A2232AZ #ODZ	32 MB ECC memory module
A2511AZ #ODZ	64 MB ECC memory module
A2516AZ #ODZ	128 MB ECC memory module (requires HP-UX 9.0)
	<i>Select base disk (Must select ONE only)</i>
A2444A #ODS	Standard base 566 MB half-height disk (requires HP-UX 9.0)
A2443A #701	Delete base 566 MB disk (alternate disk required)
	<i>Select alternate/additional internal disks Maximum 2 half-height or 1 full-height device</i>
A2444A #ODZ	Add 566 MB half-height disk (requires HP-UX 9.0)
A2445A #ODZ	Add 1 GB half-height disk (requires HP-UX 9.0)
A2446A #ODZ	Add 2 GB full-height disk (requires HP-UX 9.0)
C2472SZ #ODZ	Add 422 MB half height disk
C2473SZ #ODZ	Add 677 MB full height disk
C2474SZ #ODZ	Add 1.3 GB full height disk
	<i>Select back-up storage device (Must select ONE)</i>
C2477SZ #ODS	Standard 2 GB DDS DAT (half-height)
A2443A #700	Delete standard 2 GB DDS DAT
	<i>Select alternate/additional back-up storage device Maximum 1 half-height or 1 full-height device</i>
C2478SZ #ODZ	Add 4-8 GB DDS DAT drive (half height)
C2476SZ #ODZ	Add CD-ROM (half height)
A2311AZ #ODZ	Add 525 MB Quarter Inch Cartridge (QIC) drive (half height)
	<i>Optional—Select system console terminal (Limit to ONE only) Specify appropriate keyboard localization option.</i>
C1064GZ #___	HP 700/96 console terminal w/Green screen
C1064AZ #___	HP 700/96 console terminal w/Amber screen
C1064WZ #___	HP 700/96 console terminal w/Soft-white screen
	<i>Optional—Select I/O and networking cards</i>
J2092AZ #ODZ	16 port RS-232 direct connect single-high MUX
28655A #ODZ	Single-ended SCSI interface w/parallel port single-high card
J2146A #ODM	802.3 ThinLAN/9000 interface single-high card
J2166A #AUZ	802.5 Token ring interface single-high card
J2250A	Token ring backup media and documentation
28650B #ODZ	HP-IB interface single-high card
36960A #ODN	X.25 link with RS-232-C interface single-high card
36960A #ODP	X.25 link with V.35 interface single-high card
A2321A	X.25 backup media and documentation
	<i>Optional—Select end-user terminal Specify appropriate keyboard localization option</i>
C1080A #___	HP 700/60 Ergonomic terminal w/Amber screen
C1080G #___	HP 700/60 Ergonomic terminal w/Green screen
C1080W #___	HP 700/60 Ergonomic terminal w/Soft-white screen
C1083W #___	HP 700/60ES Ergonomic terminal w/Soft-white screen

Section 4

Model G30/G40/G50 Integrated Business Servers

Description

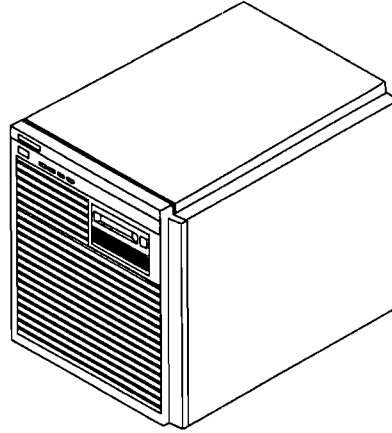
The HP 9000 Models G30, G40, and G50 are midrange systems in an integrated package (see Figure 4.1). All of these compact systems include a single processor, an embedded disk drive, and an embedded Digital Data Storage (DDS) cartridge tape drive. The package (43 cm. high, 44.4 cm. wide, and 53.3 cm. deep) has been designed to hold an entire system in a small amount of space, maximizing the utility of office or computer room space.

The package supports internal disk drive combinations of up to two 422-Mbyte, 566-Mbyte, or 1-Gbyte drives and two 677-Mbyte, 1.36-Gbyte, or 2-Gbyte drives or three 677-Mbyte, 1.36-Gbyte, or 2-Gbyte drives. Maximum internal disk storage is 6 Gbytes. All G models come standard with a single 566-Mbyte disk mechanism.

Additional disk storage is available using external standalone disk mechanisms. All models can support 70 Gbytes of SCSI disk storage, 5.36 Gbytes of standalone external HP-IB disk storage, or 86.4 Gbytes of external HP-FL disk storage.

Cost-effective backup for the G30/G40/G50 is provided with HP's Digital Audio Tape (DAT) unit using the Digital Data Storage (DDS) format. The DDS backup

Figure 4.1 Model G30/G40/G50 Business Server



unit, integrated in the desktape package, stores up to 2.0 Gbytes of data on a single DAT cassette, measuring only 7.3 × 5.4 × 1.05 cm. The unit has a transfer rate of 183 Kbytes per second and supports both 60 meter and 90 meter tapes. All models also include an option that adds hardware data compression functionality to the integrated DAT. This functionality increases 90 meter tape capacity to as much as 8 Gbytes.

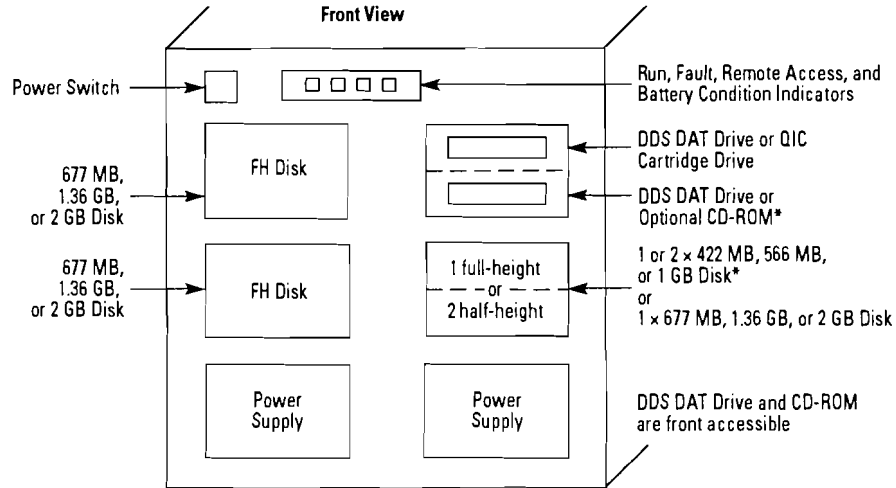
The HP Precision Bus (HP-PB) interfaces the CPU printed circuit assembly (PCA) with I/O cards. The HP-PB synchronously transfers I/O data over a 32-bit data path at a burst peak rate of 32 Mbytes/sec or a sustained rate of 21 Mbytes/sec. The HP 9000 Models G30/G40/G50 have four HP Precision Bus slots for I/O

cards. The HP-PB is designed to accommodate single-high and double-high I/O cards. Consequently, the four HP-PB slots can support two double-high cards or four single-high cards. These slots are only accessible from the rear of the package.

The card cage for the Models G30/G40/G50 is shown in Figure 4.6. All G models come standard with 32 Mbytes of ECC memory. Different processor cards are used for the Models G30, G40, and G50.

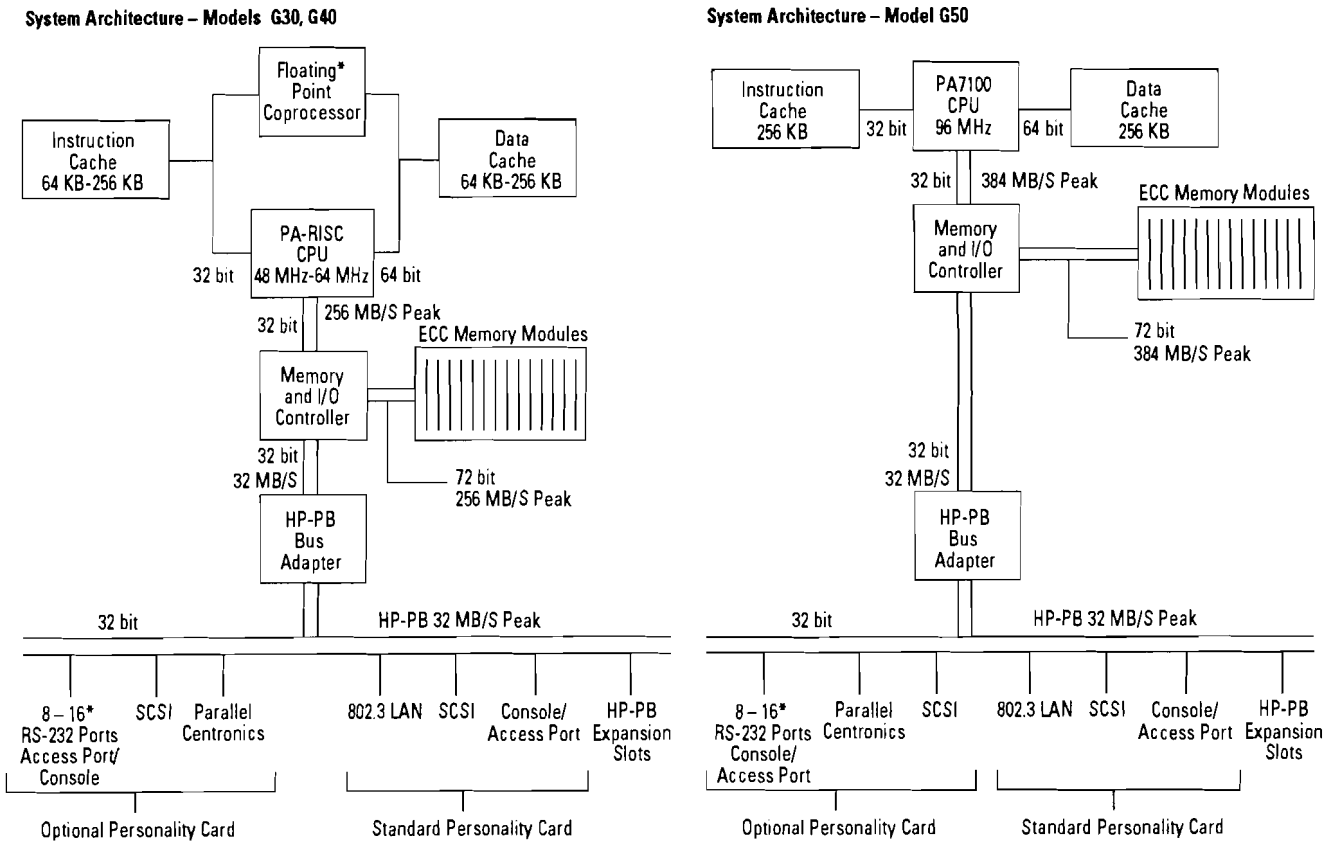
Single-high Precision Bus cards include the 8- and 16-channel MUX cards, HP-IB, LAN 9000/LINK, Token Ring, X.25/9000 Link, the SCSI adapter, and the SNA Link. These single high cards can be installed in either half of the double-high slot. The HP-FL and FDDI interfaces and the MAP 3.0 Link are double-high cards. MAP 3.0 is a 2 double-high card set (4 slots) and is NOT supported on HP-UX 9.0 based servers.

Figure 4.2 Model G30/G40/G50 Business Server Layout



*Combination of two half-height disks plus the optional CD-ROM is NOT supported, unless the tape drive is deleted. Maximum of three half-height peripherals in the package.

Figure 4.3 Model G30/G40/G50 System BUS Relationships



* Optional

Figure 4.4 Model G30/G40/G50 Rear View with Standard LAN Personality Card

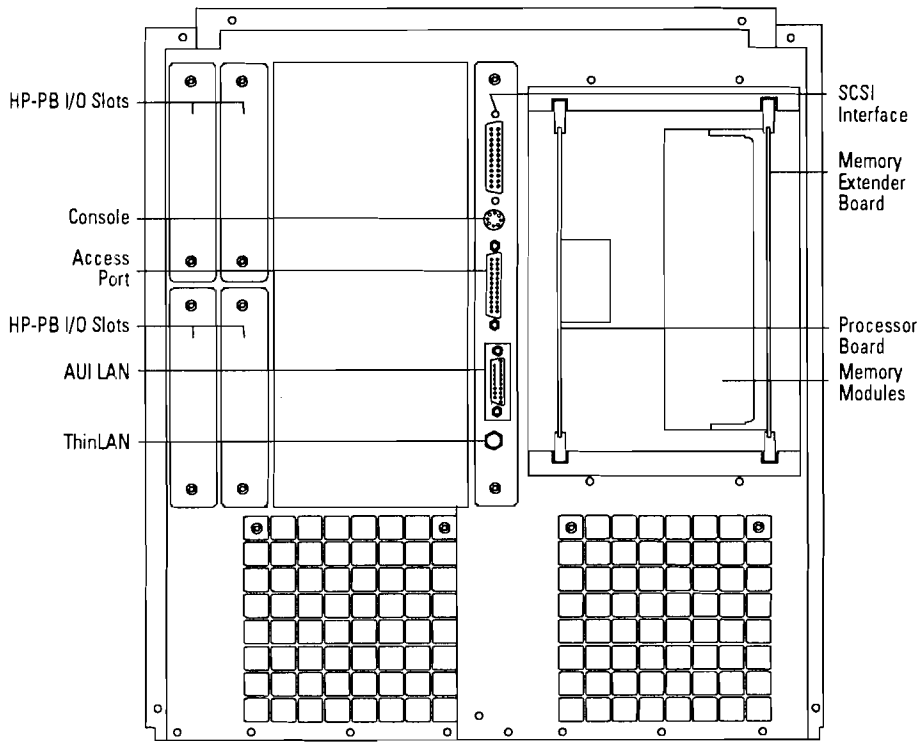


Figure 4.5 Model G30/G40/G50 Rear View with Optional MUX Personality Card

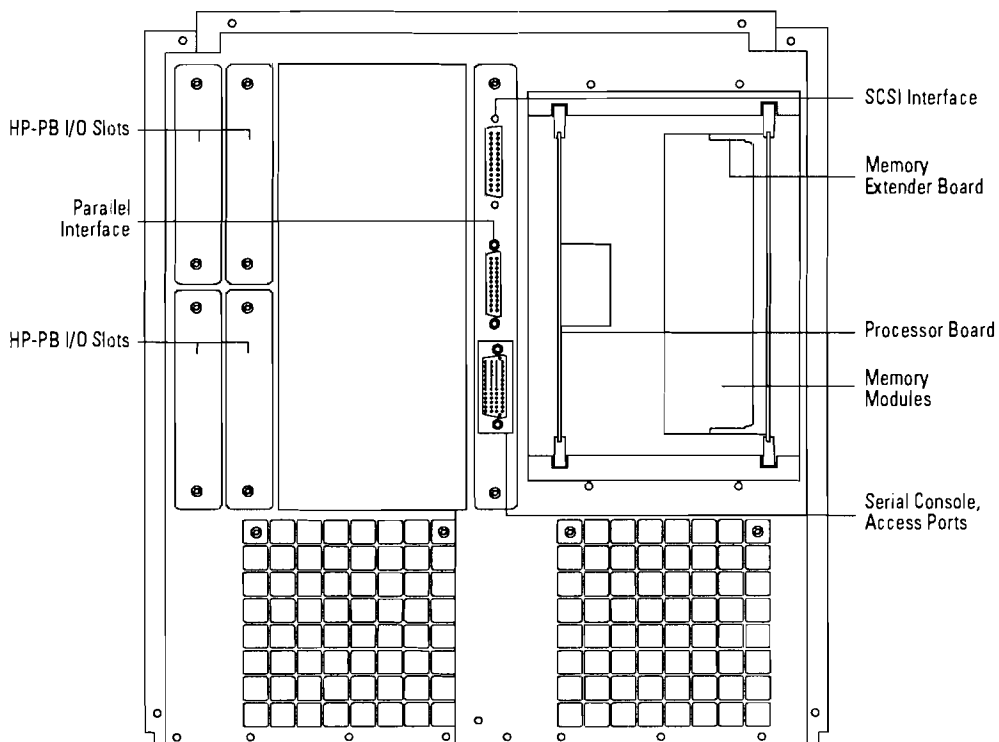
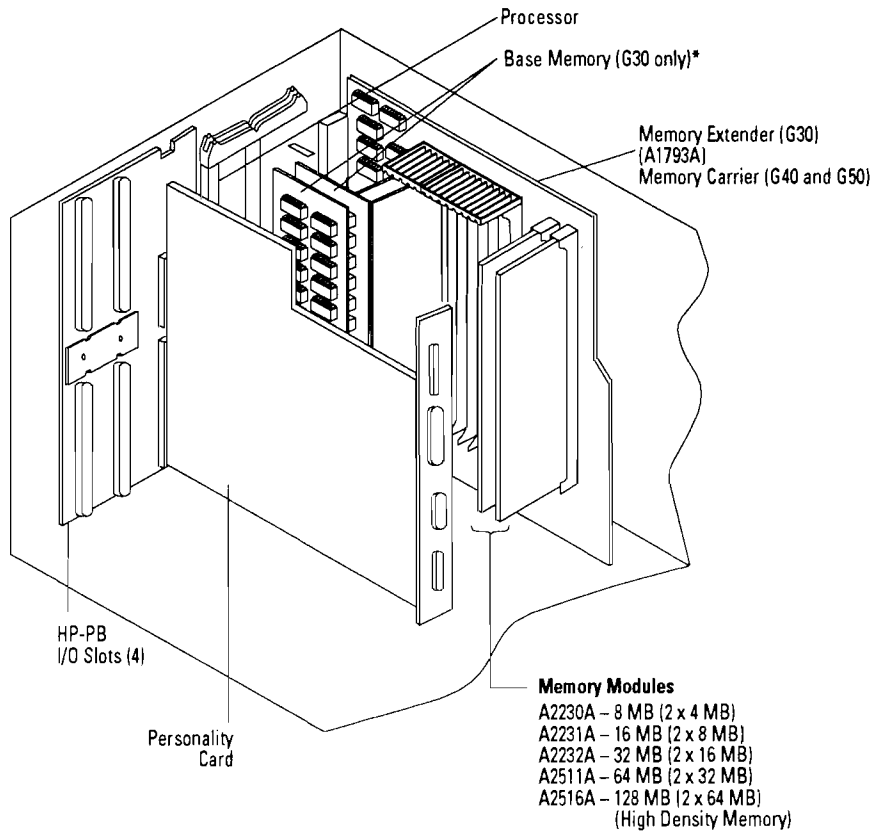


Figure 4.6 Model G30/G40/G50 Memory and I/O Configuration

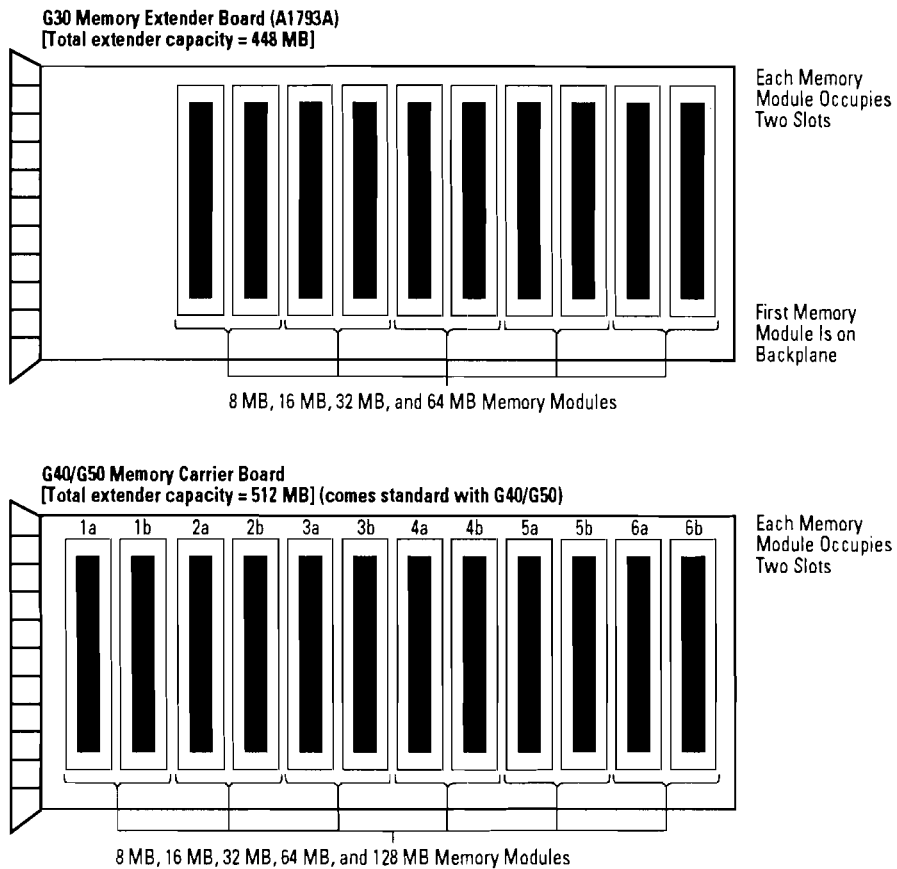


* See Note 5

Notes:

1. Each memory module consists of 2 memory cards.
2. Memory cards must be installed in pairs.
3. Each memory module fills 2 of the 12 memory slots.
4. The first pair of memory cards is installed on the backplane of Model G30.
5. All memory is installed on the memory carrier of Models G40 and G50.

Figure 4.7 Model G30/G40/G50 Memory Extender Board Layout



Model Gxx Memory Configuration

The memory configuration rules described in this section apply to G40 and G50 computer systems. When installing new memory, or installing an upgrade to one of the systems listed above, the following memory configuration rules must be adhered to or the system may not boot.

1. Common rules for all systems:
 - a. Memory array cards **MUST** be installed in pairs.
 - b. Each memory card installed in a slot pair must be the same size (e.g., 4 MB and 4 MB, 8 MB and 8 MB, 16 MB and 16 MB, 32 MB and 32 MB, or 64 MB and 64 MB).
 - c. When a memory extender card is installed, it has to have at least one memory card pair inserted in it.
2. Rules that apply to G30 computers:
 - a. All common rules.
 - b. Memory pairs can be installed in any paired slot (e.g., 0A and 0B, 4A and 4B, etc.)
3. Rules that apply to G40 and G50 computers. When installing memory (any type) follow this specific insertion order:
 - a. First memory pair into extender slot 5A/5B
 - b. Second memory pair into extender slot 0A/0B
 - c. Third memory pair into extender slot 4A/4B
 - d. Fourth memory pair into extender slot 1A/1B
 - e. Fifth memory pair into extender slot 3A/3B
 - f. Sixth memory pair into extender slot 2A/2B

- g. If the memory package you are dealing with contains any 8 MB SIMMS (A2232A 16 MB), they need to be the last pair(s) installed.

Model G30, G40, and G50 Configuration Guidelines

The Model G30, G40, and G50 Business Servers provide customers a broad range of mass storage and I/O options. Mass storage options in the package include faster next-generation disk drives, larger capacity Digital Audio Tape (DAT) drives, a Quarter-inch Cartridge (QIC) tape drive, and a CD-ROM drive. I/O options include a choice of personality cards to tailor systems for both LAN and MUX environments as well as a broad range of HP-PB cards.

While most customers will find their configurations can be supported without modification, some unusual configurations exist which exceed the available power of the systems. Therefore, the following configuration rules must be checked to verify the system is supported and that it will operate reliably:

If the system includes a QIC tape drive, a CD-ROM drive, and a DAT drive or two DAT drives, the power table and worksheet (Tables 4.1 and 4.2) must be checked. If a QIC drive, two DAT drives or a DAT and a CD-ROM drive are not present, all combinations of disk and I/O cards are supported and the worksheet can be ignored.

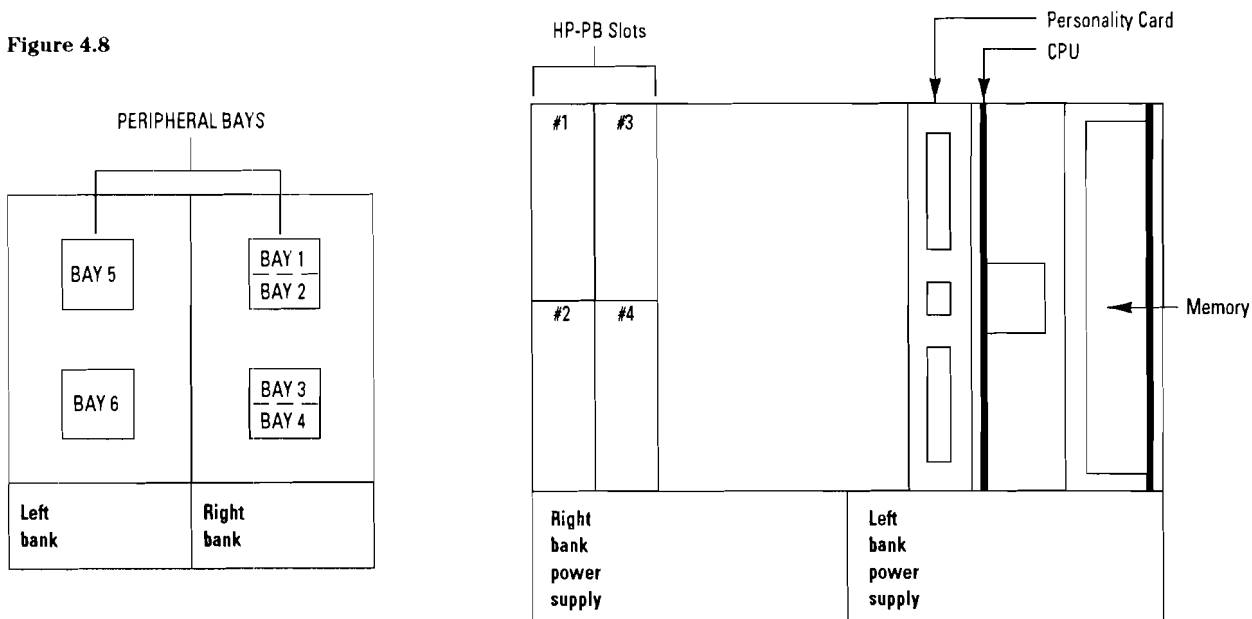
To use the power table and worksheet:

- a. Confirm the configuration does not exceed the maximum number of peripherals and I/O cards supported in the system.
- b. Note the current required by the configuration's personality card, removable media devices, disk drives, and I/O cards provided in the power table (Table 4.1).
- c. Insert the +12V, +5V, and -12V current required by the selected personality card into the worksheet row titled "personality card."
- d. If a tape backup device is present, insert the +12V, +5V, and -12V current required by the selected DAT or QIC tape drive into the worksheet row titled "Internal Peripherals Bay 1."
- e. If a CD-ROM or a second DAT drive is present, insert the +12V, +5V, and -12V current required by the drive into the worksheet row titled "Internal Peripherals Bay 2."
- f. If one or two half-height disk drives are present, insert the +12V +5V, and -12V current required by the first drive into the worksheet row titled "Internal Peripherals Bay 3" and the current for the second drive into the worksheet row titled "Internal Peripherals Bay 4."

Table 4.1 Power Table

	Personality Card, I/O Card, and Peripheral Current Requirements (Amps)			Maximum Supported Number of Personality Cards, I/O Cards, and Peripherals
	'+12V'	'+5V'	'-12V'	G Series
Personality card				1 max
LAN/SCSI	0.55	3.38	0.03	1
MUX/SCSI	0.50	1.70	0.02	1
Internal peripherals				5 max
2 GB DAT	0.75	1.00	0.00	1
4-8 GB DAT	0.75	1.00	0.00	1
QIC	1.50	1.00	0.00	1
CD-ROM	0.85	0.90	0.00	1
422 MB half-height disk	0.65	1.25	0.00	2
566 MB half-height disk	0.82	1.00	0.00	2
1 GB half-height disk	2.82	1.00	0.00	2
677 MB full-height disk	2.30	1.90	0.00	3
1.3 GB full-height disk	2.30	1.90	0.00	3
2 GB full-height disk	2.70	1.30	0.00	3
I/O cards				4 max
8 channel MUX (40299B)	0.16	1.40	0.13	4
16 channel RS-232 direct connect MUX (J2092A)	0.08	1.10	0.08	4
16 channel RS-423 direct connect MUX (J2093A)	0.20	1.10	0.15	4
16 channel RS-232 modem connect MUX (J2094A)	0.30	1.70	0.15	4
802.3 LAN (J2146A)	0.50	2.13	0.00	4
802.5 LAN (J2166A)	0.00	1.66	0.00	4
FDDI (J2157A)	0.00	3.70	0.00	2
SCSI (28655A)	0.00	0.90	0.00	4
HP-IB (28650A)	0.00	2.10	0.00	2
PBA-FL (A1749A)	0.08	6.77	0.07	2
HP-PB FL (28615A)	0.04	3.93	0.05	2
X.25 (36960A)	0.08	2.36	0.09	4
SNA (J2220A, 98173A, and 98174A)	0.08	2.36	0.09	4

Figure 4.8



- g. When full-height disk drives are used, insert the +12V, +5V, and -12V current required by the drives into the worksheet rows titled "Internal Peripherals Bay 3, Bay 5 and Bay 6." Do not use the row titled "Internal Peripherals Bay 4" for a full-height drive.
- h. Insert the +12V, +5V, and -12V current required by the selected I/O cards into the worksheet row titled "I/O cards Slots 1 through 4." If double-high cards (FDDI and HP-FL) are used, insert the current values in odd numbered slots and leave the following even numbered slot empty.
- i. Sum the total amount of +12V, +5V, and -12V current required for the configuration.

- j. Compare the total amount of +12V, +5V, and -12V current required for the configuration to the available current.

If the current used by the configuration is less than the current available, the system is supported. Also, if the configuration exceeds the available current by less than 5%, it is supported.

(Worst-case current usage is assumed for all cards and drives—the 5% exposure factor is allowed since the typical current values for cards and drives will be lower than their worst-case values).

If the configuration exceeds the available current by more than 5%, it must be modified to be supported.

All combinations of I/O cards can be supported by taking the following steps to:

- a. If possible, move the full-height disk drive from Bay 3 to Bay 5 or 6 to reduce the load on the right bank power supply. Recalculate the configuration with Peripheral Bays 3 and 4 empty.
- b. If moving drives from Peripheral Bay 3 is not viable, an external mass storage system must be used to reduce the peripheral load in the system. By moving one or more peripherals from the internal peripheral bays 1 through 4, the peripheral current load on the right bank power supply will be reduced below the available level and the configuration will be supported.

**Table 4.2 Configuration Worksheet—
HP 9000 Series 800 Models G30, G40, and G50**

	Left Bank			Right Bank			
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'	
Personality card							LAN/SCSI or MUX/SCSI card
Internal peripherals							
Bay 1							DAT or QIC tape drive
Bay 2							DAT, QIC, or CD-ROM drive
Bay 3							1 full-height disk or
Bay 4							1 or 2 half-height disks
Bay 5							1 full-height disk
Bay 6							1 full-height disk
I/O cards							
Slot 1							Any supported I/O card
Slot 2							Any supported I/O card
Slot 3							Any supported I/O card
Slot 4							Any supported I/O card
Total current used							
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Example

Configuration requires the following:

- LAN/SCSI personality card
- QIC tape drive
- CD-ROM drive
- Two 2 GB disk drives
- Three 802.3 LAN cards
- One SCSI card

Since the configuration is below the maximums supported for each component, note the current each component requires.

	+12A	+5V	-12V
LAN/SCSI Personality card	.55A	3.38A	.03A
QIC tape drive	1.50A	1.00A	.00A
CD-ROM drive	.85A	.90A	.00A
2 GB disk drive	2.70A	1.30A	.00A
802.3 LAN cards	.50A	2.13A	.00A
One SCSI card	.00A	.90A	.00A

Insert the current values into the worksheet as shown. Note that the +12V current on the right bank power is over the available current by more than 5%. Therefore, this configuration is NOT supported.

Table 4.3 Example Configuration Worksheet—HP 9000 Series 800 Models G30, G40, and G50

	Left Bank			Right Bank			
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'	
Personality card				0.55	3.38	0.03	LAN/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.85	0.90	0.00	CD-ROM drive
Bay 3				2.70	1.30	0.00	1 full-height disk
Bay 4							
Bay 5	2.70	1.30	0.00				1 full-height disk
Bay 6							
I/O cards							
Slot 1				0.50	2.13	0.00	802.3 LAN card
Slot 2				0.50	2.13	0.00	802.3 LAN card
Slot 3				0.50	2.13	0.00	802.3 LAN card
Slot 4				0.00	0.90	0.00	SCSI card
Total current used	2.70	1.30	0.00	7.10	13.87	0.03	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Note that the left bank power still has available current and that peripheral bay 6 is unused. Moving the disk drive from bay 3 to bay 6 and recalculating power results in all current values below the available current. Therefore, simply by moving the disk drive, the configuration is supported.

Table 4.4 **Example Configuration Worksheet—HP 9000 Series 800 Models G30, G40, and G50**

	Left Bank			Right Bank			
	+12V	+5V	-12V	+12V	+5V	-12V	
Personality card				0.55	3.38	0.03	LAN/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.85	0.90	0.00	CD-ROM drive
Bay 3							
Bay 4							
Bay 5	2.70	1.30	0.00				1 full-height disk
Bay 6	2.70	1.30	0.00				1 full-height disk
I/O cards							
Slot 1				0.50	2.13	0.00	802.3 LAN card
Slot 2				0.50	2.13	0.00	802.3 LAN card
Slot 3				0.50	2.13	0.00	802.3 LAN card
Slot 4				0.00	0.90	0.00	SCSI card
Total current used	5.40	2.60	0.00	4.40	12.57	0.03	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Product Summary

Product/ Opt. No.	Description
A2429A	<p>HP 9000/800 G Class Business Servers</p> <p><i>Standard server includes:</i></p> <ul style="list-style-type: none"> • Integrated chassis with four (4) single-high HP-PB slots • Factory installation of memory, disks, backup media, and I/O • One-year on-site warranty <p><i>Order desired SPU option. The following standard items may be included with the SPU at no extra charge:</i></p> <ul style="list-style-type: none"> • 566 MB embedded disk drive (requires HP-UX 9.0) • 32 MB ECC memory • 2.0 GB DDS drive • Pre-loaded HP-UX operating system with 2-user license plus TCP/IP, ARPA, and NFS services • LAN/SCSI/RS-232 personality card (requires HP-UX 9.0) with: <ul style="list-style-type: none"> – 802.3 ThinLAN interface – Single-ended (S.E.) SCSI interface – 2 RS-232 ports for console terminal and remote access • HP 700/96 console terminal • Owner's Guide and General Usage documentation set <p><i>Refer to the following ordering sections to select standard or alternate items.</i></p>
A2434A A2435A A2436A	<p><i>Select SPU (Must select ONE only):</i></p> <p>Model G30—48 MHz PA-RISC SPU w/256 KB—256 KB cache Model G40—64 MHz PA-RISC SPU w/256 KB—256 KB cache Model G50—96 MHz PA-RISC SPU w/256 KB—256 KB cache w/floating point</p>
#OS0 #OS1 #OS2 #OS3 #OS4 #OSZ	<p><i>Select a System Support Option</i></p> <p>License/Next Day System Support—1 yr. License/Same Day System Support—1 yr. Telephone/Next Day System Support—1 yr. Telephone/Same Day System Support—1 yr. Installation and Network Configuration Network Configuration</p> <p>Refer to the HP 9000 Series 800 Price Guide for warranty options</p>
A2293A	<p><i>Optional—Select floating point coprocessor (Select ONE only):</i></p> <p># ODV 48 MHz floating point coprocessor for Model G30 only # ODW 64 MHz floating point coprocessor for Model G40 only</p>
A2440A	<p><i>Select pre-loaded HP-UX OS version (Must select ONE only):</i></p> <p># APH HP-UX 9.0 with 2-user license # APC HP-UX 8.02 with 2-user license Media must be ordered separately, P/N B3108L. One media copy required per customer site.</p> <p><i>Select localization of system documentation (Must select ONE only):</i></p> <p># ABA System documentation in English # ABC System documentation in German # ABD System documentation in French/Canadian # ABJ System documentation in Japanese</p>
A2368A	<p><i>Pre-selected chassis and optional battery backup:</i></p> <p># OE1 Optional—Add powerfail battery backup</p>
C2798AZ	<p><i>Optional—select rack mount kit for installation into factory integrated 1.6M or 1.1M racks. (Integrated racks must be ordered on the same P.O./P.O. section)</i></p> <p>Add rack mount kit</p>
A2441A	<p>Select personality card (Must select ONE only)</p> <p># ODS Standard LAN personality card: 802.3 ThinLAN, 2 RS-232 ports for console and remote access, single-ended SCSI. (Requires HP-UX 9.0.)</p>
A2442A	<p># ODS Replace standard with 8-port MUX personality card: 8 modem, RS-232 ports, single-ended SCSI and parallel port.</p> <p># ODT Replace standard with 16-port MUX personality card: 8 modem, 8 DC RS-232 ports, single-ended SCSI and parallel port. (Note for A2442A options ODS and ODT: RS-232 ports include console and access ports.)</p>

Product Summary (cont'd)

Product/ Opt. No.	Description
A2429A (cont'd) HP 9000/800 G Class Business Servers	
<i>Select base memory (Must select ONE only):</i>	
A2232AZ # ODS	Standard 32 MB base memory
A2511AZ # ODU	Replace base memory with 64 MB module
A2516AZ # ODU	Replace base memory with 128 MB module (requires HP-UX 9.0)
<i>Additional memory (Select up to five modules, total) Maximum 384 MB for G30 and G40, 768 MB for G50</i>	
A2231AZ # ODZ	16 MB memory module
A2232AZ # ODZ	32 MB memory module
A2511AZ # ODZ	64 MB memory module
A2516AZ # ODZ	128 MB memory module (requires HP-UX 9.0)
<i>Select base disk (Must select ONE only):</i>	
A2444A # ODS	Standard base 566 MB half-height disk (requires HP-UX 9.0)
A2443A # 701	Delete base 566 MB disk (alternate disk required)
<i>Select alternate/additional internal disks. Maximum 2 half-height and 2 full-height devices or 3 full-height devices.</i>	
A2444A # ODZ	Add 566 MB half-height disk (requires HP-UX 9.0)
A2445A # ODZ	Add 1 GB half-height disk (requires HP-UX 9.0)
A2446A # ODZ	Add 2 GB full-height disk (requires HP-UX 9.0)
C2472SZ # ODZ	Add 422 MB half-height disk
C2473SZ # ODZ	Add 677 MB full-height disk
C2474SZ # ODZ	Add 1.3 GB full-height disk
<i>Select backup storage device (Must select ONE):</i>	
C2477SZ # ODS	Standard 2 GB DDS DAT (half-height)
A2443A # 700	Delete standard 2 GB DDS DAT
<i>Select alternate/additional backup storage device. Maximum 1 half-height or 1 full-height device.</i>	
C2478SZ # ODZ	Add 4–8 GB DDS DAT drive (half-height). Requires HP-UX 9.0.
C2476SZ # ODZ	Add CD-ROM (half-height)
A2311AZ # ODZ	Add 525 MB Quarter Inch Cartridge (QIC) drive (half-height)
<i>Optional—Select system console terminal (Limit to ONE only). Specify appropriate keyboard localization option.</i>	
C1064GZ # _____	HP 700/96 console terminal w/Green screen
C1064AZ # _____	HP 700/96 console terminal w/Amber screen
C1064WZ # _____	HP 700/96 console terminal w/Soft-white screen
<i>Optional—Select I/O and networking cards</i>	
J2092AZ # ODZ	16-port RS-232 direct-connect single-high MUX
28655A # ODZ	S.E. SCSI interface w/parallel port single-high card
J2146A # ODM	802.3 ThinLAN/9000 interface single-high card
J2166A # AU2	802.5 Token ring interface single-high card
J2250A	Token ring backup media and documentation
28650B # ODZ	HP-IB interface single-high card
36960A # ODN	X.25 link with RS-232-C interface single-high card
# ODP	X.25 link with V.35 interface single-high card
A2321A	X.25 backup media and documentation
<i>Optional—Select end-user terminal. Specify appropriate keyboard localization option.</i>	
C1080A # _____	HP 700/60 Ergonomic terminal w/Amber screen
C1080G # _____	HP 700/60 Ergonomic terminal w/Green screen
C1080W # _____	HP 700/60 Ergonomic terminal w/Soft-white screen
C1083W # _____	HP 700/60ES Ergonomic terminal w/Soft-white screen

Other disk products may be ordered from price list but will not include factory integration in the SPU chassis.

Section 5

Model H20/H30/H40/H50 Integrated Business Servers

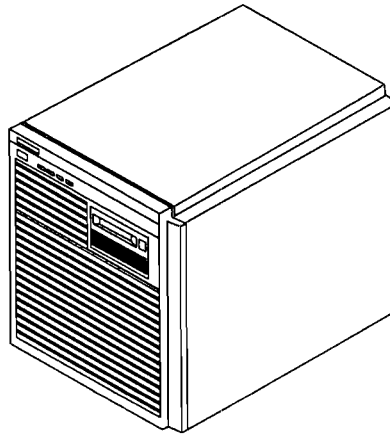
Description

The HP 9000 Models H20, H30, H40, and H50 are mid-range systems in an integrated package (see Figure 5.1). All of these compact systems include a single processor, an embedded disk drive, and an embedded Digital Data Storage (DDS) cartridge tape drive. The package (43 cm. high, 44.4 cm. wide, and 53.3 cm. deep) has been designed to hold an entire system in a small amount of office or computer room space.

The package supports internal disk drive combinations of up to two 422-Mbyte, 566-Mbyte, or 1-Gbyte drives and two 677-Mbyte, 1.36-Gbyte, or 2-Gbyte drives or three 677-Mbyte, 1.3-Gbyte, or 2-Gbyte drives. Maximum internal disk storage is 6 Gbytes. All H Models come standard with a single 1.0-Gbyte disk mechanism.

Additional disk storage is available using external standalone disk mechanisms. All models can support 70 Gbytes of SCSI disk storage, 5.36 Gbytes of standalone external HP-IB disk storage, or 172.8 Gbytes of external HP-FL disk storage.

Figure 5.1 Model H20/H30/H40/H50 Business Server



Cost-effective backup for the H models is provided with HP's Digital Audio Tape (DAT) unit using the Digital Data Storage (DDS) format. The DDS backup unit, integrated in the deskside package, stores up to 2.0 Gbytes of data on a single DAT cassette, measuring only 7.3 × 5.4 × 1.05 cm. The unit has a transfer rate of 183 Kbytes per second and supports both 60 meter and 90 meter tapes. All H models also include an option that adds hardware data compression functionality to the integrated DAT. This functionality increases 90 meter tape capacity to as much as 8 Gbytes.

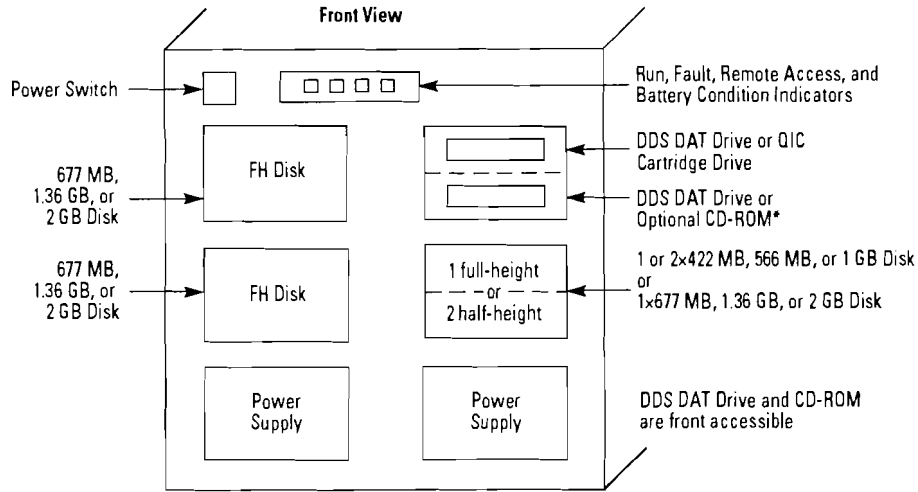
The HP Precision Bus (HP-PB) interfaces the CPU printed circuit assembly (PCA) with I/O cards. The HP-PB synchronously transfers I/O data over a 32-bit data

path at a burst peak rate of 32 Mbytes/sec or a sustained rate of 21 Mbytes/sec. The HP 9000 Models H20/H30/H40/H50 have eight HP Precision Bus slots for I/O cards. The HP-PB is designed to accommodate single-high and double-high I/O cards. Consequently, the eight HP-PB slots can support four double-high cards or eight single-high cards. These slots are only accessible from the rear of the package.

The card cage for all H models is shown in Figure 5.6. All H models come standard with 64 Mbytes of ECC memory. Different processor cards are used for the Models H20, H30, H40, and H50.

Single-high Precision Bus cards include the 8- and 16-channel MUX cards, HP-IB, LAN 9000/LINK, Token Ring, X.25/9000 Link, SCSI adapter, and the SNA Link. These single high cards can be installed in either half of the double-high slot. The HP-FL and FDDI interfaces, and the MAP 3.0 Link are double-high cards. MAP 3.0 is a 2 double-high card set (4 slots) and is NOT supported on HP-UX 9.0 based servers.

Figure 5.2 Model H20/H30/H40/H50 Business Server Layout



*Combination of two half-height disks plus the optional CD-ROM is NOT supported, unless the tape drive is deleted. Maximum of three half-height peripherals in the package.

Figure 5.3 Model H20/H30/H40/H50 System BUS Relationships

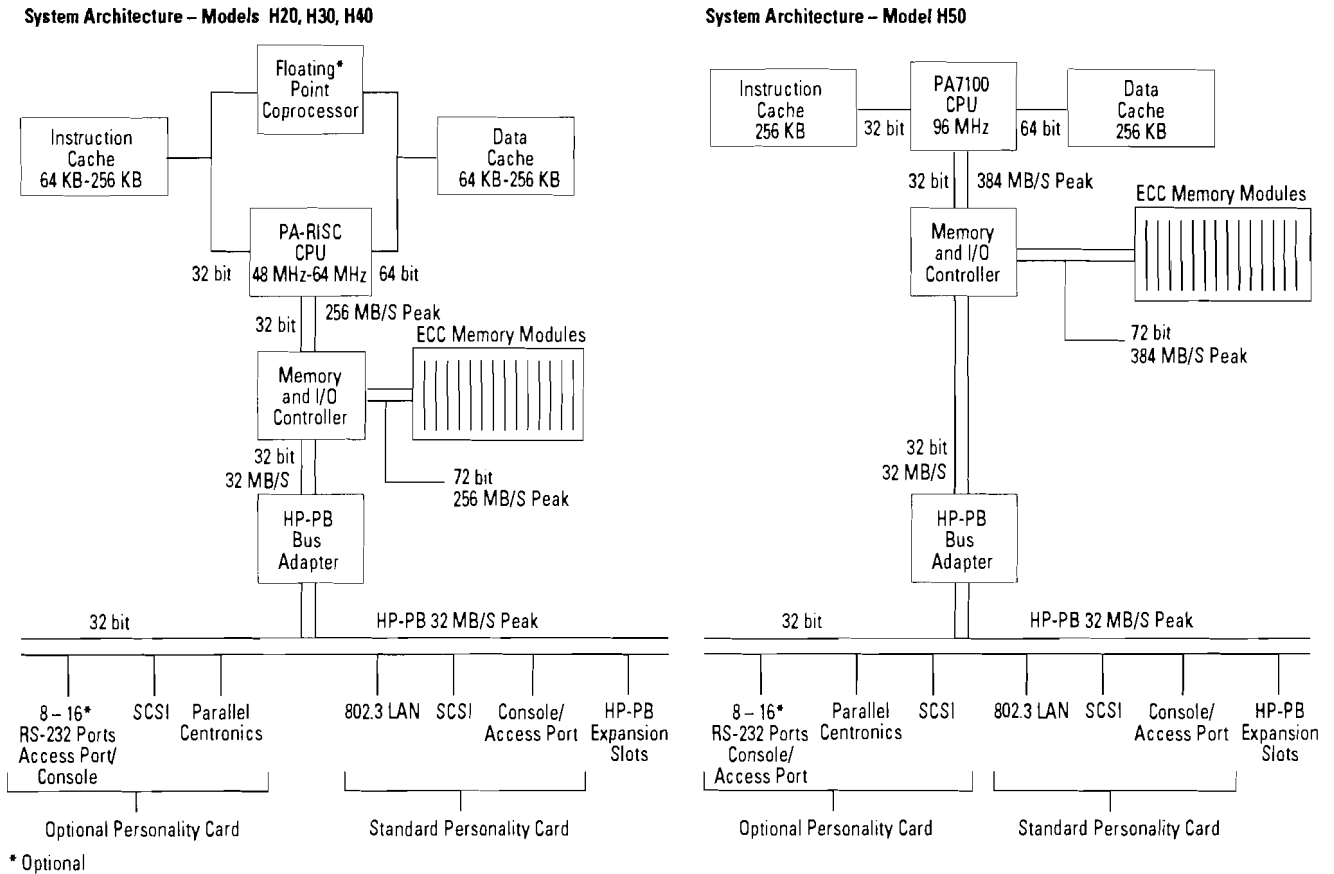


Figure 5.4 H Model Rear View with Standard LAN Personality Card

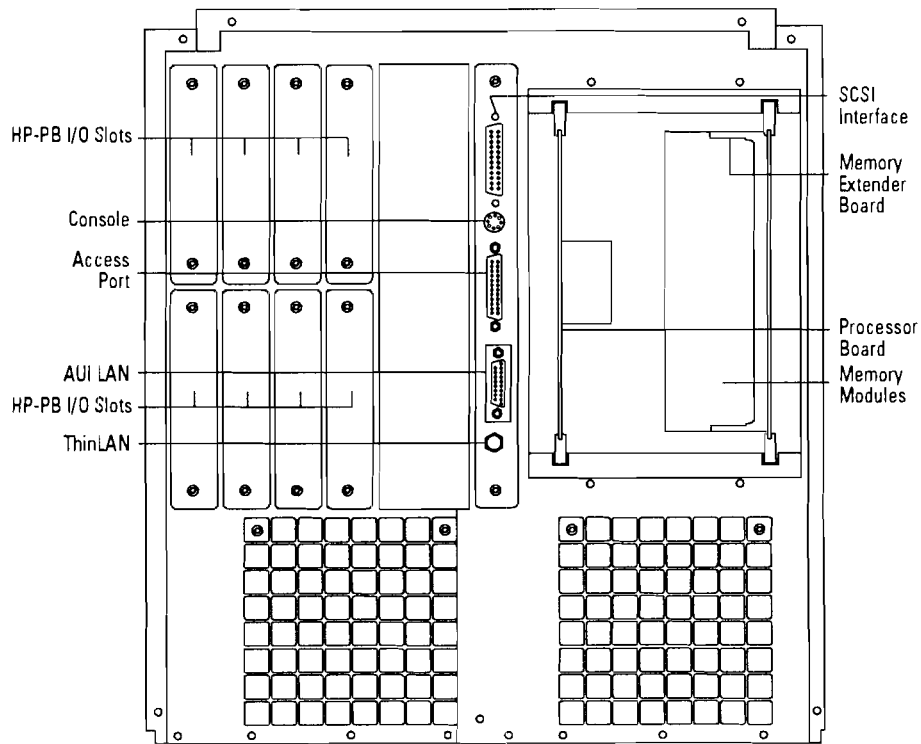


Figure 5.5 H Model Rear View with Optional MUX Personality Card

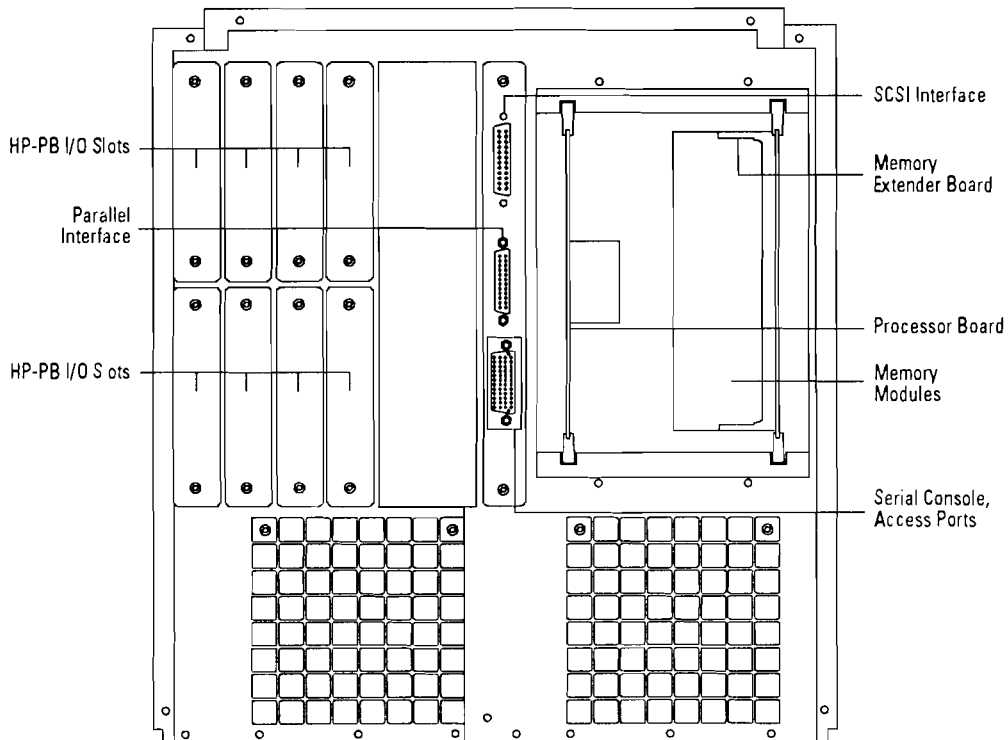
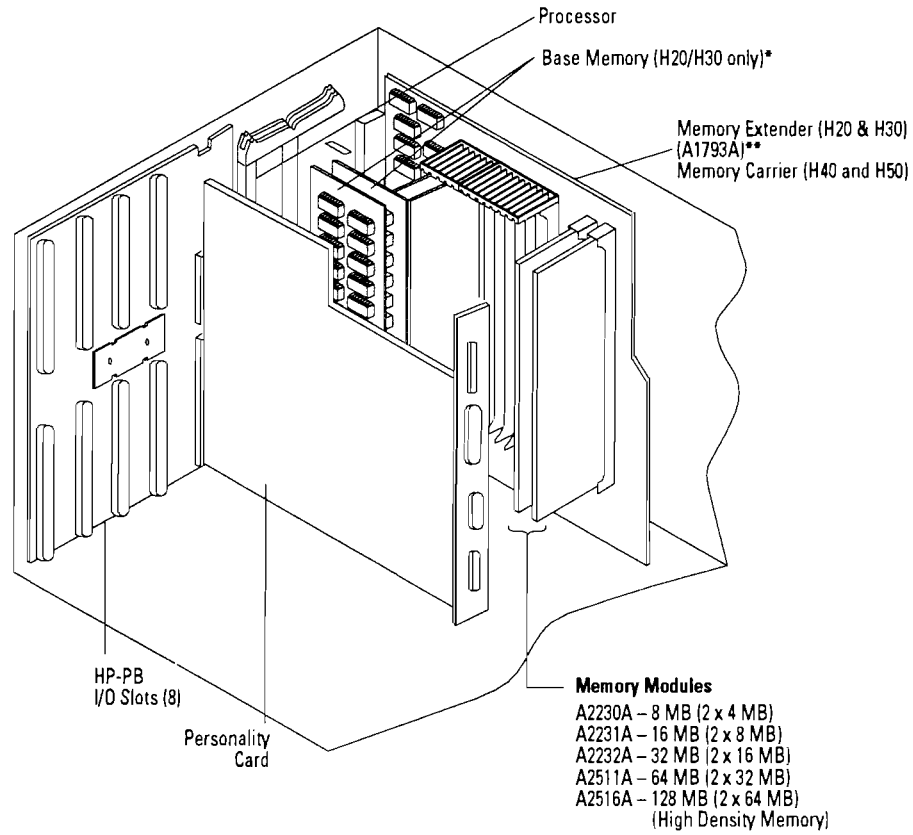


Figure 5.6 Model H20/H30/H40/H50 Memory and I/O Configuration

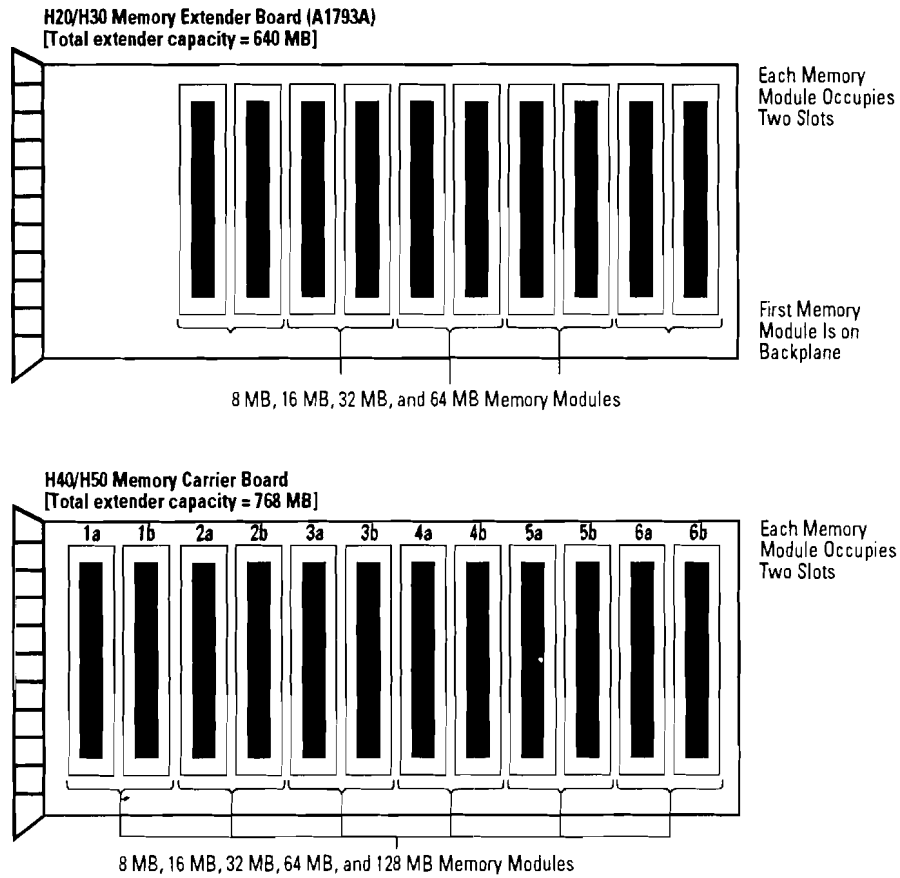


*See Note 5

Notes:

1. Each memory module consists of 2 memory cards.
2. Memory cards must be installed in pairs.
3. Each memory module fills 2 of the 12 memory slots.
4. The first pair of memory cards is installed on the backplane of Models H20 and H30.
5. All memory is installed on the memory carrier of Models H40 and H50.

Figure 5.7 Model H20/H30/H40/H50 Memory Extender Board Layout



Model Hxx Memory Configuration

The memory configuration rules described in this section apply to H40 and H50 computer systems. When installing new memory, or installing an upgrade to one of the systems listed above, the following memory configuration rules must be adhered to or the system may not boot.

1. Common rules for all systems:
 - a. Memory array cards **MUST** be installed in pairs.
 - b. Each memory card installed in a slot pair must be the same size (e.g., 4 MB and 4 MB, 8 MB and 8 MB, 16 MB and 16 MB, 32 MB and 32 MB, or 64 MB and 64 MB).
 - c. When a memory extender card is installed, it has to have at least one memory card pair inserted in it.
2. Rules that apply to H20 and H30 computers, and HP 3000 9X7LX (all), 937/947/957 and 967 computers:
 - a. All common rules.
 - b. Memory pairs can be installed in any paired slot (e.g., 0A and 0B, 4A and 4B, etc.)
3. Rules that apply to H40 and H50 computers. When installing memory (any type) follow this specific insertion order:
 - a. First memory pair into extender slot 5A/5B
 - b. Second memory pair into extender slot 0A/0B
 - c. Third memory pair into extender slot 4A/4B
 - d. Fourth memory pair into extender slot 1A/1B
 - e. Fifth memory pair into extender slot 3A/3B
 - f. Sixth memory pair into extender slot 2A/2B

- g. If the memory package you are dealing with contains any 8 MB SIMMS (A2232A 16 MB), they need to be the last pair(s) installed.

Model H20, H30, H40, and H50 Configuration Guidelines

The Model H20, H30, H40, and H50 Business Servers provide customers a broad range of mass storage and I/O options. Mass storage options in the package include faster next-generation disk drives, larger capacity Digital Audio Tape (DAT) drives, a Quarter-inch Cartridge (QIC) tape drive, and a CD-ROM drive. I/O options include a choice of personality cards to tailor systems for both LAN and MUX environments as well as a broad range of HP-PB cards.

While most customers will find their configurations can be supported without modification, some unusual configurations exist which exceed the available power of the systems. Therefore, the following configuration rules must be checked to verify the system is supported and that it will operate reliably.

To use the power table and worksheet:

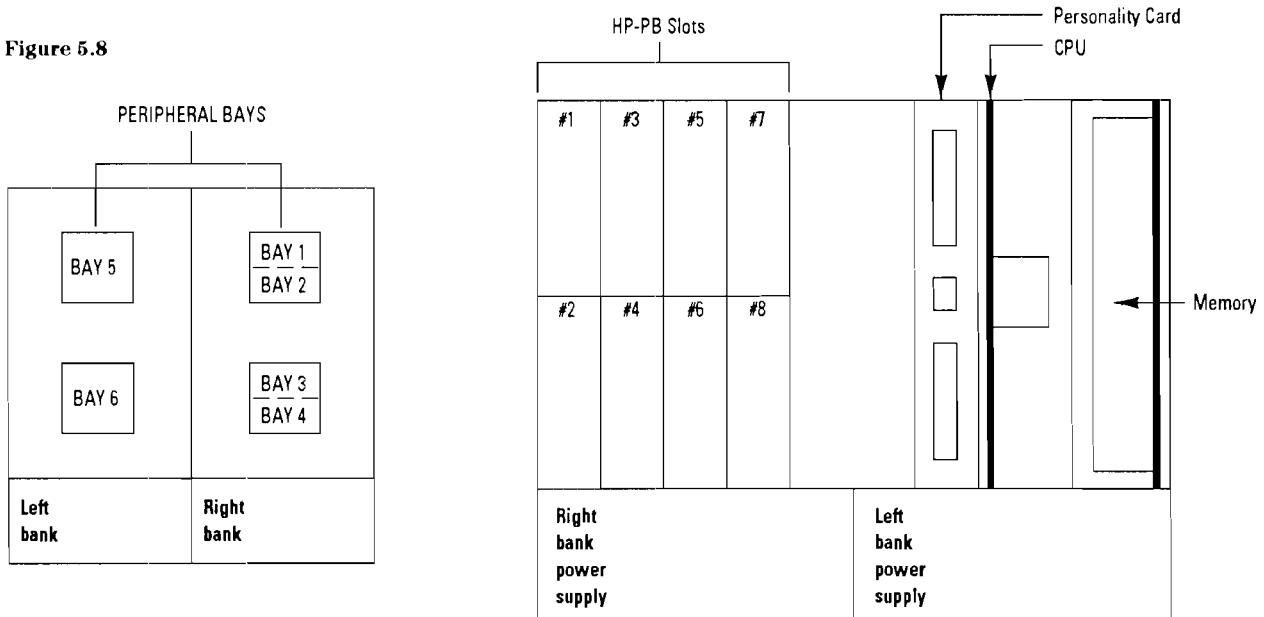
- a. Confirm the configuration does not exceed the maximum number of peripherals and I/O cards supported in the system.

- b. Note the current required by the configuration's personality card, removable media devices, disk drives, and I/O cards provided in the power table.
- c. Insert the +12V, +5V, and -12V current required by the selected personality card into the worksheet row titled "personality card."
- d. If a tape backup device is present, insert the +12V, +5V, and -12V current required by the selected DAT or QIC tape drive into the worksheet row titled "Internal Peripherals Bay 1."
- e. If a CD-ROM or a second DAT drive is present, insert the +12V, +5V, and -12V current required by the drive into the worksheet row titled "Internal Peripherals Bay 2."
- f. If one or two half-height disk drives are present, insert the +12V +5V, and -12V current required by the first drive into the worksheet row titled "Internal Peripherals Bay 3" and the current for the second drive into the worksheet row titled "Internal Peripherals Bay 4."
- g. When full-height disk drives are used, insert the +12V, +5V, and -12V current required by the drives into the worksheet rows titled "Internal Peripherals Bay 3, Bay 5 and Bay 6." Do not use the row titled "Internal Peripherals Bay 4" for a full-height drive.

Table 5.1 Power Table

	Personality Card, I/O Card, and Peripheral Current Requirements (Amps)			Maximum Supported Number of Personality Cards, I/O Cards, and Peripherals
	'+12V'	'+5V'	'-12V'	H Series
Personality card				1 max
LAN/SCSI	0.55	3.38	0.03	1
MUX/SCSI	0.50	1.70	0.02	1
Internal peripherals				5 max
2 GB DAT	0.75	1.00	0.00	1
4–8 GB DAT	0.75	1.00	0.00	1
QIC	1.50	1.00	0.00	1
CD-ROM	0.85	0.90	0.00	1
422 MB half-height disk	0.65	1.25	0.00	2
566 MB half-height disk	0.82	1.00	0.00	2
1 GB half-height disk	0.82	1.00	0.00	2
677 MB full-height disk	2.30	1.90	0.00	3
1.3 GB full-height disk	2.30	1.90	0.00	3
2 GB full-height disk	2.70	1.30	0.00	3
I/O cards				8 max
8 channel MUX (40299B)	0.16	1.40	0.13	8
16 channel RS-232 direct connect MUX (J2092A)	0.08	1.10	0.08	8
16 channel RS-423 direct connect MUX (J2093A)	0.20	1.10	0.15	8
16 channel RS-232 modem connect MUX (J2094A)	0.30	1.70	0.15	8
802.3 LAN (J2146A)	0.50	2.13	0.00	7
802.5 LAN (J2166A)	0.00	1.66	0.00	5
FDDI (J2157A)	0.00	3.70	0.00	2
SCSI (28655A)	0.00	0.90	0.00	8
HP-IB (28650A)	0.00	2.10	0.00	2
PBA-FL (A1749A)	0.08	6.77	0.07	2
HP-PB FL (28615A)	0.04	3.93	0.05	4
X.25 (36960A)	0.08	2.36	0.09	7
SNA (J2220A, 98173A, and 98174A)	0.08	2.36	0.09	8

Figure 5.8



- h. Insert the +12V, +5V, and -12V current required by the selected I/O cards into the worksheet row titled "I/O cards Slots 1 through 8." If double-high cards (FDDI and HP-FL) are used, insert the current values in odd numbered slots and leave the following even numbered slot empty.
- i. Sum the total amount of +12V, +5V, and -12V current required for the configuration.
- j. Compare the total amount of +12V, +5V, and -12V current required for the configuration to the available current.

If the current used by the configuration is less than the current available, the system is supported. Also, if the configuration exceeds the available current by less than 5%, it is supported. (Worst-case current usage is assumed for all cards and drives—the 5% exposure factor is allowed since the typical current values for cards and drives will be lower than their worst-case values).

If the configuration exceeds the available current by more than 5%, it must be modified to be supported.

- All combinations of I/O cards can be supported by taking the following steps to:
- a. If possible, move the full-height disk drive from Bay 3 to Bay 5 or 6 to reduce the load on the right bank power supply. Recalculate the configuration with Peripheral Bays 3 and 4 empty.
 - b. If moving drives from Peripheral Bay 3 is not viable, an external mass storage system must be used to reduce the peripheral load in the system. By moving one or more peripherals from the internal peripheral bays 1 through 4, the peripheral current load on the right bank power supply will be reduced below the available level and the configuration will be supported.

**Table 5.2 Configuration Worksheet—
HP 9000 Series 800 Models H20, H30, H40, and H50**

	Left Bank			Right Bank		
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'
Personality card						LAN/SCSI or MUX/SCSI card
Internal peripherals						
Bay 1						DAT or QIC tape drive
Bay 2						DAT, QIC, or CD-ROM drive
Bay 3						1 full-height disk or 1 or 2 half-height disks
Bay 4						
Bay 5						1 full-height disk
Bay 6						1 full-height disk
I/O cards						
Slot 1						Any supported I/O card
Slot 2						Any supported I/O card
Slot 3						Any supported I/O card
Slot 4						Any supported I/O card
Slot 5						Any supported I/O card
Slot 6						Any supported I/O card
Slot 7						Any supported I/O card
Slot 8						Any supported I/O card
Total current used						
Available current	6.27	6.80	1.50	6.27	27.00	1.50

Example

Configuration requires the following:

- LAN/SCSI personality card
- QIC tape drive
- CD-ROM drive
- Two 2 GB disk drives
- Three 802.3 LAN cards
- One SCSI card
- One FDDI card
- Two J2094A MUXes

Since the configuration is below the maximums supported for each component, note the current each component requires.

	+12A	+5V	-12V
LAN/SCSI Personality card	.55A	3.38A	.03A
QIC tape drive	1.50A	1.00A	.00A
CD-ROM drive	.85A	.90A	.00A
2 GB disk drive	2.70A	1.30A	.00A
802.3 LAN cards	.50A	2.13A	.00A
SCSI card	.00A	.90A	.00A
FDDI card	.00A	3.70A	.00A
J2094A MUX	.30A	1.70A	.15A

Insert the current values into the worksheet as shown. Note that the +12V current on the right bank power is over the available current by more than 5%. Therefore, this configuration is NOT supported.

Table 5.3 **Example** Configuration Worksheet—HP 9000 Series 800 Models H20, H30, H40, and H50

	Left Bank			Right Bank			
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'	
Personality card				0.55	3.38	0.03	LAN/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.85	0.90	0.00	CD-ROM drive
Bay 3				2.70	1.30	0.00	1 full-height disk
Bay 4							
Bay 5	2.70	1.30	0.00				1 full-height disk
Bay 6							
I/O cards							
Slot 1				0.00	3.70	0.00	FDDI
Slot 2							FDDI
Slot 3				0.50	2.13	0.00	802.3 LAN
Slot 4				0.50	2.13	0.00	802.3 LAN
Slot 5			0.00	0.50	2.13		802.3
Slot 6			0.00	0.00	0.90		SCSI
Slot 7			0.15	0.30	1.70		J2094A MUX
Slot 8			0.15	0.30	1.70		J2094A MUX
Total current used	2.70	1.30	0.30	7.70	20.97	0.03	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Note that the left bank power still has available current and that peripheral bay 6 is unused. Moving the disk drive from bay 3 to bay 6 and recalculating power results in all current values below the available current. Therefore, simply by moving the disk drive, the configuration is supported.

Table 5.4 Example Configuration Worksheet—HP 9000 Series 800 Models H20, H30, H40, and H50

	Left Bank			Right Bank			
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'	
Personality card				0.55	3.38	0.03	LAN/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.85	0.90	0.00	CD-ROM drive
Bay 3							
Bay 4							
Bay 5	2.70	1.30	0.00				1 full-height disk
Bay 6	2.70	1.30	0.00				1 full-height disk
I/O cards							
Slot 1				0.00	3.70	0.00	FDDI
Slot 2							FDDI
Slot 3				0.50	2.13	0.00	802.3 LAN
Slot 4				0.50	2.13	0.00	802.3 LAN
Slot 5			0.00	0.50	2.13		802.3
Slot 6			0.00	0.00	0.90		SCSI
Slot 7			0.15	0.30	1.70		J2094A MUX
Slot 8			0.15	0.30	1.70		J2094A MUX
Total current used	5.40	2.60	0.30	5.00	19.67	0.03	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Product Summary

Product/ Opt. No.	Description
A2430A	<p>HP 9000/800 H Class Business Servers</p> <p><i>Standard server includes:</i></p> <ul style="list-style-type: none"> • Integrated chassis with eight (8) single high HP-PB slots • Factory installation of memory, disks, back-up media and I/O • One year on-site warranty <p><i>Order desired SPU option. The following standard items may be included with the SPU at no extra charge:</i></p> <ul style="list-style-type: none"> • 1 GB embedded disk drive (requires HP-UX 9.0) • 64 MB ECC memory • 2.0 GB DDS drive • Pre-loaded HP-UX operating system with 2-user license plus TCP/IP, ARPA, and NFS services • LAN/SCSI/RS-232 personality card (requires HP-UX 9.0) with: <ul style="list-style-type: none"> – 802/3 thin LAN interface – Single-ended (S.E.) SCSI interface – 2 RS-232 ports for console terminal and remote access • Owner's Guide and General Usage documentation set <p><i>Refer to the following ordering sections to select standard or alternate items</i></p>
A2366A A2437A A2438A A2439A	<p><i>Select SPU (Must select ONE only)</i></p> <p>Model H20 48 MHz PA-RISC CPU w/64 KB-64 KB cache Model H30 48 MHz PA-RISC CPU w/256 KB-256 KB cache Model H40 64 MHz PA-RISC CPU w/256 KB-256 KB cache Model H50 96 MHz PA-RISC CPU w/256 KB-256 KB cache w/floating point</p>
#OS0 #OS1 #OS2 #OS3 #OS4 #OSZ	<p><i>Select a System Support Option</i></p> <p>License/Next Day System Support—1 yr. License/Same Day System Support—1 yr. Telephone/Next Day System Support—1 yr. Telephone/Same Day System Support—1 yr. Installation and Network Configuration Network Configuration</p> <p>Refer to the HP 9000 Series 800 Price Guide for warranty options.</p>
A2293A	<p><i>Optional—Select floating point coprocessor (select ONE only)</i></p> <p>#ODU 48 MHz floating point coprocessor for Model H20 only #ODV 48 MHz floating point coprocessor for Model H30 only #ODW 64 MHz floating point coprocessor for Model H40 only</p>
A2440A	<p><i>Select pre-loaded HP-UX OS version (Must select ONE only)</i></p> <p>#APH HP-UX 9.0 with 2-user license #APC HP-UX 8.02 with 2-user license</p> <p>Media must be ordered separately, P/N B3108L. One media copy required per customer site.</p> <p><i>Select localization of system documentation (Must select ONE only)</i></p> <p>#ABA System documentation in English #ABC System documentation in German #ABD System documentation in French/Canadian #ABJ System documentation in Japanese</p>
A2368A	<p><i>Pre-selected chassis and optional battery back-up</i></p> <p>Pre-selected chassis #OE1 Optional—Add powerfail battery back-up</p>
C2798AZ	<p><i>Optional—select rack mount kit for installation into factory integrated 1.6 M or 1.1 M racks. (Integrated racks must be ordered on the same P.O./P.O. section)</i></p> <p>Add rack mount kit</p>
A2441A	<p><i>Select personality card (Must select ONE only)</i></p> <p>#ODS Standard LAN personality card: 802.3 ThinLAN, 2 RS-232 ports for console and remote access, single-ended SCSI (requires UP-UX 9.0)</p>
A2442A	<p>#ODS Replace standard with 8-port MUX personality card: 8 modem, RS-232 ports, single-ended SCSI and parallel port. #ODT Replace standard with 16-port MUX personality card: 8 modem, 8 DC RS-232 ports, single-ended SCSI and parallel port. (Note for options ODS and ODT: RS-232 ports include console and access ports.)</p>

Product Summary (cont'd)

Product/ Opt. No.	Description
	<i>Select base memory (Must select ONE only)</i>
A2511AZ #0DS	Standard 64 MB base memory
A2516AZ #0DV	Replace base memory with 128 MB module (Requires HP-UX 9.0)
	<i>Additional memory (Select up to five modules, total) Maximum 384 MB for H20, H30 and H40, 768 MB for H50.</i>
A2231AZ #0DZ	16 MB memory module
A2232AZ #0DZ	32 MB memory module
A2511AZ #0DZ	64 MB memory module
A2516AZ #0DZ	128 MB memory module (requires HP-UX 9.0)
	<i>Select base disk (Must select ONE only)</i>
A2445A #0DS	Standard base 1 GB half-height disk (Requires HP-UX 9.0)
A2443A #702	Delete base 1 GB disk (diskless not supported, alternate disk required)
	<i>Select alternate/additional internal disks*</i>
	<i>Maximum 2 half-height and 2 full-height devices or 3 full-height devices</i>
A2444A #0DZ	Add 566 MB half-height disk (requires HP-UX 9.0)
A2445A #0DZ	Add 1 GB half-height disk (requires HP-UX 9.0)
A2446A #0DZ	Add 2 GB full-height disk (requires HP-UX 9.0)
C2472SZ #0DZ	Add 422 MB half-height disk
C2473SZ #0DZ	Add 677 MB full-height disk
C2474SZ #0DZ	Add 1.3 GB full-height disk
	<i>Select back-up storage device (Must select ONE)</i>
C2477SZ #0DS	Standard 2 GB DDS DAT (half height)
A2443A #700	Delete standard 2 GB DDS DAT
	<i>Select alternate/additional back-up storage device</i>
	<i>Maximum 1 half-height or 1 full-height device</i>
C2478SZ #0DZ	Add 4-8 GB DDS DAT drive (half-height)
C2476SZ #0DZ	Add CD-ROM (half-height)
A2311AZ #0DZ	Add 525 MB Quarter Inch Cartridge (QIC) drive (half-height)
	<i>Optional—Select system console terminal (Limit to ONE only)</i>
	<i>Specify appropriate keyboard localization option.</i>
C1064GZ #___	HP 700/96 console terminal w/Green screen
C1064AZ #___	HP 700/96 console terminal w/Amber screen
C1064WZ #___	HP 700/96 console terminal w/Soft-white screen
	<i>Optional—Select I/O and networking cards</i>
J2092AZ #0DZ	16 port RS-232 direct connect single high MUX
28655A #0DZ	S.E. SCSI interface w/parallel port single high card
J2146A #ODM	802.3 ThinLAN/9000 interface single high card
J2166A #AU2	802.5 Token ring interface single high card
J2250A	Token ring backup media and documentation
28650B #0DZ	HP-IB interface single high card
36960A #0DQ	X.25 link with RS-232-C interface single high card
36960A #ODR	X.25 link with V.35 interface single high card
A2321A	X.25 backup media and documentation
	<i>Optional—Select end-user terminal</i>
	<i>Specify appropriate keyboard localization option</i>
C1080A #___	HP 700/60 Ergonomic terminal w/Amber screen
C1080G #___	HP 700/60 Ergonomic terminal w/Green screen
C1080W #___	HP 700/60 Ergonomic terminal w/Soft-white screen
C1083W #___	HP 700/60ES Ergonomic terminal w/Soft-white screen

*Other disk products may be ordered from price list but will not include factory integration in SPU chassis.

Section 6

Model I30/I40/I50 Integrated Business Servers

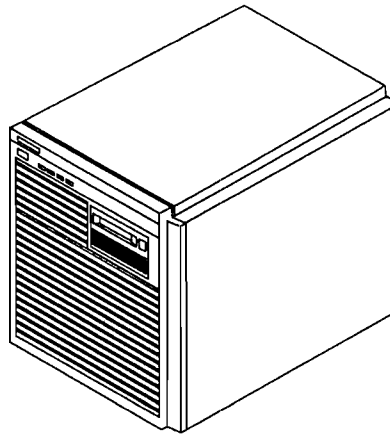
Description

The HP 9000 Models I30, I40, and I50 are high performance, highly configurable mid-range systems. These compact systems include a single processor, an embedded disk drive and an embedded Digital Data Storage (DDS) cartridge tape drive. The package (43 cm. high, 44.4 cm. wide and 53.3 cm. deep) has been designed to hold an entire system in a small amount of space, maximizing the utility of office or computer room space (see Figure 6.1).

The package supports internal disk drive combinations of up to two 422-Mbyte, 566-Mbyte, or 1-Gbyte and two 1.36 or 2-Gbyte disk mechanisms or three 1.36 or 2-Gbyte disk mechanisms. Maximum internal disk storage is 6 Gbytes. All I models come standard with a single integrated 2-Gbyte disk.

Additional disk storage is available using external standalone disk mechanisms. All models can support 70 Gbytes of SCSI disk storage, 5.36 Gbytes of standalone external HP-IB disk storage, or 172.8 Gbytes of external HP-FL disk storage.

Figure 6.1 Model I30/I40/I50 Business Server



Cost effective backup for the I30, I40, and I50 are provided with HP Digital Audio Tape (DAT) unit using the Digital Data Storage (DDS) format. The DDS backup unit, integrated in the desktape package, stores up to 2.0 Gbytes of data on a single DAT cassette, measuring only $7.3 \times 5.4 \times 1.05$ cm. The unit has a transfer rate of 183 Kbytes per second, which translates into a two hour period required for backing up 2.0 Gbytes of data, and supports both 60 meter and 90 meter tapes. All models also include an option that adds hardware data compression functionality to the integrated DAT. This functionality increases 90 meter tape capacity to as much as 8 Gbytes.

The HP Precision Bus (HP-PB) interfaces the CPU printed circuit assembly (PCA) with I/O cards. The HP-PB synchronously transfers I/O data over a 32-bit data

path at a peak rate of 32 MB/sec and a sustained rate of 21 Mbytes/sec. The HP 9000 Models I30, I40, and I50 have twelve HP Precision Bus slots available for I/O cards. The HP-PB is designed to accommodate single-high and double-high I/O cards. Consequently, the twelve HP-PB slots can support six double-high cards or twelve single-high cards. These slots are only accessible from the rear of the package.

The card cage for all I models is shown in Figure 6.6. Each model comes standard with 64 Mbytes of ECC memory.

Single-high Precision Bus cards include the 8- and 16-channel MUX cards, HP-IB, LAN/9000, Token Ring, X.25/9000 Link, the SCSI adapter, and the SNA Link. These single high cards can be installed in either half of the double-high slots. The HP-FL and FDDI interfaces and the MAP 3.0 Link are double-high cards. MAP 3.0 is a "two double-high" card set and is NOT supported on HP-UX 9.0 based servers.

Figure 6.2 Model I30/I40/I50 Business Server Layout

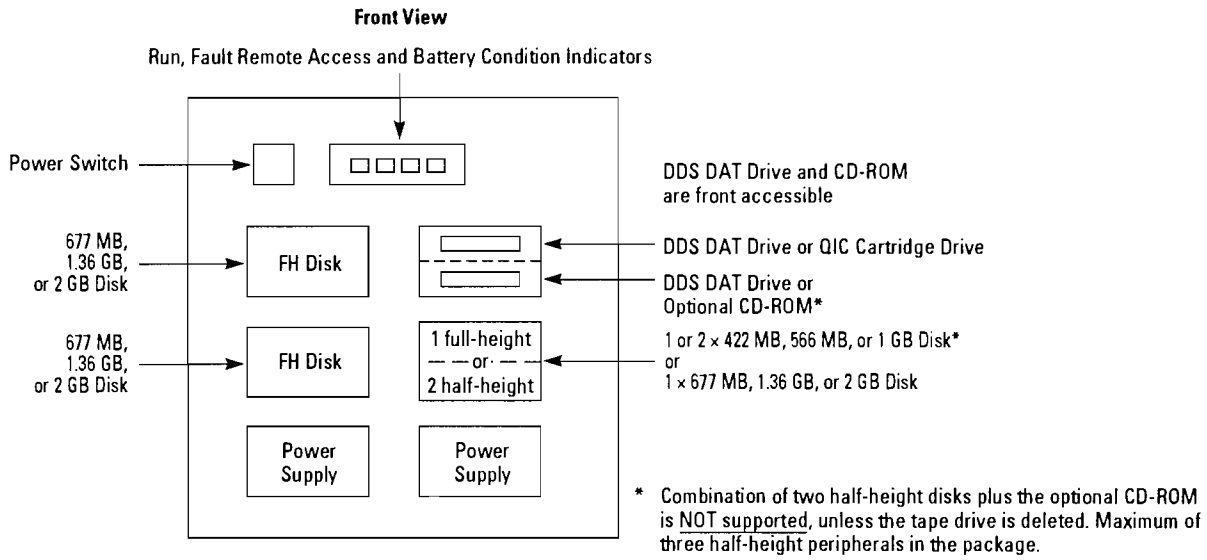
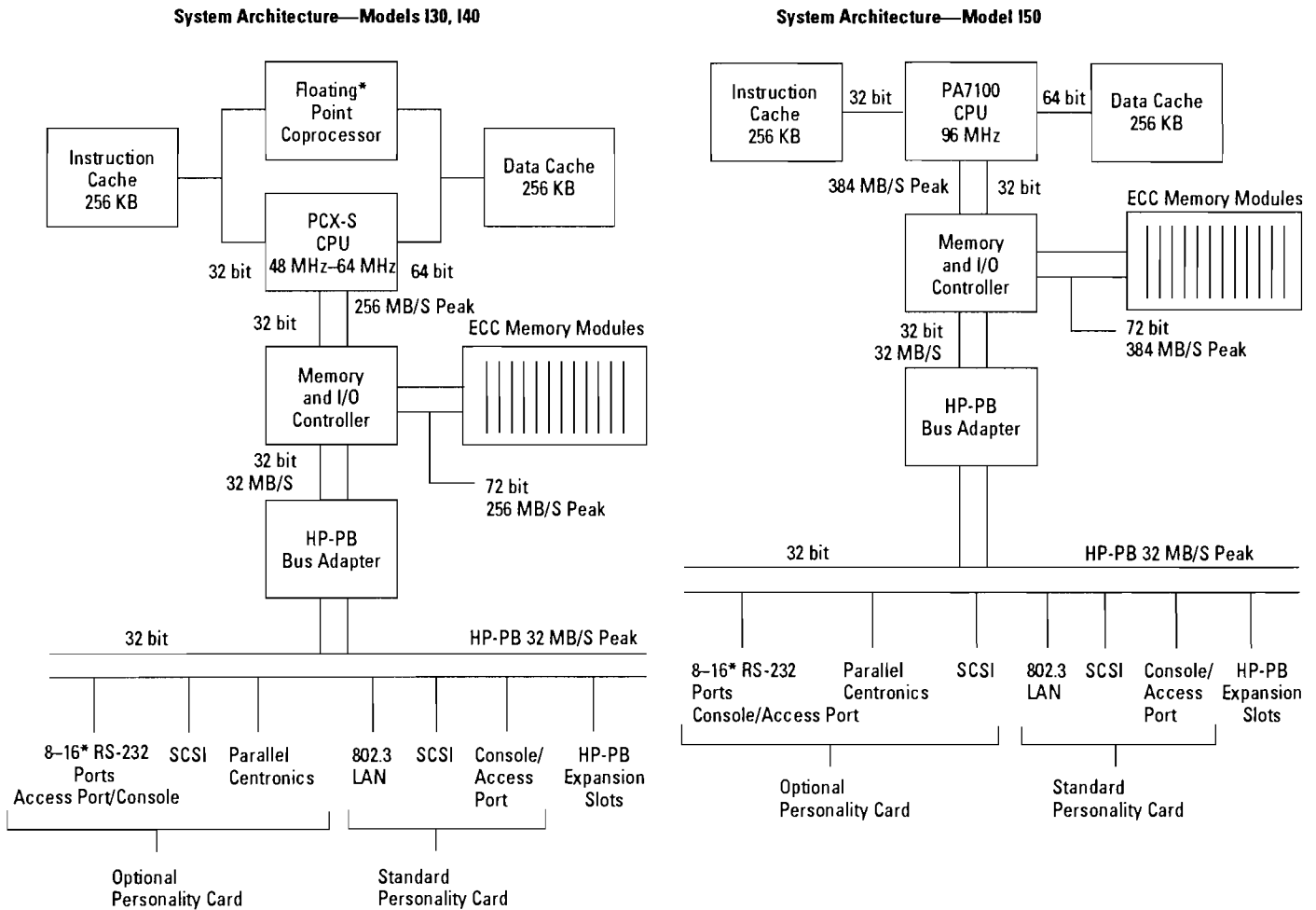


Figure 6.3 Model I30/I40/I50 System BUS Relationships



*Optional

Figure 6.4 I Model Rear View with Standard LAN Personality Card

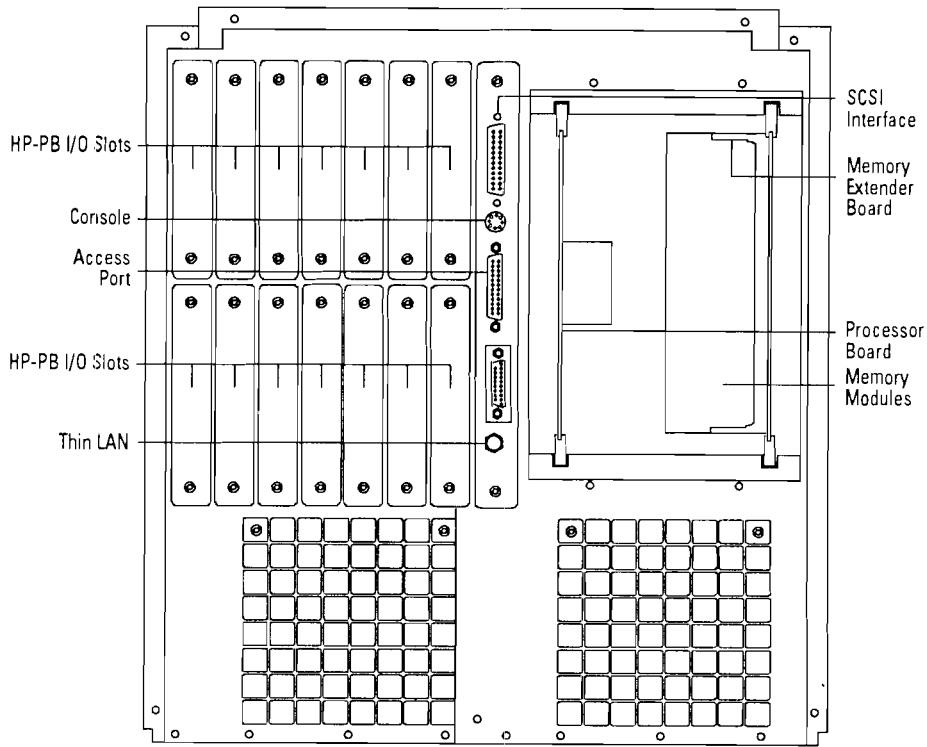


Figure 6.5 I Model Rear View with Optional MUX Personality Card

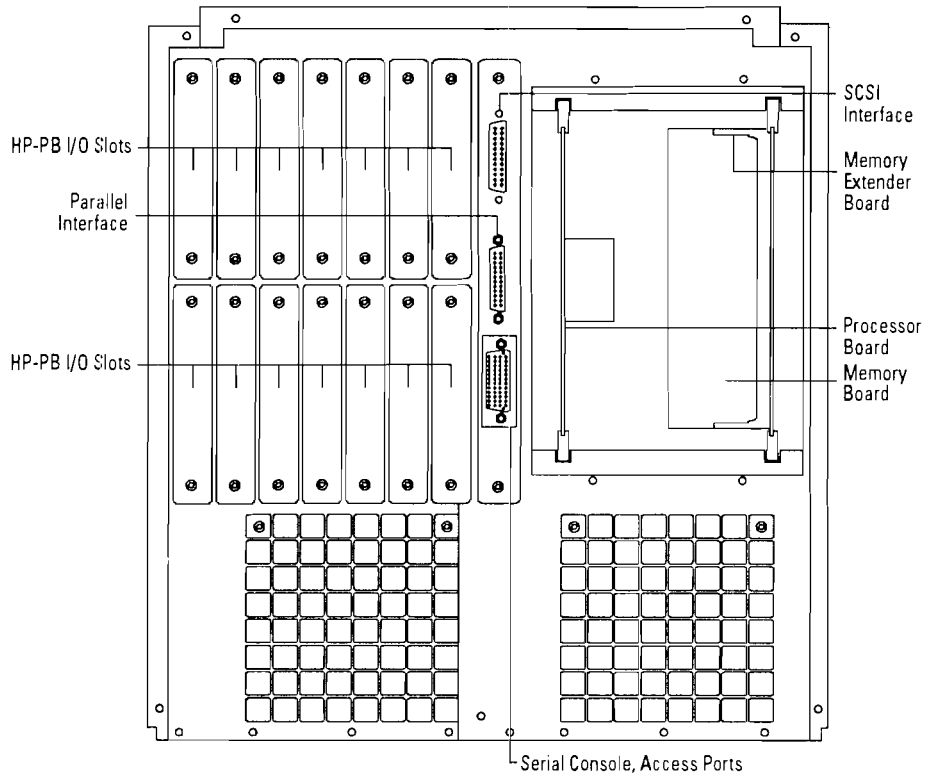
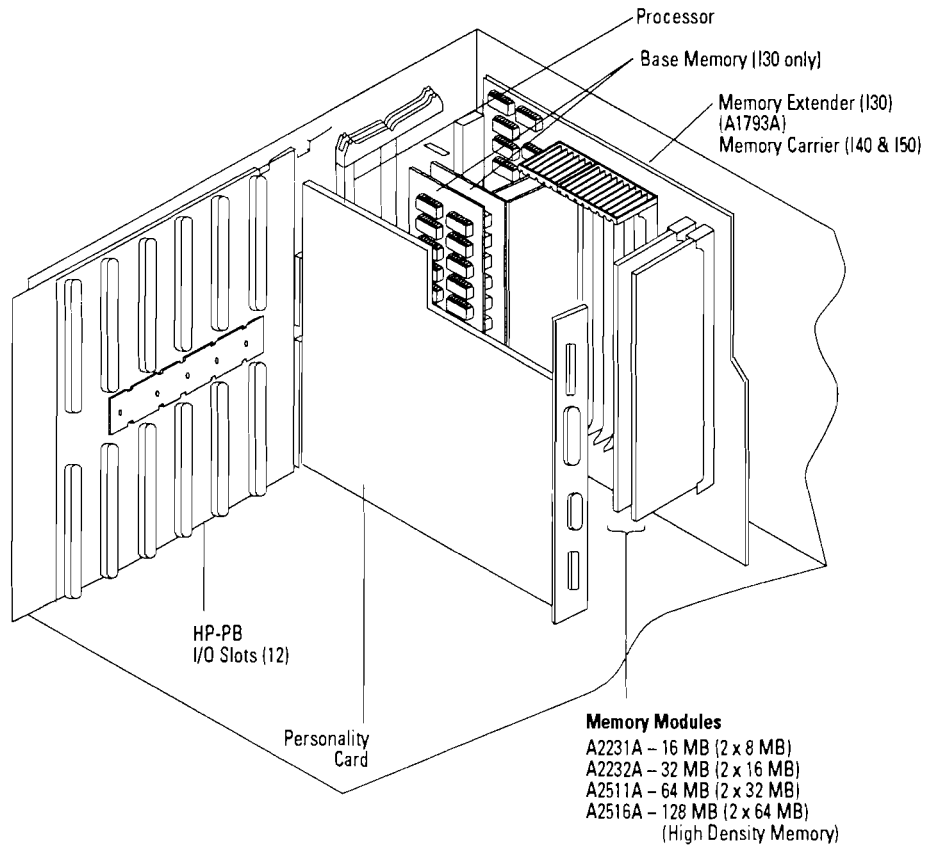


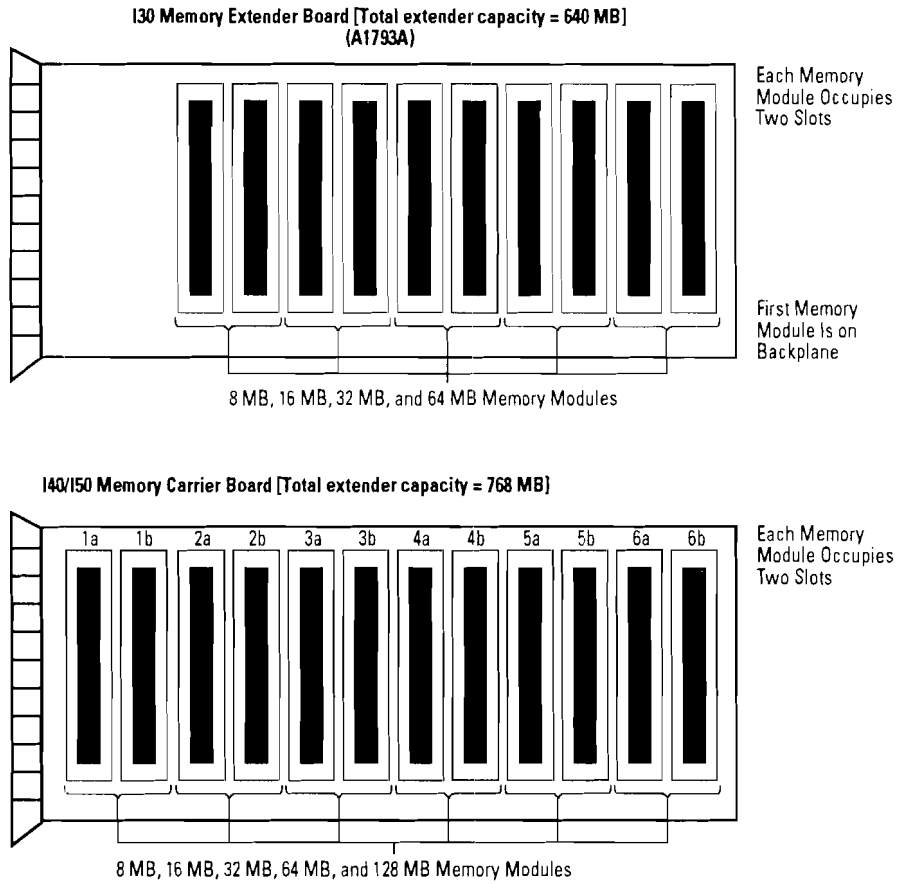
Figure 6.6 Model I30/I40/I50 Memory and I/O Configuration



Notes:

1. Each memory module consists of 2 memory cards.
2. Memory cards must be installed in pairs.
3. Each memory module fills 2 of the 12 memory slots.
4. The first pair of memory cards is installed on the backplane of Model I30.
5. All memory is installed on the memory carrier of Models I40 and I50.

Figure 6.7 Model I30/I40/I50 Memory Extender Board Layout



Model Ixx Memory Configuration

The memory configuration rules described in this section apply to I40 and I50 computer systems.

When installing new memory, or installing an upgrade to one of the systems listed above, the following memory configuration rules must be adhered to or the system may not boot.

1. Common rules for all systems:
 - a. Memory array cards **MUST** be installed in pairs.
 - b. Each memory card installed in a slot pair must be the same size (e.g., 4 MB and 4 MB, 8 MB and 8 MB, 16 MB and 16 MB, 32 MB and 32 MB, or 64 MB and 64 MB).
 - c. When a memory extender card is installed, it has to have at least one memory card pair inserted in it.
2. Rules that apply to I30 computers:
 - a. All common rules.
 - b. Memory pairs can be installed in any paired slot (e.g., 0A and 0B, 4A and 4B, etc.)
3. Rules that apply to I40 and I50 computers. When installing memory (any type) follow this specific insertion order:
 - a. First memory pair into extender slot 5A/5B
 - b. Second memory pair into extender slot 0A/0B
 - c. Third memory pair into extender slot 4A/4B
 - d. Fourth memory pair into extender slot 1A/1B
 - e. Fifth memory pair into extender slot 3A/3B
 - f. Sixth memory pair into extender slot 2A/2B

- g. If the memory package you are dealing with contains any 8 MB SIMMS (A2232A 16 MB), they need to be the last pair(s) installed.

Model I30, I40, and I50 Configuration Guidelines

The Model I30, I40, and I50 Business Servers provide customers a broad range of mass storage and I/O options. Mass storage options in the package include faster next-generation disk drives, larger capacity Digital Audio Tape (DAT) drives, a Quarter-inch Cartridge (QIC) tape drive, and a CD-ROM drive. I/O options include a choice of personality cards to tailor systems for both LAN and MUX environments as well as a broad range of HP-PB cards.

While most customers will find their configurations can be supported without modification, some unusual configurations exist which exceed the available power of the systems. Therefore, the following configuration rules must be checked to verify the system is supported and that it will operate reliably.

To use the power table and worksheet:

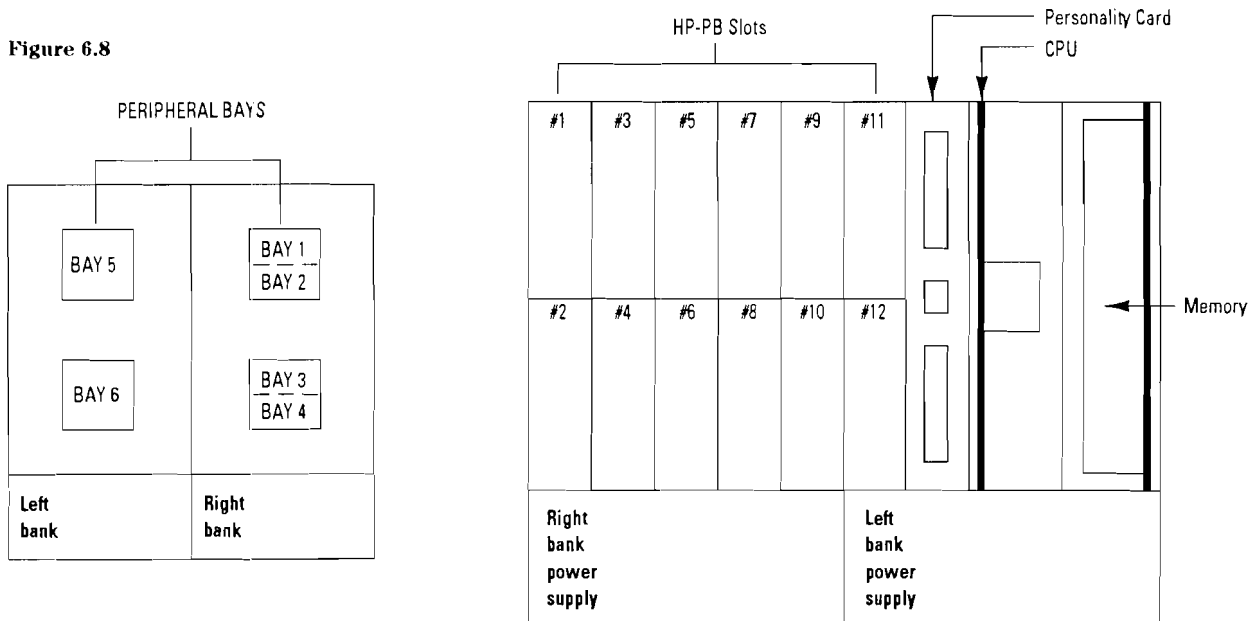
- a. Confirm the configuration does not exceed the maximum number of peripherals and I/O cards supported in the system.

- b. Note the current required by the configuration's personality card, removable media devices, disk drives, and I/O cards provided in the power table.
- c. Insert the +12V, +5V, and -12V current required by the selected personality card into the worksheet row titled "personality card."
- d. If a tape backup device is present, insert the +12V, +5V, and -12V current required by the selected DAT or QIC tape drive into the worksheet row titled "Internal Peripherals Bay 1."
- e. If a CD-ROM or a second DAT drive is present, insert the +12V, +5V, and -12V current required by the drive into the worksheet row titled "Internal Peripherals Bay 2."
- f. If one or two half-height disk drives are present, insert the +12V +5V, and -12V current required by the first drive into the worksheet row titled "Internal Peripherals Bay 3" and the current for the second drive into the worksheet row titled "Internal Peripherals Bay 4."
- g. When full-height disk drives are used, insert the +12V, +5V, and -12V current required by the drives into the worksheet rows titled "Internal Peripherals Bay 3, Bay 5 and Bay 6." Do not use the row titled "Internal Peripherals Bay 4" for a full-height drive.

Table 6.1 Power Table

	Personality Card, I/O Card, and Peripheral Current Requirements (Amps)			Maximum Supported Number of Personality Cards, I/O Cards, and Peripherals
	+12V	+5V	-12V	I Series
Personality card				1 max
LAN/SCSI	0.55	3.38	0.03	1
MUX/SCSI	0.50	1.70	0.02	1
Internal peripherals				5 max
2 GB DAT	0.75	1.00	0.00	1
4–8 GB DAT	0.75	1.00	0.00	1
QIC	1.50	1.00	0.00	1
CD-ROM	0.85	0.90	0.00	1
422 MB half-height disk	0.65	1.25	0.00	2
566 MB half-height disk	0.82	1.00	0.00	2
1 GB half-height disk	0.82	1.00	0.00	2
677 MB full-height disk	2.30	1.90	0.00	3
1.3 GB full-height disk	2.30	1.90	0.00	3
2 GB full-height disk	2.70	1.30	0.00	3
I/O cards				12 max
8 channel MUX (40299B)	0.16	1.40	0.13	12
16 channel RS-232 direct connect MUX (J2092A)	0.08	1.10	0.08	12
16 channel RS-423 direct connect MUX (J2093A)	0.20	1.10	0.15	12
16 channel RS-232 modem connect MUX (J2094A)	0.30	1.70	0.15	12
802.3 LAN (J2146A)	0.50	2.13	0.00	7
802.5 LAN (J2166A)	0.00	1.66	0.00	5
FDDI (J2157A)	0.00	3.70	0.00	2
SCSI (28655A)	0.00	0.90	0.00	12
HP-IB (28650A)	0.00	2.10	0.00	2
PBA-FL (A1749A)	0.08	6.77	0.07	2
HP-PB FL (28615A)	0.04	3.93	0.05	4
X.25 (36960A)	0.08	2.36	0.09	7
SNA (J2220A, 98173A, and 98174A)	0.08	2.36	0.09	10

Figure 6.8



- h. Insert the +12V, +5V, and -12V current required by the selected I/O cards into the worksheet row titled "I/O cards Slots 1 through 12." If double-high cards (FDDI and HP-FL) are used, insert the current values in odd numbered slots and leave the following even numbered slot empty.
- i. Sum the total amount of +12V, +5V, and -12V current required for the configuration.
- j. Compare the total amount of +12V, +5V, and -12V current required for the configuration to the available current.

If the current used by the configuration is less than the current available, the system is supported. Also, if the configuration exceeds the available current by less than 5%, it is supported. (Worst-case current usage is assumed for all cards and drives—the 5% exposure factor is allowed since the typical current values for cards and drives will be lower than their worst-case values).

If the configuration exceeds the available current by more than 5%, it must be modified to be supported.

All combinations of I/O cards can be supported by taking the following steps to:

- a. If possible, move the full-height disk drive from Bay 3 to Bay 5 or 6 to reduce the load on the right bank power supply. Recalculate the configuration with Peripheral Bays 3 and 4 empty.
- b. If moving drives from Peripheral Bay 3 is not viable, an external mass storage system must be used to reduce the peripheral load in the system. By moving one or more peripherals from the internal peripheral bays 1 through 4, the peripheral current load on the right bank power supply will be reduced below the available level and the configuration will be supported.

**Table 6.2 Configuration Worksheet—
HP 9000 Series 800 Models I30, I40, and I50**

	Left Bank			Right Bank			
	+12V	+5V	-12V	+12V	+5V	-12V	
Personality card							LAN/SCSI or MUX/SCSI card
Internal peripherals							
Bay 1							DAT or QIC tape drive
Bay 2							DAT, QIC, or CD-ROM drive
Bay 3							1 full-height disk or
Bay 4							1 or 2 half-height disks
Bay 5							1 full-height disk
Bay 6							1 full-height disk
I/O cards							
Slot 1							Any supported I/O card
Slot 2							Any supported I/O card
Slot 3							Any supported I/O card
Slot 4							Any supported I/O card
Slot 5							Any supported I/O card
Slot 6							Any supported I/O card
Slot 7							Any supported I/O card
Slot 8							Any supported I/O card
Slot 9							Any supported I/O card
Slot 10							Any supported I/O card
Slot 11							Any supported I/O card
Slot 12							Any supported I/O card
Total current used	0.00	0.00	0.00	0.00	0.00	0.00	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Example

Configuration requires the following:

- MUX/SCSI personality card
- QIC tape drive
- 2 GB DAT drive
- One 2 GB disk drive
- Six J2094A MUXes
- Two J2092A MUXes
- Two HP-PB FL cards

Since the configuration is below the maximums supported for each component, note the current each component requires.

	+12A	+5V	-12V
MUX/SCSI Personality card	.50A	1.70A	.02A
QIC tape drive	1.50A	1.00A	.00A
2 GB DAT drive	.75A	1.00A	.00A
2 GB disk drive	2.70A	1.30A	.00A
J2094A MUX	.30A	1.70A	.15A
J2092A MUX	.08A	1.10A	.08A
HP-PB FL card	.04A	3.93A	.05A

Insert the current values into the worksheet as shown. Note that the +12V current on the right bank power is over the available current by more than 5%. Therefore, this configuration is NOT supported.

Table 6.3 Example Configuration Worksheet—HP 9000 Series 800 Models I30, I40, and I50

	Left Bank			Right Bank			
	'+12V'	'+5V'	'-12V'	'+12V'	'+5V'	'-12V'	
Personality card				0.50	1.70	0.02	MUX/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.75	1.00	0.00	DAT drive
Bay 3				2.70	1.30	0.00	2 GB full-height disk
Bay 4							
Bay 5							
Bay 6							
I/O cards							
Slot 1				0.30	1.70	0.15	J2094A MUX
Slot 2				0.30	1.70	0.15	J2094A MUX
Slot 3				0.30	1.70	0.15	J2094A MUX
Slot 4				0.30	1.70	0.15	J2094A MUX
Slot 5			0.15	0.30	1.70		J2094A MUX
Slot 6			0.15	0.30	1.70		J2094A MUX
Slot 7			0.08	0.08	1.10		J2092A MUX
Slot 8			0.08	0.08	1.10		J2092A MUX
Slot 9	0.04		0.05		3.93		HP-PB FL
Slot 10							
Slot 11	0.04	3.93	0.05				HP-PB FL
Slot 12							
Total current used	0.08	3.93	0.56	7.41	21.33	0.62	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Note that the left bank power still has available current and that peripheral bay 6 is unused. Moving the disk drive from bay 3 to bay 6 and recalculating power results in all current values below the available current. Therefore, simply by moving the disk drive, the configuration is supported.

Table 6.4 Example Configuration Worksheet—HP 9000 Series 800 Models I30, I40, and I50

	Left Bank			Right Bank			
	+12V	+5V	-12V	+12V	+5V	-12V	
Personality card				0.50	1.70	0.02	MUX/SCSI card
Internal peripherals							
Bay 1				1.50	1.00	0.00	QIC tape drive
Bay 2				0.75	1.00	0.00	DAT drive
Bay 3							
Bay 4							
Bay 5	2.70	1.30	0.00				2 GB full-height disk
Bay 6							
I/O cards							
Slot 1				0.30	1.70	0.15	J2094A MUX
Slot 2				0.30	1.70	0.15	J2094A MUX
Slot 3				0.30	1.70	0.15	J2094A MUX
Slot 4				0.30	1.70	0.15	J2094A MUX
Slot 5			0.15	0.30	1.70		J2094A MUX
Slot 6			0.15	0.30	1.70		J2094A MUX
Slot 7			0.08	0.08	1.10		J2092A MUX
Slot 8			0.08	0.08	1.10		J2092A MUX
Slot 9	0.04		0.05		3.93		HP-PB FL
Slot 10							
Slot 11	0.04	3.93	0.05				HP-PB FL
Slot 12							
Total current used	2.78	5.23	0.56	4.71	20.03	0.62	
Available current	6.27	6.80	1.50	6.27	27.00	1.50	

Product Summary

Product/ Opt. No.	Description
A2431A	<p>HP 9000/800 I Class Business Servers</p> <p><i>Standard server includes:</i></p> <ul style="list-style-type: none"> • Integrated chassis with two (12) single high HP-PB slots • Factory installation of memory, disks, back-up media and I/O • One year on-site warranty <p><i>Order desired SPU option. The following standard items may be included with the SPU at no extra charge:</i></p> <ul style="list-style-type: none"> • 2 GB embedded disk drive (requires HP-UX 9.0) • 64 MB ECC memory • 2.0 GB DDS drive • Pre-loaded HP-UX operating system with 2-user license plus TCP/IP, ARPA, and NFS services • LAN/SCSI/RS-232 personality card (requires HP-UX 9.0) with: <ul style="list-style-type: none"> – 802.3 ThinLAN interface – Single-ended (S.E.) SCSI interface – 2 RS-232 ports for console terminal and remote access • HP 700/96 console terminal • Owner's Guide and General Usage documentation set <p><i>Refer to the following ordering sections to select standard or alternate items</i></p>
	<p><i>Select SPU (Must select ONE only)</i></p> <p>A2365A Model I30 48 MHz PA-RISC SPU w/256 KB–256 KB cache</p> <p>A2364A Model I40 64 MHz PA-RISC SPU w/256 KB–256 KB cache</p> <p>A2363A Model I50 96 MHz PA-RISC SPU w/256 KB–256 KB cache</p>
	<p><i>Select a System Support Option</i></p> <p>#OS0 License/Next Day System Support—1 yr.</p> <p>#OS1 License/Same Day System Support—1 yr.</p> <p>#OS2 Telephone/Next Day System Support—1 yr.</p> <p>#OS3 Telephone/Same Day System Support—1 yr.</p> <p>#OS4 Installation and Network Configuration</p> <p>#OSZ Network Configuration</p> <p>Refer to the HP 9000 Series 800 Price Guide for warranty options.</p>
A2293A #ODV	Optional—Select floating point coprocessor (select ONE only)
A2293A #ODW	48 MHz floating point coprocessor for Model I30 only
	64 MHz floating point coprocessor for Model I40 only
A2440A #APH	<i>Select pre-loaded HP-UX OS version (Must select ONE only)</i>
	HP-UX 9.0 with 2-user license
	HP-UX 8.02 with 2-user license
	Media must be ordered separately, P/N B3108L. One media copy required per customer site.
	<i>Select localization of system documentation (Must select ONE only)</i>
	#ABA System documentation in English
	#ABC System documentation in German
	#ABD System documentation in French/Canadian
	#ABJ System documentation in Japanese
A2368A	<i>Pre-selected chassis and optional battery back-up</i>
	Pre-selected chassis
	#OE1 Optional—Add powerfail battery back-up
C2798AZ	<i>Optional—select rack mount kit for installation into factory integrated 1.6M or 1.1M racks. (Integrated racks must be ordered on the same P.O./P.O. section)</i>
	Add rack mount kit
A2441A #ODS	<i>Select personality card (Must select ONE only)</i>
	Standard LAN personality card: 802.3 ThinLAN, 2 RS-232 ports for console and remote access, single-ended SCSI. (Requires HP-UX 9.0)
A2442A #ODS	Replace standard with 8-port MUX personality card: 8 modem, RS-232 ports, single-ended SCSI and parallel port
A2442A #ODT	Replace standard with 16 port MUX personality card: 8 modem, 8 DC RS-232 ports, single-ended SCSI and parallel port. (Note for options ODS and ODT: RS-232 ports include console and access ports.)

Product Summary (cont'd)

Product/ Opt. No.	Description
	<i>Select base memory (Must select ONE only)</i>
A2511AZ #0DS	Standard 64 MB base memory
A2516AZ #0DV	Replace base memory with 128 MB module (Requires HP-UX 9.0)
	<i>Additional memory (Select up to five modules, total. Maximum 384 MB for I30, I40, 768 for I50.)</i>
A2231AZ #0DZ	16 MB memory module
A2232AZ #0DZ	32 MB memory module
A2511AZ #0DZ	64 MB memory module
A2516AZ #0DZ	128 MB memory module (requires HP-UX 9.0)
	<i>Select base disk (Must select ONE)</i>
A2446A #0DS	Standard base 2 GB half height disk (requires HP-UX 9.0)
A2443A #703	Delete 2 GB base disk (diskless not supported, alternate disk required)
	<i>Select alternate/additional internal disks</i>
	<i>Maximum 2 half-height and 2 full-height devices or 3 full-height devices</i>
A2444A #0DZ	Add 566 MB half-height disk (requires HP-UX 9.0)
A2445A #0DZ	Add 1 GB half-height disk (requires HP-UX 9.0)
A2446A #0DZ	Add 2 GB full-height disk (requires HP-UX 9.0)
C2472SZ #0DZ	Add 422 MB half-height disk
C2473SZ #0DZ	Add 677 MB full-height disk
C2474SZ #0DZ	Add 1.3 GB full-height disk
	<i>Select back-up storage device (Must select ONE)</i>
C2477SZ #0DS	Standard 2 GB DDS DAT (half-height)
A2443A #700	Delete standard 2 GB DDS DAT
	<i>Select alternate/additional back-up storage device</i>
	<i>Maximum 1 half-height or 1 full-height device</i>
C2478SZ #0DZ	Add 4-8 GB DDS DAT drive (half-height)
C2476SZ #0DZ	Add CD-ROM (half-height)
A2311AZ #0DZ	Add 525 MB Quarter Inch Cartridge (QIC) drive (half-height)
	<i>Optional—Select system console terminal (Limit to ONE only)</i>
	<i>Specify appropriate keyboard localization option.</i>
C1064GZ #___	HP 700/96 console terminal w/Green screen
C1064AZ #___	HP 700/96 console terminal w/Amber screen
C1064WZ #___	HP 700/96 console terminal w/Soft-white screen
	<i>Optional—Select I/O and networking cards</i>
J2092AZ #0DZ	16 port RS-232 direct connect single high MUX
28655A #0DZ	S.E. SCSI interface w/parallel port single high card
J2146A #ODM	802.3 ThinLAN/9000 interface single high card
J2166A #AU3	802.5 Token ring interface single high card
J2250A	Token ring back-up media and documentation
28650B #0DZ	HP-IB interface single high card
36960A #0DQ	X.25 link with RS-232-C interface single high card
36960A #ODR	X.25 link with V.35 interface single high card
A2321A	X.25 back-up media and documentation
	<i>Optional—Select end-user terminal</i>
	<i>Specify appropriate keyboard localization option</i>
C1080A #___	HP 700/60 Ergonomic terminal w/Amber screen
C1080G #___	HP 700/60 Ergonomic terminal w/Green screen
C1080W #___	HP 700/60 Ergonomic terminal w/Soft-white screen
C1083W #___	HP 700/60ES Ergonomic terminal w/Soft-white screen

Other disk products may be ordered from price list but will not include factory integration in SPU chassis.

Section 7

Model Fxx, Gxx, Hxx, and Ixx Family Upgrades

The Models Fxx, Gxx, Hxx, and Ixx family upgrades consist of processor board swaps to increase performance and chassis swaps to increase I/O expandability. Customer investment is fully protected as memory, disks, DDS DAT drives and I/O cards all transfer in the upgrade. Further, all the upgrade products are installed at the customer site minimizing inconvenience and downtime. The following rules apply for the upgrade products:

- Model F10, F20, F30, G30, G40, H20, H30, H40, I30, and I40 Business Servers require HP-UX 8.02 or later. Models G50, H50, and I50 require HP-UX 9.0 or later. HP-UX version updates are provided automatically to customers subscribing to software update services. Other customers must purchase the latest HP-UX version.

- When upgrading to a 64 or 96 MHz processor-based system (867, 877, 887, 897, and G/H/I 40 and 50 systems) memory configuration rules apply. See page 59 for details.
- System software and networking licenses (if any) must be upgraded if the Series 800 upgrade moves the customer to a new software tier.
- The replaced CPU board and/or chassis resulting from any Series 800 upgrade is the property of Hewlett-Packard. The replaced parts must be returned in the packaging material supplied with the upgrade to the following address:

Hewlett-Packard (SMO)
UPGRADE RETURNS
3625 Cincinnati Avenue
Rocklin, CA 95677

Use the pre-paid label if provided.

Note: Pre-paid return is not available in all countries. If the customer's upgrade kit does not contain a country-approved pre-paid label, please ensure that all components are returned to Order Processing Department of the local HP sales office.

- All chassis upgrades support Powerfail Battery Backup.

Note: For U.S. prices of upgrades refer to the HP 9000 Series 800 Business Server Price Guide (P/N 5091-5686E).

Model Fxx, Gxx, Hxx, Ixx Upgrade Matrix*

From	To	Part No./ Opt. No.	To	Part No./ Opt. No.	To	Part No./ Opt. No.	To	Part No./ Opt. No.
F10/807S	F20	SSP# A2451A A2453A/860	F30	SSP# A2451A A2452A/860	G3	SSP# A2454A A2457A/860		
F20/817S	F30	SSP# A2451A A2452A/861	G30	SSP# A2454A A2457A/861				
F30/837S	G30	SSP# A2454A A2457A/863	G40	SSP# A2454A A2456A/863				
G30	G40	SSP# A2454A A2456A/864	G50	SSP# A2454A A2455A/864	H30	SSP# A2458A A2461A/864	H40	SSP# A2458A A2460A/864
G40	G50	SSP# A2458A A2455A/865	H40	SSP# A2458A A2460A/865	H50	SSP# A2458A A2459A/865		
G50	H50	SSP# A2458A A2459A/866						
H20	H30	SSP# A2458A A2461A/868	H40	SSP# A2458A A2460A/868	H50	SSP# A2458A A2459A/868	I30	SSP# A2462A A2465A/868
H30	H40	SSP# A2458A A2460A/869	H50	SSP# A2458A A2459A/869	I30	SSP# A2462A A2465A/869	I40	SSP# A2462A A2464A/869
H40	H50	SSP# A2458A A2459A/870	I40	SSP# A2462A A2464A/870	I50	SSP# A2462A A2463A/870		
H50	I50	SSP# A2462A A2463A/871						
I30/857S	I40	SSP# A2462A A2464A/872	I50	SSP# A2462A A2463A/872				
I40/877S	I50	SSP# A2462A A2463A/873						
807S	817S	A1898A/860**	827S	A1899A/860**				
817S	837S	A2290A/861**	847S	A2291A/861**				
827S	847S	A2291A/862						
827S	H30	SSP# A2458A A2461A/827	H40	SSP# A2458A A2460A/827	H50	SSP# A2458A A2459A/827	I30	SSP# A2462A A2465A/827
837S	847S	A2291A/863**						
847S	857S	A2292A/864	867S	A2297A/864				
847S	H40	SSP# A2458A A2460A/847	H50	SSP# A2458A A2459A/847	I30	SSP# A2462A A2465A/847	I40	SSP# A2462A A2464A/847
857S	877S	A2298A/865						
867S	877S	A2298A/866	887S	A2320A/866				
867S	H50	SSP# A2458A A2459A/867	I40	SSP# A2462A A2464A/867	I50	SSP# A2462A A2463A/867		
877S	897S	A2319A/867						
887S	897S	A2319A/868						
887S	I50	SSP# A2462A A2463A/887						

* All HP 9000 Series 800 system upgrades require the return of appropriate CPU boards from upgraded systems.

** Upgrade product will be removed from CPL effective January 1, 1993.

Upgrade Memory Configuration

The memory configuration rules described in this section apply to HP 9000 Model 867S/877S/887S/897S and G40/G50/H40/H50/I40/I50 Business Servers. When installing new memory, or installing an upgrade to one of the systems listed above, the following memory configuration rules must be adhered to or the system may not boot.

1. Common rules for all systems:
 - a. Memory array cards **MUST** be installed in pairs.
 - b. Each memory card installed in a slot pair must be the same size (e.g., 4 MB and 4 MB, 8 MB and 8 MB, 16 MB and 16 MB, 32 MB and 32 MB, or 64 MB and 64 MB).
 - c. When a memory extender card is installed, it has to have at least one memory card pair inserted in it.
2. Rules that apply to HP 9000 807S/817S/827S/837S/847S/857S and F, G, H, and I 10, 20, and 30 computers:
 - a. All common rules.
 - b. Memory pairs can be installed in any paired slot (e.g., 0A and 0B, 4A and 4B, etc.)
3. Rules that apply to HP 9000 867S/877S/887S/897S and G, H, and I 40 and 50 computers. When installing memory (any type) follow this specific insertion order:
 - a. First memory pair into extender slot 5A/5B
 - b. Second memory pair into extender slot 0A/0B
 - c. Third memory pair into extender slot 4A/4B
 - d. Fourth memory pair into extender slot 1A/1B
 - e. Fifth memory pair into extender slot 3A/3B
 - f. Sixth memory pair into extender slot 2A/2B
 - g. If the memory package you are dealing with contains any 8 MB SIMMS (A2232A 16 MB), they need to be the last pair(s) installed.

Product Summary

Product No./ Opt. No.	Description
SSP# A2451A	HP 9000 Series 800 F Class Upgrades <i>Must choose ONE upgrade selection only:</i>
A2452A	Model F30 Upgrade Upgrade includes: 48 MHz PA-RISC CPU w/512 KB cache Opt. 860 Upgrade from Model F10/807S Opt. 861 Upgrade from Model F20/817S
A2453A	Model F20 Upgrade Upgrade includes: 48 MHz PA-RISC CPU w/128 KB cache Opt. 817 Upgrade from Model F10/817S
Memory options:	
A2231A	Add 16 MB ECC memory
A2232A	Add 32 MB ECC memory
A2511A	Add 64 MB ECC memory
A2416A	Add 128 MB ECC memory

Product No./ Opt. No.	Description
SSP# A2454A	HP 9000 Series 800 G Class Upgrades <i>Must select ONE upgrade option only:</i>
A2455A	Model G50 Upgrade Upgrade includes: 96 MHz PA-RISC CPU w/256 KB cache (Requires HP-UX 9.0) Opt. 864 Upgrade from Model G30 Opt. 866 Upgrade from Model G40
A2456A	Model G40 Upgrade Upgrade includes: 64 MHz PA-RISC CPU w/512 KB cache and Floating Point Opt. 864 Upgrade from Model G30
Upgrades from F class servers:	
A2368A Opt. 001	Chassis (pre-selected)
A2456A	Model G40 Upgrade Upgrade includes: 64 MHz PA-RISC CPU w/512 KB cache Backplane w/four HP-PB slots Opt. 863 Upgrade from Model F30/837
A2457A	Model G30 Upgrade Upgrade includes: 48 MHz PA-RISC CPU w/512 KB cache Backplane w/four HP-PB slots Opt. 860 Upgrade from Model F10/807S Opt. 861 Upgrade from Model F20/817S Opt. 863 Upgrade from Model F30/837S
Memory options:	
A2231A	Add 16 MB ECC memory
A2232A	Add 32 MB ECC memory
A2511A	Add 64 MB ECC memory
A2416A	Add 128 MB ECC memory

Product Summary (cont'd)

Product No./ Opt. No.	Description
SSP# A2458A	HP 9000 Series 800 H Class Upgrades <i>Must select ONE upgrade option only:</i>
A2459A	Model H50 Upgrade Upgrade includes: 96 MHz PA-RISC CPU w/256 KB cache and Floating Point Backplane w/eight HP-PB slots
Opt. 860	Upgrade from Model H20
Opt. 861	Upgrade from Model H30
Opt. 862	Upgrade from Model H40
Opt. 865	Upgrade from Model G40
Opt. 866	Upgrade from Model G50
Opt. 870	Upgrade from Model 827S
Opt. 871	Upgrade from Model 847S
Opt. 872	Upgrade from Model 867S
A2460A	Model H40 Upgrade Upgrade includes: 64 MHz PA-RISC CPU w/512 KB cache
Opt. 860	Upgrade from Model H20
Opt. 861	Upgrade from Model H30
Opt. 864	Upgrade from Model G30
Opt. 865	Upgrade from Model G40
Opt. 870	Upgrade from Model 827S
Opt. 871	Upgrade from Model 847S
A2461A	Model H30 Upgrade Upgrade includes: 48 MHz PA-RISC CPU w/512 KB cache
Opt. 860	Upgrade from Model H20
Opt. 864	Upgrade from Model G30
Opt. 870	Upgrade from Model 827S
Memory options:	
A2231A	Add 16 MB ECC memory
A2232A	Add 32 MB ECC memory
A2511A	Add 64 MB ECC memory
A2416A	Add 128 MB ECC memory

Product No./ Opt. No.	Description
SSP# A2462A	HP 9000 Series 800 I Class Upgrades <i>Must select ONE upgrade option only:</i>
A2463A	Model I50 Upgrade Upgrade includes: 96 MHz PA-RISC CPU w/256 KB cache and Floating Point Backplane w/12 HP-PB slots
Opt. 868	Upgrade from Model I30/857S
Opt. 869	Upgrade from Model I40/877S (No backplane)
Opt. 862	Upgrade from Model H40
Opt. 863	Upgrade from Model H50
Opt. 872	Upgrade from Model 867S
Opt. 875	Upgrade from Model 887S
A2464A	Model I40 Upgrade Upgrade includes: 64 MHz PA-RISC CPU w/512 KB cache
Opt. 868	Upgrade from Model I30/857S
Opt. 861	Upgrade from Model H30
Opt. 862	Upgrade from Model H40
Opt. 871	Upgrade from Model 847S
Opt. 872	Upgrade from Model 867S
A2465A	Model I30 Upgrade Upgrade includes: 48 MHz PA-RISC CPU w/512 KB cache
Opt. 860	Upgrade from Model H20
Opt. 861	Upgrade from Model H30
Opt. 870	Upgrade from Model 827S
Opt. 871	Upgrade from Model 847S
Memory options:	
A2231A	Add 16 MB ECC memory
A2232A	Add 32 MB ECC memory
A2511A	Add 64 MB ECC memory
A2416A	Add 128 MB ECC memory

Section 8

Model Fxx, Gxx, Hxx, and Lxx

Typical Memory and Disk Configuration

The following guidelines will aid in determining typical memory and disk requirements for commercial applications. Remember, the amount of memory and disk required by any particular application environment varies widely. Hence, these are guidelines only. An exact determination of disk and memory requirements can only be made by understanding specific application requirements. Software suppliers, VABs and end user technical personnel can provide the type of information necessary to make exact memory and disk space determinations.

Since SCSI is standard and less expensive than HP-FL, SCSI disk drives should be configured in all situations except where or when extremely heavy loads are expected. For optimal performance in OLTP environments, three to seven disk drives may be connected to a SCSI adapter card with no performance degradation. The choice of whether to configure 422-Mbyte, 566-Mbyte, 677-Mbyte, 1-Gbyte, 1.36-Gbyte, or 2-Gbyte drives is dependent on the application's disk space/spindle requirements and the I/O slots available in the package.

These rules apply to a production environment commercial system. These guidelines are reasonably conservative. Systems may be configured with less memory or disk than shown here if time is spent optimizing the environment. Fxx, Gxx, Hxx, and Lxx model CPUs are much more powerful than the previous low and mid-range products. Thus, more RAM and disk is required than on some discontinued legacy systems, like the 815S or 822S, to maintain a properly balanced system.

Disk Space Requirements

Determination of disk requirements is the sum of the following:

HP-UX Fixed Disk Space Requirements	
+ Swap Space Requirements	
+ Application Disk Space Requirements	
+ Disk Space per User × Number of Connected Users	
<hr/>	
= Total System Disk Space Requirement	

Memory Requirements

Determination of RAM memory requirements is the sum of the following:

HP-UX Fixed RAM Requirements	
+ RAM per User × Number of Active Users	
+ Application Overhead (shared memory, tables, etc.)	
<hr/>	
= Total System RAM Requirement	

- HP-UX Fixed RAM Requirements:
 - HP-UX alone requires 8 MB of RAM. Typically configure 10–15 MB of RAM in total depending on other products loaded (e.g. LAN S/W, X/Windows, NFS, etc.)
- RAM per User Requirements for a Typical Commercial Application:
 - 1/2 MB per user with a non-RDB application
 - 1 MB per user with Informix, INGRES, or Sybase
 - 1.5 MB per user with Oracle (liberal amount)
- Application Overhead:
 - This varies widely depending upon the application and can increase dramatically as a result of tuning to bring larger tables into memory. A good estimate would be 8 MB.

For example, a Series 800 which will support 12 concurrent Informix users and utilize the LAN software would require the following amount of RAM:

HP-UX Fixed RAM	→	10 MB	
+ (RAM/User × Concurrent Users)	→	+ (1 MB × 12 Concurrent Users)	
+ Application Overhead	→	+ 8 MB	
<hr/>			
= RAM Required	→	= 30 MB of RAM Required	

- HP-UX Fixed Disk Space Requirements:
 - 70 MB of Disk Space without LAN S/W
 - 110 MB of Disk Space including LAN S/W
 - Swap Space Requirements:
 - At least equal to RAM installed in the Series 800. A good rule of thumb is 2 times the amount of installed RAM.
- Note: The fixed disk space requirement shown is just for HP-UX. Language compilers, Omniback/Turbo and other HP system software will require additional space. A good rule of thumb, or guideline, is to use a 400–700 MB disk drive for a typical system.*
- Application Disk Space Requirements:
 - No rules of thumb can be applied. This is completely application dependent. This could be measured in GB for an imaging application or MB for simple account data. Look at customer application records to determine the amount of data to be stored. Also include space for the application object programs.

- **Connected User Disk Space Requirements:**
 –Other user file space besides the primary application (e.g. phone book, word processing documents, etc.) This varies greatly again. A good guess would be 15 MB per connected user.

For example, building on the previous memory example, a Series 800 application which will support 24 connected Informix users (12 of which will be active at any given time), utilize the LAN software and require 1 GB of application disk space would require at least the following amount of disk space:

HP-UX Fixed Disk	→	110 MB
+ SWAP	→	+ 60 MB
+ Application Disk Space	→	+ 1,000 MB
+ (Disk Space/User Connected Users)	→	+ (15 MB × 24 Connected Users)
<hr/>		
= Disk Space Required	→	= 1,500 MB of Disk

Optimal Number of Disks per SCSI Adapter Card

Each 28655A SCSI adapter card has a rated maximum data transfer rate of 5 Mbytes per second. Each disk can sustain a maximum of 2 Mbytes per second sequential read.

The maximum combined throughput for multiple disks connected to a single SCSI adapter card is around 2.5 Mbytes per second for sequential or random I/O. Testing has shown that the maximum SCSI adapter card throughput will not be reached before the following number of disks (under worse

case workloads) are attached to the SCSI adapter. The benchmark used was DISKBENCH3 which reads and writes a 16 MB file. Table 8.1 will help decide how many disks to place on a SCSI controller card.

Table 8.1

	Disk Type C2473S/C2474S
Maximum Supported Disks/SCSI Card	7
Minimum # of Disks/SCSI Card Before Bottleneck (Sequential I/O)	3
Minimum # of Disks/SCSI Card Before Bottleneck (Random I/O)	5

Remember, connecting the minimum number of disks/SCSI card shown above assures that under very intense disk access, no SCSI card I/O bottleneck will occur. In actual application environments, a greater number of disks can be supported on each SCSI card if each disk is not expected to work at peak capacity. For example, if an application does mostly random I/O over the entire disk, performance will be limited by head seek times and more disks can be supported on a single adapter card.

The optimal number of disks per SCSI card depends on the applications' utilization of the disks and on customer critical workload paths. For example, if backups, batch or month end processing, which typically utilize sequential I/O disk access heavily, are the critical path, then 3 disks per SCSI card may be the right answer to optimize performance. If electronic mail, which is very

light disk access, is the application, then 7 disks per SCSI card may be possible without degrading performance.

When evaluating the risk/return tradeoff of using a greater number of disks per SCSI card, remember that the cost of an additional SCSI card is very low. (P/N # 28655A).

Will Two Small Disks Perform Better Than One Large Disk?

Choose two small disks for optimal performance instead of one large disk when:

- The application has files that are accessed concurrently which may be separated over multiple disks.
- The customer can afford the additional cost of purchasing two small disks.

Choose one large disk instead of two small disks when:

- Slots are a constraining factor to adding many smaller disks.
- A very price sensitive customer does not require optimal performance. This may be especially true on the low end where multiple disks could substantially increase overall system price.
- A file larger than the small disk under consideration is to be accessed sequentially (no performance gain from splitting this over two disks).

The following other guidelines may be used when working with RDBMs.

1. Each of the following should be placed on separate spindles for optimal performance (high to low priority order):
 - indices (especially indices which are accessed concurrently)
 - logfiles
 - tables which are accessed concurrently
 - table area used by the RDB during sorts
 - HP-UX commands and swap place
 - rollback segments, where applicable

2. Configure a 677 MB or 1.0-Gbyte disk drive as the root spindle and home of the typically 566 MB user file system instead of a 1.35-Gbyte or 2.0-Gbyte disk. This will avoid wasting space and keep customers from placing their files on the same spindle which is not optimal for performance.

SCSI vs. HP-FL

Disks may be connected to Fxx, Gxx, Hxx, Ixx servers using two different types of host adapters, SCSI or HP-FL. Benefits are different for each of these with:

- SCSI providing industry standard features
- HP-FL providing longer distance

Table 8.2 shows the sustainable file system disk performance measured with various SCSI and HP-FL drives connected to an I30. All measurements were made using the DISKBENCH4 benchmark developed by

Hewlett-Packard. File system rotational delay was set to 1 ms. to provide balanced sequential read and write performance. An 8K/1K file system was used with a 16 Mbyte file except in the case of the C2254HA, which requires a minimum 2K block size. DISKBENCH4 measures actual physical disk I/O rates. Applications generally see much greater throughput rates due to HP-UX software disk caching.

Note: When comparing the results in Table 8.2 with other disk performance numbers, be sure to determine whether the other values represent true sustainable physical disk I/O and are not distorted by memory caching.

Buffercache “Disk” Performance

HP-UX maintains a pool of disk buffers known as the buffercache. Application performance improves dramatically when disk reads and writes can be satisfied by the in memory buffercache instead of doing an actually physical disk I/O. Table 8.3 shows the typical Fxx/Gxx/Hxx/Ixx buffercache throughput using the DISKBENCH3 benchmark.

Table 8.2 i30 Sustained HP-UX File System Disk Throughput (No Caching)

Disk Model	Disk Type	Storage Mbytes	Seq. Read KB/Sec.	Seq. Write KB/Sec.	Ran. Read KB/Sec.	Ran. Write KB/Sec.
C2201A	HP-FL	670	712	440	460	632
C225XB	HP-FL	1355	680	410	529	626
C2254HA	HP-FL	5420	1140	468	591	661
C2472S	SCSI	422	920	680	550	430
C2473S	SCSI	677	1010	550	582	724
C2474S	SCSI	1355	(Performance not measured, similar to C2473S)			
C3010	SCSI	2003	2560	1460	706	681*
C2247M1	SCSI	1052	2500	1440	617	714*
TBD	SCSI	566	(Performance not measured, similar to C2247M1)			

*Results based on preliminary measurement w/prototype disk mechanisms.

Table 8.3 Typical Buffercache Performance with HP-UX

SPU Model	80K Read MB/Sec.	512K Read MB/Sec.	80K Write MB/Sec.	8K Read MB/Sec.
F10	15	11	11	10
F20	29	21	20	20
F30	53	30	29	28
H20	29	21	20	20
G30, H30	53	30	29	28
G40, H40	70	39	37	38
G50, H50	TBD	TBD	TBD	TBD
I30	53	39	29	28
I40	70	39	37	38
I50	TBD	TBD	TBD	TBD

Choosing the Right Disk Drives

SCSI disk drives offer better price/performance than HP-FL, therefore they should be the preferred disk solution for Fxx, Gxx, Hxx, and Ixx servers except in the following situations:

1. Disks must be located long distances from the CPU. The maximum SCSI cable length is 6 meters while HP-FL can provide 100 meters. While SCSI extender products do exist, they are not normally recommended for use with disks due to performance degradation.
2. Disk array is required. The HP225x disk array products only support HP-FL.
3. Existing customer HP-FL disk drives are to be used on Fxx, Gxx, Hxx, and Ixx servers instead of purchasing new ones.
4. System is expected to experience very heavy loads, saturating the processor. Under these conditions, HP-FL disks outperform SCSI disks by up to 20%.

Note: While older disk drives will function on Fxx/Gxx/Hxx/Ixx servers, they may limit the overall system performance. The processing power of the Fxx/Gxx/Hxx/Ixx product family is much greater than previous entry-level and mid-range systems.

Improving Disk Performance With Immediate Reporting

The C247x SCSI disk drives have a new feature called immediate reporting which can significantly improve overall system performance in some applications. Immediate reporting allows the software application to continue processing without waiting for the actual physical disk I/O to complete.

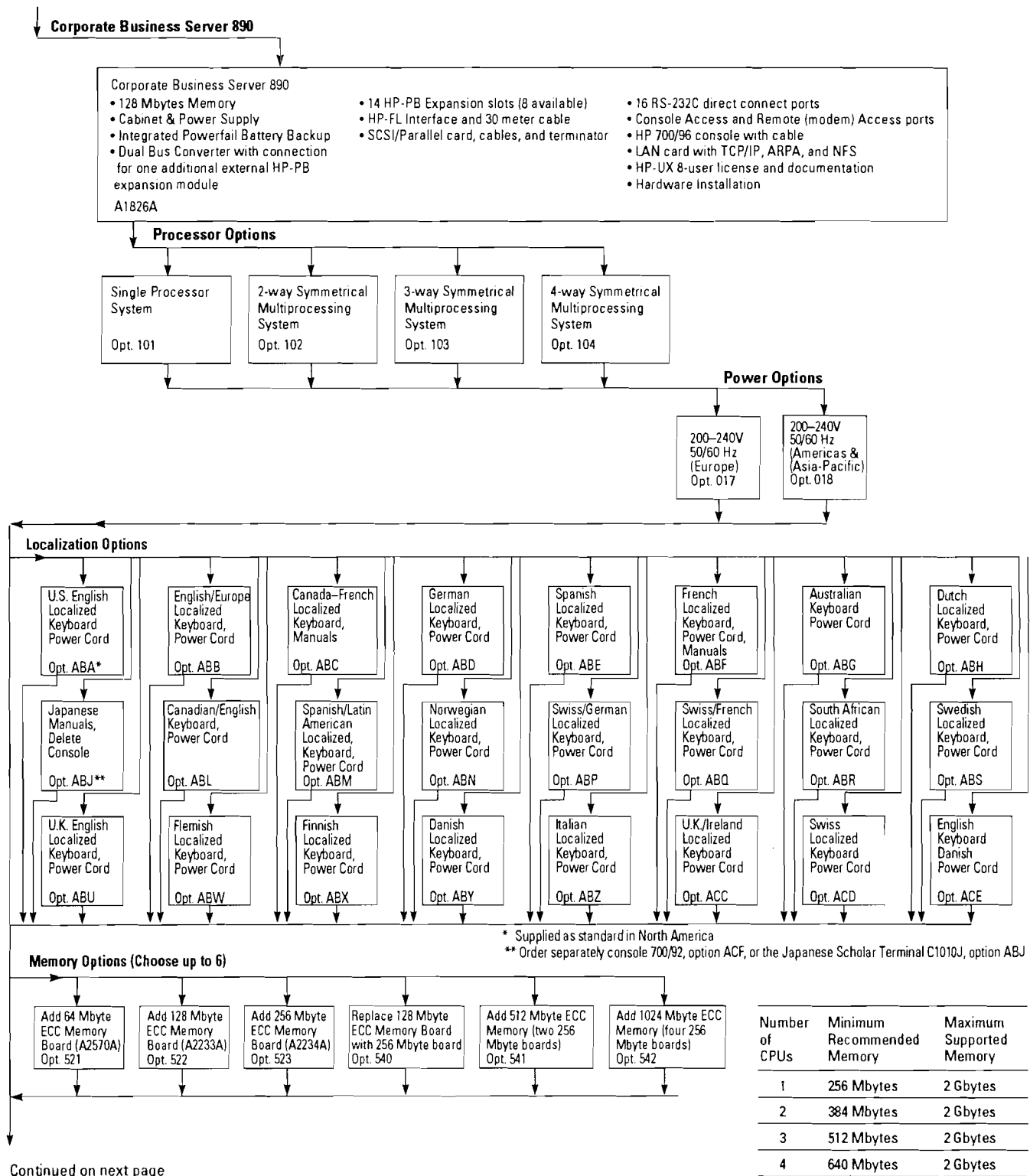
Systems are typically configured for balanced sequential disk read and write performance. Without immediate reporting, the layout of sequential data on the disk skips one or more blocks. This provides the best sequential write performance but doesn't use the full disk bandwidth. The tunable parameter *rotational delay* determines the number of blocks to skip and thus the effective sequential disk performance.

Immediate reporting allows the system to concurrently process the next sequential block of data to be written while the current one is still being put on the physical disk media. This allows the layout of data on the disk to use contiguous blocks or a rotational delay of zero. The full

bandwidth of the disk drive can now be utilized for both sequential reads and writes. Immediate reporting gives no performance improvement for random disk reads and a small improvement for random writes.

Immediate reporting does have a drawback in that it introduces some risk to data integrity in the event of a system failure. An uninterruptable power source (UPS) is recommended for the disk drives when using immediate reporting.

Section 9 Corporate Business Server 890 Configuration Flow Chart



Section 9 — Corporate Business Server 890 Configuration Flow Chart (cont'd)

Continued from previous page

Integrated Cabinets

1.6 Meter Integrated Cabinet A1897A

- North American Power (120V, 208V-240V) Opt. ABA
- European Power (230V) Opt. ABB
- Add 1.3 Gbytes Disk Series 6000 SCSI Mass Storage System Opt. 201
- Add 2.7 Gbytes Disk Series 6000 SCSI Mass Storage System Opt. 202
- Add 4.0 Gbytes Disk Series 6000 SCSI Mass Storage System Opt. 203
- Add 2.7 Gbytes Disk & 2 GB DDS Drive in Series 6000 SCSI Mass Storage System Opt. 212

- Add 5.44 Gbyte 4-way striped disk array with parity disk Opt. 230
- Add 5.44 Gbyte 4-way striped disk array with no parity disk Opt. 231
- Add 2.72 Gbyte 2-way striped disk array with parity disk Opt. 232
- Add 2.72 Gbyte 2-way striped disk array with no parity disk Opt. 233
- Add 2.72 Gbyte independent made disk array with 2 disks Opt. 234
- Add 5.44 Gbyte independent made disk array with 4 disks Opt. 235
- Add HP-PB Expansion Module including I/O card cage with 14 expansion slots, lower bus converter, and cable Opt. 250

Add-on Accessories

HP-PB expansion module including HP-PB I/O card, cage with 14 expansion slots, lower bus converter, and cable. A1828A

Dual Bus Converter A1829A

Disk Type	Maximum Disk Capacity
HP-FL Disk Array (Striped)	1300 Gbytes
HP-FL Disk Array (Independent)	320 Gbytes
SCSI	168 Gbytes
Total	1300 Gbytes

	Maximum Number of Disk Devices
HP-FL Arrays	240
HP-FL Disk Array (Independent)	240
*SCSI	84
HP-IB	12
Total	250

* Includes Optical Disk

Additional Disk

Choose from supported disks and disk arrays in peripherals section

Additional Tape

Choose from supported tape and back-up devices listed in peripherals section

External Peripherals

X-stations, terminals, printers, plotters, etc. Choose from supported devices listed in peripherals section.

	Maximum Number of Tape Devices
SCSI	16
HP-IB	9
Total	24

	Maximum Number of Printers Supported
SCSI	8
Serial	250
Centronics	20
LAN Connected	250

Standalone I/O Cards

16-port RS-232 Direct Connect Multiplexer J2092A

16-port RS-422 Direct Connect Multiplexer J2093A

16-port RS-232 Modem Connect Multiplexer J2094A

8-port RS-232, RS-422 Multiplexer 40299B

SCSI/Parallel Centronics I/F 28655A

HP-IB Interface 28650B

HP-Fiber Link Interface 28615A

I/O Card	# of HP-PB Slots Req'd
16-port MUX	1
8-port MUX	1
SCSI/Centronics	1
HP-IB	1
HP-FL	2

Continued on next page

Maximum 16-port MUX Supported	Maximum 8-port MUX Supported	Maximum SCSI/Centronics Supported	Maximum HP-IB Cards Supported	Maximum HP-FL Cards Supported
64	64	20	9	40

Section 9 — Corporate Business Server 890 Configuration Flow Chart (cont'd)

Continued from previous page

Network Products

Choose from links, transports, and services in networking section.

Networking Card	# of HP-PB Slots Req'd
LAN (802.3)	1
Token Ring (802.5)	1
X25	1
SNAplus	1
FDDI	2

Maximum # of LAN Cards Supported	Maximum # of Token Ring VFs Supported	Maximum # of X25 Links Supported	Maximum # of SNAplus Links Supported	Maximum # of FDDI Links Supported
10	5	12	12**	2

**Only 1 SNAplus Link is supported with the first calendar quarter of 1993.

HP-UX Media

HP-UX on CD-ROM (Version 9.0) B3108C

HP-UX Operating System Media (Version 9.0) B3108A

1/4 inch Media
Opt. AA0

1/2 inch Media
Opt. AA1

QIC Cartridge Media
Opt. AA4

DAT Media
Opt. AAH

Increased HP-UX User License Levels*

HP-UX User License B3108L

User License Level

User Software

Credit for 8-User License Opt. UB3

16-User License
Opt. UA5

32-User License
Opt. UA7

64-User License
Opt. UA9

128-User License
Opt. UAB

256-User License
Opt. UAD

Unlimited User License
Opt. UAT

16-User Software
Opt. AGM

32-User Software
Opt. AGN

64-User Software
Opt. AGP

128-User Software
Opt. AGQ

256-User Software
Opt. AGR

Unlimited User Software
Opt. AGS

1/2 inch Media
Opt. AA1

DAT Media
Opt. AAH

CD-ROM Media
Opt. AAU

HP-UX Documentation

English Documentation B2437A

Japanese Documentation B2440A

French Documentation B2447A

German Documentation B2449A

General Usage Documentation
Opt. OBD

Users Guide Documentation
Opt. OBG

System Administration Documentation
Opt. OBE

Programming Documentation
Opt. OBF

Documentation on CD-ROM
Opt. OBC*

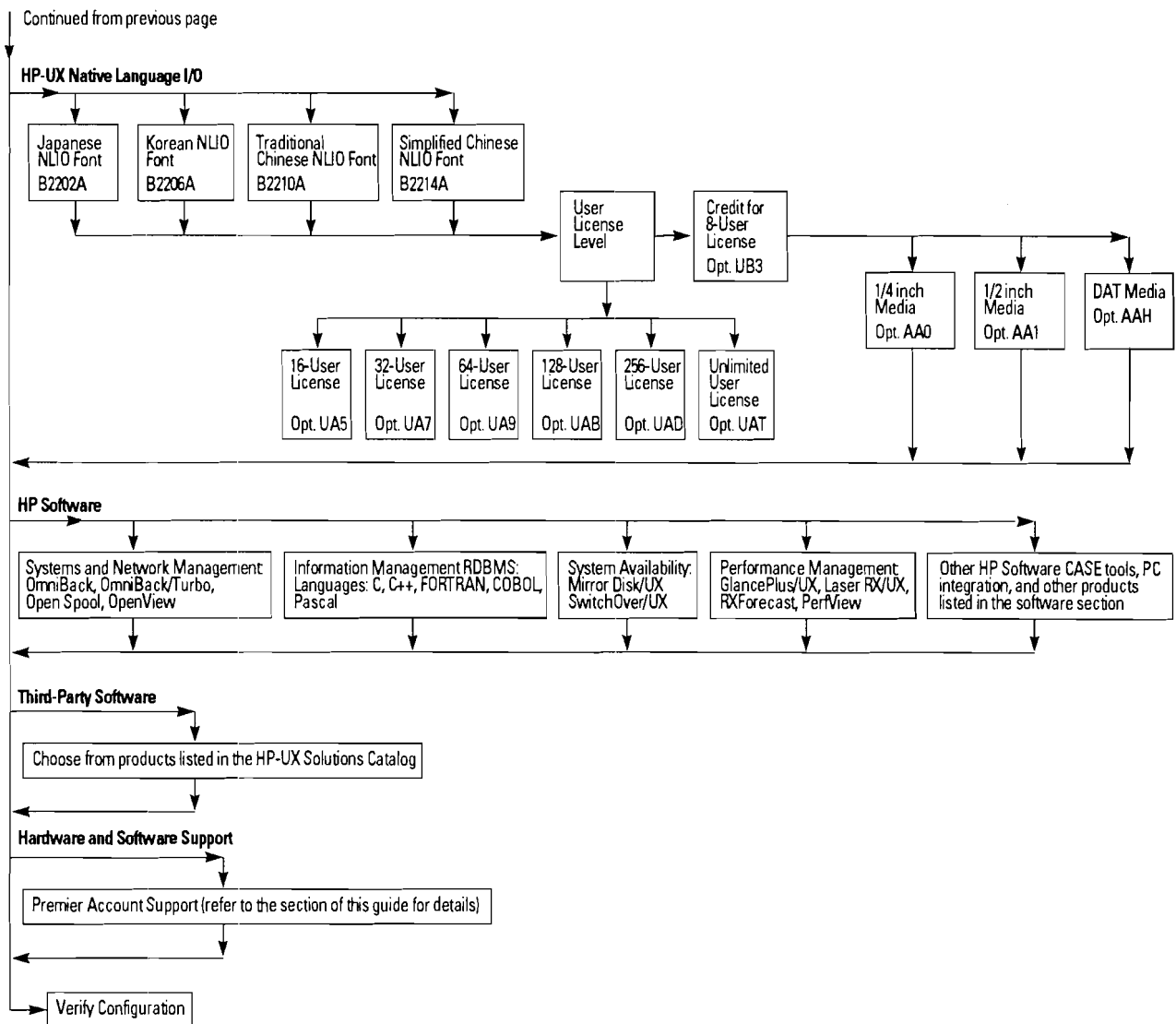
Add-on 4-user License for CD-ROM
Opt. UA2*

Networking Documentation
Opt. 014

*Available for English Documentation Only

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Section 9 — Corporate Business Server 890 Configuration Flow Chart (cont'd)



Configuration Verification

1. Ensure you have configured enough system memory and disk space
 - Refer to the Corporate Business Server 890 section for guidance.

2. Check to make sure you have not exceeded the maximum memory and disk capacity for the model 890.

Maximum Memory	Maximum Supported Disk
2 Gbytes	1300 Gbytes

3. Check to make sure you are ordering enough available HP-PB slots for the I/O and Networking Cards.

HP-PB slots available in base configuration	Total HP-PB slots in base configuration	HP-PB slots available in maximum configuration*
8	14	112 (Requires 8 total HP-PB I/O Card Cages)

4. For performance considerations, make sure you have not exceeded the maximum recommended number of HP-FL cards and SCSI interface cards in one HP-IB I/O card cage. Additional Dual Bus Converters and HP-PB Expansion Modules may need to be ordered. Consult the Corporate Business Server 890 section of this guide for details.

5. Make sure you have not exceeded the power supply capabilities of the HP-PB I/O card cage.

6. Make sure you have ordered cables for the peripherals which do not include them. Refer to the peripherals section for cable information.

7. Verify that you have ordered enough 1.6 meter expansion cabinets to house the rack-mounted peripherals, including multiplexer distribution panels.

8. The SCSI cable length limit is 6 meters. Make sure your configuration topology will not exceed 6 meters for SCSI cabling.

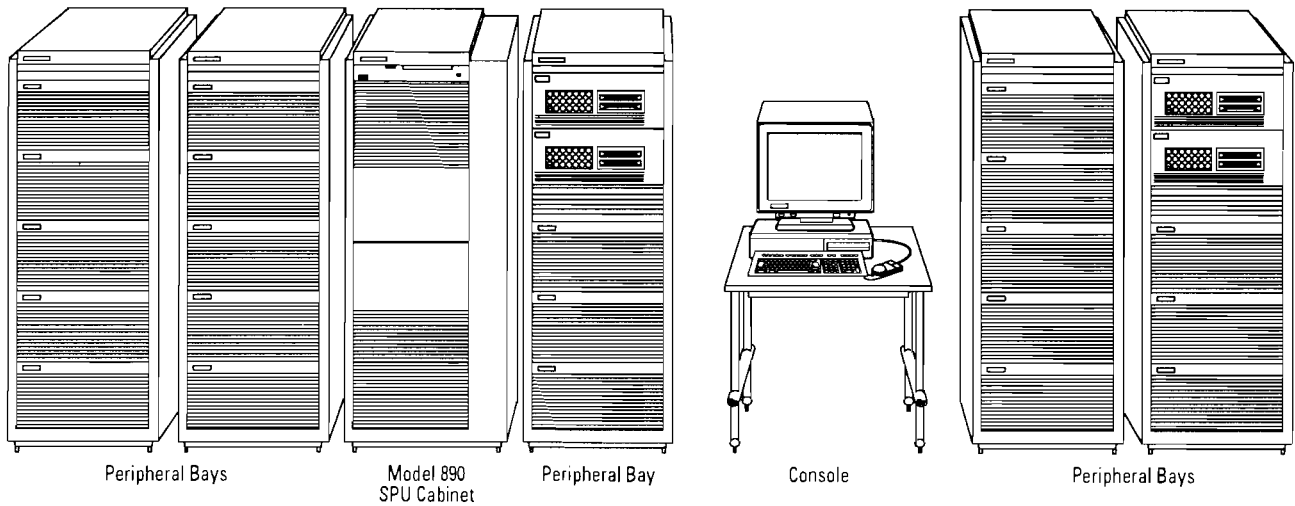
9. Check to make sure you have ordered the appropriate localization options (or products) for the Model 890, HP-UX, and peripherals (if necessary).

10. Verify your final configuration using the CONRAD on-line configuration advisor tool. Access to CONRAD is available in each U.S. sales office and in many others worldwide.

Section 10

Corporate Business Server 890

Figure 10.1 HP 9000 Corporate Business Server 890



Description

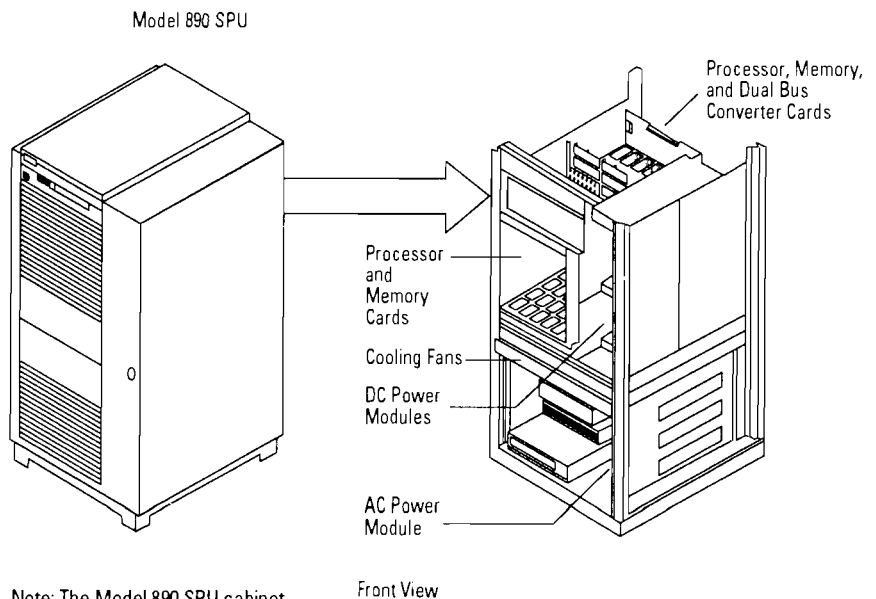
The HP 9000 Corporate Business Server 890 is a high performance server designed for use in computing environments where capacity, performance, and growth potential are of prime importance.

This system features a highly scalable Symmetrical Multi-Processing (SMP) architecture that can be configured with up to four 60 MHz HP-PA RISC processors, 2 Gbytes of main memory, and 1300 Gbytes of primary online disk storage for support of up to 4500 connected users in an OLTP environment. The base configuration consists of a single CPU, 128 MB of ECC memory, and 14 HP-PB slots (8 available) for connection to peripherals, networks, and terminals. Eight of the fourteen HP-PB slots are open in the base configuration. The base configuration can be easily expanded to meet the specific needs for additional processing power, memory, and I/O capacity for a wide range of system topologies.

The Model 890 is offered as a standalone System Processing Unit (SPU) in its own 1.6 meter high system cabinet. All disks, tapes, CD-ROMs, and other rack-mounted peripherals may be separately installed in one or more of the available 1.6 Meter Integrated Cabinet expansion

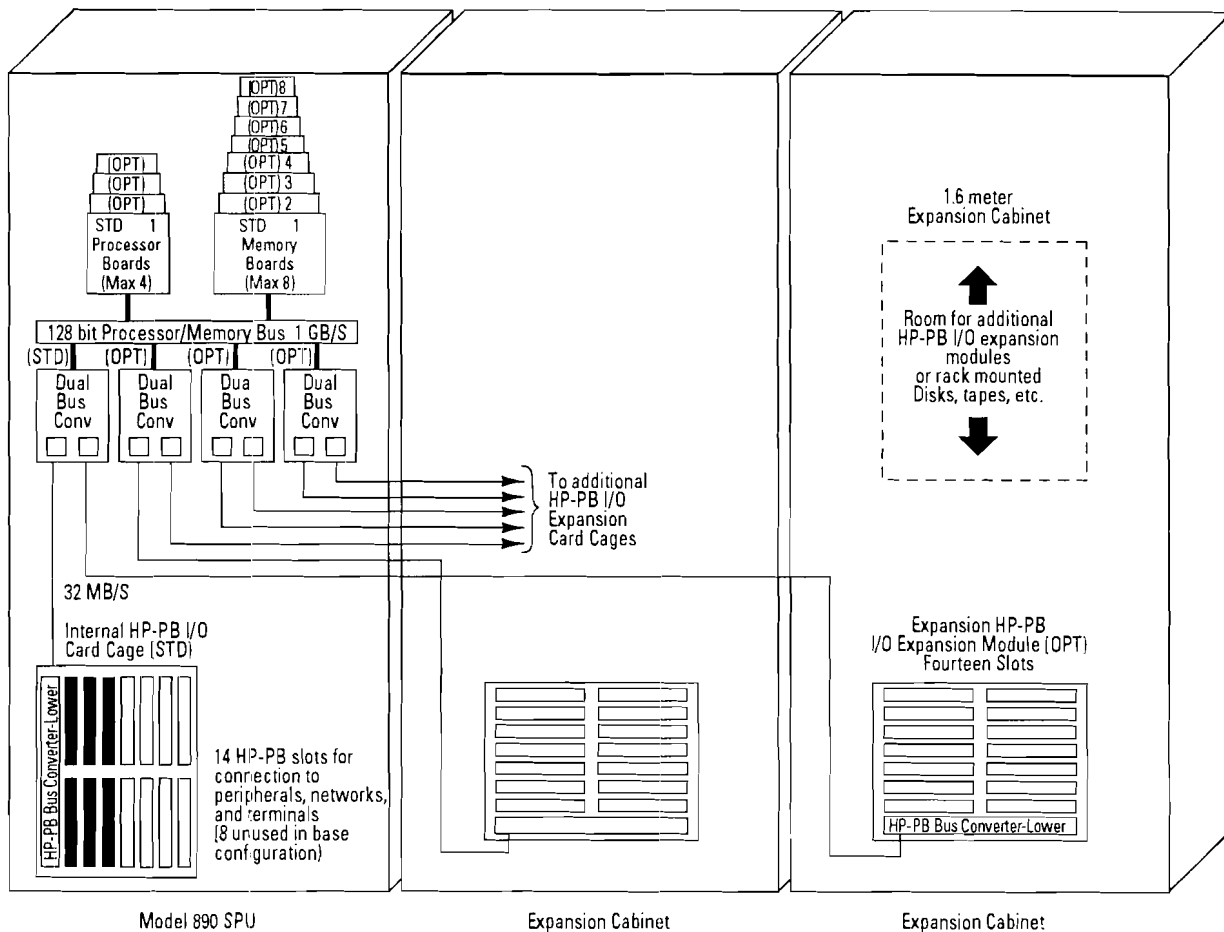
units. A typical Corporate Business Server 890 system will consist of the SPU and three or more expansion cabinets. The expansion cabinets for the Model 890 are the same as those used to rack Model 8x7S and F/G/H/I class Business Servers and peripherals.

Figure 10.2



Note: The Model 890 SPU cabinet does not house any disk or tape devices. All disks and tapes must be installed in expansion cabinet peripheral bays.

Figure 10.3



Expansion Capabilities

Expansion of processing power, memory, and I/O capacity is done by adding processor, memory, and (in some cases) Dual Bus-Converter boards to the Model 890 SPU. All processor, memory, and bus converter boards for the Model 890 plug into a common backplane known as the Processor/Memory Bus (PMB). There are sixteen slots for these boards in the PMB card cage. Figure 10.4 shows the location of the PMB slots in the Model 890 SPU cabinet, and specifications for

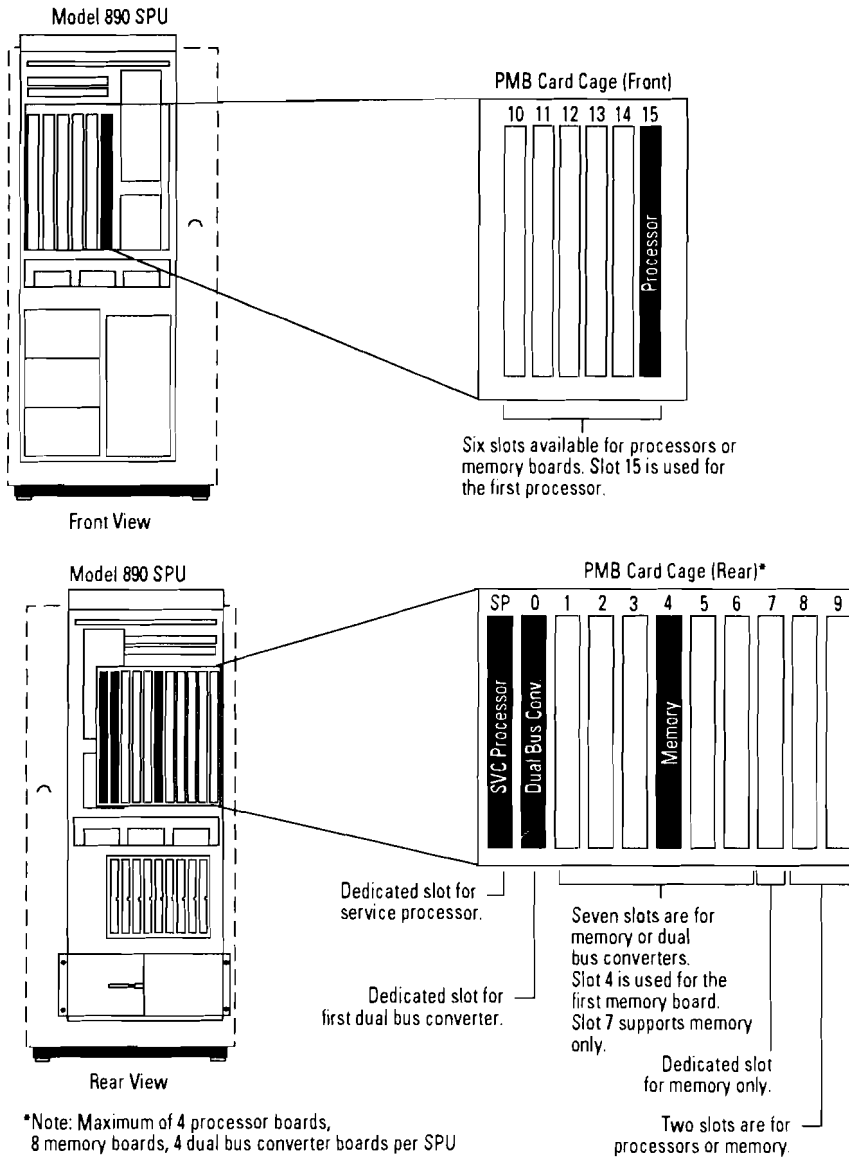
which type of board can be used in each slot. When processor, memory or dual bus converter boards are added, they must be added in a specified slot priority sequence to comply with power balancing and board cooling requirements. These installation rules are listed in the HP 9000 Corporate Business Server 890 Installation Manual.

Adding Processors

Each processor board for the Model 890 contains a single CPU and associated circuitry. The base

configuration contains a single processor. Up to three additional processors can be added as options or as upgrades later on for a maximum of four processors per SPU. When ordering the SPU, choose one of the processor options (101 for 1 CPU, 102 for 2 CPUs, 103 for 3 CPUs, 104 for 4 CPUs) to indicate the number of CPUs required. If you want the base configuration single CPU system, you must still order option 101.

Figure 10.4 Processor/Memory Bus (PMB) Card Cage



Adding Memory

Memory boards are available in increments of 64 MB, 128 MB, and 256 MB. The base configuration contains a single 128 MB memory board. Memory can be increased by adding up to seven additional memory boards for a maximum of eight memory boards per SPU. Interleaving is achieved internally within each memory board, so any combination of memory board sizes can be configured without regard for interleaving balancing. As an example, a valid memory configuration is one 64 MB board, one 128 MB board, and one 256 MB board for a total of 448 MB.

The maximum memory capacity is 2 GB. **This capacity is only achievable if all eight boards are 256 MB boards.** If you want to preserve the eventual possibility of upgrading to the full 2 GB limit, the base configuration 128 MB board should be replaced with a 256 MB board by choosing option 540 when ordering the Model 890 system. Up to six memory options may be selected when ordering memory. The same option may be ordered multiple times.

Note: Memory boards from other Series 800 Servers cannot be used in the Model 890 Corporate Business Server.

Ordering Requirements for Sample Memory Configurations

Table 10.1

Desired Memory	Memory Option Numbers to Order	
128 MB	None	Base configuration is 128 MB
192 MB	Opt. 521	Add 64 MB
256 MB	Opt. 540	Replace 128 MB with 256 MB board
320 MB	Opt. 540 Opt. 521	Replace 128 MB with 256 MB board Add 64 MB
384 MB	Opt. 523	Add 256 MB board
448 MB	Opt. 521 Opt. 523	Add 64 MB Add 256 MB board
512 MB	Opt. 540 Opt. 523	Replace 128 MB with 256 MB board Add 256 MB board
640 MB	Opt. 541	Add 512 MB (two 256 MB boards)
768 MB	Opt. 540 Opt. 541	Replace 128 MB with 256 MB board Add 512 MB (two 256 MB boards)
896 MB	Opt. 540 Opt. 541 Opt. 522	Replace 128 MB with 256 MB board Add 512 MB (two 256 MB boards) Add 128 MB
1024 MB	Opt. 540 Opt. 523 Opt. 541	Replace 128 MB with 256 MB board Add 256 MB board Add 512 MB (two 256 MB boards)
1280 MB	Opt. 540 Opt. 542	Replace 128 MB with 256 MB board Add 1024 MB (four 256 MB boards)
1536 MB	Opt. 540 Opt. 523 Opt. 542	Replace 128 MB with 256 MB boards Add 256 MB board Add 1024 MB (four 256 MB boards)
1792 MB	Opt. 540 Opt. 541 Opt. 542	Replace 128 MB with 256 board Add 512 MB (two 256 MB boards) Add 1024 MB (four 256 MB boards)
2048 MB	Opt. 540 Opt. 523 Opt. 541 Opt. 542	Replace 128 MB with 256 MB board Add 256 MB board Add 512 MB (two 256 MB boards) Add 1024 MB (four 256 MB boards)

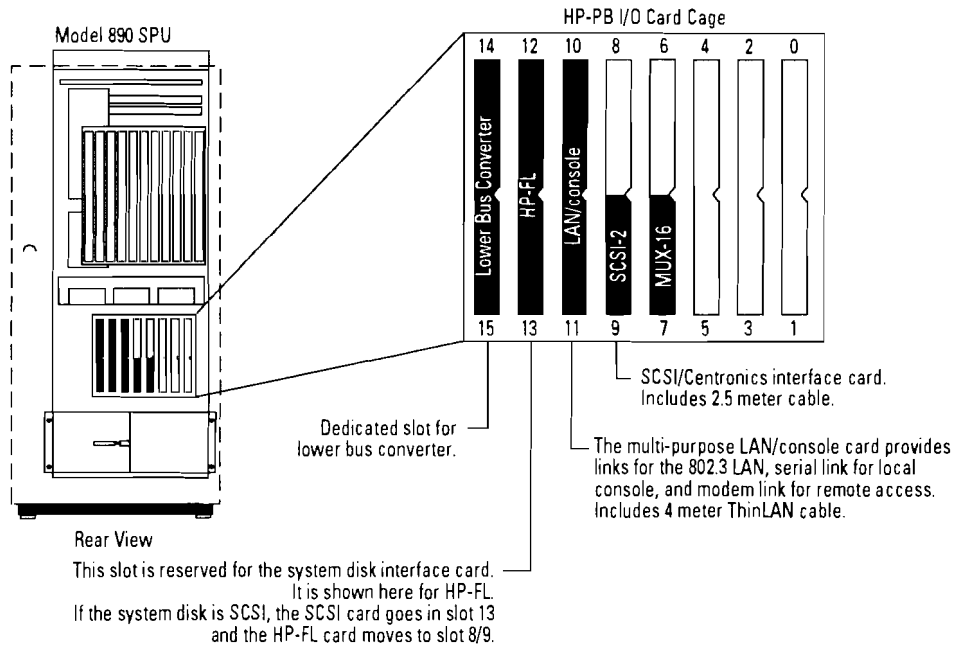
Minimum Memory

The recommended minimum memory for each CPU configuration is shown below. The recommended minimum is the least amount of memory necessary to achieve satisfactory performance under normal workloads. It may be necessary or desirable to increase the actual memory of your configuration to achieve optimum performance for your specific application workload. A minimum amount of memory is required for each CPU configuration to guarantee proper operation of the powerfail/battery back-up feature. You may configure 3 or 4 CPUs without increasing memory beyond the base of 128 Mbytes, but you will not be able to utilize the powerfail feature.

Table 10.2

Number of CPUs	Minimum (Mbytes)	Recommended Minimum (Mbytes)
1	128	256
2	128	384
3	192	512
4	256	640

Figure 10.5



Adding I/O Capacity

I/O communications are achieved through HP-PB cards which are installed into slots in an HP-PB I/O Card Cage. The base configuration for the Model 890 includes one HP-PB I/O Card Cage which is mounted inside the base of the SPU cabinet. This internal HP-PB I/O Card Cage has fourteen HP-PB slots. Six of these slots are utilized by I/O cards supplied in the base configuration, leaving eight open slots for expansion. Refer to Figure 10.5. The HP-PB I/O Card Cage is connected via its integrated Lower Bus Converter and interconnect cable to a Dual Bus-Converter board for communication with processors and memory. This dual Bus-Converter board can connect to two HP-PB I/O Card Cages, although only one HP-PB I/O Card Cage is supplied

in the base configuration. Figure 10.3 illustrates the connection of HP-PB I/O card cages to dual bus converter boards.

I/O capacity can be expanded by adding the necessary interface and communication cards to available slots in the HP-PB I/O Card Cage(s). The number of available HP-PB slots can be increased by adding up to seven additional HP-PB I/O card cages (known as HP-PB Expansion Modules, product A1828A) for a maximum of eight HP-PB I/O Card Cages. This allows expansion of HP-PB slots from the base of 14 slots to a maximum of 112 slots in 14 slot increments.

All additional HP-PB I/O Card Cages are installed in one or more 1.6 Meter Expansion Cabinets. The cable-pair linking the HP-PB

I/O Expansion Module to the Dual Bus Converter in the SPU cabinet is 10 meters long to allow ample freedom in expansion rack placement. This link cable is included with each HP-PB Expansion Module ordered.

The first HP-PB I/O Card Cage Expansion Module added can be connected to the unused link port on the Dual Bus-Converter board supplied in the base configuration (see Figure 10.3). The next HP-PB I/O Card Cage added (third total) will require that a Dual Bus-Converter board also be ordered. That new Dual Bus-Converter board can support the third and fourth HP-PB I/O Card Cages. Similarly, additional Dual Bus-Converter boards must be ordered when adding the fourth (five total) and sixth (seven total) HP-PB I/O Card Cages. The Model 890 SPU

can support a total of four Dual Bus-Converter boards, which can connect to a total of 8 HP-PB I/O Card Cages.

Table 10.3

Total I/O Card Cages	Required Dual Bus Converters	Note
1	1	First Dual Bus Converter supplied in the base system
2	1	
3	2	Order second Dual Bus Converter
4	2	
5	3	Order third Dual Bus Converter
6	3	
7	4	Order fourth Dual Bus Converter
8	4	

Dual Bus-Converter boards are available as a standalone add-on product, A1829A. HP-PB Expansion Modules (with Lower Bus Converter, HP-PB I/O Card Cage and 10 meter link cable) are available either as an option to the 1.6 Meter Expansion Rack (product A1897A) or as a standalone add-on product, product number A1828A.

HP-PB I/O Card Cage Power and Space Budgeting

When adding I/O cards to the HP-PB I/O Card Cage, care must be taken to make sure that the total power consumption of all boards within the I/O Card Cage does not exceed the total power available and that the available slots have not been exceeded. Use Table 10.4 as a worksheet to verify that your configuration is within the available power and slot limits.

The total power draw of the cards within the I/O Card Cage must meet two criteria:

1. The total power draw on each voltage (+12, +5, -12) must be below the listed limit for that voltage.
2. The total power draw of all three voltages combined must be below the listed total available for the entire power supply.

This second test is necessary because it may be possible to configure a combination of cards that is within the limits for individual voltage rails, yet exceeds the total power available from the card cage power supply.

The LAN/Console card that is supplied with the base SPU is a required card for the HP-PB I/O Card Cage within the SPU only. It is not used in any other slots or HP-PB Expansion Modules. If additional 802.3 LAN interfaces are required, the dedicated use LAN card (product J2146A) must be used. The supplied LAN/Console card is configured for use with its internal MAU for ThinLAN connections. If EtherTwist connections are required, an external MAU must be purchased, and the power consumption figures for the EtherTwist version of the LAN/Console card must be used for power budgeting.

Table 10.4 HP-PB I/O Card Cage Power and Space Budgeting

I/O Card	Qty	Power Requirements per I/O Card (watts)			Total Power Required (watts)			Slots Per Card	Total Slots Used
		+12V	+5V	-12V	+12V	+5V	-12V		
LAN/Console w/ int. MAU (ThinLAN)	*	0.40	14.20	0.40				2	
LAN/Console w/ ext. MAU (Ethernity)		6.60	14.20	0.40				2	
8 Port MUX 40299B		1.92	7.00	1.56				1	
16 Port MUX J2092A, J2093A, J2094A	*	3.60	8.50	1.80				1	
802.3 LAN J2146A		6.00	10.65	0.00				1	
SCSI/Cent. Interface 28655A	*	0.00	4.50	0.00				1	
HP-IB Interface 28650B		0.00	10.50	0.00				1	
HP-FL Interface 28615A	*	0.48	19.65	0.60				2	
X.25 36960A		0.96	9.55	0.96				1	
SNAPplus Link J2220A		0.96	9.55	0.96				1	
FDDI J2157A		0.00	18.50	0.00				2	
802.5 Token Ring J2166A		0.00	8.30	0.00				1	
Total Power Required per Voltage: (Must not exceed total below)								Total slots used (Must not exceed 14) <input type="text"/>	
Total Power Available per Voltage in HP-PB Expansion Module:					71.64	161.58	23.64		
Total Power Used [(+12 V watts) + (+5 V watts) + (-12 V watts)] Must be less than or equal to 222.82 watts									

*1 card included in base configuration

Performance Considerations

Although the workload of each configuration will be different depending on such factors as the type of application, number of users, etc. there are a few general guidelines regarding disk and I/O card configurations. These guidelines can be used as a starting point for constructing a reasonable configuration. However, your configuration may require more stringent limits or less demanding limits depending on the specific workload characteristics of the system being constructed.

Disk Drives

Three types of disk drives can be used with the Model 890: HP-FL, SCSI, and HP-IB. HP-FL and SCSI are available for new configurations, HP-IB is supported for upgrade compatibility with existing configurations.

Either HP-FL or SCSI disks can be used successfully with the Model 890 Corporate Business Server. However, depending on the performance and capacity requirements of your planned configuration, one type or the other may be more suitable. In general, SCSI disks have faster disk I/O speeds, but are limited to smaller total disk capacities and have a greater impact on overall system performance. HP-FL disks have I/O speeds which are not quite as fast,

but offer the advantages of greater layout flexibility, higher total disk capacity, and much less impact on overall system performance. (Fewer CPU cycles are required per I/O with HP-FL.)

The Disk Configuration Guidelines (Table 10.5) show comparative data for HP-FL and SCSI disks in three different I/O workloads. These workloads represent typical application environments that the Model 890 may be used for.

OLTP Using Relational DB represents a typical multiuser, online application for performing many simultaneous, small updates and inquiries. The I/O is mostly random, with a 2-Kbyte average block size.

Networked Online File Server represents the Model 890 being used as a central file server for multiple local or remote clients connected via LAN or WAN links. The workload is mostly random, but is composed of larger 8-Kbyte blocks and uses the file system instead of a database for data access.

Batch Processing with Relational DB represents the I/O intensive portion of batch processing that is highly sequential, uses a relational database for data access, and is composed mostly of 2-Kbyte blocks. Use this workload for determining your configuration needs if the performance of your system when running batch is key to your operation.

When evaluating which disk type to use for your planned Model 890 configuration, use this table as a guide to determining the performance aspects of each choice, and the interface card loading limits that should be adhered to. Use the I/O speed and configuration limits listed for the predominant system I/O workload that most closely matches that of your planned application.

Keep in mind that the example workloads modeled in Table 10.5 are provided for guidance only, not as hard-and-fast rules. The true I/O workload characteristics of your planned application will probably be a combination of workloads from the table. In that case, adhere to the configuration limits that apply to the type of workload in your configuration that will be the most performance critical.

How To Use This Table

Listed below are guidelines regarding maximum disks per I/O card, and maximum I/O cards per

HP-PB card cage. Limits are shown for five disks commonly used with Model 890 systems for each of three typical I/O workloads. Configure your disks

according to the I/O workload that most closely matches the predominant workload of your target system configuration.

Table 10.5 Corporate Business Server Disk Configuration Guidelines

		Predominant System I/O Workload			Disk Characterizations
		OLTP Using Relational DB • 100% random • 2 Kbyte avg. block size	Networked Online File Server • 90% random • 10% sequential • 8 Kbyte avg. block size	Batch Processing Using Relational DB • 90% sequential • 10% random • 2 Kbyte avg. block size	
HP-FL Disk (C2204) Single disk 1.34 GB 1 disk address/mech	Max disks per FL card	8	8	8	<ul style="list-style-type: none"> • Acceptable disk performance • Low CPU overhead • 10.4 GB max per FL card • Up to 500m distance • Large total system capacity
	Max FL cards per HP-PB	6	6	7	
	I/Os per sec per disk	25	20	30	
HP-FL Array Independent Mode (C2254B+C2251A) 5 disk array 5 × 1.3 GB 5 disk addresses/array	Max arrays per FL card	3	3	3	<ul style="list-style-type: none"> • High disk performance • Low CPU overhead • 19.5 GB max per FL card • Up to 500m distance • Large total system capacity
	Max FL cards per HP-PB	6	5	6	
	I/Os per sec per array	100	75	110	
	I/Os per sec per disk	20	15	22	
HP-FL Array High Availability RAID3 Striped (C2252HA or C2254HA) 2 or 4 disk array plus parity disk 2.7 or 5.4 GB 1 disk address/array	Max arrays per FL card	8	8	4	<ul style="list-style-type: none"> • Moderate disk performance • Low CPU overhead • 43 GB max per FL card (C2254HA) • Up to 500m distance • Largest total system capacity (C2254HA) • Built-in high availability • Hot swap disk capability
	Max FL cards per HP-PB	6	5	6	
	I/Os per sec per array	25	20	75	
SCSI Disk (C2474R) Single disk 1.3 GB 1 disk address/mech	Max disks per SCSI card	7	5	3	<ul style="list-style-type: none"> • Good disk performance • 20% higher CPU overhead vs. HP-FL • 9 GB max per SCSI card • 6m distance limitation • Lowest total system capacity
	Max SCSI cards per HP-PB	10	6	6	
	I/Os per sec per disk	25	20	200	
SCSI Disk (C3023R) Single disk 2 GB 1 disk address/mech	Max disks per SCSI card	6	4	3	<ul style="list-style-type: none"> • Highest disk performance • 20% higher CPU overhead vs. HP-FL • 12 GB max per SCSI card • 6m distance limitation • Low total system capacity
	Max SCSI cards per HP-PB	9	5	4	
	I/Os per sec per disk	45	35	300	

Choosing the Right CPU and I/O Configuration

Table 10.6 provides information to help you choose the right number of CPUs for your Model 890 and recommendations on how to configure disk I/O for good system-level performance. Use this table as a guide for determining the best configuration for your planned system.

The left section of Table 10.6 correlates two measures of system performance to the number of CPUs that can be configured into a system. Knowing either the number of active users that your system will need to support, or the approximate TPS level that needs to be achieved you can use the table to determine the number of CPUs that will be required. As an example, if your system needs to support between 800 and 900 logged-on users under a “medium” load, you would need to configure your Model 890 as a 2 CPU system. For these estimates, two logged-on users constitutes one “active” user. A medium workload represents a low to medium rate of data entry and inquiry by terminal-based relational database users with the “forms” handling as well as back-end database processing being done on the Model 890 host. A heavy workload represents a high rate of data entry and inquiry. Keep in mind that these assessments are highly application dependent, so they should only be used as a general guide.

Likewise, if you have determined via benchmarking or other methods that you will need a 300–400

TPS system to meet your client-server application needs, the table shows that you would need to configure your Model 890 as a 3 CPU system.

The right-hand side of Table 10.6 is used to determine the proper number of disk, I/O interface cards (HP-FL or SCSI), and HP-PB I/O card cages that should be configured to maximize I/O concurrency and prevent performance bottlenecks. Maximum I/O performance is achieved by evenly distributing the I/O workload generated by the application over a sufficient number of disks, I/O interface cards, and HP-PB modules (card cages) to prevent bottlenecks. When configuring large-scale systems like the Model 890 it is often important to place special emphasis on balancing the overall I/O workload.

You can determine the proper balance of disk devices, I/O cards, and HP-PB card cages with either of two approaches. Either use the Performance Configuration Guidelines (table 10.6) based on the number of CPUs that you need, or, calculate the appropriate number of disks, cards, and card cages based on a knowledge of the estimated I/O workload for your application(s). For this latter approach, you need to use the Disk Configuration Guidelines (table 10.5).

Using the Performance Guidelines Table (Table 10.6)

Choose the cell corresponding to the number of CPUs that you need, the type of disk that you plan to use, and the I/O workload that most closely matches the

workload of your applications. From that cell, note the quantity of disks, I/O cards, and HP-PB card cages recommended for optimal I/O performance.

As an example, let's assume that you have determined that you will need a 2 CPU Model 890 to achieve the desired performance level for a primarily batch-oriented application (e.g. MRP, monthly billing, etc.) using a relational database. Referring to the table under the heading of I/O Workload #3, locate the row corresponding to 2 CPUs. You can see that there is a recommended number of disks, I/O cards, and HP-PB card cages for each of three types of disks that are typically used with Model 890 systems.

As shown on the Disk Configuration Guidelines (Table 10.5), each of the different disk types has a different sustainable I/O speed for any given workload. This is due to differences in basic disk design and performance trade-offs to achieve array functionality (independent mode or RAID 3). It is because of these differences in I/O speed that you need a different number of disks (or arrays) for one disk vs. the other in order to achieve roughly the same level of I/O concurrency. Specifically, if you choose the HP-FL RAID 3 High Availability Array to get the benefit of its built-in data protection features, you can see that the recommended configuration uses 27 arrays, 7 HP-FL interface cards, and just 2 HP-PB card cages. Using that configuration would allow the 2 CPUs to be used to their maximum capacity during

batch processing without experiencing I/O bottlenecks. Conversely, if you choose the 2 GB Single Ended SCSI disks (C3023R) you only need 7 disks, 3 SCSI I/O cards, and 1 HP-PB.

On the other hand, if your planned application had an I/O workload that consists primarily of interactive online OLTP, you would look in the section under the heading I/O Workload #1 and see that the recommended configuration (again using RAID 3 arrays) would be to spread the I/O over 79 arrays, 10 HP-FL I/O cards, and 2 HP-PB card cages. You need a greater number of “disks” for the OLTP workload due to the increased randomness of data access. Note that when using the RAID 3 Arrays, each array is seen by the system as a single disk. Depending on the total capacity of disk storage that you need, you can use either the 2.7 GB C2252HA arrays or the 5.4 GB C2254HA arrays.

Using the Disk Configuration Guidelines Table (Table 10.5)

If you do not need as much concurrent I/O capacity as the Model 890 CPU(s) can support, you may want to determine the proper number of disks, I/O cards, and HP-PB card cages based on an estimate of the actual I/O workload rather than the number of CPUs that you will be using. Use the formulas below to calculate your disk, I/O card, and card cage needs. You will need to

select the type of disk you want to use, and the example I/O workload type that most closely matches the I/O workload of your application. Based on your chosen disk type and example I/O workload type use the figures for maximum disks per I/O card and maximum I/O cards per HP-PB card cage from the Disk Configuration Guidelines (Table 10.5).

$$\begin{aligned} \text{Number of Disks (or Arrays)} &= \frac{\text{Estimated I/O Workload (I/Os per sec)}}{\text{I/O Speed for the chosen disk type}} \\ \text{Number of I/O Cards} &= \frac{\text{Number of Disks}}{\text{Maximum Number of Disks (or Arrays) per I/O Card}} \\ \text{Number of HP-PB Card Cages} &= \frac{\text{Number of I/O Cards}}{\text{Maximum Number of I/O Cards per HP-PB}} \end{aligned}$$

Example:

1. Your application will generate an estimated I/O rate of 1,500 I/Os per second.
2. You choose to use HP-FL Independent Mode Disk Arrays with 5 disks in each array.
3. Your workload is most like I/O Workload #2, the Networked Online File Server.

$$\begin{aligned} \text{Number of Arrays} &= \frac{1500 \text{ I/Os per sec}}{75 \text{ I/Os per sec per Array}} = 20 \text{ Arrays} \\ \text{Number of I/O Cards} &= \frac{\text{Number of Disks}}{\text{Maximum Number of Disks (or Arrays) per I/O Card}} = \frac{20 \text{ Arrays}}{3 \text{ Arrays/HP-FL}} \\ &= 6.67 \text{ HP-FL cards} \Rightarrow 7 \text{ HP-FL cards} \\ \text{Number of HP-PB Card Cages} &= \frac{\text{Number of I/O Cards}}{\text{Maximum Number of I/O Cards per HP-PB}} = \frac{7 \text{ HP-FL cards}}{5 \text{ HP-FL/HP-PB}} \\ &= 1.4 \text{ HP-PB} \Rightarrow 2 \text{ HP-PB Card Cages} \end{aligned}$$

Table 10.6 Corporate Business Server Performance Configuration Guidelines

Required Performance			Number of CPUs	Recommended Disk Configuration for Optimal I/O Throughput								
OLTP Performance (TPS)	Number of Logged-on* Users			I/O Workload #1 OLTP using Relational DB	I/O Workload #2 Networked Online File Server			I/O Workload #3 Batch Processing with Relational DB				
	Medium Load	Heavy Load			HP-FL Indep. Mode 5-disk Array	HP-FL RAID 3 High-Avail. Array	SCSI Disk	HP-FL Indep. Mode 5-disk Array	HP-FL RAID 3 High-Avail. Array	SCSI Disk	HP-FL Indep. Mode 5-disk Array	HP-FL RAID 3 High-Avail. Array
			(Max I/Os per sec)	C2254B + C2251B	C2252HA or C2254HA	C3023R	C2254B + C2251B	C2252HA or C2254HA	C3023R	C2254B + C2251B	C2252HA or C2254HA	C3023R
480 to 600 Client/Server 400 to 500 Host-based	1500 to 1850	500 to 620	4 (3800)	38 Arrays (190 Disks) 13 I/O Cards 2 HP-PB (= 247 GB)	152 Arrays (152 "Disks") 19 I/O Cards 4 HP-PB (= 410 or 820 GB)	84 Disks 14 I/O Cards 2 HP-PB (= 168 GB)	50 Arrays (250 Disks) 17 I/O Cars 4 HP-PB (= 325 GB)	190 Arrays (190 "Disks") 24 I/O Cards 5 HP-PB (= 513 or 1026 GB)	110 Disks 22 I/O Cards 6 HP-PB (= 220 GB)	35 Arrays (175 Disks) 12 I/O Cards 2 HP-PB (= 228 GB)	51 Arrays (51 "Disks") 13 I/O Cards 2 HP-PB (= 138 or 276 GB)	13 Disks 5 I/O Cards 2 HP-PB (= 26 GB)
375 to 480 Client/Server 270 to 400 Host-based	1020 to 1500	340 to 500	3 (2900)	29 Arrays (145 Disks) 10 I/O Cards 2 HP-PB (= 189 GB)	116 Arrays (116 "Disks") 15 I/O Cards 3 HP-PB (= 313 or 626 GB)	64 Disks 11 I/O Cards 2 HP-PB (= 128 GB)	38 Arrays (190 Disks) 13 I/O Cards 3 HP-PB (= 247 GB)	145 Arrays (145 "Disks") 19 I/O Cards 4 HP-PB (= 392 or 783 GB)	83 Disks 17 I/O Cards 4 HP-PB (= 166 GB)	26 Arrays (130 Disks) 9 I/O Cards 2 HP-PB (= 169 GB)	39 Arrays (39 "Disks") 10 I/O Cards 2 HP-PB (= 105 or 210 GB)	10 Disks 4 I/O Cards 1 HP-PB (= 20 GB)
190 to 325 Client/Server 160 to 270 Host-based	600 to 1020	200 to 340	2 (2000)	20 Arrays (100 Disks) 7 I/O Cards 2 HP-PB (= 130 GB)	79 Arrays (79 "Disks") 10 I/O Cards 2 HP-PB (= 213 or 426 GB)	44 Disks 8 I/O Cards 1 HP-PB (= 88 GB)	26 Arrays (130 Disks) 9 I/O Cards 2 HP-PB (= 169 GB)	98 Arrays (98 "Disks") 13 I/O Cards 3 HP-PB (= 265 or 530 GB)	56 Disks 8 I/O Cards 3 HP-PB (= 112 GB)	18 Arrays (90 Disks) 6 I/O Cards 1 HP-PB (= 117 GB)	27 Arrays (27 "Disks") 7 I/O Cards 2 HP-PB (= 73 or 146 GB)	7 Disks 3 I/O Cards 1 HP-PB (= 14 GB)
Up to 190 Client/Server Up to 160 Host-based	Up to 600	Up to 200	1 (1200)	11 Arrays (55 Disks) 4 I/O Cards 1 HP-PB (= 72 GB)	46 Arrays (46 "Disks") 6 I/O Cards 1 HP-PB (= 124 or 248 GB)	25 Disks 5 I/O Cards 1 HP-PB (= 50 GB)	15 Arrays (75 Disks) 5 I/O Cards 1 HP-PB (= 98 GB)	58 Arrays (58 "Disks") 8 I/O Cards 2 HP-PB (= 157 or 314 GB)	33 Disks 5 I/O Cards 2 HP-PB (= 66 GB)	11 Arrays (55 Disks) 4 I/O Cards 1 HP-PB (= 72 GB)	16 Arrays (16 "Disks") 4 I/O Cards 1 HP-PB (= 43 or 86 GB)	4 Disks 2 I/O Cards 1 HP-PB (= 8 GB)

* The workload generated by two "logged-on" users is roughly equal to one "concurrent" user.
A "concurrent" user represents the workload generated by a person continuously performing terminal transactions with no interruptions or breaks.

How to Use This Table

1. Determine the required number of CPUs based on expected user load or TPS requirements for your system.
2. Choose the disk type that you plan to use. Make the choice based on needs for distance, capacity, and features such as high-availability.
3. Select which of the three example I/O workloads that most closely represents the expected workload of your system.
4. Locate the cell in the Recommended Disk Configuration section of the table for the combination of CPUs, Disk, and I/O Workload that you have chosen.
5. Read the recommended combination of disks (or arrays), I/O cards, and HP-PB card cages.

Note: These recommendations indicate the MINIMUM number of disks (or arrays) required to achieve optimal I/O throughput when the application(s) are driving the CPU(s) to their maximum I/O rate capability. You may reduce the number of recommended disks if your workload is less, or you may increase the number of disks (or arrays) to increase total capacity. When increasing or decreasing the number of disks, make sure that you adjust the number of I/O cards and/or HP-PB card cages as required to maintain balanced distribution of the I/O.

Caution: This chart should be used only as a guide. Your configuration requirements will be different as determined by actual workload characteristics of your application(s).

SCSI Tapes

Up to seven magnetic tape units may be configured on a single SCSI Interface card. It is recommended that no high volume I/O devices, such as disks, be configured on the same SCSI interface card.

SCSI Printers

For medium to heavy printing on a SCSI printer, it is recommended that only one printer be configured to a single SCSI Interface card. It is also recommended that a SCSI printer not share the same SCSI interface card with any other peripherals.

Configuring for HP Switchover/UX

Switchover configurations utilizing the Model 890 have three basic guidelines:

1. Each SPU in the switchover configuration must be a Model 890. It is not currently possible to configure a Model 890 as the primary system, and have a different model Series 800 server (e.g. 897) as the hot standby machine. It is possible, however, to configure a different model server as a "cold" standby if you are not using HP Switchover/UX.
2. The "backup" system in an HP Switchover/UX configuration may be a Model 890 that is configured with fewer CPUs and less memory. As an example, a 4 CPU "primary" 890 with 1 GB of memory can be backed up by a 1 CPU 890 with 512 MB of memory as long as the backup system is also configured with enough I/O connectivity to support the disks of the primary system.
3. Both HP-FL and SCSI disks may be used in Switchover configurations beginning with HP-UX release 9.0.

Ordering Expansion Cabinets and Peripherals

All peripherals for the Corporate Business Server 890 such as tapes, disks, Distributed Terminal Controllers (DTCs), and HP-PB Expansion Modules may be installed in 1.6 Meter expansion cabinets. You can either order the cabinet and all rack-mounted peripherals as separate products, or you can order the 1.6 Meter Integrated Cabinet product which offers several commonly used peripherals as options to that cabinet, and then order any additional separate peripheral products to add-on to the integrated cabinet. All supported peripherals are listed in the Series 800 Cabinets and Racking section.

Standalone Cabinet

If you choose to order everything separately, order the 1.6 meter Standalone Cabinet, product C2786A, and specify either option ABA to get 208-220V North American power, or ABB to get 200-240V European power. Choose the rackable peripherals that you need from the Peripherals Section of this guide, and order them as separate products. Refer to the Series 800 Racking Information section of this guide for specific information regarding space requirements for the various peripheral units that can be mounted in the cabinet. All components will require field assembly into the cabinets. You may order as many cabinets as necessary to fit the needs of your configuration.

Integrated Cabinet

If you choose to order the Integrated Cabinet product, order product A1897A, and specify the desired options for inclusion into that cabinet. Any other peripherals not listed as options may be ordered separately and installed as part of field assembly. There are two key benefits of ordering the integrated cabinet versus the Standalone Cabinet. First, all peripherals ordered as options are installed in the cabinet at the factory. Second, ordering an integrated cabinet with disk in it allows the HP-UX Operating System and Networking software to be pre-loaded at the factory. This reduces field assembly time, and reduces implementation risk for the customer. There are specific configuration and ordering requirements to enable the HP-UX software to be pre-loaded. Those requirements are outlined later in this section.

The options available with the Integrated Cabinet product include several configurations of SCSI disk combinations, several configurations of HP-FL disk arrays, and the HP-PB Expansion Module (I/O Card Cage). Refer to the Series 800 Cabinets and Racking section for a full listing of the available options with the integrated cabinet product. For each integrated cabinet that you

order, only specify those options that will physically fit into that cabinet. Any unused cabinet space will be covered with matching filler panels. If separately ordered peripherals are intended for inclusion in an integrated cabinet that you are ordering, be sure to leave sufficient unused space in the cabinet to accommodate the additional units. Refer to the Series 800 Racking Information section of this guide for specific information regarding space requirements for the various peripheral units that can be mounted in the cabinet.

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

You may order as many integrated cabinets as necessary to meet the needs of your system configuration, as long as overall configuration and cabling limits are not exceeded.

Cabling and Racking Considerations

To properly configure systems using external peripherals and the corresponding 1.6 meter expansion cabinets, it is important to understand the limits that are imposed by the interconnect cables.

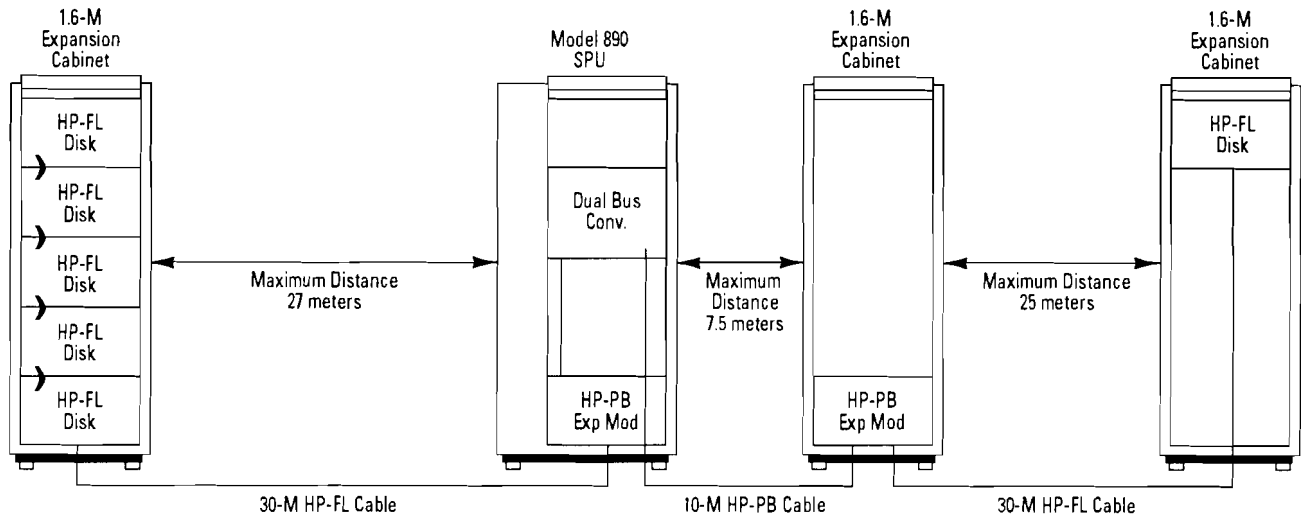
HP-PB Expansion Modules

When adding an external HP-PB I/O card cage to the Model 890 configuration, it is linked to the Dual Upper Bus Converter in the SPU by a 10 meter HP-PB cable-pair (two separate cables, side by side). As shown in Figure 10.6, the maximum distance between the SPU and the 1.6 meter cabinet containing the HP-PB Expansion Module is approximately 7.5 meters. This distance allows for cable routing underneath a raised floor. With this maximum spacing, up to twelve 1.6 meter cabinets may be placed between the SPU and the cabinet with the HP-PB expansion module.

HP-FL Connections

The total length of external and internal cabling for HP-FL device connections cannot exceed 500 meters. For most installations, this is not a restriction. With this extended length capability, HP-FL is the solution of choice for configurations requiring a large amount of disk storage, or where disks and the SPU are separated within the data center.

Figure 10.6 HP-FL Sample Configuration



HP-FL interface cards are supplied with a 30 meter long HP-FL cable. This same 30 meter cable is supplied with the base configuration of the Corporate Business Server 890. Most configurations do not need cables longer than the standard 30 meter cable. For configurations requiring a cable greater than 30 meters, a custom length cable must be fabricated.

If you are using the standard 30 meter HP-FL cable, the expansion racks must be no further than approximately 25 to 27 meters away from the SPU or expansion cabinet containing the HP-PB I/O Card Cage and the HP-FL Interface card. (Refer to Figure 10.6.)

SCSI Connections

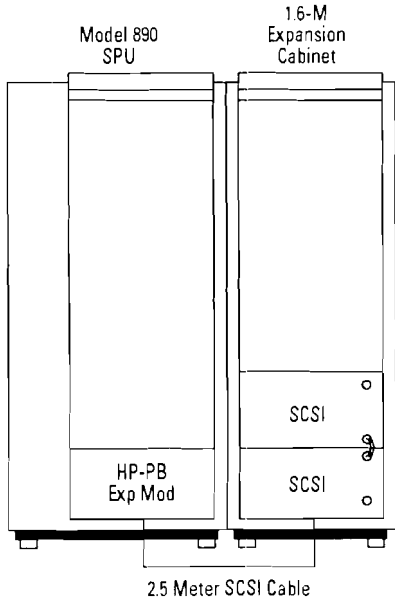
The total length of external and internal cabling for SCSI device connections cannot exceed 6 meters. This limit places some restrictions on how SCSI devices can be configured with Model 890 systems.

SCSI as a System Disk

If SCSI is chosen as the system disk, then the system disk must be housed in a 1.6 meter expansion rack that is placed immediately adjacent to the SPU. Refer to Figure 28. That SCSI disk must be connected to a SCSI interface card in the HP-PB I/O Card Cage that is housed within the SPU, and the interconnection cable must be 2.5 meters long. (Note: the base configuration SCSI card is equipped with a 2.5 meter cable)
If Series 6000 SCSI Mass Storage

enclosures are used to house the SCSI disk(s) (recommended), then no more than two Series 6000 units can be connected in series to the 2.5 meter SCSI interface cable. This is due to the SCSI cable length consumed by the internal SCSI cable length of 1.4 meter for each Series 6000 unit, and the .5 meter cable to "daisy chain" from the first Series 6000 unit to the second. As long as the cabinet containing the SCSI disk drives is immediately adjacent to the SPU, the disks may be mounted at any position in the rack.

Figure 10.7 SCSI System Disk Configuration



meter cable when ordering the 28655A SCSI interface card. The cabinet containing the HP-PB card cage may be up to 7.5 meters away from the SPU cabinet due to the 10 meter length of the HP-PB cable.

Diagrams showing example combinations of SCSI devices in a rack along with cabling diagrams and rack space utilization figures are included in the Series 800 Cabinets and Racking section of this configuration guide.

Using the 28643A HP Fiber-Optic SCSI Extender

The SCSI Extender product is available to overcome the 6 meter overall cable length limitation of single-ended SCSI. The SCSI

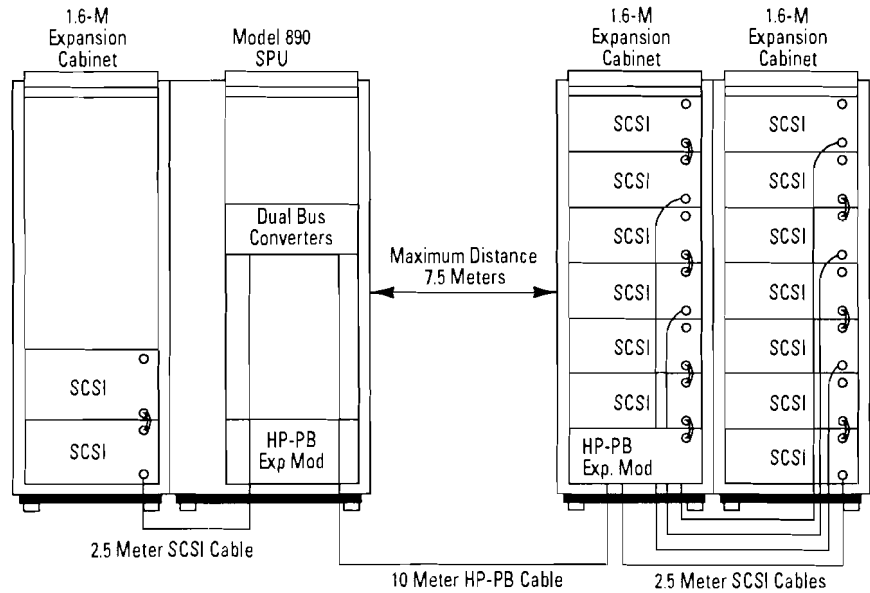
Extender may be used to increase the distance between the SCSI interface card and the SCSI device by either 50 meters or 100 meters using a pair of extender units and fiber-optic cable. This is an appropriate solution for long distance hook-up requirements for printers, optical libraries, and magnetic tape units, but is not recommended for disks due to the performance decrease encountered through the use of the SCSI Extender.

When used alone, the SCSI link supports a speed of 5 Mbytes/sec. With the SCSI Extender and a 50 meter fiber-link, the overall speed is reduced to 3.8 Mbytes/sec. With a 100 meter fiber-link, the overall speed is reduced to 2.8 Mbytes/sec.

Racking of General Purpose SCSI Devices

General purpose SCSI devices such as data disks, CD-ROMs, DAT tapes, or magneto-optical disk libraries may be connected to SCSI interface cards which are in the I/O card cage within the SPU or in external HP-PB I/O expansion modules. As shown on Figure 10.8, the SCSI devices may be housed within the same cabinet as the HP-PB I/O card cage (Expansion Module), or in a separate cabinet. When the card cage is in a separate cabinet, the cabinet containing the SCSI devices must be immediately adjacent to the cabinet containing the I/O card cage and the SCSI interface cable must be 2.5 meters long. For this situation, you should order the optional 2.5

Figure 10.8 SCSI Sample Configuration



Software Pre-Loading

When ordering the Corporate Business Server 890, you have the option of having the HP-UX Operating System and Networking software pre-loaded at the factory. Utilization of this option provides the benefit of reduced field installation time, and reduces implementation risk for the customer. Note: although the software can be pre-loaded, it is still a requirement for the HP-UX software media to be ordered in addition to the SPU. Only the current supported version of HP-UX will be available for pre-loading. Initially HP-UX 9.0 will be the supported operating system version. As future versions are released for support on the Corporate Business Server, they will become the default version for software pre-loading.

Ordering and Configuration Requirements

To get the software pre-loaded, the following configuration and ordering requirements must be met:

1. A single 1.6 meter Integrated Cabinet, product A1897A, must be ordered in the same order section as the Corporate Business Server 890, A1826A. Any additional Integrated Cabinets must be ordered in a separate order section. If multiple Integrated Cabinets are ordered in the same order section along with the SPU, no software will be pre-loaded.

2. The Integrated Cabinet must include at least one disk device, either SCSI or HP-FL, selected from the available options on the integrated cabinet product. Software pre-load cannot be done on disks that are separately ordered.

Remember:

1. Order only one A1897A Integrated Cabinet in the same order section as the Model 890 SPU.
2. Each A1897A Integrated Cabinet ordered must include at least one racked component option.

System Disk Configuration

HP-UX will be loaded onto a disk under the following guidelines:

1. HP-FL or SCSI disk(s) may be included in the integrated cabinet as the system disk. HP-FL disk arrays are supported as system disks.
2. If HP-FL and SCSI disks are both included in the cabinet, HP-UX will be loaded on the SCSI disk.
3. If multiple disks of different capacities are included in the cabinet, HP-UX will be loaded onto the smallest capacity disk.
4. The system disk will be installed as the lowest disk in the rack. In the case of multiple disks, the boot disk will be configured as the first disk in the chain.

5. The primary swap space will be pre-set to a size of 500 Mbytes. This should be more than sufficient for initial system operations. If the customer needs to adjust the swap space to more closely meet the needs of their specific configuration, the swap space can be easily increased or decreased at a later time using the facilities of the Logical Volume Manager (LVM).

6. For SCSI, HP-UX will be loaded onto the first disk on the interface at Address 6. For HP-FL, HP-UX will be loaded onto the first disk on the interface at Module 0.

Manuals

The following manuals ship with each Model 890 SPU:

- Model 890 Operator's Guide
- Model 890 Installation Guide
- Beginner's Guide to HP-UX
- Finding Information—A Guide to HP-UX installation

Upgrades

Corporate Business Server 890 upgrades are achieved by simply adding one or more processor boards to the SPU. Additional memory may be necessary to meet the minimum supported memory configuration, or to increase memory to maintain balance with the additional processing power. If that is the case, the memory is ordered separately by ordering either the A2570A 64 Mbyte ECC memory board, the A2233A 128 Mbyte ECC memory board, or the A2234A 256 Mbyte ECC memory board. Processor board upgrades are obtained by ordering product A1827A, and choosing the appropriate option or options to indicate the number of additional processors desired. For example, choose option 102 if you are upgrading from a single CPU Model 890 to a 2 CPU Model 890. Choose options 102 and 103 if you are upgrading from a single CPU Model 890 to a 3 CPU Model 890.

Table 10.7 Upgrade Product Structure

Product/ Opt. No.	Description
A1827A	Corporate Business Server 890 Symmetrical Multiprocessing (SMP) Upgrades
Upgrade Options (must choose at least one)	
Opt. 102	Upgrade from 1-way to 2-way SMP server
Opt. 103	Upgrade from 2-way to 3-way SMP server
Opt. 104	Upgrade from 3-way to 4-way SMP server

Table 10.8 Corporate Business Server 890 Upgrade Matrix

To→ From↓	2 Processors	3 Processors	4 Processors
1 Processor	A1827A; Opt. 102	A1827A; Opt. 102 and 103	A1827A; Opt. 102, 103, and 104
2 Processors		A1827A; Opt. 103	A1827A; Opt. 103 and 104
3 Processors			A1827A; Opt. 104

Product Summary

Product/ Opt. No.	Description
A1826A	HP 9000 Corporate Business Server 890 <ul style="list-style-type: none"> • High performance server with capacity for up to 4 HP PA-RISC processors • Floating point coprocessor on each processor • 128 Mbytes ECC memory • Cabinet and power supply • Integrated powerfail battery backup system • Dual Bus Converter with connection for one additional external HP-PB Expansion Module • 14 HP-PB Expansion Slots (8 available in base configuration) • HP-FL Fiber Optic Peripheral Interface Card and 30 Meter cable • SCSI/Parallel Host Adapter Card, 2.5 meter cable, and terminator • 16 RS-232C direct connect ports with DB-25 connection kit • Console Access and Remote (modem) Access ports • HP 700/96 console with interconnect cable • HP LAN/9000 Network Interface Controller with right to use for TCP/IP, ARPA, and NFS Services. Includes 4 meter ThinLAN cable • HP-UX 8 User License and General Usage Documentation Set (Operating System software and media must be ordered separately)
Hardware installation Power Options (must choose only one)	
Opt 017	200-240 VAC 50/60 Hz Single-Phase Power (without power cord for European installations)
Opt 018	200-240 VAC 50/60 Hz Single-Phase Power (with power cord and L6-30P connector for North American and Asian installations)
Processor Options (must choose only one)	
Opt 101	Single processor system
Opt 102	2-way Symmetrical Multiprocessing System
Opt 103	3-way Symmetrical Multiprocessing System
Opt 104	4-way Symmetrical Multiprocessing System
Memory Options (choose up to 6)	
Opt 521	Add A2570A 64 Mbyte ECC memory board
Opt 522	Add A2233A 128 Mbyte ECC memory board
Opt 523	Add A2234A 256 Mbyte ECC memory board
Opt 540	Replace 128 Mbyte ECC memory board with 256 Mbyte board
Opt 541	Add 512 Mbyte ECC memory (Two A2234A 256 Mbyte boards)
Opt 542	Add 1024 Mbyte ECC memory (Four A2234A 256 Mbyte boards)
Localization Options (must choose only one)	
Opt ABA	U.S. English localized keyboard, power cord
Opt ABB	English/Europe localized keyboard, power cord
Opt ABC	French-Canadian localized keyboard, North American power cord, French localized manuals.
Opt ABD	German localized keyboard, power cord, manuals
Opt ABE	Spanish localized keyboard, power cord
Opt ABF	French localized keyboard, power cord, manuals
Opt ABG	Australian keyboard, power cord
Opt ABH	Dutch localized keyboard, power cord
Opt ABJ	Japanese manuals; deletes console. Order console separately
Opt ABL	Canadian/English keyboard, Canadian power cord
Opt ABM	Spanish/Latin American localized keyboard, power cord
Opt ABN	Norwegian localized keyboard, power cord
Opt ABP	Swiss/German localized keyboard, power cord
Opt ABQ	Swiss/French localized keyboard, power cord
Opt ABR	South African localized keyboard, power cord
Opt ABS	Swedish localized keyboard, power cord

Product Summary (cont'd)

Product/ Opt. No.	Description
Localization Options (must choose only one) cont'd	
Opt. ABU	English (UK) localized keyboard, power cord
Opt. ABW	Flemish localized keyboard, power cord
Opt. ABX	Finnish localized keyboard, power cord
Opt. ABY	Danish localized keyboard, power cord
Opt. ABZ	Italian localized keyboard, power cord
Opt. ACC	U.K./Ireland localized keyboard, power cord
Opt. ACD	Swiss localized keyboard, power cord
Opt. ACE	English keyboard, Danish power cord
Upgrades (must choose at least one)	
A1827A	Corporate Business Server 890S Symmetrical Multi Processing (SMP Upgrades)
Opt. 102	Upgrade from 1-way to 2-way SMP system
Opt. 103	Upgrade from 2-way to 3-way SMP system
Opt. 104	Upgrade from 3-way to 4-way SMP system Add-On Accessories
Add-On Accessories	
A1828A	HP-PB Expansion Module <ul style="list-style-type: none"> • Interconnect cable for link to Dual Bus Converter • Lower Bus Converter • HP-PB I/O card cage with 14 single high HP-PB expansion slots
A1829A	Dual Bus Converter
A2570A	64 MB ECC memory
A2233A	128 MB ECC memory
A2234A	256 MB ECC memory

Technical Specifications

Physical Characteristics	
Height	1620 mm
Width	750 mm
Depth	905 mm
Weight	375 kg
Electrical Specifications	
AC Power Input	200–240 VAC, Single Phase, 50/60 Hz
Maximum Current	12.0 Amps @ 200 VAC; 10.1 Amps @ 240 VAC
Rated Current	24A max
Maximum Heat Dissipation	8,300 BTU/hour
Environmental Characteristics	
Operating Temperature Range	+5 C to +40 C
Recommended Temperature Range	+20 C to +25 C
Non-operating Temperature	–40 C to +70 C
Acoustics	7.5 bels (A) sound power below 30 C
Operating Humidity (non-condensing)	15% to 80% @ 40 C
Recommended Humidity	40% to 60%
Maximum Altitude (operating)	3045 m (10,000 ft)

Model 890S Corporate Business Server Configuration Reference Table

Item	Maximum Limits	Specifications	Notes
Processor Boards	4 per SPU	60 MHz	One processor in base configuration
Memory Capacity	2 GB		128 MB board in base configuration. Powerfail minimum: 128 MB for 1 or 2 CPUs; 192 MB for 3 CPUs; 256 MB for 4 CPUs.
Memory Boards	8 per SPU	64, 128, 256 MB	Use (8) 256 MB boards to reach 2 GB max configuration
Dual Bus-Converters	4 per SPU		One included in base config; 2 HP-PB I/O Card Cages per Dual BC
HP-PB I/O Slots Internal to SPU In Expansion Modules	112 Total 14 (see note) 98 slots		All slots are HP-PB 8 single-high slots unused in base configuration 14 single-high slots per HP-PB Expansion I/O Card Cage Module
HP-PB I/O Card Cages Internal to SPU External Maximum	1 7	32 MB/S	21 MB/S sustained. Maximum 256peak with 8 card cages Linked to SPU via 10 meter cable-pair
Disk Capacity HP-FL Disk Array HP-FL Independent SCSI HP-IB	1300 GB Total 1300 GB 312 GB 168 GB 8 GB		2.7 GB or 5.4 GB increments This limit includes disk arrays in independent mode 12 disks, 3 interfaces
Disk Devices HP-FL HA Arrays HP-FL Ind Mode Arrays SCSI HP-IB	250 Total** 240 48 84 12	Up to 5 disks/array	1 HP-FL "disk device" used for each High Availability (HA) array 1 HP-FL "disk device" used for each disk in the array Includes CD-ROM and optical disks
Optical Libraries	20 Library Units		2000 GB Max capacity w/ C1705A 100 GB Libraries 4 SCSI addresses (disk devices) per C1750A
Printers LAN Connected SCSI Serial Centronics	250 8 250 20		Connected via MUX or DTC port
Tape Drives SCSI HP-IB	24 16 8		
Terminal Connections MUX Connections DTC Connections DTC Units	4500 Total 1024 4500 150		Contact the Sales Center if the customer requires more than 3000 terminal connections. Available with 16 or 48 Ports
Network Links LAN (802.3) Token Ring (802.5) X.25 SNAplus Link FDDI	10 5 12 12* 2	10 Mbit/S 4 or 16 MB/S 64 KB/S 256 LU 100 Mbit/S	LAN/Console card plus 9 additional J2146A cards; J2146A single-high Single-high card size Single-high card size; 256 virtual circuits/card; 1024 VCs/SPU Single-high card size; max 256 LU per SPU Double-high card size
I/O Cards HP-FL SCSI HP-IB 8 Channel MUX 16 Channel MUX	40 20 9 64 64	5 MB/S 5 MB/S 1.5 MB/S	Double-high card size Single-high card size Single-high card size Single-high card size Single-high card size

* Until Q1 1993, only 1 SNAplus Link card is supported per SPU. Contact Sales Center if ordering prior to Q1 1993.

** Contact the Sales Center if customer requires more than 130 disk addresses.

Section 11

Series 800 Cabinets and Racking

Product Overview

System Design

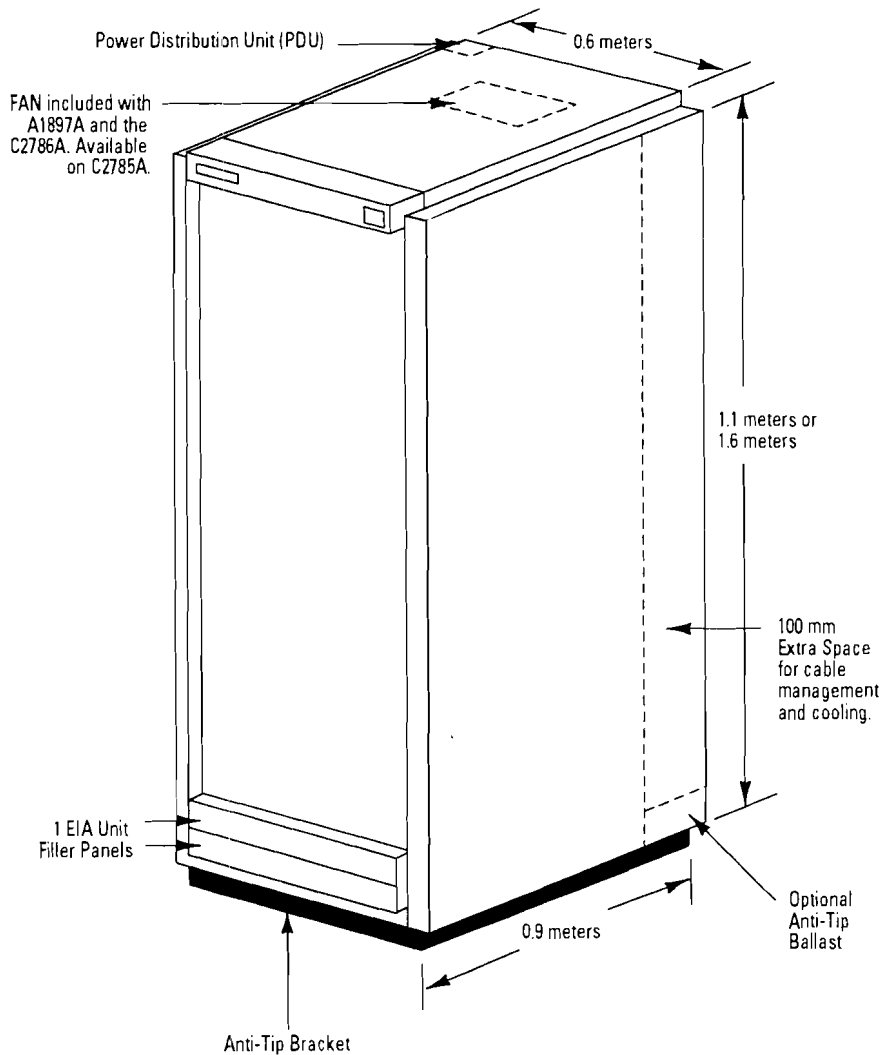
The Series 800 cabinets are designed for Fxx, Gxx, Hxx, Ixx, 8x7S, and 890 systems only. They are available in both 1.1 meter and 1.6 meter-high configurations. Further enhancing our commitment to standards, HP has adopted the 19" industry-standard package, which is divided into EIA (Electronic Industries Association) units of internal space (1 EIA unit = 1.75"). The 1.1 m cabinet includes space for 21 EIA units, and the 1.6 m cabinet provides 32 EIA units of space. Each server and peripheral occupies a specific number of EIA units. For example, a two-slot 817S is mounted sideways and uses 6 EIA units, while a 12-slot 897S uses 10 EIA units, and is mounted in its normal, upright position.

By designing the cabinet with standard EIA units, space is used more efficiently, and the cabinet projects the appearance of a single integrated system.

Additional advantages include efficient cooling with front to rear air flow and a fan on the 1.6 m unit. An extra 100 mm of space is added to the rear of the cabinet for improved cable management and cooling. An anti-tip bracket and large casters are included for added safety and mobility in all racks.

A strong, secure mounting design allows optional shipment of the cabinet with factory installed servers and peripherals. The integrated rack permits multiple combinations of servers and peripherals in a single cabinet.

Figure 11.1



* Note: Casters included as standard.

Part #	Description
A1896A	1.1 meter integrated
C2785A	1.1 meter standalone
A1897A	1.6 meter integrated
C2786A	1.6 meter standalone

Standalone Cabinets

Customers who order standalone cabinets will need to order rack-mount kits for each component they plan to install in the cabinet unless otherwise indicated. They also need to order filler panels for the empty space remaining in the cabinet. See Table 11.2 to determine how much space (in EIA units) will be filled by servers and peripherals. The remaining empty space will require filler panels. Each filler panel covers one EIA unit of space.

Note: The 1.1 meter standalone cabinet comes with 3 filler panels, and the 1.6 meter standalone cabinet comes with 2 filler panels.

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

The 1.6 meter cabinet comes standard with an extractor fan compatible with the selected power.

To Order

1. Place order for either 1.1 m cabinet (C2785A) or 1.6 m cabinet (C2786A) with correct power option.

2. Place order for Fxx, Gxx, Hxx, Ixx, or 890 Business Server and required peripherals. Order rack-mount kits for each component requiring a kit that you intend to mount in the cabinet, including servers and peripherals.

3. Calculate the number of empty EIA units in cabinet and order filler panels (Opt. 1F9—includes six panels) to cover empty space in front of cabinet. The 1.6 m cabinet includes 2 filler panels, and the 1.1 m cabinet ships with 3 filler panels. These filler panels are the minimum required after installation of servers and peripherals.

Table 11.1 Standalone Cabinet Configurations

Product Number	Description
C2785A	1.1 meter Standalone Cabinet
Opt. ABA	120 V North American Power
Opt. ABB	230 V European Power
Opt. OE3	208-240 V North American Power (must order ABA also)
Opt. 1F9	Adds 6 one-EIA-unit filler panels (order multiples of this option if more than six filler panels needed)
Opt. 1FA	Extractor fan (compatible with cabinet voltage)
Opt. 1FC	Front Door (can be locked for security purposes)
C2786A	1.6 meter Standalone Cabinet
Opt. ABA	208-240 V North American Power
Opt. ABB	230 V European Power
Opt. OE2	120 V North American Power (must order ABA also)
Opt. 1F9	Adds 6 one-EIA-unit filler panels (order multiples of this option if more than six filler panels needed)
Opt. 1FC	Front Door (can be locked for security purposes)
C2797A	Rack-mount Kit for HP 9000 Models 807S, 817S, 837S and F class systems
C2798A	Rack-mount Kit for HP 9000 Models 827S, 847S, 857S, 867S, 877S, 887S, and 897S and G, H, and I class systems
C2799A	Rack-mount Kit for HP 2345A DTC48
C2790A	14 Kg (30 lbs.) Anti-tip ballast (order 3 ballasts with 1 or more 1/2-inch tape drives)
C2791A	Package of 6 one-EIA-unit filler panels (use this P/N only when ordering separate from cabinet. Use Opt. 1F9 with cabinet.)

Integrated Cabinets

When ordering factory integrated cabinets, the factory will install rack-mount kits and filler panels automatically.

When placing your order, ensure that the cabinet is placed on the same section of the order as the SPU. The server and peripherals will then be installed in the cabinet at the factory. Operating system software will be loaded on the server's internal SCSI disk. If internal disk is deleted, software will not be loaded at the factory. *Only one 8x7S, Fxx, Gxx, Hxx, or Ixx server may be integrated into the cabinet at the factory; however, multiple disk and tape options may be ordered.*

The Corporate Business Server 890 is packaged in its own cabinet. Peripherals for the 890 may

be integrated into the A1897A 1.6 meter cabinets. When ordered at the same time as the 890, only one A1897A cabinet (containing the intended system disk, additional disks and options) may be placed in the same order section as the SPU. When this is done, the basic HP-UX OS and networking software will be pre-loaded, and all options in the cabinet will be factory integrated. Refer to the 890 configuration section for notes regarding where the OS will be pre-loaded when the cabinet contains multiple disks.

To Order

1. Place order for a Series 800 Business Server.
2. Order server product C2297AZ or C2298AZ for Fxx/Gxx/Hxx/Ixx rack-mount kit.

3. Determine customer's integrated peripheral requirements and total EIA space needed.

4. Order either 1.1 m cabinet (A1896A) or 1.6 m cabinet (A1897A) on same order-section as server (A1897A only for HP 9000 890 Server).

5. Order cabinet options for additional disks and/or tape (rack-mount kits are included).

Note:

- *Standalone peripherals which are not available as cabinet options should be ordered separately with corresponding rack mount kits. See the Supported Components list in this section.*

Table 11.2 Integrated Cabinet Configurations

Product Number	Description
A1896A	1.1 meter Integrated Cabinet
Opt. ABA	120 V North American Power
Opt. ABB	230 V European Power
Opt. 201	Add 1.3 Gbyte disk Series 6000 SCSI Mass Storage System
Opt. 202	Add 2.7 Gbyte disk in Series 6000 SCSI Mass Storage System
Opt. 203	Add 4.0 Gbyte disk in Series 6000 SCSI Mass Storage System
Opt. 212	Add 2.7 Gbyte disk and 2.0 Gbyte DDS DAT drive in Series 6000 SCSI Mass Storage System
A1897A	1.6 meter Integrated Cabinet
Opt. ABA	208-240 V North American Power
Opt. ABB	230 V European Power
Opt. 201	Add 1.3 Gbyte disk in Series 6000 SCSI Mass Storage System (C2462R)
Opt. 202	Add 2.7 Gbyte disk in Series 6000 SCSI Mass Storage System (C2462R + C2474R)
Opt. 203	Add 4.0 Gbyte disk in Series 6000 SCSI Mass Storage System (C2462R + (2) C2474R)
Opt. 212	Add 2.7 Gbyte disk and 2.0 Gbyte DDS DAT drive in Series 6000 SCSI Mass Storage System (C2462R + C2474R + C2477U)
HP-FL Disk Options	
Opt. 230	Add 5.44 GB 4-way Striped Disk Array; with Parity disk (C2254HA)
Opt. 231	Add 5.44 GB 4-way Striped Disk Array; no Parity disk (C2254B, striped mode)
Opt. 232	Add 2.72 GB 2-way Striped Disk Array; with Parity disk (C2252HA)
Opt. 233	Add 2.72 GB 2-way Striped Disk Array; no Parity disk (C2252B, striped mode)
Opt. 234	Add 2.72 GB Independent Mode Disk Array with 2 disks (C2252B, independent mode)*
Opt. 235	Add 5.44 GB Independent Mode Disk Array with 4 disks (C2254B, independent mode)*
I/O Expansion Option (Available only with Corporate Business Server 890) (A1828A)	
Opt. 250	Add HP-PB Expansion Module with 14 HP-PB expansion slots, Lower Bus Converter, and 10 Meter Interconnect Cable

Options using 2-Gbyte SCSI disks will be available January 1993.
*Independent mode only available with 9.0 and native NIOFL card (P/N 28615A)

- *Interface cards are not included when disk or tape options are ordered. Interface card requirements beyond what is provided in the base system configuration must be ordered separately.*

Configuration Detail

Space Allocation

The 1.1 m and 1.6 m rack mount cabinets, Series 800 servers and peripherals are measured in EIA unit (1 EIA unit = 1.75 in.). The 1.1 meter cabinet provides 21 EIA units of usable rack height, and the 1.6 meter cabinet provides 32 EIA units of rack space.

Power Information

When ordering standalone cabinets, customers have options for 120 V to 240 V power distribution in North America and 230 V in Europe. When ordering integrated cabinets for use in North America, customers may order only the 120 V power distribution with the 1.1 meter cabinet and 208 V-240 V with the 1.6 meter cabinet. The 240 V option is highly recommended in the U.S. for the 1.6 meter cabinet to prevent current overloads. This is based on the common 20 amp limit of most U.S. building codes. Equipment uses half the current at 240 V that it would use at 120 V, so a 240 V PDU allows more equipment to be

run off a single PDU and off a single wiring circuit in the customer's building.

Auto-ranging equipment like the HP 9000 models Fxx, Gxx, Hxx, Ixx, and 890 and the Series 6000 mass storage products will automatically work at either 120 V or 240 V. Other equipment that is not auto-ranging must should be ordered with the corresponding cabinets.

European cabinets all have 230 V power distribution units. Customers in Asia Pacific and South America should order the power option which is appropriate for the power supply in their country.

Note: Each cabinet requires a dedicated 20 amp circuit.

Table 11.3 Cabinet Measurement Details

Product Number	Description	Available EIA Units	Cabinet Height	Cabinet Width	Cabinet Depth
A1896A	Integrated 1.1 m cabinet	21	1.1 m	.6 m	.9 m
C2785A	Standalone 1.1 m cabinet	21	1.1 m	.6 m	.9 m
A1897A	Integrated 1.6 m cabinet	32	1.6 m	.6 m	.9 m
C2786A	Standalone 1.6 m cabinet	32	1.6 m	.6 m	.9 m

Table 11.4 Cabinet Power Details

Product Number	Power Option	Cabinet Height	Power Dist.	Max. Current	Phase	Plug Style
A1896A	ABA (U.S.)	1.1 m	100V-120V	16 A	Single	5-20 P
	ABB (European)	1.1 m	230V	16 A	Single	No Plug
C2785A	ABA (U.S.)	1.1 m	100V-120V	16 A	Single	5-20 P
	0E3 (U.S.)	1.1 m	208V-240V	16 A	Single	L6-20 P
	ABB (European)	1.1 m	230V	16 A	Single	No Plug
A1897A	ABA (U.S.)	1.6 m	208V-240V	16 A	Single	L6-20 P
	ABB (European)	1.6 m	230V	16 A	Single	No Plug
C2786A	0E2 (U.S.)	1.6 m	100V-120V	16 A	Single	L5-20 P
	ABA (U.S.)	1.6 m	208V-240V	16 A	Single	L6-20 P
	ABB (European)	1.6 m	230V	16 A	Single	No Plug

Note: To check that the servers and peripherals do not exceed the 16 amp capacity of the cabinets:

1. Sum the currents required by each system.
2. If sum is less than 16 amps, the configuration meets power requirements.

Supported Components

The Series 800 cabinets support HP 9000 models Fxx, Gxx, Hxx, Ixx, and 890 servers, and a variety of disk drives, tape drives, and DTCs. Combinations of supported products are limited only by space inside the cabinet and the 16-amp maximum current limit.

When ordering integrated cabinets from the factory, you simply need to order the server and cabinet options you require. When ordering standalone cabinets, you need to order a rack-mount kit for each component you intend to rack in the cabinet. A rack-mount kit

consists of rails, bezels, and a power cord. Kits are orderable in the form of server and peripheral options listed in the "Required Mounting Hardware" column in Table 11.5.

Table 11.5 Components Supported in Series 800 Cabinets

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120V AC	208-240V AC
Business Servers†					
A2428A	F Class Business Servers	6	P/N C2797A for standalone racks. C2297AZ for integrated racks.	6.5 A	3.5 A
A2429A	G Class Business Servers	10	P/N C2798A for standalone racks. C2298AZ for integrated racks.	12 A	6 A
A2430A	H Class Business Servers	10	P/N C2798A for standalone racks. C2298AZ for integrated racks.	12 A	6 A
A2431A	I Class Business Servers	10	P/N C2798A for standalone racks. C2298AZ for integrated racks.	12 A	6 A
Tape Drives					
7979A**	1/2" Tape Drive	5 + 1*	Option 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980A**	1/2" Tape Drive	5 + 1*	Option 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980XC**	1/2" Tape Drive	5 + 1*	Option 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980S**	1/2" Tape Drive	5 + 1*	Option 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980SX**	1/2" Tape Drive	5 + 1*	Option 1A4 and three C2790A ballasts	2.81 A	1.46 A
Series 6000 SCSI Storage System†					
C2460R	422 Mbyte Rack-Mount Disk Storage System	4	Included	2.6 A	1.5 A
C2461R	677 Mbyte Rack-Mount Disk Storage System	4	Included	2.6 A	1.5 A
C2462R	1.35 GB Rack-Mount Disk Storage System	4	Included	2.6 A	1.5 A
C2464R	2.0 GB Rack-Mount DAT Storage System	4	Included	2.6 A	1.5 A

* 1/2" tape drives require 5 EIA units for the mechanism plus 1 EIA unit for access to the tape drive handle for a total of 6 EIA units.

** Three anti tip ballasts (C2790A) are required for one or more 1/2" tape drive mechanisms. For 208V-240V power, order power cord (8120-1860).

† Series 6000 SCSI Storage Systems support up to 2.7 GB disk, and 2.7 GB DAT. See products C246xR in your Price Guide for expansion disks and DAT.

‡ The Corporate Business Server 890 is packaged in its own cabinet.



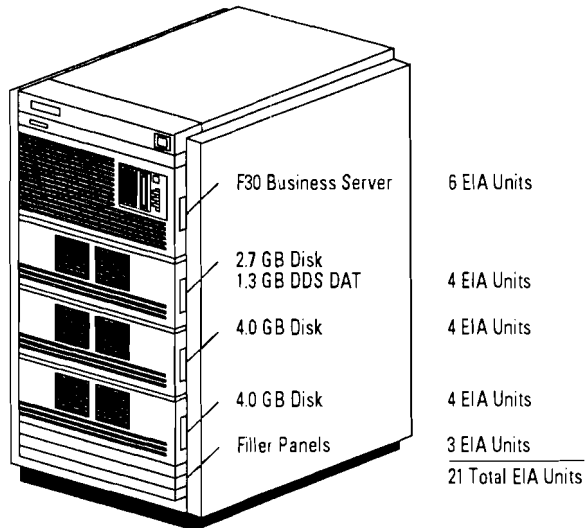
Table 11.5 Components Supported in Series 800 Cabinets (cont'd)

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120V AC	208-240V AC
Series 6000 SCSI Storage System† (cont'd)					
C2465R	2 × 2.0 GB DAT Drives Rack-Mount Storage System	4	Included	2.6 A	1.5 A
C2466R	Up to 8 GB data compression DAT Rack-Mount Storage System	4	Included	2.6 A	1.5 A
C2467R	Rack-Mount Storage System containing 2 units of the data compression DAT (up to 8 GB per drive)	4	Included	2.6 A	1.5 A
C3023R	2 GB Disk Storage System Rack Mount	4	Included	3.0	1.8 A
C3024R	2 × 2 GB Disk Storage System Rack Mount	4	Included	3.0	1.8 A
C3025RZ	3 × 2 GB Disk Storage System Rack Mount	4	Included	3.0	1.8 A
HP-FL Disk Array Options (Also available as Integrated Cabinet options)					
C2252HA	2.72 GB High Availability Disk Array	6	Included	4 A	2 A
C2254HA	5.44 GB High Availability Disk Array	6	Included	4 A	2 A
C2252B	2.72 GB Disk Array with 2 disks	6	Included	4 A	2 A
C2254B	5.44 GB Disk Array with 4 disks	6	Included	4 A	2 A
Data Terminal Connects					
Z340A	DTC16	6	Kit # 35199E	2 A	1 A
Z345A	DTC48	6	Kit # C2799A	2 A	1 A
Expansion Modules					
A1828A	HP-PB I/O Expansion Module (for 890 only)	7	Included	N/A	3 A
Rackmounting Hardware					
C2788A	Generic Rail Kit for Non- standard 19" Peripherals	1	Included	N/A	N/A
C2792A	ADP Rack-mount Kit for Rear of Cabinet	None	Included	N/A	N/A
Anti-Tip Ballast					
C2790A	Anti-Tip Ballast 14 Kg (30 lbs.)	None	Included	N/A	N/A

†Series 6000 SCSI Storage Systems support up to 2.7 GB disk, and 2.7 GB DAT. See products C246xR in your Price Guide for expansion disks and DAT.

Figure 11.2 Sample Cabinet Diagrams

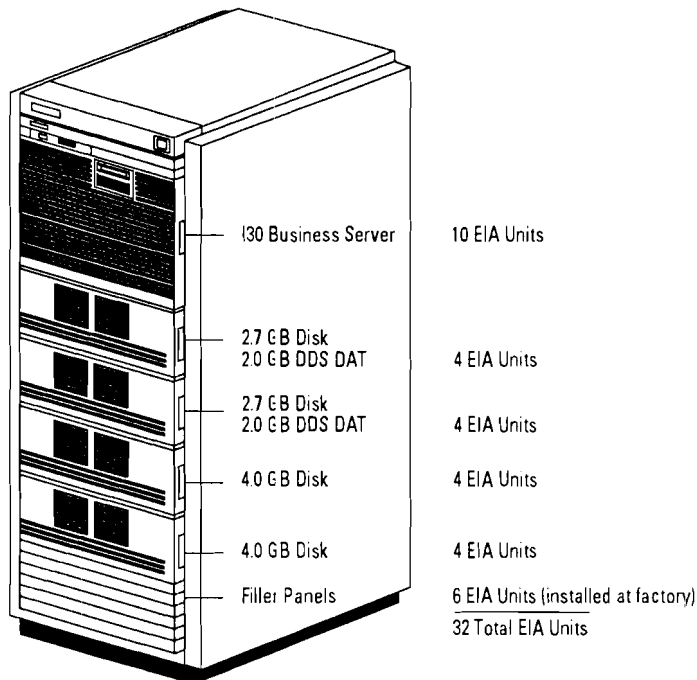
Sample Racking Configuration
Model Fxx, Gxx, Hxx, Ixx 1.1-m Factory Integrated Cabinet (A1896A)



Qty.	P/N	Description
1	A2428A	Model F30 Business Server
1	C2297AZ	Add Rack Mount Hardware Kit
1	A1896A	1.1-m Integrated Cabinet
2	Opt. 203	Add 4.0 GB Disk
1	Opt. 212	Add 2.7 GB Disk and 2.0 GB DDS DAT

Figure 11.3 Sample Cabinet Diagrams

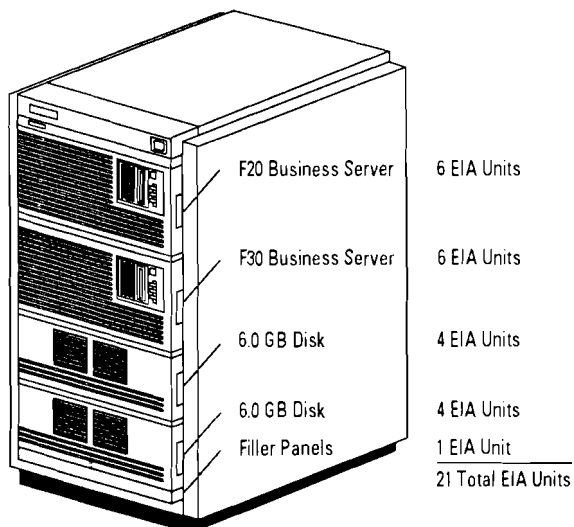
Sample Racking Configuration
Model Fxx, Gxx, Hxx, Ixx 1.6-m Factory Integrated Cabinet (A1897A)



Qty.	P/N	Description
1	A2431A	Model I30 Business Server
1	C2298AZ	Add Rack Mount Hardware Kit
1	A1897A	1.6-m Integrated Cabinet
2	Opt. 203	Add 4.0 GB Disk
2	Opt. 212	Add 2.7 GB Disk and 2.0 GB DDS DAT

Figure 11.4 Sample Cabinet Diagrams

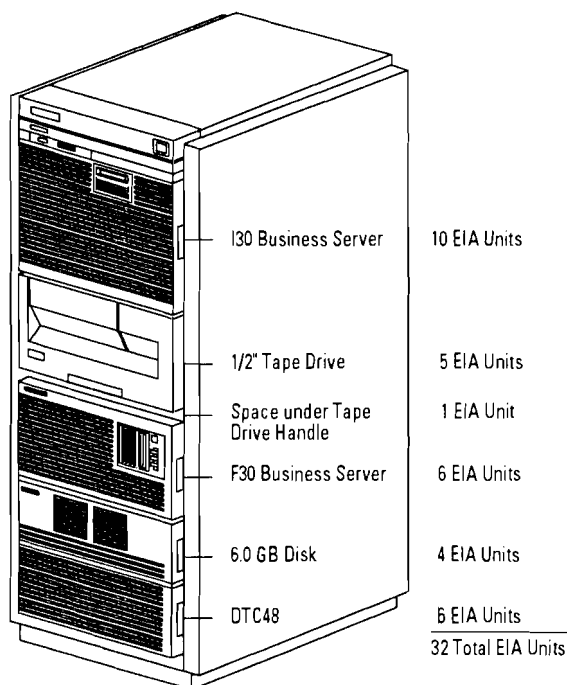
Sample Racking Configuration
Model Fxx, Gxx, Hxx, Ixx 1.1-m Field Integrated Cabinet (C2785A)



Qty.	P/N	Description
1	C2785A	1.1-m Standalone Cabinet (Three EIA Unit Filler Panels Included)
	Opt. OE3	208V-240V
1	A2428A	Model F20 Business Server
1	A2428A	Model F30 Business Server
2	C2797A	Rack-Mount Kit for F20 and F30 Business Servers
2	C2462R	1.35 GB Rack-Mount Storage System (Rack-Mount Kit included)
4	C2474R	1.35 GB Disk Drive Expansion (order Opt. 001 for factory installation into C2462R housing)

Figure 11.5 Sample Cabinet Diagrams

Sample Racking Configuration
Model Fxx, Gxx, Hxx, Ixx 1.1-m Field Integrated Cabinet (C2786A)



Qty.	P/N	Description
1	C2786A	1.1-m Standalone Cabinet (two EIA unit Filler Panels Included)
	Opt. ABA	208V-240V
1	A2428A	Model F30 Business Server
1	C2797A	Rack-Mount Kit for F30 Business Server
1	A2431A	Model I30 Business Server
1	C2798A	Rack-Mount Kit for I30 Business Server
1	7980SX	1/2" Tape Drive
	Opt. 1A4	Rack-Mount Kit
1	B120-1860	208V-240V power cord for 7980SX Tape Drive
1	C3023R	2.0 GB Rack-Mount Storage System (Rack-Mount Kit included)
2	C3028U	2.0 GB Disk Drive Expansion
3	C2790A	14 KG (30 lb.) each anti-tip ballasts (for 1/2" tape drive)
1	2345A	DTC48
	Opt. 015	220 V Power
1	C2799A	Rackmount kit for DTC48

Sample Racking Configurations for the Corporate Business Server 890

A sample configuration for a reasonably large Corporate Business Server 890 system is shown in Figure 11.6. As shown on the figure, this configuration uses one additional HP-PB Expansion Module (I/O Card Cage) to provide the additional slots and I/O bandwidth necessary to support this configuration. Depending on the system workload, it may even be advisable to add a third HP-PB Expansion Module into the configuration

to increase the aggregate system I/O bandwidth, allowing the disk, LAN and X.25 traffic to be divided across three HP-PB channels.

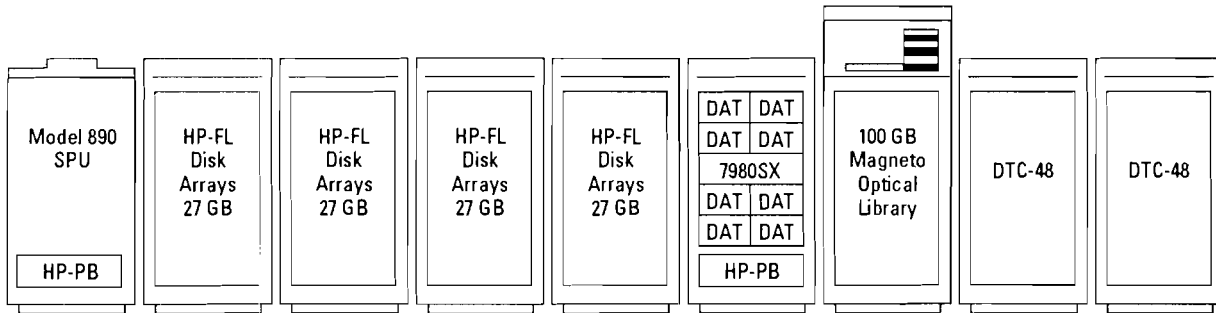
NOTE: If the additional HP-PB Expansion Module is added, an additional Dual Bus-Converter (A1829A) would need to be added to the SPU. An additional 1.6 meter expansion cabinet would also be required to house the HP-PB Expansion Module.

Several examples of 1.6 meter expansion cabinet configurations for the Corporate Business Server 890 are shown on the following pages. All sample configurations

illustrate the use of the A1897A Integrated Cabinet as a base unit. In some examples additional components must be ordered separately. Only the components ordered as options to the A1897A are factory integrated.

Note: Factory integration is only available for disk and tape devices that are offered as options to the A1897A Integrated Cabinet. All other devices which are ordered separately require field installation.

Figure 11.6 Corporate Business Server 890 Sample Configuration



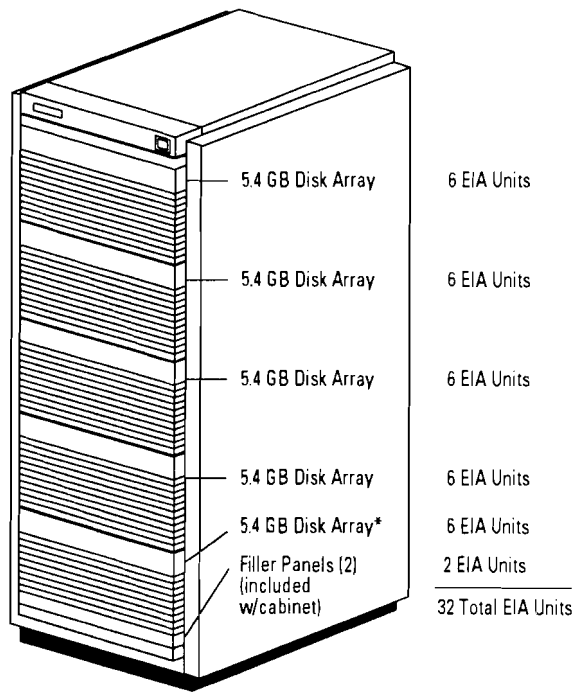
Sample Configuration Shown

- 108 GB HP-FL Disk
- 8 DATs for Backup
- 1 7980SX 1/2" Tape Drive
- 480 DTC Ports
- 100 GB Optical Library
- 4 802.3 LANs
- 2 FDDI Links
- 2 SNA Links
- 5 X.25 Links
- 1 High-Speed SCSI Printer Link

Section 11 — Series 800 Cabinets and Racking (cont'd)

Figure 11.7 Maximum High-Availability Disk Array Configuration for Use with Corporate Business Server 890

Sample Racking Configuration
Model 890 1.6-m Factory Integrated Cabinet (A1897A)

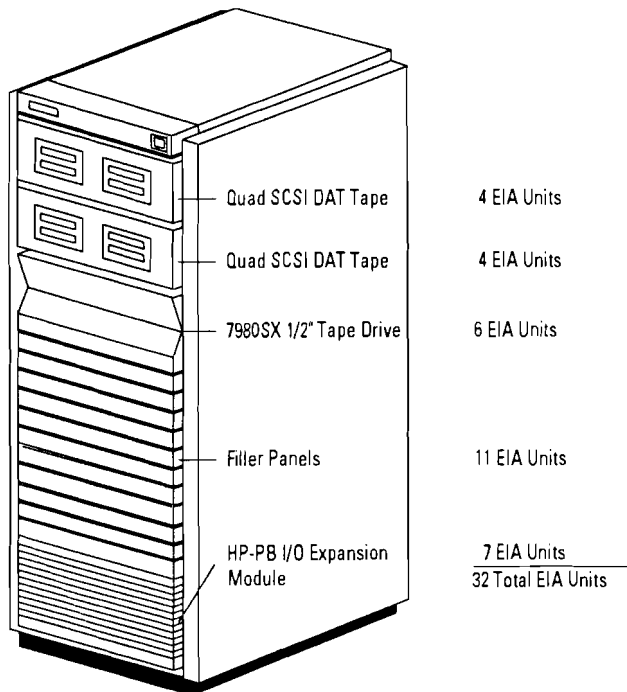


Qty.	P/N	Description
1	A1897A	1.6-m Integrated Cabinet
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with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

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

Figure 11.8 SCSI Backup Sub-System Configuration for Use with Corporate Business Server 890

Sample Racking Configuration
Model 890 1.6-m Factory Integrated Cabinet (A1897A)

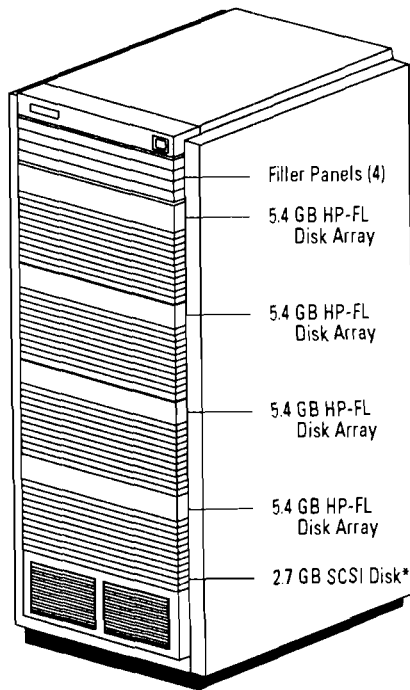


Qty.	P/N	Description
1	A1897A	1.6-m Integrated Cabinet
	Opt. 250	Add HP-PB Expansion Module
2	C2467R	4-16 GB Dual DAT tape unit
4	C2478U	2-8 GB Add-on DAT tape Opt. ODG
1	7980SX	1/2" tape drive with SCSI interface
	Opt. 1A4	
2	28655A	HP-PB SCSI/parallel host adapter card with 1.0-m Cable

Section 11 — Series 800 Cabinets and Racking (cont'd)

Figure 11.9 SCSI System Disk Configuration with HP-FL Add-On Disk for Use with Corporate Business Server 890

Sample Racking Configuration — Model 890



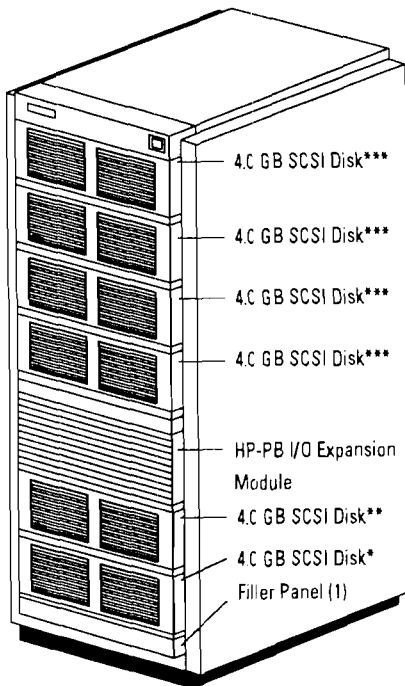
Qty.	P/N	Description
1	A1897A	1.6-m Integrated Cabinet
	Opt. 202	Add 2.7 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk
	Opt. 230	Add 5.44 GB 4-way striped disk array; with parity disk [disk arrays include 0.5-m interconnect cable.]
4		EIA Units
6		EIA Units
6		EIA Units
6		EIA Units
6		EIA Units
4		EIA Units
		32 Total EIA Units

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

Section
11

Figure 11.9a SCSI System Disk Configuration with SCSI Add-On Disk for Use with Corporate Business Server 890

Sample Racking Configuration — Model 890



Qty.	P/N	Description
1	A1897A	1.6-m Integrated Cabinet
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 203	Add 4.0 GB disk in Series 6000 SCSI Mass Storage System
	Opt. 250	Add HP-PB Expansion Module
4		EIA Units
4		EIA Units
4		EIA Units
4		EIA Units
7		EIA Units
4		EIA Units
4		EIA Units
1		EIA Unit
		32 Total EIA Units

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

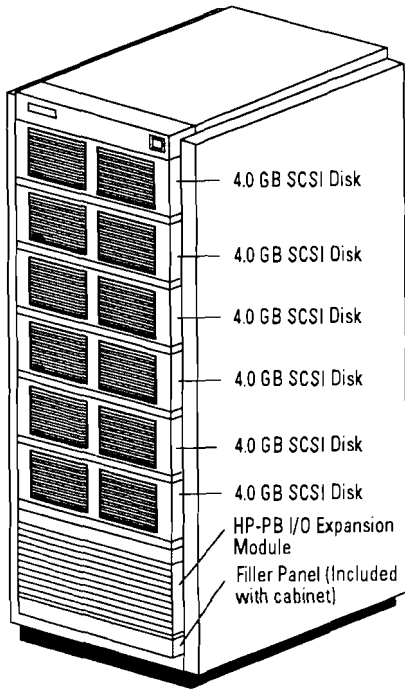
**May be chained to system disk or connected to a separate SCSI card.

***May be connected to SCSI cards in this cabinet.

Section 11 — Series 800 Cabinets and Racking (cont'd)

Figure 11.9b SCSI Add-On Disk Configuration for use with Corporate Business Server 890

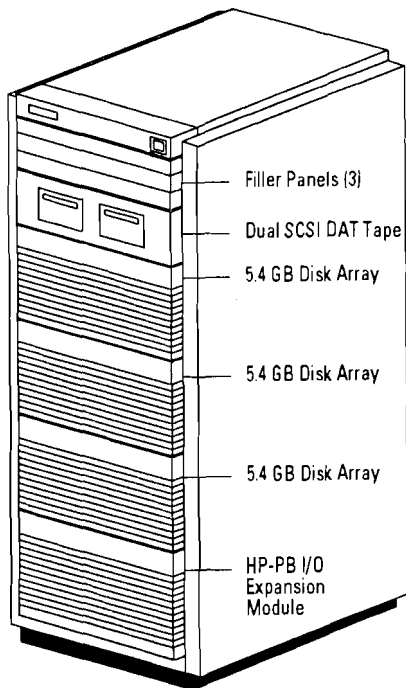
Sample Racking Configuration
Model 890 1.6-m Factory Integrated Cabinet (A1897A)



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

Figure 11.9c Multi-Purpose Combination Configuration for Use with Corporate Business Server 890

Sample Racking Configuration
Model 890 1.6-m Factory Integrated Cabinet (A1897A)



Qty.	P/N	Description
1	A1897A	1.6-m Integrated Cabinet
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 230	Add 5.4 GB 4-way striped disk array with parity disk
	Opt. 250	Add HP-PB Expansion Module
1	C2464R	2.0 GB Rackmount 5.25-inch DAT Tape Storage System
1	C24770	2.0 GB 5.25-inch add-on DAT Tape Drive
	Opt. ODG	
		3 EIA Units
		4 EIA Units
		6 EIA Units
		6 EIA Units
		6 EIA Units
		7 EIA Units
		32 Total EIA Units

Questions and Answers

1. Are the new cabinets backward compatible with older Series 800 Business Servers?

The Series 800 cabinets are compatible *only* with 8x7S, Fxx, Gxx, Hxx, Ixx, and 890 servers. They can, however, store 19" peripherals from older systems such as 1/2-inch tape drives.

2. Are fans included with the Series 800 cabinets?

A fan is included with the 1.6 m racks but is not included with the 1.1 m racks. A fan may be added to the standalone 1.1 m rack (C2785A) by ordering option 1FA.

3. When do I need to order an anti-tip ballast?

An anti-tip ballast is designed to provide added stability when slide rail peripherals such as 1/2-inch tape drives are mounted high in the cabinet. Three anti-tip ballasts should be ordered when installing one or more 1/2-inch tape drives in the cabinet. They are designed to provide added stability when tape drives are pulled out for cleaning. The ballasts add 14 kg of weight to the bottom-rear of the cabinet for added stability and do not consume any EIA units of space.

4. Why is there no plug provided for the European power options?

Plugs are not provided for European power options because the plug types are different in each country. Plugs will be installed by the local CEs.

5. When do I buy integrated cabinets versus standalone racks?

Integrated cabinets are the preferred option when you are ordering Series 800 servers, supported disk drives, or DDS tape drives, to take advantage of factory installation.

Standalone cabinets should be ordered only when unusual configurations are required or if a customer decides to purchase a cabinet after taking delivery of an Series 800 server.

6. In North America, why does the 1.1 m integrated cabinet come with 120 V power while the 1.6m cabinet comes with 240 V power?

This is to prevent current overloads when the cabinets are fully loaded with equipment. The current capacity of the power distribution unit is 16 amps. A 240 V PDU allows twice as much equipment to be run off a single PDU and off a single wiring circuit in the customer's building than a 120 V PDU.

7. Is installation included with all racked systems?

Factory integrated cabinets include installation; standalone cabinet configurations do not include installation.

8. Are there any peripherals that are not supported in the Series 800 racks?

All peripherals which have 19" rack-mount kits are supported in the Series 800 racks.

9. When do I order a front door on my cabinet?

A front door with lock is available to customers who require greater security. A front door also provides a uniform look to cabinets which contain older peripherals that do not have bezels. Refer to the Standalone Cabinets section for details on how to order a front door.

10. Can I rack more than one Fxx, Gxx, Hxx, Ixx SPU into a cabinet?

Yes, as long as they do not exceed power voltage and EIA space limitations.

Section 12 Peripheral Interfaces

HP-PB Interfaces

Input/output interfaces are the crucial connecting link between

the system and external peripheral devices and other computer systems. Table 12.1 lists the HP 9000 Series 800 HP Precision

Bus (HP-PB) interfaces by category and size (single-high or double high).

Table 12.1. HP 9000 Series 800 HP-PB Interfaces

Category	Product Number and Name	Use	Interface Card Size
Peripheral Interfaces			
Multi-Device	HP 28655A HP-PB SCSI/Parallel Host Adapter	Interfacing disks, DDS tape devices, optional disk devices, magnetic tape devices, integrated peripheral packages via the SCSI connection. Centronics printers can be connected via the parallel port.	Single high
	HP A1749A HP-PB HP-FL Interface PBA-FL Interface	PBA-FL fiber optic peripheral interface for 8x7, Fxx, Gxx, Hxx, and lxx servers. Supported on HP-UX 8.02 and 9.0.	Double high
	HP 28615A HP-PB HP-FL Interface	HP-PB fiber optic peripheral interface for 8x7, Fxx, Gxx, Hxx, lxx, and 890 servers. Supported on HP-UX 9.0 only.	Double high
	HP 28650A HP-IB Interface	Interfacing disks, cartridge tape subsystems, magnetic tape units, plotters, and other HP-IB devices to the 800/815, 822-852 systems.	Single high
	HP 28650B HP-IB Interface	Interfacing disks, cartridge tape subsystems, magnetic tape units, plotters, and other HP-IB devices to Fxx, Gxx, Hxx, lxx, and 890 servers.	Single high
	HP 40299B 8-Channel Multiplexer	Interfacing terminals, RS-232 or RS-422, printers, plotters, and other serial devices to the system, plus system console for 8X2S servers.	Single high
	HP J2092A 16 RS-232-C Direct Connect Multiplexer	Interface RS-232 peripherals in direct connect mode (using data signals only)	Single high
	HP J2093A 16 RS-423 Direct Connect Multiplexer	Interface RS-423 or RS-422 peripherals in direct connect mode (using data signals only) on long distance.	Single high
	HP J2094A 16 RS-232-C Modem Connect Multiplexer	Interface RS-232 peripherals locally with full modem control, or through asynchronous modem.	Single high
	HP 2340A DTC16	Datacommunications and Terminal Controller for connecting up to 16 devices via a LAN	Not applicable
	HP 2345A DTC48	Datacommunications and Terminal Controller for connecting up to 48 devices via a LAN	Not applicable
I/O Real-Time Interface	HP 94181A Real-Time Interface	Via HP 28672A 8-channel SBX module or other SBX module connects system to real-time processes that require faster real-time response than the host system can routinely provide.	Double high
Networking Interfaces			
System to System Comm.	HP J2146A LAN Link Interface (Fxx, Gxx, Hxx, lxx, and 890 servers only)	Communication with other HP and non-HP systems via IEEE 802.3 or Ethernet Local Area Network connection. Communication with Datacommunication and Terminal Controllers (DTC) Terminal Access/9000.	Single high
	HP 36967A LAN Link Interface (8x2S servers only)	Communication with other HP and non-HP systems via IEEE 802.3 or Ethernet Local Area Network connection. Communication with Datacommunication and Terminal Controllers (DTC) Terminal Access/9000.	Single high
	HP 36960A X.25 Link Interface	Communication with other systems conforming to CCITT via public or private packet switching network.	Single high
	HP 98173A SNA Link Interface with Opt 005	Communication with IBM 370 or plug-compatible systems.	Single high
	HP J2166A Token Ring Interface (Fxx, Gxx, Hxx, lxx, and 890 servers only)	Communication with HP and non-HP systems via the IEEE 802.5 or Token Ring connection.	Single high
	HP J2157A FDDI/9000	High speed fiber LAN communication (100 Mbps max.)	Double
	HP 36970A OSI Express MAP 3.0 Link Broadband Interface	Communication with MAP 3.0-compliant factory floor devices and systems via broadband cables.	2 × Double high

SCSI Interfaces

SCSI is an ANSI standard bus which allows connection of peripherals such as disks and tapes to a computer system. There are two SCSI Host Adapters supported: HP 28655A for HP-PB systems (Model 8x7S, Fxx, Gxx, Hxx, Ixx, and 890) and HP 27147A for CIO systems (Models 855, 860, 865, 870). The HP 28655A SCSI/Parallel Adapter includes both a SCSI port and a Centronics port. The Centronics port is a parallel port used for connecting printers.

- There are seven available SCSI device addresses on each Host Adapter Card. Most SCSI peripheral devices use one SCSI address. The Optical Disk Library System (HP C1700A) uses three SCSI addresses (two for the M/O drives and one for the AutoChanger picker).
- SCSI peripherals (disks and tapes) can be mixed and matched in any combination on the same SCSI bus as long as the total number of SCSI devices does not exceed seven.
- Total disk drive support is limited to 32 devices. The HP C1700A counts as two disk drives.
- Even if two C1700As are racked on the same cabinet (using options 1AC and 111), they still count as 4 disks and 2 auto-changers, requiring 6 SCSI device addresses.
- Use of third-party peripherals is at user's risk and is not supported by HP's standard support process.

Table 12.2 Specifications

HP 28655A	HP-PB SCSI/Parallel Adapter (single-high)
SCSI	Fully compatible with ANSI X3.131-1990 (SCSI-2) Specification 8 bit SCSI bus 3.0 Mb/sec asynchronous transfer rate 5.0 Mb/sec synchronous transfer rate Parity support (SCSI Data only) Connects up to 7 devices per adapter Alternative-2 Termination Maximum cable length is 6 meters
Centronics	64-byte FIFO 330 Kb/s burst transfer rate Connects one peripheral per adapter Support for output devices (printers and plotters) only Maximum cable length is 2 meters
HP 27147A	CIO SCSI Host Adapter (single-high)
SCSI	Fully compatible with ANSI X3.131-1990 (SCSI-2) Specification 8 bit SCSI bus 1.5 Mb/sec asynchronous transfer rate 5.0 Mb/sec synchronous transfer rate Parity support (SCSI Data only) Connects up to 7 devices per adapter Maximum cable length is 6 meters

SCSI Powerfail Recovery Guidelines for HP-UX 8.02 and 9.0

HP-UX 8.02 was the first release to support powerfail recovery with SCSI devices. Powerfail recovery is disabled on HP-UX 8.0 when a SCSI host adapter card is attached to the system. HP-UX 9.0 supports SCSI powerfail on the 8x7, Fxx, Gxx, Hxx, Ixx, and 890 Business Servers. In order to support powerfail recovery on 8.02 with SCSI devices, certain guidelines apply:

1. HP-UX 8.02 is only supported on HP 9000 Models 8x7, Fxx, Gxx, Hxx, and Ixx (except the 887S, 897S, G50, H50, and I50).
2. Embedded (internal to Fxx, Gxx, Hxx, and Ixx systems) SCSI peripherals fully support powerfail recovery.

3. The C2212A and C2213A SCSI disks do not support powerfail recovery. These devices do not have "sector atomicity," which means that they cannot guarantee that a write operation will complete during a powerfail. The system may experience data loss/corruption on these devices after a power failure. These devices require a dedicated host adapter (P/N 28655A). Multiple C2212A and C2213A can share the same host adapter. In order to ensure data integrity, it is recommended that the C2212A and C2213A drives NOT be used in environments where power fail recovery is required.

Table 12.3 Maximum SCSI Support Matrix

SPU	# Cards Supported	# Disks Supported	Max. # Gb Supported	Total # of tapes Supported (DDS, Mag, CT)	Total # of Optical Libraries Supported	Total # of Centronics Printers Supported (1 per card)
F10, F20, F30	2	21	42	8	4	3
G30, G40, G50	4	35	70	8	4	5
H20, H30, H40, H50	8	35	70	8	4	9
I30, I40, I50	12	35	70	8	4	13
890	20	84	168	16	20	20

IODC Requirement for CIO Based SPUs

- For installed base S800 CIO system customers whose systems have been installed prior to HP-UX 8.0 and want to order the CIO SCSI Host Adapter card (27147A), the Sales Team must ask if the customer will be using a SCSI peripheral device for boot (system disk capability) or install/update. If so, the IODC firmware revision must be checked. If the customer's S800 CIO system IODC firmware revision is prior to 8 on the 850/55/60/65/70, the IODC Firmware Upgrade Kit must be ordered with the CIO SCSI Host Adapter and HP-UX 8.0 (B2436A). The IODC Firmware Upgrade Kit will not be needed if customers use SCSI peripherals for secondary storage only, or if the IODC firmware version is later than 6 or 8 (as noted above). For high-end S800 CIO systems (850/855/860/865/870) with a dual SCSI boot path over separate CIO channels, two IODC Firmware Upgrade Kits will be needed.

SCSI Cabling Guidelines

- Ensure that the total cable length (including external and internal cables) does not exceed 6 meters.
- The length of the SCSI bus cable should be kept as short as possible. However, do not use cables shorter than 0.5 meters.
- Make sure that all cables are attached to a device at both ends, except for the Host Adapter of course.
- SCSI cable impedance and construction can have significant effect on signal quality. For this reason, we recommend that only HP cables be used.

SCSI Cables for 28655A NIO SCSI Adapter and 27147A CIO SCSI Adapter

Adapter-to-Peripheral SCSI Cables: For the 27147A CIO-SCSI adapter; an adapter-to-peripheral, 2 meter SCSI cable is included with the adapter. This is a special cable with a SCSI low-density bail-lock 50 pin low-density connector for the peripheral connect end.

For the 28655A HP-PB SCSI adapter; an adapter-to-peripheral, 1 meter shielded SCSI cable is included with the adapter. This cable has a 50 pin high-density thumb-screw connector for the adapter side and a 50-pin low-density bail-lock connector for the peripheral connect. (K2296 and K2297, listed in Table 12.4, are replacement cables for this adapter-to-peripheral cable. These and other cables listed in Table 12.4 can be ordered from Complimentary Products Sunnyvale—CPS previously DMK).

Table 12.4

Product Number	Length	Description
Adapter-to-Peripheral SCSI Cables		
K2296	1 m	High-density (HD) screw to low-density (LD) bail-lock male-male connectors
K2297	1.5 m	High-density (HD) screw to low-density (LD) bail-lock male-male connectors
Peripheral-to-Peripheral SCSI Cables		
92222A	0.5 m	LD bail-lock male-male connectors
92222B	1 m	LD bail-lock male-male connectors
92222C	2 m	LD bail-lock male-male connectors
SCSI Extender Cables		
92222D	1 m	LD bail-lock extension cable with 1 male and 1 female connectors
C2900A	3 m	LD bail-lock extension cable with 1 male and 1 female connectors

Termination Power

- Termination power is supplied by the host adapter. Any or all of the devices on the bus may supply termination power. The first two devices that supply termination power should be located at each end of the SCSI bus. Other devices supplying termination power can be placed anywhere along the bus.

Termination Resistors

- The Host bus Adapter will supply termination to one end of the bus if it is not part of the multifunction IO card.
- Each end of the SCSI bus must be terminated.
- Use active terminators as supplied with the product.

Usage Guidelines

- Power on all SCSI peripherals and make sure they have time to complete their selftest before powering on the SPU (System Processor Unit).

Note: Some devices require termination power to pass the selftest. These devices may fail selftest if they are powered on before the Host. If this occurs, the system will still boot up successfully AND clear the error on the device.

- Power on all SCSI peripherals that provide termination power first.
- Keep all devices powered on during and after system boot-up.
- Do not add or remove SCSI devices while the system or any SCSI peripheral providing Term Power is powered on.

Fiber-Optic SCSI Extender

The HP 28643A Fiber-Optic Extender overcomes the 6-meter SCSI distance limitation by allowing the addition of up to 100 meters to the SCSI bus. The device can transfer data synchronously and asynchronously, is independent of the computer backplane, supports powerfail recovery, and is 19" rack-mountable. Utilization of the extender is recommended only for non-disk SCSI devices due to performance implications. Typical performance rates:

	50 meters	100 meters
Asynchronous	300 Kbytes per sec	225 Kbytes per sec
Synchronous	4.0 Mbytes per sec	3.25 Mbytes per sec

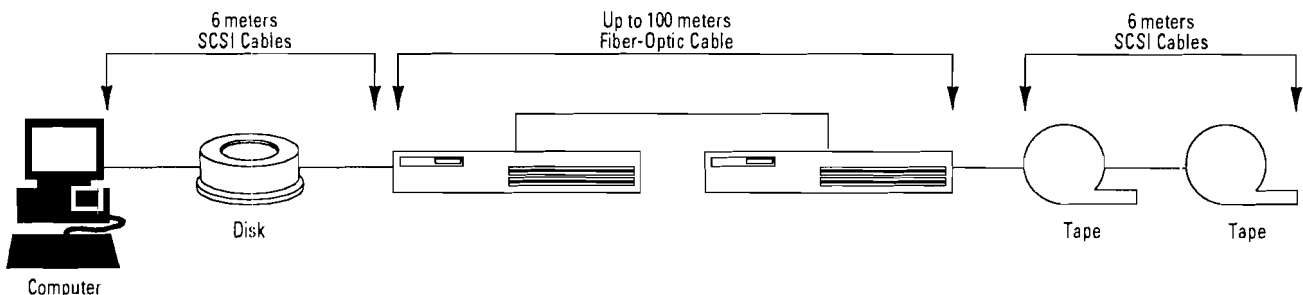
HP 28643A includes 2 extender units, 2 mounting bracket kits, an installation/reference manual, and a loopback test coupler. Option AFB and AFD add 50 meters and 100 meters of 62.5/125 mm fiber-optic duplex cable, respectively.

HP-FL Interface

Disks and disk arrays can connect to Series 800 Business Servers via HP-FL interfaces, as shown in Figure 42, (the F10, F20, F30, 807, 817, and 837 do not support HP-FL). HP-FL is the recommended disk interface for those customers requiring either disk array functionality or extra configuration flexibility (HP-FL can connect to disks up to 500 meters from the SPU). HP-FL is particularly suited for large disk configurations.

As shown in Figure 12.2, the fiber optic link connects from the system to one or a group of disk drives or disk arrays. A 30 meter fiber optic cable is included with the 28615A interface. The 30 meter cable can be replaced by a custom fiber optic cable, up to 500m long, which is ordered from Hewlett-Packard as HFBR-AWDxxx, where xxx is length in meters.

The HP-FL disk drives and disk arrays in a group are connected to each other via electrical PBus cables (included when purchasing the HP-FL disk product). Eight drives are supportable on an HP-FL Bus when installed in a single cabinet. Eight disk arrays are also supportable on a single



HP-FL bus. The HP 92211Y, 325 mm cabinet can hold up to four HP C2201A and/or HP C2204A disk drives. The HP 46299Y is a 19-inch EIA cabinet, 1.6 m tall. It can hold up to eight HP C2201A and/or C2204A disk drives. The HP C2786A is a 19" EIA cabinet, 1.6 m tall. It can hold up to five HP C225XHA/B disk arrays.

PBus cabling limitations restrict the number of HP-FL disk drives supported in multiple cabinets. Up to eight HP C2201A or C2204A disk drives are supported in two HP 92211Y cabinets or one HP 46299A cabinet. Up to six HP-FL disks can be supported in three HP 19511A cabinets. Up to eight HP C225XHA/B disk arrays are supported in two adjacent HP 2786A cabinets. Disks in adjacent cabinets are connected

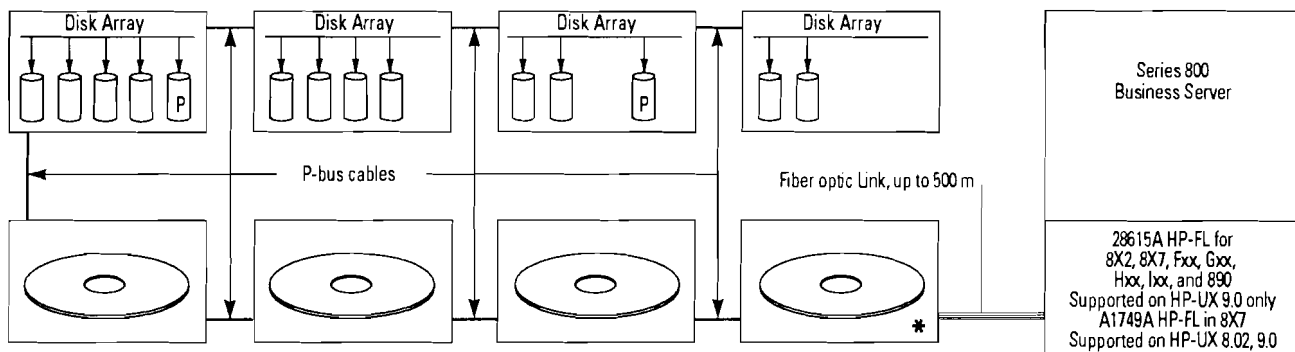
using a long PBus cable. HP 19572A is a long PBus cable that interconnects two C225XHA/B arrays in two different cabinets. HP 19573A is a long PBus cable that interconnects C225XHA/B to other HP-FL disks in an adjacent cabinet. The C220XA product PBus cables are backward compatible. The older PBus cables on the 793X products are not forward compatible.

Option 1BG available on the HP C2201A and C2204A disk drives deletes the fiber optics hardware from the controller. These disk drives can be interconnected via the PBus, but not directly to the system via the fiber optic cable. At least two disk drives on the channels should have fiber optic circuits (the standard drive).

HP-IB Interface

The HP 28650A/B HP-IB interface card can be set for high or slow/medium speed. The speed of the interface card is software selectable. The HP 28650A/B defaults to high speed and is shipped with a resistor pack which simulates seven equivalent loads. Internixing of high and slow/medium speed devices and other important configuration rules are discussed in the HP 28650A/B Installation Manual (included with the HP-IB interface card). Up to 4 devices are supported on an HP-IB card.

Figure 12.2. Connection of HP-FL Disks and Disk Arrays to Series 800 Business Servers



HP C2201A, or C2204A Disks or C2254HA, C2254B, or C2252B Disk Arrays (Up to 8 drives/arrays)

* Must be standard HP C2201A or C2204A Disk Drive or 225XHA/B Disk Array

Note: The ChanSpan adapter used to place HP-FL cards into 8X2S is not compatible with 8X7, Fxx, Gxx, Hxx, Ixx. A new HP-FL card must be placed in Fxx, Gxx, Hxx, Ixx servers.

Extension of HP-IB Transmission Distances

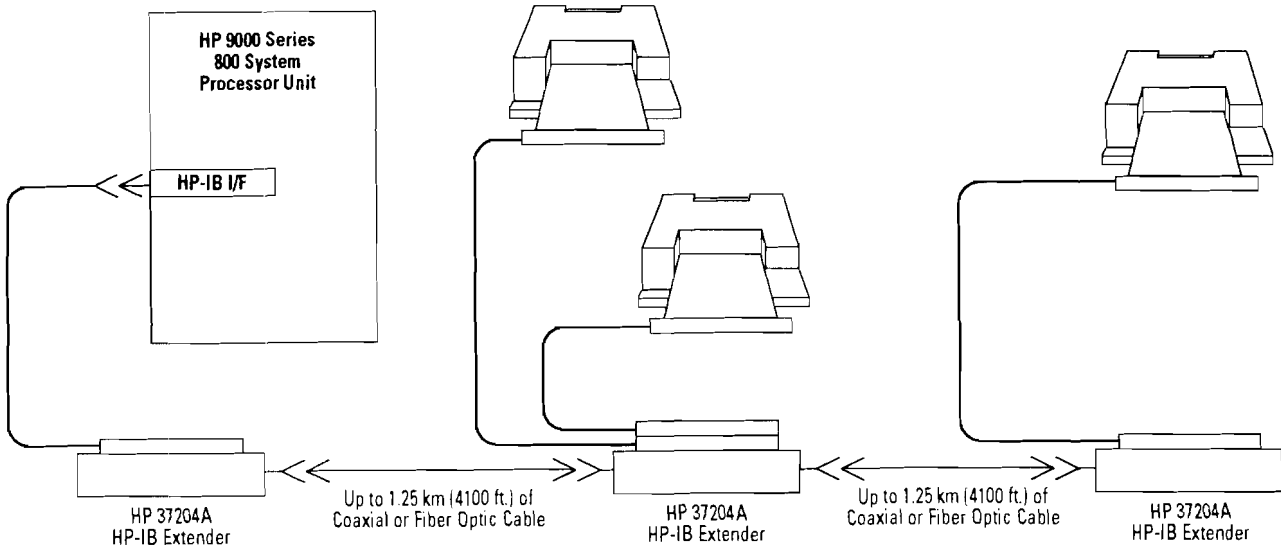
The HP 37204A Multipoint HP-IB Extender can be used to extend the transmission distance between the system and peripheral devices to as much as 1.25 km. The HP 37204A HP-IB Extender translates the parallel input from the HP-IB interfaces and devices into a high-speed serial bit stream, which it transmits to another

extender via 75 ohm coaxial cable (or optionally via fiber optic cable) at rates to 60,000 its per second. Provision of two coaxial ports supports daisy-chaining of multiple HP-IB Extenders as shown in Figure 43, below, for maximum configuration flexibility. The optional fiber optic connection works at full speed up to the maximum transmission distance of 1.25 km versus a drop to 1/10 the data rate for distances

greater than 250 meters with coaxial cable links. Fiber optic communication also overcomes the effects of severe electrical noise, permits connection between buildings without concern for lightning hazards, and makes electronic eavesdropping extremely difficult.

Note: HP-IB Printers are not supported on 8x7, Fxx, Gxx, Hxx, Ixx, or 890 systems.

Figure 12.3. HP-IB Device Connections via HP 37204A HP-IB Extenders



Section 13

Multiplexers and User Communications Devices

Multi-Device Interface Connections

Multiple devices connect to the HP 28650B HP-IB interface, the HP 40299B 8-Channel Multiplexer and the HP J209XA family of 16-channel multiplexers. The acronym HP-IB represents the full name "Hewlett-Packard Interface Bus," which is a bus cable whose connection should daisy-chain from one device to the next. The system console for 8x7S, Fxx, Gxx, Hxx, and Ixx servers is connected to port 0 of the personality card MUX. A remote console can be connected (through modems) to port 7 of the multiplexer.

16-Channel Asynchronous Multiplexers

The 16-channel multiplexers are the means to connect terminals, printers, and other asynchronous peripherals in either direct connect mode (RS-232-C or RS-423), or modem connect mode (RS-232-C) to the HP 9000 Series 800 servers that uses the HP-PB backplane. (See Figure 13.1) The 16-channel multiplexers are supported with HP-UX 8.0 or later.

Three products address three connection needs:

- 1. J2092A product:** 16 RS-232-C peripherals in direct connect mode using data signals only (up to 15 meters).
- 2. J2093A product:** 16 RS-423 or RS-422 peripherals in direct connect mode for long distance purpose (up to 1200 meters).
- 3. J2094A product:** 16 RS-232-C peripherals connected locally but using data AND modem signals (up to 15 meters) or remotely through the use of asynchronous modems.

Each product comprises one single high HP-PB card and 2 distribution panels (8 ports each) with standard DB-25 female connectors for peripherals attachment.

The distribution panels are linked to the MUX card through the use of a 4 meter cable.

For customers willing to use connectors different from the standard DB-25, the direct connect distribution panels (DDP) of the J2092A and J2093A products can be deleted, therefore allowing a customized connection scheme between the MUX card connector (fully documented) and the customer installation.

Ordering Information

For ease of ordering, the 16-channel multiplexer with RS-232-C direct connect ports and DB-25 connectors is integrated in the HP 9000 Model Fxx, Gxx, Hxx, and Ixx servers when ordered with A2442A option 0DT. To accomplish the same on the 8x7 servers, order option 601 which includes one ADP and one DDP distribution panel. (Option 025 is also required.)

For add-on cards or other configurations, use the following:

J2092A	HP-PB 16-channel RS-232-C Direct Connect Asynchronous Multiplexer
J2093A	HP-PB 16-channel RS-423 Direct Connect Asynchronous Multiplexer
J2094A	HP-PB 16-channel RS-232-C Modem Connect Asynchronous Multiplexer

Software media options

For use with J2092A, J2093A, J2094A products (MUST add one of them for use in a 8x2S system running HP-UX 8.0)

Opt AA0	software on 1/4" cartridge tape
Opt AA1	software on 1/2" magnetic tape
Opt AAH	software on DDS cartridge

Interface option

(can order one with J2092A, J2093A products)

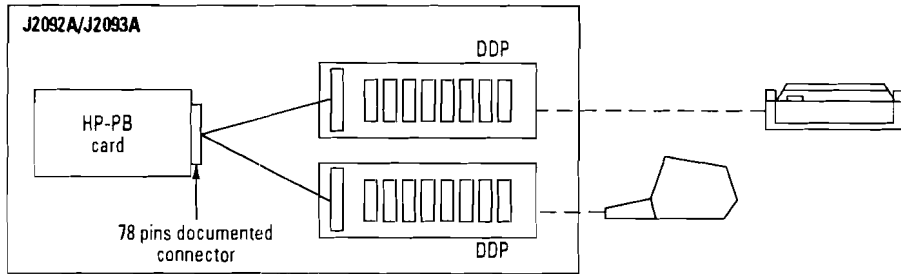
Opt 1BZ	delete the "DB-25 port connection kit"
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Figure 13.1. Asynchronous Devices Connection via 8-Channel or 16-Channel Multiplexers

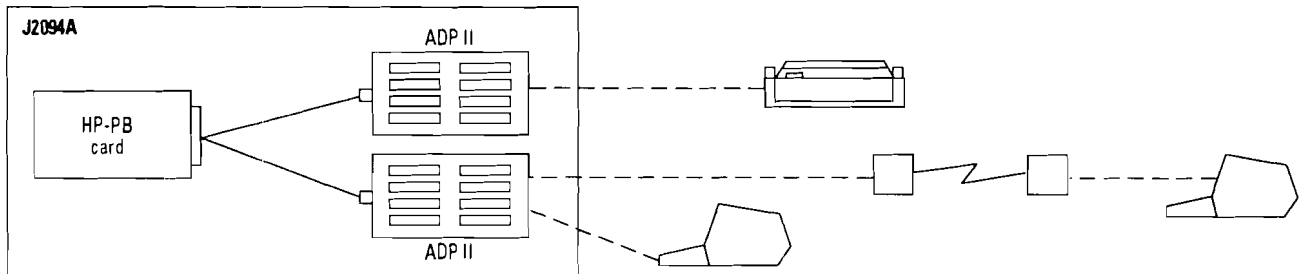
HP-PB Asynchronous Multiplexers

16-Channel Multiplexers

Direct Connect (RS232-C or RS423)

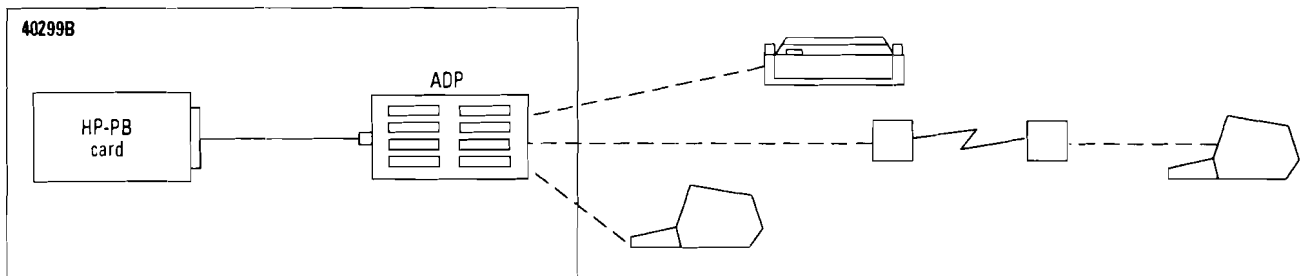


Modem Connect (RS232-C)



8-Channel Multiplexer

Direct (RS232-C or RS422)/Modem Connect (RS232-C)



- The HP-PB card is installed in the system.
- DDP (Direct Connect Distribution Panel) and ADP (Active Distribution Panel)
 - Provide eight standard DB-25 female connectors.
 - Can be rack mounted in 19" cabinets using the C279xA products.
 - ADP can connect to either a terminal or modem.
 - DDP can connect to a terminal only.

Commercial User Workload Characterization

The following information is a guide to assist you in proposing the right system based on number of users and upgrade potential.

Customers will typically fall into one of the three following types of multiuser environments (see Table 13.1):

There are two types of users to consider when sizing a system: logged-on users and concurrent users. Definitions for these different types of users follow.

Logged-On Users—Real users who take breaks and experience interruptions in their work. Logged-on users are the type of

users that a manager of workgroup is referring to when he/she mentions that “I have 30 people in my department who need to access the computer for OLTP-type work.”

Concurrent Users—Heads down continuously working users who have no interruptions and take no breaks. Concurrent range of user numbers tend to be too conservative because in reality, users take breaks. As a guideline, experience has shown in a typical commercial environment:

Logged-On Users = 2× the Concurrent Users a system can support.

The information shown in table 13.2 describes maximum possible terminal connects for each SPU as well as ranges of typical concurrent users for each of the three commercial environments. Remember to size the system based upon how many users will be actively working at peak periods instead of how many users the customer needs to connect to the system. The range of user numbers is only a guideline since each individual customer's environment is different.

Table 13.1

Environment Type	Workload
Software development or commercial applications with a relational database and a high rate of data entry (e.g. Oracle Forms)	Heavy
Commercial applications with a relational database and a low to medium level of data entry or non-relational database application with a high rate of data entry (e.g. Account database query)	Medium
Commercial application without a relational database and a medium to low level of data entry or query activity. (e.g. Asset management system using ISM files)	Light

Table 13.2

Product	Concurrent Users (see definition)		
	Heavy Workload	Medium Workload	Light Workload
F10*	1-24	1-48	1-48
F20	1-40	1-80	1-120
F30	1-56	1-120	1-160
G30	1-56	1-160	1-200
G40	1-70	1-200	1-250
G50	1-90	1-260	1-330
H20	1-40	1-112	1-150
H30	1-56	1-160	1-200
H40	1-70	1-200	1-250
H50	1-90	1-260	1-330
I30	1-56	1-160	1-200
I40	1-70	1-200	1-250
I50	1-90	1-260	1-330
8901-CPU	1-100	1-300	1-380
8902-CPU	1-170	1-510	1-650
8903-CPU	1-250	1-750	1-950
8904-CPU	1-310	1-930	1-1180

Note: Ranges shown are concurrent users as observed in typical customer environments and from benchmarks. Greater numbers of logged-on users may be connected to the system, these ranges represent terminal connectivity only. PC, workstation, X Station connectivity will vary.

* Memory will be the restricting factor in connecting large numbers of users to an F10 (48 concurrent users is typical maximum).

Section 14

DTC (Datacommunication and Terminal Controller)

The DTC is a modular and flexible LAN-based controller which provides asynchronous connectivity and PAD Support for local and remote terminals, PCs in terminal emulation mode and printers.

There are two DTCs available; they are 100% functionality compatible (see table 14.1 below).

Each Series 800 system can support multiple DTCs on the LAN. The number of active connections supported will be determined by the application load on the system. In some customer environments with heavy interactive traffic (for example transaction-processing with intense data entry), HP recommends the use of the DTC16.

Network Management

Two types of software are available to download and manage DTCs according to the level of functionality which is required and the network management needs.

Single System Access

- HP OpenView DTC Entry-Level Manager/UX (P/N J2120A). For HP 9000 Series 800 only.

Multiple System Access or PAD Support

- PC Running HP OpenView DTC Manager Software (P/N D2355A)
Customers can use the same PC to manage:
- **X.25 Switches and PADs** using HP OpenView Switch/PAD Manager Software (P/N J2017A)
- **Bridges** using HP OpenView Bridge Manager (P/N HP 28686C)
- **HUBS** using HP OpenView HUB Manager (P/N HP 28653C)

A fully configured, turn-key HP OpenView Workstation is also available to ease ordering and installation, the HP OpenView Windows Workstation (P/N 32054C).

Local and Remote End-User Access

Local and remote (from X.25/PADs) end-users can access systems through:

- **Direct access on the LAN.** This is true for the HP 9000 Series 700/300/400/800, HP 1000 and for other non-HP Telnet/TCP/IP systems.
- **Back-to-Back.** Any system with asynchronous (RS-232) links can be connected to the asynchronous ports of the DTC. Terminal users hooked to the DTC can access systems connected to the same DTC (local switching) or to an other DTC (extended switching).

PAD support is provided through the use of an X.25 Network Access Card. As stated above, this functionality requires a configured PC with HP OpenView DTC Manager software.

The DTC TCP/IP implementation makes the best use of standards. This includes symbolic name addressing (DNS) and support of extended LAN configurations with bridges and level 3 IP routers. Although this means that a DTC user can access a system located beyond a level 3 IP router, a PC management station is needed on each segment of LAN to download the local DTCs. One OpenView PC can be used as a centralized management station to communicate across IP routers X.25 networks with remote PCs. This removes any need for networking expertise at the remote site.

Table 14.1

	Number	Type	X25 Links	Virtual Circuits	Speed
DTC16 (P/N 2340A)	16	RS-232 Direct, Modem	1	32	19.2 Kbps
DTC48 (P/N 2345A)	48	RS-232 Direct, Modem, RS-422 Direct	3	256	64 Kbps

Notes:

1. Supported on ALL HP 9000 Series 800 systems (CIO and HP-PB)
2. Requires ARPA/9000 and LAN/9000 software
3. DTC48 with date code less than 3110 must be upgraded with the DTC48 Upgrade Kit HP 2348A (memory extension for the HP 2345A). The DTC16 does not require any upgrade kit.

Printer Support

In order for an HP 9000 to access and share printers connected to DTCs or to access printers connected to a remote PAD, an application uses the Telnet extensions utilities provided with the ARPA Service/9000. These utilities allow any HP 9000 Series 300/400/700/800 to route spooler output to DTC-connected printers. In addition they provide features

compatible with those of multiplexers: programmatic access to DTC devices via standard HP-UX system-calls and pseudo-terminal interface. All DTC devices are seen as locally attached to the system.

All the above is available in both standalone system environments (using HP OpenView DTC Entry-Level Manager/UX running on an HP 9000 Series 800) and multiple

systems environments (using HP OpenView DTC Manager running on an HP OpenView DOS workstation).

For more information, please refer to the DTC Family datasheet (P/N 5956-4144).

*Footnote: DTC48 with date code less than 3110 must be upgraded with the DTC48 Upgrade Kit HP 2348A (memory extension for the HP 2345A). The DTC16 does not require any upgrade kit.

Figure 14.1. DataCommunication and Terminal Controller

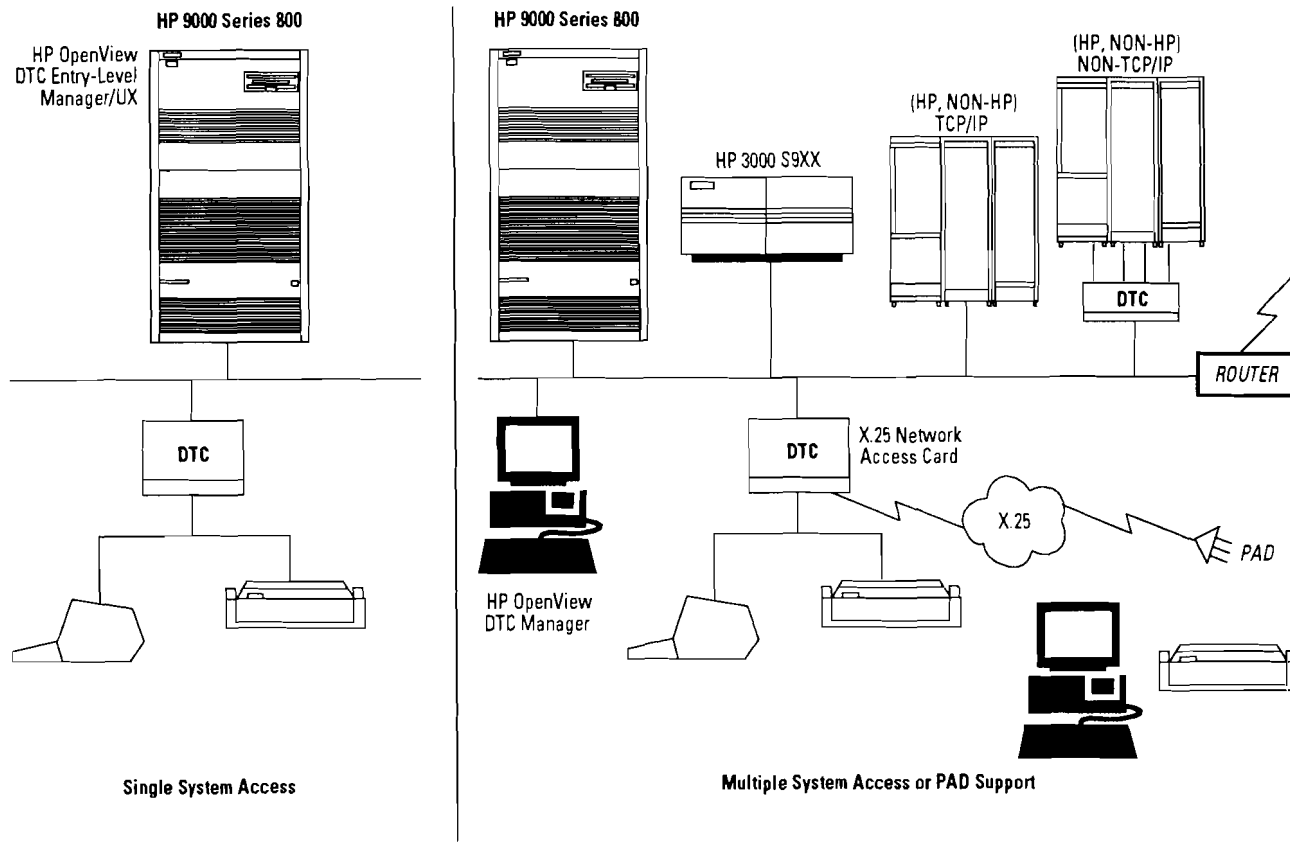


Table 14.2 Configuring the DTC in Your HP 9000 System Environment

Network Service	DTC16	DTC48	Management
Local End-User Access: Single HP 9000 S/800	2340A + asynchronous cards + LAN options	2345A + asynchronous cards + LAN options	J2120A
Multiple Systems: HP 9000 + Access to non-TCP/IP hosts ("back-to-back") + HP 3000 S 900 + Multivendor connect	2340A + asynchronous cards + LAN options	2345A + asynchronous cards + LAN options + DTC48 Upgrade Kit (HP 2348A) (if DTC48 date code is less than 3110)	HP OpenView PC with D2355A Release 10.5 or later
Remote End-User Access (single and multiple) + HP 9000 + HP 3000 S 900 + Multivendor Access to non-TCP/IP hosts ("back-to-back")	2340A + asynchronous cards (minimum 1 in slot 0) + LAN options + X.25 card	2345A + asynchronous cards (minimum 1 in slot 0) + LAN options + X.25 card	HP OpenView PC with D2355A Release 10.5 or later

Configuring the DTC16

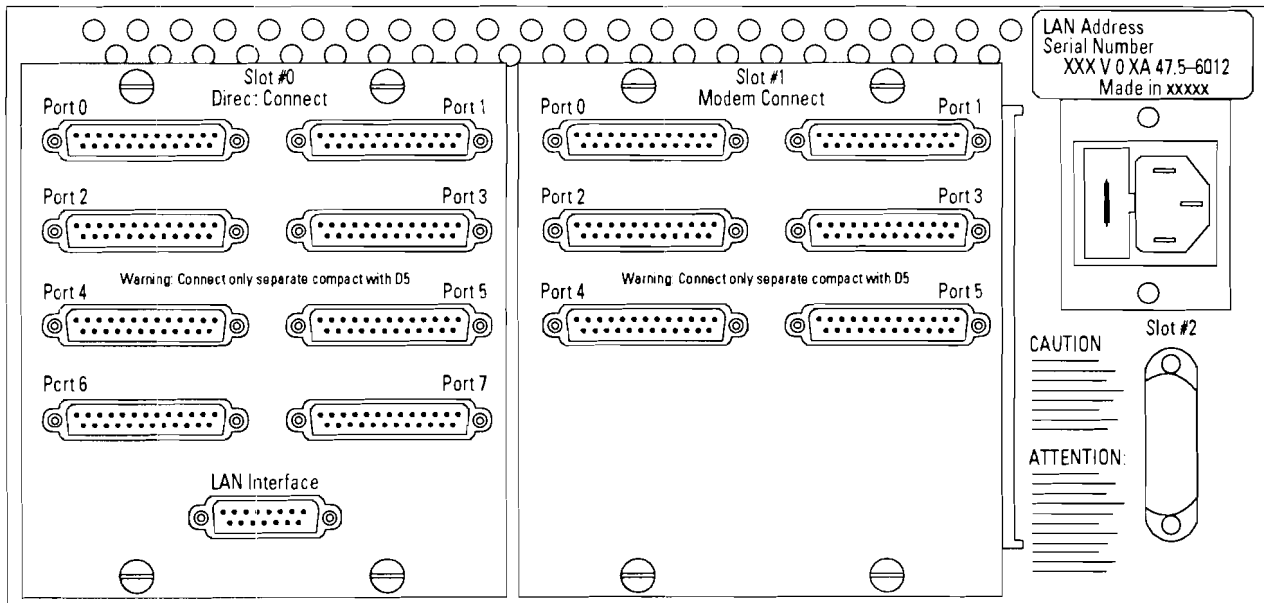
From one to two asynchronous modules may be ordered with the DTC16. Each DTC16 supports a maximum of two asynchronous modules and one X.25 Network Access Card (slot # 2 on the diagram).

Table 14.3 DTC16 Ordering
(Order P/N 2340A with the following options)

Desired Port Configuration	ThinLAN Configuration Ordering Information	AUI Port (no MAU)* Configuration Ordering Information	ThickLAN Configuration Ordering Information
6 Modem Ports	#642	#641	#640
8 Direct Ports	#842	#841	#840
12 Modem Ports	#642, #650	#641, #650	#640, #650
6 Modem and 8 Direct	#642, #850	#641, #850	#640, #850
16 Direct	#842, #850	#841, #850	#840, #850
X.25	#310	#310	#310

Note: The ordering instructions for the DTC48 and DTC16 are different. The DTC48 LAN connection is a separate option. On the DTC16, the LAN connection is tied to the first asynchronous module. No ROM upgrades are necessary for the DTC16 for X.25 connectivity.
*To connect EtherTwist, also order the EtherTwist MAU (P/N HP 28685A).

Figure 14.2 DTC16 with 8 ports DC + 6 ports MC, configured for thick LAN



Configuring the DTC48

When ordering the DTC48, a LAN interface option must be specified. Asynchronous and X.25

interface cards may be ordered as options to the DTC or as stand-alone products. From one to six interface cards may be ordered with the DTC48. Each DTC48

supports a maximum of six interface cards including no more than three X.25 Network Access Cards.

Figure 14.3 DTC48 with 2 RS-232 (3 pins) cards, + 1 RS-422 (5 pins) card + 3 X.25 cards

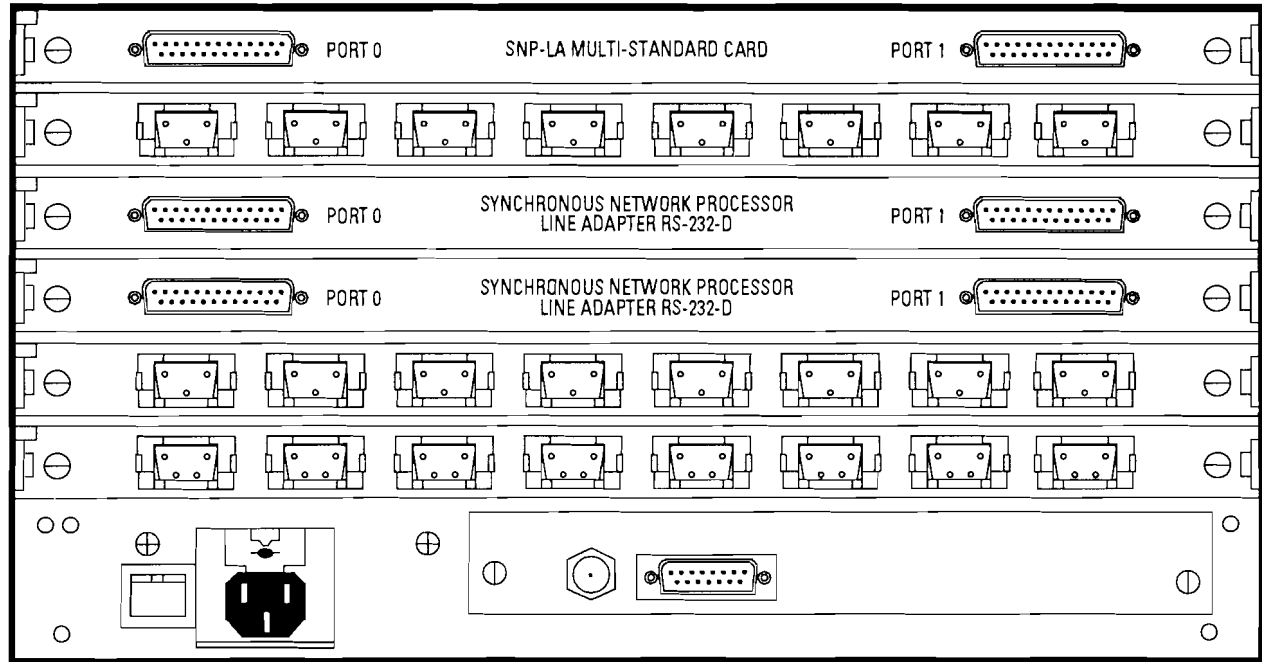


Table 14.4 DTC48 Ordering

Desired Port Connect Configuration	ThinLAN Configuration Ordering information	AUI (no MAU) Configuration* Ordering information	ThickLAN Configuration Ordering information
	2345A, #242	2345A, #241	2345A, #240
Order from 1 to 6 of the following asynchronous cards:			
8 Direct Ports	2345A, #803	2345A, #803	2345A, #803
6 Modem Ports	2345A, #625	2345A, #625	2345A, #625
8 RS-422 Ports	2345A, #805	2345A, #805	2345A, #805
X.25	Add #310 (RS-232), #320 (V35), #330 (V36) or #340 (RS-422) to the DTC48 configuration (HP 2346D/E/F/G when ordered after initial DTC48 purchase)		
8 Addit. Direct	Order HP 2346A (when ordered after initial DTC48 purchase)		
8 Addit. RS-422	Order HP 2346B (when ordered after initial DTC48 purchase)		
6 Addit. Modem	Order HP 2346C (when ordered after initial DTC48 purchase)		

Note: Option #015—Set for 220 V operation.

*To connect to EtherTwist, order in addition the EtherTwist MAU (P/N HP 28685A).

Product Summary

Product/Opt. No.	Description
HP 2345A	Datacommunications and Terminal Controller with 48 ports (DTC48).
Opt. 015	Set for 220V operation.
Opt. 240	Configure DTC for ThickLAN operation.
Opt. 241	Configure DTC for ThickLAN, no MAU or AUI provided.
Opt. 242	Configure DTC for ThinLAN operation for BNC T-connector.
Opt. 310	X.25 Network Access card for the DTC48, RS-232 interface.
Opt. 320	X.25 Network Access card for the DTC48, V.35 interface.
Opt. 330	X.25 Network Access card for the DTC48, V.36 interface.
Opt. 335	X.25 Network Access card for the DTC48, RS-422 interface.
Opt. 803	Eight 3-pin RS232C direct connect ports installed in DTC.
Opt. 805	Eight 5-pin RS422 direct connect ports installed in DTC.
Opt. 625	Six 25-pin RS232C modem connect ports installed in DTC
HP 2340A	Datacommunications and Terminal Controller with 16 ports (DTC16). Must order one and only one option 640, 641,642,840,841 or 842. A maximum of one option 650 or 850 can be ordered. A maximum of one option 310 can be ordered.
Opt. 015	Set for 220V.
Opt. 310	X.25 Network Access card for the DTC16, RS-232 interface.
Opt. 640	Configure DTC16 for ThickLAN and provides six RS-232-C 25-pin modem connections installed in the DTC16. (Thick MAU and 6m AUI cable provided)
Opt. 641	Configure DTC16 for AUI use and provides six RS-232-C 25-pin modem connections installed in the DTC16. (No MAU provided)
Opt. 642	Configure DTC16 for ThinLAN and provides six RS-232-C 25-pin modem connections installed in the DTC16. (BNC-T connector provided)
Opt. 650	Provides six additional RS-232-C 25-pin modem connection installed in the DTC16.
Opt. 840	Configure DTC16 for ThickLAN and provides eight SE-232-C 25-pin direct connections installed in the DTC16. (Thick MAU and 6m AUI cable provided)
Opt. 841	Configure DTC16 for AUI use and provides eight RS-232-C 25-pin direct connections installed in the DTC16. (No MAU provided)
Opt. 842	Configure DTC16 for ThinLAN and provides eight RS-232-C 25-pin direct connections installed in the DTC16. (BNC-T connector provided)
Opt. 850	Provides eight additional RS-232-C 25-pin direct connections installed in the DTC16.
HP Field Installed Add-On Cards	
HP 2343A	Add-on Datacommunications and Terminal Controller DTC16 Asynchronous Connector card. Provides eight additional RS-232-C 25-pin direct connections.
HP 2343C	Add-on Datacommunications and Terminal Controller DTC16 Asynchronous Connector card. Provides six additional RS-232-C 25-pin modem connections.
HP 2343D	Add-on X.25 Network Access for the DTC16.
HP 2346A	Add-on Eight 3-pin RS-232 direct connections.
HP 2346B	Add-on Eight 5-pin RS-422 direct connections.
HP 2346C	Add-on six 25-pin RS-232 modem connections.
HP 2346D	Add-on X.25 Network Access for the DTC48, RS-232 interface.
Opt. 001	Hardware Upgrade Kit (required for DTC48 with date code less than 2851).
HP 2346E	Add-on X.25 Network Access for the DTC48, V.35 interface.
Opt. 001	Hardware Upgrade Kit (required for DTC48 with date code less than 2851).
HP 2346F	Add-on X.25 Network Access for the DTC48, V.36 interface.
Opt. 001	Hardware Upgrade Kit (required for DTC48 with date code less than 2851).
HP 2346G	Add-on X.25 Network Access for the DTC48, RS-422 interface.
Opt. 001	Hardware Upgrade Kit (required for DTC48 with date code less than 2851).
HP 2348A	DTC48 Upgrade Kit (memory extension for the HP 2345A).
HP 36950A	DTC48/X.25 Start up package (provides a 25% discount).
HP 36954A	DTC16/X.25 Start up package (provides a 25% discount).

Product Summary (cont'd)

Product/Opt. No.	Description
Downloading and Managing the DTC	
HP D2355A	HP OpenView DTC Manager.
HP 32054C	HP OpenView Windows Workstation.
Opt. ABA-ABZ	Localisation options.
Opt. 101	ThinLan Connection.
Opt. 102	ThickLan Connection.
Opt. 103	Ethertwist Connection.
Opt. 201	HP Openview DTC Manager software.
HP J2120A	HP OpenView Entry-Level DTC Manager/UX.
Opt. AA0	Software on 1/4" cartridge.
Opt. AA1	Software on 1/2" Mag. Tape 1600 bpi.
Opt. AAH	Software on DDS cartridge.
Opt. AAA	Software on QIC tape.
Opt. OCC	Update to latest version.
Other Product Requirements	
*	HP-UX release 7.0 or later.
*	An HP 9000/800 LAN link and ARPA services (product numbers vary based on processor, please consult section Communication With LAN-Connected Systems.
*	For additional information on supported LAN devices, please consult the "Data Communications and Terminal Controller Family" Datasheet (P/N 5956-4144).

Table 14.5. Supported DTC Devices

Terminals	
HP 2392A, 93A, 94A, 97A	
HP 700/22, 32, 41, 43, 44, 60	
HP 700/92, 93, 94, 96, 97, 98	
HP 3081A, 3082A/B	
Note: Xon/Xoff flow control is used between the DTC and terminals.	
Personal Computers Using HP AdvanceLink 2392 Terminal Emulation*	
HP 150A/B/II	
HP Portable PLUS	
HP Vectra	
HP Vectra CS/ES/RS/QS	
IBM PS/2 Model 30, 50, 60, 80	
COMPAQ DeskPro	
Note: Non-HP Personal Computers have been successfully tested to work with the DTC. The devices themselves are not supported by Hewlett-Packard.	
*Supported Packages: AdvanceLink/DOS, AdvanceLink/Windows and Reflection/WRQ	
Printers and Plotters	
HP 7550A	Plotter
HP 2225D	Thinkjet
HP 2235C	Rugged Writer
HP 2562A, 63A/B/C, 64B/C	Line Impact Dot Matrix
HP 2932A, 33A, 34A	Impact Printer
HP 2684D/P, 86A/D	Laser
HP 33440A/F, 47A/F, 49A, 59A	
HP 3347/A	

Table 14.6. DTC-to-Workstation Connection Cables

Devices	DTC Connection Cable		
	DTC16 and DTC48 RS232 25 pins (modem or direct)	DTC48 ony RS232 3 pins	DTC48 ony RS422 5 pins
Terminals and Personal Computers			
HP 2392A/93A/94A/97A	40234A	40242X	40242P
HP 700/22/32/43/45/92/94/96/98/60	40234A	40242X	40242P
HP 150X	40234A	40242X	40242P
HP Vectra with HP24541B/ptB (25 pins)	40234A	40242X	40242P
HP 3081A, 3082A/B	40234A	40242X	40242P
HP 2622A/23A/24B/27A	13222M/N*	13222X	13222P
HP 2625A, 24B (port2)	40234A	40242X	N/A
Portable+	92221M	N/A	N/A
HP Vectra (9 pins)	92221M	N/A	N/A
24540B/ptA	24542M	N/A	N/A
24541B/ptA	24542M	N/A	N/A
Printers and Plotters			
HP 7550A	17355D	30152A	N/A
HP 2227A, 28A, 76A, 77A	40234A	40242X	N/A
HP 2235C	40234A	40242X	N/A
HP 2562A, 63A/B/C, 64A/B/C	40234A	40242X	N/A
HP 2932A, 33A, 34A	40234A	40242X	N/A
HP 2684D/P, 86A/D	40234A	40242X	40242P
HP 33440A/F, 47A/F, 49A, 59A	40234A	40242X	40242P
Modem	30062B	N/A	N/A
Extended Switching Access Through "Back-to-Back" Configurations			
HP 2334/2335A X.25 multiplexer			
– terminal	40221A	N/A	N/A
– printer	40220A	N/A	N/A
HP 2342A	30062B	N/A	N/A
HP 3000 ATP, ATPM	40233A	N/A	N/A
HP 9000 40299A, 98642A	40233A	N/A	N/A

N/A: Not Available
 *M for European mode
 N for US modem



Section 15

Mass Storage Devices

Mass Storage Drive Functions

Disks (disk storage systems) provide high-capacity, non-volatile, fast-access mass storage for programs and data for the system. The key functions performed by disk drives are discussed below.

Support of System Boot-up

The most cost-effective way of supporting system boot-up is from a mass storage device that is capable of fast transfers, such as a disk drive. The boot-up device is usually a locally connected disk drive. When the boot-up device is a local drive, it is called the system disk. For this function, fast transfer shortens the time required to boot up the system.

Fast-Access Storage and Retrieval

Applications in all but the harshest environments typically use local disk drives for storing programs and data not currently in use, from which these are retrieved when and as needed. For this function, hard drives are preferred because of the greater capacity and faster storage and retrieval rates available with hard disk drives.

HP-UX Swap Space

Under HP-UX, when the total size of executing processes and their data exceeds the capacity of installed RAM, process data is written to disk temporarily when needed to make room for other processes or data. It is also possible for individual programs to exceed the capacity of installed RAM. The capability of shifting code and data from RAM to a disk drive, which thus becomes “virtual” memory (VM), is managed by the virtual memory system.

Each process has a virtual memory space of 4 Gbytes, which is in practice limited by available disk space. Whenever a process is dispatched (run), a space equal to its “total” size is allocated in swap space. Swap space must therefore at least equal the installed RAM and should, in fact, equal the total size of all the processes to be run in a maximum simultaneous mix.

Each CPU may have up to 8 disk drives with swap space on them, on separate or shared buses.

Series 800 Disk Drive Requirements and Performance

HP-UX commands and utilities are usually read in from disk each time they are executed. Disk drive performance is, therefore, key to providing adequately fast response to user’s requests. In multiuser systems and in certain single-user applications, multiple system disk drives provide an aggregate performance which exceeds that of a single drive. The I/O capacity (I/Os per second) of two similar drives is at least 1.5 times that of one drive alone, provided that the system and user demands are well distributed between the two disk drives.

A slight performance increase can be gained in a multi-disk system by connecting the drives via multiple host adapters.

WARNING: Simple HP-IB devices (such as printers) cannot be connected to the same HP-IB interface as a mounted file system or swap disk drive.

Maximum Number of Disks

Refer to the “Series 800 Business Servers at-a-Glance” section for information on maximum disk support.

**Series 6000 Model Numbers
C3023T/R and C3024T/R**

The C3023 and C3024 are single-ended SCSI-2 devices supported on the HP 9000 Model Fxx, Gxx, Hxx, Ixx, and 890 running HP-UX 9.0. These drivers offer a significant performance improvement over HP's previous generation disk drives with a 20% improvement in average access time and a 72% increase (maximum) in sustained transfer rate.

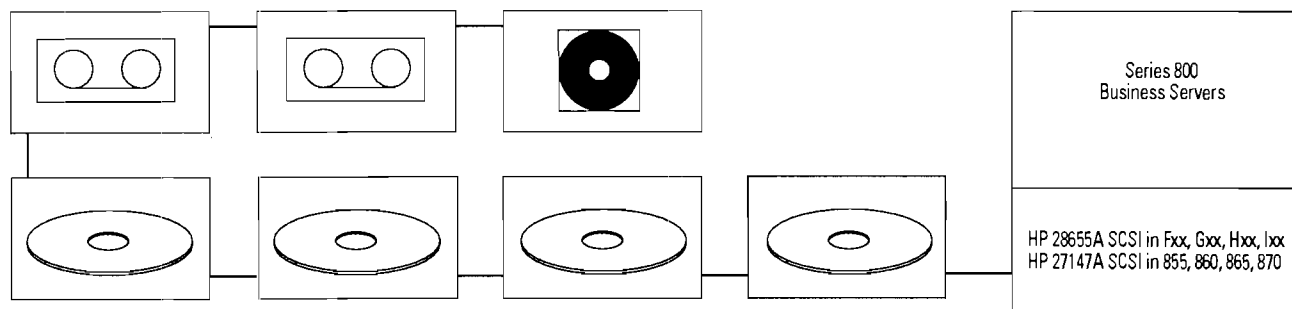
The C3023T and C3024T are housed in tower packages and come prepackaged with 2 GB and 4 GB, respectively. The tower package holds a total of 7 half-height devices (every full-height device takes 2 half-height slots).

The C3023R and C3024R are housed in rackmountable enclosures. These drives come pre-configured with 2 GB and 4 GB, respectively. These enclosures

can fit a total of 4 half-height devices plus one additional disk drive (half or full-height).

Expansion kits are available for all four products. These include CD-ROM, 2 GB DAT, up to 8 GB DAT, 1 GB disk and 2 GB disk expansion kits. With the exception of the 2 GB disk drive which is full-height, all of these kits are half-height devices.

Figure 15.1. Connection of SCSI Devices to Series 800 Business Servers



HP C2460F/R, C2461F/R, C2462F/R, C2472F/R, C2473F/R, C2474F/R, C3023T/R, C3024T/R SCSI DISK DRIVES.
 HP C2464F/R, C2477F/R, C1512A, C1520A, C2464T/R, C2465T/R, C2466T/R, C2467T/R SCSI DAT/DDS DRIVES.
 HP C2476F/R, C2293U SCSI CD-ROM DRIVES.

Table 15.1. Series 6000 External Standalone SCSI Disk Storage Systems

Product Number	C3023T	C3023R	C3024T	C3024R
Interface	Single-ended SCSI 2 →			
Capacity	2 GB	2 GB	4 GB	4 GB
Average Seek Time (ms)	11.5	11.5	11.5	11.5
Avg. Latency (ms)	5.6	5.6	5.6	5.6
Transfer Rate† Mbytes/sec. (burst)	3.1-5.3	3.1-5.3	3.1-5.3	3.1-5.3
Expansion Kits	C3027U—1 GB Expansion Kit C3028U—2 GB Expansion Kit (full-height) C2477U—2 GB DAT Expansion Kit C2478U—Up to 8 GB DAT Expansion Kit C2293U—600 Mbyte CD-ROM Expansion Kit			

T = Tower package supports up to 7 half-height devices (1 full-height device takes 2 half-height slots).

R = 19" EIA rack mounted, supports up to 3 full-height devices or 5 half-height devices.

† The average transfer rates listed here indicate the capability of the disk hardware; they are not system achievable transfer rates.

Table 15.2

Model*	420F	420R	670F	670R	1350F	1350R
Product Number*	C2460F	C2460R	C2461F	C2461R	C2462F	C2462R
Interface	Single Ended SCSI 2 →					
Capacity	422 MB	422 MB	677 MB	677 MB	1355 MB	1355 MB
Average Seek Time (ms)	12.6	12.6	13.5	13.5	13.5	13.5
Avg. Latency (ms)	8.3	8.3	7.5	7.5	7.5	7.5
Transfer Rate† Mbytes/sec. (burst)	2.2	2.2	2.88	2.88	2.88	2.88
Expansion Kits	C2472F, C2472R—422 Mbyte kit (3.5 inch disk) C2473F, C2473R—677 Mbyte kit (5.25 inch disk) C2474F, C2474R—1355 Mbyte kit (5.25 inch disk) C2477F, C2477R—2000 Mbyte DAT kit (full-height) C2476F, C2476R—600 Mbyte CD-ROM kit (half-height)					

*F = Floor standing, supports 3 full or 7 half-height devices (disk, DDS, or CD-ROM).

R = 19" EIA rack mounted, supports 2 full or 4 half-height front loading (disk, DDS, or CD-ROM).

† The average transfer rates listed here indicate the capability of the disk hardware; they are not system achievable transfer rates.

SCSI Disk Storage

Series 6000—Models 420F/R, 670F/R, and 1350F/R, (C2460F/R, C2461F/R, and C2462F/R)

Models 420F/R, 670F/R, and 1350F/R were designed with a single-ended SCSI-2 interface for entry-level and midrange multiuser HP 9000 Model Fxx, Gxx, Hxx, and Lxx servers running HP-UX 8.02 or 9.0 and the high-end Model 890. Designed with a base configuration of one disk, they have two full-height or five half-height slots available for additional mass storage devices: disk drives (full-height), DDS-format DAT (full-height and half-height), or CD-ROM (half-height).

The 420F, 670F, and 1350F are housed in a compact mini-tower floorstanding enclosure that supports three full-height or seven half-height devices. The 420R, 670R, and 1350R are housed in a compact, rackmount cabinet that holds either three full-height, five half-height, or four half-height and one full-height mass storage devices.

The Series 6000 Disk Storage devices provide:

- High-performance SCSI 2 single-ended devices
- High availability through powerfail recovery
- Additional slots for expandability and flexibility

Table 15.3. Disk Array Support Matrix

HP-UX Release	8.0	8.02	8.06	9.0	9.0
Server Models Supported	832, 842, 852, 850, 855, 860, 865, 870/100	827, 847, 857, 867, 877, G30, G40, H20, H30, H40, I30, I40	870/200, 870/300, 870/400	850, 855, 860, 865, 870/100, 870/200, 870/300, 870/400	832, 842, 852, 827, 847, 857, 867, 877, 887, 897, 890, G30, G40, G50, H20, H30, H40, H50, I30, I40, I50
2-way Striped with Parity Disk	X	X	X	X	X
2-way Striped, no Parity Disk	X	X	X	X	X
4-way Striped with Parity Disk	X	X	X	X	X
4-way Striped, no Parity Disk	X	X	X	X	X
Independent Mode, 3 disks*					X
Independent Mode, 5 disks*					X
On-Line Replacement	X	X	X	X	X
Powerfail	X	X	X	X	X
Supported as Boot Device					X

Note: Striped, no parity configurations are not recommended where high availability is critical.
 *Independent mode requires HP-PB FL card, P/N 28615A.

HP-FL Disk Storage

HP Disk Arrays

New disk storage products available on HP-FL are the C2254HA, C2254B, C2252HA, and C2252B disk arrays. Refer to Figure 15.3 for supported server models and features.

The HP-FL disk arrays offer a variety of different configurations. Some of these offer less data protection than others. In short, Hewlett-Packard recommends that customers interested in data security choose striped mode with parity over striped mode without parity (unless the later is used in a mirrored configuration). The C2254B and C2252B offer “striped” modes, where data is striped across 2 (C2252B) or 4 (C2254B) mechanisms so that a

single sector from the hosts’ point of view resides on both or all 4 mechanisms.

The C2254HA and C2252HA offer “striped with parity” mode, where the data is striped, but an extra disk mechanism preserves a parity checksum of the others, so that the array can survive a mechanism failure invisibly. In the case of such a failure, the controller uses the parity disk to reconstruct the data on the failed drive.

The distinction between striped with and without parity is important. First, a striped disk array without parity cannot survive a mechanism failure. Second, such a disk has a lower mean time between failure, because of this inability to survive a mechanism failure. And third, such a disk is subject to a new type of failure

(new with disk arrays) which, though rare, could conceivably cause data loss, depending on the application. This new type of disk failure occurs when:

- A power failure occurs, AND
- The power remains off beyond the period safe-guarded by the battery backup, AND

- The disk was doing a write, AND
- Power loss occurred in such a way as to cause the write to get to some mechanisms and not to others, AND
- The application relies on the resulting data mix without recognizing it as an error.

We estimate that, *if* the first two conditions are met, then the chances of the last three also being met are less than 1 in 1,000. This type of error is essentially impossible with a parity disk, since the mix of old and new data should corrupt the checksum, causing the disk to return a read error for that sector.

The following disk array systems are supported on Series 800 Business Servers.

Table 15.4. External Standalone HP-FL Disk Array Systems

Product Number	C2254HA	C2254B	C2252HA	C2252B
Expansion Kit/Replacement Module (1.35 GB)	C2251A	C2251A	C2251A	C2251A
Interface	HP-FL	HP-FL	HP-FL	HP-FL
Capacity	5.4 GB + Parity Disk	5.4 GB	2.7 GB + Parity Disk	2.7 GB
Average Seek Time (ms)	13.5	13.5	13.5	13.5
Average Latency (ms)	7.5	7.5	7.5	7.5

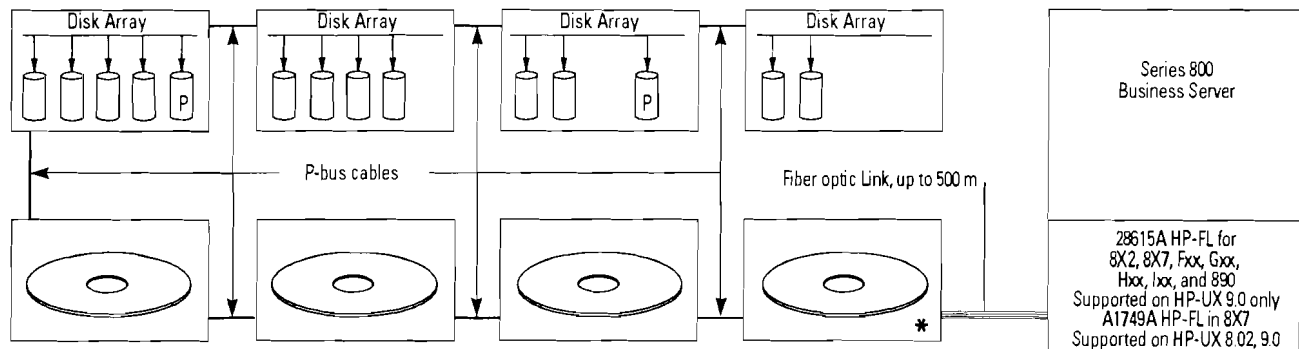
The following devices were supported on S800 at HP-UX release 8.0.

Table 15.5. Currently Available HP-FL Disks Supported on HP 9000 Series 800 Computer Systems

Product Number	Name/Description	System Interface	System Disk	Capacity (Mbyte per Product)	Average Access Time (millisec)	Transfer Rate (Kbyte per sec)*
C2201A	Fixed Disk with Fiber Optic and PBus controller	HP-FL	Yes	670	24.5	1,400**
C2204A	Fixed Disk with Fiber Optic and PBus Controller	HP-FL	Yes	1340	24.5	1,400**

* The average transfer rates listed here indicate the capability of the disk hardware; they are not system-achievable transfer rates.
 ** Transfer rate for full volume. Smaller transfers are at rates of 1,800 Kbytes/sec or more.

Figure 15.2 Connection of HP-FL Disks and Disk Arrays to Series 800 Business Servers



HP C2201A, or C2204A Disks or C2254HA, C2254B, or C2252B Disk Arrays (Up to 8 drives/arrays)

* Must be standard HP C2201A or C2204A Disk Drive or 225XHA/B Disk Array

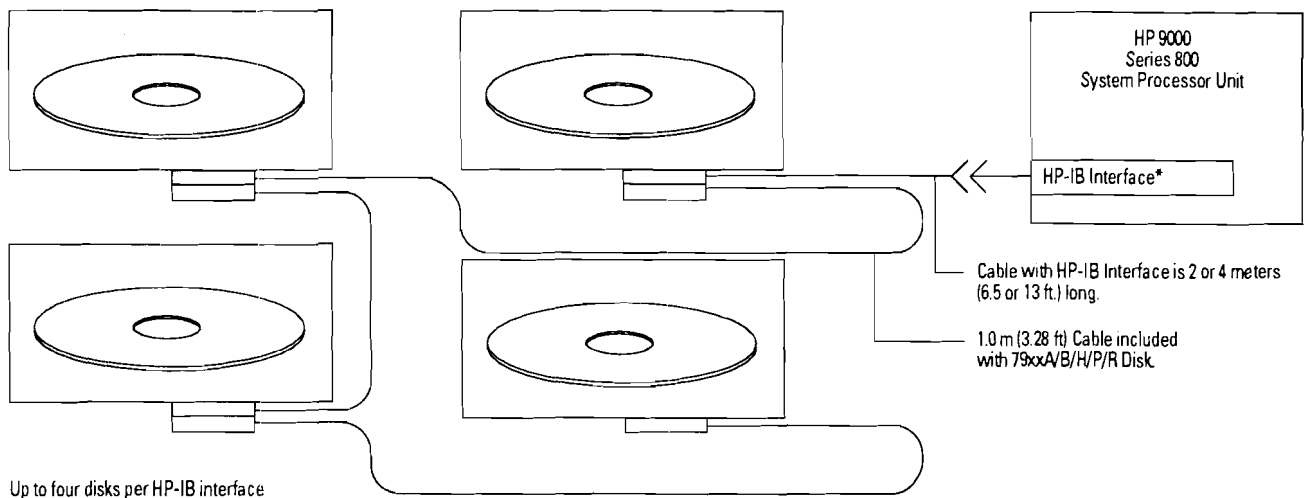
Note: The ChanSpan adapter used to place HP-FL cards into 8X2S is not compatible with 8X7, Fxx, Gxx, Hxx, lxx. A new HP-FL card must be placed in Fxx, Gxx, Hxx, lxx servers.

HP-IB Disk Storage

Disk drives may be connected to HP 9000 Series 800 Servers via an HP-IB interface, the HP 28650B interface, for Model Fxx, Gxx, Hxx, lxx, 8x7s, and 890, and the HP 27110B interface for Models 855S, 860S, 865S, and 870S/100-

400 Servers. Figure 15.3, below, shows disk connections via HP-IB interface. Note that a maximum of four disks are supported by each HP-IB interface. HP-IB is not recommended for new systems as HP-FL and SCSI offer better performance at a lower cost.

Figure 15.3. HP-IB Disk Memory Connections to HP 9000 Series 800 Servers



* HP 28650B HP-IB Interface in Models Fxx, Gxx, Hxx, lxx.
 HP 27110B HP-IB Interface in Models 855, 860, 865, and 870.

Table 15.6. Currently Available HP-IB Disks Supported on HP 9000 Series 800 Computer Systems

Product Number	Name/Description	System Interface	System Disk?	Capacity (Mbyte per Product)	Average Access Time (millisec)	Transfer Rate (Kbyte per sec)*
C2200A	Fixed Disk (CS/80)	HP-IB	Yes	335	24.5	1,000
C2203A**	Fixed Disk (CS/80)	HP-IB	Yes	670	24.5	1,000

* The average transfer rates listed here indicate the capability of the disk hardware; they are not system-achievable transfer rates.

** An HP C2206A upgrade kit is available to convert C2203A disks to HP-FL operation.

Rewritable Optical Disk Libraries and Drives

A variety of optical disk storage products are available on the Series 800 via the HP 27147A SCSI interface (for Models 850S, 855S, 860S, 865S, and 870S) or the HP 28655A SCSI interface (for Models Fxx, Gxx, Hxx, Ixx, 8x7s, and 890). Powerfail recovery is not currently supported with these products. Support of powerfail recovery with 9.0 is planned for rewritable drives whose product numbers end with a "C" suffix.

Rewritable optical disk libraries provide low cost, random access data storage in capacities from 10 GB to 94 GB. The large capacities of the libraries along with the low cost of optical media are best suited for on-line archival storage of infrequently accessed data, unattended backup, and storage of large data files such as electronic images. HP's Direct Access Secondary Storage (DASS) products fill the price performance gap between online hard disks and offline tape storage.

HP Rewritable optical disk products are now available with the new HP designed and manufactured high-performance optical drive. The new drive is available in the Model 650C standalone drive, the new Model 10LC desktide library, and models 20C, 60C, and 100C libraries. The new drives are faster and more reliable. Specific differences between the old and new drives are listed in Table 15.7.

Table 15.7

Description	Old Sony Drive	New HP drive	Improvement
Access time, ms	104	35	3x
Maximum transfer rate, KB/s			
Read	340	500	1.5x
Write	680	1,000	1.5x
Load/unload time, seconds	10	4.5	2x
MTBF, hours	25,000	40,000	1.5x

See Table 15.8 for a complete support matrix of our current peripherals offering.

The rewriteable optical disks used in HP's optical products conform to ANSI (ANSIX3B11) and ISO (ISO/IEC 10098A) specifications for continuous Composite format. In keeping with emerging industry standards, the libraries implement the Small Computer System Interface (SCSI) in asynchronous mode with the flexibility of separate bus IDs for each drive and the autochanger.

HP-UX has implemented the software drivers in such a way as to make each surface of an optical cartridge appear as a mountable file system in the operating system. In this manner, each cartridge surface is equivalent to an on-line disk of 325 MB (performance is slower than a Winchester disk). Any or all of the cartridges in a library may be mounted and on-line. Those cartridges that are not physically in a library drive will have their I/O requests queued until their turn for access to a drive comes up.

The HP-UX software drivers also support raw access to each optical cartridge. HP-UX utility commands such as *cpio* and *dd* can also function on the optical cartridges in raw or block mode.

Application Support

Application Transparent Driver

HP has developed a special integration of optical libraries with the HP-UX environment which is included in every copy of HP-UX 8.0 and above to give optical storage access to applications, without burdening users or application programs with media management. This driver is useful for VABs and end-users who develop their own applications. Each surface in the Jukebox is virtually mounted into the file system through a "mount" command. Once this is accomplished, the surfaces become logically attached to the file system and respond to any HP-UX command. The driver takes care of mounting each platter as it is required by the application. Data can be written to the disks in "raw mode" or as files.

Unattended Network Backup

HP Omniback is a distributed network backup solution HP-UX or Domain networks. It supports single or multiple optical libraries. It centralizes and orchestrates network backups while offering full HP service and support.

HiComp HIBACK/HIBARS is a network backup management product that can back up a heterogeneous network of HP-UX systems, PCs, and MPE systems. It has software data compression

and parallel writes to several devices for high capacity and performance. It also has simple administration of the entire network backup through HIBACK, and individual user recovery of files. It supports HP libraries connected to HP-UX hosts.

Host System Backup

HP Omniback/Turbo is a high-speed direct connect backup solution for Series 800 systems. It makes an image copy of the hard disk on file servers or multi-user

systems. It minimizes backup downtime by writing to one or more optical libraries in parallel. This form of backup is especially useful in making database backups. Omniback/Turbo also includes the network component for a comprehensive system backup facility.

Fbackup/Frecover also support the optical library as a backup device.

Table 15.8

Product Number	Description	Capacity	Old Sony Drive	New HP Drive	Average Access Time	Powerfail Support	First Release Supported On
C1700A	20 GB Rewritable Optical Disk Library	20 GB	X		95 ms	no	8.0
C1700C	Model 20C Optical Disk Library System	20.8 GB		X	35 ms	planned	9.0
C1701A	Rewritable Optical Disk Drive	650 MB	X		95 ms	no	8.0
C1701C	Model 650C Optical Disk Drive	650 MB		X	35 ms	planned	9.0
C1704A	57 GB Rewritable Optical Disk Library	57 GB	X		95 ms	no	8.02
C1704C	Model 60C Optical Disk Library System	57.2 GB		X	35 ms	planned	9.0
C1705A	93 GB Rewritable Optical Disk Library	93 GB	X		95 ms	no	8.02
C1705C	Model 100C Optical Disk Library	93.6 GB		X	35 ms	planned	9.0
C1708C	Model 10LC Optical Library System	10 GB		X	35 ms	planned	9.0

Table 15.9 Other Specifications

	Model 20 (in deskside cabinet)	Model 60 & Model 60C	Model 100 & Model 100C	Model 10LC
Physical Characteristics				
Height	720 mm (28.3 in)	1847 mm (72.7 in)	1847 mm (72.7 in)	720 mm (28.3 in)
Width	375 mm (14.8 in)	651 mm (25.6 in)	651 mm (25.6 in)	375 mm (14.8 in)
Depth	800 mm (31.5 in)	971 mm (38.2 in)	971 mm (38.2 in)	800 mm (31.5 in)
Weight (Net)	86 Kg (189 lbs)	347 Kg (764 lb)	360 Kg (792 lb)	76 kg (174 lbs)
Power Requirements				
Line Voltage	100-127 Vac, 200-240 Vac, 50-60 Hz	100-127 Vac, 200-240 Vac, 50-60 Hz	100-127 Vac, 200-240 Vac, 50-60 Hz	100-127 Vac, 200-240 Vac, 50-60 Hz
Power Consumption	250 W Maximum, No W Typical	475 W Maximum, 200 W Typical	475 W Maximum, 200 W Typical	250 W Maximum, 110 W Typical

Section 16 Tape Drives

Types of Software Installation and Backup Capabilities

CD-ROM

HP-UX and associated software products are available on CD-ROM for software installation. Using an HP provided codeword, the software ordered is “unlocked” from the CD-ROM and loaded onto the system.

Note: CD-ROM software is available for HP-UX releases 8.02 and 9.0 only.

QIC

QIC provides a low cost installation and back-up solution for low-end systems. The QIC drive is available as an integrated mechanism only for 8x7S Business Servers.

Cartridge Tape Subsystems

For smaller HP 9000 Series 800 servers, software can be installed and the system backed up using a cartridge tape subsystem (HP 9144A, 9145A). If necessary to minimize interfacing costs, cartridge tape subsystems can connect to the same HP-IB interface as the disk drives. However, severe performance degradation to the point of system “freeze ups” will occur while the Cartridge Tape Subsystem is in use. For reliable operation, the Cartridge Tape Subsystem should be connected via a separate HP-IB interface from that used for the disk drives. Cartridge Tape Subsystems cannot be connected on the HP-FL bus. *The 9144A and 9145A have been obsoleted. This information is listed for reference only.*

DDS Tape Units

High capacity 4 mm DDS-Format Digital Audio Tape provides low-cost, unattended back-up. In addition to the DAT/DDS drives available in the Series 6000 Mass Storage Enclosure.

With HP-UX 8.0 and later, fast search is supported. This capability allows the access of any file in an average of 20 seconds. Furthermore, software is now available via DAT for all Series 800 servers.

Magnetic Tape Drive

Magnetic Tape Drives are an alternative for software installation and backup. They can not be connected to the same HP-IB interface as the disk drives in the Series 800 CIO servers.

In addition, it is recommended that when using a SCSI Magnetic Tape Drive, the device be connected to its own separate SCSI host adapter in the SPU. In some instances when the Magnetic Tape Drive is powered down, the bus “glitches” and other peripherals on the bus may cease functioning properly, increasing the possibility of data corruption. Once this event has occurred, the only way to reset the bus is to power down the SPU, then bring it back up.

Cable Pin-Outs

Cable pin-outs can be referenced in the HP Peripheral Configuration Guide, P/N 5959-2479.

Installation and Backup Selection Criteria

Transfer Rate and Capacity

See Table 15.5 and Table 16.1 for relative transfer rates and capacities of the DDS Tape Drives, Cartridge Tape Subsystems, and Magnetic Tape Drives that are supported for use in HP 9000 Series 800 servers.

Mag Tape Compatibility Considerations

Where a library of magnetic tapes already exists, the ability of the magnetic tape unit to read those tapes can be quite important. A magnetic tape recorded at 800 cpi can only be read on a tape unit at that density. If only one tape unit can be provided for the system, the need for compatibility with existing tapes may conflict to some extent with the need for fast transfers. Of all of the currently available supported mag tape units, the 7980XC Magnetic Tape Unit is the only one that cannot be optionally equipped with option 800 to read 800 cpi mag tapes.

Table 16.1 SCSI Tape Drives Supported in Series 800 Business Servers

Product Number	Name/Description	Interface Used	Recording Density	Operating Mode	Transfer Rate (KB/sec)	Capacity
7980S	Autoloading Magnetic Tape Unit	SCSI	6250/1600 cpi	Streaming	781/200	140/40 Mbytes in 2400 feet
7980SX	Autoloading Magnetic Tape Unit with Data Compression	SCSI	CPR*/6250/1600 cpi	Streaming	C*/781/200	280-420/140/40 Mbytes in 2400 feet
C2477S	DDS Format Tape Drive Mechanism	SCSI Internal Mech. Only (Model 8x7 only)	61,000 bpi	Streaming	183	2000 Mbytes per Cassette
C1512A ¹	DDS Format Tape Drive Standalone Mechanism	SCSI	61,000 bpi	Streaming	183	1300 Mbytes per Cassette
C2292A ¹	DDS Format Tape Drive Mechanism Upgrade	SCSI	61,000 bpi	Streaming	183	1300 Mbytes per Cassette
C2464F/R	DDS Format Tape Drive Mechanism in Series 6000 SCSI Mass Storage Enclosure	SCSI	61,000 bpi	Streaming	183	2000 Mbytes per Cassette
C2477F/R	DDS Format Tape Drive Mechanism Upgrade in Series 6000 SCSI Mass Storage Enclosure	SCSI	61,000 bpi	Streaming	183	2000 Mbytes per Cassette
C2477U	DDS Format Tape Drive Mechanism for Series 6000 Storage Enclosure	SCSI	61,000 bpi	Streaming	183	2000 Mbytes per Cassette
C2478U	DC-DDS Format Tape Drive Mechanism for Series 6000 Storage Enclosure	SCSI	61,000 bpi	Streaming	183-732	2000 to 8000 Mbytes per Cassette
C1520B	DDS Format Tape Drive Standalone**	SCSI	61,000 bpi	Steaming	183	2000 Mbytes per Cassette
C1521B	DC-DDS Format Tape Drive Standalone**	SCSI	61,000 bpi	Streaming	183-732	2000 to 8000 Mbytes per Cassette

* CPR (compression) gives 2 to 3 times tape data capacity and transfer rate of 6250 cpi recording density without compression.

** For use on HP-UX 8.02 order C1521B option 800.

¹ Obsolete, listed for reference only.

Table 16.2 HP-IB Cartridge Tape Subsystems, Digital Data Storage Tape Drives, and Magnetic Tape Units Supported in Series 800 Business Servers

Product Number	Name/Description	Interface Used	Recording Density	Operating Mode	Transfer Rate (KB/sec)	Reel/Cartridge Capacity
9144A**	16-Track Cartridge Tape Subsystem	HP-IB	10,000 bpi	Streaming	35	67 Mbyte per cartridge
9145A**	32-Track Cartridge Tape Subsystem	HP-IB	20,000 bpi	Streaming	70	133 Mbyte per cartridge
35401A**	16-Track Autochanger Tape Subsystem	HP-IB	10,000 bpi	Streaming	35	Magazine of eight 67 Mbyte cartridges (536 Mbyte total)
7979A	Autoloading Mag Tape Unit	HP-IB	1600 cpi, 800 cpi optional	Streaming	200	40 Mbyte in 2400 ft
7980A	Autoloading Mag Tape Unit	HP-IB	6250/1600 cpi 800 cpi optional	Streaming	781/200	140/40 Mbyte in 2400 ft
7980XC	Autoloading Mag Tape Unit with data compression	HP-IB	CPR*/6250/1600 cpi	Streaming	C*/781/200	280-420/140/40 Mbyte in 2400 ft
7974A**	Magnetic Tape Unit	HP-IB	1600 cpi,	St-Stp/Str 800 cpi optional	80/40/160/80	40 Mbyte in 2400 ft
7978B**	Magnetic Tape Unit	HP-IB	6250/1600 cpi	Streaming	468/120	140/40 Mbyte in 2400 ft
C1511A*	DDS Format Tape Drive Mechanism	HP-IB	61,000 bpi	Streaming	183	1300 Mbyte per cassette

* CPR (compression) gives 2 to 3 times tape data capacity and transfer rate of 6250 cpi recording density without compression.

** Discontinued product, listed here for reference.

HP-IB Interfacing

Cartridge Tape Subsystems (9144A, 9145A) and Magnetic tape units (7979A, 7980A, 7980XC) (MTUs) connect to HP 9000 Series 800 servers via the 27110B or 28650A HP-IB interface. As shown in Table 16.2, Cartridge Tape Subsystems should connect to the system via their own HP-IB interface. However, if interfacing cost is more important than performance, Cartridge Tape Subsystems can connect via the interface used to connect HP-IB disks. Up to four MTUs can connect to the system via one HP-IB interface, or a lesser number can connect to the system via the disk interface. In either case, a maximum of four devices per interface is supported.

Digital Audio Tape Drives

Second Generation

The second generation DAT/DDS drives (C1520A, C1521B, C2464F/R, C2477F/R, C2477U, C2478U) all accommodate 90 meter DAT/DDS media. In addition, these drives support 60 meter media. However, use of 90 meter media in any first generation devices (C1511A, C1512A, C2292A) risks premature failure of the drive, and is not supported.

Hardware Data Compression (2 to 8 GB)

Features:

- Up to 8 Gbytes of storage capacity
- Up to 732 Kbytes per second transfer rate
- 3-1/2 inch form factor
- 50,000 MTBF

- Standard DDS recording format extended to support data compression (DDS-DC)
- Standard method of data compression—DCLZ (Data Compression Lempel Ziv)
- SCSI II, single-ended
- 5 Mbytes per second burst transfer rate
- Full plug-compatibility with all DAT drives from HP and other DDS manufacturers
- Fastsearch
- HP-UX Boot support with Release 9.0

The drive supports up to 8 Gbytes of data storage on a single cassette through the use of data compression and a 90 meter tape. It also continues to support existing 60 meter tapes.

The DCLZ data compression algorithm provides up to a 4 fold increase in capacity and transfer rate over the capability of a standard DAT drive. The data compression occurs in real time so capacity improvements are matched by improvements in the sustained transfer rate of the drive.

The DLCZ algorithm is implemented in the electronics of the tape drive. The entire compression process is resident in the tape drive and is transparent to the host. The algorithm can achieve a compression factor of two for files such as object code which do not have much repetition, and a compression factor of four for text or databases. Series 800 users can expect a typical compression ratio of 2.5 : 1.

The DDS-DC format allows compressed data to be stored in a way that maintains the full functionality of the DDS format and ensures backward compatibility with existing DDS drives. The drive/HP-UX:

- Supports the DDS-DC format to allow interchange of compressed data between HP and other DDS vendors
- Can read any DDS and DDS-DC tape whether data compression is switched on or off
- Automatically de-compresses DLCZ data whether data compression is switched on or off
- The data compression feature is selectable through either SCSI commands or the setting of hardware switches

Table 16.3 Drive Specifications

Capacity	2 to 8 Gbytes (90 meter tape)
Transfer rate (sustained)	183 to 732 Kbytes/sec
Transfer rate (burst)	
Asynchronous	1.5 Mbytes/sec maximum
Synchronous	5.0 Mbytes/sec maximum
Search speed	An average of 30 seconds access for any part of a 90 meter tape
Reliability (MTBF)	50,000 power-on hours
Power Requirements	+5V dc: \pm 5%, 0.6 amps typical +12C dc: \pm 10%, 0.1 amps typical, 0.6 amps maximum (<< 1 sec)
Power Consumption	5 watts typical

Digital Audio Tape Storage Subsystems

For the HP 9000 Model Fxx, Gxx, Hxx, Ixx, and 890, several DAT storage subsystems are available in both tower and rackmountable housing. These devices are single ended SCSI and are available in the following base configurations.

Each of the DAT drives is half-height. Each tower package can hold a total of 7 half-height devices. Each rackmountable package can hold for half-height devices plus one additional half or full-height device. The following upgrade kits can be integrated into these packages.

Table 16.4

Product Number	Base Configuration
C2464T/R	2 Gbyte DAT
C2465T/R	2x 2Gbyte DAT
C2466T/R	Up to 8 Gbyte Data Compression DAT
C2467T/R	2x Up to 8 Gbyte Data Compression DAT

Table 16.5

Expansion Kit Product No.	Description	Half-height or full-height
C2293U	500 Mbyte CD-ROM expansion kit	half-height
C2477U	2 Gbyte DAT expansion kit	half-height
C2478U	Up to 8 Gbyte DAT expansion kit	half-height
C3027U	1 Gbyte single-ended disk drive expansion kit	half-height
C3028U	2 Gbyte single-ended disk drive expansion kit	full-height

Quarter-Inch Cartridge (QIC525)

The QIC525 drive supported on the HP 9000 Fxx, Gxx, Hxx, and Ixx servers is available as an internal mechanism only, attaching to the system via the internal SCSI bus. The device offers up to 525 Mbytes of data storage on a single tape. It is a bootable device, and a variety of HP-UX software products are available on the QIC media.

The QIC drive uses the industry-standard QIC320/525 format. It is also compatible with a number of other QIC formats (see Table 16.6).

Table 16.6 Drive Specifications

Transfer Rate (sustained)	240 Kb/sec
Media Capacity (using DC6525)	525 MB
Write Compatibility	QIC120, QIC150, QIC320/525
Read Compatibility	QIC24, QIC120, QIC150, QIC320.525
Recording Density (bpi)	16,000
Error rate (max)	10 ⁻¹⁴
MTBF (15% Duty Cycle)	50,000 power-on hours
Input Voltage Range	85-264 V ac
Input Frequency Range	47-440 Hz
Power Consumption	25 W

There are a number of QIC media types available in the industry. Table 16.7 indicates the media type along with the read/write compatibility supported by this QIC drive.

The recommended format for writing to QIC media with HP's supported drive is the 320/525 format. Although other formats are supported, the device and driver have been specifically tuned for the QIC320/525 format.

Note: The QIC525 drive and media are not compatible with HP's proprietary HP-IB quarter-inch cartridge drives (9144A, 9145A) and cartridges.

Table 16.7 QIC Media Support

Media/Cartridge Type	Write Compatibility	Read Compatibility
DC 6525	QIC320/525, QIC150, QIC120	QIC320/525, QIC150, QIC120, QIC24
DC 6320	QIC320/525, QIC150, QIC120	QIC320/525, QIC150, QIC120, QIC24
DC 6250	QIC150, QIC120	QIC150, QIC120, QIC24
DC 6150	QIC150, QIC120	QIC150, QIC120, QIC24
DC 600A	QIC120	QIC120, QIC24
DC 300XL/P	—	QIC24

Section 17

Printers

Printer Selection

The four types of printers supported on Series 800 Business Servers are compared in Table 17.1 with respect to relative cost, print speed, noise level, and estimated print quality.

Inkjet Printers

Inkjet (ThinkJet, QuietJet, DeskJet, and PaintJet) printers offer low price, reasonably fast print speed, and the quietest operation of all printers. Of these printers, the DeskJet offers Laser printer print quality. The PaintJet has the added advantage of being able to make full-color overhead transparencies. This type of printer is useful mainly as a low-cost, light-workload, workstation printer. It should never be considered for use as the only printer in a system.

Dot-Matrix Serial Impact Printers

Dot-matrix serial impact printers combine versatility at reasonable cost with good print speed. Versatility can include graphics image and bar code printing and the ability to trade print speed for better print quality. Good print speed means that a dot-matrix serial impact printer can be used as the only printer on a system with modest-to-average printing requirements.

Table 17.1 Types of Printers Available for Series 800 Business Servers

Printer Type	Print Speed	Noise Level (dBA)	Print Quality
Monochrome Inkjet	150-240 cps	50	NLQ
Color Inkjet	167 cps	50	NLQ
Dot-Matrix Impact Serial	40-480 cps	56-63	NLQ
Laser	8-20 ppm	50	LQ
Dot-Matrix Impact Line	300-1200 lpm	55-65	NLQ

Laser Printers

Laser printers combine excellent print quality with print speed faster than the fastest dot-matrix serial printers at higher cost. Laser printers are recommended for systems with average printing workload in which high print quality is important and the lack of multipart forms print capability is irrelevant.

Dot-Matrix Impact Line Printers

Dot-matrix impact line printers offer versatility similar to dot-matrix serial impact printers at faster print speeds and higher prices. A dot-matrix impact line printer should be selected for uses with large printing requirements.

Printer Interfacing

Printer connections for HP 9000 Series 800 Business Servers are summarized in Table 18.2 and illustrated in Figure 49.

Network Interface Support via NPX

The HP LaserJet IIISi (HP 33491A) is now supported by the S800s on HP-UX 8.0, or later, via the optional 3-Com 3+ OPEN/Ethernet Interface (C2059B), available when ordering the printer. *In addition, one must also retrieve the NPX patch driver for this interface from HPPFCSE (Fort Collins patch machine) until HP-UX release 9.0.*

NPX will provide access to printers equipped with any of the following cards:

Table 17.2

Part	Description	Printer
C2059B	3-Com Ethernet	LaserJet IIISi
C2071C	3-Com BNC (ThinLAN)	LaserJet Series II and LaserJet III
C2071D	3-Com EtherTwist	LaserJet Series II and LaserJet III

Printers must be attached to the same LAN as the HP-UX print "server."

Table 17.3 Interfacing of System-Connected Printers to HP 9000 Series 800 Business Servers

Multiplexer Connected Printers Each printer uses one multiplexer channel, connected via the indicated multiplexer-to-printer cable.		HP-IB Connected Printers* Each printer is connected via a 10833B/C cable.	
Printer	Connects via	Printer	Comments
2562C with Option 049† 2563C with Option 049† 2564C with Option 049† 2566C with Option 049† 2567C with Option 049†	92218A (15m) Cable or 40242M (5 m) Cable	2562C Std 2563C with Option 290 2564C with Option 290 2566C with Option 290 2567C with Option 290 2608SR** with Option 290	HP-IB printers are not supported on HP-PB systems.
2235B 2932A** and 2934A 2225D 2227A and 2228A 3630A with Option 001 2684A 33440A 41063A C1200A C1202A with Option 1A9 C1602A with Option 1AX C2106A	92218A (15 m) Cable or 40242M (5 m) Cable	2235B 2932A** with Option 046 2934A with Option 046 2227B C1202A with Option 1A8 C1602A with Option 1A8	HP-IB printers are not supported on HP-PB systems.
2686A** 2686A** with Option 300	92218A (15 m) Cable922 or 13242N (5 m) Cable		

* The Model 808S, 815S, 822S, 832S, 842S, and 852S support only RS-232C Printers; HP-IB printers are not supported on the Model 808S, 815S, 8x2S, Fxx, Gxx, Hxx, lxx, and 890.

** Discontinued product, listed here for reference only.

† Centronics interface are supported on HP-PB systems at HP-UX 8.0. Maximum cable length is 6 feet. Due to this cable length restriction, racked 8x7S Business Servers should be mounted in the lower half of the 1.6 meter cabinet.

Centronics Connected Printers

Maximum cable length is 6 feet. Due to this cable length restriction, racked Fxx/Gxx/Hxx/lxx Business Servers should be mounted in the lower half of the 1.6 meter cabinet.

Table 17.4

Printer	
2225C	ThinkJet Printer (U.S. Version)
2227A	QuietJet Plus Printer
2228A	QuietJet Printer
2235A	RuggedWriter 480 Printer (U.S. version)
2235C	RuggedWriter 480 Printer (U.S. version)
2276A	DeskJet Printer (U.S. version)
2277A	DeskJet Plus Printer (U.S. version)
C2354A	Dot Matrix Line Printer, 840 lpm
2562C	420 lpm Line Impact Printer
2563A	Line Printer, Dot Matrix, 300 lpm
2563B	Line Printer, Dot Matrix, 300 lpm
2563C	Dot Matrix Line Printer, 420 lpm
2564B	Dot Matrix Line Printer, 4600 lpm
2564C	Dot Matrix Line Printer, 840 lpm
2565A	Dot Matrix Line Printer, 600 lpm
2566B	Dot Matrix Line Printer, 900 lpm
2566C	Dot Matrix Line Printer, 1200 lpm
2567B	Dot Matrix Line Printer, 1200 lpm
2567C	Dot Matrix Line Printer, 1600 lpm
2684A	LaserJet 2000 Printer
2684P	LaserJet 2000 w/ Paper Deck
2686D	LaserJet 500
2932A	Dot Matrix Line Printer, 200 cps
2934A	Dot Matrix Office Quality Impact Printer
33440A	LaserJet Series II
33447A	LaserJet IID Dual Tray
33449A	LaserJet III 8ppm Printer
33459A	LaserJet IID Dual Tray
33471A	LaserJet IIP 4 ppm Printer
3630A	PaintJet Color Graphics Printer
C1602A	PaintJet XL Color Graphics Printer
C2106A	DeskJet 500 Printer

High Capacity Printers

The HP 5000 Model F100

The HP 5000 Model F100 production capacity printer is a 100 pages per minute (ppm) fanfold printer. It is based on HP Printer Control Language (PCL), the printer language used by the HP LaserJet family.

The HP 5000 Model F100 is supported on all Series 800 systems running HP-UX 9.0 using the 27147A or the 28655A SCSI interface. The printer may be placed up to 100 meters away from the SPU with a fiber optic SCSI connection (P/N 28643/A). Distance can be even further with the use of LANs and routers in a print server configuration.

Table 17.5 Features Summary

Print Speed (8-1/2" x 11" pages)	100 ppm
Text and Graphics resolution	300 dpi
Maximum Duty Cycle	
Linear feet per month	2 million
8-1/2" x 11" pages	2.8 million
Data Memory	4 MB
Graphics and Font Memory	
Standard	16 MB
Maximum Memory	64 MB
Input capacity	3600 pages
Output capacity	4000 pages
Internal fonts	20 bitmapped
Internal symbol sets	14
Number of downloadable fonts	128
Number of fonts per page	128
HP 9000 Interface	SCSI II, single-ended
Printer Language	HP PCL 4
Print line (maximum)	13.875 inches (375 mm)

Because it is based on PCL 4, the F100 can utilize many off-the-shelf, PC-based LaserJet Series III formatting tools that can be uploaded to the Series 800. This allows printing of 2-up and 4-up formats, electronic forms, bar codes, logos, and merged text and sophisticated graphics all at 300 dpi, at production speeds and in production volumes.

High quality continuous feed paper is required for the F100. For best results, 18 to 28 lb paper is recommended. Because high speed printer reliability and performance are highly depended on paper quality, it is strongly recommended that all media be tested before purchasing. Refer to the HP 5000 Paper Specifications Guide (P/N C2750-90101).

Table 17.6

Internal Fonts		
Typeface	Size(s) (points)	Treatment(s)
Courier	10, 12	Medium, Bold, Italic
Prestige Elite	7	Medium
Prestige Elite	10	Medium, Bold, Italic
Line printer	8.5, 10	Medium
Univers	14	Bold
CG Times	8	Medium
CG Times	10, 12	Medium, Bold, Italic
Symbol Sets		
Roman-8 (Includes ASCII and Roman Extension and all ISO characters)	ISO 6 ASCII	ISO 4 United Kingdom
ECMA-94 Latin 1 (ISO 8859/1)	ISO 69 French	ISO 21 German
PC-8	ISO 11 Swedish names	ISO 17 Spanish
PC-8 D/N	ISO 17 Spanish	ISO 60 Norwegian v1
PC-850	ISO 60 Norwegian v1	ISO 15 Italian
Legal	ISO 15 Italian	
Physical Specifications		
Height:	60.2 inches (1530 mm)	
Width:	78.2 inches (1987 mm)	
Depth:	37 inches (940 mm)	
Weight:	2138 lbs (972 kg)	
Power Requirements		
Basic Model		
C2753A	208 V, 3-phase, 60 Hz, 35A (per phase max.)	
C2754A	400/230 V and 380/220 V, 3-phase, 50 Hz, 25 A (per phase max.)	
with Transformer Kit (C2763A)		
C2753A	200 V, 3-phase, 60 Hz, 35A	
C2754A	400/230 V, or 415/240 V, 3-phase, 50 Hz, 25 A	
TN (Terra Neutral) power connection only.		
Ordering Information		
Model F100		
C2753A	HP 5000 Model F100, 60 Hz, 16 MB graphics memory	
C2754A	HP 5000 Model F100, 50 Hz, 16 MB graphics memory	
C2763A	Voltage Selectable transformer kit for 200 V, 50 or 60 Hz, and 415/240 V, 50 Hz	
C2758A	16 MB graphics memory expansion module	
Adapter Cards, Cabling, Extenders		
27147A	SCSI Host Adapter Card for models 825, 835, 840, 850, 855, 860, 865 and 870s	
28655A	SCSI Host Adapter Card for models 815, 8x2s, 8x7s, Fxx, Gxx, Hxx, Ixx, and 890	
28643A	Fiber Optic SCSI Extender	
	Opt. AFB	500 meters
	Opt. AFD	100 meters
92222A-C	0.5, 1 and 2 meter SCSI cables (from remote extender to printer)	

Physical paper width ranges from 6.5 inches (165 mm) to 18 inches (457.2 mm) including perforation. Form height, fold-to-fold, ranges from 6 inches (152.4 mm) to 16 inches (406.4 mm).

All points are addressable with edge to edge printing in all directions up to a maximum 13.875" image width. For best results, the paper feed sprocket holes must be kept free from print.

Table 17.7 Currently Available Graphics Printers for HP 9000 Series 800 Business Servers

Device Product Number and Name	Display/Plot/Print Area	Data Rate or Plotting Speed	Usable Resolution
C1200A Asian Line Printer	345 × 241 mm	Not specified	70.8 × 70.8 dots per cm
C1202A Asian High Speed Printer	345 × 241 mm	Not specified	70.8 × 70.8 dots per cm
2227A/B QuietJet Plus Printer	13.2 × 9.5 in. (335 × 241 mm)	Not specified	96 × 96 dots per in. (37.7 × 37.7 dots per cm)
2228A QuietJet Printer	7.5 × 9.5 in. (190 × 241 mm)		
2235B RuggedWriter Printer	13.6 × 9.5 in. (345 × 241 mm)	Not specified	90 × 90 dots per in. (35.4 × 35.4 dots per cm)
C2106A DeskJet Printer	7.5 × 9.5 in. (190 × 241 mm)	Not specified	300 × 300 dots per in. (118 × 118 dots per cm)
2563C Line Printer	13.2 × 42.6 in. (335 × 1083 mm)	14.5 in./min. (36.8 cm/min.)	70 × 72 dots per in. (27.5 × 28.3 dots per cm)
2564C Line Printer	13.2 × 42.6 in. (335 × 1083 mm)	29 in./min. (73 cm/min.)	
C2354A Line Printer	13.2 × 42.6 in. (335 × 1083 mm)	29 in./min. (73 cm/min.)	
2566C Line Printer	13.2 × 42.6 in. (335 × 1083 mm)	50 in./min. (127 cm/min.)	
2567C Line Printer	13.2 × 42.6 in. (335 × 1083 mm)	50 in./min. (127 cm/min.)	
2684x LaserJet/2000 Printer	8 × 10.6 in. (203 × 269 mm)	Up to 20 ppm	
2932A* General-Purpose Printer and 2934A Office Printer	11.3 × 42.6 in. (289 × 1083 mm)	8 in./min. (20.3 cm/min.)	90 × 90 dots per in. (35 × 35 dots per cm)
33449A/33459A LaserJet Series III/IIID Printer	8 × 10.6 in. (203 × 269 mm)	8 ppm	300 × 300 dots per in. (118 × 118 dots per cm)
3630A PaintJet Color Printer	8 × 10.6 in. (203 × 269 mm)	4 min. for page of color graphics, 8 min. for transparency	180 × 180 dots per in. (70.8 × 70.8 dots per cm)
41063A Asian Workstation Printer	345 × 241 mm	Not specified	70.8 × 70.8 dots per cm

*Discontinued product, listed here for reference.

Section 18

Graphics Devices

Basic Requirements

In addition to the graphics devices that are listed in this section, HP 9000 Series 800 Computer Systems require the HP 92445A or 92463A Starbase Graphics Library for graphics I/O. The Starbase Graphics Library provides device interface subroutines for all of the supported graphics devices listed in this section.

Graphics Kernel System (GKS) Compatibility

For Series 800 Multiuser systems, order 92521A HP-GKS/HP-UX, which offers a choice of 1/4-inch

cartridge tape (option AA0) or 1/2-inch magnetic tape (option AA1) media. GKS requires Starbase.

Interactive Graphics

Interactive graphics involves pointing and picking using a mouse or graphics table. It may also involve image control using a multi-axis control dial box, which is used interactively while observing a monochrome or color graphics display. Series 800 Business Servers offer a choice of high-resolution graphics displays.

Medium-Resolution Graphics

Medium-resolution graphics is based on the HP 2393A (monochrome) Graphics Terminal, the 2397A Color Graphics Terminal, and a mouse or graphics digitizer tablet for cursor control or picking. This type of graphics does not involve 3-D objects, so there is no use for a control dial box with the medium-resolution graphics terminals. The graphics terminals connect to the system via an 8-channel or 16-channel multiplexer, (see Table 18.1). For comparisons, see Table 18.2 and Table 18.3.

Table 18.1. Interfacing of Multiplexer Connected and HP-IB Connected Graphics Devices

Multiplexer Connected Devices Each device uses one multiplexer channel, connected via the indicated multiplexer cable.		HP-IB Connected Devices Each device is connected via a 10833B/C cable.	
Device	Connects via	Device	Comments
2393A or 2397A	40242M Cable	Terminals are not connected via HP-IB.	Terminals are not connected via HP-IB.
2563C with Option 049 2564C with Option 049 2566C with Option 049 2567C with Option 049	92218A (15 m) Cable or 40242M (5 m) Cable	2563C with Option 290 2564C with Option 290 2566C with Option 290 2567C with Option 290	HP-IB printers are not supported in HP-PB systems.
2225D 2227A or 2228A 2235B 2932A* or 2934A 33440A 3630A 41063A C1202A with Option 1A9	92218A (15 m) Cable or 40242M (5 m) Cable	2235B 2934A with Option 046 2227B C1202A with Option 1A8	HP-IB printers are not supported in HP-PB systems.
C1625A or C1627A 7440A+001 7475A+001	92218A (15 m) Cable or 40242M (5 m) Cable	C1625A or C1627A 7440A+002 7475A+002	Four plotters and NO OTHER DEVICES per HP-IB interface.
7550B	92215F (15 m) Cable or 40242C (5 m) Cable	7550B	Four plotters and NO OTHER DEVICES per HP-IB interface.
7570B 7595B 7596B	92218A (15 m) Cable or 40242M (5 m) Cable	7570B+17570A 7595B 7576B	Four plotters and NO OTHER DEVICES per HP-IB interface.
7580B* 7585B* 7586B*	92218A (15 m) Cable or 40242M (5 m) Cable	7580B* 7585B* 7586B*	Four plotters and NO OTHER DEVICES per HP-IB interface.

*Discontinued product, listed here for reference only.

Graphics Hardcopy Output

Plotters

Graphics plotters are available for plotting hardcopy on media ranging from A-Size (ISO A4 size) on up to E-size (ISO A0 size). Available are fast electrostatic plotters and multicolor plotters with a carousel capable of holding 6 or 8 pens. They connect to the

system as listed in Table 18.1. For selection information, see Table 18.4.

Printers

All of the currently available HP 9000 Series 800 supported printers that use dot-matrix impact technology can be used to print graphics as well as alpha-numeric output. These print a

raster output which has been converted from vector inputs. In addition, the HP 9000 Series 800 servers support graphics output on monochrome and color inkjet printers and the LaserJet Series II laser printer. See Table 18.1 for connections and Table 17.7 for selection information.

Table 18.2. Graphics Displays for HP 9000 Series 800 Business Servers

Device Product Number and Name	Display/Plot/Print Area	Data Rate or Plotting Speed	Usable Resolution	Graphics Features	Comments
2393A Graphics Terminal	8.4 × 6.3 in. (214 × 160mm)	210 vectors/sec	512(h) × 390(v) or 640(h) × 400(v)	Polygon fill, 11 line types	Monochrome display
2397A Color Graphics Terminal	8.4 × 6.3 in. (214 × 160mm)	210 vectors/sec	512(h) × 390(v) or 640(h) × 400(v)	Polygon fill, 11 line types, 8 colors from a palette of 64	Color display
98752A 19-inch Color Graphics Monitor	10.7 × 13.5 in. (274 × 343mm)	276,000 vectors per second	1280(h) × 1024(v)	Determined by display controller	Color display
98789A 16-inch Color Graphics Monitor	9.3 × 11.6 in. (238 × 297mm)	276,000 vectors per second	1280(h) × 1024(v)	Determined by display controller	Color display

Table 18.3. Currently Available Graphics Input Devices for HP 9000 Series 800 Business Servers*

Device Product Number and Name	Display/Plot/Print Area	Data Rate or Plotting Speed	Usable Resolution	Comments	
45911A Graphics Digitizer Tablet	11 × 11 in. (279 × 279mm)	65 coordinate pairs per sec	48 lines per millimeter	Connects between keyboard and display unit of 239xA Graphics Terminal or to HP-HIL port of Display Controller.	
46087B Graphics Digitizer Tablet	8.5 × 11.7 in. (216 × 297mm)	65 coordinate pairs per sec	40 lines per millimeter		
46088B Graphics Digitizer Tablet	11.7 × 17 in. (297 × 432mm)				
46060A/B HP Mouse	N/A	N/A	N/A		
46085A Control Dial Box	N/A	N/A	480 counts/rev.		
46084A ID Module	N/A	N/A	N/A		
M1309A 3-button Trackball	N/A	N/A	N/A		
46080A HP-HIL Extension	N/A	N/A	N/A		2.4m, no audio
46081A HP-HIL Extension	N/A	N/A	N/A		2.4m, with audio
46082A HP-HIL Extension	N/A	N/A	N/A		15m, w/audio and 0.5m RGB cable extension
46082B HP-HIL Extension	N/A	N/A	N/A	30m, w/audio and 0.5m RGB cable extension	

*Graphics input devices are not supported on the Model 808S and 815S.

Table 18.4. Currently Available Graphics Plotters for HP 9000 Series 800 Business Servers

Device Product Number and Name	Display/Plot/Print Area	Data Rate or Plotting Speed	Usable Resolution	Graphics Features	Comments
C1625A Electrostatic Plotter	23.6 in. width (600 mm width)	0.67 in./sec (1.6 cm/sec)	406 dots/in. (160 dots/cm)	Prints across full width	Complete drawing takes <1 minute
C1627A Electrostatic Plotter	35.3 in. width (896 mm width)	0.86 in./sec (2.2 m/sec)	406 dots/in. (160 dots/cm)	Prints across full width	Complete drawing takes <1 minute
7440A ColorPro Plotter	7.5 × 10.7 in. (191 × 272 mm)	15.7 in./sec (40 cm/sec)	0.004 in. (0.1 mm)	8 pens	Multicolor plotting
7475A Graphics Plotter	10.8 × 16.2 in. (275 × 414 mm)	15 in./sec (38.1 cm/sec)	0.004 in. (0.1 mm)	6 pens	Multicolor plotting
7550B Graphics Plotter	10.7 × 16.1 in. (272 × 411 mm)	31.5 in./sec (80 cm/sec)	0.004 in. (0.1 mm)	8 pens, auto sheet feed	Multicolor plotting
7570B DraftPro Plotter	25.2 × 39.4 in. (550 × 1000 mm)	15.7 in./sec (40 cm/sec)	0.004 in. (0.1 mm)	8 pens	Multicolor plotting
7595B DraftMaster I Plotter	36.5 × 48.5 in. (927 × 1232 mm)	24 in./sec (60 cm/sec)	0.004 in. (0.1 mm)	8 pens	Multicolor plotting
7596B DraftMaster II Plotter	36.5 × 48.9 in. (927 × 1243 mm)	24 in./sec (60 cm/sec)	0.004 in. (0.1 mm)	8 pens, auto roll feed	Multicolor plotting

Section 19 Terminals

System Console/Terminal Selection

A locally interfaced display terminal must be provided for operator communication in any HP 9000 Series 800 server. Except where otherwise noted, any of the display terminals listed in Table 19, next page, can be used as a system console. These include previously purchased terminals that have been discontinued. However, it is most cost effective to specify a minimum-capability terminal for the system console, because extra capability, such as graphics, usually cannot be put to good use on a system console. The other main consideration in selecting a system console is to specify one that uses the same type of cable as most of the other terminals in the system to facilitate connection of another terminal as system console if the original system console terminal fails.

Console/Display Terminal Interfacing

Via RS-232C Ports

The interfaces used for connection of the system console and other display terminals to the system differ with the HP 9000 Series 800 Models, as follows:

In HP 9000 Models 8x2S, 8x7s, Fxx, Gxx, Hxx, and Ixx, the system console and additional terminals are connected via the HP 40299B Asynchronous 8-channel Multiplexer interface, which is included in the System Processor Unit. In the HP 9000 Models Fxx, Gxx, Hxx, and Ixx, the system console and additional terminals are connected via the integrated 8-channel multiplexer interface, which is on the system personality card. Connections are shown in Figure 19.

In the HP 9000 Corporate Business Server 890, the system console and additional terminals

are connected via an Asynchronous 16-channel Multiplexer interface, which is included in the System Processor Unit. The system console uses one of the 16 multiplexer channels, and the access port uses another, leaving 14 channels available in the first multiplexer for additional terminals or other RS-232C devices.

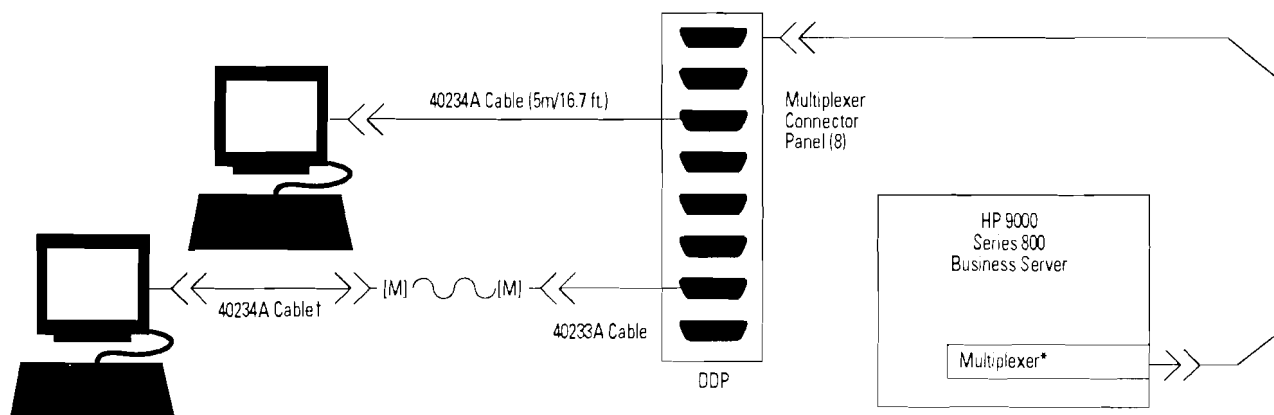
Terminal Cable Selection

RS-232 terminals are connected to the HP 9000 asynchronous multiplexers via direct cables or via asynchronous modems.

The following cables are recommended:

- 40234A for direct connection to a peripheral
- 40233A for connection to a modem

Figure 19 Terminal Connection via 8-Channel Multiplexer



* HP 40299B or J209XA Multiplexer for HP-PB systems.
HP 98196A or 90190A Multiplexer for CIO systems.

† See the Terminal Cables Selection section, to confirm cable product number to order.

Table 19 Display Terminals and PCs Supported on HP 9000 Series 800 Business Servers

Product Number	Name/Description	Connects to Model 815S via RS-232-C Port A or B or 98196A, 98190A, 40299B, or J209XA Multiplexer
C1001A/G/W	HP 700/92 Display Terminal, available Amber (A), Green (G), or White (W) background display, 80/132 col.	40242M/40234A Cable
C1002A/G/W	HP 700/94 High Performance Terminal, available with Amber (A), Green (G), or White (W) background display, 80/132 col.	40242M/40234A Cable
C1006A/G/W	HP 700/43 Full-Featured ASCII Terminal, available with Amber (A), Green (G), or White (W) background display, 80/132 col. <i>Not supported as system console.</i>	40242M/40234A Cable
C1007A/G/W	HP 700/44 PC Systems Terminal, available with Amber (A), Green (G), or White (W) background display, 80/132 col. <i>Not supported as system console.</i>	40242M/40234A Cable
C1017A/G/W	HP 700/32 DEC VT 320 Compatible Terminal, available with amber (A), Terminal, available with amber (A), green (G), or white (W). <i>Not supported as system console.</i>	40242M/40234A Cable
C1080A/G/W	HP 700/60 the HP Multiprocessing Terminal, available with amber (A), green (G), or white (W) background display 80/32 col. <i>Not supported as system console for 8x7S only.</i>	40242M/40234A Cable
Z393A	Monochrome Graphics Terminal, 80 columns. <i>Not supported as system console.</i>	40242M/40234A Cable
Z397A	Color Graphics Terminal, 80 columns. <i>Not supported as system console.</i>	40242M/40234A Cable
	Note: The following are discontinued products, listed here for reference only.	
C1003A/G	HP 700/41 Entry Level ASCII Terminal, available with Amber (A) or Green (G) display, 80 col. <i>Not supported as system console.</i>	40242Y/40234A Cable
C1004A/G/W	HP 700/22 DEC VT220 compatible Display Terminal, available with Amber (A), Green (G), or White (W) background display, 80/132 col. <i>Not supported as system console.</i>	40242C/40234A Cable
C2301B	HP 700/RX X Window Terminal base unit. <i>Not supported as system console.</i>	Connection by LAN only
C2303B	HP 700/RX X Window VGA color terminal. <i>Not supported as system console.</i>	Connection by LAN only
C2304B	HP 700/RX X Window 1024 x 768 color terminal. <i>Not supported as system console.</i>	Connection by LAN only
C2305B	HP 700/RX X Window grayscale terminal. <i>Not supported as system console.</i>	Connection by LAN only
Z392A	Display Terminal, 80 column system console requires option S12.	40242M Cable
Z394A	Alphanumeric Terminal with forms capability, 80 column. <i>Not supported as system console.</i>	40242M Cable
3081A	Industrial Workstation Terminal, 80 columns. <i>Not supported as system console.</i>	40242C Cable
3082B	Industrial Touch Terminal, 80 columns. <i>Not supported as system console.</i>	40242C Cable
45610A/B	Touchscreen PC/Terminal, 80 columns. May require upgrade with the latest HP 150-II ROMs. Emulates 2623A. <i>Not supported as system console.</i>	40242M or 92218A Cable
45711A.D	Portable Plus PC/Terminal, 80 columns. Requires 82863K Option 400 software, which emulates the 2392A Terminal. <i>Not supported as system console.</i>	92221M Cable
72425A*	Vectra Model 25 PC, 80 columns. Emulates the 2392A Terminal. <i>Not supported as system console.</i>	24542M or 40242M Cable
72445A*	Vectra Model 45 PC, 80 columns. Emulates the 2392A Terminal. <i>Not supported as system console.</i>	24542M or 40242M Cable

* HP Vectra Model 25 and 45 PCs also require a monitor, graphics adapter, HP Advancelink software, the Vectra Disk Operating System, and a Serial/Parallel or Dual Serial Interface card for operation as an HP 9000 Series 800 Terminal.

Section 20 X Stations

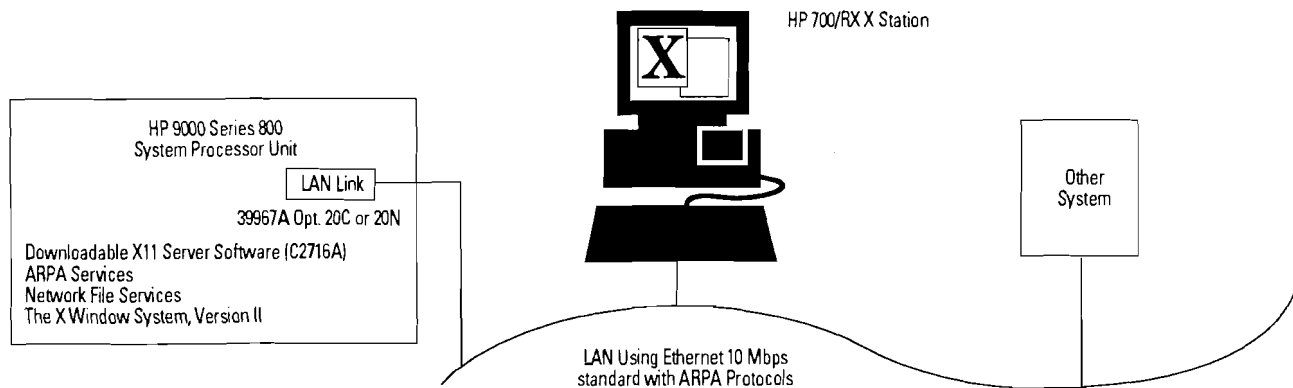
HP 700/RX X Stations via LAN Link

The HP 700/RX family of color and grayscale X Window graphics terminals, when connected to an EtherNet LAN as shown in Figure 20, provide the user with interactive access and simultaneous display of multiple applications. The number of stations that can access a specific application is limited by the amount of RAM and by the available performance on the HP 9000 Series 800 Business Server. HP 700/RX X Stations operate well on systems where LAN loading is below 15% of capacity.

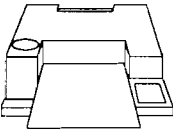

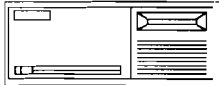
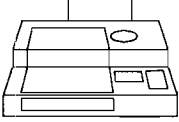
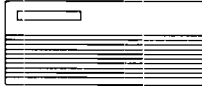
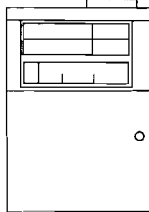
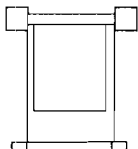
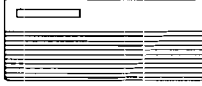
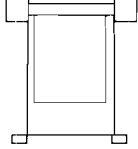
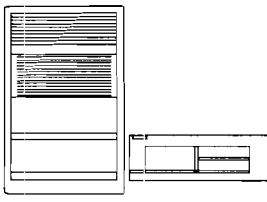
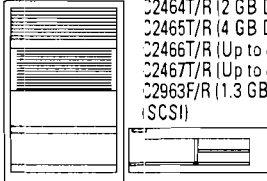
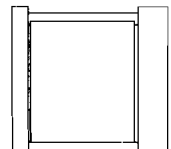
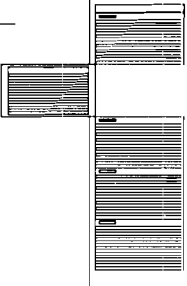
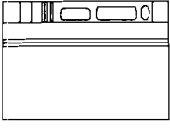
Table 20. HP X Stations Supported on the Series 800 (LAN Required)

Part Number	Description
C2701A	HP 700RX Monochrome X Station Base Unit (no monitor included)
C2702A	HP 700/RX 19-inch Monochrome X Station (monitor included)
C2704A	HP 700/RX Color X Station Base Unit (no monitor included)
C2705A	HP 700/RX 14-inch Color X Station (monitor included)
C2706A	HP 700/RX 16-inch Color X Station (monitor included)
C2709A	HP 700/RX Hi-Res Color X Station Base Unit (no monitor included)
C2710A	HP 700/RX 16-inch Color X Station (monitor included)
C2711A	HP 700/RX 19-inch Color X Station (monitor included)

Figure 20. HP 700/RX X Station Connection Via LAN Link



Section 21 — Recommended Series 800 Peripherals (cont'd)

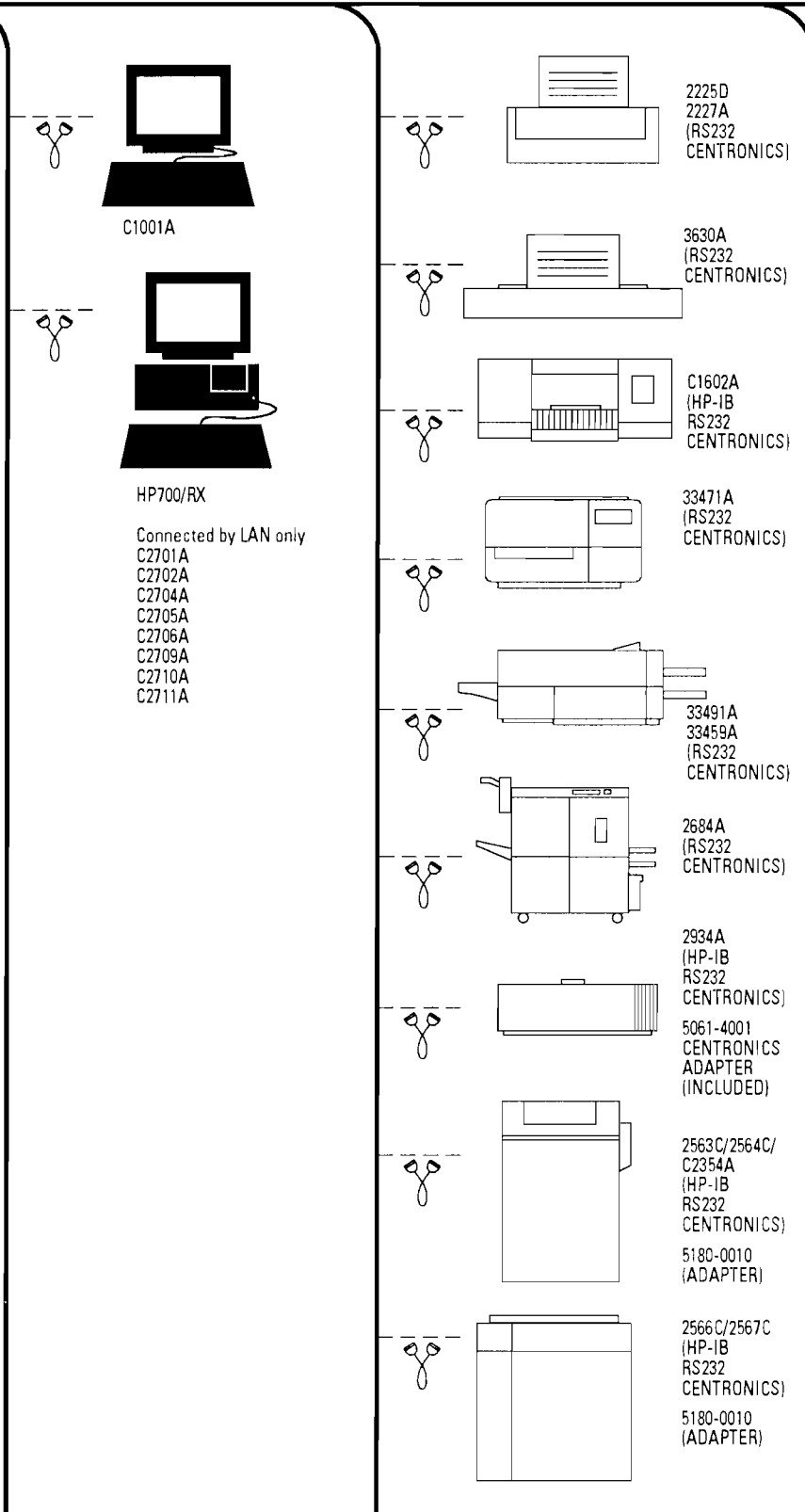
Plotters	Disk Drives	Tape Drives/DAT
 <p>7440A (RS232 HP-IB)</p>	 <p>7957B 81 MB (HP-IB)</p>	 <p>DDS (DAT) C1511A (1.3 GB) C1512A (1.3 GB) C1520B (DAT) C1521B (DAT) (HP-IB SCSI)</p>
 <p>7476A (RS232 HP-IB) 7550B (RS232 HP-IB)</p>	 <p>C2200A 335 MB C2203A 670 MB (HP-IB)</p>	 <p>1/2 INCH 7978B 1600/(800)CPM 7980S 1600/6250 CPI 7980S 800/1600/6250 CPI 7980SX 1600/6250/6250SX CPI 7980SX 800/1600/6250/6250SX CPI</p>
 <p>7670A/7576A/7576A (RS232 HP-IB)</p>	 <p>C2201A 670 MB C2204A 1.34 GB (HP-FL P-BUS)</p>	<p>Cables Used to Connect Tape Drives/DAT: 10833A – HP-IB K2296 – SCSI</p>
 <p>C1633A (HP-IB* CENTRONICS) *C1642A INTERFACE RIGID</p>	 <p>C3023T/R (2 GB) C3024T/R (4 GB) C2460F/R (420 MB) C2461F/R (670 MB) C2462F/R (1350 GB) (SCSI)</p>	 <p>C2464T/R (2 GB DAT) C2465T/R (4 GB DAT) C2466T/R (Up to 8 GB DAT) C2467T/R (Up to 8 GB DAT) C2963F/R (1.3 GB) DAT (SCSI)</p>
 <p>7595B/7596B/7599A (RS232 HP-IB)</p>	 <p>C2254HA/B – 5.4 GB C2252HA/B – 2.7 GB (HP-FL)</p>	<p>Cables Used to Connect Disk Drives: 10833A – HP-IB HFDR-AWQXXX – HP-FL 19570A – P-BUS 1.08 m 19571A – P-BUS 0.8 m K2296 – SCSI 0.9 m K2291 – TERMINATOR</p>
 <p>C1625A C1627A C1620A (HP-IB RS232 CENTRONICS)</p>	<p>Cables Used to Connect Plotters: 10833A/B/C – HP-IB 92284A – CENTRONICS 40242M – RS232</p>	

Section 21 Recommended Series 800 Peripherals

Series 800
Business
Server

Terminals

Printers



C1001A

HP700/RX

Connected by LAN only
C2701A
C2702A
C2704A
C2705A
C2706A
C2709A
C2710A
C2711A

2225D
2227A
(RS232
CENTRONICS)

3630A
(RS232
CENTRONICS)

C1602A
(HP-IB
RS232
CENTRONICS)

33471A
(RS232
CENTRONICS)

33491A
33459A
(RS232
CENTRONICS)

2684A
(RS232
CENTRONICS)

2934A
(HP-IB
RS232
CENTRONICS)

5061-4001
CENTRONICS
ADAPTER
(INCLUDED)

2563C/2564C/
C2354A
(HP-IB
RS232
CENTRONICS)

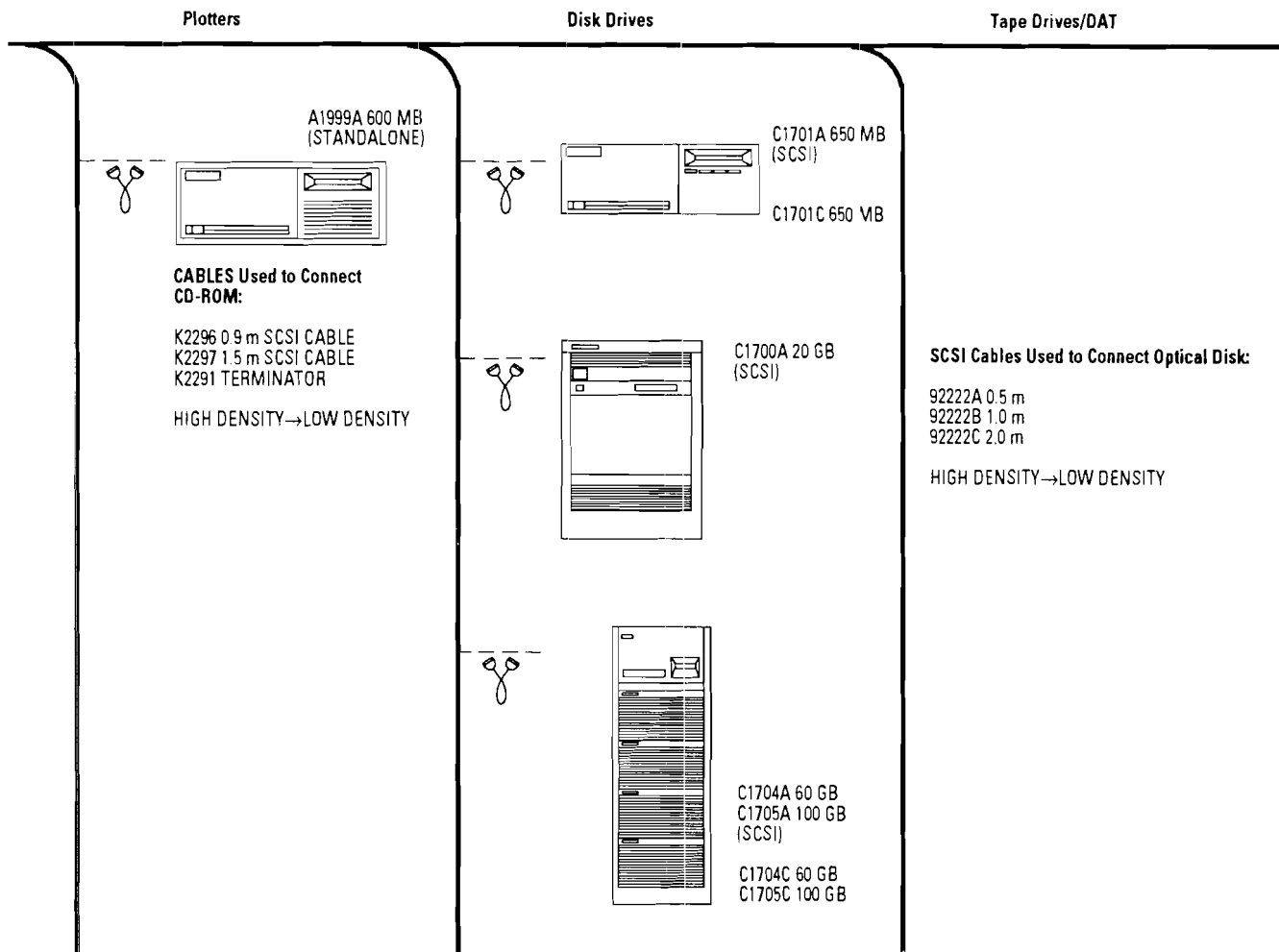
5180-0010
(ADAPTER)

2566C/2567C
(HP-IB
RS232
CENTRONICS)

5180-0010
(ADAPTER)

Cables Used to Connect Terminals and Printers:

40242M - RS232
92284A - CENTRONICS
10833A/B/C - HP-IB



NOTE: Use K22967 SCSI cable when connecting to internal SCSI bus in 8x7S Business Servers (to connect to internal disks and DAT). Additional SCSI interfaces come without a cable, so the 92222x cables are needed to daisy chain peripherals.

Section 22

Peripherals Supported on the Series 800

Peripheral Support Matrix

Table 22.1 DATACOMM Devices

Part No.	Notes	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB
35016A	#	Support Modem	RS-232	Pre-7.0	Y	Y
35141A		HP Support Link	RS-232	Pre-7.0	Y	Y
37204A		High Speed Multi-pt HP-IB Extender	HP-IB	7.0	Y	Y
37212A	#	1200 Baud Modem	RS-232	Pre-7.0	Y	Y
37212B	#	1200 bps Autodial Error Correcting Modem	RS-232	Pre-7.0	Y	Y
92205A		Hayes 1200 Modem	RS-232	Pre-7.0	Y	Y
92205B		Smartmodem 2400	RS-232	Pre-7.0	Y	Y
92205C	#	Hayes 1200 Modem	RS-232	7.0	Y	Y
BELL212A	@	Modem, Dial-In	RS-232	Pre-7.0	Y	Y
BELL103J	@	Dial-up, Auto-Answer	RS-232	Pre-7.0	Y	Y
BELL202T	@	4-Wire Leased Line	RS-232	Pre-7.0	Y	Y
Telebit	@	PEP/V.32 Modem	RS-232	8.0	Y	Y
Trailblazer V.32	@	Telebit 19.2 Modem	RS-232	7.0	Y	Y
USR HST	@	HST/V.32 Modem	RS-232	7.0	Y	Y
USR2400	@	Courier HST Modem	RS-232	7.0	Y	Y
USR9600	@	Courier HST Modem	RS-232	7.0	Y	Y

Device is obsolete, listed for reference only.

@ Third party devices will be certified with 8.0 software only. HP does not support third party software.

Note: Datacomm devices are not supported in powerfail recovery.

Table 22.2 Series 800 Mounted Disk List

Part No.	Opt.	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Notes
7907A		41 Mbyte Fixed; Removable Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0
7914CT		132 MB Disk/Tape	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7914P/R		132 MB Disc/Tape Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7914ST		132 MB/1600 CPI Disk/ Tape Storage System	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7933H		404 MB Disc Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7935H		404 MB removable disc drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7936FL		307 MB Fixed Disk Drive	HP-FL	Pre-7.0	Y	N	0, S, ^
7936H		307 MB Formatted Fixed Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7937FL		571 MB Megabyte FL Disk Drive	HP-FL	Pre-7.0	Y	N	0, S, ^
7937H		571 MB Formatted Fixed Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7957A		81 MB Fixed Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7957B		81 MB Fixed Disk in Desktop Package a	HP-IB (fast)	Pre-7.0	Y	Y	0
7957S		107 Megabyte SCSI Fixed Disk Drive	SCSI	8.0	Y	Y	0
7958A		130 MB Fixed Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7958B		152 MB Fixed Disk In a Desktop Package	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7958S		161 MB SCSI Fixed Disk Drive	SCSI	8.0	Y	Y	0, S
7959B		304 MB Fixed Disk Drive	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7959S		323 MB SCSI Fixed Disk	SCSI	8.0	Y	Y	0, S
7962B		152 MB Fixed Disk w/Up-grade Capability	HP-IB (fast)	Pre-7.0	Y	Y	0, S
7963B		304 MB Fixed Disk w/Up-grade Capability	HP-IB (fast)	Pre-7.0	Y	Y	0, S
9122C		2 MB 3.5 inch micro-floppy disk drive	HP-IB (slow)	Pre-7.0	Y	Y	
9122D		Dual disk drive	HP-IB (slow)	Pre-7.0	Y	Y	0
9122S		Single 3 1/2" flexible disk drive	HP-IB (slow)	Pre-7.0	Y	Y	0
9127A		Single 5 1/4" Flexible Disk Drive	HP-IB (slow)	Pre-7.0	Y	Y	0
9153C	040	40 MB Winchester + 2 MB 3 1/2" Floppy	HP-IB (slow)	Pre-7.0	Y	Y	
9262B		152 MB removable disk drive	HP-IB (fast)	3.1	Y	Y	0
9263B		304 MB removable disk drive	HP-IB (fast)	3.1	Y	Y	0, S
97902B		152 MB removable disk drive kit	HP-IB	3.1	Y	Y	0, S
97903B		304 MB removable disk drv kit for HP926XB	HP-IB	3.1	Y	Y	0, S
97962B		152 Mbyte Upgrade Kit	HP-IB	Pre-7.0	Y	Y	0, S
97963B		304 Mbyte Upgrade Kit	HP-IB	Pre-7.0	Y	Y	0, S
A1896A	201	1.1m Integrated Cabinet—Add 1.3 GB Disk	SCSI	8.02	N	Y	S
A1896A	202	1.1m Integrated Cabinet—Add 2.7 GB Disk	SCSI	8.02	N	Y	S
A1896A	203	1.1m Integrated Cabinet—Add 4.0 GB Disk	SCSI	8.02	N	Y	S
A1897A	201	1.6m Integrated Cabinet—Add 1.3 GB Disk	SCSI	8.02	N	Y	S
A1897A	202	1.6m Integrated Cabinet—Add 2.7 GB Disk	SCSI	8.02	N	Y	S
A1897A	203	1.6m Integrated Cabinet—Add 4.0 GB Disk	SCSI	8.02	N	Y	S
C1700A		20 GB rewritable optical disk library	SCSI	8.0	Y	Y	
C1700C		20 GB Optical Library	SCSI	9.0	Y	Y	
C1701A		Rewritable optical disk drive	SCSI	8.0	Y	Y	S, *
C1701C		650 GB Standalone Drive	SCSI	9.0	Y	Y	S
C1704A		57 GB rewritable optical disk library	SCSI	8.02	Y	Y	
C1704C		60 GB Optical Library	SCSI	9.0	Y	Y	
C1705A		93 GB Rewritable optical disk library	SCSI	8.02	Y	Y	
C1705C		100 GB Optical Library	SCSI	9.0	Y	Y	
C2200A		Model 335H Formatted Fixed Disk Drive	HP-IB (fast)	7.0	Y	Y	S
C2201A		Model 670FL Formatted Fixed Disk Drive	HP-FL	7.0	Y	Y	S
C2203A		Model 670H Formatted Fixed Disk Drive	HP-IB (fast)	7.0	Y	Y	S
C2204A		Model 1.34FL Formatted Fixed Disk	HP-FL	7.0	Y	Y	S

Notes:

- S Supported as System Disk.
- ^ Not supported on 815 (no HP-FL support).
- 0 Obsolete; listed for reference only.
- * C1701A has been tested for use as a system disk. Such usage is normally limited to recovery after a system-disk crash, when an image of the system disk is available on a C1701A medium (On the S'300 only).
- + Not tested in 8.0, but supports glitchless transceivers.

Table 22.2 Series 800 Mounted Disk List (cont'd)

Part No.	Opt.	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Notes
C2212A		332 MB SCSI Disk Mass Storage System	SCSI	8.0	Y	Y	S, +
C2212A	003	Add-On 1.3 GB Digital Audio Tape Drive	SCSI	8.0	Y	Y	S
C2212A	001	Add-On 332 MB SCSI 5 1/4" disk drive	SCSI	8.0	Y	Y	S
C2212A	005	Add-On 650 MB Rewritable Optical Disk Drive	SCSI	8.0	Y	Y	S
C2212A	004	Add-On CD-ROM Drive	SCSI	8.0	Y	Y	
C2212A	024	Two Add-On CD-ROM drives	SCSI	8.0	Y	Y	
C2213A	664	MB SCSI Disk Mass Storage System	SCSI	8.0	Y	Y	S
C2213A	003	Add-On 1.3 GB Digital Audio Tape Drive	SCSI	8.0	Y	Y	S
C2213A	001	Add-On 332 MB SCSI 5 1/2" disk drive	SCSI	8.0	Y	Y	S
C2213A	005	Add-On 650 MB Rewritable Optical Disk Drive	SCSI	8.0	Y	Y	S
C2213A	002	Add-On 664 MB SCSI 5 1/4" disk drive	SCSI	8.0	Y	Y	S
C2213A	004	Add-On CD-ROM Drive	SCSI	8.0	Y	Y	
C2213A	022	Two Add-On 664 MB SCSI 5 1/4" disk drives	SCSI	8.0	Y	Y	S
C2213A	024	Two Add-On CD-ROM drives	SCSI	8.0	Y	Y	
C2252B		2.72 GB Disk Array	HP-FL	8.0	Y	Y	T, R
C2252HA		2.72 GB High Availability Disk Array	HP-FL	8.0	Y	Y	T, R
C2254B		5.44 GB Disk Array	HP-FL	8.0	Y	Y	T, R
C2254HA		5.44 GB High Availability Disk Array	HP-FL	8.0	Y	Y	T, R
C2281A		Integrated 335 MB Mechanism/Controller	SCSI	7.02	N	Y	
C2282A		Integrated 670 MB Mechanism/Controller	SCSI	8.02	N	Y	
C2290A		332 MB SCSI disk upgrade kit/C2212A/C2213A	SCSI	8.0	Y	Y	S
C2291A		664 MB SCSI disk upgrade kit/C2212A/C2213A	SCSI	8.0	Y	Y	S
C2294A		650 MB Rewritable Optical Disk upgrade /C2212A/C2213A	SCSI	8.0	Y	Y	S
C2460F		Model 420F Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2460R		Model 420R Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2461F		Model 670F Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2461R		Model 670R Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2462F		Model 1350F Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2462R		Model 1350R Formatted SCSI-2 Disk Drive	SCSI	8.02	Y	Y	@@, S, R
C2470S		234 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2471S		328 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2472F		422 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2472R		422 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2472S		422 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2473F		677 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2473R		677 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2473S		677 Mbyte Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2474F		1.35 GB Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2474R		1.35 GB Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C2474S		1.35 GB Single-Ended SCSI Expansion	SCSI	8.02	N	Y	S, R
C3023T		2 GB Disk Minitower	SCSI	9.0	N	Y	S, #
C3023R		2 GB Disk Rackmount	SCSI	9.0	N	Y	R, S, #
C3024T		4 GB Disk Minitower	SCSI	9.0	N	Y	S, #
C3024R		4 GB Disk Rackmount	SCSI	9.0	N	Y	R, S, #
C3027U		1 GB Disk Drive Expansion Kit	SCSI	9.0	N	Y	S, #
C3028U		2 GB Disk Drive Expansion Kit	SCSI	9.0	N	Y	S, #

Notes:

- S Supported as System Disk.
- ^ Not supported on 815 (no HP-FL support).
- O Obsolete; listed for reference only.
- * C1701A has been tested for use as a system disk. Such usage is normally limited to recovery after a system-disk crash, when an image of the system disk is available on a C1701A medium (On the S'300 only).
- + Not tested in 8.0, but supports glitchless transceivers.
- @@ CIO Support.
- R Rack Mountable.
- T Support of boot/install and independent mode with HP-UX release 9.0 native NIO FL card (P/N 28615A) and independent mode functionality.
- # 8.02 support (as data disk only) under investigation.

Table 22.3 Series 800 Plotter List

Part No.	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB
17440A	Graphics Enhancement Cartridge	7440A	7.0	Y	Y
7440A	Color-Pro Graphics Plotter	HP-IB	Pre-7.0	Y	Y
	RS-232	Pre-7.0	Y	Y	
7475A	6-Pen Graphics Plotter	HP-IB	Pre-7.0	Y	Y
		RS-232	Pre-7.0	Y	Y
7550A*	8-Pen Graphics Plotter	HP-IB	Pre-7.0	Y	Y
		RS-232	Pre-7.0	Y	Y
7550B	7550 Plus 4 Color Desktop Plotter	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
		Cent	8.0	N	Y
7586B*	Roll Feed Drafting Plotter	HP-IB	Pre-7.0	Y	Y
		RS-232	Pre-7.0	Y	Y
7595A*	HP7595A A4 through A0 Plotter	HP-IB	Pre-7.0	Y	Y
		RS-232	Pre-7.0	Y	Y
		RS-422	Pre-7.0	Y	Y
7595B*	HP7595B A4 through A0 Plotter	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
7596A*	HP7596A A4 through A0 Plotter	HP-IB	Pre-7.0	Y	Y
		RS-232	Pre-7.0	Y	Y
		RS-422	Pre-7.0	Y	Y
7596B*	HP7596B A4 through A0 Plotter	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
7599A*	HP7599A, A0/E Rollfeed, 4 user	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
C1600A*	HP7600 Series/240D	HP-IB	Pre-7.0	Y	Y
		Cent	8.0	N	Y
C1601A*	HP7600 Series/240E	HP-IB	Pre-7.0	Y	Y
		Cent	8.0	N	Y
C1620A	HP7600 Series/355 Electrostatic	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
		Cent	8.0	N	Y
C1625A	HP7600 Series Model 250	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
		Cent	8.0	N	Y
C1627A	HP7600 Series Model 255	HP-IB	8.0	Y	Y
		RS-232	8.0	Y	Y
		Cent	8.0	N	Y

*Obsolete; listed for reference only

Table 22.4 Series 800 Printer List

Part Number	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Page Rate	Paper Type	Print Quality	Bar Codes	Notes
2225C	ThinkJet Printer for USA	Cent	8.0	N	Y	150 cps	Std fanfold/ cut sheets	Draft	No	
2225D	ThinkJet Printer for USA	RS-232	Pre-7.0	Y	Y	150 cps	Std fanfold/ cut sheets	Draft	No	
2225P	Thinkjet battery powered printer	Cent	8.0	N	Y	150 cps	Std fanfold/ cut sheets	Draft	No	
2227A	QuietJet Plus Printer	Cent	8.0	N	Y	160/192 cps	Wide fanfold/ cut sheets	NLQ/Draft	No	
2227A	QuietJet Plus Printer	RS-232	Pre-7.0	Y	Y	160/192 cps	Wide fanfold/ cut sheets	NLQ/Draft	No	
2227B	U.S. Version of QuietJet PlusPrinter	HP-IB (slow)	Pre-7.0	Y	N	160/192 cps	Wide fanfold/ cut sheets	NLQ/Draft	No	
2228A	QuietJet Printer	Cent	8.0	N	Y	160/192 cps	Std fanfold/ cut sheets	NLQ/Draft	No	
2228A	QuietJet Printer	RS-232C	Pre-7.0	Y	Y	160/192 cps	Std fanfold/ cut sheets	NLQ/Draft	No	
2235A	RuggedWriter 480 Printer/ U.S. Version	Cent	8.0	N	Y	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235A	RuggedWriter 480 Printer/ U.S. Version	RS-232	Pre-7.0	Y	Y	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235B	RuggedWriter 480 Printer/ U.S. Version	HP-IB (slow)	Pre-7.0	Y	N	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235B	RuggedWriter 480 Printer/ U.S. Version	RS-232	Pre-7.0	Y	Y	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235C	RuggedWriter 480 Printer/ U.S. Version	Cent	8.0	N	Y	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235C	RuggedWriter 480 Printer/ U.S. Version	RS-232	Pre-7.0	Y	Y	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235D	RuggedWriter 480 Printer/ U.S. Version	HP-IB (slow)	Pre-7.0	Y	N	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2235D	RuggedWriter 480 Printer/ U.S. Version	RS232C	Pre-7.0	Y	N	240/480 cps	Wide fanfold/ cut sheets	LQ/Draft	No	
2276A	DeskJet Printer/ U.S. Version	Cent	8.0	N	Y	120/240 cps	Single sheet/ envelopes	LQ/Draft	No	0
2276A	DeskJet Printer/ U.S. Version	RS-232	Pre-7.0	Y	Y	120/240 cps	Single sheet/ envelopes	LQ/Draft	No	0
2277A	DeskJet Plus Printer/ U.S. Version	Cent	8.0	N	Y	120/240 cps	Single sheet/ envelopes	LQ/Draft	No	0
2277A	DeskJet Plus Printer/ U.S. Version	RS-232	7.0	Y	Y	120/240 cps	Single sheet/ envelopes	LQ/Draft	No	0
2562C	420 lpm line impact printer	Cent	8.0	N	Y	150/300 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Yes	
2562C	420 lpm line impact printer	HP-IB	7.0	Y	N	150/300 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Yes	
2562C	420 lpm line impact printer	RS-232	7.0	Y	Y	150/300 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Yes	

0 Obsolete, listed for reference only.

Print Quality Legend
 NLQ = Near Letter Quality
 LQ = Letter Quality

Table 22.4 Series 800 Printer List (cont'd)

Part Number	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Page Rate	Paper Type	Print Quality	Bar Codes	Notes
2563A	Line Printer; Dot Matrix lpm; 300 lpm	Cent	8.0	N	Y	300/420 lpm	Wide fanfold/6-part forms	Compressed/Draft	Opt	0
2563A	Line Printer; Dot Matrix lpm; 300 lpm	HP-IB	Pre-7.0	Y	N	300/420 lpm	Wide fanfold/6-part forms	Compressed/Draft	Opt	0
2563A	Line Printer; Dot Matrix lpm; 300 lpm	RS-232C	Pre-7.0	Y	Y	300/420 lpm	Wide fanfold/6-part forms	Compressed/Draft	Opt	0
2563B	Line Printer; Dot Matrix; 300 lpm	Cent	8.0	N	Y	300/420 lpm	Wide fanfold/6-part forms	Compressed/Draft	Opt	0
2563B	Line Printer; Dot Matrix; 300 lpm	RS-232C HP-IB	Pre-7.0	Y	Y	300/420 lpm	Wide fanfold/6-part forms	Compressed/Draft	Opt	0
2563C	Dot Matrix Line Printer 420 lpm	Cent	8.0	N	Y	300/150 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2563C	Dot Matrix Line Printer 420 lpm	HP-IB (slow)	8.0	Y	N	300/150 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2563C	Dot Matrix Line Printer 420 lpm	RS-232	8.0	Y	Y	300/150 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2564B	Line Printer; Dot Matrix; 600 lpm	Cent	8.0	N	Y	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2564B	Line Printer; Dot Matrix; 600 lpm	CIPER	Pre-7.0	Y	N	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2564B	Line Printer; Dot Matrix; 600 lpm	HP-IB	Pre-7.0	Y	N	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2564B	Line Printer; Dot Matrix; 600 lpm	RS-232C	Pre-7.0	Y	Y	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2564C	Dot Matrix line printer 840 lpm	Cent	8.0	N	Y	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2564C	Dot Matrix line printer 840 lpm	HP-IB (slow)	8.0	Y	N	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2564C	Dot Matrix line printer 840 lpm	RS-232C	8.0	Y	Y	300/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	
2565A	Line Printer; Dot Matrix Impact; 600 lpm	Cent	8.0	N	Y	166/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2565A	Line Printer; Dot Matrix; Impact; 600 lpm	CIPER	Pre-7.0	Y	N	166/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2565A	Line Printer; Dot Matrix; Impact; 600 lpm	HP-IB	Pre-7.0	Y	N	166/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2565A	Line Printer; Dot Matrix; Impact; 600 lpm	RS-232C	Pre-7.0	Y	Y	166/600 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2566A	900 lpm Line Printer; Dot Matrix Impact	RS-232C	Pre-7.0	Y	Y	248/900 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2566B	900 lpm Line Printer; Dot Matrix Impact	Cent	8.0	N	Y	248/900 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2566B	900 lpm Line Printer; Dot Matrix Impact	CIPER	Pre-7.0	Y	N	248/900 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2566B	900 lpm Line Printer; Dot Matrix Impact	HP-IB	Pre-7.0	Y	N	248/900 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0
2566B	900 lpm Line Printer; Dot Matrix Impact	RS-232	Pre-7.0	Y	Y	248/900 lpm	Wide fanfold/6-part forms	NLQ/Draft	Opt	0

0 Obsolete, listed for reference only.

Print Quality Legend
 NLQ = Near Letter Quality
 LQ = Letter Quality

Table 22.4 Series 800 Printer List (cont'd)

Part Number	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Page Rate	Paper Type	Print Quality	Bar Codes	Notes
2566C	1200 lpm Dot Matrix line printer	Cent	8.0	N	Y	248/900 lpm 6-part forms	Wide fanfold/	NLQ/Draft	Opt	
2566C	1200 lpm Dot Matrix line printer	HP-IB (slow)	8.0	Y	N	248/900 lpm 6-part forms	Wide fanfold/	NLQ/Draft	Opt	
2566C	1200 lpm Dot Matrix line printer	RS-232	8.0	Y	Y	248/900 lpm 6-part forms	Wide fanfold/	NLQ/Draft	Opt	
2567B	Line Printer; Dot Matrix Impact; Impact; 1200 lpm	Cent	8.0	N	Y	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	0
2567B	Line Printer; Dot Matrix Impact; Impact; 1200 lpm	CIPER	Pre-7.0	Y	N	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	0
2567B	Line Printer; Dot Matrix Impact; Impact; 1200 lpm	HP-IB	Pre-7.0	Y	N	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	0
2567B	Line Printer; Dot Matrix Impact; 1200 lpm	RS-232C	Pre-7.0	Y	Y	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	0
2567C	Dot Matrix line printer 1600 lpm	Cent	8.0	N	Y	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft		
2567C	Dot Matrix line printer 1600 lpm	HP-IB (slow)	8.0	Y	N	320/1200 lpm	Wide fanfold/ 6-part forms	NLQ/Draft		
2567C	Dot Matrix line printer 1091 lpm	RS-232	8.0	Y	Y	320/1091 lpm	Wide fanfold/ 6-part forms	NLQ/Draft		
2684A	LaserJet 2000 Printer; 115 Vac 60Hz	Cent	8.0	N	Y	20 ppm	Single sheet/ no forms	LQ	Std	0
2684A	LaserJet 2000 Printer; 115 Vac 60Hz	RS-232	Pre-7.0	Y	Y	20 ppm	Single sheet/ no forms	LQ	Std	0
2684P	LaserJet 2000 Printer with Paper Deck	Cent	8.0	N	Y	20 ppm	Single sheet/ no forms	LQ	Std	0
2686A	LaserJet Printer; 115 VAC 60Hz; 8 ppm	Cent	8.0	N	Y	8 ppm	Single sheet/ no forms	LQ	Std	0
2686A	LaserJet Printer; 115 VAC 60Hz; 8 ppm	RS-232	Pre-7.0	Y	Y	8 ppm	Single sheet/ no forms	LQ	Std	0
2686D	LaserJet 500+; 115 VAC 50Hz	Cent	8.0	N	Y	8 ppm no forms	Single sheet/	LQ	Std	0
2686D	LaserJet 500+;	RS-232	7.0	Y	Y	8 ppm no forms	Single sheet/	LQ	Std	0
C2354A	Dot Matrix Line Printer 840 lpm	Cent	9.0	N	Y	300/600	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	
C2354A	Dot Matrix Line Printer 840 lpm	HP-IB	9.0	Y	N	300/600	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	
C2354A	Dot Matrix Line Printer 840 lpm	RS-232	9.0	Y	Y	300/600	Wide fanfold/ 6-part forms	NLQ/Draft	Opt	
2932A	Dot Matrix Impact Printer	HP-IB (slow)	Pre-7.0	Y	N	200 cps	Wide fanfold/ 6-part forms	Draft	No	0
2932A	Dot Matrix Impact Printer	Cent	8.0	N	Y	200 cps	Wide fanfold/ 6-part forms	Draft	No	0
2932A	Dot Matrix Impact Printer	RS-232	Pre-7.0	Y	Y	200 cps	Wide fanfold/ 6-part forms	Draft	No	0
2932A	Dot Matrix Impact Printer	HP-IB	Pre-7.0	Y	N	200 cps	Wide fanfold/ 6-part forms	Draft	No	0
2934A	Dot Matrix Office Quality Impact Printer	Cent	8.0	N	Y	40/67/200 cps	Wide fanfold/ 6-part forms	LQ/Draft	Yes	
2934A	Dot Matrix Office Quality Impact Printer	HP-IB (slow)	Pre-7.0	Y	N	40/67/200 cps	Wide fanfold/ 6-part forms	LQ/Draft	Yes	
2934A	Dot Matrix Office Quality Impact Printer	RS-232	Pre-7.0	Y	Y	40/67/200 cps	Wide fanfold/ 6-part forms	LQ/Draft	Yes	

Notes:
 • RS-232 printers are not supported in powerfail recovery.
 • 815 (NIO) only supports RS232 printers.
 0 Obsolete, listed for reference only.

Print Quality Legend
 NLQ = Near Letter Quality
 LQ = Letter Quality

Table 22.4 Series 800 Printer List (cont'd)

Part Number	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Page Rate	Paper Type	Print Quality	Bar Codes	Notes
33440A	LaserJet Series II 115V 8 ppm printer	Cent	8.0	N	Y	8 pages/min	Single sheets	LQ	Yes	0
33440A	LaserJet Series II 115V 8 ppm printer	RS-232	Pre-7.0	Y	Y	8 pages/min	Single sheets	LQ	Yes	0
33447A	LaserJet IID Dual Tray, Duplex Printer	Cent	8.0	N	Y	8 pages/min	Single sheets and Duplex	LQ	Yes	0
33447A	LaserJet IID Dual Tray, Duplex Printer	RS-232	7.0	Y	Y	8 pages/min	Single sheets and Duplex	LQ	Yes	0
33449A	LaserJet III 8 ppm Laser Printer	Cent	8.0	N	Y	8 pages/min	Single sheets	LQ	Yes	
33449A	LaserJet III 8 ppm Laser Printer	RS-232	8.0	Y	Y	8 pages/min	Single sheets	LQ	Yes	
33459A	LaserJet IIID Printer Dual Tray, Duplex	Cent	8.0	N	Y	8 pages/min	Single sheets and Duplex	LQ	Yes	
33459A	LaserJet IIID Printer Dual Tray, Duplex	RS-232	8.0	Y	Y	8 pages/min	Single sheets and Duplex	LQ	Yes	
33471A	LaserJet IIP 4 ppm Laser Printer	Cent	8.0	N	Y	4 pages/min	Single sheets	LQ	Yes	
33471A	LaserJet IIP 4 ppm Laser Printer	RS-232	8.0	Y	Y	4 pages/min	Single sheets	LQ	Yes	
33491A	LaserJet IIISi Laser Printer	LAN	7.0	Y	Y	17 pages/min	Single sheets and Duplex	LQ	Yes	
3630A	PaintJet Color Graphics Printer for A/A4	Cent	8.0	N	Y	167 cps	Std fanfold/cut sheets	NLQ	No	
3630A	PaintJet Color Graphics Printer for A/A4	RS-232	Pre-7.0	Y	Y	167 cps	Std fanfold/cut sheets	NLQ	No	
41063A	Asian WS Printer	RS-232	Pre-7.0	Y	Y	40/80 cps	Wide fanfold/cut sheets	NLQ/Draft	No	
C1200A	300 lpm Dot Matrix Asian Line Printer	RS-232	Pre-7.0	Y	Y	270/330 lpm	Wide fanfold/6-part forms	NLQ/Draft	No	
C1602A	PaintJet XL Color Graphics Printer	Cent	8.0	N	Y	167 cps	Wide cut sheets/autofeed	NLQ	No	
C1602A	PaintJet XL Color Graphics Printer	HP-IB	7.0	Y	N	167 cps	Wide cut sheets/autofeed	NLQ	No	
C1602A	PaintJet XL Color Graphics Printer	RS-232	7.0	Y	Y	167 cps	Wide cut sheets/autofeed	NLQ	No	
C2106A	DeskJet 500 Printer	Cent	8.0	N	Y	120/240 cps	cut sheets/envelopes	LQ/Draft	No	
C2106A	DeskJet 500 Printer	RS-232	8.0	Y	Y	120/240cps	cut sheets/envelopes	LQ/Draft	No	
C2753A	HP5000 Model F100 Pg Printer—60Hz	SCSI	9.0	Y	Y	100 pages/min	Std fanfold	LQ	Std	
C2754A	HP5000 Model F100 Pg Printer—50Hz	SCSI	9.0	Y	Y	100 pages/min	Std fanfold	LQ	Std	

Notes:

- RS-232 printers are not supported in powerfail recovery.
 - 815 (NIO) only supports RS232 printers.
- 0 Obsolete, listed for reference only.

Print Quality Legend

NLQ = Near Letter Quality
LQ = Letter Quality

Table 22.5 Series 800 Terminal List

Part No.	Description	Interface	1st HP-UX Rel. Supported On	CIO	HP-PB	Note
2323A	40 Chanel Seq	RS-232	None	N	N	O
2382A	Office Display Terminal	RS-232	None	N	N	O
2392A	Display Terminal	RS-232	Pre-7.0	Y	Y	O, C
2393A	Monochrome Graphics Terminal	RS-232	Pre-7.0	Y	Y	O, C
2394A	Data Entry Terminal	RS-232	Pre-7.0	Y	Y	O
2397A	Color Raster Terminal	RS-232	Pre-7.0	Y	Y	O, @
2622A	Display Terminal	RS-232	None	N	N	O
2625A	Dual System Terminal	RS-232	None	N	N	O
2627A	Color Graphics Terminal	RS-232	None	N	N	O
2628A	HPWord Terminal	RS-232	None	N	N	O
3081A	Workstation Terminal	RS-232	Pre-7.0	Y	Y	O
3082A	Industrial Terminal 2397	RS-232	Pre-7.0	Y	Y	O, *
3082B	Industrial Terminal	RS-232	7.0	Y	Y	O
45610A	HP150 PC	RS-232	None	N	N	O
45610B	Touchscreen Terminal	RS-232	None	N	N	O
45710A	Portable Computer	RS-232	None	N	N	O
45711A	Portable Plus w/Modem	RS-232	None	N	N	O
45850A	HP150-II Terminal	RS-232	None	N	N	O
45970C	Vectra ES/12 Model 20 SPU	RS-232	8.0	Y	Y	O, C
72425A	Vectra Model 25 PC	RS-232	None	N	N	O
72445A	Vectra Model 45 PC	RS-232	None	N	N	O
97056A	ASYNCR Terminal	RS-232	None	N	N	O
9807A	Integral Personal Computer—U.S.	RS-232	None	N	N	O
98720A	High-Resolution Display Controller	LGB	Pre-7.0	Y	Y	O, C, N
98730A	High-Resolution Display Controller	LGB	Pre-7.0	Y	Y	C, N
C1001A/G/W	HP700/92 Terminal	RS-232	Pre-7.0	Y	Y	C
C1002A/G/W	HP700/94 Terminal	RS-232	Pre-7.0	Y	Y	C
C1003A/G	HP700/41 Terminal	RS-232	Pre-7.0	Y	Y	O
C1004A/G/W	HP700/22 Terminal	RS-232	Pre-7.0	Y	Y	O
C1006A/G/W	HP700/43 Terminal	RS-232	Pre-7.0	Y	Y	
C1007A/G/W	HP700/44 Terminal	RS-232	Pre-7.0	Y	Y	
C1010C	Simplified Chinese HP700/92A Keyboard	RS-232	3.1	Y	Y	O, ^, C
C1010J	Japanese HP700/92A Keyboard	RS-232	8.0	Y	Y	O, C
C1010K	Korean HP700/92A Keyboard Kit	RS-232	7.0	Y	Y	O, ^, C
C1010T	Traditional Chinese HP700/92A Keyboard	RS-232	3.1	Y	Y	O, ^, C
C1017A/G/W	HP700/32 Terminal	RS-232	7.0	Y	Y	
C1064A/G/W	HP700/96 Terminal	RS-232	9.0	Y	Y	C
C1065A/G/W	HP700/98 Terminal	RS-232	9.0	Y	Y	C
C1080A/G/W	HP700/60 Terminal	RS-232	9.0	Y	Y	
C1083W	HP700/60 ES (Reduced Emission)	RS-232	9.0	Y	Y	C
C1084W	HP700/96 ES (Reduced Emission)	RS-232	9.0	Y	Y	C
C1085W	HP700/98 ES (Reduced Emission)	RS-232	9.0	Y	Y	C
C2300A	XWindow Graphic Terminal (700/X)	LAN	8.0	Y	Y	O, C
D2300A	AXDS/PC for Vectra PC Family	LAN	None	N	N	O
Emulators	150, 110 +, 300, IPC Vectra	RS-232	Pre-7.0	Y	Y	

Notes:

^ For use in certain Asian countries only.

O Obsolete: Listed for reference only.

N Not supported with HP-UX Release 9.0.

C Supported as System Console.

@ Can be used as a system console on the 815 only.

* The C1511A (Foxbox) is supported in the 7980A Tape Drive Emulation Mode with limited functionality and diagnostics on the S800 family on HP-UX 7.0.

Table 22.6 Series 800 Tape Drive and CD-ROM List

Part No.	Opt. No.	Description	1st HP-UX Rel. Supported Interface	On	CIO	HP-PB	Note
35401A		1/4" Cartridge Autochanger Tape Drive	HP-IB(fast)	Pre-7.0	Y	Y	O
7974A		1600 cpi Streaming & Strt/Stp Tape Drive	HP-IB(fast)	Pre-7.0	Y	Y	O
7978B		6250/1600 cpi Streaming Tape Drive	HP-IB (fast)	Pre-7.0	Y	Y	O
7979A		1600 CPI Autoload 1/2" Tape Drive	HP-IB (fast)	Pre-7.0	Y	Y	
7979A	Opt. 800	Add 800 cpi	HP-IB (fast)	Pre-7.0	Y	Y	
7980A		6250/1600 cpi Autoload 1/2" Tape Drive	HP-IB (fast)	Pre-7.0	Y	Y	
7980A	Opt. 800	Add 800 cpi	HP-IB (fast)	Pre-7.0	Y	Y	
7980S		1600/6250 bpi 1/2" Tape Drive	SCSI	8.0	Y	Y	G
7980S	Opt. 800	Adds 800 bpi density	SCSI	8.0	Y	Y	G
7980SX		1600/6250/6250XC bpi 1/2" Tape Drive	SCSI	8.0	Y	Y	G
7980SX	Opt. 800	Adds 800 cpi NRZI	SCSI	8.0	Y	Y	G
7980XC		6250XC/6250/1600 Extra Capacity Tape Drive	HP-IB (fast)	Pre-7.0	Y	Y	
9144A		67 MB 1/4" Tape Cartridge	HP-IB (fast)	Pre-7.0	Y	Y	O
9145A		133 MB 1/4" Tape Cartridge	HP-IB (fast)	Pre-7.0	Y	Y	O
A1999A		Standalone 660MB SCSI CD-ROM	SCSI	8.02	N	Y	
A2311A		QIC Upgrade Kit	SCSI	8.02	N	Y	R
A2312A	Opt. AM7	2 GB DAT in Peripheral Upgrade Kit	SCSI	8.02	N	Y	R
A2312A	Opt. AM8	CD-ROM in Peripheral Upgrade Kit	SCSI	8.02	N	Y	R
A2312A	Opt. AM9	QIC in Peripheral Upgrade Kit	SCSI	8.02	N	Y	R
C1501A		Embedded Digital Data Storage	HP-IB (fast)	8.0	Y	Y	O, @, T
C1502A		1.3GB DAT mech	SCSI	8.0	Y	Y	O, @, G, T
C1511A		1.3GB HP-IB DDS Format Tape Drive	HP-IB (fast)	8.0	Y	Y	O, *, T
C1512A		1.3GB SCSI DDS Format Tape Drive	SCSI	8.0	Y	Y	O, G, T
C1520B		Standalone 2.0GB DAT Drive	SCSI	8.02	N	Y	
C1521B		Standalone 2GB Datacompression DAT Drive	SCSI	8.02	N	Y	D
C2292A		1.3GB Digital Audio Tape Upgrade Kit	SCSI	8.0	Y	Y	
C2293A		600 MB CD-ROM Upgrade Kit					
C2293U		600 MB CD-ROM Expansion Kit	SCSI	9.0	Y	Y	
C2463F		1.3GB DAT Expansion Kit—MiniTower	SCSI	8.02	N	Y	O, R, G, T
C2463R		1.3GB DAT Expansion Kit—Rack	SCSI	8.02	N	Y	O, R, G, T
C2464F		2GB DAT Expansion Kit—MiniTower	SCSI	8.02	N	Y	@@, R
C2464R		2GB DAT Expansion Kit—Rack	SCSI	8.02	N	Y	@@, R
C2464T/R		2GB DAT in Tower or Rackmountable Enclosure	SCSI	8.02	N	Y	

Notes:

- O Obsolete: Listed for reference only.
- @ Product not currently sold by HP. For support purposes only (used to structure H/W support prices per CPL Database).
- * The C1511A (Foxbox) is supported in the 7980A Tape Drive Emulation Mode with limited functionality and diagnostics on the S800 family on HP-UX 7.0. HP-IB and SCSI DDS will not be fully supported until HP-UX 8.0 MR.
- @@ Qualified on CIO at 9.0.
- R Rack Mountable
- G Glitchy controllers. These devices require a dedicated SCSI bus.
- D Data compression DAT allows for storage of up to 8 GB of compressed data per 90 m tape.
- # 8.02 support available without boot/install support.
- T Product not supported by A2306A, A2307A, A2319A, and A2320A.

Table 22.6 Series 800 Tape Drive and CD-ROM List (cont'd)

Part No.	Description	1st HP-UX Rel. Supported Interface	On	CIO	HP-PB	Note
C2465F	Two 2.0 GByte DATs	SCSI	8.02	N	Y	R
C2465R	Two 2.0 GByte DATs	SCSI	8.02	N	Y	R
C2465T/R	2 × 2 GB DAT in Tower or Rackmountable Enclosure	SCSI	8.02	N	Y	
C2466F	2GB Datacompression Drive—MiniTower DAT	SCSI	8.02	N	Y	R, D
C2466R	2GB Datacompression Drive—Rack DAT	SCSI	8.02	N	Y	R, D
C2466T/R	Up to 8 GB DAT in Tower or Rackmountable Enclosure	SCSI	9.0	N	Y	#
C2467F	Two 2GB Datacompression DATs—MiniTower	SCSI	8.02	N	Y	R, D
C2467R	Two 2GB Datacompression DATs—Rack	SCSI	8.02	N	Y	R, D
C2467T/R	2 × up to 8 GB DAT in Tower or Rackmountable Enclos.	SCSI	9.0	N	Y	#
C2476F	600MB Half-height CD-ROM—MiniTower	SCSI	8.02	N	Y	R
C2476R	600MB Half-height CD-ROM—Rack	SCSI	8.02	N	Y	R
C2476S	600MB Half-height CD-ROM—CPU	SCSI	8.02	N	Y	R
C2477F	2GB DAT Expansion Kit—MiniTower	SCSI	8.02	N	Y	R
C2477R	2GB DAT Expansion Kit—Rack	SCSI	8.02	N	Y	R
C2477S	2GB DAT Expansion Kit—CPU	SCSI	8.02	N	Y	R
C2477U	2 GB DAT Expansion Kit—MiniTower or Rack	SCSI	8.02	N	Y	
C2478U	Up to 8 GB DAT Expansion Kit—MiniTower or Rack	SCSI	9.0	N	Y	#

Notes:

- ⓪ Obsolete: Listed for reference only.
- Ⓢ Product not currently sold by HP. For support purposes only (used to structure H/W support prices per CPL Database).
 - * The C1511A (Foxbox) is supported in the 7980A Tape Drive Emulation Mode with limited functionality and diagnostics on the S800 family on HP-UX 7.0. HP-IB and SCSI DDS will not be fully supported until HP-UX 8.0 MR.
- ⓈⓈ Qualified on CIO at 9.0.
 - R Rack Mountable
 - G Glitchy controllers. These devices require a dedicated SCSI bus.
 - D Data compression DAT allows for storage of up to 8 GB of compressed data per 90 m tape.
 - # 8.02 support available without boot/install support.
 - T Product not supported by A2306A, A2307A, A2319A, and A2320A.

Section 23

HP-UX Operating System

Adding Software to the Series 800

HP-UX 9.0 is the operating system for the Series 800 Business Servers. All Fxx, Gxx, Hxx, Ixx, and 890 servers include:

- 2-user license-to-use for HP-UX 9.0 for the Fxx, Gxx, Hxx, Ixx servers; 8-user license-to-use for the Model 890 (licenses for higher HP-UX user levels can be ordered)
- VUE 3.0 (Visual User Environment) 1-user license
- Motif 1.2 1-user license
- X11 release 5 1-user license
- LAN/9000 license-to-use
- ARPA/9000 license-to-use
- NFS/9000 license-to-use

The following software is preloaded on the system disk:

- HP-UX 8.02 or 9.0 at a 2-user level for the Fxx, Gxx, Hxx, Ixx servers; HP-UX 9.0 at an 8-user level for the Model 890

If the Model Fxx, Gxx, Hxx, Ixx server also includes a LAN card, then the following software is loaded as well:

- LAN/9000
- ARPA/9000
- NFS/9000
- VUE 3.0
- Motif 1.2
- X11 release 5
- NCS 1.5.1 Runtime
- NetLS Runtime

Even if HP-UX is preloaded on the system disk, at least one copy of HP-UX media is strongly recommended per site/workgroup, primarily for recovery, installation, and administration needs.

HP-UX 9.0 is divided up into two parts:

- Core HP-UX operating system media. Includes software for:
 - HP-UX at a 2-user level (or 8-user level for the 890)
 - LAN/9000
 - ARPA/9000
 - NFS/9000
 - NCS 1.5.1
 - VUE 3.0
 - Motif 1.2
 - X11 R5
 - General Programming Tools
 - Minimum System Administration documentation with media
- HP-UX User Licenses for increasing beyond the 2-user level (or 8-user level for the 890)
 - License-to-use for desired HP-UX user level
 - User file to increase system access
 - No System Administration documentation

To order Series 800 HP-UX software, follow these general steps.

Step 1: Order HP-UX Operating System Media (one copy per workgroup).

- B3108A HP-UX 9.0 operating system media.
 - Select DDS, QIC-525 cartridge, or 1/2-inch magnetic tape.
- B3108C HP-UX 9.0 on CD-ROM

- B3108D Reduced HP-UX 9.0 for 8 MB systems
 - Does not provide networking subsystems or X11, Motif, or VUE
 - Select DDS, QIC-525, or 1/2-inch magnetic tape

Step 2: Order increased HP-UX user license level (if more than 2 users will be connected to the Fxx, Gxx, Hxx, or Ixx server, or if more than 8 users will be connected to the Model 890).

Each distinct login into a Series 800 system is counted as a user. Each user logging in through multiplexers and DTCs is counted toward the overall Series 800 user count. Workstations and X stations do not count toward the overall user count. An HP-UX license level that will cover the maximum number of expected users should be purchased for each Series 800.

- Order the B3108L HP-UX User License Product.
 - Select the desired user level with options UAx
 - Select the same user level software with options AGx
 - Select an HP-UX 9.0 user upgrade credit with options UBx. The 2-user credit (or 8-user credit in the case of the 890) should at least be ordered since all Series 800 systems include a 2-user (or 8-user) license.
 - Select the desired media with options AAX

An HP-UX 9.0 user license must be purchased for each Fxx, Gxx, Hxx, and Ixx server running above the base 2-user level. Likewise, an HP-UX 9.0 user license must be purchased

Table 23.2 HP-UX Software and Documentation Products (cont'd)

HP-UX 9.0 Documentation for Series 800

B3108M	English Documentation
Opt. 0BD	General Usage Documentation
Opt. 0BG	Users Guides Documentation
Opt. 0BE	System Administration Documentation
Opt. 0BF	Programming Documentation
Opt. 0BC	Documentation on CD-ROM
Opt. UA2	Add-on 4-user license for CD-ROM
B3135A	Japanese Documentation (see options below)
B2447A	French Documentation (see options below) (HP-UX 8.0 documentation)
B2449A	German Documentation (see options below) (HP-UX 8.0 documentation)
B3136A	Simplified Chinese Documentation (see options below)
B3134A	Traditional Chinese Documentation (see options below)
B3133A	Korean Documentation (see options below)
Opt. 0BD	General Usage Documentation
Opt. 0BG	Users Guides Documentation
Opt. 0BE	System Administration Documentation
Opt. 0BF	Programming Documentation

NLIO Software for Series 800

B2202A	Japanese NLIO Font (see options below)
B2206A	Korean NLIO Font (see options below)
B2210A	Traditional Chinese NLIO Font (see options below)
B2214A	Simplified Chinese NLIO Font (see options below)
Opt. UA3	8 user license
Opt. UA5	16 user license
Opt. UA7	32 user license
Opt. UA9	64 user license
Opt. UAB	128 user license
Opt. UAD	256 user license
Opt. UAT	Unlimited user license
Opt. UB3	Credit for 8 user license
Opt. UB5	Credit for 16 user license
Opt. UB7	Credit for 32 user license
Opt. UB9	Credit for 64 user license
Opt. UBC	Credit for 128 user license
Opt. UBD	Credit for 256 user license
Opt. AA0	1/4 inch media
Opt. AA1	1/2 inch media
Opt. AAH	DAT media

Section 24 Database Software

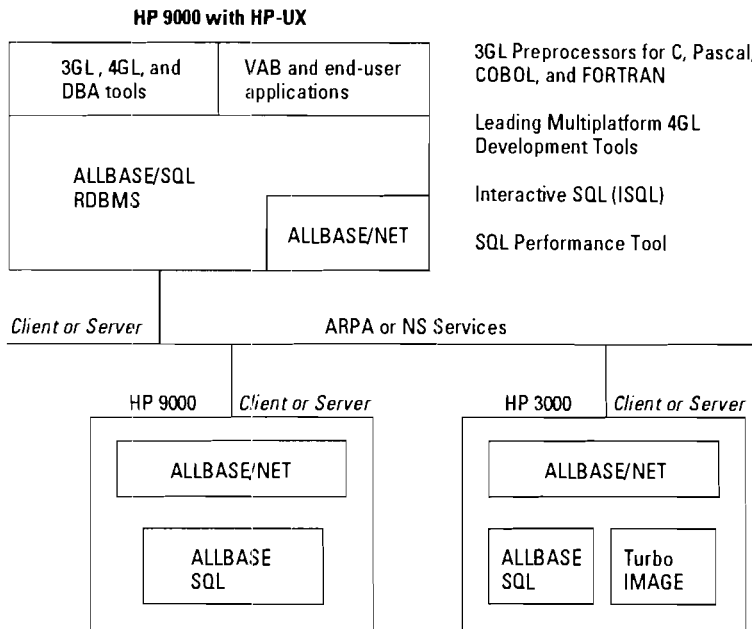
ALLBASE/SQL Configuration Guidelines

ALLBASE/SQL is Hewlett-Packard's high-performance relational database management system (RDBMS) for all HP-UX and MPE/iX systems. Key benefits include:

- the highest OLTP performance for mission-critical applications on HP 9000 servers
- the lowest overall cost-of-ownership for all Hewlett-Packard systems
- leading features such as stored procedures, rules and triggers, row-level locking, database shadowing, and built-in referential integrity

The ALLBASE/NET client/server remote database access product is bundled with ALLBASE/SQL on the Series 800 and is backward-compatible for client systems running earlier versions of HP-UX. Read access from an HP-UX system to TurboIMAGE data on a target MPE/iX system is provided

Figure 24.1



3GL Preprocessors for C, Pascal, COBOL, and FORTRAN

Leading Multiplatform 4GL Development Tools

Interactive SQL (ISQL)

SQL Performance Tool

by using SQL for IMAGE (available separately on the HP 3000).

The development version of ALLBASE/SQL for HP-UX provides 3GL preprocessors for using embedded SQL in C, Pascal, FORTRAN, and COBOL applications. Development and runtime

versions of ALLBASE/SQL provided full support for third-party multiplatform 4GL development tools, as well as Hewlett-Packard's own ALLBASE/4GL and ALLBASE/Query tools.

Table 24.1 Software Matrix For ALLBASE/SQL Development and Runtime for the HP 9000 Series 800

ALLBASE Development System		ALLBASE Runtime Environment
B3143A		B3142A
1-16 User License		Option UA5
1-32 User License		Option UA7
1-64 User License		Option UA9
1-128 User License		Option UAB
100 Additional User License	Option UAE	—
Unlimited User License	—	Option UAT
CD-ROM		Option AAU (as of HP-UX 9.0)
1/4" Cartridge Tape		Option AA0
1/2" Magnetic Tape		Option AA1
Digital Audio Tape (DAT)		Option AAH
QIC		Option AA4

Table 24.2 ALLBASE/SQL Development and Runtime Systems Requirements for the HP 9000 Series 800

	Minimum RAM Required	Minimum Disk Space
ALLBASE Development System	4 Mbytes	15 Mbytes
ALLBASE Runtime System	4 Mbytes	15 Mbytes

Table 24.3 ALLBASE/SQL Documentation

	ALLBASE/SQL Manual Part Numbers
ALLBASE SQL Reference	36217-90001
ALLBASE ISQL Reference	32617-90004
ALLBASE Quick Reference	32617-90012
ALLBASE Database Administration Guide	32617-90005
ALLBASE Message Manual	32617-90009
ALLBASE/NET User's Guide	32617-90093
ALLBASE C Programming Guide	32617-90014
ALLBASE FORTRAN Programming Guide	32617-90013
ALLBASE COBOL Programming Guide	32617-90058
ALLBASE Pascal Programming Guide	32617-90007
Up and Running with ALLBASE/SQL	36389-90011

ALLBASE/4GL Configuration Guidelines

ALLBASE/4GL is HP's advanced development tool# set for high-performance business applications on the Series 800. ALLBASE/4GL is specifically tuned for peak performance on the ALLBASE/SQL engine, and it gives programmers dramatic time savings relative to traditional 3GLs. ALLBASE/4GL applications are portable across both the HP-UX and MPE/iX operating systems, and ALLBASE/4GL is available on both the Series 800 and on HP's Series 700/400/300 workstations.

ALLBASE 4GL currently supports HP-UX operating system versions 7.x and 8.x. ALLBASE/4GL supports all of the media types currently supported for the Series 800.

Table 24.4 ALLBASE/4GL

ALLBASE/4GL	
• Screen Painter	• Module Builder
• Reports Facility	• Logic Facility
• Dictionary	
• ALLBASE/SQL Relational DBMS (HP-UX and MPE/iX)	
• Flat Files (HP-UX and MPE/iX)	• TurboIMAGE (MPE/iX)
• ISAM Files (HP-UX)	• KSAM Files (MPE/iX)
HP-UX Operating System	MPE/iX Operating System
HP 9000 Series 800, 600 Servers, Series 700/400/300 Workstations	HP 3000 Series 900 Servers

Table 24.5 Software Matrix for ALLBASE/4GL on the Series 800

	ALLBASE/4GL Developer Version	ALLBASE/4GL Runtime Version	ALLBASE/SQL/ 4GL/Query Bundle
Tier 1 Systems	30662A	30665A	30671A
Tier 2 Systems	92646A	92633A	92632A
Tier 3 Systems	30663A	30666A	30672A
Tier 4 Systems	35305A	35306A	36362A
Tier 5 Systems	92440A	92441A	30697A
Tier 6 Systems	35307A	35308A	36361A
Tier 7 Systems	30664A	30667A	30673A
Opt. APA	For use with ALLBASE/SQL D.0 and HP-UX 7.0x		
Opt. APB	For use with ALLBASE/SQL E.1 and HP-UX 8.x		
Opt. APH	For use with ALLBASE/SQL F.0 and HP-UX 9.0		
Supported media options: CD ROM, 1/4" cartridge, 1/2" tape, DAT and QIC			

Table 24.6 Recommended Minimum Memory and Disk

ALLBASE/4GL Developer Version	• 3 Mbytes memory • 30 Mbytes disk
ALLBASE/4GL Runtime Version	• 2 Mbytes memory • Disk requirements depend on specific application

ALLBASE/Query Configuration Guidelines

HP ALLBASE/Query is an easy-to-use, terminal-based query management facility which enables both novice and advanced users to generate ad hoc queries and reports on relational databases maintained under the HP ALLBASE/SQL DBMS.

ALLBASE/Query's flexible selection of access and reporting modules enables users to perform queries, modify data or tables, and generate their own reports without involving a programmer. Also included are powerful facilities for advanced users for use in preconfiguring complex tasks, to directly enter SQL commands, or to improve productivity when working with HP ALLBASE/SQL DBMS.

ALLBASE/Query supports HP-UX operating system versions 7.x and 8.x and is also available on HP workstations (Series 700/400/300). ALLBASE/Query supports all of the media types currently supported for the Series 800.

Table 24.7 ALLBASE/Query Modules

ALLBASE/Query Modules		
Data Access • EZAccess • SQLAccess	Table Creation/Update • EZCreate • EZUpdate	Reporting • EZReport
ALLBASE/SQL Relational DBMS		
HP-UX Operating System	MPE/iX Operating System	
HP 9000 Series 800, Business Servers, Series 700/400/300 Workstations	HP 3000 Series 900 Servers	

Table 24.8 Software Matrix For ALLBASE/Query on the Series 800 Systems

Tier 1 Systems	30668A
Tier 2 Systems	92635A
Tier 3 Systems	30669A
Tier 4 Systems	92533A
Tier 5 Systems	92534A
Tier 6 Systems	92535A
Tier 7 Systems	30670A
Opt APA	For use with ALLBASE/SQL D.0 and HP-UX 7.0x
Opt APB	For use with ALLBASE/SQL E.1 and HP-UX 7.08 or 8.0x
Opt APH	For use with ALLBASE/SQL F.0 and HP-UX 9.0
Supported media options: CD ROM, 1/4" cartridge, 1/2" tape, DAT and QIC	

Table 24.9 ALLBASE/Query Supported Terminals

HP 700/41, 22 (HP-UX ONLY)
HP 700/92, 94
HP 262x
HP 239x
HP Vectra PC (with terminal emulation software)

OpenODB from Hewlett-Packard Configuration Guidelines

OpenODB is an advanced object-oriented database management system (ODBMS) from Hewlett-Packard for complex commercial application needs. OpenODB takes advantage of new object-oriented features combined with a robust database management system.

OpenODB's object-oriented features will help to reduce development and maintenance costs by more intuitively representing business problems. Also, OpenODB stores code as well as data. This means that applications will be simpler and code as well as data can be shared between multiple users and applications.

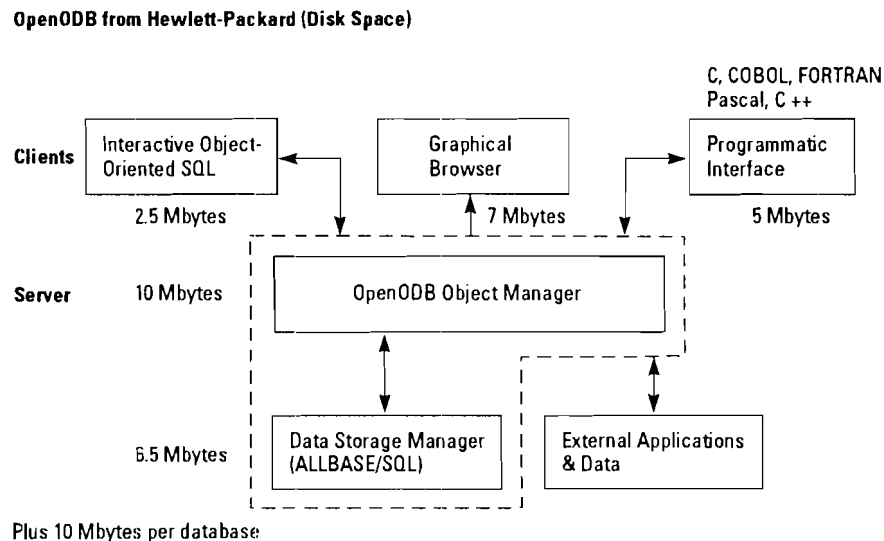
OpenODB Product Structure

Hewlett-Packard's OpenODB product uses a client/server architecture, enabling efficient utilization of available computing power. Communication between client and server is via TCP/IP and ARPA Berkeley Services.

OpenODB's clients use the programmatic interface to access information on the server.

OpenODB is composed of the following client and server components, as shown below.

Figure 24.2 OpenODB from Hewlett-Packard (Disk Space)



OpenODB Clients

- Interactive Object-Oriented SQL (IOSQL)**
 This interface allows interactive entry of all object-oriented SQL (OSQL) statements, facilitating rapid prototyping and testing. IOSQL provides basic query, administration and editing capabilities.
- Graphical Browser**
 The Graphical Browser is a tool that allows graphic exploration of the database schema and contents. This tool is designed to increase the speed of application development by making it easier to find reusable code stored in OpenODB.

- Programmatic Interface**
 OpenODB applications can be written using any programming language that can be linked with C (C++, COBOL, FORTRAN, Pascal). The programmatic interface uses OSQL statements passed as parameters and does not require preprocessors.

OpenODB Server Components

- Object Manager**
 The Object Manager executes OSQL calls made by the OpenODB clients. The Object Manager processes requests and accesses data and code from the internal data storage manager (Relational Storage Manager) or passes the request to a subsystem outside of OpenODB (External Functions).

- **Relational Storage Manager**

OpenODB uses a relational database as its storage manager for internally stored data and code. The relational database performs the physical file management and database functions such as multiuser concurrency, transaction management, and recovery. Relational database tools are available to help you perform online backup and recovery, manage physical distribution of files, maximize availability and change database parameters.

- **External Functions**

External functions allow access to data and code stored outside of OpenODB, regardless of data format or location. They are implemented by users as subroutines written in general-purpose programming languages and compiled outside of OpenODB. With external functions, users can encapsulate existing applications. External functions can be called by any OSQL statement, allowing use of this remote data and application code like any other object.

Note: There are also log files that exist for each client and one server log file. If not maintained, these files can grow quite large.

Section 25

Application Development Tools

HP-UX Symbolic Debugger

Program defects need to be isolated and corrected, a process that is aided by the Symbolic Debugger/HP-UX. Symbolic Debugger/HP-UX is screen-oriented and can support multiple panes for viewing source statements and assembly instructions at the same time. It provides controlled execution that facilitates program fault isolation. With corrections made to the source code, it can be recompiled and retested. Symbolic Debugger/HP-UX provides complete support for programs written in C, C++, FORTRAN, Pascal, and Assembly Language. With HP-UX 8.0x and 9.0, the Symbolic Debugger is bundled with the compiler products.

COBOL applications can use the ANIMATOR symbolic debugger which is available across all implementations of Micro Focus COBOL/2. The ANIMATOR supports debugging of intermediate code execution. Symbolic debugging of Native Code is not supported at this time.

Note: As of HP-UX 9.0, the Symbolic Debugger supports ANSI terminals.

Routine Execution

After debugging and compilation of an error-free program, the program development process ends with routine execution of a successful application program.

C++ Program Development

For program development in C++, the C++ Developer is a powerful class browsing and construction

tool that provides graphical editing, viewing, and construction of classes and class heir archives in a C++ software system. C++ Developer supports C++ 3.0 features as well.

SoftBench Program Construction Tools

Conventional program development under HP-UX is greatly facilitated in the SoftBench window-oriented program development environment for C, FORTRAN, and PASCAL. SoftBench provides these integrated program development tools:

- Development Manager for all files related to a software project, including version control.
- Choice of Soft VI or language-sensitive Program Editor to provide an easy-to-use, window-based editor environment.
- Static Analyzer, with graphical source code browser, for determining program structure cross reference information, which facilitates maintenance and re-use of program code.
- Program Builder, with graphical make file browser, for coordination of compilations of source files.
- Program Debugger, based on the Symbolic Debugger/HP-UX, with a mouse/menu interface and graphical data browser added.
- Mail for easy communication among members of the development team.

SoftBench integrates these tools and the compilers they use. It also provides distributed computing services, communication among the tools, OSF/Motift appearance and behavior across all tools, and an integrated on-line help facility.

HP also offers a C++ SoftBench programming environment. C++ SoftBench includes HP C++, C++ Developer, and SoftBench with full support for C++.

SoftBench Encapsulator

Encapsulator affords users the means of extending and customizing the SoftBench environment. Encapsulator establishes communication between the standard SoftBench tools and user-added tools, including popular third-party tools. Tools with a command-line interface can be added to SoftBench with no changes to source code.

The Application Development Products

Table 25

Application Development Product Model	Use Product
C++ Compiler License to use	B2404B (on all tiers)
C++ Compiler Media and Manuals	B2405B (on all tiers)
C++ Developer License	B1696B (on all tiers)
C++ Developer Media and Manuals	B1697B (on all tiers)
C++ SoftBench License to Use	B2617B
End-User Kit	B2619B
SoftBench License to Use	B2600B
End-User Kit	B2602B
Encapsulator License to Use	B2606B
End-User Kit	B2608B

* Requires options with this product number. Refer to HP 9000 Series 800 Price Guide (P/N 5091-5686E) for details.

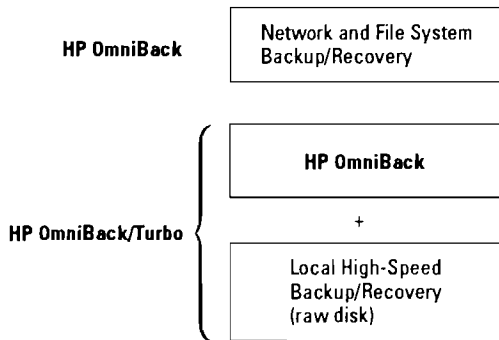
** These products currently are only supported on the HP-UX 8.0x and 9.0 operating system.

Section 26

System and Network Management

HP OmniBack and HP OmniBack/Turbo

Figure 26



HP OmniBack

HP OmniBack is a global network backup management solution that provides central file-system backup and recovery. HP OmniBack automates the backup process from any system on the network for all machines in a distributed computing environment, and it can also be used on a standalone system. HP OmniBack provides sophisticated scheduling and journaling in addition to traditional backup and recovery functions.

HP OmniBack/Turbo

HP OmniBack/Turbo provides major enhancements to HP OmniBack for mid-range and high-end HP-UX systems and servers. It is designed for networked system environments and for systems with large amounts of online data, especially large databases. HP OmniBack/Turbo combines network backup capabilities from HP OmniBack with high-speed local backup functionality (15 to 25 Gbytes per hour depending on the configuration).

HP OmniBack/Turbo's high-speed component achieves outstanding performance by providing:

1. raw disk backup
2. simultaneous backup to up to eight parallel output devices

HP OmniBack and HP OmniBack/Turbo's network component achieves up to 0.72 Gbyte/hour over network environments. This is more than double the performance of standard UNIX commands. Such performance is achieved by simultaneous backup of multiple disks in the network.

Table 26. Supported Backup Devices

	HP OmniBack/Turbo		
	HP OmniBack	Network	High Speed
HP 9-track Magnetic Tape Drives	Yes	Yes	HP 7980A/XC
HP DAT Drives	Yes	Yes	Yes
HP 6300/650MB Optical Drives	Yes	Yes	Yes
HP 6300/20GB Optical Drives	Yes	Yes	Yes
Disk Files	Yes	Yes	No
8-mm Tape Drives	Yes	Yes	No
HP 1/4" Cartridge Tape Drives	No	No	No
QIC 525 Tapes Drives	No	No	No

Section 27

Performance Management

Obtaining Timely Performance Information

HP's leading-edge performance tools assist with ongoing, in-house performance management requirements and provide the information needed to make system resource investments and management decisions with confidence.

HP's performance tools provide concise reports with meaningful recommendations and presentation-quality graphic overviews that help evaluate situations quickly and easily.

Diagnostic and Resource Management Tools Resolve Performance Problems

HP GlancePlus/UX, HP's on-line performance monitoring and diagnostic tool, gives the system activity information needed to monitor performance and quickly restore satisfactory service levels when occasional problems occur. HP GlancePlus/UX provides high-level summaries as well as extensive detail on current system activity (CPU, memory, disk, etc.) for in-depth diagnoses and problem resolution. HP GlancePlus/UX is host resident interactive software and can be viewed from a terminal device anywhere in your network.

HP LaserRX/UX, HP's diagnostic and resource management solution, combines historic performance data collection with

graphic analysis capability to help analyze current and past system bottlenecks, manage service levels, and control resource costs. HP LaserRX/UX provides long-term trending and in-depth data on CPU, disk, memory, transaction rates, and response times for planning, load balancing, and diagnosis.

HP LaserRX/UX consists of collector and analyzer software. The HP LaserRX/UX collector runs on the HP 9000 host where it continually collects and logs performance data. The HP LaserRX/UX analyzer is personal computer based, interfacing to the host collector via a serial or LAN communication link. The analyzer utilizes the Microsoft Windows 3.0 graphical interface to display performance information to the user.

Capacity Forecasting and Planning with Confidence

With HP's capacity forecasting and planning tool, HP RXForecast, workloads can be analyzed and future system resource utilization and performance levels can be forecasted.

HP RXForecast helps in the performance of regular system resource forecasting and supports ongoing capacity and budget planning. Forecasts are based on past trends and projected future business demands. HP RXForecast is built on the

HP LaserRX/UX performance management software through utilization of the same user-interface and performance data logfiles. HP LaserRX/UX is a prerequisite product for purchase of HP RXForecast.

Performance Management for Distributed Computing Environments

HP PerfView software provides an advanced framework and powerful tools that enable centralized performance management for systems throughout the enterprise. Through state-of-the-art management-by-exception techniques, HP PerfView automatically identifies and helps resolve existing and potential performance problems before they affect system and network users.

The HP PerfView distributed software application has two components. The performance analysis software, based on OSF/Motif, runs on HP 9000 computer systems. The performance collection software runs on HP 9000, HP 3000, and Sun SPARCstation systems. As an integral member of the HP OpenView system and network management products, HP PerfView delivers the performance management functionality required for group, site, and enterprise-wide environments.

Section
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Section
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Section 28

System Availability

HP MirrorDisk/UX

HP MirrorDisk/UX software prevents data loss due to disk failures by maintaining up to three copies of data on separate disks. Applications can continue to access data even after a single disk failure. In addition, you can perform on-line backups to avoid user and application disruption.

MirrorDisk/UX is supported with SCSI and HP-FL disks. To prevent the failure of a single I/O interface from causing a system failure, we recommend the mirrored disks be connected to separate interface cards.

MirrorDisk/UX Software

- B2491A—Software that provides LVM mirroring of SCSI and HP-FL disks. Increases data integrity and availability by protecting against disk failure.

MirrorDisk/UX Configuration Requirements

1. MirrorDisk/UX configurations support SCSI or HP-FL disks. HP-IB disks are not supported. Configurations can mix SCSI and HP-FL disks.
2. To prevent the failure of a single I/O interface from causing a system failure, we recommend the mirrored disks be connected to separate SCSI or HP-FL I/O cards.
3. The maximum number of disks (connected via the P-bus) to one HP-FL I/O card is eight. The maximum number of devices connected to one SCSI I/O card is seven. (Note the internal SCSI bus on the 8X7S, Fxx, Gxx, Hxx, and Ixx systems already has at least one device connected.)

4. There is a maximum HP-FL cable length limitation of 500 meters. The maximum SCSI cable length is 6 meters. Note that the internal SCSI bus on the 8X7S, Fxx, Gxx, Hxx, and Ixx systems is approximately 1.5 to 3 meters long.

5. The integrated SCSI disks included in the 8X7S, Fxx, Gxx, Hxx, and Ixx systems are supported with MirrorDisk/UX. It is recommended that the internal disk be mirrored to an external disk to minimize single points of failure.

HP SwitchOver/UX

SwitchOver/UX provides near-continuous operation of mission critical systems by significantly decreasing downtime due to system hardware or software failures. A SwitchOver/UX configuration can have up to seven primary systems and one designated standby system. This standby SPU is connected to the disks of all primaries in the SwitchOver/UX configuration. The standby continuously monitors the health of the primaries with a “heartbeat” message over the LAN. Should a primary fail, it stops sending the heartbeat. The standby reboots, assuming control of the failed primary’s disks and takes over the “identity” of the failed primary. Users can then transparently log onto the standby and resume work as if they were logging onto the primary.

To increase the availability of the entire system, HP recommends customers include MirrorDisk/UX software in the SwitchOver/UX configuration.

SwitchOver/UX Software

- 92668A—One copy of SwitchOver/UX software must be ordered per system. HP recommends MirrorDisk/UX software for the primary systems.

SwitchOver/UX Configuration Types

A SwitchOver/UX configuration can be one of two types: symmetrical or asymmetrical. A symmetrical configuration consists of two or more SPUs, each of which has access to all disks in the configuration. In an asymmetrical configuration, only the standby SPU has access to all the SCSI or HP-FL disks.

Choosing Symmetrical Versus Asymmetrical Configurations

Symmetrical Configuration

- *Advantage:* This configuration allows a primary system that has failed and been repaired to be brought back up as the new standby system. There is no need to have the original roles resumed and therefore avoids additional disruption.
- *Disadvantage:* Need to hook all SPUs to all SCSI or HP-FL disks. This requires additional SCSI or HP-FL cards.

Asymmetrical Configuration

- *Advantage:* May be a less expensive solution since fewer SCSI or HP-FL cards are required.
- *Disadvantage:* When the failed primary system is repaired, you need to plan downtime so the standby and primary systems can resume their original roles.

SwitchOver/UX Configuration Requirements and Information

1. WARNING: If you are installing SwitchOver/UX on an 8X7S system with a SCSI I/O card (28655A) which was purchased before 8/14/92, you will need an HP-PB SCSI IODC ROM upgrade (SCSI IODC ROM 28655-81004, socket U52). Please consult your local CE for details (Service Note Numbers: 28642A-01 and 28655A-01).

2. All systems must be within the same HP 9000 Series 800 SPU class or category. For example, a SwitchOver/UX configuration may include an 827S and 847S but not an 8x5S system or an 8x2S system within the 8x7S configuration.

SPU class 1:
807S, 817S, 827S, 837S, 847S, 857S, 867S, 877S, 887S, 897S, Fxx, Gxx, Hxx, and Ixx

SPU class 2:
850S, 855S, 860S, 865S, and 870S/100-400

SPU class 3:
822S, 832S, 842S, and 852S

SPU class 4:
825S and 835S

SPU class 5:
845S

SPU class 6:
890 1-way to 4-way

3. SwitchOver/UX configurations support SCSI or HP-FL disks. HP-IB disks are not supported. Configurations cannot mix SCSI and HP-FL disks.

4. SwitchOver/UX configurations are supported over FDDI or Ethernet LANs. Configurations cannot mix FDDI and Ethernet LANs.

5. The maximum number of disks (connected via the P-bus) to one HP-FL I/O card is eight. The maximum number of devices connected to one SCSI I/O card is six (since each host counts as one device).

6. There is a maximum HP-FL cable length limitation of 500 meters. Therefore, system to disk distance is 500 meters, or the distance between two systems is 1000 meters. The maximum SCSI cable length is 6 meters.

7. SwitchOver/UX configurations cannot use the internal personal-ity card to connect systems together.

8. SwitchOver/UX configurations support the integrated SCSI disks included in the 8X7S, Fxx, Gxx, Hxx, and Ixx systems only as a dump disk. The internal disks cannot be used for boot or data because it won't be accessible after a switchover, and data could possibly be lost.

9. One copy of SwitchOver/UX software (92668A) must be ordered per system. HP recommends MirrorDisk/UX software (B2491A) for the primary systems.

10. HP-FL SwitchOver/UX can have up to 7 primary systems with 1 standby system in both symmetrical or asymmetrical configurations. SCSI SwitchOver/UX can have up to 4 primary systems with 1 standby system in an asymmetrical configuration, and 1 primary system with 1 standby system in a symmetrical configuration.

11. A dump disk is required. A dump device is used for core dumps in the event of a failure. No data can be stored on the device designated as the dump disk. A single dump disk can be shared among systems within the SwitchOver/UX configuration. HP-PB systems (i.e. 8X7S, Fxx, Gxx, Hxx, Ixx, and 8X2S only) can use the integrated disk as the dump device for each system. Dump disks are required for system support.

12. To avoid a possible lockout during simultaneous system booting, do not have two HP-FL system disks on the same HP-FL interface where one or more of the system disks are directly connected to the HP-FL interface (instead of via the P-Bus connection).

13. The following are possible 8X7S and Fxx (2-slot system) configurations including their limitations.

Configuration 1 (Personality Card with LAN option and HP-FL I/O Card)

There are 2 single points of failure using this configuration:

- Since there is only 1 LAN card, if the network goes down or the LAN I/O card malfunctions, a switchover will occur.
- Since there is only 1 HP-FL card, you are not protected from a P-Bus or HP-FL card malfunction.

Configuration 2 (Personality Card without LAN option, LAN I/O card, and SCSI I/O Card). There are 2 single points of failure. See Configuration 1.

Configuration 3 (Personality Card with LAN option, SCSI I/O Card, and either a second SCSI I/O card or second LAN card) . This configuration has 1 point of failure, either the SCSI bus or the network depending on which card you choose for the remaining slot. See Configuration 1.

14. In SCSI SwitchOver/UX configurations, the SwitchOver/UX software will turn off the primary system's AUTOBOOT software.

SwitchOver/UX LAN Connection Information

Peripherals (terminals and printers) should be connected with a DTC over a LAN (Ethernet or FDDI). This allows communication and access to be re-established easily with the standby system in the event a primary system fails.

When the standby system reboots, taking over the failed primary's disks, it assumes the LAN address of the failed primary.

We recommend redundant LANs to avoid a single point of failure. This provides added security in the event of a LAN failure. If there is a LAN failure, the following will occur based on the connection:

1. DTC. A switch can be used on the LAN to provide the flexibility of switching to the alternate LAN when problems occur. Previously established connections will be lost and users will need to re-establish their environment. The DTC will need to be re-downloaded with the new IP address of the LAN.

2. Workstations can have two LAN cards and be connected to both LAN cables. The configuration should include a route statement to facilitate the redundant LAN being automatically used for reconnection.

3. PCs can have two LAN cards and be connected to both LAN cables. The user will need to alter the LAN configuration to provide the alternate IP address of the redundant LAN.

High Availability Functionality/Configuration Information (HP-UX 9.0)

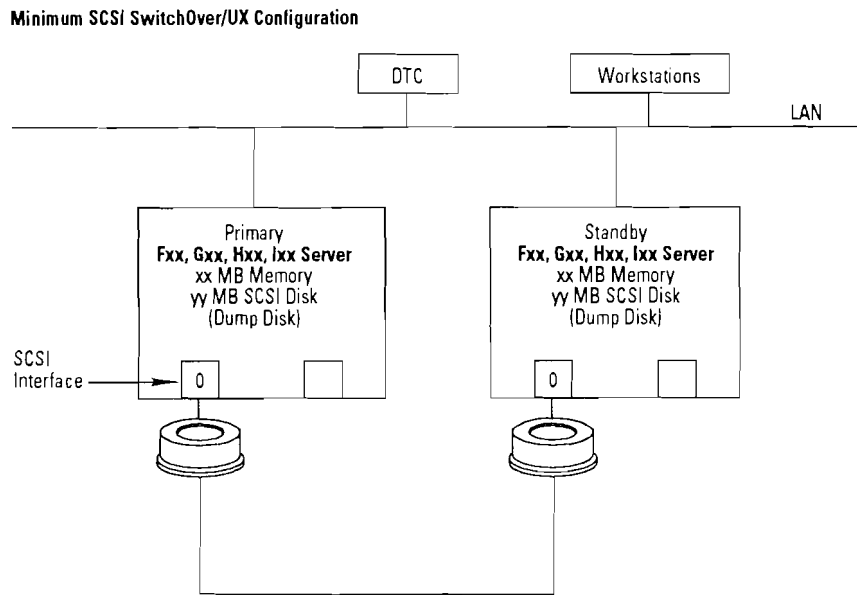
Table 28

	DataPair/800 (92625A)	MirrorDisk/UX (B2491A)	SwitchOver/UX (92668A)
SCSI Boot Disks	N/A	C3023T/R C3024T/R C3027U C3028U C2460F/R C2461F/R C2462F/R C2472F/R C2473F/R C2474F/R	C3023T/R C3024T/R C3027U C3028U
SCSI Data Disks	N/A	C3023T/R C3024T/R C3027U C3028U C2460F/R C2461F/R C2462F/R C2472F/R C2473F/R C2474F/R	C3023T/R C3024T/R C3027U C3028U C2460F/R C2461F/R C2462F/R C2472F/R C2473F/R C2474F/R
SCSI I/O Cards	N/A	28655A (8X7S/890) 27147A (CIO)	28655A (8X7S/890)*
HP-FL Boot/Data Disks	C2201A C2204A 7936FL 7937FL	C2201A C2204A 7936FL 7937FL	C2201A C2204A 7936FL 7937FL
HP-FL I/O Cards	A1749A (8X7S/8X2S) 27111A (CIO)	28615A (8X7S/890) A1749A (8X7S/8X2S) 27111A (CIO)	28615A (8X7S/890) A1749A (8X7S/8X2S) 27111A (CIO systems)
HP-FL Boot Disk Arrays w/A1749A or 27111A	N/A	N/A	N/A
HP-FL Data Disk Arrays w/A1749A or 27111A	C2252HA/B** C2254HA/B**	N/A	C2252HA/B C2254HA/B
HP-FL Boot Disk Arrays w/28615A	N/A	C2252HA/B C2254HA/B	C2252HA/B C2254HA/B
HP-FL Data Disk Arrays w/28615A	N/A	C2252HA/B C2254HA/B	C2252HA/B C2254HA/B

*May need new SCSI IODC ROM upgrade if purchased prior to 8/14/92

**If used in raw mode, must be 2 KB aligned with 2 KB transfer size.

Figure 28.1 Minimum SCSI SwitchOver/UX Configuration

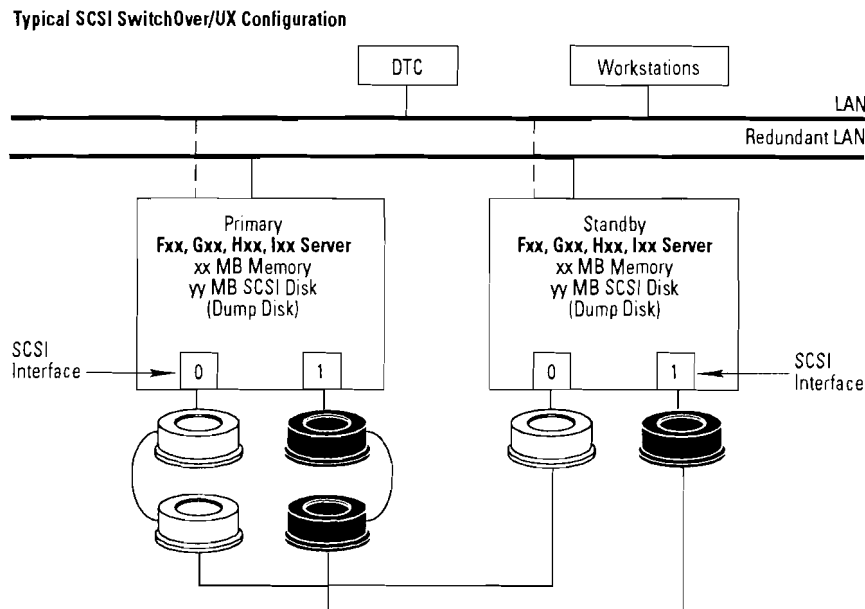


Software: HP SwitchOver/UX

Notes:

1. This configuration has several points of failure.
2. HP recommends disk mirroring on the primary system, and redundant LAN.

Figure 28.2 Typical SCSI SwitchOver/UX Configuration



Software: HP SwitchOver/UX
HP MirrorDisk/UX



Notes:

1. Disk mirroring software is not required on the standby, but is recommended.

Figure 28.3 Typical 3-Way SCSI SwitchOver/UX Configuration

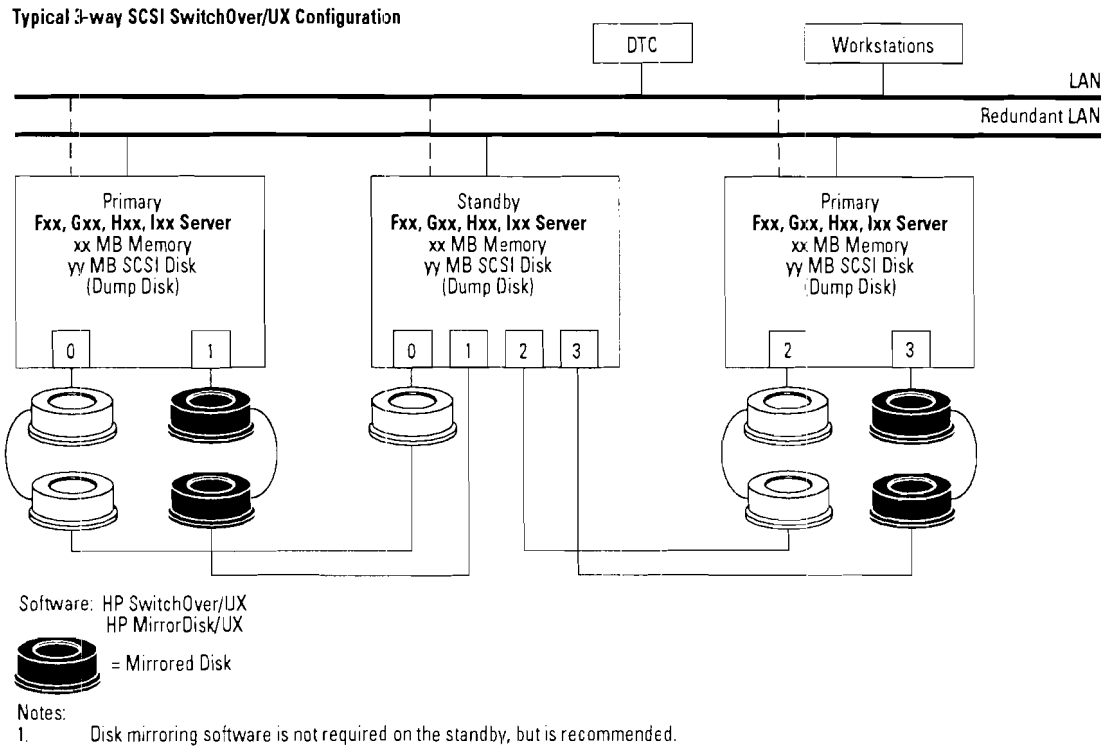


Figure 28.4 Minimum HP-FL SwitchOver/UX Configuration

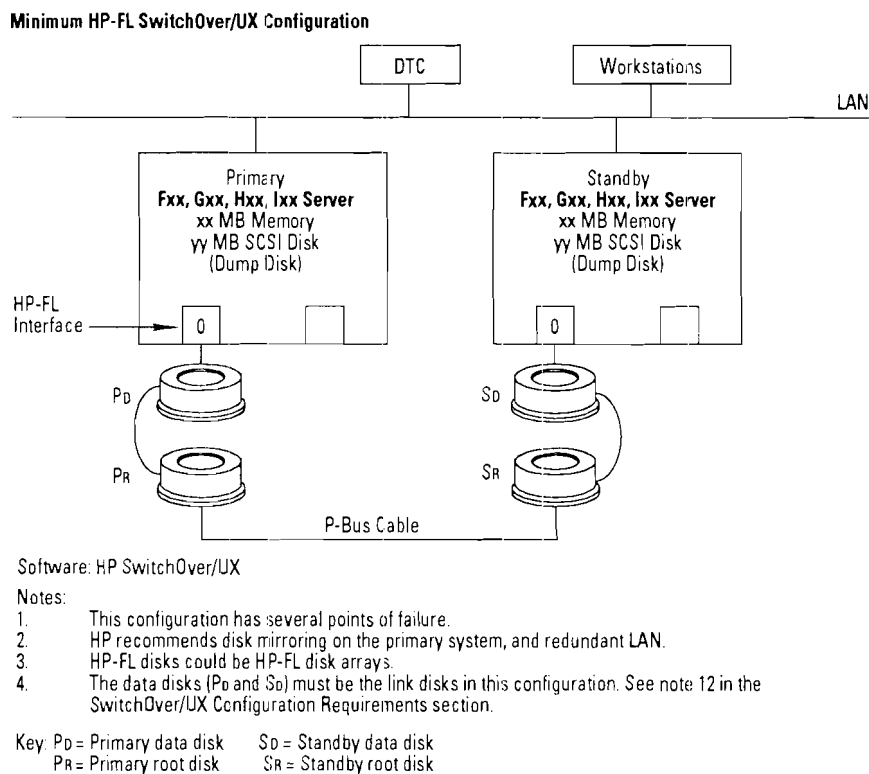
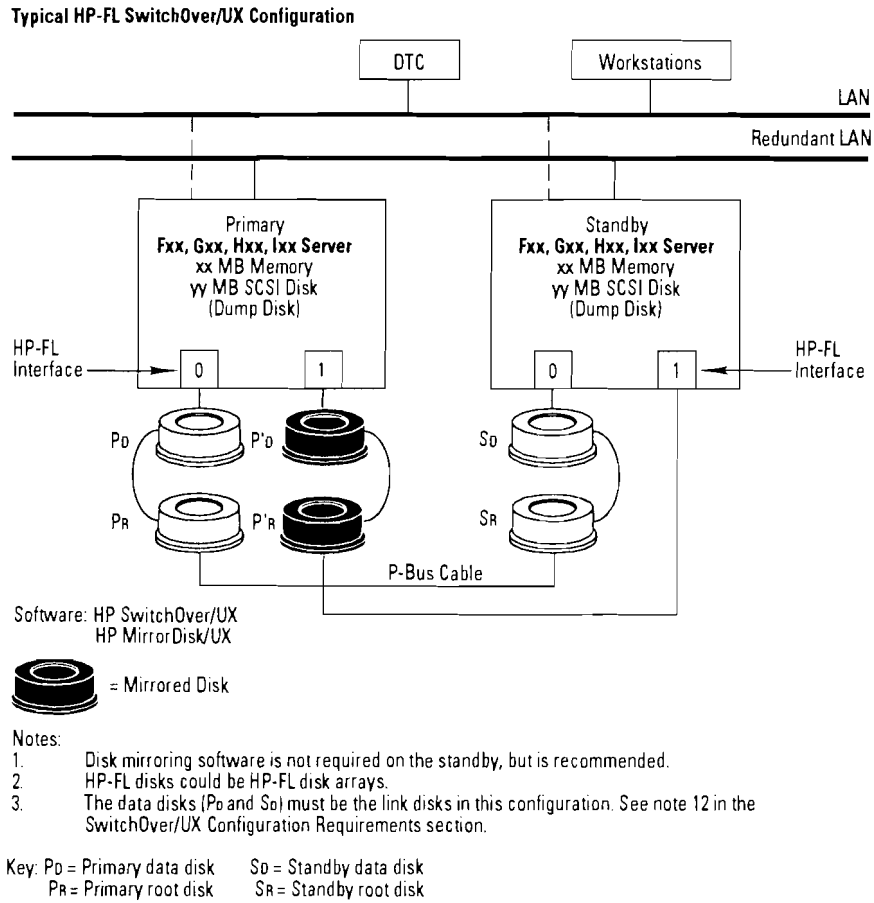


Figure 28.5 Typical HP-FL SwitchOver/UX Configuration



Section 29 System Software

Series 800 Software Matrix

Software Product Name	HP OpenSpool/UX	HP OmniBack	HP OmniBack/Turbo
Part Number	B1900B*	B1920A*	B1921A*
Media Types Available:			
CD-ROM	N/A	N/A	N/A
1/4"	Opt. AA0	Opt. AA0	Opt. AA0
1/2"	Opt. AA1	Opt. AA1	Opt. AA1
DAT	Opt. AAH	Opt. AAH	Opt. AAH
QIC	Opt. AA4	Opt. AA4	Opt. AA4
Structured to 7 Tier Model (Y/N)	Yes	Yes	Yes
Incremental System RAM Required	None	None	None
Disk Space Required	~21 Mbytes	4–5 Mbytes	5–6 Mbytes
Additional Hardware Requirements	None	None	None
Localization Options	ABA—English ABD—German ABF—French ABE—Spanish ABJ—Japanese	ABA—English ABJ—Japanese Documentation	ABA—English ABJ—Japanese Documentation
Documentation List:			
Title	HP Open Spool/UX Spooler Administrators Guide and Command Reference	HP OmniBack Version 2.0 SW Release Document	HP OmniBack Version 2.0 SW Release Document
Part Number	B1900-90022	B1921-90060	B1921-90060
Title	HP Open Spool/UX The Graphical Interface	Managing Network Backups with HP OmniBack	Managing Network Backups with HP OmniBack
Part Number	B1900-90020	2146-90001	B2146-90001
Title	HP Open Spool/UX The Terminal Interface		Managing High-Speed Backups with OmniBack/Turbo
Part Number	B1900-90021		B1921-90002
Title			Planning Your Backup Strategy with OmniBack/Turbo
Part Number			B1921-90003
Title			Version A.01.00 Software Release Document
Part Number			B1921-90004

*Evaluation copy is available by ordering Option AGZ.

Series 800 Software Matrix

Software Product Name		HP Glance Plus/UX	HP Laser RX/UX	HP RX Forecast/UX	HP PerfView	HP MirrorDisk/UX
Part Number		B2660A	B1766B	B1764B	H5324A	B2491A
Media Types Available:	CD-ROM	N/A	N/A	N/A	N/A	Opt. AAU
	1/4"	Opt. AA0	Opt. AA0	Opt. AA0	Opt. AA0	Opt. AA0
	1/2"	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1
	DAT	Opt. AAH	Opt. AAH	Opt. AAH	Opt. AAH	Opt. AAH
	QIC	Opt. AA4	Opt. AA4	Opt. AA4	N/A	Opt. AA4
Release Option:	APB	N/A	N/A	N/A	N/A	N/A
	APC	N/A	N/A	N/A	N/A	N/A
	APD	Release 8.06	Release 8.06	N/A	N/A	N/A
	APH	Release 9.0	Release 9.0	N/A	N/A	Release 9.0
Structured to 7 Tier Model (Y/N)		Yes	Yes	Yes	No	Yes
Incremental System RAM Required		None	None	None	16 Mbytes	None
Disk Space Required		None	None	None	55 Mbytes	None
Additional Hardware Requirements		None	None	None	See Technical Data Sheet (P/N 5091-4177E)	See System Availability section
Localization Options		None	None	None	None	None
Documentation List:	Title	HP GlancePlus/UX Users Manual	HP Laser RX/UX Users Manual: Analysis Software	HP RX Forecast/UX Users Manual	HP PerfView Administrator's Guide	System Administration Tasks Manual
	Part Number	B2660-90002	B1766-90010	B1764-90006		B3108-90005
	Title		HP Laser RX/UX Users Manual: Collection Software	Capacity Planning Overview	HP PerfView Primer	
	Part Number		5960-6605	5960-1772		

Series 800 Software Matrix

Software Product Name	SwitchOver/UX	HP FORTRAN ²	FORTRAN/9000	C/ANSI C	HP Pascal	
Part Number	92668A	B2409A	B2409B	B2412A	B2415A	
Media Types Available:	CD-ROM	Opt. AAU	Opt. AAU	Opt. AAU ¹	Opt. AAU ¹	
	1/4"	Opt. AA0	Opt. 030	N/A	Opt. AA0*	
	1/2"	Opt. AA1	Opt. 031	Opt. AA1	Opt. AA1	
	DAT	Opt. AAH	Opt. 032	Opt. AAH	Opt. AAH	
	QIC	Opt. AA4	Opt. AA4	Opt. AA4 ¹	Opt. AA4 ¹	
Release Option:	APB	Release 8.0	N/A	N/A	Release 8.0	
	APC	Release 8.02	N/A	N/A	N/A	
	APD	Release 8.06	N/A	N/A	N/A	
	APH	Release 9.0	N/A	N/A	Release 9.0	
Structured to 7 Tier Model (Y/N)	Yes	Yes	Yes	Yes	Yes	
Incremental System RAM Required	None	16 Mbytes ³	16 Mbytes ³	16 Mbytes ³	16 Mbytes ³	
Disk Space Required	None	2.8 Mbytes	3.3 Mbytes	3.3 Mbytes	3.5 Mbytes	
Additional Hardware Requirements	See System Availability section	None	None	None	None	
Localization Options	None	None	None	None	None	
Documentation List:	Title	Managing SwitchOver/UX	FORTRAN Programmer	HP-UX FORTRAN Programmer	HP C/HP-UX Reference	HP Pascal Reference
	Part Number	92668-90001	92430-90004	B2408-9009	92453-90024	92431-90005
	Title		FORTRAN Reference	HP-UX FORTRAN Reference	HP C/HP-UX Programmer	HP Pascal Programmer
	Part Number		92430-90005	B2408-90010	92434-90002	92431-90006
	Title		HP-UX System Debug	HP-UX System Debug	C Program Tools	
	Part Number		B1864-90005	B2355-90044	B1864-90009	
	Title			Portability Guide	HP-UX System Debug	HP-UX System Debug
	Part Number			B2355-90025	B2355-90044	B2355-90044
	Title			Floating Pt Guide	HP-UX Program Guide	HP-UX Program Guide
	Part Number			B2355-90024	B2355-90026	B2355-90026
	Title			HP-UX Program Guide		
	Part Number			B2355-90026		

* Option AA0 only available on 8.0 version of OS

¹ The 8.0 version on CD-ROM and QIC are only available on BX7 8.02 based systems. The 9.0 versions on CD-ROM and QIC are available on all 9.0 based systems.

² Product is available on 8.0 OS. For 9.0, order B2409B

³ This product requires a MINIMUM of 16 Mbytes of memory (no incremental).

Series 800 Software Matrix

Software Product Name		COBOL Development Pack	COBOL Compiler	COBOL Run Time	C++ Compiler
Part Number		B2433A ⁴	B2434A	B2435A	B2404A/B2405A
Media Types Available:	CD-ROM	Opt. AAU	Opt. AAU	Opt. AAU	Opt. AAU ⁵
	1/4"	Opt. AA0 ⁶	Opt. AA0 ⁶	Opt. AA0 ⁶	Opt. AA0 ⁶
	1/2"	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1
	DAT	Opt. AAH	Opt. AAH	Opt. AAH	Opt. AAH
	QIC	Opt. AA4	Opt. AA4	Opt. AA4	Opt. AA4
Release Option:	APB	Release 8.0	Release 8.0	Release 8.0	Release 8.0
	APC	N/A	N/A	N/A	N/A
	APD	N/A	N/A	N/A	N/A
	APH	Release 9.0	Release 9.0	Release 9.0	Release 9.0
Structured to 7 Tier Model (Y/N)		Yes	Yes	Yes	No (user)
Incremental System RAM Required		32 Mbytes ²	32 Mbytes ²	32 Mbytes ²	16 Mbytes ¹
Disk Space Required		See ³	See ³	See ³	12 Mbytes
Additional Hardware Requirements		None	None	None	None
Localization Options		None	None	None	None
Documentation List:	Title	Implementation Notes	Implementation Notes		HP C++ Programmers Guide
	Part Number	B2433-90001	B2433-90001		92501-90005
	Title	Language Reference Manual	Language Reference Manual		The C++ Programming Language
	Part Number	35328-90001	35328-90001		ISBN 0-201-53992-6 B2402-90001
	Title	Operating Manual	Operating Manual		USL C++ Language System Reference Manual ⁴
	Part Number	35328-90002	35328-90002		92501-90001
	Title	Utilities Manual	Utilities Manual		USL C++ Standard Components Manual ⁷
	Part Number	35328-90003	35328-90003		B2402-90004
	Title	Pocket Guide	Pocket Guide		C++ Quick Reference Card
	Part Number	35328-90012	35328-90012		B1637-90001

¹ This product requires a MINIMUM of 16 Mbytes of memory (no incremental).

² This product requires a MINIMUM of 32 Mbytes of memory (no incremental).

³ Application Dependent but:

- Just to install B2433A version B.06.25 requires 18 Mbytes of disk
- Just to install B2434A version B.06.25 requires 11 Mbytes of disk
- Just to install B2435A version B.06.25 requires 5 Mbytes of disk

⁴ To be ordered from USL

- C++ Language System Release 3.0 Product Reference Manual
- C++ Language System Release 3.0.1 Library Manual
- C++ Language System Release 3.0 Selected Readings
- C++ Language System Release 3.0.1 Release Note

⁵ Available for HP-UX 9.0 only

⁶ Available for HP-UX 8.0 only

⁷ To be ordered from USL C++ standard components Release 3.0 (C308)

⁸ The COBOL Development Pack includes the Animator debugger, Forms/2, a profiler, and some conversion utilities in addition to the compiler.

Series 800 Software Matrix

Software Product Name		DCE CPS Server	DCE Security Server	DCE Client	DCE Application Tools
Part Number		B3187A	B3188A	B3189A	B3193A
Media Types Available:	CD-ROM	Opt AAU	Opt AAU	Opt AAU	Opt AAU ⁵
	1/4"	N/A	N/A	N/A	N/A
	1/2"	Opt AA1	Opt AA1	Opt AA1	Opt AA1
	DAT	Opt AAH	Opt AAH	Opt AAH	Opt AAH
	QIC	Opt AA4	Opt AA4	Opt AA4	Opt AA4
Structured to 7 Tier Model (Y/N)		Yes	Yes	Yes	Yes
Incremental System RAM Required		32 Mbytes ²	32 Mbytes ²	32 Mbytes ²	32 Mbytes ¹
Disk Space Required		46 Mbytes	47 Mbytes	44 Mbytes	5 Mbytes
Additional Hardware Requirements		None	None	None	None
Localization Options		None	None	None	None
Documentation List:	Title				
	Part Number				
	Title				
	Part Number				

²This product requires a MINIMUM of 32 Mbytes of memory (no incremental).

Series 800 Software Matrix

Software Product Name		NCS/NIDL	Passwd Etc	Net LS/LSLOCK
Part Number		B1022A	B2680A	B2678A
Media Types Available:	CD-ROM	Opt AAU with 9.0	Opt AAU with 9.0	Opt AAU
	1/4"	Opt AA0	Opt AA0	Opt AA0
	1/2"	Opt AA1	Opt AA1	Opt AA1
	DAT	Opt AAH	Opt AAH	Opt AAH
	QIC	Opt AA4	Opt AA4	Opt AA4
Structured to 7 Tier Model (Y/N)		Yes	Yes	Yes
Incremental System RAM Required		None	None	None
Disk Space Required		None	None	2 Mbytes
Additional Hardware Requirements		None	None	None
Localization Options		None	None	None
Documentation List:	Title	Release notes	Release notes	Managing Software Products with the Network License System
	Part Number	B1020-90001	B2679-90600	D-11272-B
	Title	NCS Tutorial		Licensing Software Products with the Network License System
	Part Number	D-18355-B		D-11273-B
	Title	NCS Reference		Managing NCS
	Part Number	D-10200-C		D-11895-E

Series 800 Software Matrix

Software Product Name		7.X VUE 2.01	8.X HP User Environment Developers Kit	8.X VUE 2.01	SoftBench
Part Number		B1176A	B1170A	Bundled with OS	B2600B, B2602B, B2600A, B2602AJ
Media Types Available:	CD-ROM	N/A	N/A	N/A	N/A
	1/4"	N/A	N/A	N/A	Opt. AA0
	1/2"	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1
	DAT	N/A	N/A	N/A	Opt. AAH
	QIC	N/A	N/A	N/A	Opt. AA4
Structured to 7 Tier Model (Y/N)		No	No	No	No
Incremental System RAM Required		None	None	None	4 Mbytes
Disk Space Required		35 Mbytes	35 Mbytes	35 Mbytes	4 Mbytes + 6 Mbytes Swap
Additional Hardware Requirements		None	None	None	None
Localization Options		None	None	None	B2602AJ (for B2600A) End-user kit (Kanji)
Documentation List:	Title	HP VUE Users Guide	HP VUE Programmers Guide	HP VUE Users Guide	Softbench Documentation
	Part Number	B1171-90042	B1171-90024	B1171-90042	B2602B, Opt. 0B1
	Title		Programming with Xlib	HP VUE Configura- tion Guide	
	Part Number		B1171-90026	B1171-90041	
	Title		X Toolkit Intrinsics—Prog		
	Part Number		B1171-90027		
	Title		X Toolkit Intrinsics—Ref		
	Part Number		B1171-90028		
	Title		X Window System C Quick Ref		
	Part Number		B1171-90029		
	Title		Mastering OSF/Motif Widgets		
	Part Number		5010-7168		
Title		HP OSF/Motif Style Guide			
Part Number		B1171-90032			
Title		HP OSF/Motif Programmers Ref			
Part Number		B1171-90033			
Title		HP OSF/Motif Programmer Guide			
Part Number		B1171-90034			

Series 800 Software Matrix

Software Product Name	Encapsulator	C++ SoftBench	OpenODB Developer Release*	HP Interface Architect 2.0 License-to-Use
Part Number	B2606A, B2608A, B2608AJ	B2617B, B2619B, B2600A, B2619AJ	B2470A	B1183A
Media Types Available:				
CD-ROM	N/A	N/A	N/A	N/A
1/4"	Opt. AA0	Opt. AA0	Opt. AA0	N/A
1/2"	Opt. AA1	Opt. AA1	Opt. AA1	N/A
DAT	Opt. AAH	Opt. AAH	Opt. AAH	N/A
QIC	N/A	Opt. AA4	N/A	N/A
Structured to 7 Tier Model (Y/N)	No	No	No	No
Incremental System RAM Required	5 Mbytes	5 Mbytes	None (recommend, not required)	8 Mbytes
Disk Space Required	1 Mbyte + 5 Mbytes Swap	7 Mbytes + 7 Mbytes Swap ¹	35 Mbytes (min.)	15 Mbytes
Additional Hardware Requirements	None	None	None	None
Localization Options	B2608AJ End-user kit (Kanji)	B2619AJ (for B2617A) End-user kit (Kanji)	None	None
Documentation List:	Title	C++ Softbench Documentation	OpenODB Reference Document	Architect 2.0 Documentation
	Part Number	B2608A, Opt. 0B1	B2619B, Opt. 0B1	B2470-90001
			B2470-90001	B1164-90003

¹ Also need C++ Language.

* OpenODB Swap Space Recommendations:

- Each Server: 15 Mbytes
- 1 Daemon: 4 Mbytes
- Each Browser: 15 Mbytes
- Each IOSQL: 1 Mbyte

Series 800 Software Matrix

Software Product Name	Interviews Plus License to Use/ Series 800 End User Kit	
Part Number	B2622A, B2625A	
Media Types Available:	CD-ROM	AAU
	1/4"	Opt. AA0
	1/2"	Opt. AA1
	DAT	Opt. AAH
	QIC	N/A
Structured to 7 Tier Model (Y/N)	No	
Incremental System RAM Required	None	
Disk Space Required	5 Mbytes	
Additional Hardware Requirements	Mouse	
Additional Software Requirements	C++ 2.1 or 3.0, X11R4 or X11R5	
Localization Options	None	
Documentation List:	Title	Programmer's Guide
	Title	Reference Manual
	Part Number	(available with product only)

Series 800 Software Matrix

Software Product Name	HP Interface Architect 2.0 End-user Kit	HP Interface Architect 2.0 HDIA Library source code	HP Interface Architect 1.0 License-to-Use	HP Interface Architect 1.0 Media and Manuals	HP Interface Architect 1.0 Library Source Code
Part Number	B1185A	B1189A	B1165A	B1166A	B1167A
Media Types Available:	CD-ROM	N/A	N/A	N/A	N/A
	1/4"	Opt. AA0	Opt. AA0	N/A	Opt. AA0
	1/2"	Opt. AA1	Opt. AA1	N/A	Opt. AA1
	DAT	Opt. AAH	Opt. AAH	N/A	N/A
	QIC	N/A	N/A	N/A	N/A
Structured to 7 Tier Model (Y/N)	N/A	No	No	No	No
Incremental System RAM Required	None	None	8 Mbytes	None	None
Disk Space Required	N/A	N/A	15 Mbytes	N/A	N/A
Additional Hardware Requirements	None	None	None	None	None
Localization Options	None	None	None	None	None
Documentation List:	Title	HP-IB Manual Set			
	Part Number	Opt. OB1			

Series 800 Software Matrix

Software Product Name	HP Software Integration Sockets for HP-UX ^{1,2} Developers Kit (Services and Development S/W)	HP Software Integration Sockets for HP-UX ^{1,2} Run-Time Software Only	HP Software Integration for MVS License/Media —Manuals ³	HP Software Integration for MS-DOS License/Media —Manuals ³	HP Software Integration for SunOS License/Media —Manuals ³
Part Number	92768A	92568A	92730B/92740B	92731B/92741B	92732B/92742B
Media Types Available:					
CD-ROM	N/A	N/A	N/A	N/A	N/A
1/4"	Opt. AA0	Opt. AA0	Opt. AA0	Opt. AA0	Opt. AA0
1/2"	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1	Opt. AA1
DAT	Opt. AAH	Opt. AAH	Opt. AAH	Opt. AAH	Opt. AAH
QIC	N/A	N/A	N/A	N/A	N/A
Structured to 7 Tier Model (Y/N)	Yes	Yes	No	No	NO
Incremental System RAM Required	None	None	None	None	None
Disk Space Required	14 Mbytes	14 Mbytes	270 Kbytes	170 Kbytes	170 Kbytes
Additional Hardware Requirements	None	None	LAN	LAN	LAN
Localization Options	None	None	None	None	None
Documentation List:	Title				
	See 2.	See 2.	See 3.		

¹For more detailed configuration information, consult the HP Software Integration Sockets Configuration Guide Available from "CCSY HOTLINE" on HPDesk, Subject: SIS ORDGU

²Manuals are included with the product, but are not orderable separately:

- Programmers Manual
- System Administrator's Manual
- Self-Paced Tutorial
- Installation Guide
- Access Routing Reference Guide

³Manuals are included with the product, but are not orderable separately:

- Gateway Server Manual
- Gateway MVS Client Manual

Series 800 Software Matrix

Software Product Name		HP Software Integration Sockets for OS/400 License Media/Manuals	HP Software Integration Sockets for VMS License Media/Manuals	HP Information Access
Part Number		92733A/92743A 92753A	92734A/92744A	B3115A—Single-user License B3116A—HP-UX 800 Media
Media Types Available:	CD-ROM	N/A	N/A	Opt. AAU
	1/4"	Opt. AA0	Opt. AA0	Opt. AA0
	1/2"	Opt. AA1	Opt. AA1	Opt. AA1
	DAT	Opt. AAH	Opt. AAH	Opt. AAH
	QIC	N/A	N/A	N/A
	PC Floppy	N/A	N/A	For NW and Windows for DOS low density 3 1/2", 5 1/4"
Structured to 7 Tier Model (Y/N)		No	No	No
Incremental System RAM Required		None	None	3 Mbytes in PC
Disk Space Required		620 Kbytes	620 Kbytes	5 Mbytes in PC
Additional Hardware Requirements		IBM AS/400, Ethernet, LANLink	DEC VAX	MS mouse
Additional Software Requirements		OS 400 V2R1, TCP/IP, Utilities/400, IBA SAA C/400	WIN TCP-for-VMS, VAX C V3.2	SQL DBMS, ³ 1A Client, ³ MS Windows, 1A SQL UX Server, ³ NS 2.1 or ARPA 2.1 ⁴
Localization Options		None	None	German, French
Documentation List:	Title	HP Software Integration Sockets MNLS for OS/400	HP Software Integration Sockets MNLS for VMS	System Manager (with product only)
	Part Number	92743A Opt. 0B1	92744A Opt. 0B1	NewWave Access User's Guide for NewWave Users D2500-90002
	Title			NewWave Access Guide for Windows Users
	Part Number			D2500-90014 (Plus 3 from D2502B)

¹ For more detailed configuration information, consult the HP Software Integration Sockets Configuration Guide Available from "CCSY HOTLINE" on HPDesk, Subject: SISORDGU

² Run-Time client orderable as 92752A.

³ Information Access is client-server software that requires Information Access SQL UX server software be installed along with the DBMS, and requires that one of the PC clients be installed on each PC. DBMSs supported by IA SQL UX include ALLBASE/SQL, INGRES, ORACLE, INFORMIX and PROGRESS. NewWave Access can also access Sybase SQL SERVER via Sybase's client API, and does not require the IA SQL UX server software. Other databases supported using a client DBMS API include Microsoft SQL SERVER and Gupta SQLBase. In addition to accessing HP 9000 databases, NewWave Access can also interface to HP 3000 data sources via Information Access Server software for the HP 3000.

⁴ ALLBASE/SQL and Oracle can be accessed via either a LAN or a serial connection. INGRES, INFORMIX and PROGRESS require a LAN connection. Supported LANs include LAN Manager and Novell NetWare. LAN Manager clients require either NS 2.1 or ARPA 2.1, while NetWare clients require either NS 2.1 for NetWare or ARPA 2.1 for NetWare.

Series 800 Software Matrix

Software Product Name		Information Access PC	HP Software Vendor ⁵	AdvanceLink for MS-DOS ⁶	AdvanceLink for MS-Windows	HP NewWave 4.1 ⁷
Part Number		D2502B	D2506A	D2102B	D2104C	D1704D
Media Types Available:	CD-ROM	N/A	N/A	N/A	N/A	N/A
	1/4"	N/A	N/A	N/A	N/A	N/A
	1/2"	N/A	N/A	N/A	N/A	N/A
	DAT	N/A	N/A	N/A	N/A	N/A
	QIC	N/A	N/A	N/A	N/A	N/A
	PC Floppy	Low Density 3 1/2", 5 1/4"	High Density 3 1/2", 5 1/4"	Low Density 3 1/2", 5 1/4"	3 1/2", 5 1/4"	N/A
Structured to 7 Tier Model (Y/N)		No	No	No	No	No
Incremental System RAM Required		None	None	None	None	None
Disk Space Required		None	See 5.	None	LAN	LAN
Additional Hardware Requirements		Mouse Opt.	None	None	None	None
Additional Software Requirements		IA SQL UX Server ³ NS 2.1 or ARPA 2.1 ⁴	See 5.	LAN, NS 2.1, ARPA 2.1	None	LAN, NS 2.1, ARPA 2.1
Localization Options		German, French, Spanish	None	None	None	None
Documentation List:	Title	Using IA PC	Installation Guide	HP AdvanceLink Reference MS-DOS	HP AdvanceLink Reference MS-Windows	
	Part Number	B1716-90014	D2506-90002	D2102-90002	D2104-90005	
	Title	Learning IA PC	Administration Guide	HP AdvanceLink Mask User Guide	HP AdvanceLink NewWave Supplement	
	Part Number	B1716-90016	D2506-90003	D2102-90001	D2104-90006	
	Title	Connections/Batch	Vending Tips		TermTalk	
	Part Number	B1716-90015	D2506-90009		5060-2332	
	Title				Release Notes	
	Part Number				D2104-90007	

³Information Access is client-server software that requires Information Access SQL UX server software be installed along with the DBMS, and requires that one of the PC clients be installed on each PC. DBMSs supported by IA SQL UX include ALLBASE/SQL, INGRES, ORACLE, INFORMIX and PROGRESS. NewWave Access can also access Sybase SQL SERVER via Sybase's client API, and does not require the IA SQL UX server software. Other databases supported using a client DBMS API include Microsoft SQL SERVER and Gupta SQLBase. In addition to accessing HP 9000 databases, NewWave Access can also interface to HP 3000 data sources via Information Access Server software for the HP 3000.

⁴ALLBASE/SQL and Oracle can be accessed via either a LAN or a serial connection. INGRES, INFORMIX and PROGRESS require a LAN connection. Supported LANs include LAN Manager and Novell NetWare. LAN Manager clients require either NS 2.1 or ARPA 2.1, while NetWare clients require either NS 2.1 for NetWare or ARPA 2.1 for NetWare.

⁵The HP Software Vendor product is supplied on 3.5" and 5.25" flexible disks for PCs. It requires either LAN Manager/X or Portable NetWare be installed on the server. Incremental disk space requirements for HP Software Vendor are 315 Kbytes plus the disk space required to store the packaged PC applications that are loaded onto a shared directory for distribution to PC users on the LAN.

⁶The AdvanceLink Family are two terminal emulation and file transfer products which enable you to integrate host/terminal applications with your client/server and personal computer applications. Both applications reside on the PC and connect to HP 9000/800s serially or over the LAN. The product is supplied on 3.5" or 5.25" flexible disks for PCs. It requires either LAN Manager/X or Portable NetWare be installed on the server in a LAN configuration.

Series 800 Software Matrix

Software Product Name		HP Document Manager	Verity TOPIC	HP Information Access
Part Number		B3109A (license), B3110A (media/manual)	B3124A (media), B3171A (merge ctr.)	B3115A (license), B3116A (media/manual)
Media Types Available:	CD-ROM	Opt AAU	Opt AAU	Opt AAU
	1/4"	N/A	N/A	Opt AA0
	1/2"	N/A	N/A	Opt AA1
	DAT	Opt AAH	N/A	Opt AAH
	QIC	N/A	N/A	N/A
Structured to 7 Tier Model (Y/N)		No	No	No
Incremental System RAM Required		16 Mbytes	N/A	16 Mbytes
Server Disk Space Required		36 Mbytes + catalog database + document storage rqmts.	47 Mbytes + index file + document storage rqmts.	3 Mbytes
Additional Hardware Requirements		PC (80386 or 80486), MS Mouse, LAN	PC (80386 or 80486) and MS Mouse, or Series 700 or X-station or Macintosh; LAN	PC (80286, 80386, or 80486), MS Mouse, LAN
Localization Options		None	None	German, French
Documentation List:	Title	Mezzanine Installation Handbook for HP-UX	TOPIC—Database Administrator's Guide	Information Access SQL/UX System Manager Manual
	Title	Mezzanine Administrator's Handbook	TOPIC—User's Guide for Microsoft Windows	Using Information Access PC (B1716-90014)
	Title	Curo—User's Handbook and Administrator's Guide (B3110-90008)	TOPIC—User's Guide for Motif	Learning Information Access PC (B1716-90016)
	Title	FileShare User's Handbook	TOPIC—User's Guide for the Macintosh	Connections and Batch Files (B1716-90015)
	Title			NewWave Access Guide for Windows Users (D2500-90014)
	Title			NewWave Access Guide for NewWave Users (D2500-90002)
	Part Number	(all manuals included as part of Media and Manuals product B3110A)	(manuals and software license must be ordered separately from Verity Inc.)	(all manuals included as part of Media and Manuals product B3116A)

(Continued)

Series 800 Software Matrix (cont'd)

Software Product Name	HP Document Manager	Verity TOPIC	HP Information Access
MS-DOS Client Support:	No	No	Yes
Client Software Required	N/A	N/A	MS-DOS 3.1 or later
Client RAM Required	N/A	N/A	640 KB
Client Disk Space Required	N/A	N/A	2.3 MB
Client Networking Required	N/A	N/A	Int LAN Manager Services or Int NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare
MS Windows Client Support:	Yes	Yes	Yes
Client Software Required	MS-DOS 5.0, MS Windows 3.1	MS-DOS 5.0, MS Windows 3.1	MS-DOS 3.2 or later, MS Windows 3.0 or 3.1
Client RAM Required	4 MB	8 MB	4 MB
Client Disk Space Required	6 MB	7.5 MB	2.7 MB
Client Networking Required	Int LAN Manager Services or Int NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare	Int LAN Manager Services or Int NetWare Services	Int LAN Manager Services or Int NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare
HP NewWave Client Support:	Yes	Yes (with HP JoinWare bridge)	Yes
Client Software Required	MS-DOS 5.0, MS Windows 3.1, NewWave 4.X	MS-DOS 5.0, MS Windows 3.1, NewWave 4.X	MS-DOS 3.2 or later, MS Windows 3.0/3.1, NewWave 3.0 or later
Client RAM Required	4 MB	8 MB	4 MB
Client Disk Space Required		7.5 MB	2.7 MB
Client Networking Required	Int LAN Manager Services or Int NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare	Int LAN Manager Services or Int NetWare Services	Int LAN Manager Services or Int NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare
HP-UX/Motif Client Support:	No	Yes	No
Client Software Required	N/A	HP-UX 8.0X, Motif, VUE (optional)	N/A
Client RAM Required	N/A	24 MB	N/A
Client Disk Space Required	N/A	14.5 MB	N/A
Client Networking Required	N/A	NFS	N/A
Apple Macintosh Client Support:	No	Yes	No referenced product available—ClearAccess for the Mac, call 800-522-4252 for more information
Client O/S Required	N/A	System 7.0	N/A
Client RAM Required	N/A	8 MB	N/A
Client Disk Space Required	N/A	2.3 MB	N/A
Client Networking Required	N/A	HP Integrated Macintosh Services	N/A

Series 800 Software Matrix

Software Product Name		HP OpenMail	HP WorkRouter	Macintosh Network Services
Part Number		B2499A (license), B3100A (media/manual)	B2497A (license), B2482A (media/manual)	B3111A (license), B3112A (media/manual)
Media Types Available:	CD-ROM	Opt. AAU	Opt. AAU	Opt. AAU
	1/4"	Opt. AA0	N/A	N/A
	1/2"	Opt. AA1	N/A	N/A
	DAT	Opt. AAH	N/A	N/A
	QIC	N/A	N/A	N/A
Structured to 7 Tier Model (Y/N)		No	No	No
Incremental System RAM Required		.8 MB + 1 MB/client + temp space/request	N/A (uses HP OpenMail on server)	1.5 MB + ??/client connection
Server Disk Space Required		32 MB + 1 MB/client	N/A (uses HP OpenMail on server)	1.5 MB
Additional Hardware Requirements		PC (80286, 80386, or 80486), MS Mouse, LAN	PC (80386 or 80486), MS Mouse, LAN	Apple Macintosh, LAN
Localization Options		None	None	None
Documentation List:	Title	OpenMail Technical Guide	WorkRouter "Getting Started" Manual (B2482-90001)	Pacer Share Administrator's Guide
	Title	OpenMail Installation Instructions	WorkRouter Self-Paced Tutorial (B2482-90002)	PacerPrint Administrator's Guide
	Title	AdvanceMail User Guide (5959-9684)	WorkRouter Designer's Guide (B2482-90003)	Installation for HP-UX
	Title	NewWave Mail Technical Guide (D2103-90010)		
	Part Number	(all manuals included as part of Media and Manuals product B3100A)	(all manuals included as part of Media and Manuals product B2482A)	(all manuals included as part of Media and Manuals product B3112A)

(Continued)

Series 800 Software Matrix (cont'd)

Software Product Name	HP OpenMail	HP WorkRouter	Macintosh Network Services
Part Number	B2499A (license), B3100A (media/manual)	B2497A (license), B2482A (media/manual)	B3111A (license), B3112A (media/manual)
MS-DOS Client Support:	Yes	No	No
Client Software Required	MS-DOS 3.1 or later	N/A	N/A
Client RAM Required	640 KB	N/A	N/A
Client Disk Space Required	2.0 MB	N/A	N/A
Client Networking Required	Int. LAN Manager Services or Int. NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare	N/A	N/A
MS Windows Client Support:	No (available January 1993)	No	No
Client Software Required	N/A	N/A	N/A
Client RAM Required	N/A	N/A	N/A
Client Disk Space Required	N/A	N/A	N/A
Client Networking Required	N/A	N/A	N/A
HP NewWave Client Support:	Yes	Yes	No
Client Software Required	MS-DOS 3.2 or later, MS Windows 3.0/3.1, NewWave 3.0 or later	MS-DOS 5.0, MS Windows 3.1, NewWave 4.X	N/A
Client RAM Required	4 MB	4 MB	N/A
Client Disk Space Required	1.5 MB	1.2 MB	N/A
Client Networking Required	Int. LAN Manager Services or Int. NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare	Int. LAN Manager Services or Int. NetWare Services or ARPA 2.1 for DOS or ARPA 2.1 for NetWare	N/A
HP-UX/Motif Client Support:	No (available January 1993)	No	No
Client Software Required	N/A	N/A	N/A
Client RAM Required	N/A	N/A	N/A
Client Disk Space Required	N/A	N/A	N/A
Client Networking Required	N/A	N/A	N/A
Apple Macintosh Client Support:	No	No	Yes
Client O/S Required	N/A	N/A	Macintosh System 6.X or higher
Client RAM Required	N/A	N/A	1 MB (2 MB for System 7.0)
Client Disk Space Required	N/A	N/A	N/A
Client Networking Required	N/A	N/A	Apple Share (included as part of System 6.X and 7.X)

Section 30

Distributed Computing

DCE Developers' Environment

The DCE Developers' Environment for the Series 800 consists of two groups of products: DCE Core Services and DCE Application Development Tools. The DCE Core Services provide a runtime environment for DCE applications, as well as a DCE Interface Compiler and DCE Validation Tests. The DCE Application Development Tools provide special tools designed to increase developer productivity.

The basic unit for a DCE application is the DCE Cell. A Cell is defined as a group of users that share the same resources. The components for the Cell are available with the DCE Core Services and are available with the following products:

- B3188A—DCE Security Server License
- B3187A—DCE Cell Directory Services (CDS) Server License
- B3189A—DCE Client License

The above products are License-To-Use (LTUs) for the DCE components. Media and documentation for the entire DCE Core Services are available with the:

- B3190A—DCE Core Media and Documentation (U.S. orders only)
- B3191A—DCE Core Media and Documentation (non-U.S. orders)

There are 2 different DCE Core Media products due to the U.S. export restrictions on some of the security technology included in the U.S. version.

A DCE Cell consists of one DCE Security Server, one CDS server and DCE Client on every system (including the Servers) in the DCE Cell. One B3189A DCE Client license must be purchased for every system in a DCE Cell. One B3188A license must be purchased for every Security Server. One B3187A license must be purchased for every CDS Server. Only one DCE Core Media product needs to be purchased because it delivers the software for all the Core components.

Note: Presently only one Security Server is supported for each DCE Cell. The CDS Server can be replicated within a Cell, but a B3187A license must be purchased for each CDS replica.

The DCE Application Toolkit consists of the:

- B3193A—DCE Application Development Tools Media and Documentation
- B3192A—DCE Application Development Tools User License

Only one copy of the B3193A needs to be purchased. One user license (B3192A) must be purchased for each software developer that will use the Application Development Tools (B3193A). All HP DCE Developers' Environment documentation is available with the B2927A.

Ordering Example

A US customer would like to purchase an 8-node DCE Cell for 8 developers. He would like to have each developer run the DCE Application Development Tools and also needs an extra copy of documentation. The order would require:

Table 30

Qty	Product
8	B3189A—DCE Client (for each node)
1	B3188A—DCE Security Server
1	B3187A—DCE CDS Server
1	B3190A—DCE Core Services Media and Docs
8	B3192A—DCE Application Tools User License
1	B3193A—DCE Application Tools Media and Docs
1	B2927A—DCE Documentation

Mixed Series 800 and Series 700 Cells

The DCE Developers' Environment is also available on the Series 700 Workstations and follows the same structure as the Series 800's structure. The Series 700 products are:

- B2925A—DCE Security Server
- B2924A—DCE Cell Directory Services (CDS) Server
- B2923A—DCE Client
- B2920A—DCE Core Media and Documentation (U.S. orders only)
- B2921A—DCE Core Media and Documentation (non-U.S. orders)
- B2922A—DCE Application Development Tools Media Documentation
- B2926A—DCE Application Development Tools User License
- B2927A—DCE Hardcopy Documentation

When ordering for a mixed Series 700/800 environment, you only need to order one media product. For the DCE Core Services, order either B3190A or B2920A, or for international orders, either B3191A or B2921A. For the DCE Application Development Tools media and documentation, order either B3193A or B2922A. The appropriate system licenses for the targeted systems must still be ordered for each Series 700 or Series 800 system.

Section 31 Networking

Networking

HP 9000 Series 800 networking can be broken down into 4 categories:

Networking Foundation—To build a strong enterprise-wide network, customers need the fundamental building blocks of the network. This category includes connectivity products (comprising both LAN and WAN products) such as X.25, 802.3/Ethernet, 802.5/Token Ring and FDDI adapters; products which comprise the lower level of a networking stack.

Server-to-Server Communications—These are products which enable Series 800 servers to communicate with other Midrange and UNIX systems such as Sun, DEC and the IBM RS/6000 LAN/9000 using standards based networking such as OSI and ARPA Services.

Mainframe Systems Communication—Allows your customers to communicate between the Series 800 and Mainframe systems using networking such as SNA.

End User Access and Integration—These are products which allow customers to integrate their terminals, workstations, and PCs with the HP 9000 Series 800.

The following roadmap (Figure 31.2) illustrates how HP networking products fit into the networking categories just described. This roadmap can be used as a tool that shows the interdependency of products. You must have the entire stack (top to bottom) to ensure a usable networking solution. Please note that this roadmap only depicts products that would reside in a single system (client server and networking specific boxes are covered later).

Figure 31.1 HP 9000 Series 800 Networking

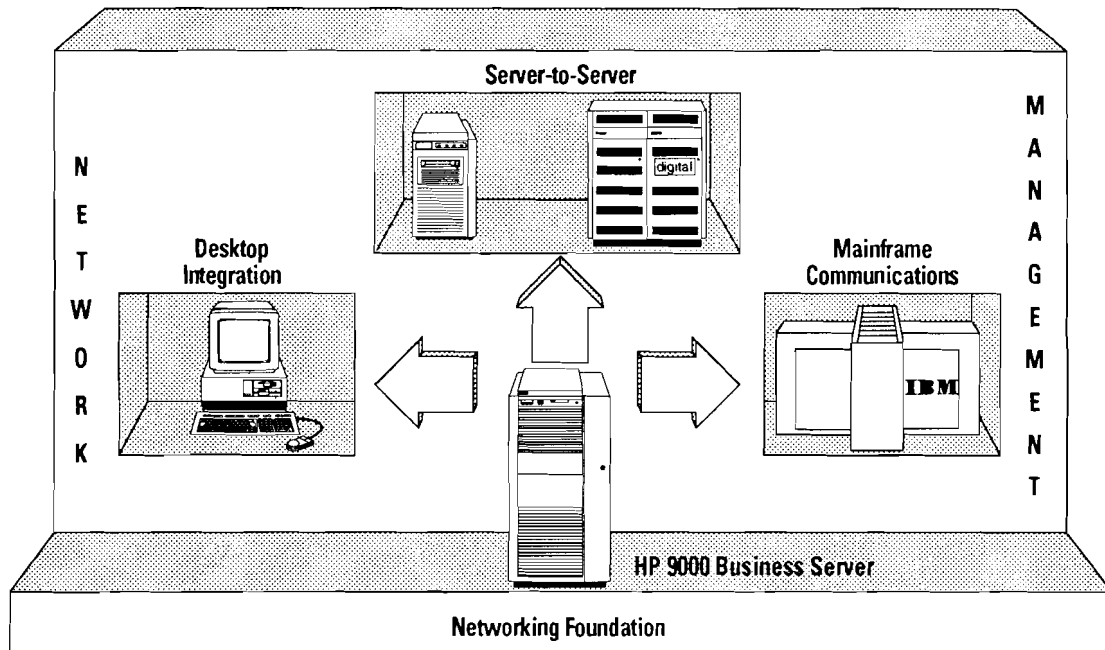
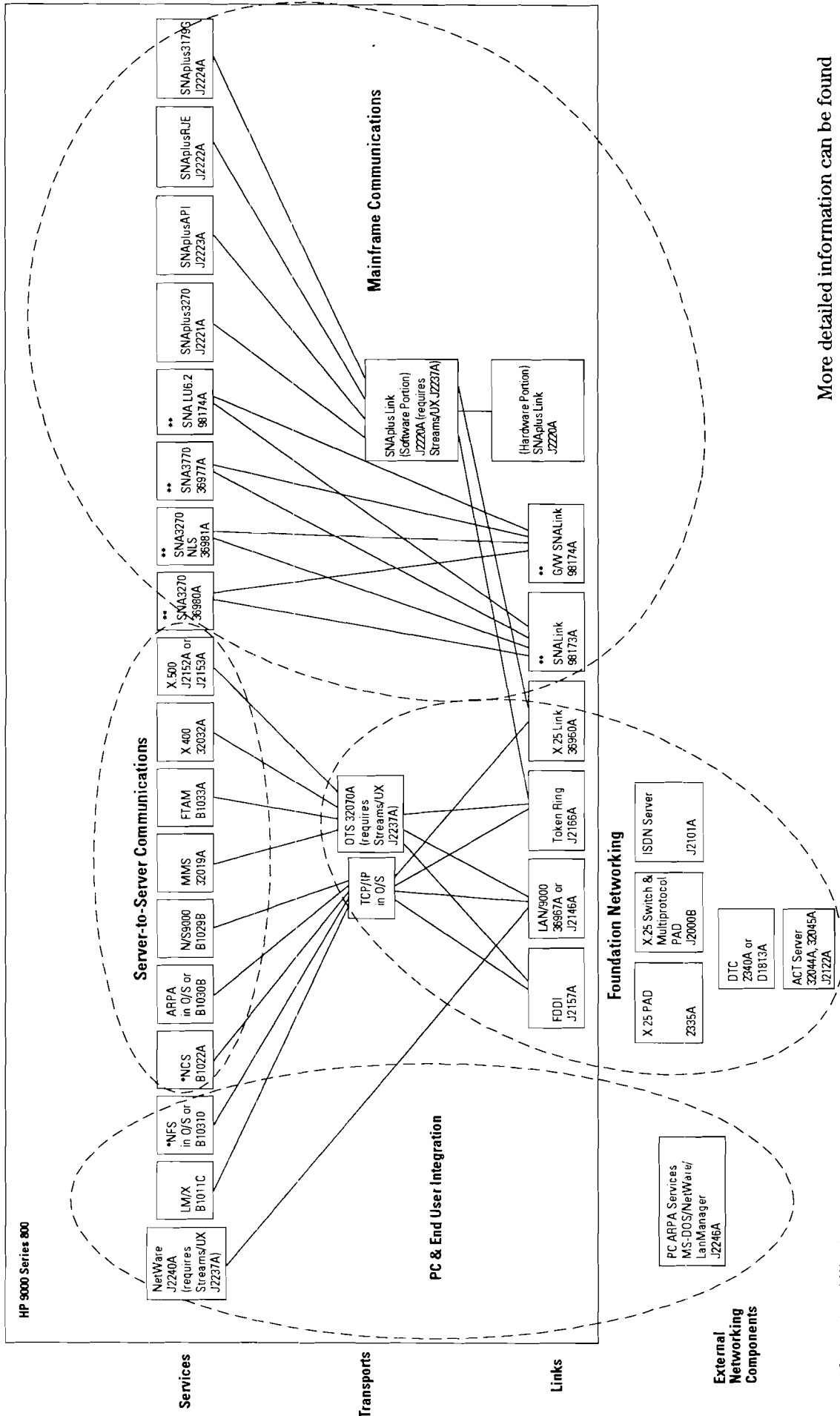


Figure 31.2 Roadmap for Series 800 Networking Products



More detailed information can be found about all these products in the HP Networking Communication Specification Guide, May 1992 (Hardcopy 5091-3821E or CD-ROM 5091-3820E).

* Supported over LANs only
 ** Supported on HP-UX 8.0 only

Networking Foundation

Table 31.1 LAN Links

Communications Packages	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication with
LAN/9000 Series 800 Link	8x7S, Fxx, Gxx, Hxx, lxx, and 890	J2146A	Interface, AUI, ThinMAU, or ThickMau Assembly, lower level software collectively supporting OSI or TCP/IP. The first LAN port is included on the LAN personality card for HP-UX 9.0. You must purchase the J2146A if 1) you are running HP-UX 8.0, <i>or</i> 2) you substitute the 8-port MUX personality card for the LAN personality card, <i>or</i> 3) you want additional LAN cards.	HP and other vendor systems that comply to the IEEE 802.3 protocol standard.
LAN/9000 Series 800 Link	All systems <i>except</i> 8x7S, Fxx, Gxx, Hxx, lxx, and 890	36967A	Interface, AUI or ThinMAU Assembly, and lower-level software collectively supporting OSI or TCP/IP	HP and other vendor systems that comply to the IEEE 802.3 protocol standard.
Token Ring	8x7S, Fxx, Gxx, Hxx, lxx, and 890	J2166A	Allows S/800 native physical connection to an existing Token ring network. 4 or 16 Mbps supported as well as UTP and STP.	Any system that supports TCP/IP over Token Ring. (SNA over Token Ring will be supported 2CQ93.)
FDDI/9000* for Series 800 Business Servers	8x7S, Fxx, Gxx, Hxx, lxx, and 890	J2157A	High speed Fiber LAN communications (100 Mbps max.)	Networks with systems that support OSI and TCP/IP over FDDI.

*An FDDI concentrator is required to connect single attach stations to the FDDI ring. HP does not manufacture its own FDDI concentrator.

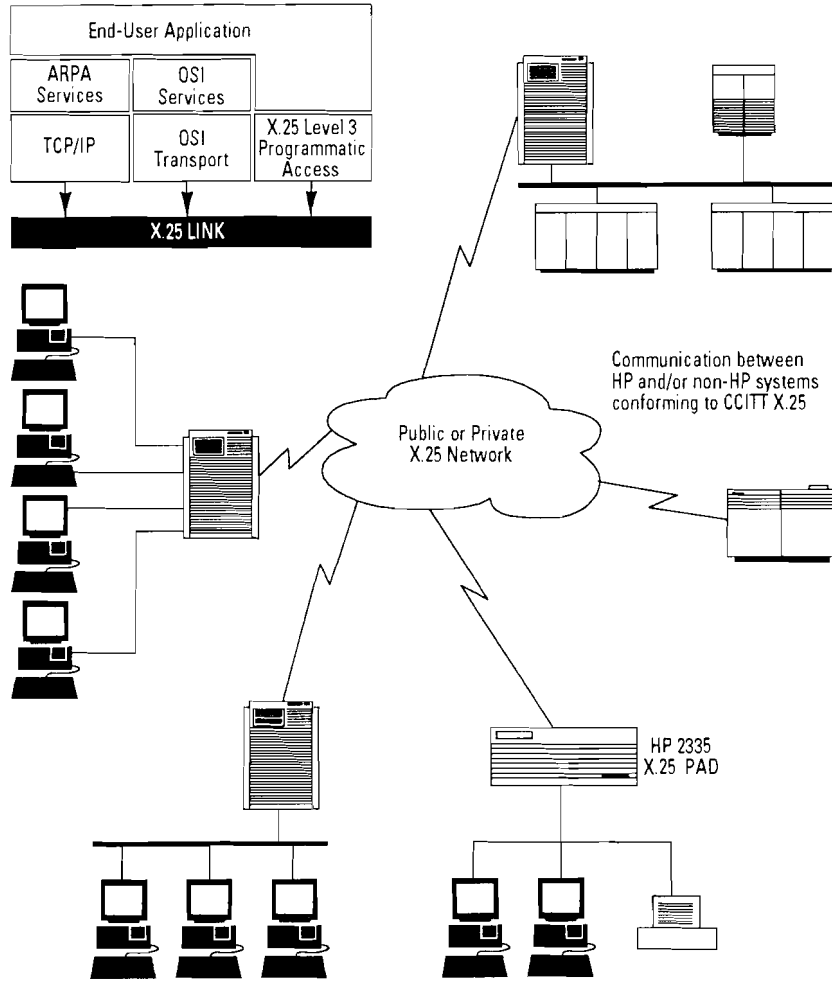
Table 31.2 WAN Links
X.25 Products and Networking (X.25 2335 Asynchronous Pad)—see Figure 52

Communications Packages with	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication
X.25/800 systems	All Series 800	36960A	Native Series 800 connection to Public or Private Packet Switching Networks. 256 virtual circuits are supported per card for 256 byte packet size. (Fewer VCs are supported with larger packet sizes up to 4096 bytes.) A total of 1024 VCs are supported per system.	HP and other vendor that comply with CCITT X.25 protocol.
X.25 PAD and systems Stat MUX	All Series 800	2335A Opt 123	Connection of terminals and printers to public and private X.25 networks. 4 modem ports for connection of terminals and printers to X.25 networks.	HP and other vendor that comply with CCITT X.25 protocol.
Cable	All Series 800	40220A	Cable between HP 2335A and ATP/DTC printer ports.	
Cable	All Series 800	40221A	Cable between HP 2335A and ATP/DTC terminal ports.	
X.25 Multi-protocol systems Concentrator Model 45 Plus Desktop Up to 18 Ports	All Series 800	J2000B	Concentrate multiple X.25 connections into a central HP 9000 S800. It includes X.25, Async., and SNA/SDLC. Two extra ALP 6-port card (J2004B) can be added.	HP and other vendor that comply with CCITT X.25 protocol.
X.25 Multi-protocol systems Concentrator Model 45 Plus Tower Up to 30 Ports	All Series 800	J2001B	Concentrate multiple X.25 connections into a central HP 9000 S800. It includes X.25, Async., and SNA/SDLC. Up to 4 extra ALP 6-port cards (J2004A) can be added.	HP and other vendor that comply with CCITT X.25 protocol.
Model 45 Plus Add'l 6-port ALP card	All Series 800	J2004B	Additional 6-port ALP card (include X.25, Async., and SNA/SDLC software).	
Model 45 Plus monitor pkg. (opt.)	All Series 800	J2007B	Optional package which VGA monitor and keyboard for HP Model 45 Plus configuration.	
Model 45 Plus RS-232 Cable	All Series 800	J2030A	6 RS232 port cable DTC/DCE configurable per port	
Model 45 Plus V.35 Cable	All Series 800	J2031A	2 V.35/4 RS232 cable DTC/DCE configurable per port	
Model 45 Plus X.21 Cable	All Series 800	J2032A	2 X.21/4 RS232 cable DTC/DCE configurable per port	
Model 45 Plus RS-449 Cable	All Series 800	J2033A	2 RS449/4 RS232 cable DTC/DCE configurable per port	
HP ISDN Server		J2101A Opt OE2 Opt OE3 Opt 1BF Opt 1BJ Opt 100	Includes 1 LAN interface and 1 ISDN basic rate interface. Set for 110 V operation Set for 220 V operation Set for ThinLAN Set for ThinLAN and ThickLAN Add 1 ISDN Basic Interface	
HP ISDN Link/MS-DOS		J2102A	Plug-in AT compatible PC card and software (only 1 card/PC).	
HP ISDN Link Server		J2103A	Additional ISDN basic rate interface for HP ISDN Server.	

Table 31.3 Streams

Communications Packages	Use Product Number	Capabilities
Streams	J2237A	Required to run NetWare (J2240A), OTS (32070A), SNAplus Link (J2220A)

Figure 31.3 X.25 Communications for HP 9000 Series 800 Business Servers



X.25 Multiprotocol Access Products

The HP X.25 Multiprotocol Access products family includes cost-effective, performant products such as the HP 2335A Asynchronous PAD and the HP Model 45 Plus X.25 Multiprotocol concentrator which are used to concentrate remote/distributed site access to HP 9000 systems.

These products provide to HP 9000 users the following:

- Remote Terminal access to HP 9000 systems

- Concentration of multiple X.25 access links in one location

- Turn-key solution to interconnect dispersed sites at high speed up to 1.5 Mbps

The *new* HP Model 45 Plus: Open your HP 9000 network . . . with the following new features.

- Higher number of ports (up to 30 synch/asynch ports)
- Enhanced IBM SNA/SDLC features (SNA links up to 64 Kbps)

- State-of-the-art connectivity (RS-232/V.24, V.35, X.21, and RS-449 standards)

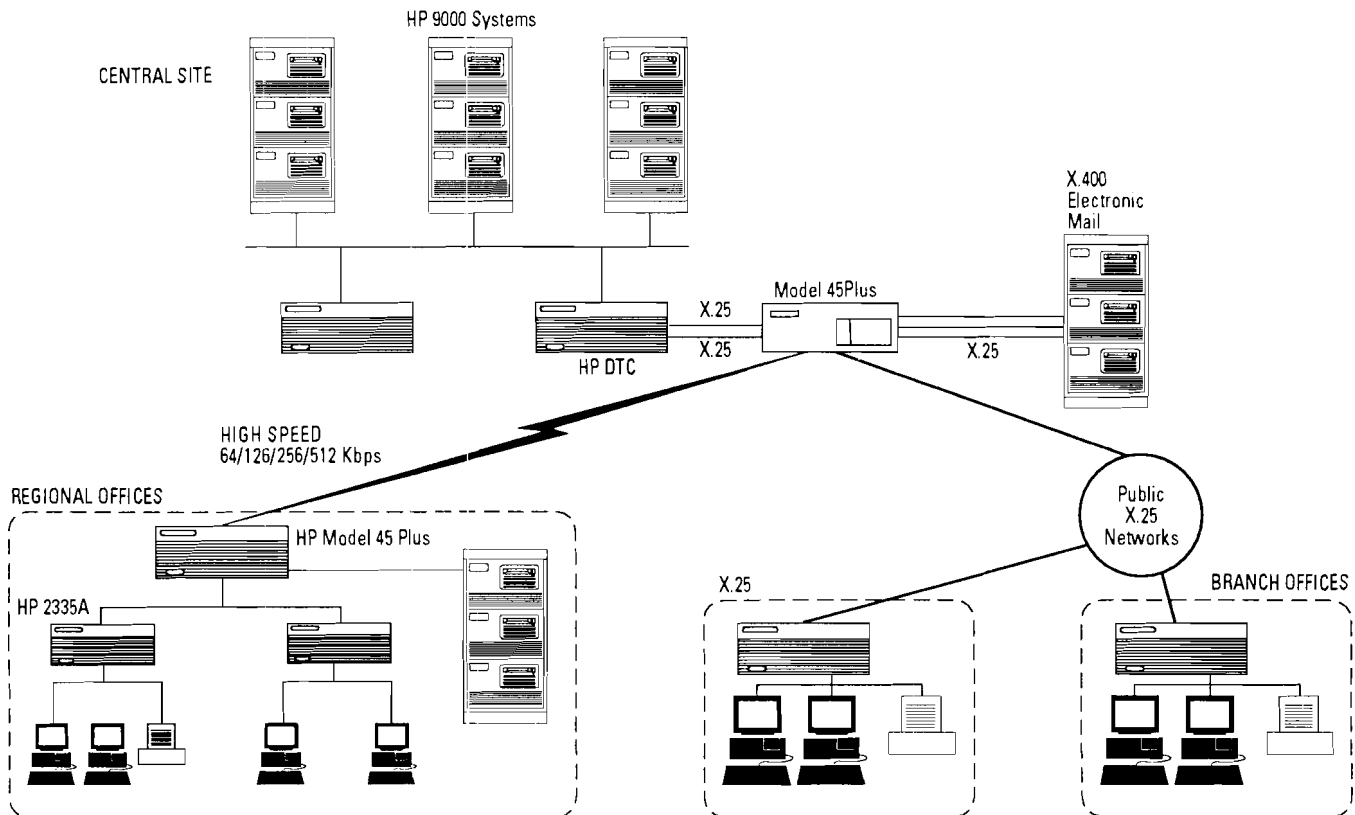
- High performance multiprotocol links up to 1.5 Mbps (T1 speed) with up to 3000 packets per second

- Full satellite links performance (packet size up to 1 Kbyte)

- Rackmountable and customer installable

- Managed by HP OpenView Switch/PAD Manager

Figure 31.4



ISDN

The HP ISDN Server (J2101A) allows for cost-effective interconnection of remote LAN's over an ISDN network, in a transparent way, for any application running on top of the standard TCP-IP protocol. The HP ISDN Server can host up to three Basic Rate Interface cards for a maximum total throughput of 384 kbps.

The HP ISDN Link/MS-DOS (J2102A) allows for integration of remote, stand-alone PCs to a central LAN and for access to HP 9000 servers or non-HP computers connected to this LAN through an HP ISDN server.

The telephone-like tariff structure of ISDN services makes the HP ISDN products attractive for TCP-IP based applications that require LAN-to-LAN or PC-to-LAN large file transfers. Example applications include: image management, batch file transfers, and ARPA FTP services.

Figure 31.5

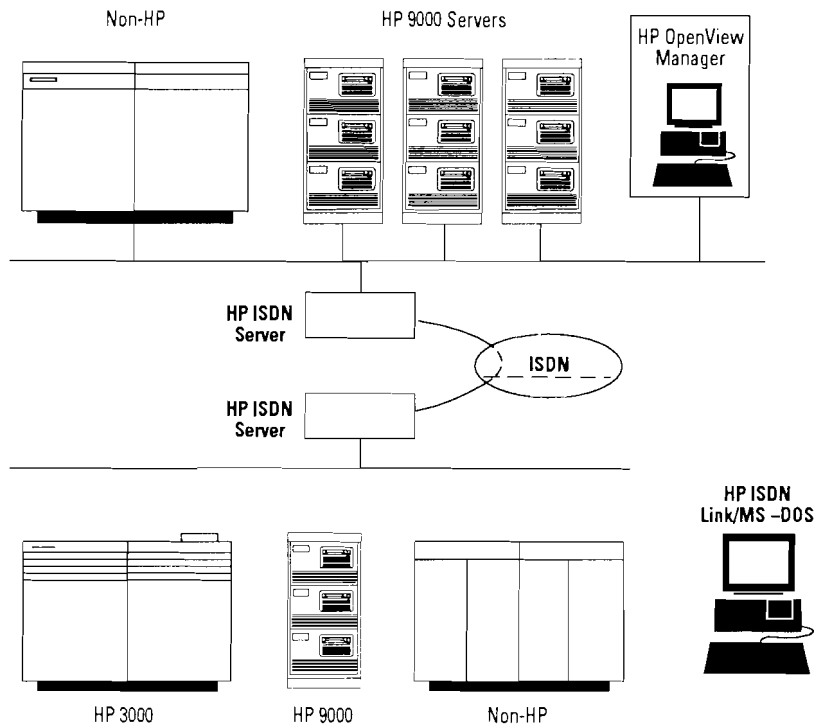


Table 31.4 Transports

Communications Packages	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication with
OTS/9000 (OSI)	All Series 800	32070A	Provides OSI Model Layers 4, 5 and 6 for transport between the link and X.400, X.500, FTAM, or MMS. OTS requires the installation of Streams/UX J2237A to run on HP-UX 9.0.	HP and other vendor systems that comply with OSI Layers 4-6.
TCP/IP Transport	All Series 800	Bundled with HP-UX O/S	Provides TCP/IP Layers 3, 4, 5 for transport between links and services (see RoadMap).	HP and other vendor's systems that support TCP/IP.

Server-to-Server Communications

Table 31.5 OSI Products

Communications Packages	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication with
X.400/9000	All Series 800	32032A	Standards based Electronic Messaging	HP and other vendor's systems that comply with the X.400 standard. Supports various E-mail packages such as OpenMail, HPDesk and SMTP based E-Mail products. Also supports CC:Mail and MS Mail through a third-party gateway.
FTAM/9000	All Series 800	B1033A	Standards based File Transfer, Access and Management	HP and other vendor's systems that comply with the FTAM standards.
MMS/9000	All Series 800	32019A	Standards based Messaging for the factory floor.	HP and other vendor's systems that comply with the MMS standard.
X.500 Server	All Series 800	J2152A	Provides a common enterprise-wide directory for E-Mail addresses, phone numbers, etc. which can be accessed by applications such as E-Mail, and other distributed applications. Includes Directory Server and Clients.	
X.500 Client Only	All Series 800	J2153A	Provides client access to X.500 Directory Server. Provides DUA capability.	HP and other vendor's systems that comply with X.500 standard.

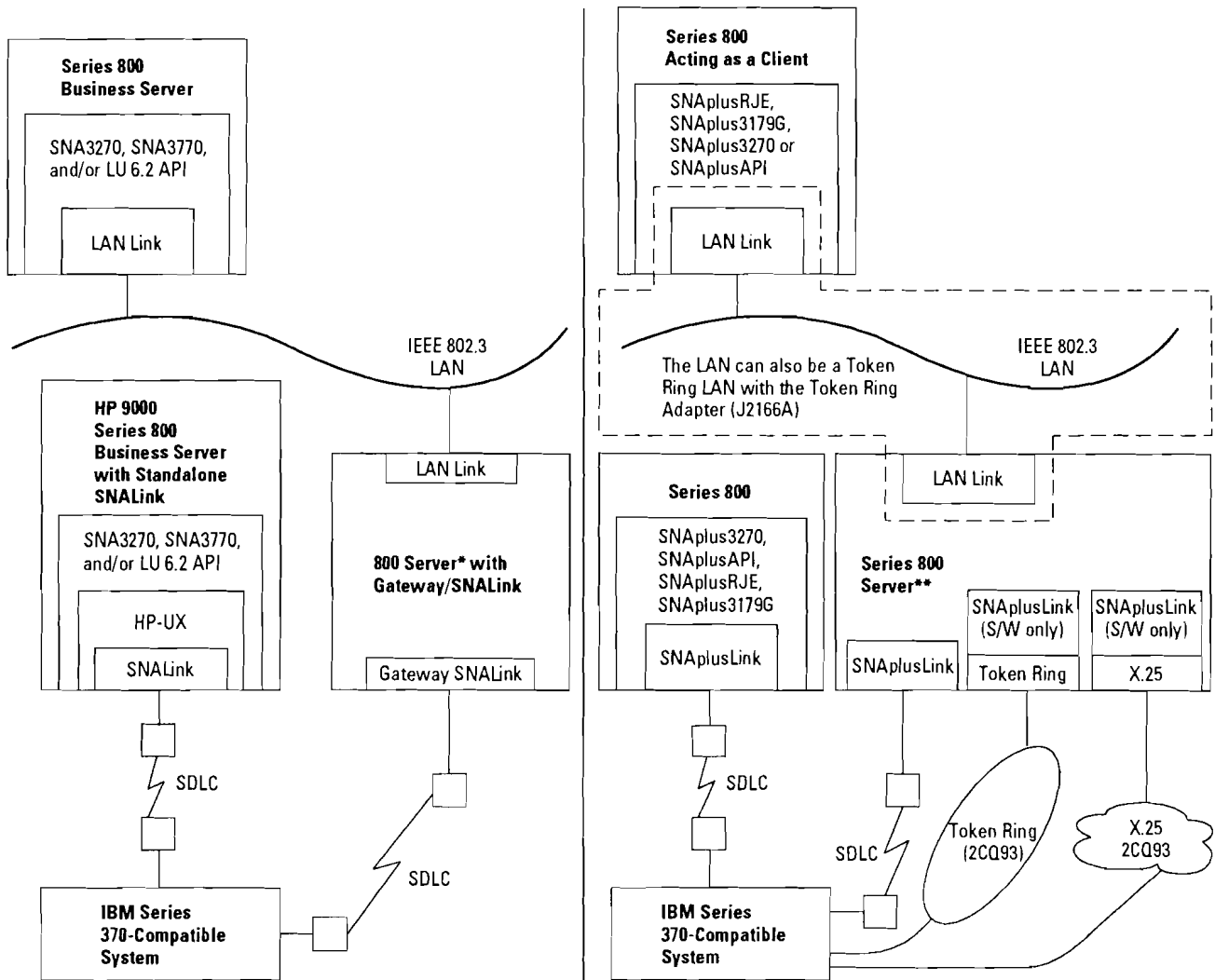
Table 31.6 TCP/IP Products

Communications Packages	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication with
ARPAServices/800	All Series 800	Bundled in O/S or B1030B	<ul style="list-style-type: none"> • File Transfer Protocol (FTP) (ARPA) • TELNET Virtual Terminal Capability (ARPA) • Simple Mail Transfer (ARPA) • Remote Copy (BSD 4.3) • Remote Login (BSD 4.3) • Remote Who (BSD 4.3) • Remote Uptime (BSD 4.3) • Remote Shell (BSD 4.3) • Sendmail (BSD 4.3) • Berkeley Sockets API (BSD 4.3) 	<ul style="list-style-type: none"> • HP 9000 Series 300 System with HP-UX 7.0 or later and NS/ARPA Services Series 300 software • DEC VAX BSD UNIX 4.3/4.3 System with BSD 4.3/4.3 networking • DEC VAX VMS 4.0 System with Wollongong's WIN/VX Rel. 2.2 (ARPA services only) • IBM PC-AT or HP Vectra with MS-DOS or PC-DOS 3.xx and ARPA Services/Vectra and ARPA ThinLAN Link/Vectra (Supports FTP and TELNET only) • Sun 68010 or 68020 computer with Sun Release 3.0 operating system and Sun ARPA
NCS	All Series 800	B1022A	Allows remote procedure calls between systems on LAN.	HP, IBM, DEC (Ultrix or NMS), Prime, Pyramid, and Sun.
Network Services/3000 Series 800	All Series 800	B1029B	<ul style="list-style-type: none"> • Network File Transfer • Net IPC API Virtual Terminal to HP 3000 	<ul style="list-style-type: none"> • HP 1000 A-Series System with Network Services/1000 software • HP 3000 System with Network Services/3000-V or 3000-XL software • HP 9000 Series 300 System with NS/ARPA Services Series 300 software • HP 9000 Series 400 system with NS/ARPA Service Series 400 software • HP 9000 Series 700 System with NS Services Series 700 software

ARPA services are bundled with the HP-UX operating system. A separate product number is available for those customers wishing to add ARPA after they

have ordered their Series 800 system and decided to delete the software at the time of original purchase.

Figure 31.6 HP 9000 Series 800 Communication with IBM Systems



Classic SNA Products – Supported on HP-UX 8.0 only

Communications Package	Product Number
HP-UX SNA3270 English Version 36980A	
HP-UX SNA3270 Asian Languages Version	36981A
HP-UX SNA3770 for Series 800	36977A
HP-UX LU 6.2 API	98164A
HP-UX SNA Link	98173A
HP-UX Gateway/SNA Link	98174A

Note: Each standard product above must be ordered with the appropriate processor option number.

* This server may also run SNA3270, SNA3770, LU 6.2 API, and/or SNA3179G (Series 300/400 only). It does not need to be a dedicated gateway.

SNAplus Product Line

(supported on HP-UX 9.0 starting Q1 of calendar 1993)

Communications Package	Product Number
SNAplusLink	J2220A
SNAplus3270	J2221A
SNAplusRJE	J2222A
SNAplusAPI	J2223A
SNAplus3179G	J2224A

Note: The Classic SNA products and the SNAplus products cannot intermix on the same LAN. Token Ring will be able to connect directly to the IBM Host in 2CQ93.

** This server may also run SNAplusAPI, SNAplus RJE, SNAplus3179G, and/or SNAplus3270. It does not need to be a dedicated gateway. SNA plus products require the installation of Streams/UX J2237A to run on HP-UX 9.0.

Mainframe Communications

HP 9000 Series 800 systems can communicate with IBM System/370-compatible mainframes by direct connection via an HP 9000 Series 800 Gateway system and the LAN connection to that system. See Figure 31.6.

IBM Wide-Area Communication

Due to the IBM mainframe downsizing trend in the computer industry, customers are installing UNIX machines around their existing backbone networks.

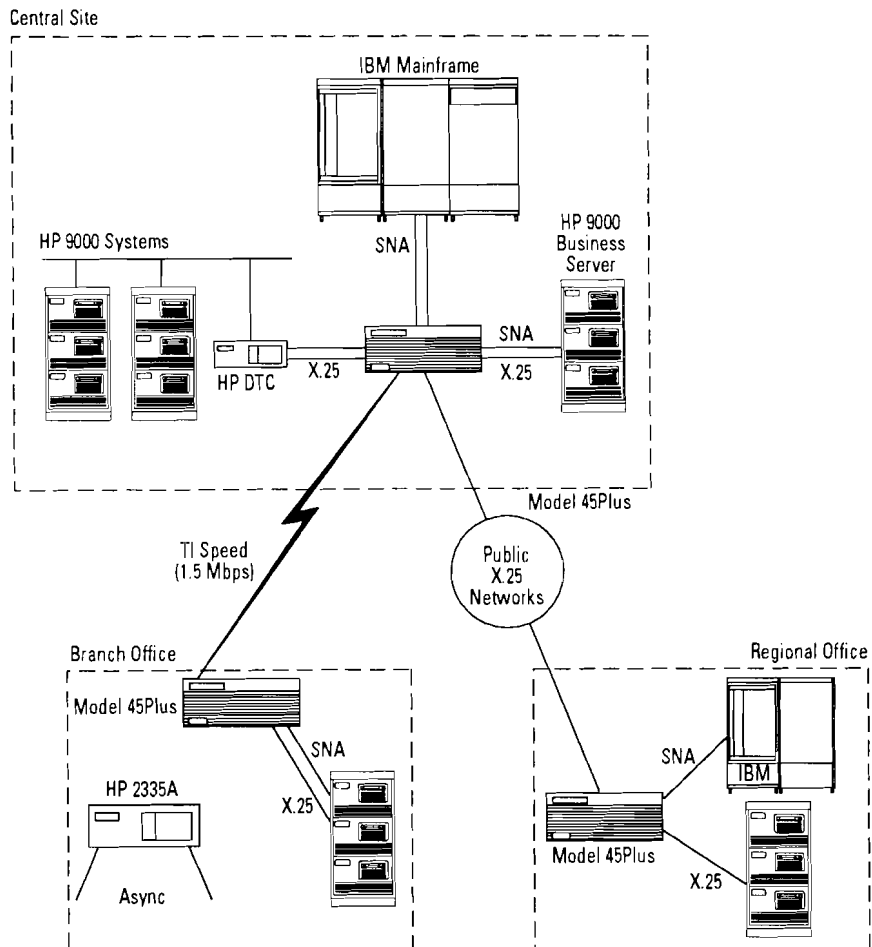
Very often, this backbone is based on X.25 technology and customers have the need to route SNA traffic over this X.25 backbone.

The HP Model 45 X.25 multiprotocol concentrator is an excellent solution for HP 9000 Business Servers access into this X.25 backbone.

The HP Model 45 Plus improves integration of HP 9000 systems within IBM SNA environment with the following enhanced SNA/SDLC features:

- Support of standard IBM QLLC protocol

Figure 31.7



- SNA Local Polling performed by HP Model 45 Plus allows SNA data only traffic to cross the network (not all the SNA polling overhead traffic)
- Support of SNA Links up to 64 Kbps with SNA frames up to 4K

The HP Model 45 Plus multiprotocol concentrator is a low-cost solution to concentrate and transport the data coming from multiple IBM and HP systems into one of multiple locations.

Table 31.7 End User Access and PC Integration

Communications Packages	For HP 9000 Model	Use Product Number	Capabilities	Supports Communication with
Network File System Services/800	All Series 800	Bundled with O/S or B1031A	<ul style="list-style-type: none"> • Network File Sharing (ONC/NFS) • Remote Procedure Call (ONC/RPC) • External Data Report (XDR) • Network Information Services (NIS) • Virtual Home Environment (VHE) • Automounter (AM) • PC-NFS daemon (PC-NFSd) • Remote Execution (REX) <p>Note: All the above capabilities are supported over LAN only.</p>	<ul style="list-style-type: none"> • HP 9000 Series 300, 400, or 700 System with HP-UX 7.0 or later and Network File System Services/300 • DEC VAX VMS 4.0 System with Wollongong's WIN/TCP 3.0 and WIN/NFS 1.1 <ul style="list-style-type: none"> – HP-UX Series 400 and 700 – IBM RS/6000 and MUS – MPE/iX running NFS server from third party – HP/Apollo Domain running NFS • IBM PC-AT or HP Vectra with MS-DOS or PC-DOS 3.xx and Sun Microsystems PC NFS 1.0, or 2.0, 3.0 • Sun 2/xxx or 3/xxx system with Sun Release 3.x and 4.X operating system and Sun NFS
HP LAN Manager/X	807/817/827/837/847/850/855/857/860/865/867/877/887/897/890/870/100–400, Fxx, Gxx, Hxx, Ixx	B1011C	Transparent File and Peripheral Sharing. Standard Program Interface for Development of Distributed Applications.	DOS and OS/2 Workstations
NetWare	All Series 800	J2240A	Transparent File and Peripheral sharing. NetWare's application programming interface is supported for development of distributor applications. NetWare requires the installation of Streams/UX J2237A to run on HP-UX 9.0.	DOS and OS/2 PCs and existing NetWare networks.
HP PC ARPA and Network Services (for MS-DOS, LAN Manager, NetWare)	800, 300, 400	J2246A	Gives MS-DOS PC users the capability to access computers using the widely accepted ARPA/Berkeley networking services, FTP, TELENET, Berkeley Sockets, and Berkeley Services (rcp, rsh).	DOS Workstations (either running LAN Manager, Novell NetWare, or standalone).
DTC	N/A	2340A 2345A	Please refer to the I/O section of this configuration guide for complete details.	

Applied Computerized Telephony (ACT)

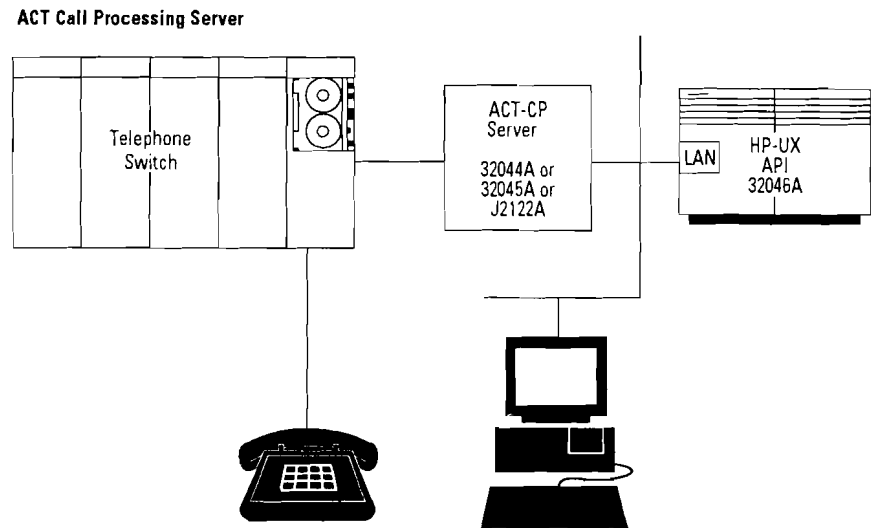
Applied Computerized Telephony (ACT) interfaces with a telephone switch to integrate voice and data technologies. An application using the ACT APIs (Application Programming Interfaces) uses information passed from the telephone switch. An application can identify the caller (by their calling number) or the purpose of their call (from the telephone number that was called) and automatically deliver caller and data specific information to the purpose of the call to a terminal or workstation.

ACT Products

ACT Call Processing (ACT-CP) requires two products, an ACT-CP Server and an ACT-CP API.

The ACT-CP Server is a pre-configured bundle (hardware and software) that is customer installable. There are two types of ACT-CP Servers:

Figure 31.8 ACT Call Processing Server



ACT Server

- 32044A Option 101—Interfaces with a Northern Telecom PBX (except SL-100)
- 32045A Option 101—Interfaces with a Northern Telecom Central Office switch (DMS100) and SL-100 PBX.
- J2122A Option 101—Interfaces with AT&T Generic 3 PBX

ACT API

- 32046A—ACT Call Processing, API for the HP 9000
- The ACT—CP Server communicates with the APIs over a thin LAN connection; therefore, the Series 800 requires a LAN/9000 Link.

Table 31.8 HP Networking Product Structure and Requirements

Product Name	Product No.	Media Types Available					Tier Model	Incremental System RAM Required	Disk Space Required (bytes)
		CD-ROM AAU	1/4" Cart AAO	1/2" Mag AA1	DAT AAH	QIC AA4			
X.400/9000	32032A	Y	Y	Y	Y	Y	Y	8 M	16 M
OTS	32070A	Y	Y	Y	Y	Y	Y	16 M	30 M
X.25/9000	36960A	N	Y	Y	Y	Y	Y	8 M	3.4 M
LAN/9000—C10	36967A	N	Y	Y	Y	N	Y		5.29 M
SNA 3770—Classic	36977A	N	Y	Y	Y	Y	Y	250 K/Session	500 K
SNA 3270—Classic	36980A	N	Y	Y	Y	Y	Y	500 K/Session	500 K
SNA 3270 NLS—Classic	36981A	N	Y	Y	Y	Y	Y	500 K/Session	500 K
LU 6.2—Classic	98164A	N	Y	Y	Y	Y	Y	250 K	150 K
SNA LINK—Classic	98173A	N	Y	Y	Y	Y	Y	1.75 M/Link	1.5 M
SNA G/W LINK—Classic	98174A	N	Y	Y	Y	Y	Y	2.5 M/Link	1.5 M
LAN Manager	B1011C	N	Y	Y	Y	Y	User	8 M	5 M
NCS/NIDL	B1022A	Y	Y	Y	Y	Y		8 M	2.5 M
NS/9000 S/800s	B1029B	Y	Y	Y	Y	Y	Y	8 M	
ARPA Services—in O/S	B1030B	N	Y	Y	N	N	Y	8 M	163 M
NFS S/800—in O/S	B1031B	N	Y	Y	N	N	Y	500 K	2.28 M
FTAM	B1033A	Y	Y	Y	Y	Y	Y	2 M	2.33 M
LAN/9000—Nova (HP-PB)	J2146A	N	N	N	N	N	H/W only	1 M/Link	5.29 M
X.500 Server	J2152A	Y	Y	Y	Y	Y	Y	8 M	20 M
FDDI	J2157A	N	Y	Y	Y	Y	Y	100 M	1 M
Token Ring/9000	J2166A	N	Y	Y	Y	Y	Y	1 M/Link	5.3 M
SNaplusLink	J2220A	N	Y	Y	Y	Y	Y	2.1 M	5.2 M
SNaplus3270	J2221A	Y	Y	Y	Y	Y	Y	1.6 M	4.6 M
SNaplusAPI	J2223A	Y	Y	Y	Y	Y	Y	800 M	3.8 M
Novell NetWare	J2240A	Y	Y	Y	Y	Y	User	16 M	20 M
PC ARPA and Network Services (MS-DOS and NetWare)	J2246A	N	N	N	N	N	Right to Copy	PC-640 K	2 M
OpenView DTC Manager	J2120A	N	Y	Y	Y	Y	One price		
ACT Server	32044A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ACT 9000 (API)	32046A	Y	Y	Y	Y	Y	Y	Y	Y
X.25 Concentrator	J2000A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
X.25 Concentrator	J2001A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4 Port X.25 Card	J2004A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Async Exp Card	J2006A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mon/Keyboard	J2007A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Cable—4 DTE	J2008A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Cable—2 DTE and 2 DCE	J2009A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Cable—4 DCE	J2010A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Cable—3 DTE and 1 DCE	J2011A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q Cable—3 DCE and 1 DTE	J2012A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OpenView Switch Pa	J2017A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ISDN Server	J2101A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ISDN Links for Vec	J2102A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Add ISDN Serverq	J2103A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MMS 802.3	32019A	N	Y	Y	Y	N	Y	16 M	150 M

Table 31.9 Series 800 Networking Product Configuration Reference

Business Server	I/O Bus Back Plane Type	Maximum number of cards supported for:						
		X.25 Link* 36960A	LAN Link* 36967A or J2146A	TokenRing* J2166A	FDDI** J2157A	SNAPplus-Link* J2220A	SNA-Link* 98173A (HP-UX 8.0 only)	Gateway* SNALink 98174A (HP-UX 8.0 only)
807	HP-PB	2	2	2	1	2†	2	2
808	HP-PB	2	5	0	0	2†	2	2
815	HP-PB	4	5	0	0	4†	4	4
817	HP-PB	2	2	2	1	2†	2	2
822	HP-PB	4	5	0	0	4†	4	4
825	CIO	4	5	0	0	4†	4	4
827	HP-PB	6	5	5	2	6†	6	6
832	HP-PB	4	5	0	0	4†	4	4
835	CIO	4	5	0	0	4†	4	4
837	HP-PB	2	2	2	1	2†	2	2
840	CIO	5	5	0	0	5†	5	5
842	HP-PB	5	5	0	0	5†	5	5
845	CIO	3	5	0	0	3†	3	3
847	HP-PB	6	5	5	2	6†	6	6
850	CIO	7	5	0	0	7†	7	7
852	HP-PB	7	5	0	0	7†	7	7
855	CIO	7	5	0	0	7†	7	7
857	HP-PB	7	7	5	2	7†	7	7
860	CIO	7	5	0	0	7†	7	7
865	CIO	7	5	0	0	7†	7	7
867	HP-PB	6	5	5	2	6†	6	6
870	CIO	7	5	0	0	7†	7	7
877	HP-PB	7	7	5	2	7†	7	7
887	HP-PB	6	5	5	2	6§	0	0
890	HP-PB	12	7	5	2	10‡	0	0
897	HP-PB	7	5	5	2	7§	0	0
Fxx	HP-PB	2	2	2	1	2	2	2
Gxx	HP-PB	4	4	4	2	4	4	4
Hxx	HP-PB	7	7	5	2	8	8	8
Ixx	HP-PB	7	7	5	2	10	10	10

* Uses one single high slot

** Uses one double high HP-PB slot

† Prior to the first calendar quarter of 1993, only 1 card is supported on the 8.0x version of HP-UX.

‡ Prior to the first calendar quarter of 1993, only 1 card is supported on HP-UX revision 9.0 as a special. Contact the Sales Center for ordering details until Q1, 93.

§ SNAPplus Link will be supported in first calendar quarter 1993 on these systems.

Section 32

Customer Support Services

Hewlett-Packard's customer support services are designed to ensure long-term, productive use of HP 9000 systems. Support is available throughout the life of a system to meet the needs of particular applications and the working environment. HP offers a complete range of customer support services for HP 9000 systems:

- HP System Support Options provide basic hardware and software support during the first year of system ownership.
- HP System Support Solutions provide scalable, integrated ongoing support coverage.
- Premier Account Support provides a premium level of complete service and support for Corporate Business systems customers

- Standardized and custom consulting services allow customers to develop tailored solutions to meet their application needs
- Fundamental and advanced training courses help customers quickly take full advantage of their system's capabilities
- Disaster recovery planning and back-up services prepare customers for the unexpected

HP customer support is delivered by a worldwide network of systems engineers (SEs), customer engineers (CEs), and HP Response Center engineers (RCEs). These extensively trained professionals work closely with HP sales representatives to provide customers with complete support for their HP 9000 products.

HP System Support Options

The HP System Support Options offer customers basic hardware and software support for HP systems, peripherals and stand-alone software applications.

System Support Options improve the warranty response time, and give customers basic software support services. Key program features include:

- Quoted and ordered as a product option
- One option gives you recommended HW/SW support
- CPL prices represent the total cost for a full year of hardware and software support
- Quota credit and commission on every sale

System Support Options Availability

Each Support option represents a combination of hardware and software support for an HP product. Table 32.1 below illustrates the deliverables of each support option.

Descriptions of the HP System Support Options features can be found under “HP System Support Solutions” on the following page.

Table 32.1

<p>Option 0S0</p> <ul style="list-style-type: none"> • License to use SW updates • Updates* • Electronic Access • Next day on-site repair 	<p>Option 0S1</p> <ul style="list-style-type: none"> • License to use SW updates • Updates* • Electronic Access • 4 hr. on-site repair
<p>Option 0S2</p> <ul style="list-style-type: none"> • Telephone Support (SW assistance) • License to use SW updates • Updates* • Electronic Access • Next day on-site repair 	<p>Option 0S3</p> <ul style="list-style-type: none"> • Telephone Support (SW assistance) • License to use SW updates • Updates* • Electronic Access • 4 hr. on-site repair

*Includes one copy of media and documentation updates for each media and documentation product ordered.

Notes:

Option 0S4 provides installation and network configuration for products whose purchase price does not include installation.

Option 0SZ provides network configuration for products whose purchase price includes installation.

Selecting the Appropriate Option

Select HP System Support Options based on your knowledge of the customer's support needs. Follow these basic steps:

1. Select the customer's hardware, software and peripherals
2. Determine the customer's support needs.
3. Select the applicable Support Options to meet the support needs.

HP System Support Options are available for systems, associated peripherals and stand-alone software.

Systems

To select the appropriate option, follow these steps:

1. Determine the customer's desired response time for repairs (next-day or 4 hour)
2. Determine whether the customer has an existing response center caller who will be responsible for support of the system being purchased.
 - If NO, select Option 0S2 or 0S3.
 - If YES, select Option 0S0 or 0S1.

Peripherals

For system peripherals, select the option that provides the desired response time for repairs (next-day or 4 hour). In general, select the same option as you chose for the system.

Stand-Alone Software Applications

For stand-alone software application, select options as follows:

- Select Option 0S2 or 0S3 for the first copy of the application.
- Select Option 0S0 or 0S1 for additional copies.

HP System Support Solutions

HP System Support Solutions provide customers with support solutions designed to meet their ongoing contractual support needs. The HP System Support program provides a framework to create and sell a solution tailored to the customer's individual needs. Descriptions for the HP System Support Solutions features are described below.

Hardware Support

Feature	Delivery Specification
On-site hardware support	HP travels to your site and provides all labor, parts, and materials necessary to maintain your hardware products in good operating condition. HP diagnoses and corrects products malfunctions and failures. Replacement parts are new or equivalent to new; replaced parts become the property of HP.
Work to completion	Once an HP engineer arrives at your site, the engineer continues service, uninterrupted, until your products are operational or as long as reasonable progress is being made. Work may be temporarily suspended if additional parts or resources are required, but resumes when they become available. With the Scheduled support service level, work resumes on the following business day.
Engineering improvements	HP installs appropriate engineering improvement on your system to ensure maximum performance and maintain compatibility with HP-supplied hardware replacement parts.
Escalation management (hardware)	HP has established formal escalation procedures to solve very complex hardware problems. Local HP management coordinates problem escalation, rapidly enlisting the skills of key problem-solving experts throughout HP.
24-hour hardware call submittal	If you've selected a hardware service level that only provides coverage during normal business hours, you can still place an after-hours service call. The HP Response Center logs the call and notifies your local office the following business day.*
Preventive hardware maintenance	An HP engineer visits your site at regularly scheduled intervals to perform diagnostics on your system, adjust mechanical or electronic system components as needed, and replace worn or defective parts if necessary.
Remote hardware support	Prior to any necessary on-site assistance, an HP engineer may initiate and perform remote diagnostics to facilitate problem resolution. By using an HP-qualified support modem to resolve problems remotely, HP can have your system up and running more quickly. HP performs remote support only upon receipt of your authorization.

*Subject to local availability outside the United States.

Hardware Service Levels

The right coverage hours and response times for your business depend upon the critical nature of your applications and the availability of alternate computing resources. With HP System Support service, you can choose from the four service levels described in Table 32.2. While these service levels meet the needs of most customers, HP also has the flexibility to individualize service for you.

Table 32.2 Hardware Service Level Selection Guide

Hardware Service Level	Coverage Hours*	Response Time	Environment
Priority Plus	24 hours a day 7 days a week	Best response; not to exceed 4 hours	Highly critical
Priority	8:00 am–9:00 pm, Monday–Friday, excluding HP holidays**	Best response; not to exceed 4 hours	Urgent
Next Day	8:00 am–5:00 pm Monday–Friday, excluding HP holidays	Next working day	Less critical
Scheduled	8:00 am–5:00 pm Monday–Friday, excluding HP holidays	Scheduled weekly visits	Multiple units; spare equipment

* Outside the United States, hours are subject to local availability. Please check with your local office for detailed coverage hours.

** If you request service before 5:00 pm, an HP engineer respond on site within 4 hours if necessary.

Software License, Information, and Updates

Feature	Delivery Specification
License for software updates	You can use and copy updates to HP software on each system covered by HP System Support service as described in HP Terms and Conditions of Sale and Service, Exhibit 5, HP System Support Service.
Software media and documentation	As HP releases updates to your HP software, the latest revisions of the software and reference manuals are made available to your system manager. Media types available for software and documentation updates include tape, disk, paper, electronic, and CD-ROM. HP value-added businesses (VABs) may request priority delivery of software releases.
HP SupportLine electronic support	HP SupportLine provides electronic access to a database of current product and support information. HP SupportLine includes new product information, software status bulletins, engineering and application notes, and information about available software patches. Keyword search and browse capabilities make it easy to locate appropriate information. Software patches, when available for HP 9000 systems, can be downloaded to your system. HP SupportLine is available Sunday through Friday from 2:00 am to midnight, and Saturday from 2:00 am to 9:00 pm eastern time (U.S.). Outside the U.S., hours are subject to local availability.

Software Assistance, Information and Updates

Includes the features of software license, information, and updates, plus:

Feature	Delivery Specification
Software assistance	Remote assistance is available for software problems. Unlimited, toll-free access to the HP Response Center is available to authorized callers. Response is immediate for critical calls and within 2 hours all calls. Assistance is available from Monday through Friday, excluding HP holidays, during normal HP Response Center hours for all HP and select non-HP software products. Extended-hours support is available for operating system, subsystem, and application software products. Refer to the HP SupportLine database for details of products and coverage hours.
Electronic software call submittal	Authorized callers can submit calls electronically to the HP Response Center via HP SupportLine electronic support and request a call back within 2 hours (or the next business day if after normal hours) or a written electronic response the next business day.
Escalation management (software)	At HP's discretion, the HP Response Center may dispatch an HP service representative to your site to assist with critical software problem resolution. In most cases, resources arrive within 1 working day if your site is within 100 miles of the nearest HP support office.
Remote software support	Prior to any necessary on-site assistance, an HP engineer may initiate and perform remote diagnostics to facilitate problem resolution. By using an HP-qualified support modem to resolve problems remotely, HP can have your system up and running more quickly. HP performs remote support only upon receipt of your authorization.
HP PowerPatch tapes (select products)	Operating and subsystem patches are available for supported MPE V and MPE/iX releases. You can order HP PowerPatch tapes from the HP Response Center at any time, for installation with a new release or between major software updates. HP PowerPatch solutions are subjected to the same quality assurance testing as all HP software releases.

Network Support (requires hardware/software support)

Feature	Delivery Specification
Network support	Resolution of a network problem begins within 2 hours of your call to the HP Response Center. Network specialists isolate the problem remotely and, if HP deems necessary, HP sends a support engineer to your site. Since the HP Response Center can manage the resources required to solve multivendor and multisite problems, HP can cover your entire network. To efficiently solve your problem, HP may contact select vendors directly or work with you to contact the appropriate vendor.
Complete network documentation	Customer-specific network documentation for all of your sites is updated annually by your HP representative. Your network map is included in the HP Response Center's database.
Assigned contract administrator	An account-assigned contract administrator serves as your single point of contact for contract administration.

Personalized System Support

Feature	Delivery Specification
Assigned system support engineer	Your assigned system support engineer (SSE) coordinates all hardware, software, and network on-site maintenance services, schedules operational reviews, installs software updates, and ensures that all appropriate HP resources are made available to you. Your SSE is available during normal HP business hours, excluding HP holidays.
Assigned HP Response Center engineer	Your assigned HP Response Center engineer (RE) understands the remote support needs of your computing environment and works as your HP Response Center advocate to ensure that your remote maintenance needs are met. Your RE monitors your calls to the HP Response Center for software assistance to help identify trends and potential problems, and to help HP Response Center engineers provide more precise solutions to your problems. Your engineer contacts you immediately if a class problem arises and works with you to implement a solution that minimizes system disruptions. Assistance is available Monday through Friday, 8:00 am to 5:00 pm local HP Response Center time, excluding local HP Response Center holidays.
Patch management assistance	Your HP Response Center engineer monitors all newly recommended patches and helps you manage needed patch installations to avoid potential problems. Assistance is available Monday through Friday, 8:00 am to 5:00 pm local HP Response Center time, excluding local HP Response Center holidays.
Operational reviews	Your SSE schedules two operational reviews per year, covering review topics mutually agreed to. Possible topics include reviewing operational procedures such as system security; planning for add-on hardware, software, and network products; and reviewing HP Response Center calls. Operational reviews are provided during normal HP business hours.
System release planning seminars	In system release planning seminars, HP support representatives review changes to new software releases—including new features and functions, problem fixes, and performance implications; new hardware, software, and network products supported by new releases; hardware needs; and impact on system and network configurations. System release planning seminars are provided for major releases only, generally one per year. HP schedules meetings 1 month in advance at an HP office, with one seminar for each major release.
Installation of software updates and add-on hardware products	<p>Your SSE installs one operating system update per year on your central system. Installation is available 7 days a week, 24 hours a day, excluding HP holidays. Installation must be scheduled at least 1 week in advance at a mutually agreed-upon time, and your system manager or alternate must be present during the installation.</p> <p>Additional HP hardware products purchased directly from HP and added to your HP System Support service agreement are installed at no additional charge. This applies to select products and does not apply to hardware that is designated as customer-installable.</p>

Premier Account Support Program

HP Premier Account Program provides a premium level of complete service and support for Corporate Business Systems customers.

At the heart of a customer-focused organization is the ability to understand customers. At the heart of HP's Premier Account Support program is the concept that our customers' success defines our success. We've built a program to help make the Corporate Business Systems customer successful in the three key areas on which they are measured:

Solution Availability

Computing power within a corporation can be compared to a public utility. When a blackout makes power unavailable, users suffer and productivity stops. System managers are measured on whether their business solutions are available to their end users when they say they'll be. These systems managers rely upon computer vendors to anticipate as many problems as possible and provide the highest-level response possible when problems do occur.

Resource Management

Systems managers and Information Technology (IT) manager are managers: they manage people, equipment, and budgets. Corporate Business Systems users are

measured on how effectively they plan and manage their resources. They rely upon a vendor to effectively plan their support needs at the beginning of the year and develop a single contract that covers their needs. They don't want to be "nickel and dimed" by vendors with charges that are within the spirit of the original plan.

Technology Leadership

System managers and IT managers are responsible for tracking complex, rapidly evolving systems technologies and recommending technology implementations that provide the maximum benefit with minimum disruptions. They need a business partner who can create a plan for implementing technologies that create the greatest competitive advantage for their organizations.

Service Description

We have discovered that Corporate Business Systems customers want one packaged set of services that will ensure successful implementation and ongoing operation of their high-end systems—a package that ensures the right support for their systems hardware, software, network, and the people using it. HP has packaged the services we think are truly essential for their systems support into one fixed-price product.

Each new HP 9000 Corporate Business Server has a specific support package associated with it. Each support package bears the name of the specific processor version it supports.

Each support package includes the primary services customers need to support their new corporate business system. Each Premier Account customer is supported by a fully integrated support team with account-assigned representatives. Each product contains the following premium deliverables, all designed to make the Corporate Business Systems manager successful:

- A new 24 × 7 hardware support service level with immediate response
- An enhanced level of software support with expanded 24 × 7 software coverage
- A new Account-assigned Response Center Engineer who handles daily technical problems as well as ensuring that the customer receives the highest level of remote support possible.
- An enhanced level of 24 × 7 network support for the system
- Two person weeks of customer training
- An amount of consulting time for implementation and system performance assistance

In many cases, the up front purchase of fixed-price packages can be financed through the Finance and Re-marketing Division (FRD). This helps customers to better manage their cash flow and makes it easier to purchase support for their corporate business servers.

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