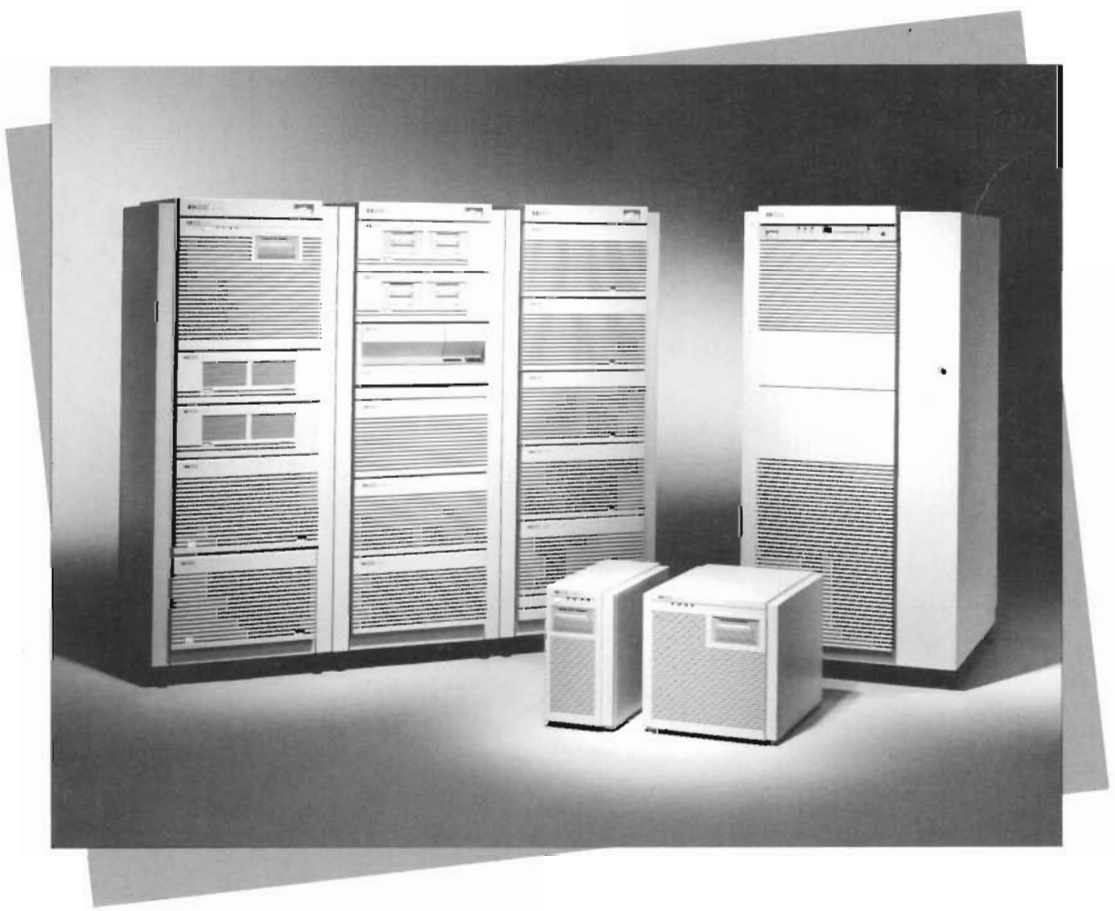
HEWLETT PACKARD

HP 3000 900 Series Computer Systems

Configuration Guide

May 1992



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About This Guide

Configuring an HP 3000 System

This Configuration Guide is designed to help in the configuration of HP 3000 systems including:

- Series 9x7LX (917LX, 927LX, 937LX, 947LX, 957LX, and 967LX)
- Series 9x7 (937, 947, 957, 967, 977, and 987)
- Series 980/100, 980/200, 980/300, 980/400
- HP 3000 Corporate Business Systems (CS) 990 and 992

The system configuration sections provide a review of the standard and required equipment comprising a minimum and maximum system configuration along with general configuration guidelines. Use the guidelines and information provided to check that a proposed configuration is valid and does not violate any of the system maximums or physical limitations.

CONRAD On-line Configuration Tool

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. For assistance, users should contact CONRAD Support once a CONRAD template and an advice file have been obtained. The CONRAD Support number is (415) 852-8338 (telnet). CONRAD Support can also be contacted via HPDESK (CONRAD SUPPORT / HP0000).

New Hardware Products

A2300A	Series 977
A2301A	Series 977 Field Upgrade
A2317A	Series 987
A2318A	Series 987 Field Upgrade
A1150A	Series 980/300
A1139A	Series 980/300 Field Upgrade
A1151A	Series 980/400
A1140A	Series980/400 Field Upgrade
A1811A	HP 3000 Corporate Business System (CS)
A1809A	HP 3000 Corporate Business System DX (CS DX)
A1810A	HP 3000 Corporate Business System Field Upgrade
C1064G	HP 700/96 Console
28616A	PB-FL (Precision Bus - Fiber Link)
J2167A	802.5 Token Ring
28643A	SCSI Extender
C2753A	HP 5000 Model F100 Printer (60 Hz)
C2754A	HP 5000 Model F100 Printer (50 Hz)
C1703A	Optical Autochanger
C2254HA	5.4 Gb High Availability Disk Array HP-FL (five 1.36 Gb disk drives)
C2254B	5.4 Gb Disk Array HP-FL (four 1.36 Gb disk drives)
C2252HA	2.7 Gb High Availability Disk Array HP-FL (five 1.36 Gb disk drives)
C2252B	2.7 Gb Disk Array HP-FL (two 1.36 Gb disk drives)
4220	1/2-inch Tape Cartridge (3480 compatible) from StorageTek (table top)
4280 Model A01, A02	1/2-inch Tape Cartridge (3480 compatible) from StorageTek (rackmount)
C1520B,C2464F/R	DDS Format Tape Drive 2.0 Gb
C1521B,C2466F/R*	DDS Format Tape Drive 8 Gb with Data Compression

** Support planned for 1Q93*

Products Deleted Since the Last Configuration Guide

Do **NOT** discard your previous HP 3000 900 Series Configuration Guide (PN 5091-1731E) June 1991 edition, it contains information on 900 Series systems that have been deleted from this version. See the list of deleted products below. This information has been placed on INfoROM CD internal support subscription service. For information or questions about ordering an InfoROM subscription, send an HPDESK message to INFOROM/HP4700/M2.

A1702A	Series 920	A1700A	Series 948
A1027A	Series 922LX	A1701A	Series 958
A1046A	Series 922RX	32490B	Series 950
A1033A	Series 922	A1109A	Series 955
A1041B	Series 932	A1130A	Series 960

Printing History

The June 1988 edition of the HP 3000 Configuration Guide contains configuration information for many older MPE V/E systems. This information has been placed on the InfoROM CD internal support subscription service. We no longer print new configuration guidelines for these older systems. For information on MPE V/E systems, consult the June 1988 edition of the Configuration Guide or obtain an InfoROM subscription. For information or questions about ordering an InfoROM subscription, send an HPDESK message to INFOROM / HP4700/M2.

The August 1990 *Configuration Guide Update* (P/N 5954-9354) is the last revision to contain information on the MICRO family of systems and information on the MPE/iX Series 925LX, 925, 935 and 949. Please refer to that revision for configuration guidelines for those systems.

Contents

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900 Series Business Computers

General System Configuration Information

The following information is common to all MPE/iX 900 Series systems.

Supplied Hardware

- Central Processing Unit
- Error Correcting Memory with Controllers
- One 802.3 LAN interface channel for network and Datacommunications and Terminal Controller (DTC) communication
- Console attachment hardware
- Power supply
- Manual set
- Battery backup unit
- System cabinet includes card cages and power supply supporting the CPU, memory, and I/O card slots and additional mass storage (seven of eight CS card cages are external - not in system cabinet)

Supplied Software

The following software is included as part of the preconfigured systems and includes all the required software for an HP supported system:

- Multiprogramming Executive Operating System (MPE/iX)
- MPE V/E V-MIT compatibility mode software
- Database management systems including network model (TurboIMAGE) and relational model (ALLBASE/SQL) databases
- Keyed sequential access method software (KSAM/XL)
- TurboIMAGE Database inquiry language (QUERY/V)
- Data entry and forms management (VPLUS/XL)
- Sort and merge software (SORT-MERGE/XL)
- File copying utility (FCOPY/XL)
- Text editor (EDIT/XL)
- System debug utility (DEBUG/XL)

Preconfigured System

For ordering convenience and economy, preconfigured systems are available including:

- One of the following SPUs:

SPU	Part Number	SPU	Part Number
Series 917LX	A1770A	Corporate Business System DX	A1809A
Series 927LX	A1771A	- CS 990 DX	opt. 880
Series 937LX	A1758A	- CS 992/100 DX	opt. 881
Series 947LX	A1752A	- CS 992/200 DX	opt. 882
Series 957LX	A1707A	- CS 992/300 DX	opt. 883
Series 967LX	A1757A	- CS 992/400 DX	opt. 884
Series 937	A1772A		
Series 947	A1708A	Corporate Business System	A1811A
Series 957	A1709A	- CS 990	opt. 880
Series 967	A1710A	- CS 992/100	opt. 881
Series 977	A2300A	- CS 992/200	opt. 882
Series 987	A2317A	- CS 992/300	opt. 883
Series 980/100	A1134A	- CS 992/400	opt. 884
Series 980/200	A1149A		
Series 980/300	A1150A		
Series 980/400	A1151A		

- MPE/iX FOS software
- Database management systems, including ALLBASE/SQL and TurboIMAGE
- DX versions of the Corporate Business System also include Systems Management Software:
  - OpenView console
  - ThinLAN 3000/iX
  - TurboSTORE/iX II with online backup for rewritable optical disk, 1/2-inch tape or DDS
  - AutoRestart/iX
- DX versions of the Corporate Business System also include Performance Management Software:
  - GlancePlus
  - LaserRX/MPE
  - RXForecast

One or more of the 900 Series preconfigured systems' database management systems may be deleted by specifying one of the following preconfigured system options. It is also possible to delete both database management systems and FOS for all systems leaving a hardware only system. On the DX version of the Corporate Business System, you may also delete either the Systems Management Software group or the Performance Management Software group.

- Option 910: ALLBASE/SQL only (deletes TurboIMAGE)
- Option 915: TurboIMAGE only (deletes ALLBASE/SQL)
- Option 920: MPE/iX only (deletes ALLBASE/SQL and TurboIMAGE)
- Option 930 (ICON only): SPU hardware only (deletes ALLBASE/SQL, TurboIMAGE, and FOS). The FOS software product (3265xA) must be ordered separately when ordering option 930.

- Option 931: Deletes Systems Management Software group and the PC console
- Option 932: Deletes Performance Management Software group

MPE Media Products

One MPE media product (51453A or 51454A) **MUST** be ordered with each system. Corporate Business Systems require media P/N 51454A, all other HP 3000 systems require 51453A. See Chapter 8, Software Media and FOS Learning Products, for specific options to order.

For preconfigured Series 9x7LX and 9x7 systems, the operating system will be installed at the factory, and the software support tape and license will ship with the system. For Series 9x7LX and 9x7 systems, subsystem software products will be installed at the factory and requires that option 0D1 be ordered on the MPE media product (51453A).

Preloaded software for Corporate Business Systems (CS) ordered with disk require SPU cabinet/disk and media with option 0D1 on same section. CS systems require media P/N 51454A.

Server Option

A server version of each system – except the 980 systems and the Corporate Business Systems (CS) 990 and 992 – may be ordered. Ordering option 100 "Server Version" as part of the preconfigured system will configure the 900 Series system as a server. Server versions also require the MPE/iX Server Media Product (36396A) for shipment of the networking software associated with SPU server Option 100. Server versions do not allow terminals (or PCs configured as terminals) to establish a log on via the DTC. DTCs are supported on the server for X.25 and serial device connections. PCs connected to the server via a local area network can access the server using NetIPC or Berkeley Sockets communications and virtual terminal emulation.

User License

The HP 3000 User License sets a legal limit to the number of concurrent users allowed to access the system. Once the license limit is reached, MPE/iX will prevent any further users from logging on to the system. The user license applies to the number of users rather than the actual number of sessions, processes, or physical workstation connections. The MPE/iX users license is consistent with user-based licenses supported in the industry.

Required Hardware Ordered Separately

In addition to the preconfigured system, the following items are required for an HP supported system:

- One Datacommunications and Terminal Controller (DTC48 product 2345A with option 625 for modem connect or DTC16 product 2340A with option 640, 641, or 642 for modem connect). At least one modem connect is required for each system for remote support purposes. Series 9x7LX and 9x7 and CS 990 and 992 systems come standard with one modem-capable port and do not require a DTC for remote support purposes. DTCs are not required for server systems. *Refer to page 7-10 for information regarding modem options.*
- 802.3 LAN cabling: Series 9x7LX and 9x7 and CS 990 and 992 systems come with built-in ThinLAN Transceiver. The Datacommunications and Terminal Controller (DTC) has options for either ThickLAN, ThinLAN or EtherTwist. Integrated 900 Series systems are provided standard with one 2 meter 802.3 ThinLAN cable.

For Series 980, CS 990, and CS 992 systems, the following are also required:

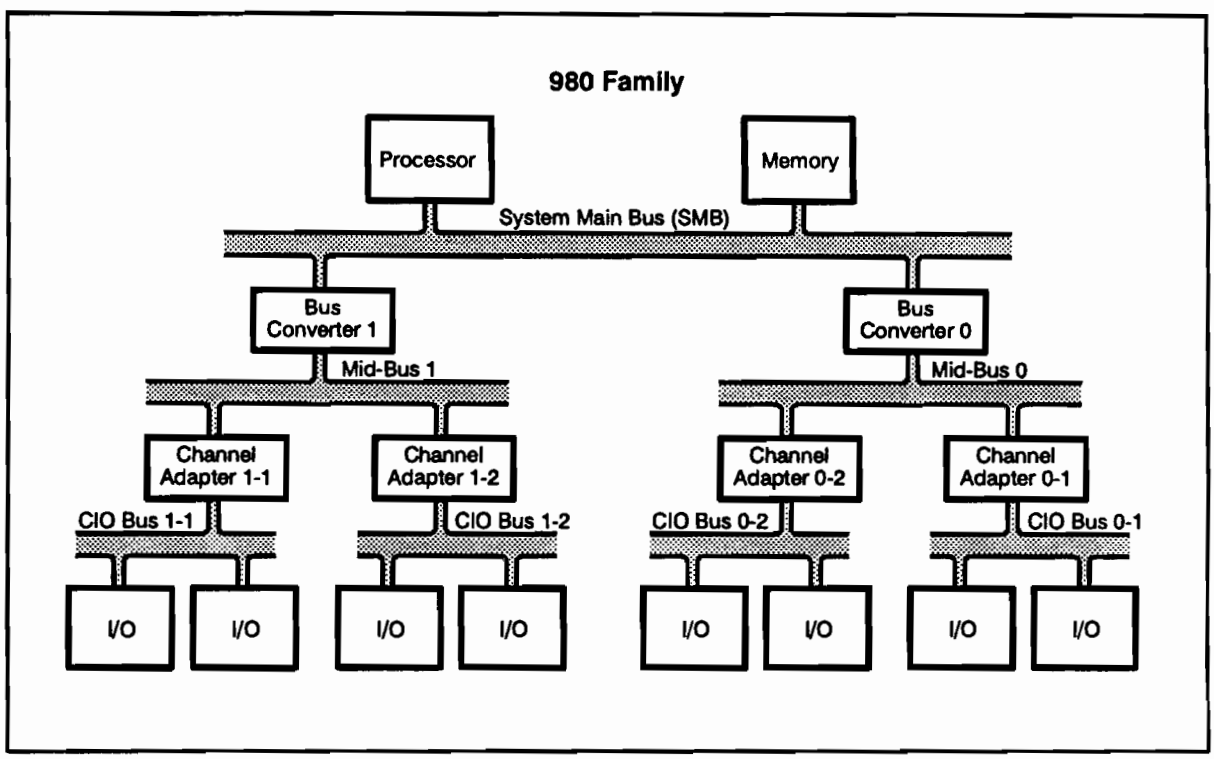
1. One system disk: C2201A, C2204A, or C2252HA/B
2. One user disk: C2201A, C2204A, C2252HA/B, or C2254HA/B
3. One tape drive for system backup and boot: 7979A, 7980A, 7980XC, or C2464F/R
4. One system console:
   For the Series 980 only order - 700/92 (C1001A/G) or 700/96 and a 40242M cable
   Corporate Business System - ship with 700/96 console as standard
   Corporate Business System DX - ship with OpenView console PC as standard

Note

400 Mbytes of disk space **must** be allocated for exclusive use of the operating system. For HP remote system failure analysis, refer to the Disk Space Recommendations for Dump/XL on page 6-8.

HP-PB versus CIB Systems

There are two types of I/O bus structures supported on the HP 3000 systems. The first is the Channel I/O Bus (CIB) which is supported on the Series 980 systems. The second is the Hewlett-Packard Precision Bus (HP-PB) which is supported on the Series 9x7LX, 9x7, and Corporate Business Systems (CS) 990 and 992.



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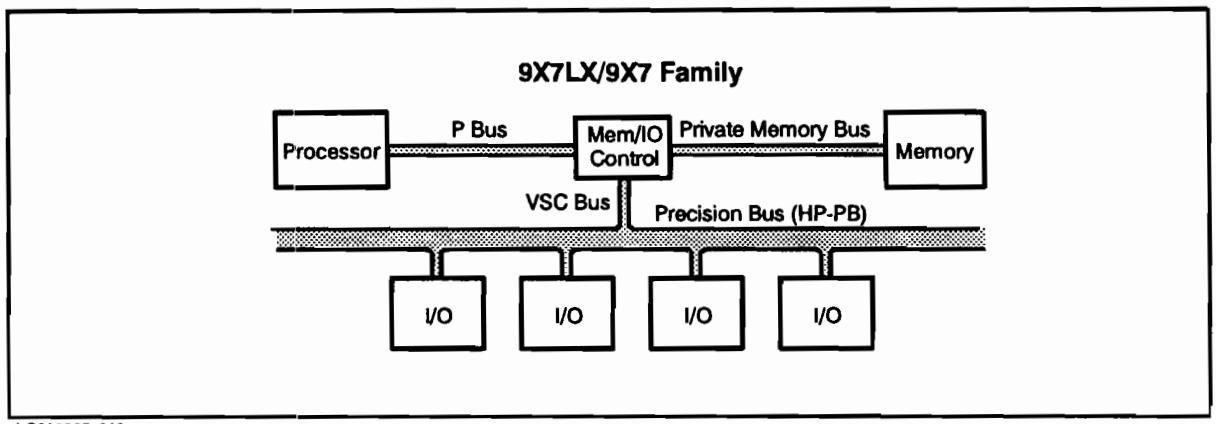

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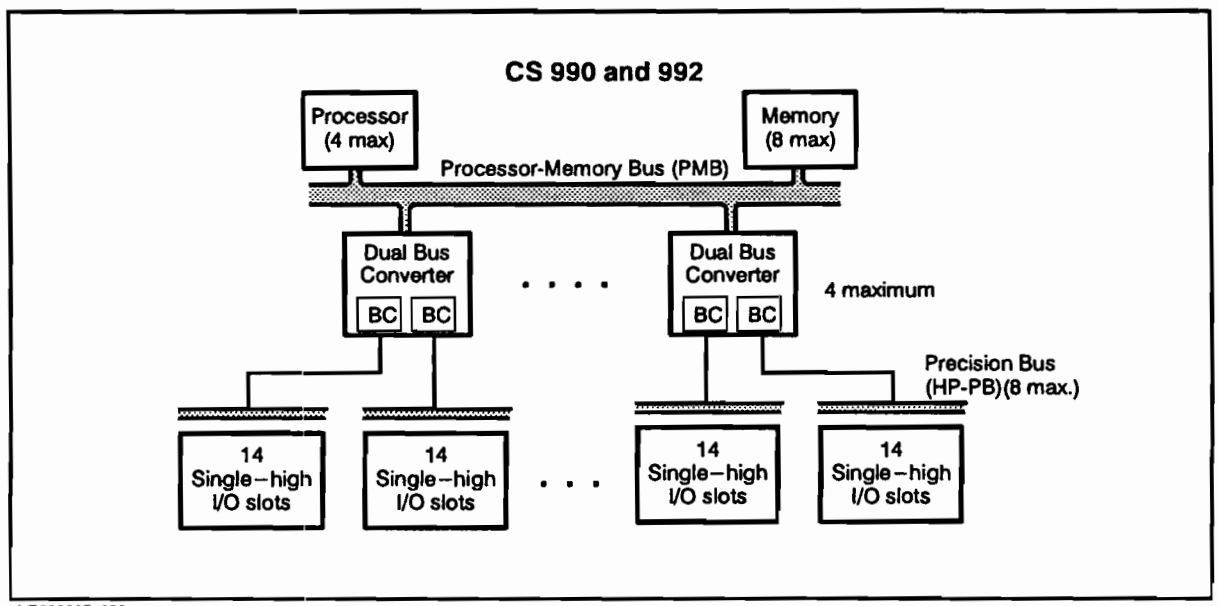

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Data Communications

Workstation Connections

Point-to-point workstation (terminals, personal computers and serial printers) connections are made to the 900 Series systems through the Datacommunications and Terminal Controller (DTC16 or DTC48) which connects to the SPU via the 802.3 LAN. The DTC supports local RS-232C and RS-422 (DTC48 only) connections and remote RS-232C modem connections. Server versions do not allow terminals (or PCs configured as terminals) to establish a log-on via the DTC.

Note

Systems with user licenses will specify the maximum number of users. Performance considerations may limit the number of concurrent users. The practical number of concurrent users is dependent on the application mix and response time/throughput requirements. Please consult with an HP performance specialist to determine the number of logons that can be concurrently active with a particular application.

Network Links

802.3 LANIC Cards (ThinLAN Link)

Each 900 Series system is supplied with one 802.3 LAN interface channel (LANIC) which is required for DTC connections. The Asynchrounous Serial Communication (ASC) software included with the FOS uses this card and the 802.3 LAN to communicate between the SPU and the Datacommunications and Terminal Controller (DTC). Series 9x7LX and 9x7 systems come standard with a Multi-Function I/O card (MFIO) which has the 802.3 LANIC and a ThinLAN Transceiver built onto it. Each Corporate Business System comes with a LAN/Console card which has the 802.3 LANIC and ThinLAN Transceiver built onto it. In addition, both the Multi-Function I/O card and the LAN/Console card have an external Attachment Unit Interface (AUI) connector for customers who want a connection to either a ThickLAN Transceiver (30241A) or EtherTwist MAU (28685B). These products must be ordered separately. Each Series 980 system comes standard with a 802.3 LANIC, a ThickLAN Transceiver and ThinLAN Transceiver, taps, and AUI cables.

A second HP-Precision Bus (HP-PB) 802.3 LAN card is available for Series 9x7LX, 9x7, and Corporate Business Systems. The card is a single-high HP-PB 802.3 LAN interface with a ThinLAN Transceiver built onto it. An AUI port is also available on the card for connection to an alternate Transceiver, such as a ThickLAN Transceiver or Ethertwist Transceiver. In order to use the second HP-PB card, MPE/iX release 4.0 or later is required.

For system-to-system communication via an 802.3 LAN, the customer may either use the HP-PB 802.3 LANIC supplied with the system, or order a second HP-PB 802.3 LANIC. From a performance perspecive, the 802.3 LANIC supplied with the system should be sufficient to meet the customers DTC and system-to-system traffic needs. There are circumstances however, where a second HP-PB 802.3 LANIC should be considered. If the system-to-system traffic is high, the customer may want to use a second HP-PB card. Another possibility is that for topology reasons, a customer may want to split their DTC and system-to-system traffic. The ThinLAN Link product (36923A with the appropriate hardware option and software option) provides the second HP-PB 802.3 LANIC card and the downloadable software for the LANIC to manage system-to-system traffic.

For Series 980 systems, a second 802.3 CIB LANIC card is required for system-to-system communication. This requirement is based on the system's ability to create enough traffic to bottleneck the CIB card. The ThinLAN Link product (36923A) must be ordered with the appropriate hardware and software option.

802.3 LANIC Channel Card Summary

Systems	DTC Connection (supplied with system)	System-to-System Communication
9x7LX, 9x7	HP-PB 802.3 LANIC and ThinLAN Transceiver included on MFIO card	Use MFIO card supplied with system or second 802.3 LANIC card Must order ThinLAN/XL (36923A) to receive system-to-system software
980/100, 980/200, 980/300, 980/400	CIB 802.3 LANIC card ThickLAN Transceiver and ThinLAN Transceiver, AUI cable	Second card is required Must order ThinLAN/XL (36923A) to receive system-to-system software
CS 990 DX and 992 DX	HP-PB 802.3 LANIC and ThinLAN Transceiver included on LAN/Console card	Use LAN/Console card supplied with system or use second 802.3 LANIC card CS 990 DX and 992 DX SPUs include system-to-system software
CS 990 and 992	HP-PB 802.3 LANIC and ThinLAN Transceiver included on LAN/Console card	Use LAN/Console card supplied with system or use second 802.3 LANIC card Must order ThinLAN/XL (36923A) to receive system-to-system software

Token Ring Network Link

The Token Ring 3000/iX Network Link product (J2167A) provides a native Token Ring connection for Series 900 HP Precision Bus (HP-PB) systems (9x7LX, 9x7, and CS 990 and 992). This product can be used to connect a Series 900 HP-PB system to a Token Ring network that is compatible with IEEE 802.5 and/or IBM Token-Ring. The product includes the Token Ring HP-PB adapter, Token Ring driver, TCP/IP transport, and manuals. MPE/iX release 4.0 or later is required.

The Token Ring adapter is a single-high HP-PB card. A 9-pin D-type connector on the Token Ring adapter card is used to connect the adapter to the Token Ring network via a cable that plugs into a Multi-station Access Unit (MsAU). The Token Ring adapter supports either 4Mbps or 16 Mbps link speeds over shielded twisted pair (STP) and 4Mbps over unshielded twisted pair (UTP). For UTP, the customer will need to use a media filter which attaches to the DB-9 connector. Ring speed configuration is done on the card with a jumper. The default configuration is 4Mbps. The card will not be able to connect to other systems on the Ring if the speed is not properly configured.

The following IBM cable types are supported:

Data Grade	AWG	Type
Type 1	22	2-wire shielded twisted pair
Type 2	22	2-wire shielded twisted pair or 4-wire unshielded twisted pair
Type 3[1]	22, 24	unshielded twisted pair
Type 6	26	2-wire shielded twisted pair
Type 9	26	2-wire shielded twisted pair
[1] Type 3 cabling supports only a 4Mbps link speed		

The customer is responsible for supplying their own cables and other Token Ring accessories (eg., MsAU, CAU/LAM, media filter).

The software (Token Ring driver and TCP/IP transport) provides the necessary software for system-to-system communication to occur between a Series 900 HP-PB system and another system over the Token Ring network. The software included in the Token Ring product corresponds with layer 2 through 5 of the Open System Interconnection reference model.

PSI

For MPE/iX systems, the Programmable Serial Interface (PSI) card is the hardware component for SNA Link, BSC Link and NS Point to Point 3000 remote communications and is included with each order of the appropriate Network Link product. PSI cards are not interchangable among all 900 Series systems. Because different systems require different PSI cards, be sure to order the correct remote network link hardware option.

Series 9x7LX, 9x7, and CS 990 and 992. The PSI cards for the Series 9x7LX and 9x7 systems and Corporate Business Systems 990 and 992 interface to the HP Precision Bus and are supported in all available expansion slots. Each PSI card is a single-high board which occupies a full slot. *Refer to pages 2-1 and 4-1 for PSI maximums.*

Series 980. Each network link PSI card requires one CTB slot. *Refer to page 3-1 for PSI maximums.*

X.25 Network Link

X.25 and PAD communications are provided by the DTC/X.25 Network Link which is part of the same Datacommunications and Terminal Controller subsystem used for terminal and serial device communications. X.25 configuration requirements may be found in the *Datacommunications and Terminal Controller* chapter.

X.400/3000

X.400 connections are provided by the X.400/3000 Server. The server system can connect single or multiple HP DeskManager nodes into an X.400 environment. The X.400/3000 server (32057A) includes an HP 9000 Series 360 system with the hardware and software needed to run X.400. The X.400/3000 server offers options to connect to ThickLAN, ThinLAN or X.25. X.400 connection also requires HP X.400/HPDesk software (32055A opt 3xx).

System Console

One hardwired point-to-point 700/92 or 700/96 terminal must be used as the system console. The console connects directly to the system. It has no direct connection to the DTC. Console printing is accomplished via a terminal attached serial printer. Each preconfigured 9x7LX and 9x7 system is shipped with the required console and hardware. For the Series 980, the 700/92 console (C1001A,G or W) must be ordered separately. To connect the 700/92 terminal as a console a 40242M cable must be ordered. The Corporate Business System includes the 700/96 (C1064G) console and the Corporate Business System DX includes an OpenView console PC.

900 Series Localized Console Options

Option Number	Description
ABA	English localized display
ABB	English/Europe localized display
ABC[1]	Canada - French localized display
ABD	German localized display
ABE	Spanish localized display
ABF	French localized display
ABG	Australia localized display (US keyboard and manual; local power card)
ABH	Dutch localized display
ABL[1]	Canada - English localized display
ABM	Spanish/Latin American localized display
ABN	Norwegian localized display
ABP	Swiss/German localized display
ABQ	Swiss/French localized display
ABR[1]	Republic of South Africa (US keyboard and manual; local power card)
ABS	Swedish localized display
ABU	English (UK) localized display
ABV	Arabic/English localized display
ABW	Flemish localized display
ABX	Finnish localized display
ABY	Danish localized display
ABZ	Italian localized display
ACC[1]	UK/Ireland localized display (US keyboard and manual; local power card)
ACD[1]	Switzerland localized display (US keyboard and manual; local power card)
ACE[1]	Denmark localized display (US keyboard and manual; local power card)
ACF[1]	Japan localized display (US keyboard and manual; local power card)

[1] *Not available on the DX version of the Corporate Business System*

Support Modem

Under the HP Remote Support Program, all new systems with a qualifying HP support agreement are supplied with an HP Support Modem. This modem is loaned to the customer for support purposes during the time period that the support agreement is in effect, and remains the property of Hewlett-Packard Company. This modem is connected to the system's remote console port.

Remote Session

For Series 9x7LX, 9x7, and CS 990 and 992 systems, the remote console port may also be used to establish a remote session. However, on all other systems, an additional connection is required for the remote console to simulate a user session. The most common method to establish this connection is to connect the console MUX to a nearby DTC via the 15 foot RS-232 modem cable included with the system. Alternatively, customers may purchase a second modem for connection to any DTC. HP personnel can then log into the second modem for application support. Note that either method requires the presence of a DTC with a modem interface card.

2

Series 9x7LX and 9x7 Systems

General System Configuration Information

Maximum Supported Hardware Configuration

	917LX	927LX	937LX	937	947LX	947	957LX	957	967LX	967	977	987
MPE/iX Release Support	3.1/4.0											
User license: (UL=unlimited) - standard - optional	8	20	32 40/64	32 40/64	100 UL	100 UL	64 100/UL	64 100/UL	100 160/UL	100 160/UL	100 160/UL	100 160/UL
Typical users	8	16	24	24	48	64-100	64-100	64-160	64-100	96-250	96-300	96-380
Maximum connected workstations	64	64	152	152	410	410	655	655	655	850	1050	1300
Performance relative to 917LX	1.0	1.0	1.0	1.0	1.0	1.0	1.6	1.6	2.0	2.0	2.6	3.2
HP-PB Slots	2	2	2	12	2	12	2	12	2	12	12	12
Memory (MB): Standard/Maximum	24/192	24/192	32/192	32/384	48/192	64/384	64/192	64/384	64/192	64/512[5]	96/768[5]	96/768[5]
Maximum disk storage (GB)	24	24	24	66	24	66	24	66	24	66	66	66
Maximum disks: Total - HP-FL - SCSI - HP-IB[4]	18 8 18 6	18 8 18 6	18 8 18 6	49 24 25 12	18 8 18 6	49 24 25 12	18 8 18 6	49 24 25 12	18 8 18 6	49 24 25 12	49 24 25 12	49 24 25 12
Maximum tape drives	6	6	6	8	6	8	6	8	6	8	8	8
Maximum printers - system - serial	6 32	6 32	6 32	8 48	6 32	8 48	6 32	8 64	6 32	8 64	8 64	8 64
Maximum DTCs	4	4	6	6	12	12	24	24	24	24	24	24
Max. # devices per I/O card - SCSI - PBA-IB (HP-IB)[4] - PB-FL (HP-FL) 28616A - PBA-FL (HP-FL) A1748A	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8	7 6 8 8
Maximum number of cards - PBA-IB cards[4] - PB-FL cards (28616A) - SCSI cards - PBA-FL (A1748A)	1 1 2 0	1 1 2 0	1 1 2 0	2 3 10 3	1 1 2 0	2 3 10 3	1 1 2 0	2 3 10 3	1 1 2 0	2 3 10 3	2 3 10 3	2 3 10 3
Max. network links per system - 802.3 LANIC[2] - 802.5 Token Ring	2 1	2 1	2 1	2 1	2 1	2 1	2 1	2 1	2 1	2 1	2 1	2 1
Floating point coprocessor	N/A	N/A	opt	opt	opt	opt	opt	opt	opt	opt	opt	std
Maximum PSI cards	2	2	2	5[6]	2	5[6]	2	5[6]	2	5[6]	5[6]	5[6]
Supplied Manual Set[3]	9x7LX Core	9x7LX Core	9x7LX Core	Sys Mgmt Core	9x7LX Core	Sys Mgmt Core	9x7LX Core	Sys Mgmt Core & Core Plus	9x7LX Core	Sys Mgmt Core & Core Plus		

[1] Add-on cards, does not include integrated SCSI interface
[2] First card standard on multi-function I/O card
[3] See Chapter 8 for description of manual sets
[4] Six disks are physically supported per PBA-IB. Four disks per PBA-IB are recommended for optimum performance.
[5] Effective with MPE/iX Release 4.5
[6] If three PBA-FL cards (A1784A) are installed, maximum PSI cards are four

Unique Supplied Hardware

- One Multi-Function I/O card (MFIO) containing 802.3 LANIC, two RS-232 C ports (for console and remote support connections), SCSI interface, integrated ThinLAN Transceiver, and AUI connector
- One 2 meter ThinLAN cable and a pair of ThinLAN terminators
- Integrated SCSI disk drive: 673 MB (917LX), 1355 MB (927LX, 937LX, 937, 947LX, 947, 957LX, 957, 967LX, 967, 977, 987)
- Integrated SCSI DDS format tape drive with 2.0 Gbytes capacity per cassette, 1 DDS cleaning cassette, 1 blank DDS cassette
- One 700/92 terminal (console) and cable

Unique Supplied Software

- HP Easytime/XL system management interface (Series 9x7LX only)

Packaging

The Series 9x7LX and 9x7 systems are offered in two different package types:

- The Series 9x7LX package is a small, integrated deskside package offering two I/O expansion slots, space for one 3 1/2-inch DDS format tape drive, and one internal 5 1/4-inch disk mechanism.
- The Series 9x7 package is a larger deskside package offering twelve I/O expansion slots and space for one internal 3 1/2-inch DDS format tape drive, and up to three 5 1/4-inch disk mechanisms.

Upgrades from the small package to the large package are available. Also, both packages are rack mountable in a 1.1 or 1.6 meter cabinet (P/Ns A1883A, A1884A). Option 1CM under the system product number provides the necessary hardware to rack mount the systems in a 1.1 meter or 1.6 meter cabinet. *See page 2-8 to 2-12 for more information on cabinet solutions.*

Memory Expansion

Error correcting memory is supplied with each SPU. Additional memory can be obtained by ordering options 503-519 with the system, or by ordering the stand-alone products: A2230A (8 Mbytes), A2231A (16 Mbytes), A2232A (32 Mbytes), A2511A (64 Mbytes), or A2516A (128 Mbytes).

Memory consists of memory modules of 4, 8, 16, 32, and 64 Mbytes which must be installed in pairs of identical size. Add-on memory products consist of an identical pair of memory modules. For example, the 32 Mbyte add-on memory product (A2232A) contains two 16 Mbyte modules.

The systems have the capacity to support a total combination of six pairs of memory modules. On all 9x7LX systems, maximum memory of 192 Mbytes can be achieved through the use of six pairs of 16 Mbyte memory modules. For 9x7 systems, maximum memory of 384 Mbytes is provided by six pairs of 32 Mbyte memory modules. Adding memory in smaller increments will reduce the maximum amount of memory possible.

Note Maximum memory on the Series 967 is 512 Mbytes, and on the Series 977 and 987 is 768 Mbytes, effective with MPE/iX Release 4.5.

Memory modules are installed on the private memory bus and do not use HP Precision Bus expansion slots.

Floating Point Coprocessor

An IEEE floating point coprocessor is available as an option (8Z7) to Series 937LX, 937, 947LX, 947, 957LX, 957, 967LX, 967, and 977 systems for high performance in numerical applications. The coprocessor is built into the SPU so no installation is required. Floating point is standard on the Series 987 by combining the CPU and floating point coprocessor onto one chip.

Due to the tremendous performance of the 917LX and 927LX, a separate floating point coprocessor is not deemed necessary. Floating point operations for these systems are adequately handled via the system processor and high speed system software routines.

Note Several HP 3000 third party applications and tools require the floating point coprocessor for optimal performance. Consult your third party software supplier for the floating point requirements of their specific application.

HP EasyTime/XL

HP EasyTime/XL is an easy-to-use interface for commonly performed system management functions on Series 9x7LX systems. HP EasyTime/XL must be ordered separately. Part number B1940A will preload HP EasyTime/XL on the system disk at the factory and provide future updates on Series 9x7LX systems.

Based upon an easy-to-use user interface, HP EasyTime/XL provides novice system managers and end users with limited computer experience access to commonly used system management utilities while shielding the user from the complexity of MPE/iX.

Factory Software Pre-loading

Factory pre-loading of HP 3000 FOS and standard subsystem software is available with HP 3000 9x7LX and 9x7 systems. This software will be factory installed on the standard integrated disk provided with each system. In order to have all HP subsystem software pre-installed at the factory, order MPE/iX media product (51453A option 0D1) on the same order section as the system and specify a coordinated shipment.

User Licenses

All Series 9x7LX and 9x7 systems are supplied with a software class/concurrent license specifying the maximum number of users. Some systems are available with options to increase the maximum number of users. The practical number of concurrent users is dependent on the application mix and response time/throughput requirements.

I/O Channel Configuration Information

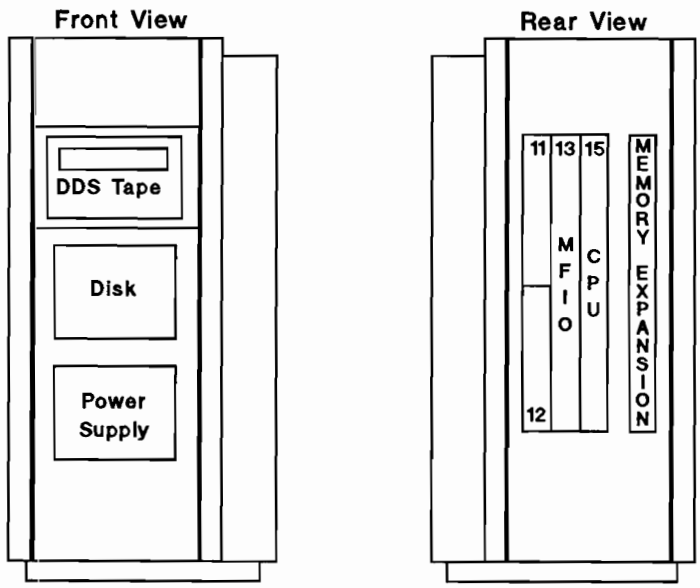
HP Precision Bus (HP-PB)

HP 3000 Series 9x7LX and 9x7 systems connect to peripheral devices and data communication networks via the HP Precision Bus (HP-PB). In compliance with the Eurocard standard, the HP Precision Bus supports both single-high and double-high I/O cards. Single-high I/O cards use one Precision Bus slot each and double-high I/O cards use two slots each. Single-high Precision Bus cards include SCSI, PSI, second 802.3 LANIC, and 802.5 Token Ring cards. Double-high Precision Bus cards include PBA-IB and PBA-FL interfaces. The table below illustrates the slot usage for the various adapter cards supported on the Series 9x7LX and 9x7 systems.

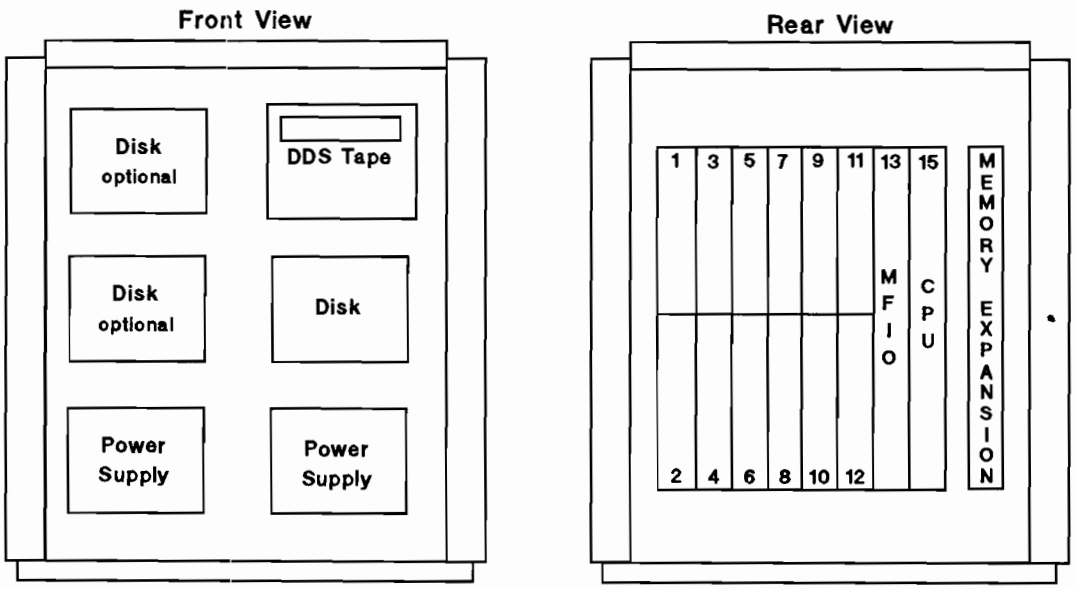
Adapter Card	Size	HP-PB slots used per card
SCSI	Single-high	1
802.3 LANIC	Single-high	1
802.5 Token Ring	Single-high	1
PSI	Single-high	1
PBA-IB (HP-IB)	Double-high	2
PBA-FL (HP-FL)[1]	Double-high	2
PB-FL (HP-FL)[2]	Double-high	2

[1]The PBA-FL card is supported on Release 3.1 and 4.0. PB-FL replaces the PBA-FL.
[2]The PB-FL card is supported on Release 4.0 and later

The Series 9x7LX systems support up to two SCSI or PSI cards, one PBA-IB card, or one PB-FL card (28616A). The Series 9x7 systems support up to twelve single-high cards (such as SCSI or PSI), or two double-high PBA-IB cards, or three double-high cards (PBA-FL, PB-FL) or a combination thereof.



Series 9x7LX System Layout



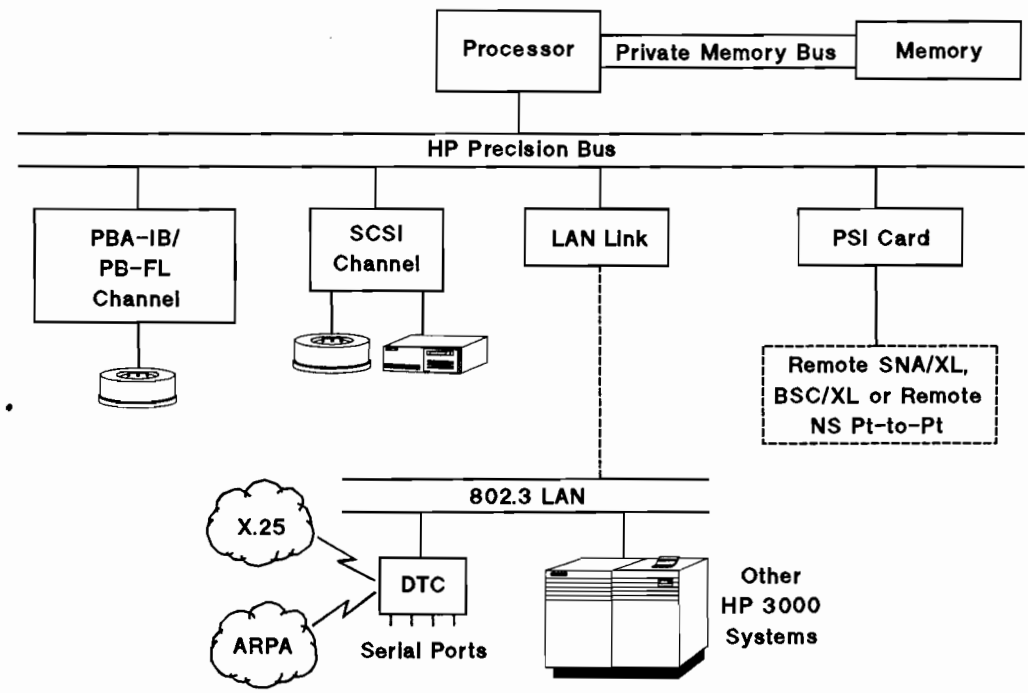
Series 9x7 System Layout

Note

Installing double-high cards will impact the number of available single wide slots available for single-high cards. Use the table below to determine slot availability.

System	HP-PB Slots Available	Double-High Cards Used	HP-PB Slots Remaining
Series 9x7LX	2	0	2
		1	0
Series 9x7	12	0	12
		1	10
		2	8
		3	6

For example, if a customer has one HP-IB printer or HP-IB back-up device on a Series 9x7LX system, no HP-PB slot remains. Consequently, a Series 9x7 package with its expanded I/O slots may need to be purchased.



I/O Block Diagram

Multi-Function I/O Card (MFIO)

One MFIO card is supplied standard with each Series 9x7LX and 9x7 system. This card provides:

- 802.3 LAN connection for use with both DTC and system-to-system LAN traffic (integrated ThinLAN Transceiver and AUI connector)
- two RS-232-C ports for console and remote support connections
- one SCSI interface which provides connection for five SCSI devices

Note

The MFIO card does not utilize any Precision Bus slots.

External 2.0 GB DDS tape drives are supported on the integrated SCSI interface, but 1.3 GB DDS drives are not. An add-on SCSI interface card is required to support external 1.3 GB DDS tape drives.

Precision Bus Adapter (PBA)

The Precision Bus Adapter (PBA) is supported in the Series 9x7LX and 9x7 systems to provide connectivity to CIB HP-IB. The Precision Bus Adapter (PBA) is supported on the Series 9x7 systems to provide connectivity to CIB HP-FL. The PBA combines the functionality of a CIB adapter and physical bus adapter into a single card. Only one CIB HP-IB or CIB HP-FL can be connected to each PBA.

The Series 9x7LX systems support one PBA-IB (PBA with HP-IB) while the Series 9x7 systems support a maximum of two PBAs. *Consult page 2-1 for PBA-IB maximums.*

The Series 9x7LX systems support zero PBA-FLs, while the Series 9x7 systems support a maximum of three PBAs. The PB-FL (28616A) replaces the PBA-FL (A1748A).

Integrated Peripherals

The Series 9x7LX systems come standard with and support two embedded SCSI peripherals:

- one DDS format tape drive
- one 5 1/4-inch disk mechanism (673 Mbyte or 1.3 Gbyte capacity)

For additional disk storage or tape backup, external peripherals are required.

The Series 9x7 systems come standard with two embedded SCSI peripherals:

- one DDS format tape drive
- one 1.3 Gbyte capacity 5 1/4-inch disk mechanism

Up to two additional 1.3 Gbyte SCSI disk mechanisms are supported inside the package, providing up to 4 Gbytes of internal disk storage.

Refer to pages 2-4 and 2-5 for a diagram of the system layout.

Note

C2463 (5 1/4-inch SCSI DDS) is ONLY supported on the Series 9x7LX and 9x7 systems. It is NOT supported on other platforms.

Customer Installability

Everything the customer needs for easy SPU installation is included on the Series 917LX, 927LX, and 937LX systems. Installation by the HP Customer Engineer is available at an extra cost for these systems. The remaining 9x7LX systems and all Series 9x7 systems include CE installation.

Many add-on products to Series 9x7LX systems will include HP CE installation. Some of the most common are networking products, additional I/O products, DTC48s (2345A), and large disk configurations. Customers purchasing Series 9x7LX systems with these CE installable products are expected to perform the routine system set-up and complete minimum site preparation activities prior to HP CE arrival. Cabinets with systems and peripherals racked at the factory include HP CE installation.

All Series 9x7LX systems come from the factory with CPU, memory, base I/O, and integrated mass storage devices. In addition, the MPE/iX operating system and HP subsystem software comes pre-installed on the internal disk. Special easy-to-understand learning products are shipped with the system to assist the novice customer through the initial startup.

The 917LX, 927LX, and 937LX systems are customer-installable if the configuration is limited to the following:

- SPU and memory
- Multi-Function I/O card (LAN/Console connection/SCSI)
- system console
- DTC16 (option 0DG – 6 modem/8 direct connect ports, ThinLAN)

The SPU, memory, and base I/O come preinstalled at the factory. Default configurations for up to three 14 port (6 modem/8 direct) DTC16s are preloaded on the system at the factory as well. Customers are expected to connect the system console and DTC16 only.

Many peripherals are customer installable. Some of the most common are:

- additional workstations
- RS-232 printers
- external peripheral package (up to 1 Series 6000 multi-mechanism package)
- additional DTC16s (up to 3 total in 14 port configurations)

While not included in the system price, installation and site services can be purchased for these "customer installable" components from HP's Professional Services and Systems Support organizations. Since larger configurations increase the installation time and complexity, there is a limit to customer installable configurations. The limits are one external peripheral package only and up to three DTC16s.

Many peripherals, networking, and I/O include HP CE installation. They are:

- HP-IB interfaces/devices
- PB-FL interfaces/devices
- additional SCSI interfaces
- 802.3 LAN
- 802.5 Token Ring
- Remote communication products based on PSI
- X.25
- DTC16 in configurations other than 14 ports (6 remote, 8 local)
- DTC48
- add-on memory not ordered as an option to the system

Note

In Europe, HP CE installation is bundled into the system price for all Series 9x7LX and 9x7 systems.

Cabinets

Product Overview

Two cabinets are available for racking HP 3000 Series 9x7LX and 9x7 systems as well as associated peripherals and DTCs. Both a 1.1 meter cabinet, providing 21 EIA units (1 EIA unit = 1.75 in.) of usable rack height, and a 1.6 meter cabinet, with 32 EIA units of rack space, are available.

How to Order Cabinets and Peripherals

Cabinets may be ordered as a total integrated solution assembled at the factory or as stand-alone products where the system and peripherals are rack mounted in the cabinet at the customer site. The cabinets support a variety of combinations of HP 3000 systems, disk drives, tape drives, and DTCs. Combinations of supported products are limited only by space inside the cabinet.

Cabinet Overview

Product Number	Factory Integrated	Racking Space Available (EIA units)	Power Distribution	Maximum Current	Height	Width	Depth
C2785A	No	21	100-120V/200-240V	16A	1.1 m	.48 m	.9 m
A1883A	Yes	21	100-120V/200-240V	16A	1.1 m	.48 m	.9 m
C2786A	No	32	200-240V	16A	1.6 m	.48 m	.9 m
A1884A	Yes	32	200-240V	16A	1.6 m	.48 m	.9 m

Supported Racked Components

The Series 9x7LX and 9x7 cabinets support a variety of HP 3000 9x7LX and 9x7 SPUs, disk drives, tape drives, and DTCs. Combinations of supported products are limited only by space inside the cabinet and the 16-amp maximum limit. Factory Integrated Cabinets have been structured so that all orderable configurations will not exceed the 16-amp maximum current limit. When configuring cabinets to be installed in the field, the configuration should be checked to ensure it does not exceed the 16-amp maximum current limit.

Components Supported in the 1.1 and 1.6 Meter Cabinets

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
SPUs					
A1770A	Series 917LX	6	C2797A for standalone rack Option 1CM for factory installed rack	6.5 A	3.5 A
A1771B	Series 927LX	6	C2797A for standalone rack Option 1CM for factory installed rack	6.5 A	3.5 A
A1758A	Series 937LX	6	C2797A for standalone rack Option 1CM for factory installed rack	6.5 A	3.5 A
A1772A	Series 937	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A
A1752A	Series 947LX	6	C2797A for standalone rack Option 1CM for factory installed rack	6.5 A	3.5 A
A1708A	Series 947	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A
A1707A	Series 957LX	6	C2797A for standalone rack Option 1CM for fctory installed rack	6.5 A	3.5 A
A1709A	Series 957	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A
A1757A	Series 967LX	6	C2797A for standalone rack Option 1CM for factory installed rack	6.5 A	3.5 A
A1710A	Series 967	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A
A2300A	Series 977	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A
A2317A	Series 987	10	C2798A for standalone rack Option 1CM for factory installed rack	12 A	6 A

Continued on next page.

Components Supported in the 1.1 and 1.6 Meter Cabinets (cont.)

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
Tape Drives[1]					
7979A	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980A	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980XC	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46A
Series 6000 SCSI Multi-Mechanism Package (also available as integrated cabinet option)					
C2462R	1.3 GB disk	4	Included	2.6 A	1.5 A
C2464R	2 GB DDS	4	Included	2.6 A	1.5 A
C2465R	Two SCSI 2 GB DDS	4	Included	2.6 A	1.5 A
HP-FL Disk Array[2]					
C2252HA	2.72 GB high availability disk array	6	Included	4.0 A	2.0 A
C2254HA	5.44 GB high availability disk array	6	Included	4.0 A	2.0 A
C2252B	2.72 GB disk array with 2 disks	6	Included	4.0 A	2.0 A
C2254B	5.44 GB disk array with 4 disks	6	Included	4.0 A	2.0 A
Data Terminal Connects					
2340A	DTC16	6	35199E	2 A	1 A
2345A	DTC48	6	C2799A	2 A	1 A
Filler Panels					
40101A/2A/3A/4A/5A/6A/7A - 1 to 7 filler panels					

[1] *Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanism.*
[2] *If HP-FL disk is the bottom-most racked deviced in the cabinet, add two EIA space units. This will allow ample space for cables coming into the bottom of the cabinet.*

Integrated System Solution (A1883A and A1884A)

To ease ordering and speed installation, integrated cabinet products are the preferred choice for customers desiring a racked system solution. These products contain options for disk storage, DTCs, and a DDS tape drive. When the system and racking options are ordered together, the entire system (including SPU, disk, tape, and DTC) will be pre-installed in the cabinet prior to shipment from the factory.

Customers desiring to have peripheral only configurations (DTC48, disk, DDS) can use these products to meet their racking needs as well. Add-on DTC48, Series 6000 multi-mechanism products (disk and DDS), and 7980/7980XC tape drives not in the Integrated Cabinet product structure will need to be installed at the customer site. *Refer to table on page 2-11 for the necessary hardware to rack these components.*

Note

Customers requiring DTC configurations not provided by the Integrated Cabinet product can either order a stand-alone DTC48 (2345A) with the appropriate rack mount kit or select one of the configurations offered in the Integrated Cabinet product and order additional DTC Connector cards (X.25 etc.) for installation in the field.

Integrated Cabinet Product Structure

Product Number	Description
A1883A	1.1m 21U cabinet
A1884A	1.6m 32U cabinet
Options	
ABA	(A1883A) U.S. 100-120V power
ABA	(A1884A) U.S. 200-240V power
ABB	European 200-240V power
201	Add 1.3 Gbyte disk
202	Add 2.7 Gbyte disk
203	Add 4 Gbyte disk
212	Add 2.6 Gbyte disk and 2.0 Gbyte DDS
316	Add DTC48 with 16 local RS-232 ports
324	Add DTC48 with 24 local RS-232 ports
331	Add DTC48 with 24 local, 6 remote RS-232 ports
346	Add DTC48 with 40 local, 6 remote RS-232 ports
348	Add DTC48 with 48 local RS-232 ports

Use the Factory-Integrated Cabinet selection worksheet on the following page to choose the cabinet that best meets the customer's needs. Simply fill in the desired quantities of each component to determine the appropriate cabinet product for the configuration. Filler panels to cover unused space will be installed automatically at the factory and do not need to be ordered for the integrated cabinet products.

Factory Integrated Cabinet Selection Worksheet

	Component	Quantity		EIA Units		Vertical Space Required (EIA units)
I.	SPU (select SPU to be racked) *Option 1CM must be ordered for factory racking – factory racking recommended. Factory Integrated Cabinets have been structured so that all orderable configurations will not exceed the 16-amp maximum current limit.*					
=	a. 917LX,927LX,937LX,947LX,957LX,967LX	_____	X	6	=	_____
	b. 937,947,957,967,977,987	_____	X	10	=	_____
II.	Cabinet options (available on A1883A and A1884A) A1883A – 1.1 meter cabinet A1884A – 1.6 meter cabinet					
	a. Option 201 - 1.3 Gbyte disk	_____	X	4	=	_____
	b. Option 202 - 2.7 Gbyte disk	_____	X	4	=	_____
	c. Option 203 - 4 Gbyte disk	_____	X	4	=	_____
	d. Option 212 - 2.7 Gbyte disk + DDS	_____	X	4	=	_____
	e. Option 316 - DTC48 with 16 local ports	_____	X	6	=	_____
	f. Option 324 - DTC48 with 24 local ports	_____	X	6	=	_____
	g. Option 331 - DTC48 with 24 local, 6 remote ports	_____	X	6	=	_____
	h. Option 346 - DTC48 with 40 local, 6 remote ports	_____	X	6	=	_____
	i. Option 348 - DTC48 with 48 local ports	_____	X	6	=	_____
III.	Add-on peripherals (not factory-racked and requiring racking kits – *see page 2-12 for details*)					
	1. 2345A - DTC48	_____	X	6	=	_____
	2. Series 6000 multi-mechanism	_____	X	4	=	_____
	3. 7980A/7980XC tape drives	_____	X	5	=	_____
IV.	Total EIA units required (Sum of Total EIA column)				=	_____
V.	Integrated cabinet selection If line IV is less than or equal to 21, order cabinet A1883A with appropriate power, disk, DDS, and DTC48 options. If line IV is less than or equal to 32, order cabinet A1884A with appropriate disk, DDS, and DTC48 options. If line IV is greater than 32, more than one cabinet is required. Cables connecting the SPU and peripherals within the A1883A or A1884A cabinet are factory-installed and are free of charge. Cables connecting a cabinet with another cabinet or separate peripheral must be ordered separately.					

Field-Installed Cabinets

Standalone cabinets are also available for customers who decide to rack their system components after the initial system installation. Care must be exercised when configuring these cabinets to ensure that all appropriate cabinet components (filler panels, peripheral mounting kits, etc) are ordered to successfully rack the system, and that the configuration does not exceed the 16-amp current limit of the cabinet. Refer to page 2-11 for a table of supported racked components. Component racking for these cabinets is performed at the customer site.

For each of the components that need to be racked, the appropriate racking hardware must be ordered. Order filler panels to cover unused cabinet space.

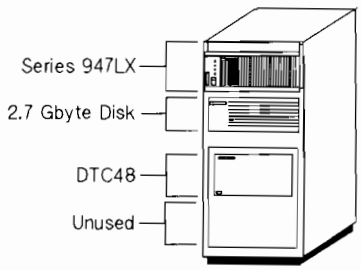
Rack Mounting Information

Product Structure

Product/Option	Description
C2785A	1.1 meter cabinet (21 EIA units)
ABA	100-120V with U.S. power cord
ABB	200-240V with European power cord
0E3	Substitute 200-240V for U.S.
1F9	Add six 1-unit filler panels
1FA	Extractor fan (compatible with cabinet voltage)
1FC	Front door (can be locked for security purposes)
C2786A	1.6 meter cabinet (32 EIA units)
ABA	200-240V with U.S. power cord
ABB	200-240V with European power cord
0E2	100-120V with U.S. power cord
1F9	Add six 1-unit filler panels
1FC	Front door (can be locked for security purposes)

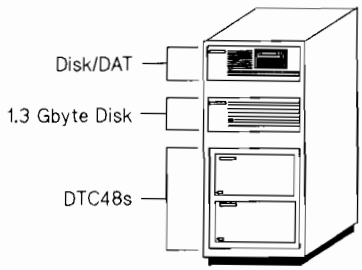
1.1 Meter Cabinet (A1883A)

Example 1:
Series 947LX with 4 Gbyte, 46 ports



Quantity	Part Number	Description
1	A1752B	Series 947LX with 1.3 Gb disk, 48 Mb memory
1	option 1CM	Add racking hardware
1	opiton UBD	100 user license
1	A1883A	1.1 meter cabinet
1	option 202	2.7 Gbyte disk
1	option 346	46 port DTC48

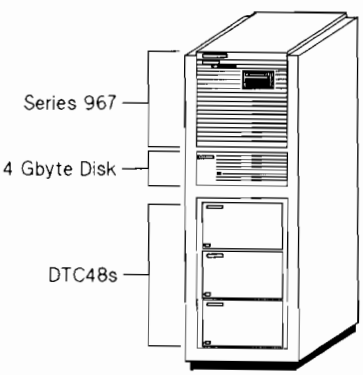
Example 2:
Peripherals only - 4 Gbyte disk, DDS, 72 ports



Quantity	Part Number	Description
1	A1883A	1.1 meter cabinet
1	option 201	1.3 Gb disk
1	option 202	2.7 Gb disk, 2.0 Gb DDS
1	option 324	24 port DTC48
1	option 348	48 port DTC48

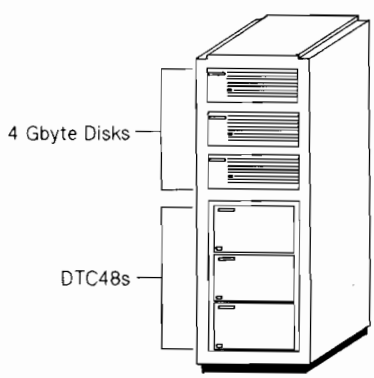
1.6 Meter Cabinet (A1884A)

Example 3:
Series 967 with 8 Gbyte, 142 ports



Quantity	Part Number	Description
1	A1710A	Series 967 with 1.3 Gb disk, 64 Mb memory
1	option 1CM	Add racking hardware
1	option 011	Increase disk to 4 Gb
1	A1884A	1.6 meter cabinet
1	option 203	4 Gb disk
1	option 346	46 port DTC48
2	option 348	48 port DTC48

Example 4:
Peripherals only - 12 Gbyte disk, 144 ports



Quantity	Part Number	Description
1	A1884A	1.6 meter cabinet
3	option 203	4 Gb disk
3	option 348	48 port DTC48

Factory Integrated Cabinet Ordering Examples

Product Summary

The Series 9x7LX and 9x7 systems share a common product option structure. The following tables represent information for all of the products and should be used with the specific configuration rules. They are intended as a general reference for configuring systems and some caution should be used, because not all options are available on all systems. Please consult the HP 3000 Computer Systems Price Guide for the latest product structure.

Product Structure

Product Number	Description *	Standard Memory	Standard Disk	Standard User License
A1770A	Series 917LX	24 MB	670 MB	1-8
A1771B	Series 927LX	24 MB	1.3 MB	1-20
A1758A	Series 937LX	32 MB	1.3 GB	1-32
A1772A	Series 937	32 MB	1.3 GB	1-32
A1752B	Series 947LX	48 MB	1.3 GB	1-100
A1708B	Series 947	64 MB	1.3 GB	1-100
A1707A	Series 957LX	64 MB	1.3 GB	1-64
A1709A	Series 957	64 MB	1.3 GB	1-64
A1757A	Series 967LX	64 MB	1.3 GB	1-100
A1710A	Series 967	64 MB	1.3 GB	1-100
A2300A	Series 977	96 MB	1.3 GB	1-100
A2317A	Series 987	96 MB	1.3 GB	1-100

** All preconfigured systems include 2.0 Gbytes DDS format tape drive, MPE/iX FOS, TurboIMAGE, and ALLBASE/SQL in addition to the standard memory, disk, and user licenses indicated above.*

Option Structure

Option Structure
(not all options available on all systems)

Option	Description
1B6	Delete 700/92 console
1CM	Add cabinet racking hardware (must order with A1883A or A1884A)
8Z7	Add floating point coprocessor
0E4	Delete battery backup unit
UCY	40 user license
UA9	64 user license
UBD	100 user license
UCN	160 user license
UAT	Unrestricted user license
007	Increase disk to 1.3 GB
009	Increase disk to 2.7 GB
011	Increase disk to 4 GB
100	Server version
401	Add SCSI interface card
405	Add PBA-IB (PBA with HP-IB) adapter
407	Add PBA-FL (PBA with HP-FL) adapter (PB-FL replaces the PBA-FL)
410	Add PB-FL card
503	Increase memory to 32 MB
504	Increase memory to 40 MB
505	Increase memory to 48 MB
506	Increase memory to 64 MB
508	Increase memory to 96 MB
509	Increase memory to 128 MB
511	Increase memory to 160 MB
513	Increase memory to 192 MB
514	Increase memory to 224 MB
515	Increase memory to 256 MB
517	Increase memory to 320 MB
519	Increase memory to 384 MB
910	SQL only system (deletes TurboIMAGE)
915	TurboIMAGE only system (deletes ALLBASE/SQL)
920	MPE/iX only system (deletes TurboIMAGE, SQL)
930	Hardware only (deletes TurboIMAGE, SQL, MPE/iX) ICON only

Upgrade Structure

Option	Description
704	Return MICRO 3000, 3000LX with 2 MB
705	Return MICRO 3000GX, RX with 2 MB
706	Return MICRO 3000XE
707	Return Series II, III, 30, 33, 37, 37XE
708	Return HP 250, 260
709	Return Series 39, 40, 42, 44, 48
710	Return Series 42XP, 52, 58
711	Return Series 64, 68 with 2 MB
712	Return Series 70 with 2 or 4 MB
713	Return Series 920 with 24 MB
714	Return Series 925LX with 24 MB
715	Return Series 922LX with 24 MB
716	Return Series 922RX, 922, 925 with 32 MB
717	Return Series 932, 935 with 32 MB
718	Return Series 949, 948 with 64 MB
719	Return Series 955 with 96 MB
720	Return Series 958 with 96 MB, 960 with 128 MB
721	Return Series 950 with 64 MB

Note

HP's policy for upgrading HP 3000 systems mandates that systems must be returned for credit and must have been installed at the customer's site at least 6 months. Customers must provide documentation of installation date or proof of support for at least 6 months.

Field Upgrades

Field Upgrade Structure

Product	Description
A1789A	Field Upgrade to Series 927LX
A1791A	Field Upgrade to Series 937LX
A1790A	Field upgrade to Series 937
A1759B	Field Upgrade to Series 947LX
A1792B	Field Upgrade to Series 947
A1760A	Field upgrade to Series 957LX
A1761A	Field Upgrade to Series 957
A1763A	Field Upgrade to Series 967LX
A1762A	Field upgrade to Series 967
A2301A	Field upgrade to Series 977
A2318A	Field upgrade to Series 987
Option	
516	Add 16 MB memory
532	Add 32 MB memory
8Z7	Add floating point coprocessor
UBD	1-100 user license
UCN	1-160 user license
UAT	Unrestricted user license
UCC	Credit for 100 user license on 947LX
UCD	Credit for unlimited user license on 947LX
UCE	Credit for 100 user license on 947
UCF	Credit for unlimited user license on 947
UCG	Credit for 100 user license on 957LX
UCH	Credit for unlimited user license on 957LX
UCJ	Credit for 100 user license on 957
UCK	Credit for unlimited user license on 957
UDA	Credit for 160 user license on 967LX
UDB	Credit for unlimited user license on 967LX
UDC	Credit for 160 user license on 967
UDD	Credit for unlimited user license on 967
UDL	Credit for 160 user license on 977
UDM	Credit for unlimited user license on 977

Field Upgrade Structure (continued)

Option	Description
851	From Server 917LX
852	From Server 927LX
853	From Server 937LX
854	From Server 937
855	From Server 947LX
856	From Server 947
857	From Server 957LX
858	From Server 957
859	From Server 967LX
860	From Server 967
871	From Server 977
861	From Series 917LX
862	From Series 927LX
863	From Series 937LX
864	From Series 937
865	From Series 947LX
866	From Series 947
867	From Series 957LX
868	From Series 957
869	From Series 967LX
870	From Series 967
872	From Series 977

Note

HP 3000 board and/or chassis upgrades require return of original processor board and/or chassis to HP.

Configuration Worksheet

The worksheet below will help in configuring a basic multiuser Series 9x7LX or 9x7 system. Use it as a guideline, but note that particular customer needs (performance, etc) may dictate different configuration choices.

STEP 1 - Select a system

Select the HP 3000 that best fits the customer's performance and user needs.

System	Standard Memory	Standard Disk	Expansion Slots
Series 917LX	24 MB	670 MB	2
Series 927LX	24 MB	1.3 GB	2
Series 937LX	32 MB	1.3 GB	2
Series 937	32 MB	1.3 GB	12
Series 947LX	48 MB	1.3 GB	2
Series 957LX, 967LX	64 MB	1.3 GB	2
Series 947, 957, 967	64 MB	1.3 GB	12
Series 977	96 MB	1.3 GB	12
Series 987	96 MB	1.3 GB	12

STEP 2 - Determine memory requirements

Memory requirements will vary depending on the specific applications running on the system. If there is not information available on the memory requirements of the customer's applications, the following rule of thumb may be used:

- Memory = 16 Mbytes + (0.5 to 1.0 x number of concurrent users)

Note 1 MB per user should be used at the low end of the 9x7LX/9x7 family.

Note that the maximum supported memory is 192 Mbytes for all 9x7LX systems and 384 Mbytes for all 9x7 systems. The 967 has a maximum memory of 512 Mbytes and the 977 and 987 have a maximum memory of 768 Mbytes at MPE/iX Release 4.5.

The following table illustrates the ordering recommendation for the typical memory configurations.

System	Memory (Mbytes)												
	24	32	40	48	64	96	128	160	192	224	256	320	384
917LX	Std	Opt 503	Opt 504										
927LX	Std	Opt 503	Opt 504	Opt 505									
937LX	N/A	Std	Opt 504	Opt 505	Opt 506								
937	N/A	Std	Opt 504	Opt 505	Opt 506								
947LX	N/A	N/A	N/A	Std	Opt 506	Opt 508							
947	N/A	N/A	N/A	N/A	Std	Opt 508	Opt 509	Opt 511	Opt 513				
957LX, 967LX	N/A	N/A	N/A	N/A	Std	Opt 508	Opt 509	Opt 511	Opt 513				
957	N/A	N/A	N/A	N/A	Std	Opt 508	Opt 509	Opt 511	Opt 513	Opt 514			
967	N/A	N/A	N/A	N/A	Std	Opt 508	Opt 509	Opt 511	Opt 513	Opt 514	Opt 515		
977	N/A	N/A	N/A	N/A	N/A	Std	Opt 509	Opt 511	Opt 513		Opt 515	Opt 517	Opt 519
987	N/A	N/A	N/A	N/A	N/A	Std	Opt 509	Opt 511	Opt 513		Opt 515	Opt 517	Opt 519

Note

For memory requirements beyond available options, standalone memory must be ordered: 8 Mbytes (A2230A), 16 Mbytes (A2231A), 32 Mbytes (A2232A), 64 Mbytes (A2511A), and 128 Mbytes (A2516A) at MPE/iX Release 4.5. Please be aware of possible slot limitations due to existing memory modules.

STEP 3 - Determine disk storage needs

Disk requirements will vary with the number of active users and the nature of the customer's application. As a general rule of thumb the following formula can be used:

- Disk Storage = 400 Mbytes + (40 Mbytes x Number of Concurrent Users)

For disk storage beyond what is supported internal to the system package, external disks will need to be ordered as stand-alone products. *Refer to Chapter 6 for more information on external add-on SCSI, HP-FL, and HP-IB disk drives.*

System	Standard Disk (SCSI)	Internal Disk Options (SCSI only)	Maximum Disk (internal and external)
917LX	.67 GB	1.3 GB	24 GB
927LX, 937LX, 947LX, 957LX, 967LX	1.3 GB	N/A	24 GB
937, 947, 957, 967, 977, 987	1.3 GB	2.7 GB / 4 GB	66 GB

Enter the number of SCSI disks required (including internal) _____

Enter the number of HP-IB disks required _____

Enter the number of HP-FL disks required _____
(Note: LX versions do not support HP-FL)

STEP 4 - Choose a tape backup solution

Every Series 9x7LX and 9x7 system comes standard with a 2.0 GB DDS format tape drive capable of backing up data at 11 MB/minute. The chart below can be used as a guide for selecting an appropriate backup solution. *See Chapter 6 for more detailed information on back-up solutions.*

Tape Back-Up Recommendation

Type of Back-Up	Disk Storage to be backed up (Gbytes)				
	2.5	2.5 - 4	4 - 6	6 -10	> 10
Unattended (with TurboSTORE/XL II)	1 DDS	1 DDS	1 DDS	2 DDS	≥ 3 DDS
On-line (with TurboSTORE/XL II)	1 DDS	1 DDS	2 DDS	3 DDS	≥ 4 DDS

Enter the number of SCSI DDS drives required (including internal) _____

STEP 5 - Select a printer

Both system and serial printers are supported on the 9x7LX and 9x7 systems. *Consult chapter 6 for supported printers.*

Note

HP-IB system printers require a PBA-IB card (A1747A) which uses two HP-PB slots (Series 9x7LX systems have only two slots). Consequently, having an HP-IB printer or HP-IB back-up device may require the purchase of a Series 9x7 package with its expanded number of slots.

Record the number of HP-IB printers required _____

Record the number of serial printers required _____

STEP 6 - Network link products

For MPE/iX systems, NS 3000 Point-to-point and IBM (SNA, BSC) communications require a PSI card. Each PSI card occupies one HP-PB slot.

Record the number of PSI cards required _____

Second 802.3 HP-PB LANIC card occupies one HP-PB slot _____

802.5 Token Ring LAN card occupies one HP-PB slot _____

STEP 7 - I/O interface cards

I/O interface cards allow the system to communicate with peripheral devices. The number of each card required depends on the number and type of peripheral devices that will be connected to the system. Use the configuration rules in Chapter 5 to determine the number of SCSI, PBA-IB, and PB-FL interfaces required.

To verify that the number of cards required do not exceed the capacity of the system package enter the quantity of each interface card required in the slot worksheet below.

I/O Interface Cards	Quantity				Number of Slots
Enter number of SCSI interfaces (not including integrated SCSI on MFIO) (9x7LX maximum = 2) (9x7 maximum = 10)	_____	X	1	=	_____
Enter number of PBA-IB interfaces (9x7LX maximum = 1) (9x7 maximum = 2)	_____	X	2	=	_____
Enter number of PBA-FL interfaces (PBA-FL is obsolete. Replace with PB-FL) (9x7LX maximum = 0) (9x7 maximum = 3)	_____	X	2	=	_____
Enter number of PB-FL interfaces (9x7LX maximum = 1) (9x7 maximum = 3)	_____	X	2	=	_____
Enter number of network link cards (from Step 6) (9x7LX maximum = 2) (9x7 maximum = 5) *Note: If 3 PBA-FL cards selected on 9x7, maximum network link cards = 4.*	_____	X	1	=	_____
Total slots required (9x7LX maximum = 2) (9x7 maximum = 12)				=	_____

STEP 8 - Terminal connect (DTC16 and DTC48)

DTCs are used to connect HP 3000s to local terminals, remote terminals (via modems), serial printers, and provide access to X.25 and ARPA networks. The number of DTCs required will depend on the number of ports needed to connect users, printers etcetera and the mode of network distribution.

The table below illustrates the recommended solution for various port configurations. *For further detail on DTC16 or DTC48 or information on X.25 or Telnet connections, consult Chapter 7.*

DTC Recommendations

	Number of ports required	
	1-32	**> than 32**
9x7LX or 9x7		
- Unracked	2340A	2345A
- Racked *	A1883A/A1884A	A1883A/A1884A
** Provides a factory integrated solution with SPU, DTC48, and external disk racked in a 1.1 or 1.6 meter cabinet. See pages 2-8 to 2-12 for more details on these integrated solutions.*		

STEP 9 - LAN cabling

A 2 meter 802.3 LAN cable is included with each Series 9x7LX and 9x7 system for attaching the DTC. Distributed DTC configurations will need longer cables which are orderable from CPO.

STEP 10 - Console/terminals

Each Series 9x7LX and 9x7 system is supplied with one 700/92 terminal as the system console. All necessary console attachment hardware is included.

Several high-quality terminals are available for the HP 3000:

Product	Description	Memory	Additional Features
700/43	Multipersonality ASCII	4 pages	Supports 12 popular compatibility modes
700/92	Blockmode VPLUS	8 pages	
700/94	High performance blockmode VPLUS	16 pages	Local forms cache, edit checks, modified data tag
700/96	Blockmode VPLUS	8 pages	High-quality display; EC 92 regulations (EN 55022B)
700/98	High performance blockmode VPLUS	16 pages	High-quality display local forms cache, edit checks, modified data tag; EC 92 regulations (EN 55022B)
700/96ES	Blockmode VPLUS	8 pages	Compliant with Swedish MPR 1990:10 guidelines
700/98ES	High performance blockmode VPLUS	16 pages	Compliant with Swedish MPR 1990:10 guidelines
*Note: VPLUS requires a 700/92 or 700/94 terminal. Oracle's SQL*Forms, INGRES forms, and JAM will run on any 700 series terminal. JAM also runs on a block mode terminal, giving the user optimal performance.*			

3

Series 980/100, 980/200, 980/300, and 980/400

General System Configuration Information

Maximum Supported Hardware Configuration

	980/100	980/200	980/300	980/400
Supported as of MPE/iX release	Rel 2.2	Rel 3.0	Rel 3.0[1]	Rel 4.0
Typical users	175-450	250-600	325-725	400-800
Maximum connected workstations[2]	1250	1250	1250	1250
Performance relative to Series 950	3.4	5.3	6.9	8.5
Standard memory (Mbytes)	192	256	320	384
Maximum memory (Mbytes)	512	1024	1024	1024
Maximum disk (Gbytes)	300	300	300	300
Maximum disk drive total[2]	96	96	96	96
Maximum tape drive total	8	8	8	8
Maximum system printers	12	12	12	12
Maximum serial printers	104	156	156	156
Maximum DTC48s supported	48	48	48	48
Maximum number of I/O channels	12	12	12	12
Maximum number of disk I/O channels	12	12	12	12
Maximum number of HP-IB channels	12	12	12	12
Maximum number of SCSI cards	12	12	12	12
Maximum number of CIB-FL (HP-FL) channels	12	12	12	12
Maximum number of 802.3 LAN cards	2	2	2	2
Maximum number of PSI links	8	8	8	8
Maximum number of disk drives per HP-IB channel	6	6	6	6
Maximum number of disk drives per HP-FL channel	8	8	8	8
Maximum number of disk drives per SCSI channel[3]	7	7	7	7

[1]The Series 980/300 is supported on Release 3.0 plus patches
[2]Effective with MPE/iX Release 4.0
[3]Supported in 3Q92

Unique Supplied Hardware

- Dual Channel I/O Busses (CIBs)
- Two CTB adapters and 10 I/O card slots
- Two HP-IB device adapters for HP-IB devices
- One 802.3 LAN interface channel for network and data communications and terminals controller (DTC) communications
- 6 meter AUI cable, ThickLAN Transceiver and tap for SPU attachment for ThickLAN cable; ThinLAN Transceiver with integrated AUI cable for attachment to ThinLAN cable
- SPU Bay including card cages and power supplies for CPU, cache, up to four CIB adapters, up to 20 I/O card slots and up to 512 Mbytes of main memory (Series 980/100), or 1024 Mbytes (Series 980/200, 980/300, 980/400).

Memory Expansion

Memory consists of 1 Mbit RAM Error Correcting Memory configured on 16 Mbyte memory cards or 4 Mbit memory configured on 64 Mbyte cards. The Series 980 supports both 16 Mbyte (A1104A) and 64 Mbyte (A1152A) memory cards. Memory cards may be obtained by ordering multiple option 50x with the system or as stand-alone products.

Note

Series 980 systems and upgrades are provided two memory controllers which support up to 512 Mbytes each.

Interleaving is recommended for 980 memory array cards, particularly for the 980 symmetric multiprocessing systems. To achieve interleaving, memory array cards must be installed in equal amounts in each memory controller. If memory interleaving is not enabled, alternative memory configuration rules are required. Refer to "HP 3000 Series 980 / HP 9000 Model 870s Familiarization Guide" for memory configuration details with and without memory interleaving.

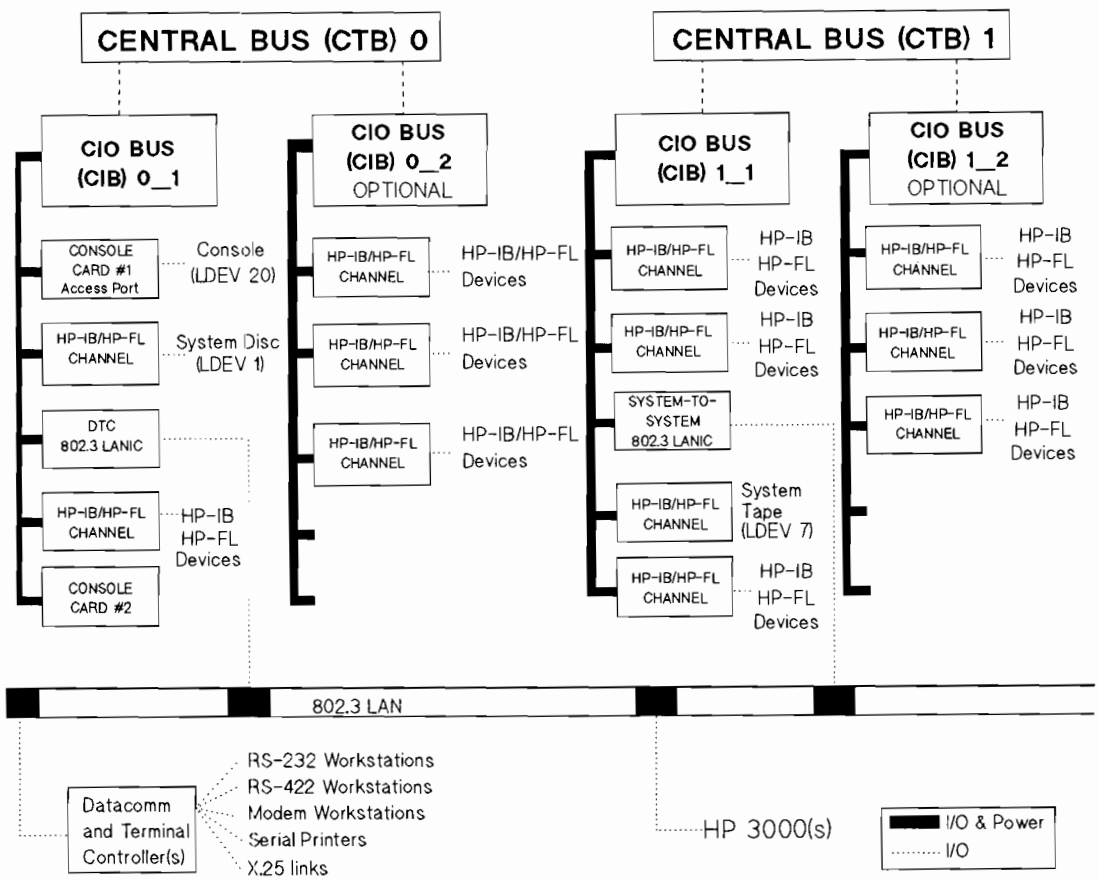
As of MPE/iX 4.0, AutoRestart/XL is supported on all system configurations containing greater than 512 Mbytes of memory. AutoRestart/XL is not supported on prior releases to MPE/iX 4.0 in certain system configurations containing greater than 512 Mbytes of memory. Consult your HP Representative before using AutoRestart/XL to determine whether or not it is supported in your configuration. In addition, AutoRestart/XL requires a separate dedicated volume set containing 1 or more volumes for dump file storage. *Refer to page 6-7 for dump file space recommendations.*

I/O Channel Configuration Information

Channel I/O Bus (CIB)

The Series 980/100, 980/200, 980/300, and 980/400 are shipped standard with two CIBs, a third and fourth are optional. They are connected to the CPU via a CIB adapter (A1101A). CIB adapters have reserved slots in the SPU, so they do not affect I/O slot configuration. Each CIB can be configured with up to 5 I/O expansion cards. Up to four CIBs may be configured in a 980/100, 980/200, 980/300, and 980/400 providing a maximum of 20 I/O expansion slots.

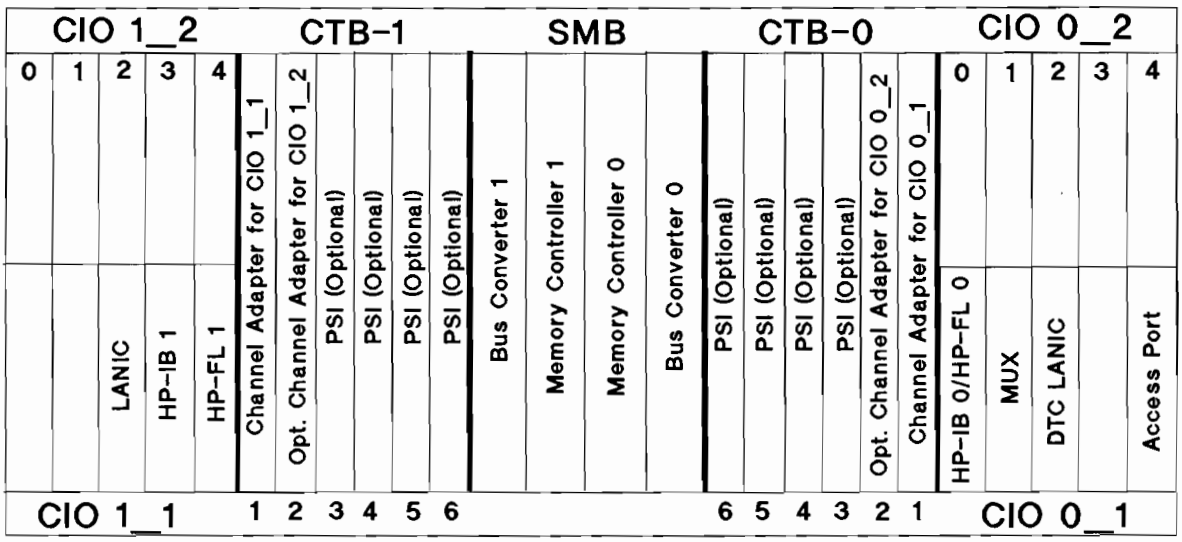
In general, the third CIB is appropriate for systems which have more than six channels installed (HP-IB, HP-FL and LAN cards), or which have more than 24 disk drives attached. A fourth CIB is appropriate for systems which have more than nine channels installed (HP-IB, HP-FL and LAN cards), or which have more than 36 disk drives attached.



Conceptual Schematic: Series 980 I/O Configuration

Slot Availability

Two VLSI CIB Adapters are included with each system. Each CIB adapter creates 5 available I/O slots. Five I/O cards are included with each system, occupying five I/O slots. Two VLSI CIB Adapters each connect the Channel I/O Bus. Two boards are supplied on the CIB for console attachment and system diagnostic support. One 802.3 LANIC board is included on the CIB for workstation attachment. Two HP-IB channel cards are supplied for peripheral connections. This leaves five I/O slots for additional HP-IB, HP-FL or LANIC cards. A third and fourth CIB adapter (A1101A) are optional. Each provides an additional 5 I/O slots.



HP 3000 Series 980 SPU (Back)

CIB Card Cage Rules

Console card #1 (Access Port PCA) must be in slot 4 of the CIB 0_1 card cage (factory installed). Console card #2 (MUX PCA) must be in slot 1 of the CIB 0_1 card cage (factory installed). Factory installed HP-IB channels are positioned for MPE/iX auto-boot capability.

The factory installed 802.3 LANIC (for DTC communication) and required second 802.3 LANIC (for system-to-system traffic) are shown in slot 2 of CIB 0_1 and slot 2 of CIB 1_1 respectively. There is a maximum of four HP-IB channels per CIB. There is a maximum of three HP-FL channels per CIB and a combined maximum of five HP-IB, HP-FL and 802.3 LANIC boards per CIB.

Note

Series 980/100, 980/200, 980/300, and 980/400 come standard with Memory Controller 0 and Memory Controller 1.

Product Summary

The Series 980/100, 980/200, 980/300, and 980/400 all share a common product option structure. The following tables represent information for all of the products and should be used with the specific Series 9xx configuration rules. They are intended as a general reference for configuring systems and some common sense should be exercised when using these product structure tables.

Common Product Structure Base Configuration

Product Number	Description
A1134A	Series 980/100 preconfigured system w/192 Mbyte memory[1]
A1149A	Series 980/200 preconfigured system w/256 Mbyte memory[1]
A1150A	Series 980/300 preconfigured system w/320 Mbyte memory[1]
A1151A	Series 980/400 preconfigured system w/384 Mbyte memory[1]
Option Number	
015	380V/50Hz System Operation
016	415V/50Hz System Operation
0E3	200 – 240 VAC operation
500	Add-on 16 Mbyte memory
502	Add-on 64 Mbyte memory
550	Substitute 1 HP-FL for 1 HP-IB
910	SQL only system (deletes TurboIMAGE)
915	TurboIMAGE - only system (deletes SQL)
920	MPE only system (deletes TurboIMAGE and SQL)

[1]All preconfigured systems include software and a class license to use MPE/iX FOS, TurboIMAGE/XL, and SQL software on the specified HP 3000 computer system.

Upgrade Options

Use the specific Series 9xx product number with the following option numbers for the appropriate upgrade, consult the *HP 3000 Computer Systems Price Guide* or CPL for pricing information.

Common Upgrade Option Structure

Option Number	Description
700	Return credit 4 Mbyte memory w/MICRO LX/GX/RX
701	Return credit 81 Mbyte disk w/MICRO LX
702	Return credit 152 Mbyte disk w/MICRO LX/GX/RX
703	Return credit 304 Mbyte disk w/MICRO LX/GX/RX
704	Upgrade MICRO 3000 or 3000LX w/2 Mbyte
705	Upgrade MICRO 3000 w/4 Mbyte 3000GX/RX w/2 Mbyte
706	Upgrade MICRO 3000XE
707	Upgrade pre-Series II/30/33, HP 2000
708	Upgrade from Series III
709	Upgrade from HP 250
710	Upgrade from HP 260
711	Upgrade Series 37,37XE,39,40 w/no memory
712	Upgrade from Series 39HP, 42, 44
713	Upgrade from Series 48 with 1 Mbyte
714	Upgrade from 42XP, 52 with 4 Mbyte
715	Upgrade from 58 with 4 Mbyte
716	Upgrade from Series 64 with 2 Mbyte
717	Upgrade from Series 68 with 2 Mbyte
718	Upgrade from Series 70 with 4 Mbyte
719	Upgrade from Series 925LX with 24 Mbyte
720	Upgrade from Series 925 with 32 Mbyte
721	Upgrade from Series 935 with 48 Mbyte
722	Upgrade from Series 949 with 64 Mbyte
723	Upgrade from Series 922LX
724	Upgrade from Series 922RX
725	Upgrade from Series 922
726	Upgrade from Series 932
727	Return 304 Mbyte disk mechanism
728	Return 670 Mbyte disk mechanism
729	Return Series 948
730	Return Series 958
731	Return Series 920

Field Upgrades

Product/Option	Description
A1137A[1]	Field upgrade to Series 980/100
871	Upgrade from Series 950, includes 128 Mbyte memory
872	Upgrade from Series 955, includes 96 Mbyte memory
873	Upgrade from Series 960, includes 64 Mbyte memory
A1138A[1]	Field upgrade to Series 980/200
020	Power option for Series 980/100 SPU with serial code prefix of 2844 or less
021	Power option for Series 980/100 SPU with serial code prefix of 2845 or greater
874[2]	Upgrade from Series 980/100, includes 64 Mbyte memory
875[3]	Upgrade from Series 980/100, includes 64 Mbyte memory
A1139A[1]	Field upgrade to Series 980/300
020	Power option for Series 980/100 SPU with serial code prefix of 2844 or less
021	Power option for Series 980/100 SPU with serial code prefix of 2845 or greater
875	Upgrade from Series 980/200, includes 64 Mbyte memory
876[2]	Upgrade from Series 980/100, includes 128 Mbyte memory
877[3]	Upgrade from Series 980/100, includes 128 Mbyte memory
A1140A[1]	Field upgrade to Series 980/400
020	Power option for Series 980/100 SPU with serial code prefix of 2844 or less
021	Power option for Series 980/100 SPU with serial code prefix of 2845 or greater
252	Card cage upgrade option for system serial number prefix $\leq$3006
253	Card cage upgrade option for system serial number prefix $\geq$3007
878	Upgrade from Series 980/300, includes 64 Mbyte memory
879	Upgrade from Series 980/200, includes 128 Mbyte memory
880	Upgrade from Series 980/100, includes 192 Mbyte memory
503	Delete 16 Mbyte memory
509	Delete 64 Mbyte memory
704	Return of MICRO 3000,3000LX with 2 Mbyte
705	Return of MICRO 3000 with 4 Mbyte, MICRO 3000GX,RX with 2 Mbyte
706	Return of MICRO 3000XE
707	Return of pre Series II,30,33,HP 2000
708	Return of Series III
709	Return of HP 250
710	Return of HP 260
711	Return of Series 37,37XE,30,40 with 0 Mbyte
712	Return of Series 39HP,42,44 with 0 Mbyte
713	Return of Series 48 with 1 Mbyte
714	Return of Series 42XP,52 with 4 Mbyte
715	Return of Series 58 with 4 Mbyte
716	Return of Series 64 with 2 Mbyte
717	Return of Series 68 with 2 Mbyte
718	Return of Series 70 with 4 Mbyte

[1]The field upgrade requires the return of the original processor board. With the 950, 955 and 960, the return of the PDH board is also required.

[2]Required option if the Processor Reference Label, PRL-V2, does not exist on the Series 980/100.

[3]Required option if the Processor Reference Label, PRL-V2, does exist on the Series 980/100. This would be located near the SPU serial number.

Note

HP's policy for upgrading HP 3000 systems mandates that systems must be returned for credit and must have been installed at customer's site at least 6 months. Customer must provide documentation of installation date or proof of support for at least 6 months.

4

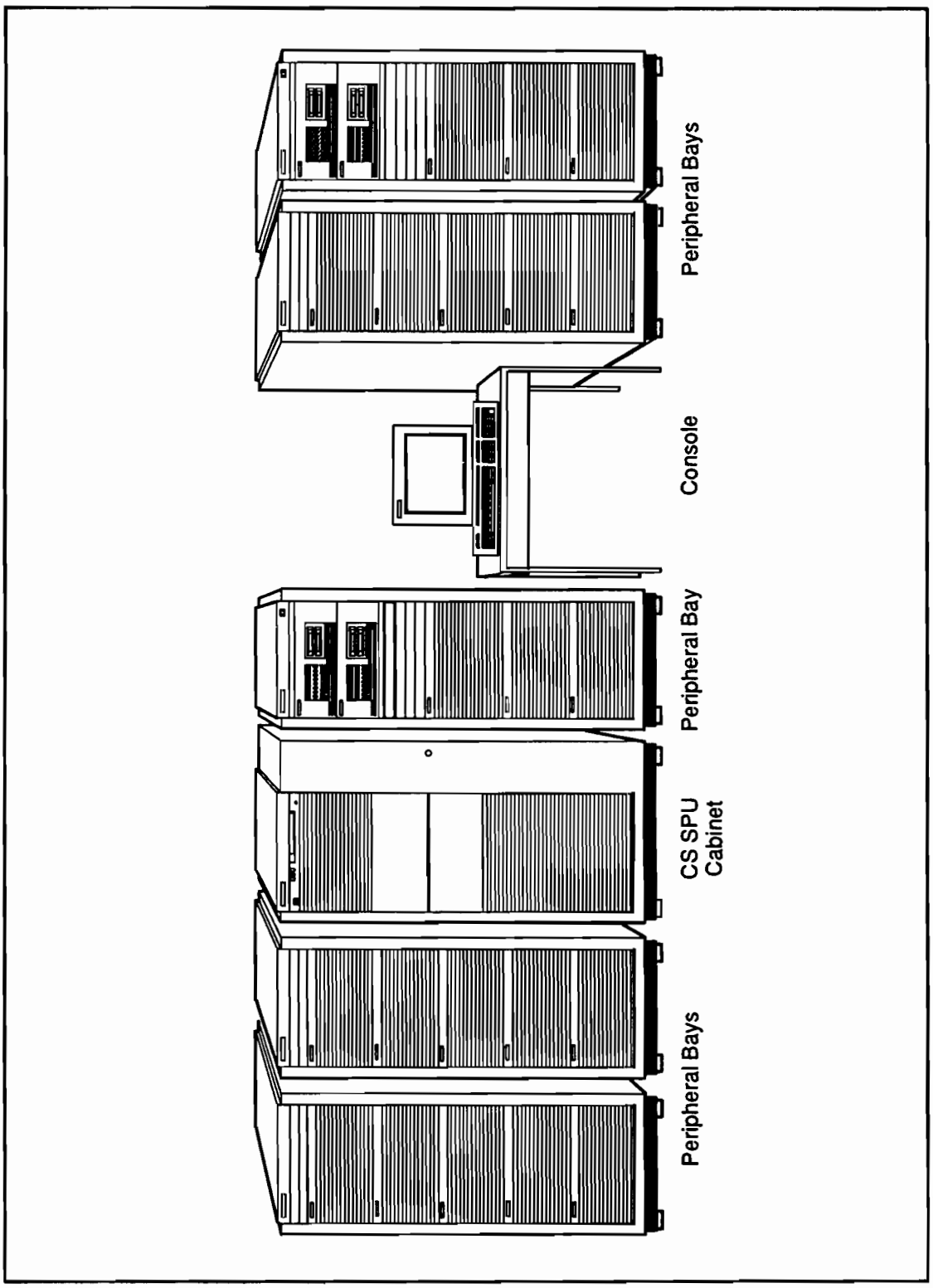
HP 3000 Corporate Business Systems

General System Configuration Information

Maximum Supported Hardware Configuration*

	990 DX, 992/100 DX 990, 992/100	992/200 DX, 992/200	992/300 DX, 992/300	992/400 DX, 992/400
MPE/iX Release Support	Rel. 4.0	Rel. 4.0	Rel. 4.0	Rel. 4.0
User license: (UL=unlimited) Standard/Optional	160/UL	UL/UL	UL/UL	UL/UL
Typical users	200 - 580	325 - 775	425 - 945	500 - 1000
Maximum connected workstations	2300	2300	2300	2300
Maximum memory card per SPU[3]	8	8	8	8
Maximum dual bus-converter cards	4	4	4	4
HP-PB I/O card cages[2]: Internal/External	1/7	1/7	1/7	1/7
HP-PB Slots per HP-PB I/O card cage	14	14	14	14
Memory (MB): Minimum/Maximum	192/2048	256/2048	256/2048	256/2048
Maximum disk storage: Total = 691 GB - PB-FL - 128 spindles x 5.4 GB	691	691	691	691
Maximum disks: Total = 128[4] - PB-FL - SCSI - PBA-IB	128 128 48	128 128 48	128 128 48	128 128 48
Maximum backup devices - SCSI (DDS) - PBA-IB (HP-IB) (tape drive) - Optical SCSI - 1/2-inch cartridge (3480 compatible)	 8 8 3 8 transports	 8 8 3 8 transports	 8 8 3 8 transports	 8 8 3 8 transports
Maximum printers - system PBA-IB (HP-IB) - serial - system SCSI - line	 8 250 4 16	 8 250 4 16	 8 250 4 16	 8 250 4 16
Maximum number of devices per I/O card - per PBA-IB (HP-IB) - per PB-FL - per SCSI	 6 8 7	 6 8 7	 6 8 7	 6 8 7
Maximum DTCs	120	120	120	120
Maximum cards per HP-PB I/O card cage - PBA-IB (HP-IB) cards - PB-FL (HP-FL) cards - SCSI cards	 2 5 5	 2 5 5	 2 5 5	 2 5 5
Maximum network links per system - 802.3 LANIC[1] - 802.5 Token Ring	 2 1	 2 1	 2 1	 2 1
Maximum PSI cards per system	8	8	8	8

[1]First 802.3 LANIC standard on LAN/Console card
[2]First HP-PB I/O card cage is internal to the SPU cabinet, seven additional card cages can be added to the 1.6 m Expansion Cabinet
[3]Memory cards available: 64 MB, 128 MB, 256 MB
[4]Configurations exceeding 96 disks must be factory approved
** For recommended configurations to optimize system performance, refer to "HP-PB I/O Card Cage Performance Guidelines" section of this chapter.*



HP 3000 Corporate Business System

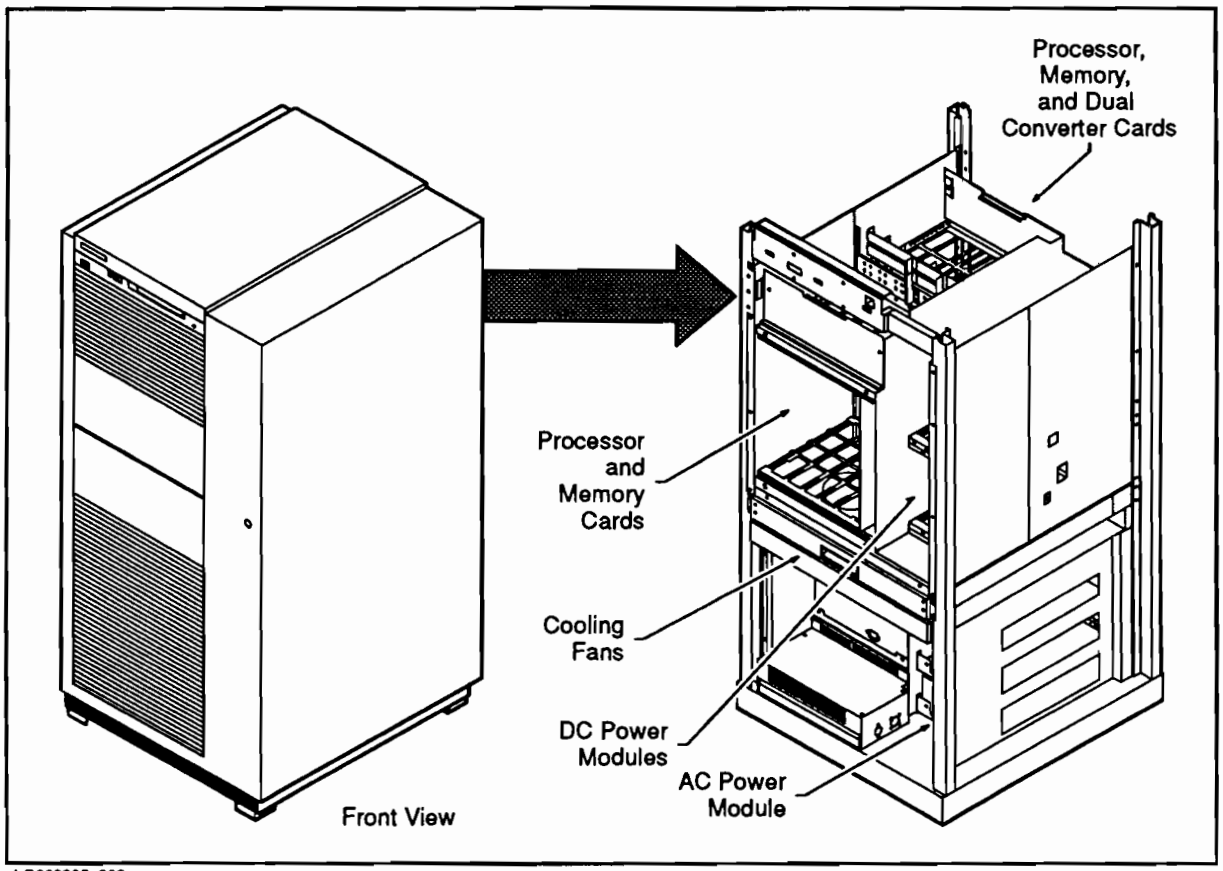
Product Description

The HP 3000 Corporate Business Systems (CS) are highly expandable, high-performance computers which feature a tightly coupled, symmetrical multiprocessing architecture. Multiprocessing of up to four processors allows for economical modular growth as system performance requirements increase. The CS can be configured with up to 2 Gigabytes of main memory, 690 Gigabytes of online disk storage, and support of up to 2300 online users in an OLTP environment. The base configuration consists of one CPU, 192 MB of ECC memory, and 14 HP-PB interface card slots for connection to peripherals, networks, and terminals. The base configuration can be expanded by adding additional processors, memory, and I/O for a broad range of system configurations.

The CS is a standalone System Processing Unit (SPU) in a 1.6 meter high system cabinet. All rack-mounted peripherals are separately installed in one or more 1.6 meter Expansion Cabinets.

The five performance levels of the HP 3000 Corporate Business System are available in two solution choices, each of which has its own product number. (Therefore, there are ten HP 3000 Corporate Business System models to choose from in total.) The customers' desired performance and/or multiprocessor level is then designated via the option selected within that product number. Product number A1809A (signified by "DX") offers standard software for systems and performance management, and a OpenView console PC. The A1811A product does not include the systems and performance management software and comes with a terminal console instead of a PC.

A1809A	A1811A
CS 990 DX (uniprocessor)	CS 990 (uniprocessor)
CS 992/100 DX (uniprocessor)	CS 992/100 (uniprocessor)
CS 992/200 DX (2-way multiprocessor)	CS 992/200 (2-way multiprocessor)
CS 992/300 DX (3-way multiprocessor)	CS 992/300 (3-way multiprocessor)
CS 992/400 DX (4-way multiprocessor)	CS 992/400 (4-way multiprocessor)



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SPU Frame, Cards, and Power Module Locations

Base Configuration

The base CS 990 and 992/100 SPU configuration contains the following hardware components:

- one processor card with floating-point coprocessor
- service processor (SP) card
- 192 MB ECC memory (one 64 MB and one 128 MB ECC memory cards with onboard memory controller)
- one Upper Dual Bus Converter
- internal HP-PB (HP Precision Bus) I/O card cage which includes the following base configuration cards:
  - LAN/console card (multi-purpose card with connections for 802.3 LAN, internal ThinLAN Transceiver and AUI port, serial link for console terminal, and modem link for remote access)
  - one PB-FL fiber link interface card
  - one SCSI interface card
  - one PBA-IB card
  - one Bus Converter (lower)
- modular power supply subsystem and integrated powerfail battery backup system
- OpenView PC console (included only with the Corporate Business System DX)
- HP 700/96 console terminal and interconnect cable (not included with the Corporate Business System DX)

Unique Supplied Software for the CS DX

In addition to the preconfigured software standard with every preconfigured HP 3000 system, all CS DX systems come standard with the following additional software.

Systems Management Software Group

- OpenView console and software preloaded on the OpenView console PC. *See OpenView console PC discussion on page 4-6 for a complete listing of the PC software included.*
- TurboSTORE/iX II with on-line backup for rewritable optical disk, 1/2-inch tape or DDS
- AutoRestart/iX
- ThinLAN 3000/iX
- OpenView System Manager Management Node software for the OpenView console

Performance Management Software Group

- GlancePLUS
- LaserRX/MPE
- RXForecast

Note

Of the unique supplied CS DX software, only a complete group can be deleted. Individual pieces of software can not be deleted. See A1809A product structure on page 4-32.

OpenView Console PC

HP 3000 Corporate Business System DX systems are shipped standard with the OpenView console PC as the system console. The OpenView console is a Vectra 386/20 based OpenView Workstation supplied with the necessary software to act as the system console. The OpenView console provides a windows based, PC environment which allows system operators to manage the Corporate Business System via user friendly screen icons.

PC Hardware and Software

The OpenView console PC consists of the following hardware and PC software. The PC software is preloaded on the internal hard disk at the factory prior to shipment. Software versions are subject to change more frequently than revisions of this document. Please contact your HP representative for the current revision number. Revision numbers shown are current as of the date of this publication.

Vectra 386/20 PC with:	**OpenView Windows Workstation software:**
8 Mbytes memory	MS-DOS 5.0*
120 Mbyte hard disk	MS Windows 3.0*
3.5-inch floppy drive	OpenView Windows A.05.01*
20-inch color monitor	OpenView Sysman A.00.03*
color monitor VGA card	Advancelink for Windows A.03.02*
ThinLAN adapter card	Network Services B.02.00*
	ARPA Services

* *Or later version.*

Required Hardware Ordered Separately

HP 3000 Corporate Business System DX systems (A1809A) are provided standard with the OpenView console PC as the system console. To ensure maximum availability of the OpenView console in the event of power fluctuation or interruption, a continuous power source is required for the OpenView console PC.

The HP 3000 Corporate Business Systems (A1811A) are shipped with a 700/96 terminal and do not require a continuous power source for the 700/96 terminal.

Factory Software Pre-Loading

Factory pre-loading of HP 3000 FOS, standard subsystem software, customized subsystem software, GlancePLUS* and Systems Management Software* is available with HP 3000 Corporate Business Systems. Software will be factory installed on disk drives contained within add-on 1.6 meter Integrated Expansion Cabinets (A1884A). Only Corporate Business Systems ordered with this cabinet are eligible to have FOS and subsystem software installed at the factory prior to shipment.

The steps below should be followed when ordering a Corporate Business System to ensure pre-installation of software:

1. On the same section of the order as the SPU, order:
   a. one Integrated Expansion Cabinet (A1884A) with at least one disk option (HP-FL or SCSI)
   b. MPE/iX media product 51454A with option 0D1
2. Specify a coordinated shipment
3. Order any additional Integrated Expansion Cabinets on other sections of the order

** DX version only. Other Performance Management software and PC software (LaserRX/MPE and RXForecast) are always shipped separately and never pre-loaded. OpenView console software (and its supporting PC software) is pre-loaded on the Vectra PC order.*

Note

Since the 5.4 GB HP-FL disk drives are not supported as LDEV1, the only HP-FL disk drive that can be used for factory software installation is the 2.7 GB version.

Hardware and Software Support

HP 3000 Premier Account Support Program

The HP 3000 Premier Account Support Program is designed for the CS and CS DX systems and includes the following:

- 24 x 7 hardware support service level with immediate response
- An enhanced level of software support with expanded 24 x 7 software coverage
- An 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 x 7 network support for the system
- Two person weeks of customer training
- An account containing on-site consulting time, so that the customer gets consulting activities focused on meeting their unique business needs. For example, a customer can receive one day every other week for account planning and general consulting, or a combination of general consulting and specialist activities over a number of days.

Refer to Chaper 9 for details regarding the Premier Account Support.

Expansion Capabilities

Expansion of the CS 990 and 992 SPU is done by adding processor, memory and Dual Bus-Converter cards. These cards plug into a common backplane refered to as the Processor Memory Bus (PMB). The PMB consists of sixteen slots. Slot location rules are shown in the slot availability section of this chapter.

Processor Expansion

The base configuration for the CS 990 and 992/100 contains one processor card. Up to three additional processor cards can be added as options or as a field upgrade. *Refer to the Product Summary section of this chapter for a list of processor options and field upgrade option structure.*

Memory Expansion

Memory Array cards use 4 Mbit RAMs and are available in increments of 64 MB, 128 MB, and 256 MB. Up to seven additional memory cards can be added for a maximum of eight memory array cards per SPU. Interleaving is automatically achieved internally to each memory card, therefore any size memory card can be configured without having to consider memory interleaving rules. Each Memory array contains its own on board Memory Controller chip, which eliminates the need to balance memory arrays per memory controller.

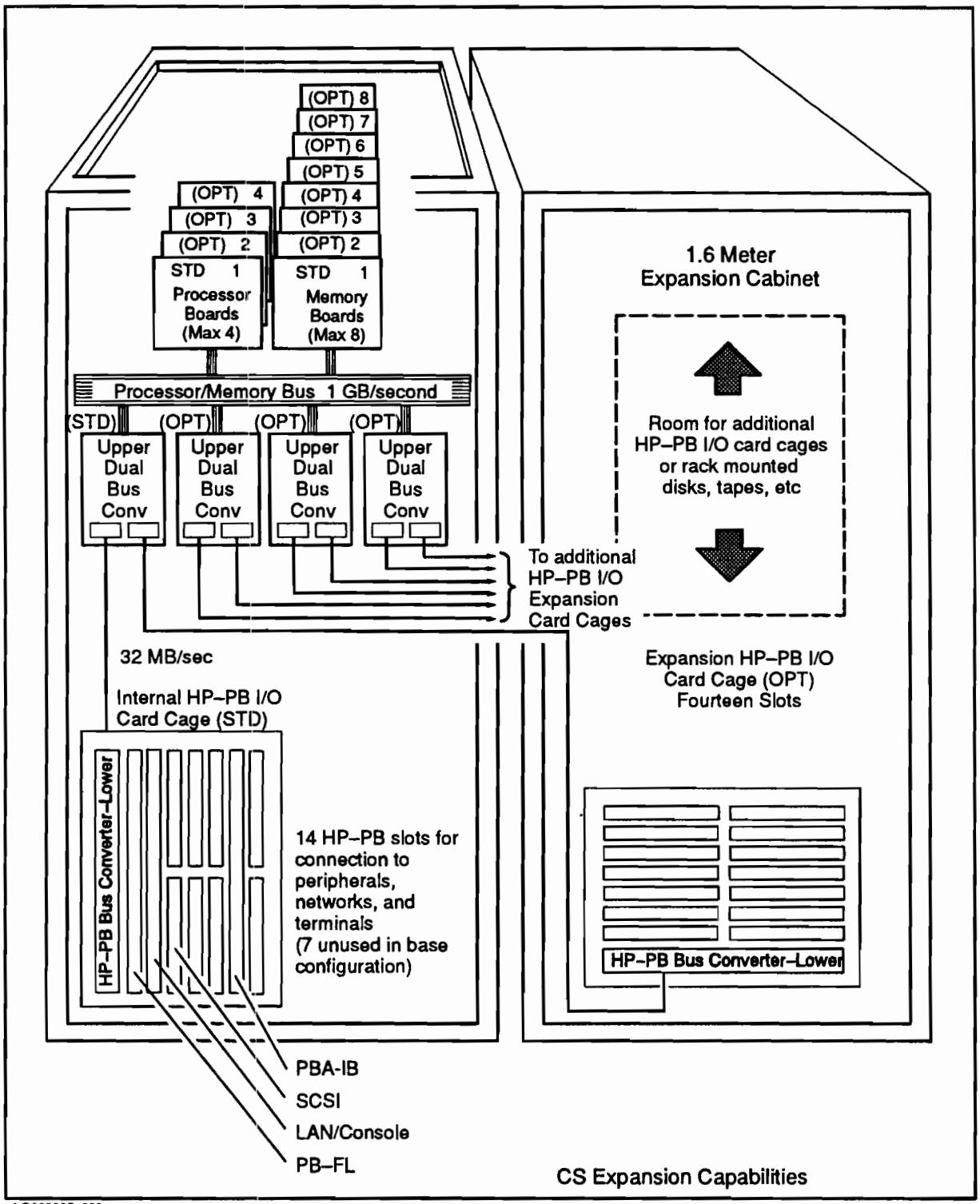
The maximum memory supported is 2 GB. To achieve this memory capacity, all eight cards must be 256 MB cards. The base configuration memory supplied with the CS 990 and CS 992/100 is 192 MB (supplied as one 64 MB card and one 128 MB card). The remainder of the CS systems include 256 MB of memory (supplied with one 256 MB card).

I/O Expansion

The bus converter is a communication link between the processor/memory bus (PMB) and the HP-PB (HP Precision Bus) I/O card cages. The bus converter consists of an upper portion in the main SPU cabinet linked to a lower portion in each HP-PB I/O card cage. A maximum of four upper dual bus converters are supported by the SPU cabinet for a maximum of eight I/O card cages (one internal and seven external to the SPU cabinet). Each HP-PB I/O card cage consists of 14 HP-PB slots, therefore the CS 990 and 992 can be expanded to 112 I/O slots (eight card cages x 14 slots per card cage = 112 single-high slots).

The base SPU configuration has one HP-PB I/O card cage located at the bottom of the SPU cabinet. Seven slots are already used for base configuration I/O cards, leaving seven of the 14 slots for expansion. The base configuration I/O cards for peripheral device support consist of the following cards:

- LAN/console (multi-purpose card with connection for 802.3 LAN, internal ThinLAN Transceiver and AUI ports, serial link for console terminal, and modem link for remote access)
- one PB-FL card
- one SCSI card
- one PBA-IB card



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Seven additional HP-PB I/O card cages can be installed external to the SPU system cabinet in one or more 1.6 meter expansion cabinet units. The dual cable connecting the lower bus converter in each HP-PB I/O card cage in the 1.6 meter Expansion Cabinet and the Upper Dual Bus Converter in the SPU cabinet is 10 meters in length to allow flexibility in the placement of the expansion rack cabinets. The 10 meter HP-PB dual cable comes standard with each HP-PB I/O card cage ordered.

The first HP-PB I/O card cage added in the 1.6 meter Expansion Cabinet can be connected to the unused link port on the Dual Bus Converter Card supplied in the base configuration. The next HP-PB I/O card cage added (third total including SPU HP-PB I/O card cage) will require that an additional Dual Bus Converter Card also be ordered. That new Dual Bus Converter Card will then support the third and fourth HP-PB I/O card cages. Similarly, additional Dual Bus Converter Cards must be ordered when adding the fifth and sixth HP-PB I/O card cages.

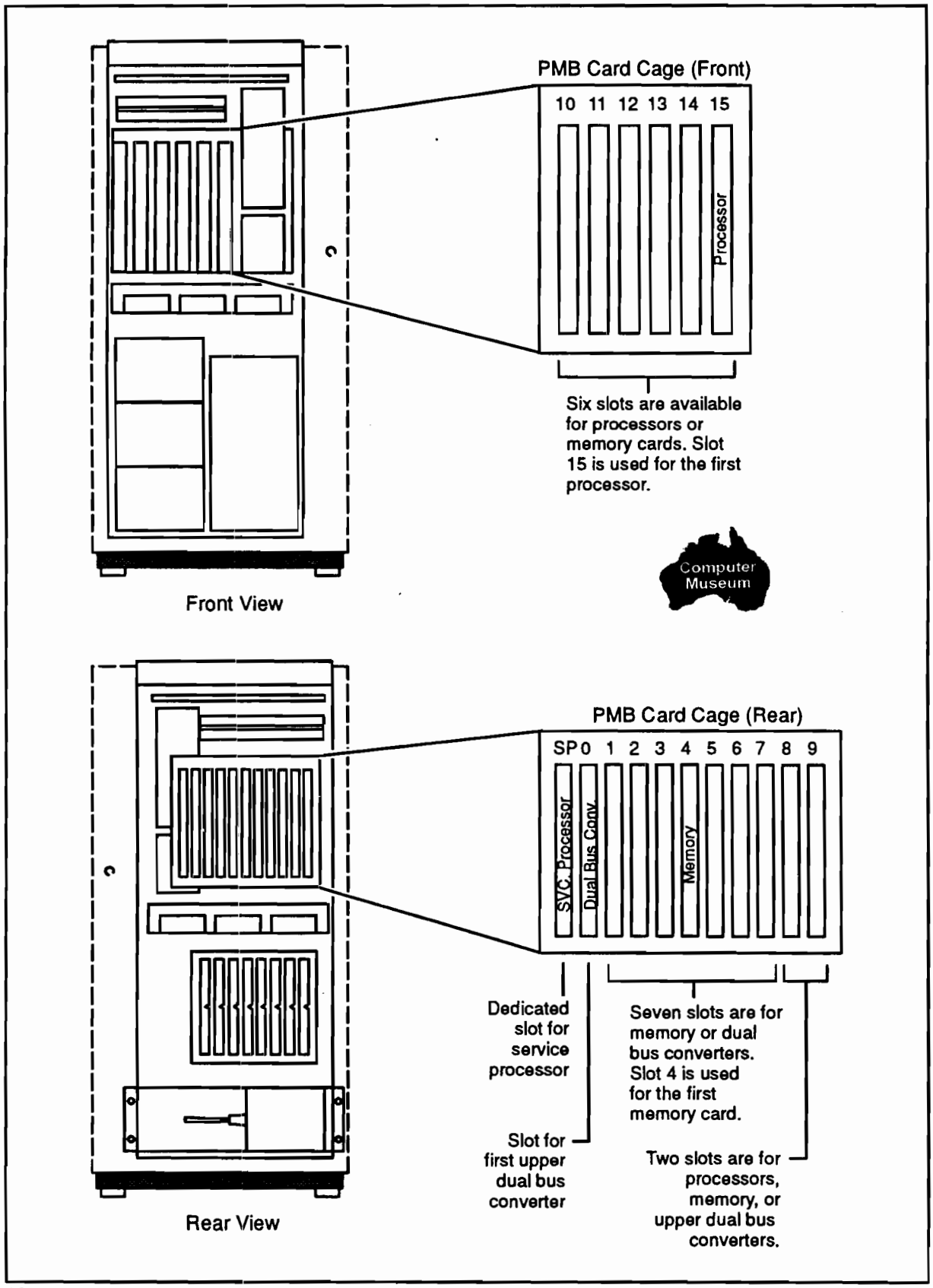
Dual Bus Converter cards are available as a standalone add-on product, product number A1829A. HP-PB I/O card cages (with Lower Bus Convertor and 10 meter HP-PB dual cable) are available either as an option to the 1.6 meter Factory Integrated Expansion Cabinet (A1884A Option 250) or as a standalone add-on product (A1828A).

Slot Availability

Processor/Memory Bus (PMB) Card Slot Availability

There is a front and a rear PMB card cage in the upper section of the SPU system cabinet. Refer to the PMB card cage slot illustration on page 4-11. The processor, memory, and Dual Bus Converter Cards must be added in a slot priority sequence when installing cards in the Processor Card Cage. The slot priority sequence is required to maximize cooling efficiency. The front PMB card cage contains six slots (10 through 15) for installation of memory and processor cards. The first Processor Card is installed in slot 15. The rear PMB card cage contains a dedicated service processor (SP) slot and ten slots (0 through 9) are available for memory, Dual Bus Converters, or Processors. The first Memory Card is installed in slot 4 and the first Dual Bus Converter Card is in slot 0. The following maximum PMB cards are supported:

- four processor cards
- eight memory cards
- four dual bus converter cards



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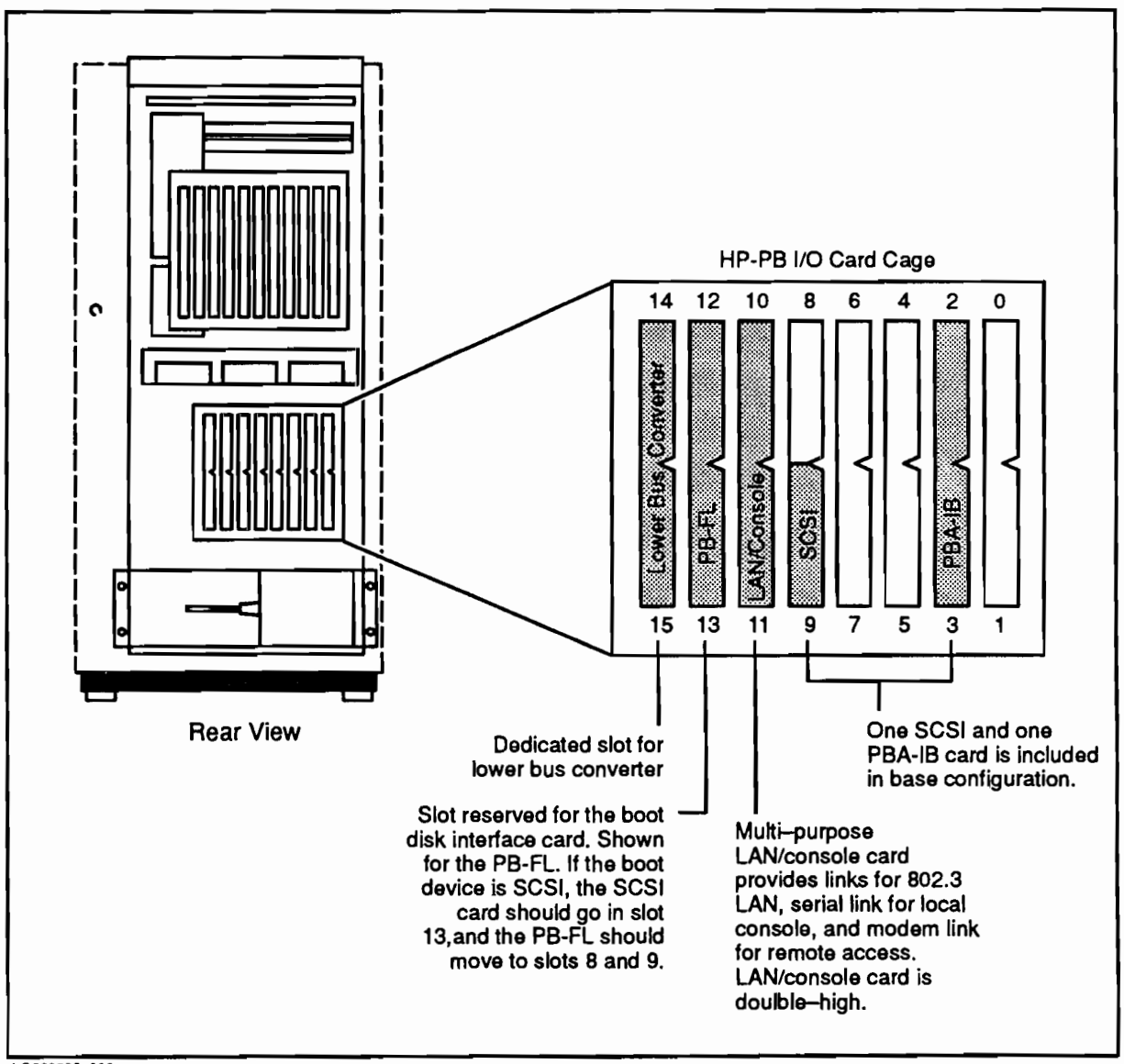
Processor/Memory Bus (PMB) Card Cage Slots

HP-PB I/O Card Slot Availability

One HP-PB I/O card cage is located in the base of the SPU system cabinet and includes one Lower Bus Converter Card in slots 15 and 14, leaving a total of seven double-high or 14 single-high HP-PB slots. Four I/O cards included in the base configuration occupy 7 single-high slots. Slot 13 (single-high) or 13 and 12 (double-high) should be used as the primary boot device slot (PB-FL or SCSI). The Multi-Purpose LAN/Console card is located in slots 11 and 10. The Multi-Purpose LAN/Console card provides links for the 802.3 LAN, Serial link for the local console, and a modem link for remote access. The SCSI and PBA-IB cards are also included in the base configuration in slot 9 and in slots 3 and 2. The higher the slot number the higher the priority on the HP Precision Bus.



HP-PB I/O Card Cage Slots

Up to seven additional HP-PB I/O card cages can be located in one or more 1.6 Meter Expansion Cabinet(s) (maximum of four per cabinet). It is recommended that HP-PB I/O card cages be racked starting at the base of the Expansion Cabinet working upwards. Each external HP-PB Card Cage includes one Lower Bus Converter (double-high), leaving 14 HP-PB card slots for expansion. This allows expansion of HP-PB slots from the base of fourteen slots to a maximum of 112 slots in fourteen slot increments.

LAN/Console Card

One LAN/Console card is supplied standard with each Corporate Business System. This card provides:

- 802.3 LAN connection for use with both DTC and system-to-system LAN traffic
- External ThinLAN Transceiver and AUI port
- Serial link for console terminal
- Modem link for remote access

The LAN/Console card is not orderable as a separate product and is supported only in the HP-PB I/O Card Cage in the SPU. The LAN/Console card has the 802.3 LANIC and ThinLAN Transceiver built onto it. In addition, the LAN/Console card has an external Attachment Unit Interface (AUI) connector for customers who want a connection to either a ThickLAN Transceiver (30241A) or Ethertwist Transceiver (28685B). These products must be ordered separately. If a second 802.3 LANIC is needed, the HP-PB 802.3 LAN card (36923A Option 002) must be ordered.

HP Precision Bus and Adapter

The Precision Bus (HP-PB) is used in the CS 990 and 992 systems to connect peripheral devices and data communication networks.

All supported I/O cards (connecting to peripherals) are Precision Bus (PB) cards with the exception of the HP-IB card which is a CIB card. In order to support the CIB HP-IB card on the Precision Bus, a Precision Bus Adapter (PBA) must be used. The PBA combines the CIB adapter and physical bus adapter into a single, double-high card. Only one CIB HP-IB can be connected to each PBA. The following ordering information should be used to order a PBA with or without an HP-IB card.

- PBA with CIB HP-IB card = PBA-IB (P/N A1747A)

Note

Customers with HP-IB cards who are interested in moving these forward should order a PBA-IB with option 001. This provides a Precision Bus Adapter. The CS 990 and 992 require a new version of PBA. Only PBAs with a revision C or later will work in the Corporate Business Systems.

HP-PB Cards	Product Number
PB-FL	28616A
SCSI	28642A
802.5 Token Ring	J2167A
802.3 LAN	36923A opt. 002
PSI	36922A opt. 002 (NS point-to-point) 30291A opt. 002 (SNA/SDLC link) 32007A opt. 002 (BSC link)

Note

The PBA-FL is not supported on the Corporate Business Systems.

HP-PB I/O Card Cage Performance Guidelines

The maximums stated in this table are to optimize system performance. These values should not be confused with the maximum number of cards supported on page 4-1. To optimize system performance, the following HP-PB I/O guidelines are recommended:

I/O Card	Slot Height	Maximum I/O Cards per HP-PB Card Cage	Maximum Devices per I/O Card	Maximum I/O Cards per System
PB-FL	double-high	5[1]	5	Refer to "Power Budget Worksheet"
SCSI	single-high	5[1]	5	Refer to "Power Budget Worksheet"
PBA-IB	double-high	2	4	Refer to "Power Budget Worksheet"
802.3 LANIC	single-high	N/A	N/A	2[2]
802.5 Token Ring	single-high	N/A	N/A	1
LAN/Console	double-high	N/A	N/A	1
PSI	single-high	N/A	N/A	8

[1] A maximum of 5 connections for SCSI and a maximum of 5 connections for PB-FL. Remaining slots can be used for any other non-disk activity as long as power limits are not violated. This limit applies to single disks as well as disk arrays.

[2] First 802.3 LANIC standard on LAN/Console card.

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

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

The HP-PB I/O Power Budgeting Worksheet on the following page will determine the supportability of a proposed HP-PB I/O configuration. The worksheet will ensure that the proposed total power consumption of all the cards in the I/O card cage does **not** exceed the total power available and that the available slots have not been exceeded. Use the worksheet as follows:

1. Enter the proposed configuration in the quantity column and multiply the quantity entered in each row by the value given in each of the three "Power Req./Card" columns. Put the result in the appropriate "Total Power Required" column.
2. Sum each column and compare the results with the three voltage power limits for each HP-PB I/O being used.
3. The total power used for all three voltages must not exceed 222.82 watts.

Caution

It is possible to configure a combination of cards that is within the power limits per a specific voltage, yet exceed the total available from the card cage power supply.

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

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

[1] I/O cards included in base configuration.

[2] Refer to page 4-13 for a description of the LAN/Console card

Note: The total rating of the power supply includes the bus converter card.

Expansion Cabinet Racking

The HP 3000 Corporate Business System (CS) 99x supports the 1.6 Meter Expansion Cabinet for racking disks, tapes, Distributed Terminal Controllers (DTCs) and additional HP-PB I/O card cages. This is the same 1.6 Meter Cabinet that is supported on the 9x7 systems. The 1.6 Meter Cabinet provides 32 EIA (Electronic Industries Association) units of rack space (one EIA unit = 1.75 inches). Each component occupies a specific number of EIA units.

How to Order Cabinets and Peripherals

Cabinets can be ordered as a Factory Integrated product or as a Standalone product. The Factory Integrated Cabinet provides a choice of peripherals as options to the cabinet which are rack-mounted at the factory. Additional separate peripherals can be ordered as add-on products to the cabinet and rack-mounted at the customer site by a Customer Engineer (CE). The Standalone Cabinet and peripherals are both ordered as separate products. The Standalone Cabinet arrives unracked and all peripherals are rack-mounted into the cabinet at the customer site by a Customer Engineer.

Supported Racked Components

The Corporate Business System cabinet supports a variety of disk drives, tape drives, DTCs and the HP-PB I/O Card Cage. Combinations of supported products are limited only by space inside the cabinet and 16-amp maximum current limit. Factory Integrated Cabinets have been structured so that all orderable configurations will not exceed the 16-amp maximum current limit. When configuring cabinets to be installed in the field the configuration should be checked to ensure it does not exceed 16-amp maximum current limit.

Components Supported in the 1.6 Meter Cabinets

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
Tape Drives					
7979A[1]	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980A[1]	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46 A
7980XC[1]	1/2-inch tape drive	5	opt. 1A4 and three C2790A ballasts	2.81 A	1.46A
4280[2]	1/2-inch cartridge tape (Model A02)	6	Included	4.1 A	2.08 A
Series 6000 SCSI Multi-Mechanism Package (also available as integrated cabinet option)					
C2462R	1.3 GB disk	4	Included	2.6 A	1.5 A
C2464R	2 GB DDS	4	Included	2.6 A	1.5 A
C2465R	Two SCSI 2 GB DDS	4	Included	2.6 A	1.5 A

[1] Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanism
[2] Stacker requires ten inch clearance above and below tape drive. Therefore, any devices racked above or below the 4280 must not have front panel accessibility.

Components Supported in the 1.6 Meter Cabinets (cont.)

Product Number	Description	EIA Units	Required Mounting Hardware	Current Consumption	
				120 VAC	208 - 240 VAC
HP-FL Disk Array[3]					
C2252HA	2.72 GB high availability disk array	6	Included	4.0 A	2.0 A
C2254HA	5.44 GB high availability disk array	6	Included	4.0 A	2.0 A
C2252B	2.72 GB disk array with 2 disks	6	Included	4.0 A	2.0 A
C2254B	5.44 GB disk array with 4 disks	6	Included	4.0 A	2.0 A
Data Terminal Connects					
2340A	DTC16	6	35199E	2 A	1 A
2345A	DTC48	6	C2799A	2 A	1 A
Expansion Modules					
A1828A	HP-PB I/O Expansion Module	7	Included	N/A	3.0 A
Filler Panels					
40101A/2A/3A/4A/5A/6A/7A - 1 to 7 filler panels					

[3]If HP-FL disk is the bottom-most racked deviced in the cabinet, add two EIA space units. This will allow ample space for cables coming into the bottom of the cabinet.

Factory Integrated Expansion Cabinet

For quick, easy ordering, and installation, the Factory Integrated Expansion Cabinet (A1884A) is the desired racking choice. The integrated cabinet contains options for SCSI disk or SCSI disk/tape, PB-FL disk, DTCs, and HP-PB I/O Card Cages. An integrated cabinet with an option for a disk allows software and subsystem software to be pre-loaded at the factory.

Certain add-on peripherals NOT in the Integrated Expansion Cabinet product structure can be installed at the cutomer site. (These include Series 6000 SCSI DDS, 7980, 7980XC tape drives, and 4280 cartridge tape drives.) Peripherals that are part of the Integrated Expansion Cabinet can also be ordered later as standalone and installed at the customer site. Refer for page 4-23 for a list of orderable products. Refer to the "Factory Integrated Expansion Cabinet Racking Configuration Worksheet" for a list of supported options and add-on peripherals and their EIA units.

Integrated Expansion Cabinet Product Structure

Product Number	Description
A1884A	1.6 meter cabinet (32 EIA units) same as for 9x7 family
ABA	U.S. 200V - 240V power
ABB	European 200V - 240V power
201	Add 1.3 GB Series 6000 SCSI disk
202	Add 2.7 GB Series 6000 SCSI disk
203	Add 4.0 GB Series 6000 SCSI disk
212	Add 2.7 GB Series 6000 SCSI disk and one DDS tape drive
230	Add high availability 5.4 GB HP-FL disk array
231	Add 5.4 GB HP-FL disk array without parity
232	Add high availability 2.7 GB HP-FL disk array
233	Add 2.7 GB HP-FL disk array without parity
250	HP-PB I/O Card Cage
316	DTC with 16 direct connect ports
324	DTC 48 with 24 direct connect ports
331	DTC 48 with 24 direct and 6 modem connect ports
346	DTC 48 with 40 direct and 6 modem connect ports
348	DTC 48 with 48 direct connect ports

Integrated Cabinet Racking Configuration Worksheet

The Factory Integrated Expansion Cabinet Racking Configuration Worksheet (following page) illustrates the integrated expansion cabinet options and add-on products. Use the worksheet to determine supportability of the proposed peripheral and HP-PB I/O Card Cage Racking Configuration. Use the worksheet as follows:

1. After entering the proposed configuration in the quantity column, multiply the quantity entered for each peripheral and card cage by the EIA number given for each component.
2. Sum all of the components to ensure that the total EIA units are less than or equal to 32. If more than 32 EIA units an additional Expansion cabinet must be ordered.

Note

If add-on peripherals are ordered with the Factory Integrated Expansion Cabinet, ensure that enough unracked space is left to install additional peripherals.

Factory Integrated Expansion Cabinet Racking Configuration Worksheet

	Component	Quantity		EIA Units		Vertical Space Required (EIA units)
I.	A1884A 1.6 meter cabinet *The A1883A 1.1 meter cabinet is not available for the CS 990 and 992 systems. Filler panels to cover unused space will be installed automatically at the factory for integrated cabinet products.*					
	Power Options:					
	ABA - Adds U.S. 200V - 240V power					
	ABB - Add European 200V - 240V power					
	Disk Options:					
	Option 201 - Adds 1.3 GB Series 6000 SCSI disk	_____	X	4	=	_____
	Option 202 - Adds 2.7 GB Series 6000 SCSI disk	_____	X	4	=	_____
	Option 203 - Adds 4.0 GB Series 6000 SCSI disk	_____	X	4	=	_____
	Option 212 - Adds 2.7 GB Series 6000 SCSI disk and one DDS tape drive	_____	X	4	=	_____
	Option 230 - Adds 5.4 GB HP-FL high availability disk	_____	X	6	=	_____
	Option 231 - Adds 5.4 GB HP-FL disk without parity	_____	X	6	=	
	Option 232 - Adds 2.7 GB HP-FL high availabiity disk	_____	X	6	=	_____
	Option 233 - Adds 2.7 GB HP-FL disk without parity	_____	X	6	=	_____
	DTC Options:					
	Option 316 - Adds DTC 48 with 16 local ports	_____	X	6	=	_____
	Option 324 - Adds DTC 48 with 24 local ports	_____	X	6	=	_____
	Option 330 - Adds DTC 48 with 24 local, 6 remote ports	_____	X	6	=	_____
	Option 346 - Adds DTC 48 with 40 local, 6 remote ports	_____	X	6	=	_____
	Option 348 - Adds DTC 48 with 48 local ports	_____	X	6	=	_____
	HP-PB I/O Card Cage:					
	Option 250 - Adds HP-PB I/O card cage with 14 single-high card slots, 10 meter HP-PB Dual Cable, and lower bus converter	_____	X	7	=	_____
II.	Add-on peripherals *Not factory racked. Filler panels and rackmount kits must be ordered for add-on products. See following page for details.*					
	7980/7980XC tape drives[1,3]	_____	X	5	=	_____
	Series 6000 SCSI DDS and disk	_____	X	4	=	_____
	HP-FL disk arrays	_____	X	6	=	_____
	4280[2] - Cartridge Tape Drive (without stacker)	_____	X	6	=	_____
III.	Total EIA Units (must be ≤32)				=	_____
	If number of EIA units is greater than 32, more than one cabinet is required					

[1]Refer to the Peripheral section for information on these devices
[2]Stacker requires ten inch clearance above and below tape drives, therefore devices racked above or below the 4280 must not have front panel accessibility
[3]Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms

Standalone Expansion Cabinet

A Standalone Expansion Cabinet (C2786A) is available for customers who decide to order all peripherals and HP-PB I/O Card Cages separately. When configuring an expansion cabinet, ensure that all appropriate components (filler panels and peripheral rack mounting kits) are ordered to successfully complete racking and that the configuration does not exceed the 16-amp current limit of the cabinet. *Refer to page 4-18 for a table of supported components.* The Standalone Cabinet arrives unracked and all peripherals are rack-mounted into the cabinet at the customer site by a Customer Engineer. Refer to the "Standalone Expansion Cabinet Configuration Worksheet" for a list of supported components along with their EIA space units.

Standalone Expansion Cabinet Product Structure

Product Number	Description
C2786A	1.6 meter cabinet (32 EIA units) same as for 9x7 family
ABA	200V - 240V with U.S. power cord
ABB	200V - 240V with European power cord
1F9	Add six 1-unit filler panels
1FC	Front door (can be locked for security purposes)

Standalone Cabinet Racking Configuration Worksheet

Use the racking configuration worksheet on the following page to determine supportability of the proposed peripheral and HP-PB I/O Card Cage Configuration. Use the worksheet as follows:

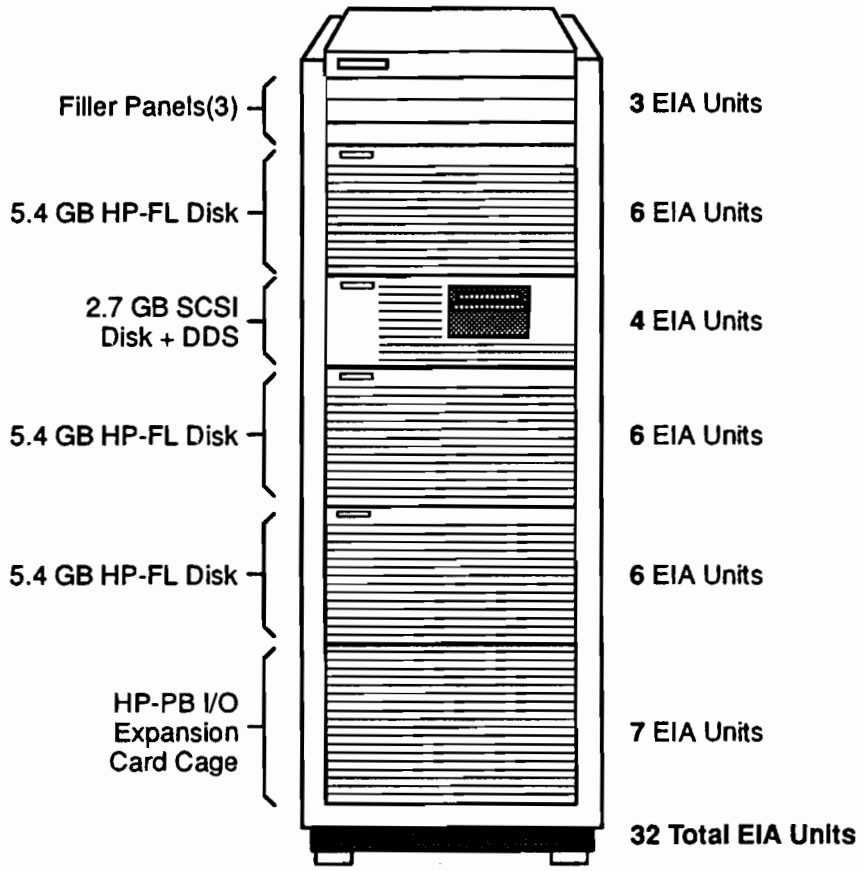
1. After entering the proposed configuration in the quantity column, mulitiply the quantity entered for each peripheral and card cage by the EIA number given for each component.
2. Sum all the components to ensure that the total EIA units are less than or equal to 32. If more than 32 EIA units an additional Expansion Cabinet must be ordered.
3. Sum the current requirements of all components to ensure the 16-amp current limit is not exceeded. Refer to page 4-18 for a table of components supported and their current consumption.

The Standalone Expansion Cabinet Racking Configuration Worksheet illustrates the standalone cabinet products.

Standalone Expansion Cabinet Racking Configuration Worksheet

	Component	Quantity		EIA Units		Vertical Space Required (EIA units)
I.	C2786A 1.6 meter racking cabinet *The C2785A 1.1 meter cabinet is not available for the CS 990 and CS 992 systems. Filler panels to cover unused space must be ordered separately.*					
	Power Cords:					
	ABA - Adds U.S. 200V - 240V power cord					
	ABB - Adds European 200V - 240V power cord					
	Disk Products:					
	C2462R - Adds 1.3 GB Series 6000 SCSI disk	_____	X	4	=	_____
	C2464R - Adds SCSI 2 GB DDS	_____	X	4	=	_____
	C2465R - Adds two SCSI 2 GB DDS	_____	X	4	=	_____
	C2252HA,B - Adds 2.7 GB HP-FL array	_____	X	6	=	_____
	C2254HA,B - Add 5.4 GB HP-FL array	_____	X	6	=	_____
	Add two EIA unit panels if HP-FL disk is the bottom-most racked device in cabinet. (Allows room for cables.) *Racking hardware for ALL disks is included.*					
	Tape Drives:					
	7980A[1] - Adds 1/2-inch HP-IB tape drive	_____	X	5	=	_____
	7980XC[1] - Adds 1/2-inch HP-IB tape drive data compression	_____	X	5	=	_____
	Racking hardware for ALL 7980/7980XC tapes is 1A4.					
	4280[2] - 1/2-inch Cartridge Tape Drive without stacker (Racking hardware for 4280 is included)	_____	X	6	=	_____
	DTC Products:					
	2345A - Adds DTC 48 with 16 local ports	_____	X	6	=	_____
	Racking hardware for DTC 48 is C2799A.					
	HP-PB I/O Card Cage:	_____	X	7	=	_____
	A1828A - Adds HP-PB I/O Card Cage with 14 single-high card slots, 10 meter HP-PB dual cable, and lower bus converter *Racking hardware for HP-PB I/O card cage is included.*					
II.	Total EIA Units (must be ≤32)				=	_____
	If number of EIA Units is greater than 32, more than one cabinet is required					
III.	Filler Panels					
	1F9 - Adds six 1 EIA unit filler panels					
	A40101A - A40107A - Adds up to 7 filler panels					
	Racking hardware for DDS is included.					

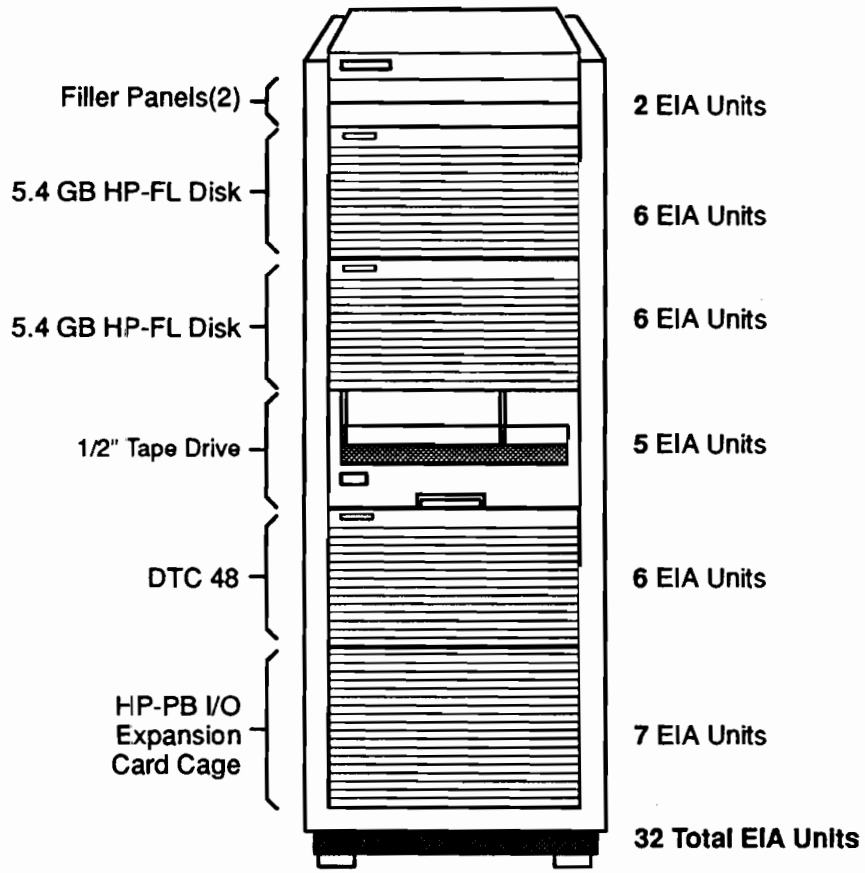
[1]Three anti-tip ballasts (C2790A) are required for one or more 1/2-inch tape drive mechanisms
[2]Stacker requires ten inch clearance above and below tape drive, therefore devices racked above or below the 4280 must not have front panel accessibility



Qty	P/N	Description
1	A1884A	1.6-Meter Factory Integrated Expansion Cabinet
3	Option 230	5.4-GB HP-FL Disk
1	Option 212	2.7-GB SCSI Disk + DDS
1	Option 250	HP-PB I/O Card cage

LG200205_013

1.6 Meter Factory Integrated Expansion Cabinet Configuration Example



Qty	P/N	Description
1	C2786A	1.6-Meter Standalone Expansion Cabinet
2	C2254HA	5.4-GB HP-FL Disk
1	7980XC	1/2" HP-IB Tape Drive
1	2345A	DTC48
1	A1828A	HP-PB I/O Card Cage

LG200205_014

1.6 Meter Standalone Expansion Cabinet Configuration Example

Note

This configuration requires the following racking hardware:

- C2799A - DTC
- 7980XC option 1A4

Cabling and Racking Configuration Guidelines

To ensure that peripheral devices and corresponding 1.6 Meter Expansion Cabinets are configured correctly, interconnect cable length limits must be adhered to.

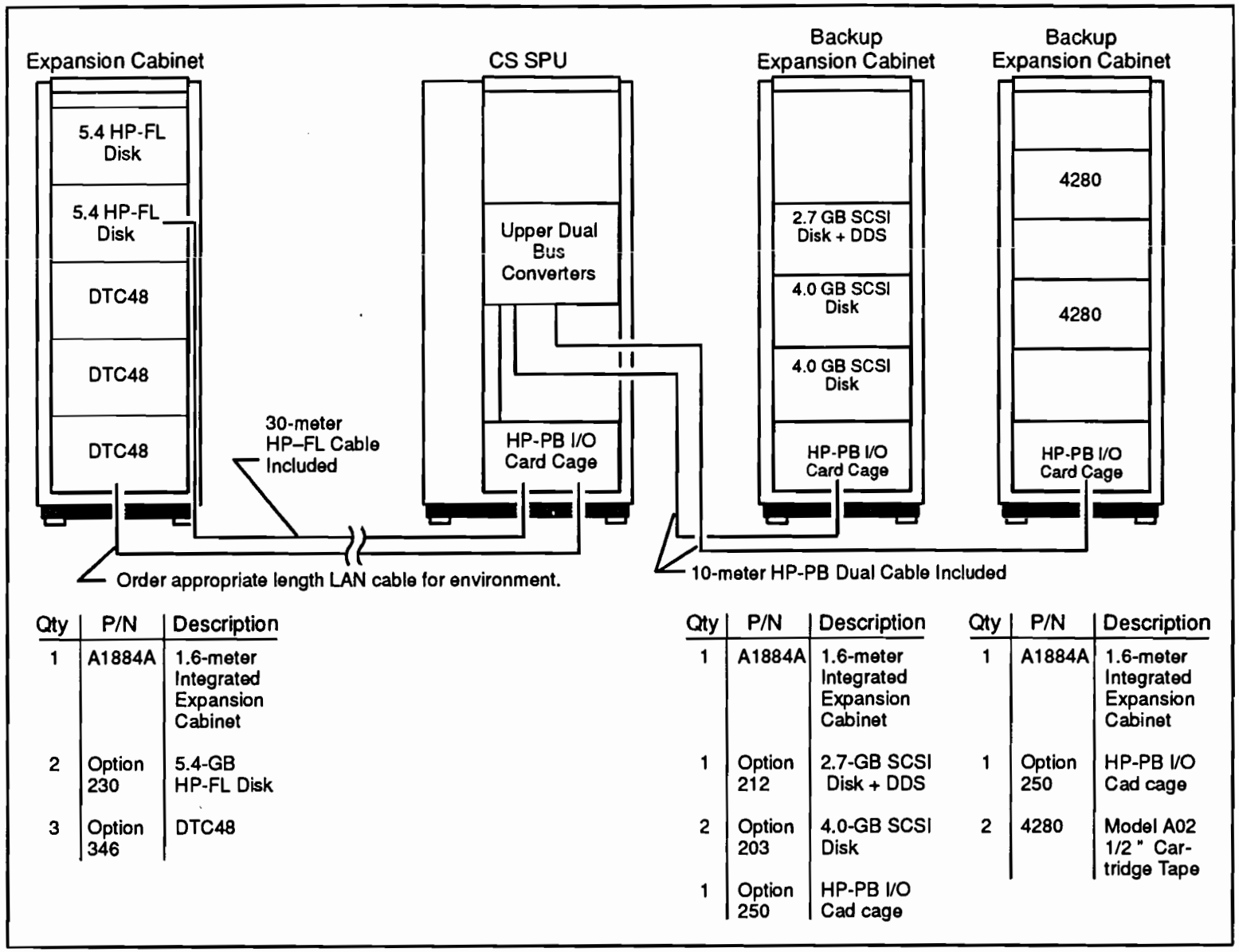
CS Illustrated Racking Configuration Example

The illustrated configuration on page 4-27 is an example of a CS 990/992 system racking arrangement as dictated by cable length limits. The system consists of one SPU cabinet and one cabinet for disk drives and DTCs, and two backup cabinets.

The SPU cabinet houses the HP-PB I/O Card Cage for the Expansion Cabinet to the left of the SPU in the illustration. The racked components in the cabinet are HP-FL 5.4 GB disks and DTC48s. The Fiber Link interface card ships standard with a 30 meter cable. A custom length cable of up to 500 meters can be ordered if required. The cable for connection of the LAN card to the DTC ships standard with a length of 4 meters. A custom length DTC cable can be ordered for extended lengths. The custom length cables for the HP-FL and DTC mentioned above allow flexible racking configurations and distances between Expansion Cabinets.

The two cabinets to the right of the SPU cabinet (each containing SCSI devices) house their own HP-PB I/O Card Cage. The card cages are racked in each Expansion Cabinet to bypass the limited cable length of 2.5 meters between the SCSI card and the first SCSI device. The SCSI cable provided with the base CS SPU is 2.5 meters. To resolve the distance restriction, an HP-PB I/O Card Cage can be mounted in each expansion cabinet (as shown in the illustration) to allow the use of a 10 meter HP-PB Dual Cable.

A SCSI Bus has a maximum supported cable length of 6 meters, including internal, interconnect, and external cables of SCSI devices. In order to connect a SCSI card housed in the Expansion Cabinet, no more then a maximum of 2 Series 6000 multi-mechanism packages can be racked and still remain within the 6 meter length (each Series 6000 package utilizes 1.5 meters internal cable length and .5 meters of interconnect cabling for "daisy chaining" of SCSI packages). If a greater separation distance is required between the SPU and the expansion cabinet housing the SCSI devices, then the HP-PB I/O Card Cage containing the SCSI should be in the same cabinet as the SCSI device. Refer to the "SCSI Racking Examples" in this section for additional racking examples.



Qty	P/N	Description
1	A1884A	1.6-meter Integrated Expansion Cabinet
2	Option 230	5.4-GB HP-FL Disk
3	Option 346	DTC48

Qty	P/N	Description
1	A1884A	1.6-meter Integrated Expansion Cabinet
1	Option 212	2.7-GB SCSI Disk + DDS
2	Option 203	4.0-GB SCSI Disk
1	Option 250	HP-PB I/O Cad cage

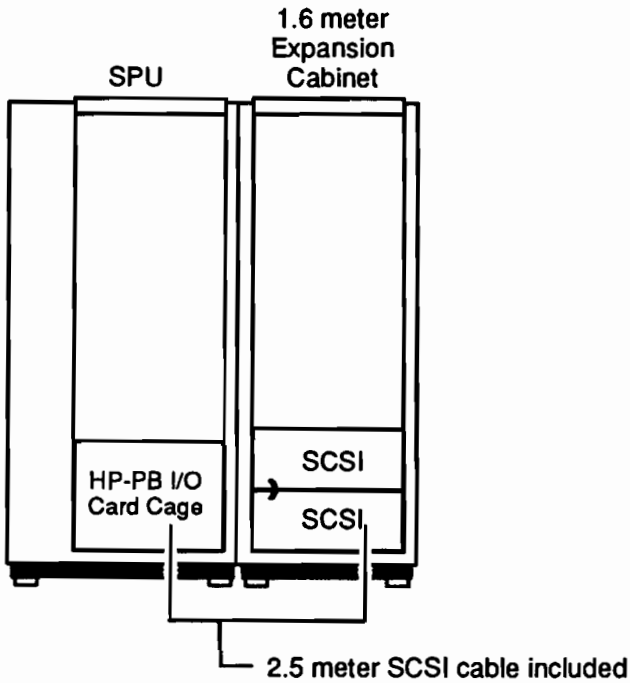
Qty	P/N	Description
1	A1884A	1.6-meter Integrated Expansion Cabinet
1	Option 250	HP-PB I/O Cad cage
2	4280	Model A02 1/2 " Car-tridge Tape

LG200205_012

CS 990/992 Ilustrated Racking Configuration Example

SCSI Racking Example A

Using only the SPU internal HP-PB I/O card cage

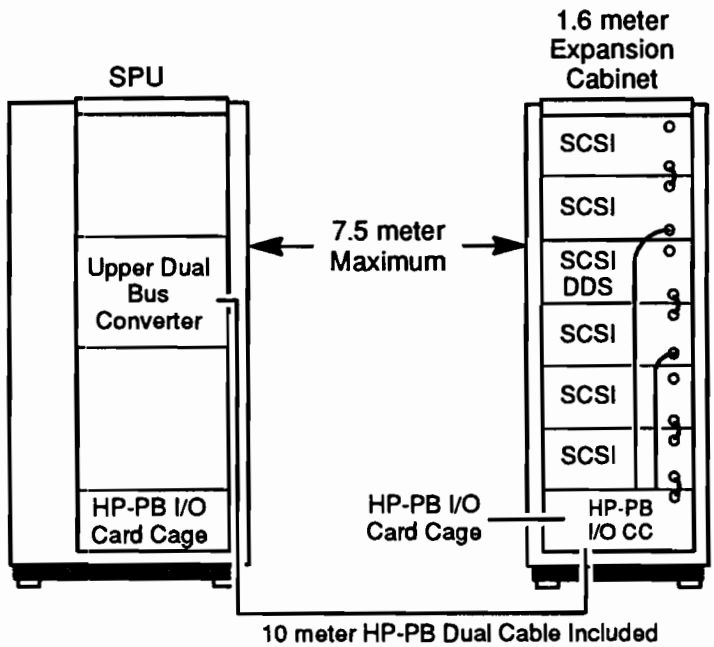


- The SPU and 1.6 meter cabinets must be placed in close proximity when using only the SPU internal card cage due to the 2.5 meter SCSI cable length.
- A 2.5 meter SCSI cable is provided standard with the base CS SPU. Add-on SCSI cards allow a choice of a 1.0 or 2.5 meter SCSI cable.
- The first Series 6000 SCSI multi-mechanism package *with* DDS should be racked higher in the 1.6 meter cabinet for convenient access. The second SCSI can then be "daisy chained" above or below the first SCSI package.
- 2 Series 6000 disk drive modules max per SCSI card and up to 3 SCSI devices in each module.
- Internal SCSI cable length for each Series 6000 SCSI multi-mechanism package is equivalent to 1.5 meters.
- Interconnecting cable length between Series 6000 SCSI multi-mechanism packages is .5 meters.
- If the SCSI disk is the boot device, the boot disk is typically connected to a SCSI card in the HP-PB I/O card cage of the SPU cabinet.

LG200205_010

SCSI Racking Example B

Using the expansion cabinet HP-PB I/O card cage at the bottom of the 1.6 meter expansion cabinet.

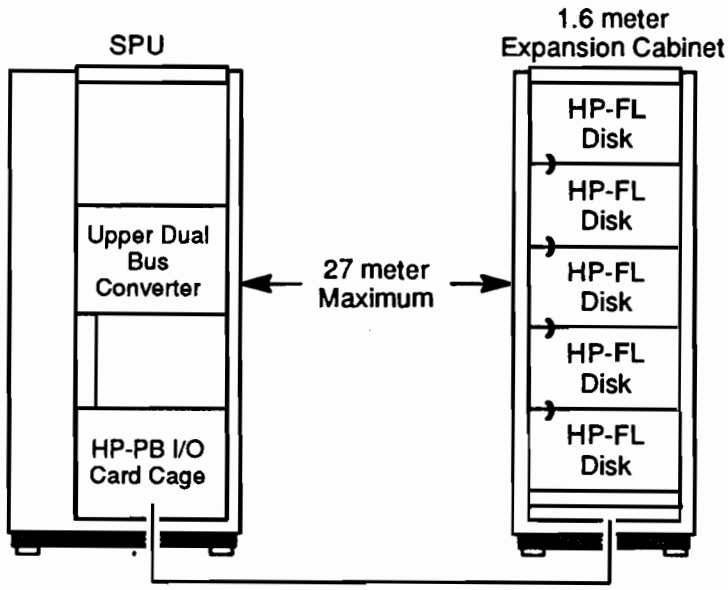


- A maximum distance of 7.5 meters is allowable between the SPU and 1.6 meter cabinet when using an HP-PB I/O card cage at the bottom of the 1.6 meter cabinet.
- A 2.5 meter SCSI cable is provided standard with the base CS SPU. Add-on SCSI cards allow a choice of a 1.0 or 2.5 meter SCSI cable.
- SCSI devices, such as DDS, should be racked higher in the 1.6 meter cabinet for convenient access. The second SCSI can then be "daisy chained" above or below the first SCSI device.
- Multiple SCSI interface cards can be installed to connect up to 6 SCSI modules per expansion cabinet.
- Internal SCSI cable length for each Series 6000 SCSI multi-mechanism package is equivalent to 1.5 meters.
- Interconnecting cable length between Series 6000 SCSI multi-mechanism packages is .5 meters.

LG200205_011

HP-FL Racking Example

A 30-meter fiber-optic link is included with P/N 27115A. The 30-meter cable can be replaced by a custom fiber-optic cable, up to 500 meters long.



Using a 30-meter standard cable included

- A maximum of five FL disks can be physically racked per 1.6 meter cabinet.
- HP-FL Cable Lengths:
  A) Fiber Link cards are shipped with 30 meter cables.
  B) Custom Length fiber Link Cable is orderable.
  C) The internal and external cable lengths for HP-FL device connections cannot exceed 500 meters.
- A maximum distance of 27 meters is allowable between the SPU and the 1.6 meter cabinet with a 30 meter HP-FL cable.
- 2 filler panels must be at the bottom of the 1.6 meter cabinet if an HP-FL disk is the bottom-most racked device in the cabinet. This will allow ample space for cables coming into the bottom of the cabinet.

LG200205_008

SCSI Extender Guidelines

The SCSI extender (P/N 28643A) is only recommended for customers who must have greater cabling flexibility then the 6-meter SCSI cable length provides.

The SCSI extender is supported for use with the Rewriteable Optical Autochangers and the HP 5000 High End Printer only. The extender is available in 50-meter and 100-meter cable lengths. The SCSI extender has performance implications when used with SCSI devices that are asynchronous. The Optical Autochangers have asynchronous interfaces and therefore performance can be impacted by as much as 50%. The F100 printer has a synchronous interface and therefore should see little performance degradation when connected to the extender.

Product Summary

A1809A Product Structure

A1809A Product Structure

Product Number	Description
A1809A	HP 3000 Corporate Business System DX with MPE/iX Fundamental Operating Software, TurboIMAGE/XL, ALLBASE/SQL Additional Standard System Software includes: Systems Management Software ■ TurboSTORE/XL II with on-line backup for Rewritable Optical Disk, 1/2-inch tape and DDS ■ AutoRestart/XL ■ HP OpenView console software ■ ThinLAN 3000/XL ■ Management Node Software for the OpenView console Performance Management Software ■ HP LaserRX/MPE ■ RX Forecast ■ GlancePLUS/XL Standard Integrated Hardware includes: ■ Central processing unit and SPU cabinet ■ Error correcting memory with on-board memory controllers ■ LAN/Console card (multi-purpose card with connections for 802.3 LAN, integrated ThinLAN Transceivers and AUI port, serial link for console terminal, and modem link for remote access) ■ Power supplies ■ Integrated powerfail battery backup system ■ Small computer system interface (SCSI) card cable and terminator ■ HP-IB interface with precision bus adapter (PBA-IB) ■ PB-FL fiber-optic link peripheral interface card ■ Internal HP-PB (Precision Bus) I/O card cage with 7 remaining single-high card slots available (of 14 available slots, SCSI uses 1, PB-FL uses 2, PBA-IB uses 2, and LAN/Console uses 2) ■ Floating-point coprocessor on each processor card ■ OpenView console PC

A1809A Option Structure

A1809A Option Structure

Option Number	Description
Processor (Must order one)	
880	HP 3000 Corporate Business System 990 DX with 192 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 990 by 1-160 users
881	HP 3000 Corporate Business System 992/100 with 192 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/100 DX by 1-160 users
882	HP 3000 Corporate Business System 992/200 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/200 DX
883	HP 3000 Corporate Business System 992/300 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/300 DX
884	HP 3000 Corporate Business System 992/400 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/400 DX
Memory	
502	Replace 192 MB with 256 MB
503	Add 64 MB
504	Add 128 MB
505	Add 256 MB
506	Add 384 MB
507	Add 512 MB
508	Add 640 MB
509	Add 768 MB
Power (Must order one)	
017	200-240 VAC (L-N) / 346-416 VAC (L-L) 50/60 Hz
018	200-220 VAC 50/60 Hz

A1809A Option Structure (continued)

Option Number	Description
Box Swap Upgrade	
704	Return MICRO 3000, 3000LX
705	Return MICRO 3000GX, 3000RX
706	Return MICRO 3000XE
707	Return Series II, III, 30, 33, 37, 37XE
708	Return HP 250/260
709	Return Series 39, 40, 42, 44, 48
710	Return Series 42XP, 52, 58
711	Return Series 64, 68
712	Return Series 70
713	Return Series 920 or 917LX
714	Return Series 925LX
715	Return Series 922LX or 927LX
716	Return Series 925, 922RX, 922, or 937LX
717	Return Series 935, 932, 947LX, or 937
718	Return Series 949, 948
719	Return Series 955, 967LX
720	Return Series 960, 958
721	Return Series 950, 947, or 957LX
722	Return Series 957
723	Return Series 967
724	Return Series 977
725	Return Series 980/100
726	Return Series 980/200
727	Return Series 980/300
728	Return Series 980/400

A1809A Option Structure (continued)

Option Number	Description
Console Localization	
ABA	U.S. English localized keyboard, power cord
ABB	English/Europe localized keyboard, power cord
ABD	German localized keyboard, power cord, manuals
ABE	Spanish localized keyboard, power cord
ABF	French localized keyboard, power cord, manuals
ABG	Australian power cord, US keyboard, English manuals
ABH	Dutch localized keyboard, power cord, English manuals
ABM	Spanish-Latin American localized keyboard, US power cord
ABN	Norwegian localized keyboard, power cord, English manuals
ABP	Swiss-German localized keyboard, power cord
ABQ	Swiss-French localized keyboard, power cord
ABS	Swedish localized keyboard, power cord
ABU	English (UK) localized keyboard, power cord
ABW	Flemish localized keyboard, power cord
ABX	Finnish localized keyboard, power cord, English manuals
ABY	Danish localized keyboard, power cord, English manuals
ABZ	Italian localized keyboard, power cord
Software Delete	
910	Delete TurboIMAGE
915	Delete SQL
920	MPE only
931	Delete Systems Management Software and OpenView PC console
932	Delete Performance Management Software
User License	
UAT	Upgrade to Unlimited User License on CS 990 DX and CS 992/100 DX

A1811A Product Structure

A1811A Product Structure

Product Number	Description
A1811A	HP 3000 Corporate Business System with MPE/iX Fundamental Operating Software, TurboIMAGE/XL, ALLBASE/SQL Standard integrated hardware includes: ■ Central processing unit and SPU cabinet ■ Error correcting memory with on-board memory controllers ■ LAN/Console card (multi-purpose card with connections for 802.3 LAN, integrated ThinLAN Transceivers and AUI port, serial link for console terminal, and modem link for remote access) ■ Power supplies ■ Integrated powerfail battery backup system ■ Small computer system interface (SCSI) card cable and terminator ■ HP-IB interface with precision bus adapter (PBA-IB) ■ PB-FL fiber-optic link peripheral interface card ■ Internal HP-PB (Precision Bus) I/O card cage with 7 remaining single-high card slots available (of 14 available slots, SCSI uses 1, PB-FL uses 2, PBA-IB uses 2, and LAN/Console uses 2) ■ Floating-point coprocessor on each processor card ■ HP 700/96 console display with interconnect cable and software phosphor

A1811A Option Structure

A1811A Option Structure

Option Number	Description
Processor (Must order one)	
880	HP 3000 Corporate Business System 990 with 192 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 990 by 1-160 users
881	HP 3000 Corporate Business System 992/100 with 192 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/100 by 1-160 users
882	HP 3000 Corporate Business System 992/200 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/200
883	HP 3000 Corporate Business System 992/300 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/300
884	HP 3000 Corporate Business System 992/400 with 256 MB Main Memory with a Class/Concurrent License to use MPE/iX on HP 3000 CS 992/400
Memory	
502	Replace 192 MB with 256 MB
503	Add 64 MB
504	Add 128 MB
505	Add 256 MB
506	Add 384 MB
507	Add 512 MB
508	Add 640 MB
509	Add 768 MB
Power (Must order one)	
017	200-240 VAC (L-N) / 346-416 VAC (L-L) 50/60 Hz
018	200-220 VAC 50/60 Hz

A1811A Option Structure (continued)

Option Number	Description
Box Swap Upgrade	
704	Return MICRO 3000, 3000LX
705	Return MICRO 3000GX, 3000RX
706	Return MICRO 3000XE
707	Return Series II, III, 30, 33, 37, 37XE
708	Return HP 250/260
709	Return Series 39, 40, 42, 44, 48
710	Return Series 42XP, 52, 58
711	Return Series 64, 68
712	Return Series 70
713	Return Series 920 or 917LX
714	Return Series 925LX
715	Return Series 922LX or 927LX
716	Return Series 925, 922RX, 922, or 937LX
717	Return Series 935, 932, 947LX, or 937
718	Return Series 949, 948
719	Return Series 955, 967LX
720	Return Series 960, 958
721	Return Series 950, 947, or 957LX
722	Return Series 957
723	Return Series 967
724	Return Series 977
725	Return Series 980/100
726	Return Series 980/200
727	Return Series 980/300
728	Return Series 980/400

A1811A Option Structure (continued)

Option Number	Description
Console Localization	
ABA	U.S. English localized keyboard, power cord
ABB	English/Europe localized keyboard, power cord
ABC	French-Canadian localized keyboard, North American power cord, French manuals
ABD	German localized keyboard, power cord, manuals
ABE	Spanish localized keyboard, power cord
ABF	French localized keyboard, power cord, manuals
ABG	Australian power cord, US keyboard, English manuals
ABH	Dutch localized keyboard, power cord, English manuals
ABL	Canadian-English localized keyboard, US power cord, English manuals
ABM	Spanish-Latin American localized keyboard, US power cord
ABN	Norwegian localized keyboard, power cord, English manuals
ABP	Swiss-German localized keyboard, power cord
ABQ	Swiss-French localized keyboard, power cord
ABR	US keyboard, South African power cord, English manuals
ABS	Swedish localized keyboard, power cord, English manuals
ABU	English (UK) localized keyboard, power cord
ABW	Flemish localized keyboard, power cord
ABX	Finnish localized keyboard, power cord, English manuals
ABY	Danish localized keyboard, power cord, English manuals
ABZ	Italian localized keyboard, power cord
ACC	US keyboard, United Kingdom power cord
ACD	Swiss power cord, US keyboard, English manuals
ACE	Danish power cord, US keyboard, English manuals
ACF	Japan power cord, US keyboard and manual
Software Delete	
910	Delete TurboIMAGE
915	Delete SQL
920	MPE only
User License	
UAT	Upgrade to Unlimited User License on CS 990 and CS 992/100
Hardware Delete	
1B6	Delete system console

Field Upgrade Option Structure for A1809A and A1811A

Field Upgrade Option Structure

Product Number	Description
A1810A	HP 3000 Corporate Business System Upgrade
opt. 514	Delete 64 MB
opt. 528	Add 128 MB
opt. 556	Add 256 MB
opt. 881	CS 990 to CS 992/100
opt. 882	CS 992/100 to 992/200 (includes 64 MB)
opt. 883	CS 992/200 to 992/300
opt. 884	CS 992/300 to 992/400 (includes power module)
opt. UAT	Unlimited User License
opt. UBP	Credit for purchase of Unlimited User License on CS 990 and CS 992/100

Factory Integrated Expansion Cabinet Option Structure for A1809A and A1811A

Factory Integrated Expansion Cabinet Option Structure

Product Number	Description
Integrated Expansion Cabinet	
A1884A	1.6 meter 19-inch computer rack (same as for 9x7 family)
Options	
ABA	U.S. 200V - 240V power
ABB	European 200V - 240V power
201	Add 1.3 GB SCSI disk
202	Add 2.7 GB SCSi disk
203	Add 4.0 GB SCSI disk
212	Add 2.7 GB SCSI disk and one DDS tape drive
316	DTC with 16 direct connect ports
324	DTC48 with 24 direct connect ports
331	DTC48 with 24 direct and 6 modem connect ports
346	DTC48 with 40 direct and 6 modem connect ports
348	DTC48 with 48 direct connect ports
230	Add high availability 5.4 GB HP-FL disk array
231	Add 5.4 GB HP-FL disk array without parity
232	Add high availability 2.7 GB HP-FL disk array
233	Add 2.7 GB HP-FL disk array without parity
250	Add HP-PB I/O card cage with 14 single-high card slots, 10 meter HP-PB dual cable, and lower bus converter

Corporate Business Systems Standalone Products

Standalone Product Structure

Product Number	Description
A1828A	HP 3000 CS 99x HP-PB I/O card cage set. Includes: Lower Bus Converter Card and HP-PB Dual Cable with HP-PB I/O card cage with 14 single-high card slots
A1829A	HP 3000 CS 99x Upper Bus Converter Card (two bus converters per card)
A2570A	64 MB memory card
A2233A	128 MB memory card
A2234A	256 MB memory card
A1747A	PBA-IB (chan-span with HP-IB device adapter)
opt. 001	Delete HP-IB card
28616A	PB-FL card
28642A	SCSI card
J2167A	Token Ring 3000/iX network link
36923A opt. 002	802.3 LAN[1] (second LAN card)

[1] *First 802.3 LAN is supplied on the LAN/Console card.*

5

900 Series Input/Output Channels

Peripheral Channels

HP Small Computer System Interface (SCSI)

HP's SCSI link is an interface card used to connect disks, DDS tape drives, 1/2-inch cartridge tape (3480 compatible), optical drives, and the HP 5000 high-end printer family of products. There are two SCSI interface cards available:

28642A	HP-PB SCSI host adapter card for use on Precision Bus (PB) systems. Supported on Series 9x7LX, 9x7, and Corporate Business Systems (CS).
27251A	CIB SCSI host adapter card for use on Channel I/O Bus (CIB) systems. Supported on Series 980 systems.

The following SCSI peripherals are supported on all 900 Series systems:

- Disks
  - C2461F/R/S
  - C2462F/R/S
- DDS Tape
  - C2463F/R - 1.3 GB (supported only on Series 9x7LX and 9x7 systems - obsolete)
  - C2464F/R - 2.0 GB
  - C2465F/R - 2 x 2.0 GB
  - C1520B - 2 GB (standalone)
  - C1521B - 8 GB data compression (standalone; support planned 1Q93)
  - C2466F/R - 8 GB data compression (support planned 1Q93)
  - C2467F/R - 2 x 8 GB data compression (support planned for 1Q93)
- Optical
  - C1700A - 20 GB
  - C1703A - 10 GB
- Printers
  - HP 5000 Model F100
- 1/2-inch Cartridge Tape
  - 4220[1,2] with auto loader
  - 4280 Model A01[1,2] - 1 transport
  - 4280 Model A02[1,2] - 2 transports with or without auto loader

[1] *Available 2H92 (post MPE/iX Release 4.0)*
[2] *From StorageTek*

Maximum Cable Length

The maximum combined length of single ended SCSI bus is six meters. The maximum length applies to cables that interconnect each daisy-chained device and to the cable lengths that are internal to each device.

The total cable length is the sum of the length of all SCSI cables:

Series 9x7LX and 9x7 Systems

Where	Cable Length
Inside SPU	
- Series 9x7LX	1.5 meters
- Series 9x7	3.0 meters
Inside Series 6000 Multi-Mechanism Package	
- Mini Tower	1.8 meters
- Rackmount	2.2 meters*
Between the Series 9x7LX and 9x7 SPU and the first peripheral	1 or 1.5 meters
Between the CS SPU and the first peripheral	Base CS SPU is provided standard with one 2.5 meter SCSI cable Add-on SCSI cards allow a choice of 1.0 meter or 2.5 meter SCSI cable
Between Peripherals	.5, 1, or 2 meters
** See chapter 6 for further discussion on mini-tower and rackmount for Series 9x7LX and 9x7 systems and Chapter 4 for further discussion on rackmounting for the CS 99x.*	

To increase cabling flexibility, the following SCSI cables may be ordered separately:

- .5 meter SCSI cable: P/N 92222A
- 1.0 meter SCSI cable: P/N 92222B
- 2.0 meter SCSI cable: P/N 92222C

The cables listed above are peripheral-to-peripheral cables with male-to-male connectors. For an extender cable order P/N 92222D, a 1 meter cable with female-to-male connectors.

For best performance results with SCSI, follow these guidelines:

- connect 5 or less disks per SCSI bus on systems with heavy disk I/O workloads
- connect tape and back-up devices on separate SCSI bus from disks on systems with $\geq$10 Gbytes of storage

Device Loading

A maximum of 7 peripheral devices can be attached to each bus.

Note

The integrated SCSI interface on Series 9x7LX and 9x7 systems supports only 5 devices. C2463F/R DDS drive is not supported external to the SPU via the integrated bus. A SCSI interface card is required to support C2463F/R external DDS. The new 2 GB DDS and 8 GB DDS models are supported via the integrated bus and via a SCSI interface card.

The 900 Series SCSI implementation adheres to the HP Common SCSI (HPCS) specification which is a superset of the ANSI SCSI-2 specification.

The Rewritable Optical Autochanger is supported as a serial device accessed through TurboSTORE/XL II. Two versions of TurboSTORE/XL II are available for support of the Rewritable Optical Autochanger: 36397A Support for Rewritable Optical Disk and 36398A Support for Online Backup for Rewritable Optical Disk.

Configuration limitations for C1700A and C1703A are:

- No boot capabilities are provided.
- Only one C1700A or C1703A per SCSI channel.
- Only three C1700A or C1703A products per system.
- The SCSI channel includes a 2m cable. P/N 92222D can be ordered for 1m SCSI cable extender.
- The SCSI channel has to be configured at address 7 (factory standard).
- The maximum cable length is 6 meters (including internal cables).

SCSI Guidelines

- Third party SCSI devices are not supported, except the 1/2-inch cartridge tape.
- SCSI switch boxes are not supported.
- Use daisy chain configuration for all devices.
- All devices must have a unique address between 0 and 6.
- All cables should be attached to a device at both ends.
- The last SCSI device in the chain must have a terminator installed in its second connector.
- All devices must be connected to a common (single point) reference ground. Refer to appropriate Site Preparation Guide for details.
- All devices must be powered up with the self-test completed before power is applied to SPU.
- Keep all devices powered up during and after system boot-up.

SCSI Performance Guidelines for Corporate Business Systems 990 and 992.

- Maximum of 5 SCSI disks per SCSI interface card.
- Maximum of 5 SCSI interface cards per HP-PB I/O card cage. Remaining slots can be used for any other non-disk activity as long as power limits are not violated.

SCSI Extender .

HP's SCSI extender (P/N 28643A) is supported for use with the Rewritable Optical Autochangers and with the HP 5000 high end printers.

The SCSI extender has performance implications when used with SCSI devices that are asynchronous. The Optical Autochangers have asynchronous interfaces and therefore performance can be impacted by as much as 50%. The extender is **only** recommended for customers who **must have greater cabling flexibility** than 6 meters allows.

The extender is available in 50 meter and 100 meter lengths. Only one device may be connected to each extender and **NO** devices are allowed to be connected to the same SCSI bus.

The F100 printer has a synchronous interface and therefore should see little performance degradation when connected to the extender.

HP-IB Channels

HP's HP-IB channel card is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the 900 Series systems.

- 27113A – CIB HP-IB channel for use on Channel I/O Bus (CIB) systems
- A1747A – PBA-IB channel for use on Precision Bus (PB) systems

Each HP-IB channel is a board that supports one HP-IB cabling system. Each HP-IB cabling system may be used to connect from one to six HP-IB peripherals. Peripherals connected to one HP-IB channel are linked together with HP-IB cables. The number of peripherals which may be practically connected to a single HP-IB channel depends on cable length restrictions and performance considerations.

Series 9x7LX and 9x7

HP-IB channels are only supported in the Series 9x7LX and 9x7 via the Precision Bus Adapter (PBA-IB). Each PBA-IB uses 2 I/O slots (double-wide card).

HP-IB channels may be ordered two ways:

- option 401 (9x7 only) at time of initial purchase
- A1747A (PBA-IB) after initial purchase

Refer to page 2-1 for HP-IB channel maximums of Series 9x7LX and 9x7 systems.

Series 980

The Series 980/100, 980/200, 980/300, and 980/400 are supplied standard with two HP-IB channels. Additional HP-IB channels may be ordered as product number 27113A. System option 550 will delete one HP-IB channel and replace it with an HP-FL channel.

Up to 4 HP-IB channels are supported on each CIB. As a rule of thumb, you should not exceed 3 HP-IB channels per CIB without consulting a performance specialist. Order product 27113A to obtain additional HP-IB channels. *Refer to page 4-1 for HP-IB channel maximums of systems.*

Corporate Business Systems 990 and 992

Corporate Business System (CS) HP-IB channels are supported on the Series 990 Business System via the Precision Bus Adapter (PBA). Only one HP-IB channel can be connected to each PBA. The following ordering information should be used to order a PBA with or without an HP-IB card:

- A1747A – PBA with HP-IB
- Option 001 – PBA without HP-IB

Refer to page 4-1 for HP-IB channel maximums.

HP-IB Performance Considerations/Device Loading

- A maximum of six non-disk devices may be attached to each HP-IB device adapter
- A maximum of 4 disks should be attached to each HP-IB device adapter for consistent performance results
- A mixture of disk, tapes, and printers may be attached to an HP-IB device adapter as long as the firmware date code is 2912 or greater
- Any variance from these guidelines must have prior written approval from your local Hewlett-Packard Support office
- The electrical device load maximum remains at 8 external device loads per HP-IB device adapter

Configuring HP-IB Cabling

HP-IB Guidelines

- HP-IB Switch Boxes are not supported
- Use daisy-chain configuration for all devices
- All devices must have a unique address between 0 and 7
- All cable connections should occur at device (i.e., no cables should be connected together simply to extend to effective cable length)
- There should be no unterminated cables. All cables should be attached to a device at both ends
- All devices must be connected to a common (single point) system reference ground. Refer to appropriate Site Preparation Guide for details.
- All devices must be powered with the self test completed before power is applied to the SPU
- Keep all devices powered during and after system boot-up

Maximum Cable Length

The maximum combined length of HP-IB cables connected to a single device adapter is 15 meters. However, this maximum may be further restricted by the "seven plus one rule" described below. When connecting multiple peripherals to a single device adapter, the first device in the chain connects via a special 4 meter HP-IB cable included with the device adapter.

The calculation of maximum cable length also includes the length of HP-IB cable internal to the system and/or peripherals. The maximum length applies to the combination of cables whether they are "daisy-chained" in a line or connected in a branched layout.

The total cable length is the sum of the length of all HP-IB cables:

a. Inside the peripheral devices
b. Between peripherals
c. Between the nearest peripheral and the junction panel (HP-IB interface)
d. Between the HP-IB DA and the first device (4m)

The Seven Plus One Rule

The maximum combined length of HP-IB cables is restricted by electrical device loading as well as total cable length. *The total HP-IB cable length may not exceed seven meters plus one meter for each electrical device load attached to the HP-IB cable, up to a 15 meter maximum.* This calculation optimizes data transfer rates, ensuring correct performance.

All HP-IB cables internal to either the system or the peripherals are supplied standard with the product ordered. A special 4 meter cable is supplied standard with the HP-IB device adapter. External HP-IB cables are usually supplied with the peripheral, but there are exceptions.

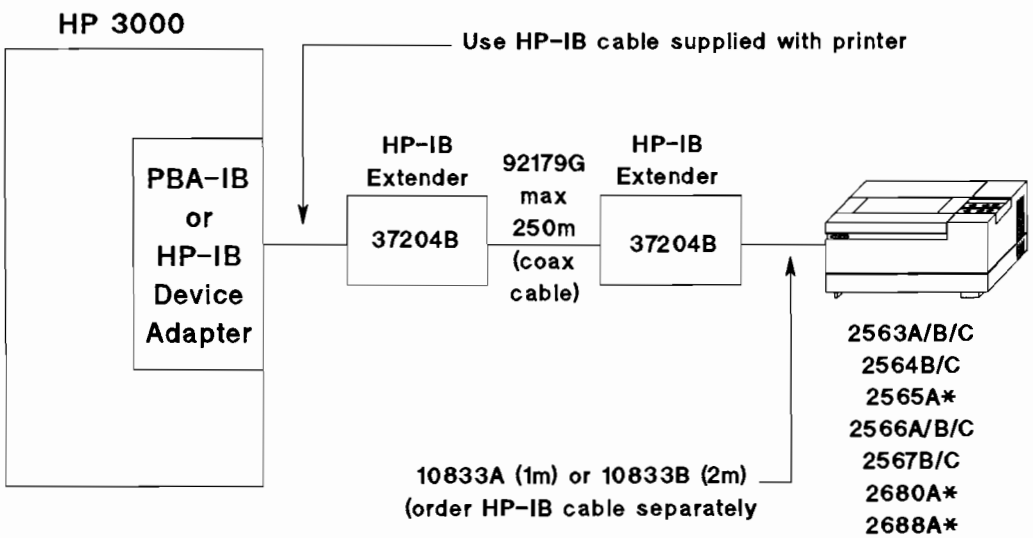
To increase cabling flexibility, the following HP-IB cables may be ordered separately:

- 1 meter HP-IB cable: P/N 10833A
- 2 meter HP-IB cable: P/N 10833B
- 4 meter HP-IB cable: P/N 10833C

HP-IB Extenders (for printers only)

For environments which require printers to be located longer distances from a 900 Series system, an HP-IB extender configuration may be installed. Extenders are available with coaxial cabling. Coaxial cable lengths are supported up to 250 meters. Coaxial cables must be ordered separately. Coaxial cable is P/N 92179G.

Each extender configuration requires a pair of extenders, one at each end. A configuration example is shown below.



** Discontinued*

Single Printer Cabling with HP-IB Extenders (37204B)

An HP-IB extender configuration is subject to the following limits:

- HP-IB extenders are supported on MPE/iX release 1.2 or later
- A maximum of four printers are supported per extender configuration. These may be a combination of 256x, 2688A* or 2680A* printers. However, only two page printers (2688A or 2680A) are supported per extender configuration.

- When multiple printers are connected to an extender configuration, a maximum of 1 meter HP-IB cable (P/N 10833A) can be installed between printers. This cable must be ordered separately.
- Two sets of extender pairs may be connected to a single HP-IB device adapter, but only 256x printers may be used on both extender pairs.

** Discontinued*

Note

For HP-IB device adapters with firmware 27113-81002 (Rev 2733), a firmware upgrade is required to support HP-IB extenders. See service note 27113A-02 for details.

HP Fiber-Optic Link Channels

HP's Fiber-Optic link is an interface channel used to connect HP-FL disk drives to the 900 Series systems. The following interface cards are available:

- 27115A – CIB HP-FL link for the channel I/O bus (CIB) systems. Supported on Series 980 systems.
- 28616A – PB-FL link for the Precision Bus systems. Supported on Series 9x7LX, 9x7, and Corporate Business systems.
- A1748A – PBA-FL link for the Precision Bus systems. Supported only on 9x7LX and 9x7 systems. The PB-FL replaces the PBA-FL.

Each interface uses two I/O slots and attaches one fiber-optic cable. The cable needed to connect the channel to its first disk drive is included with the HP-FL channel. Each channel may support up to 8 disks in a daisy-chain using a disk-to-disk bus called P-Bus.

The advantages of HP-FL (PB-FL) relative to HP-IB (PBA-IB) are numerous. First, up to eight HP-FL disks can be placed on a single HP-FL Device Adapter (DA) while, for performance reasons, it is not recommended to exceed five HP-FL (PB-FL) disks per HP-FL (PB-FL) DA. This means larger disk configurations can be achieved with HP-FL using fewer system I/O slots. Second, HP-FL (PB-FL) supports fiber-optic cable lengths up to 500 meters while HP-IB (PBA-IB) supports a maximum cable length of 15 meters. This allows HP-FL (PB-FL) a higher degree of configuration flexibility because disks can be placed further away from the CPU. Third, HP-FL (PB-FL) offers an improved data transfer rate relative to HP-IB (PBA-IB), 5 megabytes per second versus 1 megabyte per second, respectively.

HP-FL (PB-FL) also has advantages over SCSI. The HP-FL (PB-FL) interface uses the link more efficiently than SCSI, providing higher sustained data transfer rates. In addition, HP-FL (PB-FL) supports all high availability solutions such as Disk Mirroring and SPU Switchover/XL and supports larger configurations.

Series 9x7LX and 9x7

PBA-FL channels may be ordered for the Series 9x7 systems either as an option to the system (option 407) or via a Precision Bus Adapter with HP-FL (A1748A). The Precision Bus (PB-FL), part number 28616A, is also supported on the 9x7LX and 9x7 systems. *Refer to page 2-1 for PB-FL channel maximums. The PB-FL replaces the PBA-FL.*

The new HP-FL disk arrays (C2252, C2254) are **NOT** supported by the PBA-FL bus adapter. Series 9x7 customers who have a PBA-FL bus and want to connect disk arrays must order the new PB-FL (28616A).

Series 980

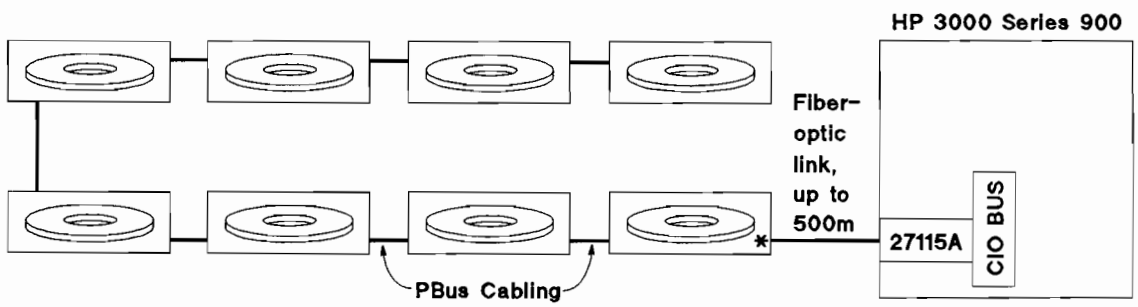
Each system supports a maximum of 3 HP-FL channels per CIB. As a rule of thumb, you should not exceed 2 HP-FL channels per CIB without consulting a performance specialist. *Refer to page 4-1 for HP-FL channel maximums.*

Corporate Business Systems 990 and 992

Each system supports a maximum of 5 HP-FL channels per HP-PB I/O card cage. Each PB-FL card supports 8 devices. PBA-FL card is not supported on the Corporate Business Systems.

HP-FL Cabling

Unlike HP-IB (PBA-IB), there are two cabling methods incorporated into the HP-FL (PB-FL) interface. The fiber-optic cable is used to connect a group of HP-FL disk drives to the HP-FL (PB-FL) DA. The fiber-optic cable is a duplex cable of glass fiber containing two fiber-optic strands. One strand is used to transmit data from the CPU to the disks and the other is used to transmit data from the disks to the CPU. As shown in the figure below, the fiber-optic link connects from the system to one or a group of disks. A 30 meter fiber-optic link is included with P/N 27115A and P/N 28616A. The 30 meter cable can be replaced by a custom fiber-optic cable, up to 500 meters long. This is orderable as HFBR-AWQnnn, where nnn is the length in meters.

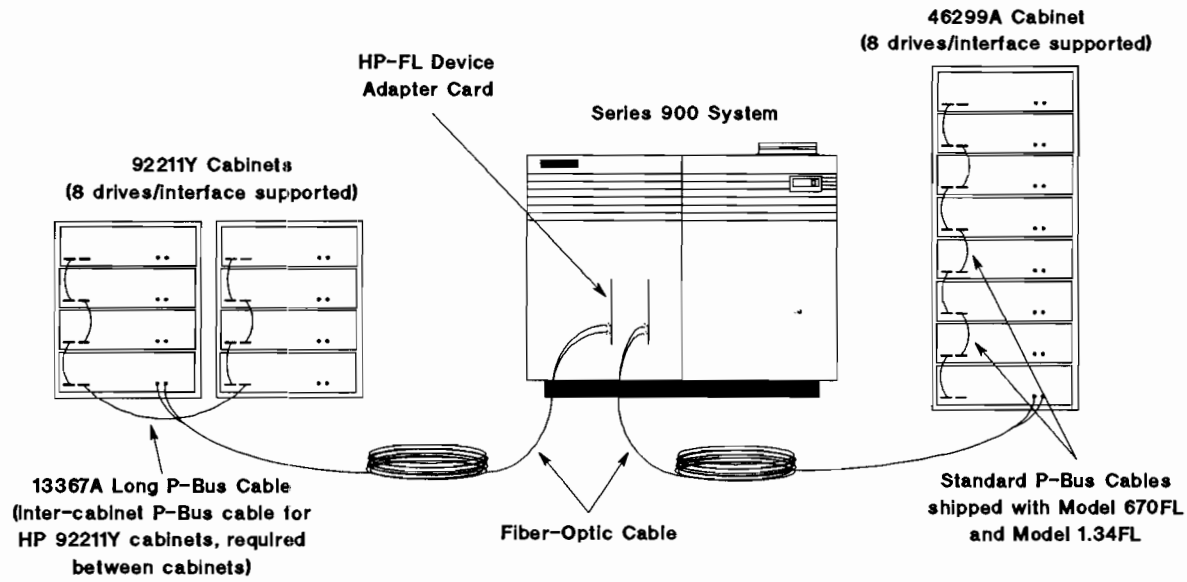


HP-FL Disk Interface

As a space and cost savings solution, a multi-wire P-Bus cable is used to daisy-chain up to eight HP-FL disk drives together on a single HP-FL (PB-FL) interface card in a single cabinet. (The HP 46299A is a 19-inch EIA cabinet, 1.6m tall. It can hold up to eight HP C2201A and/or C2204A disk drives.) The P-Bus cable is a 64-wire copper cable. The transfer rate capabilities of the P-Bus cable match that of the fiber-optic cable at 5 megabytes per second.

P-Bus 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. Disks in adjacent cabinets are connected using a long P-Bus cable, P/N 13367A. The C22XXA product P-Bus cables are backward compatible. The older P-Bus 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 P-Bus, but not directly to the system via the fiber-optic cable. At least two disk drives per channel should have fiber-optic circuits (the standard drive) for configuration flexibility.



P-Bus Cabling

Performance Considerations

To enhance performance with TurboSTORE/XL or TurboSTORE/XL II, modified configurations are suggested. If backup devices will only be used sequentially, they may share an HP-IB channel. If devices are used in parallel or parallel in device pools, it is suggested that each backup device have its own HP-IB DA. Additional performance increases can occur with:

Series 980

- FL disks connected to at least one HP-FL DA. If HP-IB disks are used, they should be spread over at least four HP-IB DAs
- A maximum of two HP-FL DAs per CIB
- HP-IB and HP-FL channels on separate CIB
- A maximum of 3 HP-IB channels per CIB

For best performance results with SCSI disks, follow these guidelines:

- Place add-on DDSs or other back-up device on a separate SCSI bus from disks
- Connect 5 or less disks per SCSI bus

Corporate Business Systems 990 and 992

For best performance results with HP-FL disks, follow these guidelines:

- A maximum of 5 HP-FL disks per PB-FL interface card (single disks and disk arrays)
- A maximum of 5 HP-FL interface cards per HP-PB I/O card cage. (Remaining slots can be used for any other non-disk activity as long as power limits are not violated).

For best performance results with SCSI disks, follow these guidelines:

- Place add-on DDSs or other back-up device on a separate SCSI bus from disks
- Connect 5 or less disks per SCSI bus

Interconnect Positioning

	HP-IB (PBA-IB)	SCSI	HP-FL (PB-FL)
Primary focus	Upgrade systems with HP-IB devices 1/2-inch tape Printers	Disk/DDS on new low end and midrange systems Optical Autochanger 1/2-inch cartridge tape	Disks on midrange, and high end
High availability	No	Mirrored Disk only	Yes
Cable length maximum	15 meter	6 meter	500 meter
Maximum throughput	1 MB/sec	5 MB/sec	5 MB/sec
Sustained throughput relative to HP-IB	1	2x	4x
Maximum disks per interface card	6	7 (5 for performance)	8

SCSI

Use SCSI to:

- connect disks, optical autochangers for 900 Series low end and midrange systems, HP 5000 printer family, and 1/2-inch cartridge tape (3480 compatible) (configurations larger than 15 Gbytes should consider using HP-FL disks)
- satisfy industry standard and open system requirements
- replace HP-IB as customers migrate to new 900 Series systems

HP-IB (PBA-IB)

Use HP-IB (PBA-IB) to:

- connect 1/2-inch tape devices
- meet customers need to migrate HP-IB peripherals

HP-FL (PB-FL)

Use HP-FL (PB-FL) to:

- connect disks on the 900 Series high end systems, including disk arrays
- satisfy high performance requirements for disk
- satisfy High Availability requirements for midrange and high end systems (Disk Mirroring, SPU Switchover/XL)
- satisfy longer distance requirements between host and disk
- satisfy larger disk configurations (disk configurations over 15 GB are not recommended for SCSI)
- satisfy fiber-optic requirements (EMI/RFI noise)

I/O Card Summary

I/O Card	Part Number	System Supported
CIB HP-IB	27113A	Series 980
PBA-IB	A1747A	Series 9x7LX, 9x7, CS 990, and CS 992
CIB SCSI	27251A	Series 980
HP-PB SCSI	28642A	Series 9x7LX, 9x7, CS 990, and CS 992
CIB HP-FL[1]	27115A	Series 980
PB-FL[1]	28616A	Series 9x7LX, 9x7, CS 990, and CS 992
PBA-FL[2,3]	A1748A	Series 9x7

[1]LDEV 1 C2201, C2204, C2252
[2]C2252 and C2254 are NOT supported on the PBA-FL (A1748A) card. If a Series 9x7 customer orders C2252 or C2254, a PB-FL (28616A) MUST also be ordered.
[3]PB-FL replaces the PBA-FL

Interconnect Product Number Summary

Interface Card	Part Number	Cable(s)	Extender
HP-IB **PBA-IB**	27113A A1747A (PBA)	10833A (1 meter) 10833B (2 meter) 10833C	37204B
HP-FL **PB-FL** **PBA-FL**	27115A 28616A A1748A (with PBA)	HFBR-AWQnnn	

SCSI Interconnect Product Number Summary

From:	High Density Squeeze Lock	High Density Thumb Screw	Low Density Bail Lock	Low Density Thumb Screw	Terminator
To:					
Low Density Bail Lock	K2286 .9m K2285 1.5m	K2296 .9m K2297 1.5m	92222A .5m 92222B 1.0m 92222C 2.0m	K2284 1.0m K2283 1.5m	K2291
Low Density Thumb Screw	K2288 .9m K2287 1.5m	K2294 .9m K2295 1.5m	K2284 1.0m K2283 1.5m	K2207 .5m K2208 1.0m K2209 1.5m K2210 2.2m K2211 3.0m	K2290

6

Peripherals

Disks

The 900 Series systems can be ordered with either SCSI disks or HP-FL disks. SCSI disks are integrated into the Series 9x7LX and 9x7 systems and additional disks can be ordered and integrated into the system or added as standalone disks. The standalone disks are packaged in the Series 6000 multi-mechanism package. This package can be thought of as a "peripheral hotel" and is available in several models.

The Series 6000 multi-mechanism package can be used to add SCSI peripherals to the Series 980 and the Corporate Business Systems 990 and 992. The rackmount models can be packaged into the standard 1.6 meter expansion cabinet for the CS 990 and 992 and can also be mounted into a 1.1 meter or 1.6 meter cabinet for the Series 980 systems. Additional 1.6 meter cabinets are orderable from HP:

- C2786A – Standalone Cabinet
- A1884A – Factory Integrated Cabinet

The new Disk Array products (C2254, C2252) are supported on all 900 Series systems with release 4.0. These HP-FL disks provide large capacity and high performance for HP's customers with large configurations. High availability offerings such as SPU Switchover and Mirrored Disk are supported with HP-FL disks, including disk arrays. The C2254 and C2252 are also offered in the A1884A cabinet.

HP 3000 900 Series Disks and Performance

The HP 3000 900 Series and the MPE/iX operating system provide outstanding disk performance, ideal for OLTP applications. Outstanding disk performance occurs by:

- Eliminating disk I/O where possible
- Moving data in large transfer sizes
- Reducing time waiting for disk I/O given larger disk prefetches
- Eliminating substantial number of disk I/O operations for repeated file reference as large volumes of disk file data is managed in main memory

HP 3000 900 Series Disk Support

Capacity and Performance Specifications	Series 6000 Models 335H (C2200A), 670H (C2203A), 670XP (C2202A)	Series 6000 Models 670FL (C2201A), 1.34FL (C2204A)	Series 6000 Multi-Mechanism Package C2461F/R, C2462F/R, C247x	Disk Arrays C2252HA/B, C2254HA/B
Mbytes (formatted)	335/670	670/1.34 GB	673/1.35 GB	2.7 GB/5.4 GB
Interface	HP-IB (XP=Cache)	Fiber Optic Link	SCSI	Fiber Optic Link
Seek time (ms)	17	17	15	13.5
Latency (ms)	7.5	7.5	7.5	7.5
Controller Overhead (ms)	1.1/1.1/1.4	1.6	< 1.0	< 0.5
Internal disk transfer rate (MB/second) Burst	2.50	2.50	2.88	2.46
Internal disk transfer rate (MB/second) Sustained	1.40	2.2	2.2	2.2
Operating system release	2.0	2.0	3.1	3.0 patch (CIB systems) 4.0 general release
NOTE: 795XB disk drives are NOT supported on 900 Series systems.				

Disk Array Guidelines

- **Only** C2252HA or C2252B are supported as LDEV 1 (2.7 GB) with release 4.0

Note

On Channel I/O Bus (CIB) systems, LDEV 1 will be limited to 2.0 GB of usable space. This is necessary to ensure files can be retrieved at boot time. CIB I/O Dependent Code (IODC) can only manage up to 2 GB.

On Precision Bus (PB) systems, LDEV 1 will be limited to 4.0 GB of usable space. IODC on PB systems can manage up to 4.0 GB.

- Disk configurations less than 12 GB should use only C2252 (2.7 GB) disks for performance reasons. The large disk array in this configuration may not provide the system with sufficient concurrent I/Os.

Optimal system performance can be achieved by following these guidelines:

Series 9x7

- 3 PBA-FL or PB-FL cards per HP-PB
- 5 or less disk arrays per HP-FL channel

Series 980

- 2-3 CIB HP-FL cards per CIB
- 5 or less disk arrays per HP-FL channel

- 5 PB-FL cards per HP-PB I/O card cage
- 5 or less disk arrays per HP-FL channel

HP-FL Disk Array and Relational Database

The HP-FL disk arrays offer a variety of different configurations. Some of these offer more data protection than others. Hewlett-Packard recommends that customers interested in data security choose striped mode with parity.

The C2252HA and C2254HA offer 'striped with parity' mode, where the data is striped across two or four (respectively) data mechanisms, and an extra disk mechanism preserves a parity checksum of the others. This allows the array to survive a mechanism failure invisibly. In the case of such a failure, the array controller uses the checksum to reconstruct the data from the failed mechanism without any performance degradation.

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, although extremely rare, could potentially cause data loss, depending on the application. This new type of disk failure occurs when:

1. A power failure occurs, AND
2. The power remains off beyond the period safeguarded by the system battery backup (approximately 15 minutes), AND
3. The disk was doing a write, AND
4. The power loss occurred in such a way as to cause the write to complete to some mechanisms and not to others, AND
5. 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 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.

Some relational database systems will be susceptible to this type of problem due to their error detection schemes. If a customer chooses to use a relational database with disk arrays without a parity disk configuration, they should ALWAYS reload their database and roll forward to recover up to the point of the powerfailure if numbers 1 and 2 above occur. This will prevent any data loss.

This type of failure is NOT an issue for HP 3000 TurboIMAGE users. The recovery mechanisms for TurboIMAGE are sufficiently robust to prevent this situation from occuring.

Packaging

The Series 9x7LX and 9x7 systems are preconfigured with one integrated SCSI disk. Additional disks can be ordered and integrated into the System package or added as standalone disks. The standalone disks are packaged in the Series 6000 multi-mechanism package. The Series 6000 package can be thought of as a "peripheral hotel" and is available in several models containing:

- C2461F/R - 673 Mbyte SCSI disks for floor or rackmount package
- C2462F/R - 1.35 Gbyte SCSI disks for floor or rackmount package
- C2464F/R, C2466F/R - 2.0 Gbyte, 8.0 Gbyte DDS drive for floor or rackmount package

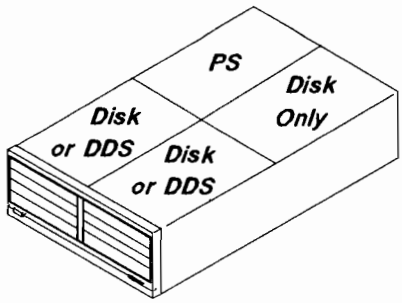
The Series 980 and CS 990 also support these peripheral packages. The rackmount models can be ordered and racked in the 1.6 meter cabinet (P/N A1884A).

Series 6000 Package Maximums*

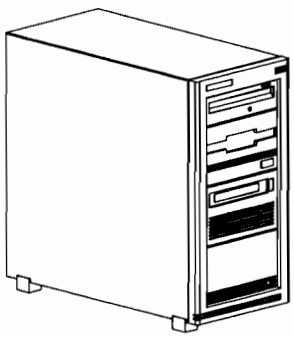
	Product Number	Maximum
Model F (Floor Mini Tower)		
5 1/4-inch full height disks	C2461/62F	3
3 1/2-inch DDS half height	C2464F, C2466F[1]	7
Model R (Rackmount)		
5 1/4-inch full height disks	C2461/62R	3
3 1/2-inch DDS half height	C2464R, 2466R[1]	4
[1] *Support planned for 1Q93*		

* *See Series 6000 Sales Guide (5091-1686E) for more details.*

Rack (R) Model



Mini Tower
Floor (F) Model



SCSI Disks 5 1/4" full height
SCSI DDS 3 1/2" half height

7 half height equivalents or
3 full height equivalents
(any combination of mechanisms)

HP Series 6000 Model 670F/R, 1355F/R, and 2000D F/R

The disk array products (C2252 and C2254) are rackmountable in the standard 1.6 meter cabinet. A total of 5 arrays will fit in one 1.6 meter cabinet.

Series 9x7LX and 9x7 Device Configuration Rules

The following configuration rules must be adhered to for systems with add-on DDS (C2463) SCSI devices connected to the 9x7LX and 9x7 systems. These configuration restrictions are necessary to support Powerfail.

This configuration restriction is **only** necessary for C2463 (5 1/4-inch SCSI DDS). Any Series 6000 multi-mechanism package which contains one or more C2463 DDS tape drives must be connected to the Series 9x7LX and 9x7 system via its own SCSI bus. It can NOT be daisy-chained to another multi-mechanism package NOR can it be connected via the same SCSI bus as the integrated peripherals.

Series 6000 multi-mechanism packages containing only disks or disks and DDS drives **other than** C2463 can be daisy-chained to another multi-mechanism package or to the integrated SCSI bus up to the limit of 7 devices per SCSI bus.

Note

The SCSI bus which supports the integrated mechanisms can ONLY support a maximum of five devices.

C2463 (5 1/4-inch SCSI DDS) is ONLY supported on Series 9x7LX and 9x7 systems. It is NOT supported on other platforms.

Maximum Disk Drive Configurations

	9x7LX[2]	9x7	980/100 980/200	980/300 980/400	990
HP-IB disk drives[A]	6	12	72	72	48
PB-FL disk drives[B]	8	24	96	96	128
PBA-FL disk drives[B,3]	0	24	N/A	N/A	N/A
SCSI disks[C]	18	25	84	84	128
Embedded disks					
C2280A	N/A	N/A	N/A		
C2281A[1]	N/A	N/A	N/A		
C2282A	N/A	N/A	N/A		
2473S[1]	1	3	N/A		
2497S[1]	1	3	N/A		
Total disk drives	18	49	96	96	128

[1] Disk drive not supported as a system disk (LDEV 1). Minimum capacity for system disk for MPE/iX is 400 Mbytes
[2]If HP-IB interface is used, system supports only 3 additional SCSI disks.
[3]PB-FL (28616A) replaces PBA-FL (A1748A)

N/A = Not applicable

A (HP-IB)	B (HP-FL)	C (SCSI)
7933H/XP[1,4] *	7936FL[1] *	C2473S/F/R
7935H/XP[1,4] *	7937FL[1] *	C2474S/F/R
7936H/XP[1] *	C2201A	C2461F/R
7937H/XP *	C2204A[3]	C2462F/R
7962B[1] *	C2252HA,B	
7963B[1,2] *	C2254HA,B[1]	
C2200A[1]		
C2202A		
C2203A		

** Discontinued*

NOTES:

[1]Disk drive not supported as a system disk (LDEV 1).

[2]Each 7963B unit may hold up to 3 disk drives each with a separate controller. Support is for the total number of disk drives.

[3]Each C2204A unit holds two disk mechanisms which share a controller and is considered a single disk drive.

Disk Space Recommendations for Dump File Storage

HP will be able to provide remote dump analysis on customer systems in a timely manner if enough disk space is allocated for dump file storage on customer systems. In order to better help customers plan for enough disk space to restore dump files or to dump to disks via AutoRestart/XL, average file sizes for various system configurations are provided below in the following table.

Dump sizes are determined by the amount of main memory, the number of active processes and the dump compression rate which is affected by the application mix. The dump sizes are listed by number of processes assuming an average of three processes per job or session. One should note that for systems that have greater than three processes per job or session, the dump file could be larger. Conversely, for systems that have less than three processes per job or session, the dump file could be smaller.

Dump/XL and AutoRestart/XL automatically compress the dump file. The compression rate will vary depending on the type of data stored in each dump file. An average compression rate of 40% is used to calculate the dump size estimates listed in the following table.

Note

AutoRestart/XL requires a separate dedicated volume set containing one or more volumes for dump file storage. *Refer to the table below for dump file space recommendations.*

Disk Space Recommendations for Dump/XL

Number of Processes	Main Memory Size (Mbytes)	Estimated Average Compressed Dump Size* in Sectors
24	24	260,000
	96	375,000
75	24	285,000
	96	500,000
150	24	570,000
	96	685,000
300	24	935,000
	96	1,055,000
600	128	1,845,000
	256	2,055,000
	512	2,475,000
1200	128	3,320,000
	256	3,530,000
	512	3,950,000
	1024	4,785,000
1800	128	4,795,000
	256	5,000,000
	512	5,420,000
	1024	6,260,000
2400	128	6,270,000
	256	6,475,000
	512	6,895,000
	1024	7,735,000
3600	128	9,215,000
	256	9,425,000
	512	9,845,000
	1024	10,685,000
5300	128	13,395,000
	256	13,605,000
	512	14,025,000
	1024	14,865,000
** Actual dump sizes may vary by +/- 25%*		

Back-Up Solutions

The choice of a back-up solution is specific to the customer, based on applications, back-up goals, and other MIS strategies. The appropriate solution can depend on many of the following variables: mass storage configurations today and in the future, amount of data interchange with non-HP systems, level of operator intervention or unattendedness of the back-up, continuous 24 hour processing, CPU utilization and user impact, price/performance of solution, future applications of back-up technology (ie, rewritable optical disk library system as a future archival solution).

HP 3000 900 Series customers have many backup solutions from which to choose to meet their specific backup needs. On the hardware side, HP offers 1/2-inch magnetic tape, DDS-format Digital Audio Tape (DAT) drives, 1/2-inch cartridge tape (3480 compatible), and Rewritable Optical Disk Library System. HP also offers a family of backup software products, TurboSTORE and TurboSTORE/XL II, to provide fast, unattended, and online backup solutions.

There are many parameters which need to be considered when evaluating a backup solution for a specific environment. The customer's objective, with regard to backup, needs to be well understood in order to make the appropriate choices. Below is a list of parameters you need to consider when evaluating a particular solution for your customer's environment.

- attended versus unattended backup
- online versus dedicated backup
- system size (CPU)
- system configuration (how many GB need backing up)
- customer's backup strategy (how often, for what purpose, full and/or partials, onsite or offsite storage, media interchange, retrieval time)
- number of disks and what type of disks and interface
- type and number of backup devices
- impact of rewind time for 1/2-inch tape and DDS

Some conclusions follow which can be drawn from the data we have collected.

- Optical (C1700A) performance today approaches 1/2-inch tape performance (because HP-IB is the bottleneck)
- Optical media costs become very reasonable with TurboSTORE/XL II and data compression
- The *hierarchy* of performance constraints seems to be; 1) device throughput, 2) collective device throughput with multiple devices, 3) CPU utilization for TurboSTORE/XL II and high data compression, 4) the spread of data across how many disks, and 5) the disk type and interface, with newer disks and HP-FL interface providing the best performance
- The number and type of disks matter because with interleaving, TurboSTORE will pull data from multiple disks in parallel, therefore the greater the number of disks, the better TurboSTORE can perform.
- Online backup should be performed with fast rather than high data compression because high data compression is CPU intensive.

The 1/2-inch magnetic tape and 1/2-inch cartridge tape (3480 compatible) is ideal for data interchange with non-HP systems. The 1/2-inch cartridge tape products are available from Storage Technology Corporation (4220 with autoloader and 4280). The 4280 is ideal for fast backup and for data interchange in a mainframe environment. These products are only supported with autoloaders that hold up to ten cartridges. The 1/2-inch cartridge tape cannot share a SCSI device card with HP SCSI devices.

The DDS cassette can provide up to 2 GB of storage with no data compression. As the amount of data per cassette increases, so does the need to improve the access time to the stored data. Single and multiple DDS devices can provide low cost and unattended backup for small to medium configurations.

Note

"DDS format quality" cassettes must be purchased by customer either from HP or other vendors. Not all generic DAT tapes meet HP standards.

The HP Series 6300 Model 20GB/A Rewritable Optical Disk Library System (C1700A) and Model 10GB (C1703A) provide unattended backup for large configurations on the HP 3000. To ensure operability on the HP 3000, three pieces need to be ordered:

1. TurboSTORE/XL II with support for Rewritable Optical Disk (P/N 36397A) or TurboSTORE/XL II with Online Backup for Rewritable Optical Disk (P/N 36398A)
2. Rewritable Optical Disk Library System (P/N C1700A, option 1AC or option 133). Option 1AC provides the 1 meter, 19-inch rack version of the library system. Option 133 provides the library system without the cabinet for installation into an existing 1 meter cabinet. Option AFJ provides 2 meter SCSI cable.
3. SCSI host-adapter for CIB HP 3000 systems (P/N 27251A) includes 2 meter cable. P/N 92222D can be ordered for 1 meter SCSI cable extender. SCSI host-adapter for HP-PB systems (28642A) includes a 1 meter cable.*

In configuring the Optical Disk Library, each Library System must have its own SCSI host adapter card.

HP 3000 900 Series Summary of Backup Capacity

	7980A	7980XC	DDS	Optical	1/2-inch Cartridge (3480)
Media Capacity Comparison					
Media capacity basic	140 MB	500 MB	2000 MB	650 MB	200 MB
Media capacity with (typical) fast data compression	280 MB	N/A	4000 MB	1300 MB	400 MB
Media capacity with (typical) high data compression	500 MB	N/A	7000 MB	2250 MB	700 MB
Media Cost Comparison					
Media cost per unit	$23	$23	$15	$200	$9
Media cost per MB basic	$.16	$.05	$.01	$.31	$.05
Media cost per MB with fast data compression	$.08	N/A	$.005	$.16	$.03
Media cost per MB with high data compression	$.05	N/A	$.003	$.09	$.01

HP 3000 900 Series Summary of Transfer Rates in Gbytes/Hour (Series 980/100)

	7980A	7980XC	DDS	Optical	1/2-inch Cartridge
Standard device	~2.5	~3.0	~.65	~2.0	6
TurboSTORE/XL II with fast data compression	~5.0	N/A	~1.3	~3.5 - 4.0	10 - 12
TurboSTORE/XL II with high data compression	~7 - 8.0	N/A	~2.5	~5 - 7.0	15 - 20

Note

These transfer rates are based on TurboIMAGE databases being backed up under optimal conditions. Your customer may get different results depending on their environment.

Transfer rates depend on back-up device, number of devices per bus, processor performance, TurboSTORE/XL II compression ratio, and type of data being compressed. The above transfer rates assume one device; additional devices obviously increase transfer rates. Data compression (other than 7980XC) requires TurboSTORE/XL II.

Maximum Backup Drive Configurations

	9x7LX	9x7	980/100 980/200 980/300 980/400	990
1/2-inch Tape Drives[A]	4	8	8	8
DDS tape drive	4	8	8	8
1/2-inch cartridge tape	2	8	8	8
Total Tape Drives	4	8	8	8
Optical	2	3	3	3

[A] 7974A, 7978A/B, 7979A, 7980A, 7980XC[1]

[1] *Highest performance with TurboSTORE/XL requires configuring each 7980XC and 7980 to a separate HP-IB channel.*

TurboSTORE/XL II

TurboSTORE/XL II offers fast, unattended dedicated and online back-up. For maximum flexibility, TS/XL II has two software data compression algorithms from which to choose: fast and high density. The fast algorithm provides an average of 2:1 data compression while the high density algorithm provides an average of 3.5:1 data compression. Actual compression rates will depend on the type of data being compressed.

Note Fast data compression is recommended for *online* back-up for all systems.

Parallel devices provide the capability of reducing back-up time (depending on the characteristics of your files and your backup device) by storing different files on different devices at the same time. When files are stored to a set of parallel devices, the files are grouped before the *Store* begins and then copied to multiple devices simultaneously. TurboSTORE/XL II supports up to a maximum of eight parallel back-up devices.

Parallel device pools are multiple sets of sequential devices used in parallel. (In a sequential backup, the system stores to one backup device first. Once that backup device is filled, the system stores to another device.) Using large device pools is often the most efficient way to store a large set of files when you have several backup devices. Parallel device pools give you the advantage of both parallel and sequential devices. File subsets are copied to different devices simultaneously, while another sequential device is ready when the tape is filled in any device pool. TurboSTORE/XL II supports up to eight backup devices within a parallel device pool. Maximum performance is obtained by using three or four parallel sets, each consisting of two sequential devices.

To enhance performance with TS/XL or TS/XL II, modified configurations are suggested. If backup devices will only be used sequentially, they may share an HP-IB DA. If devices are used in parallel or parallel in device pools, it is suggested that each backup device have its own HP-IB DA. Additional performance increases can occur with:

- HP-IB disks spread over at least four HP-IB DAs
- A maximum of two HP-FL DAs per CIB.
- Have HP-IB and HP-FL DAs on separate CIB.
- A maximum of 3 HP-IB DAs per CIB.

For Series 9x7 systems with greater than 12 Gbytes storage, spread disks across 3 SCSI busses. Back-up performance is enhanced with TurboSTORE/XL II and SCSI disks and DDS by having the disks on a separate SCSI bus from the DDS tapes and/or 1/2-inch tape drives.

TurboSTORE/XL II can create compatibility mode tapes which can be recovered on MPE V systems and MPE/iX systems using the "TRANSPORT" parameter. You cannot create tapes with TurboSTORE/XL or TurboSTORE/XL II in Native Mode and recover in Compatibility Mode. Compatibility Mode tapes can be created, but no TurboSTORE/XL or TurboSTORE/XL II options (data compression, online, etc.) can be used.

The 1/2-inch tape compressed on the 7980XC cannot be read by TurboSTORE/XL II if restored from a drive other than 7980XC.

The 1/2-inch cartridge tape drive from StorageTek can provide your customer with media interchange in mainframe environments. This standard (3480 compatible) cartridge is usable

in IBM's 3480 1/2-inch cartridge tape drives. Data stored to this cartridge with IBM label tape format can be easily transferred to an IBM system, and vice versa.

STORE and TurboSTORE/XL Products

Product	Part Number	Description
STORE/XL		Single device store/restore, fastsearch for DDS as of 2.2 and forward
TurboSTORE/XL	30319A	Up to 8 parallel tape drives, up to 8 sequential tape drives, support dissimilar devices (7980XC and 7978), interleaving, fastsearch as of 2.2 and forward
TurboSTORE/XL II	36387A	Software data compression, up to 8 parallel or serial devices, DDS and fastsearch on DDS, parallel restore, IBM/ANSI label tapes, dissimilar tape devices, interleaving
TurboSTORE/XL II with Online Backup	36388A	All functionality in P/N 39387A plus capabilities for online backup
TurboSTORE/XL II with support for Rewritable Optical Disk	36397A	All functionality in P/N 39387A plus support for Rewritable Optical Disk
TurboSTORE/XL II with Online Backup for Rewritable Optical Disk	36398A	All functionality in P/N 39397 plus online backup

Printers

Description

Three categories of printers are supported directly connected to HP 3000 Series 900 systems. Character printers tend to be less expensive yet versatile in capabilities, including the handling of multipart forms. Line printers offer much of the same versatility and are cost effective and more reliable for larger volumes of printing. Page printers are quieter in the office environment and offer crisp, letter quality output in a range of print speeds. The table below summarizes the various printers supported directly connected to 900 Series systems.

Summary of Printers Supported on HP 3000 900 Series Systems

	Maximum Print Speed	Paper Type	Print Quality	Bar Codes	Interface	Modem Support
Dot Matrix Impact Character Printers						
2932A* General Purpose Printer	200 cps	FF/MPF	Dft	No	Serial	Yes
2933A* Factory Data Printer	200 cps	FF/MPF	Dft	Yes	Serial	Yes
2934A Business Printer	40/67/200 cps	FF/MPF/CS	LQ/NLQ/Dft	Yes	Serial	Yes
C1202A Asian Character Printer	110/220 cps	FF/MPF/CS	NLQ/Dft	No	Serial/HP-IB	Yes
Dot Matrix Impact Line Printers						
2562C Industrial Line Printer	150/300 lpm	FF/MPF	NLQ/Dft	Yes	Serial/HP-IB	No
2563A*/B*/C Line Printer	150/420 lpm	FF/MPF	NLQ/Dft	Opt	Serial/HP-IB	No
2564B*/C Line Printer	300/840 lpm	FF/MPF	NLQ/Dft	Opt	Serial/HP-IB	No
2566A*/B*/C Line Printer	248/1200 lpm	FF/MPF	NLQ/Dft	Opt	HP-IB	No
2576B*/C Line Printer	320/1600 lpm	FF/MPF	NLQ/Dft	Opt	HP-IB	No
C1200A Asian Line Printer	270 lpm	FF/MPF	NLQ/Dft	No	Serial	Yes
Page Printers						
2686A* LaserJet	8 ppm	CS	LQ	Opt	Serial	No
33440A* LaserJet Series II	8 ppm	CS	LQ	Opt	Serial	No
33447A* LaserJet Series IID	8 ppm	CS	LQ	Opt	Serial	No
33449A LaserJet Series III	8 ppm	CS	LQ	Opt	Serial	No
33459A LaserJet Series IIID	8 ppm	CS	LQ	Opt	Serial	No
33491A LaserJet Series IIISi	17 ppm	CS	LQ	Opt	Serial/LAN	No
2687A* Page Printer	12 ppm	CS	LQ	Opt	Serial	No
2688A* Page Printer	12 ppm	CS	LQ	Opt	HP-IB	No
2684A* LaserJet 2000	20 ppm	CS	LQ	Opt	Serial	No
2680A* High Speed Page Printer	45 ppm	FF	LQ	Yes	HP-IB	No
C2753A HP 5000 Model F100 60Hz	100 ppm	FF	LQ	Yes**	SCSI	No
C2754A HP 5000 Model F100 50Hz	100 ppm	FF	LQ	Yes**	SCSI	No

** Discontinued product, listed for support reference*
*** Requires third party software*

```
cps = characters per second    FF = fanfold          Dft = draft
lpm = lines per minute         MPF = multipart forms NLQ - near letter quality
ppm = pages per minute         CS = cutsheet         LQ = letter quality
```

Maximum Printer Support

System Printers

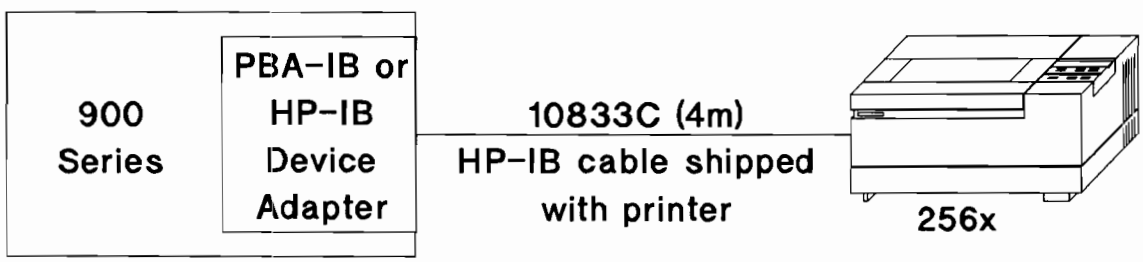
System printers connect through the HP-IB (PBA-IB) or SCSI interface. This configuration generally offers higher printer throughput, guarantees data integrity, ensures print job independence and reports operational status to the system. More information on HP-IB and SCSI interfacing printers is in Chapter 5.

The following tables list the total number of system printers as well as the maximum number of each type of printer supported on 900 Series systems.

Maximum System Printer Configurations

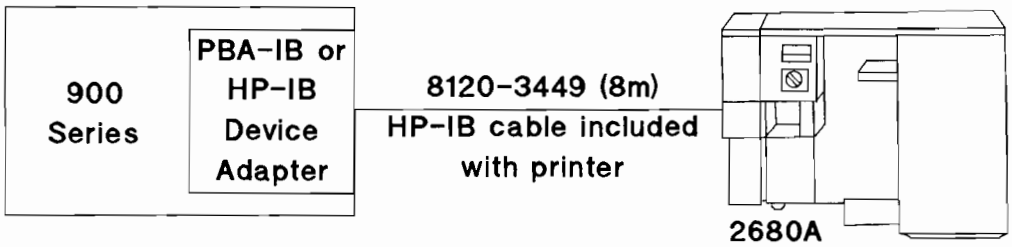
	9x7LX	9x7	960, 980/100, 980/200, 980/300, 980/400	CS 990, CS 992
2562C	6	8	8	8
2563A/B/C	6	8	8	8
2564B/C	6	8	8	8
2566A/B/C	6	8	8	8
2567B/C	6	8	8	8
2680A[1]	2	4	4	4
2688A[1]	2	4	4	4
HP 5000 Model F100[2] - C2753A (60 Hz) - C2754A (50 Hz)	4	4	4	4
Total System Printers	6	8	12	12

[1] *Discontinued*
[2] *Requires SCSI adapter, cannot be connected to built-in SCSI*



Cable Configuration for 256X Printers

- Order the 256X option 393 to obtain the HP-IB interface and a 4 meter HP-IB cable.
- 256X printers are shipped configured with one device load (configurable from 1 to 7).
- A maximum of six 256X printers are supported per HP-IB device adapter. *See Chapter 5 for device loading and cable length rules.*
- Up to four 256X printers are supported on an HP-IB extender configuration.



Cable Configuration for 2680A Page Printer

- 2688A and 2680A printers are both shipped configured with four device loads and are both configurable from 1 to 7.
- Both printers include a 1 meter internal HP-IB cable.
- Both printers are shipped with an 8 meter HP-IB cable.
- A maximum of two 2688A or 2680A printers are supported per HP-IB device adapter. See previous discussion for device loading and cable length rules.
- Up to two 2688A or 2680A printers are supported on an HP-IB extender configuration.

Note: 2680A is discontinued. Information listed here is for reference only.

HP 5000 Model F100 Printer

The F100 printer is supported on the HP 3000 900 Series systems through a direct SCSI (small computer system interface) interface channel. The CIB SCSI Host Adapter Card (27251A) and HP-PB SCSI Host Adapter Card (28642A) are industry-standard local I/O busses that allow computer connections to certain peripherals. They support the SCSI common command and message set, as well as asynchronous and synchronous data transfers.

Requirements

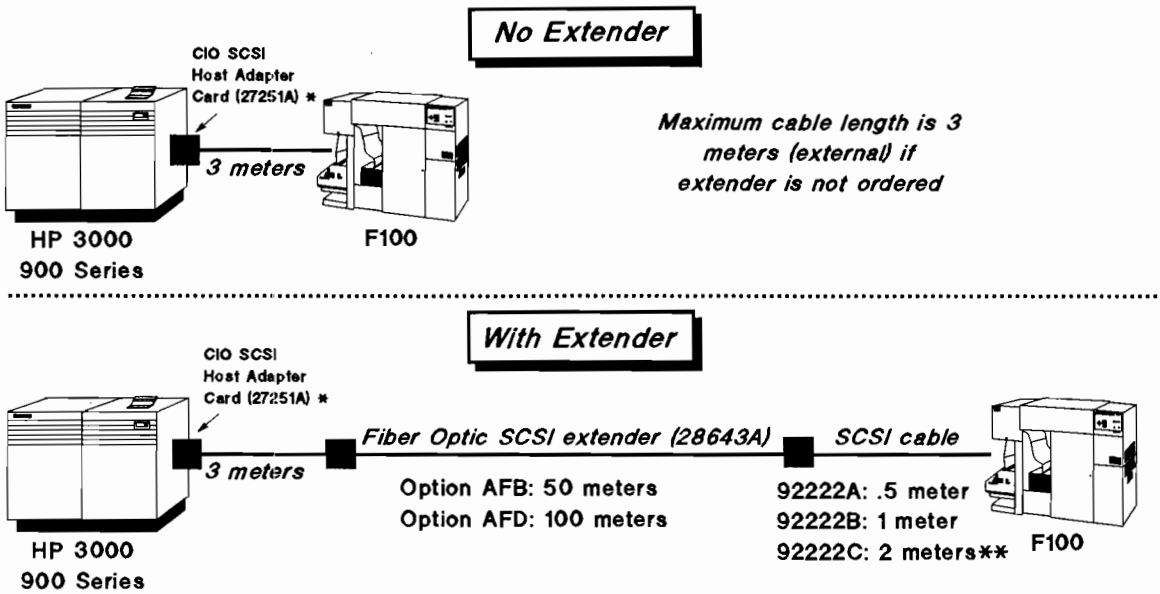
- CIB SCSI Host Adapter Card (27251A) or HP-PB SCSI Host Adapter Card (28642A)
- MPE/iX 4.0

Configuration Limitations

- Only one F100 printer per SCSI channel
- Up to four F100 printers per system
- The SCSI Host Adapter Card includes 2 meter cable. P/N 92222B can be ordered for 1 meter SCSI cable extender
- The SCSI channel has to be configured at address 7 (factory standard)

Cable Configurations

With the HP SCSI interconnect, the maximum cable distance from the SPU to printer is 3 meters (cables internal to the printer are estimated at 3 meters). For distances for 50 or 100 meters between printer and SPU, the fiber-optic SCSI extender (P/N 28643A) can be ordered.



** Option 003 for Series 920, 922, 932, 948, 958 (comes with 2 meter cable)*
*** Recommended for extender to printer connection*

HP 5000 F100 Cabling Alternatives

Fiber-Optic SCSI Extender Support

The extender overcomes the SCSI distance limitation. By delivering up to 100 meters, the HP 28643A provides the flexibility to place the F100 printer in locations more convenient to and efficient for users. The extender comes in two lengths, 50 meters and 100 meters, and provides industry-standard SCSI compatibility.

HP 28643A includes two extender assemblies, two 19-inch rackmounting brackets, one install/reference manual, and one loopback test connector. Option AFB provides 50 meters distance, option AFD provides 100 meters. Additional SCSI cabling must be ordered to attach from the remote extender to the printer. The products are:

- 92222A - .5 meter male-male
- 92222B - 1 meter male-male
- 92222C - 2 meter male-male
- 92222D - 1 meter female-male

For distances greater than 100 meters, the HP Router can be used to extended LAN networking.

Serial Printers

900 Series systems support spooled serial printers through the Data Communications and Terminal Controller (DTC). Serial printers connect to a DTC port either via a hardwired RS-232/422 cable or via a modem.

The following tables list the maximum number of total serial printers as well as maximum number of each type of printer supported on 900 Series systems.

Note

The following configurations have been determined to impose an acceptable impact on system performance. These represent the maximum factory supported configurations. In many cases, customers have successfully exceeded these maximums. There is no electrical or operating system limit that would prevent connecting printers to all available system ports. However, a careful evaluation of system loading should be performed before attempting to exceed the specified maximum configuration.

Maximum Serial Printer Configurations

	9x7LX	937 947	957 967 977 987	980/100	980/200	980/300	980/400	CS 990 CS 992
2562C	14	21	28	44	68	88	96	200
2563A/B/C	14	21	28	44	68	88	96	200
2564B/C	7	10	14	22	34	44	48	N/A
2932A	N/A	N/A	N/A	104	156	200	228	N/A
2934A	N/A	N/A	N/A	104	156	200	228	N/A
2684A/D LaserJet 2000	3	5	7	10	16	20	24	50
2686A/D LaserJet	10	15	20	25	35	50	55	100
2687A	N/A	N/A	N/A	7	10	14	18	N/A
33440A LaserJet II	10	15	20	32	48	64	70	150
33447A LaserJet IID	10	15	20	32	48	64	70	150
33449A LaserJet III	10	15	20	32	48	64	70	150
33459A LaserJet IIID	10	15	20	32	48	64	70	150
33491A LaserJet IIISi	5	8	10	16	24	32	40	100
C1200A	4	4	4	5	5	6	6	8
C1202A	4	4	4	> 4	> 4	6	6	8
7550 Plotter	4	4	4	4	4	4	4	4
Total Serial Printers	32	48	64	104	156	156	156	250
N/A = not applicable - obsoleted devices not tested on new platforms.								

Serial Printing Interfacing

Serial printers are considered either "local spooled" or "remote spooled" when connected to a 900 Series system. Local spooled printers are hardwired to the DTC via either RS-232C or RS-422. Remote spooled printers connect to the DTC via a modem. *For more information on connecting to the DTC, see Chapter 7.*

Note

Only 293x printers are supported as remote spooled.

Status Checking

If the serial printer supports the "ESC" status checking capability, the MPE Spooler or "hot" printing application has the ability to determine whether a printer is on-line before spooling the print job. This will prevent the data from being sent (and lost) to a printer that is out of paper or encountered a fault condition.

With status checking, if the printer goes off-line for any reason, the spooler will stop printing, save the print job, and automatically resume printing when the printer comes back on-line. Without status checking, printer faults or out-of-paper conditions cannot be detected. The spooler will always send the print job "blind" and purge the spoolfile assuming it printed successfully. The spoolfile will then have to be re-created in order to restart the printing process.

With the exception of some LaserJet models, all supported serial printers provide the status checking feature as standard. All printers with the status checking feature are configured as Term Type 26.

On the LaserJet IID, LaserJet III, and LaserJet IIID, a status checking card (26013A) is installed in the printer to support the status checking feature. On the LaserJet IIISi, a special MIO RS-232 card (C2059H) must be installed in the printer to provide status checking. In each of these cases, the status checking feature is ordered spearately.

If the status checking feature is not installed in a LaserJet IID, LaserJet III, LaserJet IIID, or LaserJet IIISi, these printers would be configured as Term Type 18.

LAN Printers

Printers connected to the HP 3000 via the LAN are a new class of printers supported by NetWare for the HP 3000 (P/N 32020A). LAN-based printers offer convenience and connectivity that has been difficult to achieve by HP-IB and serial-connected printers. LAN-connected printers can be located in the workgroup via the same LAN cable used to connect to PC workstations to the system.

The first LAN-based printer available to the HP 3000 is the LaserJet IIISi. By using NetWare for the HP 3000 and the LaserJet IIISi Network Printer Interface cards for NetWare, the LaserJet IIISi is directly suppported for PC applications when the LaserJet is operating the Queue Server mode. Token Ring LANs can also be used if a PC-based Novell NetWare file server the Ethernet and Token Ring cards is used to connect the two media types.

NetWare for the HP 3000 provides LAN printer access to PC applications. It does NOT provide transparent access to LAN printers for MPE/iX applications. Consult your local HP representative regarding the availability of third party solutions and/or applications programming interfaces which could be used in conjunction with NetWare for the HP 3000 to provide LAN printer access from MPE/iX applications.

To support PC clients using NetWare or "Network aware" applications on MPE/iX you will need the following:

- NetWare for the HP 3000 (and a LAN link if not already installed)
- LaserJet IIISi with a Network Interface card (C2059A for Ethernet or C2059C for Token Ring. As of Release 4.0, HP 3000 HP-PB systems support a Native Token Ring connection. For further details, see section one.

At the time of this writing, full performance testing of NetWare for the HP 3000 had not been completed. The number of LAN-based printers which can be used will depend on system loading and any NetWare for the HP 3000 printer configuration limits. Consult the NetWare for the HP 3000 documentation for further information.

To support MPE/iX spool files on the LAN based LaserJet IIISi, you must purchase the third party software package entitled "NBSpool", which is available from Quest Software.

Workstations

Terminals

HP designs and manufactures high-quality terminals specifically for HP 3000 systems. These terminals offer:

- anti-glare displays
- high character definition
- functional keyboard layouts
- display screen tilt and swivel
- enhanced keyboard with tactile feedback

Product	Description	Memory	Additional Features
700/43	Multipersonality ASCII	4 pages	Supports 12 popular compatibility modes
700/60	ASCII/ANSI/PC-Term	Wyse 60/VT320	Wyse 60, DEC VT320, and PC-Term modes
700/60ES	ASCII/ANSI/PC-Term	Wyse 60/VT320	Meets Swedish MPR 1990:10 guidelines
700/92	Blockmode VPLUS	8 pages	
700/94	High performance blockmode VPLUS	16 pages	Local forms cache, edit checks, modified data tag
700/96	Blockmode VPLUS	8 pages	High-quality display; EC 92 regulations (EN 55022B)
700/96ES	Blockmode VPLUS	8 Pages	Meets Swedish MPR 1990:10 guidelines
700/98	High performance blockmode VPLUS	16 pages	High-quality display Local forms cache, edit checks, modified data tag; EC 92 regulations (EN 55022B)
700/98ES	High performance blockmode VPLUS	16 pages	Meets Swedish MPR 1990:10 guidelines
*NOTE: VPLUS requires a 700/92, 94, 96, or 98 terminal. Oracle's SQL*Forms, INGRES forms, and JAM will run on any 700 series terminal. JAM also runs on a block mode terminal, giving the user optimal performance.*			

All terminals have:

- 14-inch screen
- printer port
- selectable 80 or 132 column display modes
- detachable adjustable keyboard with 8 shiftable function keys
- green, white, or amber phosphor

700/96, 98, and 60 have:

- full overscan
- larger, sharper characters
- serial and parallel printer ports

VPLUS/Windows

VPLUS/Windows is an MS Windows 3.0 PC based user interface for standard VPLUS applications. It allows users to take advantage of increased productivity and performance benefits of a cooperative computing environment with no changes to current applications. Users get the benefits of MS Windows interface including:

- multiple PC and HP 3000 applications from multiple HP 3000 servers and systems integrated on the PC
- field-sensitive help
- color enhanced VPLUS displays

Required Software

- VPLUS/Windows
- VPLUS (and B.06.XX or subsequent version)
- MPE/iX (version 2.2 and subsequent versions)
- Microsoft® MS-DOS (version 3.2 and subsequent versions)
- Microsoft® Windows (version 3.0 and subsequent versions)

PC Configuration

- 640K memory
- 286 microprocessor or greater

Optional Software

- To take advantage of NewWave encapsulation - NewWave 3.0 (requires version 3.0 of Microsoft® Windows
- To take advantage of Application Online Help
  -Microsoft® Software Development Kit (version 3.0)
  -A "Rich Text Format" (RTF) editor. Some examples include Microsoft® Word for Windows (version 1.0), Microsoft® Word for PC (version 5.0), and other editors that support RTF

Networking Environment

- NS 3000 Network Services (HP 36920A), 2.1
- HP EtherTwist, HP StarLAN 10 or HP ThinLAN Network PC Link
- LAN/3000 Link

HP Personal Computers

HP's personal computers are easily integrated with HP 3000 systems. User's can take advantage of the rich functionality available in PC applications while utilizing the full range of HP 3000 resources. Processing power can then be focused on the PC, reducing the demand on the host system.

Supported PCs:

- HP Vectra ES/12
- HP Vectra QS/16S and QS/20
- HP Vectra RS/20C and RS/25C
- HP Vectra 486/25
- HP Vectra 386/25
- HP Vectra 286/12

Workstation Cabling

Refer to Chapter 7 for workstation cabling.

7

Datacommunications and Terminal Controller

End-User Connectivity

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

Note

Previously, two versions of DTCs were available, the DTC/3000 and the DTC/9000. They are now combined into a single DTC providing multivendor location-independent access to HP and non-HP systems.

The DTC also implements Telnet Access and X.25 system-to-system networking for the HP 3000 900 Series. For more details on any of the products discussed in this section, refer to the appropriate datasheets in the *HP Networking Communications Specifications Guide* (5091-3821E).

Two DTCs are available; they are 100% functionality compatible:

- the DTC16 (P/N 2340A) provides up to 16 asynchronous connections (RS-232 Direct Connect and RS-232 Modem Connect) and one X.25 link supporting up to 32 virtual circuits at speeds up to 19.2kbps. The DTC16 is an ideal solution in an environment where a small concentration of connections is needed (either centralized or distributed throughout buildings).
- the DTC48 (P/N 2345A) provides up to 48 asynchronous connections (RS-232 Direct Connect, RS-232 Modem Connect and RS-422 Direct Connect) and up to three X.25 links supporting up to 256 virtual circuits at speeds up to 64kbps. The DTC48 is best suited in an environment where a large number of connections is needed.

The minimum required terminal communications subsystem for HP 3000 900 Series systems consists of the 802.3 LANIC card installed in the SPU, the ASC software (Asynchronous Serial Communications software residing on the SPU), one DTC with one modem port card (for remote support) and 802.3 cabling (ThinLAN, ThickLAN or EtherTwist).

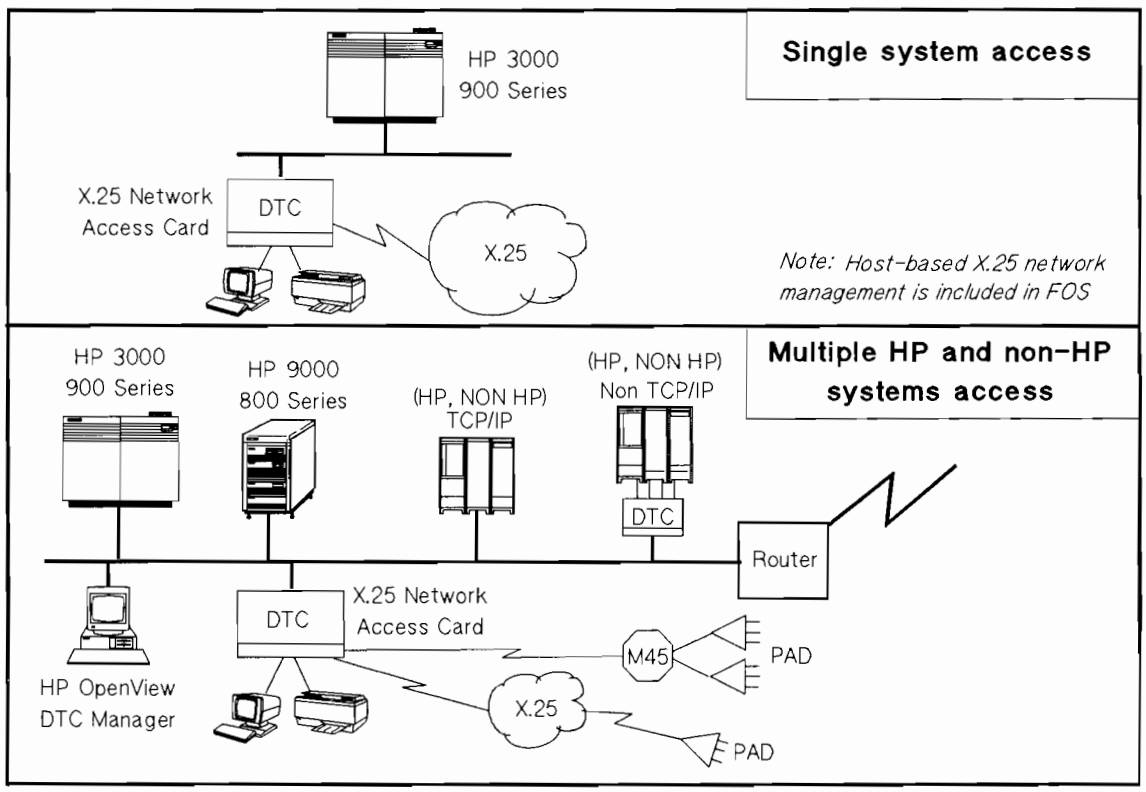
Each Series 9x7LX and 9x7 systems is delivered with a Multi-Function I/O (MFIO) card and ASC software. The MFIO card has a built-in 802.3 LANIC, ThinLAN Transceiver, and an integrated AUI port for customers who want connection to either a ThickLAN (30241A) or Ethertwist (28685B) Transceiver. These products must be ordered separately.

Each Corporate Business System comes standard with a LAN/Console card and ASC software. The LAN/Console card has a built-in 802.3 LANIC, ThinLAN Transceiver, and an integrated AUI port for customers who want connection to either a ThickLAN (30241A) or Ethertwist (28685B) Transceiver. These products must be ordered separately.

Series 980 systems come standard with an 802.3 LANIC, ASC software, and connection for both Thick and Thin 802.3 LAN. For ThickLAN, this connection hardware includes the

Transceiver, tap, and six meter AUI cable. The ThinLAN Transceiver includes an integral one meter AUI cable.

Each 900 Series system can support multiple DTCs on the LAN. The number of active connections supported will be determined by the application load on the system. See the General System Configuration Information page of each system family for details on numbers of DTCs supported and numbers of logged-on workstations supported for each SPU.



Datacommunication and Terminal Controller End-User Connectivity

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:

For single system stand-alone environments, the system will download software to manage all the DTCs. This software is included in the Fundamental Operating System (FOS).

When access to multiple systems, PAD Support or Telnet is needed to a non-HP 3000 900 Series single system, an HP OpenView workstation running the HP OpenView DTC Manager Software (D2355A) is required. Customers can use the same PC to manage other equipment (like HP's 2335A Asynchronous X.25 PAD, the HP Model 48 X.25 multiprotocol, HP's Ethertwist hubs, routers, and bridges) through the use of the HP OpenView Switch/PAD Manager Software (J2017A). To ease ordering and installation, a fully configured, turn-key HP OpenView Windows Workstation (32054B) is available. Please refer to the DTC family datasheet in the HP Networking Communication Specification Guide (5091-3821E) for the complete list of requirements for the HP OpenView workstation.

Local and Remote End-User Access

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

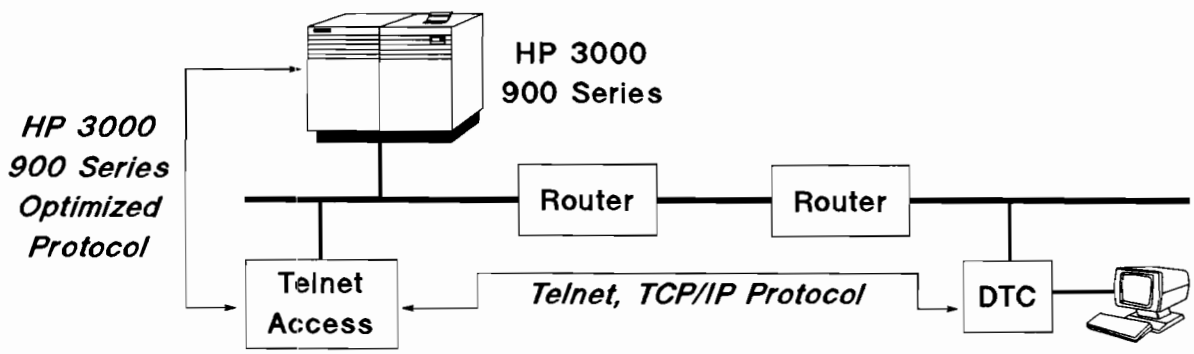
- direct access on the LAN: this is true for the HP 3000 900 Series, the 300/400/700/800 Series HP 9000, HP 1000 and other non-HP Telnet/TCP/IP systems.
- back-to-back: any system with asynchronous (RS-232) links can be connected to the asynchronous ports of the DTC. Terminal users connected to the DTC can access systems connected to the same DTC (local switching) or to another DTC (extended switching). HP 3000 MPE/V Systems release V-delta-7 or later can be accessed using the back-to-back configuration through the HP ATP (Pass 3,5 or 6) or ATP/M. Remote PAD terminals support to HP 3000 MPE/V Systems through this back-to-back configuration is also provided.

PAD support is provided through the use of an X.25 Network Access Card. As stated above, this functionality requires a configured HP OpenView workstation with DTC Manager software when access is needed to multiple systems or to a non HP 3000 900 Series single system. Host-Based X.25 is provided when access is needed to a single HP 3000 900 Series. (For more information about the X.25 Network Access Card, please refer to the "Datacommunications and Terminal Controller/X.25 Network Link for HP 3000 900 Series Environments" section).

Extended LAN Configuration

The DTC supports extended LAN configurations with bridges (using the HP 3000 900 Series optimized protocol) and level 3 IP routers (using TCP/IP protocol). This means that a DTC user can access a system located on remote segment of a LAN. When access is done through level 3 IP routers, the Telnet, TCP/IP protocol must be available on the remote system. In the case of an HP 3000 900 Series, the Telnet, TCP/IP protocol would be provided by the DTC-based Telnet products. More information on these products is provided in the *Datacommunications and Terminal Controller/Telnet Services for the 900 Series* section of this chapter.

The figure below diagrams a DTC connected user accessing an HP 3000 900 Series on a remote LAN segment via level 3 IP routers.



HP 3000 900 Series Optimized Protocol

Currently, a PC-based HP OpenView DTC Manager is required on each segment of the LAN to download and manage the local DTCs. (This requirement may change in future releases.)

Note With Release 12.0 of the DTC Manager, it is now possible to control multiple OpenView and DTC Manager PCs that are on extended LAN segments from a single OpenView workstation.

Note For access to Multiple systems, the DTC48 must have date code 3110 or later. A 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 an upgrade kit.

Datacommunications and Terminal Controller/X.25 Network Link for HP 3000 900 Series Environments

The DTC/X.25 XL Network Link provides access to public and private X.25 packet-switching networks for communication with remote systems and PAD devices. (Note that this link also supports PAD devices for non-HP 900 Series systems as described in the *End-User Connectivity* section of this chapter).

For HP 3000 900 Series environments, two X.25 solutions are offered; PC-Based X.25 management and Host-Based X.25 management. While both X.25 solutions provide X.25 capabilities for the user, there are differences between the two products. The main difference is that Host-Based X.25 management is limited to a single system use of the X.25 card, whereas, PC based X.25 management allows for the X.25 card to be shared between multiple systems. Therefore, Host-Based X.25 management is targeted for users with one system on a LAN and PC based X.25 management is targeted for users with multiple system on a LAN and multiple types of devices (i.e., DTCs, switches, PADs, bridges and Hubs).

PC-Based X.25 Management Solution

With PC-based X.25 management, the X.25 link is managed by HP OpenView DTC Manager. This requires the following products:

- A PC running HP Openview DTC Manager software (D2355A)
- DTC/X.25 Network Access card installed in the DTC (see below for P/Ns).
- One or more DTCs attached to the 802.3 LAN
- X.25 System Access software (36939A) which resides on the Series 900 SPU and makes system-to-system communication possible. System Access is NOT needed for users who only need PAD support.

Host-Based X.25 Management Solution

Host-Based X.25 management provides the capability to manage an X.25 link from the XL host instead of the PC. Host-Based X.25 software is included on the Fundamental Operating System (FOS). Thus, Host-Based X.25 will not be a product listed on the CPL. There are three products required for Host-Based X.25 management to be operational:

- DTC/X.25 Network Access card installed in the DTC (see below for P/Ns).
- A DTC attached to the 802.3 LAN

- X.25 System Access software (36939A) which resides on the Series 900 SPU and makes system-to-system communication possible. System Access is NOT required for users who only need PAD support.

PC-based and Host-Based X.25 management support both DTC16 and DTC48 configurations. Each DTC48 supports a maximum of three DTC/X.25 Network Access cards and a total maximum of six interface cards. The available DTC48/X.25 Network Access cards include:

- DTC48/X.25 Network Access card with RS-232 interface (2346D)
- DTC48/X.25 Network Access card with V.35 interface (2346E)
- DTC48/X.25 Network Access card with V.36 interface (2346F)
- DTC48/X.25 Network Access card with RS-422 interface (2346G)

The DTC16 can accommodate only one DTC16/X.25 Network Access card with the RS-232 interface.

For additional information on differences between PC-based and host-based X.25 management, see Network Hotline Subject "HBX25".

Datacommunications and Terminal Controller/Telnet Services for the 900 Series

Telnet is available on the HP 3000 900 Series and has been implemented in the DTC. There are two key features provided by Telnet:

- access to HP 3000 900 Series applications from a Telnet host user
- access to applications on a Telnet host from a DTC-connected user

Access to HP 3000 900 Series Applications from a Telnet Host

Access to HP 3000 900 Series applications from a Telnet host requires Telnet hardware as well as HP OpenView DTC Manager Release 10.5 or later. Two hardware packages are available for Telnet access:

- HP ARPA Telnet Express (HP 2344A) - a dedicated 802.3 LAN-based processor which can provide up to a maximum of 80 concurrent Telnet sessions. Of these 80 sessions logged on, up to 70 can be active if VPLUS applications are being accessed and up to 12 can be active if character mode applications are being accessed. The disparity between the number of active sessions is due to the increased number of packets and DTC CPU overhead needed to process character mode applications. The Telnet Express connects directly to a 802.3 LAN and is orderable with options for ThickLAN or ThinLAN use.
- HP ARPA Telnet Access (HP 2347A) - a card which is installed in an open slot of a DTC48 and can provide up to a maximum of 40 concurrent Telnet sessions. Of these 40 sessions logged on, up to 40 can be active if VPLUS applications are being accessed and up to 9 can be active if character mode applications are being accessed. There are a few rules to observe when installing the Telnet access card:
  - If the DTC48 to be used has a datecode less than 3110, a memory upgrade is required. This upgrade is available as an option to the Telnet Access product.
  - Only one Telnet Access card can reside in a given DTC48.
  - The Telnet Access card and DTC/X.25 card CANNOT reside in the same DTC48.

Access to Applications on a Telnet Host from a DTC-Connected User

Access to applications on a Telnet host from a DTC connected user does not require any additional hardware. Users connected to a DTC16 or a DTC48 can access remote hosts via the Telnet protocol provided the DTCs are managed by HP OpenView DTC Manager Release 10.5 or later. DTC48s with a datecode less than 3110 require a memory upgrade. This upgrade is available as an option to the Telnet Access product or as a stand-alone product if the Telnet Access hardware is not needed.

Note

For more information on access to applications on a Telnet host, refer to the *End-User Connectivity* section of this guide. For additional information on Telnet refer to the ARPA/iX datsheet in the *HP Networking Communication Specification Guide*.

Configuring the DTC in your HP 3000 900 Series System Environment

Service	DTC16	DTC48*	Network Management
Local end-user access			
Single HP 3000 900 Series	2340A +async cards + options	2345A + async cards + LAN options	Included in MPE/iX FOS tape (NMNGR, TermDSM)
Multiple systems			
HP 3000 900 Series + access to non-4.0 TCP/IP hosts (back-to-back)	2340A + async cards + LAN options	2345A + async cards + LAN options	HP OpenView PC with D2355A release 3.0 or later
HP 3000 900 Series + access to non-12.0 TCP/IP hosts (back-to-back) + HP 9000 access + multivendor connect	2340A + async cards + LAN options	2345A + async cards + LAN options + Multivendor Upgrade Kit (HP 2348A) if DTC48 date code less than 3110	HP OpenView PC with D2355A release 10.5 or later
Remote end-user access			
Single HP 3000 900 Series	2340A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	2345A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	Included in MPE/iX FOS tape (HBX.25)
HP 3000 900 Series + HP 9000 + multivendor + access to non-TCP/IP hosts (back-to-back)	2340A + async cards (minimum 1 in slot 0) + LAN options + X.25 LAN card	2345A + async cards (minimum 1 in slot 0) + LAN options + Multivendor Upgrade Kit (HP 2348A) if DTC48 date code less than 3110	HP OpenView PC with D2355A release 10.5 or later
System-to-HP 3000 900 Series			
X.25 communications			
Single HP 3000 900 Series	2340A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	2345A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	Included in MPE/iX FOS tape (HBX.25)
Multiple HP 3000 900 Series	2340A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	2345A + async cards (minimum 1 in slot 0) + LAN options + X.25 card	HP OpenView PC with D2355A release 3.0 or later
Telnet services for HP 3000 900 Series	2340A + async cards + LAN options	2345A + async cards + LAN options + 2347A + Multivendor Upgrade Kit (HP 2348A) if DTC48 date code less than 3110	HP OpenView PC with D2355A release 10.5 or later

** DTC 48 are also available as part of the A1884A peripheral expansion cabinet.*

Note: At least one asynchronous card (add-on option) must be installed in a DTC for it to be functional. This includes X.25 or telnet access only environments.

Configuring the DTC48

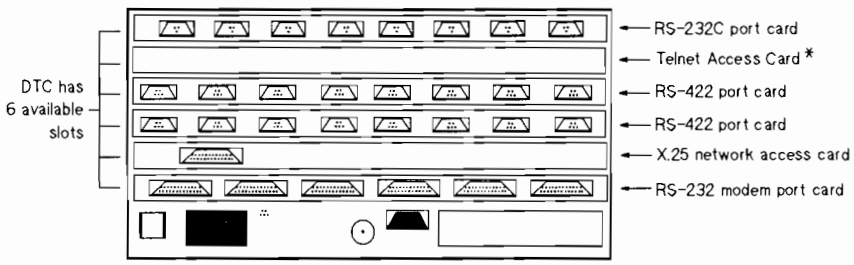
When ordering the DTC48, a LAN interface option must be specified. Three types of cards can be installed in the DTC :

- Asynchronous Interface Card*
- DTC48/X.25 Network Access Card*
- The Telnet Access Card (can only be ordered as a stand-alone product)

** May be ordered as options to the DTC48 or as stand-alone products.*

Note

The DTC48/X.25 Network Access Card cannot be accommodated with a Telnet Access Card in the same DTC48.



*A telnet access card and an X.25 card are shown here in the same cabinet for illustration purposes. Please note that you cannot have these two cards in the same DTC in actual configurations.

DTC Configuration Example

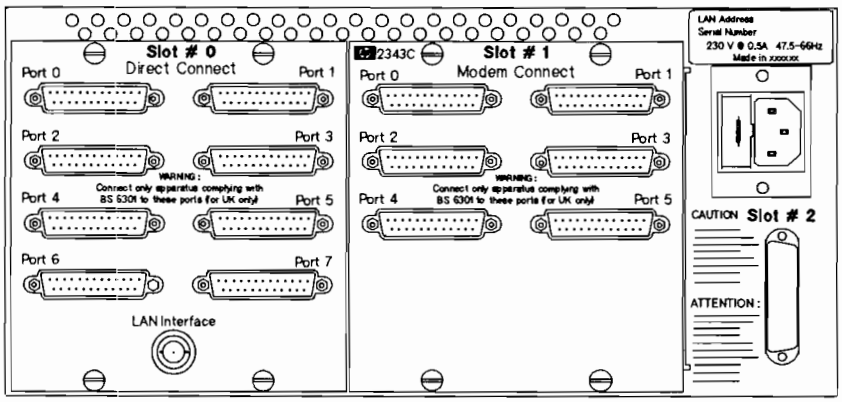
Ordering the DTC48

Also orderable via factory integrated cabinets A1883A and A1884A.

Access	ThinLAN Configuration	AUI (no MAU) Configuration[1]	ThickLAN Configuration
Order: and from 1 to 6 following asynchronous cards[2]	2345A #242	2345A #241	2345A #240
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)		
Telnet	2347A #001 is required for DTC48 memory upgrade if date code is less than 3110		
8 additional direct	Order HP 2346A (when ordered after initial DTC48 purchase)		
8 additional RS-422	Order HP 2346B (when ordered after initial DTC48 purchase)		
6 additional modem	Order HP 2346C (when ordered after initial DTC48 purchase)		
[1]To connect to EtherTwist, order in addition the EtherTwist MAU (P/N HP 28685A) [2]A minimum of one asynchronous option must be ordered with the DTC48			
Note: Option 015 - set for 220V operation			

Configuring the DTC16

From one to two asynchronous interface modules may be ordered with the DTC16. Each DTC16 supports a maximum of two asynchronous modules and one DTC16/X.25 Network Access Card. No Telnet Access Card is currently available for the DTC16.



DTC16 Configuration Example
with 8 ports DC + 6 port MC, configured for ThinLAN

Ordering the DTC16

Access	ThinLAN Configuration	AUI (no MAU) Configuration[1]	ThickLAN Configuration
6 modem ports[2]	2340A #642	2340A #641	2340A #640
8 direct ports	2340A #842	2340A #841	2340A #840
12 modem ports	2340A #642 and #650	2340A #641 and #650	2340A #640 and #650
6 modem + 8 direct	2340A #642 and #850	2340A #641 and #850	2340A #640 and #850
16 direct	2340A #842 and #850	2340A #841 and #850	2340A #840 and #850
X.25	Add #310 to the DTC16 configuration (HP 2343D when ordered after initial DTC16 purchase)		
8 additional direct	Order HP 2343A (when ordered after initial DTC16 purchase)		
8 additional RS-422	Order HP 2343B (when ordered after initial DTC16 purchase)		
6 additional modem	Order HP 2343C (when ordered after initial DTC16 purchase)		

[1] To connect to EtherTwist, order in addition the EtherTwist MAU (P/N HP 28685A)
[2] One modem port is needed per HP 3000 900 Series system to do remote diagnostics

Note: Option 015 - set for 220V operation

Note: A minimum of one asynchronous option must be ordered with DTC16

Note

The ordering instructions for the DTC48 and the DTC16 are different. The DTC48 LAN connection is in a separate option. On the DTC16, the LAN connection is tied to the first asynchronous module.

Ordering HP ARPA Telnet

The HP ARPA Telnet products previously mentioned are part of the HP ARPA Services family of products. The structure for the ARPA Services/iX products was designed for maximum flexibility. Two bundled products, containing Telnet hardware and HP ARPA File Transfer Protocol (FTP), were created to meet some specific low- and high-end customer needs. Since not every customer's environment will be suited for the bundled products, all of the ARPA Services/iX products are also available as stand-alone products. The bundled and stand-alone products can be mixed in any combination to accommodate the customer's exact Telnet and FTP needs.

Telnet Ordering

Product/Option	Description
2344A	HP ARPA Telnet Express (must order one LAN option 240, 241, or 242)
option 015	Set for 220v operation
option 240	Configure for ThickLAN use (AUI and MAU provided)
option 241	Configure for ThickLAN use (no AUI or MAU provided)
option 242	Configure for ThinLAN use (BNC T-connector provided)
2347A	HP ARPA Telnet Access (order option 001 for DTC48s with datecode less than 3110)
option 001	DTC48 Upgrade Kit required memory upgrade for 2345A
36955A*	HP ARPA/40 Services/iX - includes Telnet Access & FTP (Must order one processor option 310, 315, or 320. Also order opiton 001 for DTC48s with datecode less than 3110)
option 001	DTC48 Upgrade Kit required memory upgrade for 2345A
36956A*	HP ARPA/80 Services/iX - includes Telnet Express & FTP (Must order one processor option 330, 335, 340, or 350 and one LAN option 240, 241, or 242.)
option 015	Set for 220V operation
option 240	Configure for ThickLAN use (AUI and MAU provided)
option 241	Configure for ThickLAN use (no AUI or MAU provided)
option 242	Configure for ThinLAN use (BNC T-connector provided)

** If ordering 36955A or 36956A as a standalone product, must also order 51453A or 51454A for Corporate Business Systems. (MPE/iX media product - includes FOS tapes, manuals, software installation procedures.)*

Ordering DTC Modem Connections

Product/Option	Description
DTC48 2345A	
option 625	Provides six additional RS-232-C 25-pin modem connections
DTC16 2340A	
option 640	Configure DTC16 for ThickLAN and provides six RS-232-C 25-pin modem connections (ThickMAU and 6 meter AUI cable provided)
option 641	Configure DTC16 for AUI use and provides six RS-232-C 25-pin modem connections (no MAU provided)
option 642	Configure DTC16 for ThinLAN and provides six RS-232-C 25-pin modem connections (BNC-T connector provided. For new ThinLAN installations, a ThinLAN terminator pair (92227P) must be ordered.

Ordering the DTC Management Products

To order the DTC Management products, please use the following rules:

Local end user access/single system access

- nothing to order, provided on FOS tape

Remote end-user access or multi-system access

- order D2355A if PC available with HP OpenView Windows Workstation configuration
- order 32054B option 201 and one network connection option if PC not available

Product/Option	Description
HP D2355A	HP OpenView DTC Manager software
HP J2120A	HP OpenView DTC Entry-Level Manager/UX software
	One of the following AA0, AA1, AAH **MUST** be ordered:
option AA0	Software on 1/4-inch cartridge tape
option AA1	Software on 1/2-inch magnetic reel tape 1600 bpi
option AAH	Software on DDS cartridge tape
option 0CC	Update to latest version
HP 32054B	HP OpenView Windows Workstation
	The HP OpenView Windows Workstation is a specially configured HP Vectra, with PC software already installed. It includes 2 Mbyte additional memory, Thinkjet printer, MS-DOS, MS-Windows, ARPA Services 2.1, HP OpenView Windows, HP AdvanceLink for Windows software. It provides the required PC hardware and software to run the HP OpenView DTC Manager.
option ABA - ABZ	Localization options (**MUST ORDER**)
	Network connection options (**MUST ORDER ONE**; only one may be ordered per workstation)
option 101	ThinLAN connection
option 102	ThickLAN connection
option 103	EtherTwist connection
	Application options (**MUST ORDER**). Additional HP OpenView products such as the Switch/PAD Manager can be ordered via options to HP 32054B.
option 201	HP OpenView DTC Manager software

DTC Supported Peripherals

Terminals

- HP 2392A, 93A, 94A, 97A
- HP 700/22, 32, 41, 43, 44, 60, 60ES
- HP 700/92, 94, 96, 98, 96ES, 98ES
- HP 3081A, 3082A/B
- HP 2622A, 23A, 24B, 27A, 28A

Note

The specified firmware is necessary for the following terminals

- 2622A: ROM 3199 or later
- 2623A: ROM 3223 or later
- 2624B: ROM 3139 or later
- 2627A: ROM 1818-3487 or later

Personal Computers

- HP 150A/B/II
- HP Portable PLUS
- HP Vectra
- HP Vectra CS,ES,RS,QS, 286/12, 486/25
- IBM PS/2 Model 30,50,60,80
- COMPAQ DESKPRO 286,386,386S

Note

These personal computers have been supported when operating in terminal emulation mode with HP AdvanceLink 2392.

Printers and Plotters

- HP 7550A/B Plotter
- HP 2227A, 28A, 76A, 77A
- HP 2235C
- HP 2562A, 63A/B/C, 64B/C Line Impact Dot Matrix
- HP 2932A, 33A, 34A Impact Printer
- HP 2684D/P, 86A/D LaserJet 2000
- HP 33440A/F, 47A/F, 49A, 59A, LaserJet Series II, III
- HP C1200A, C1202A Asian Printers

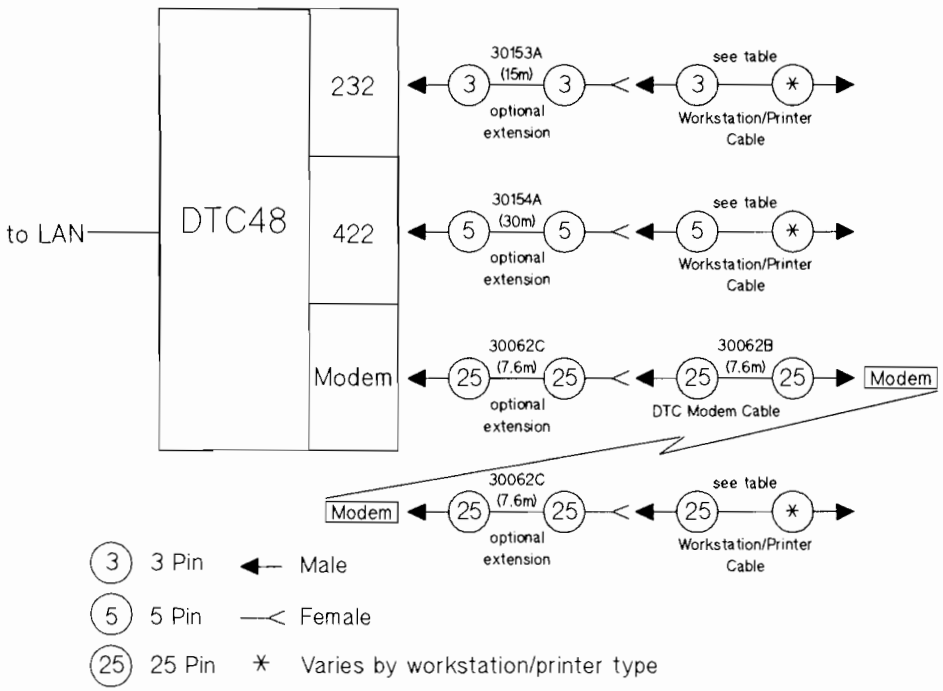
Note

Xon/Xoff protocol is used between the DTC and printers. Modem connections are not supported with the HP laser printer.

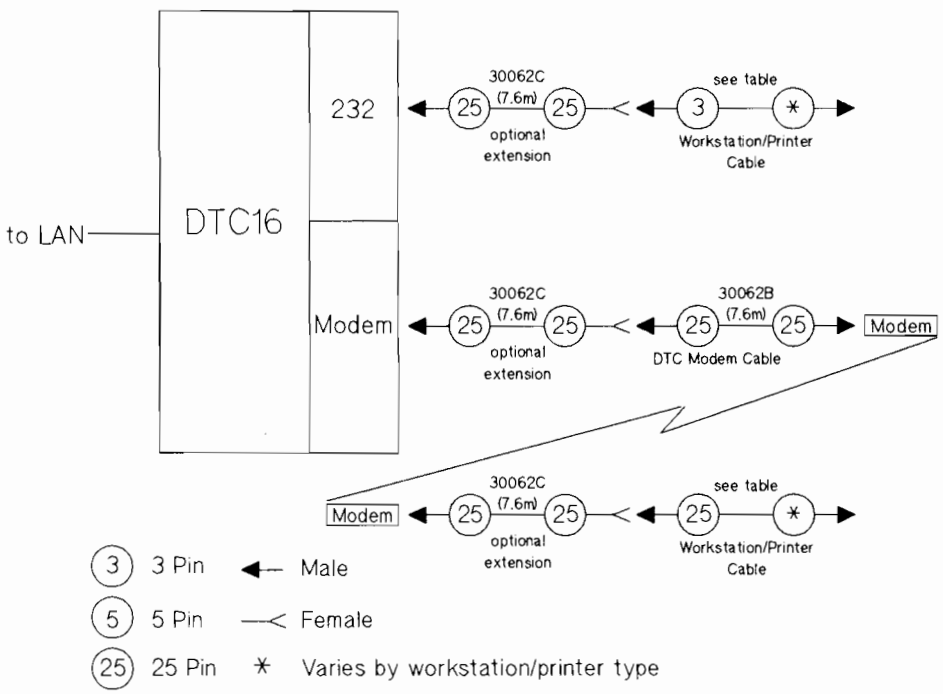
DTC-to Workstation Connection Cables

Devices	DTC Connectors		
	DTC16 and DTC48 RS-232 25 pins (modem or direct)	DTC48 only RS-232 3 pins	DTC48 only RS-422 5 pins
Terminals and personal computers			
HP 2392A,93A,94A,97A	40234A	40242X	40242P
HP 700/22,32,43,60,60ES,92,94,96,98,96ES,98ES			
HP 150X			
HP Vectra with HP 24541B/ptB (25 pins)			
HP 3081A, 3082A/B			
HP 2622A,23A,24B,27A	13222M/N*	13222X	13222P
HP 2625A,24B (port 2)	40234A	40242X	N/A
Portable Plus	92221M	N/A	N/A
HP Vectra (9 pins)			
24540B/ptA	24542M	N/A	N/A
24541B/ptA			
Printers and plotters			
HP 7550A/B	17355D	30152A	N/A
HP 2562A,63A/B/C,64A/B/C			
HP 2932A,34A			
HP 2684D/P,86A/D	40234A	40242X	40242P
HP 33440A/F,47A/F,49A,59A			
HP C1200A,C1202A	13242N	N/A	N/A
Modem	300062B	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			

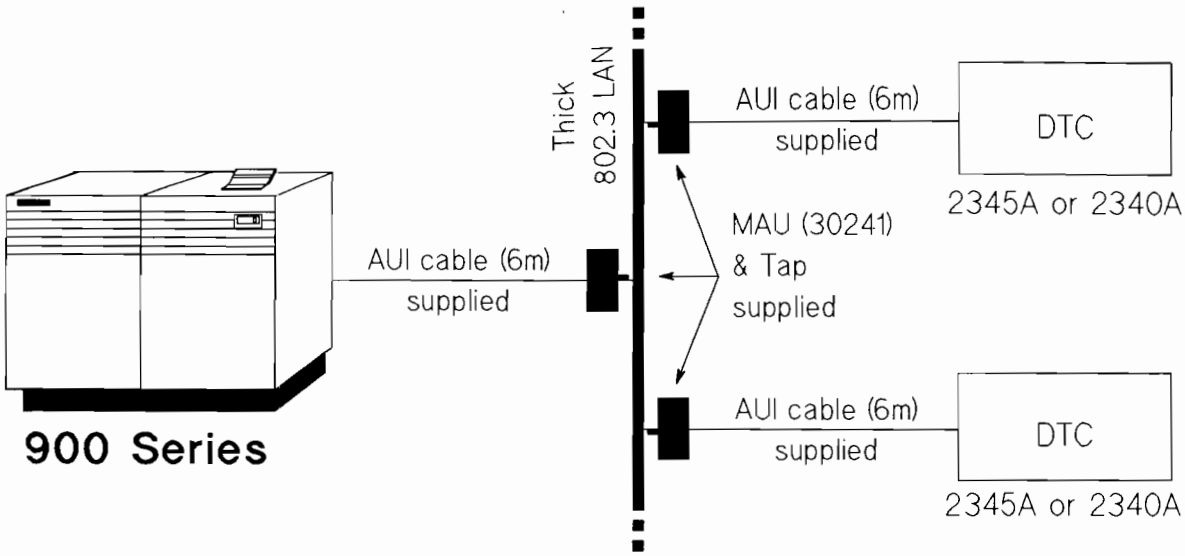
* M - European modem; N - U.S. modem



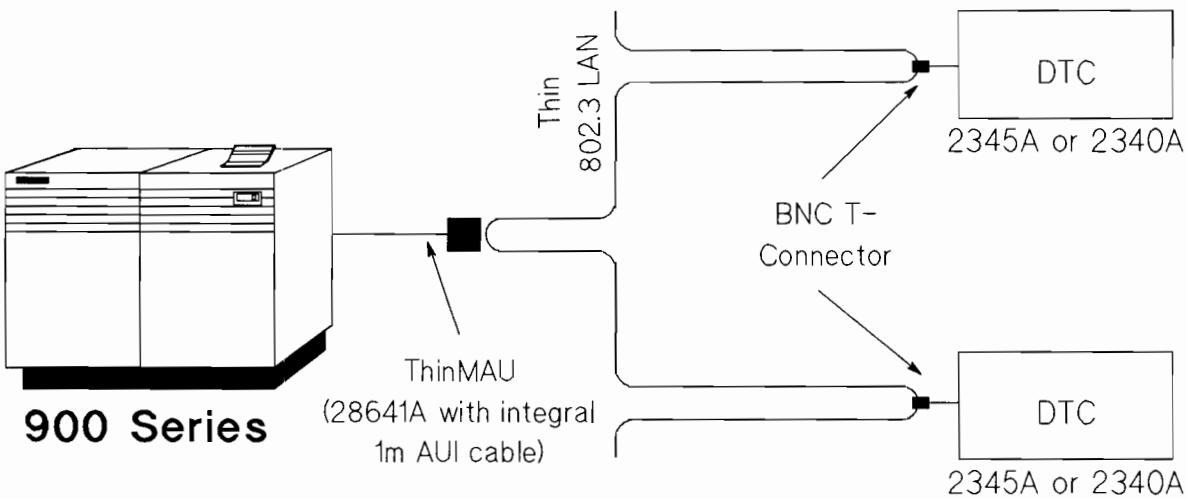
DTC48-to-Workstation/Serial Printer Cabling



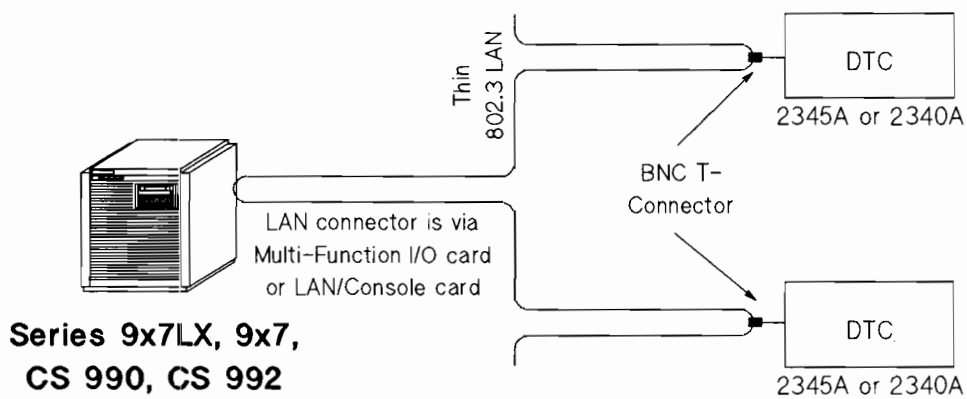
DTC16-to-Workstation/Serial Printer Cabling



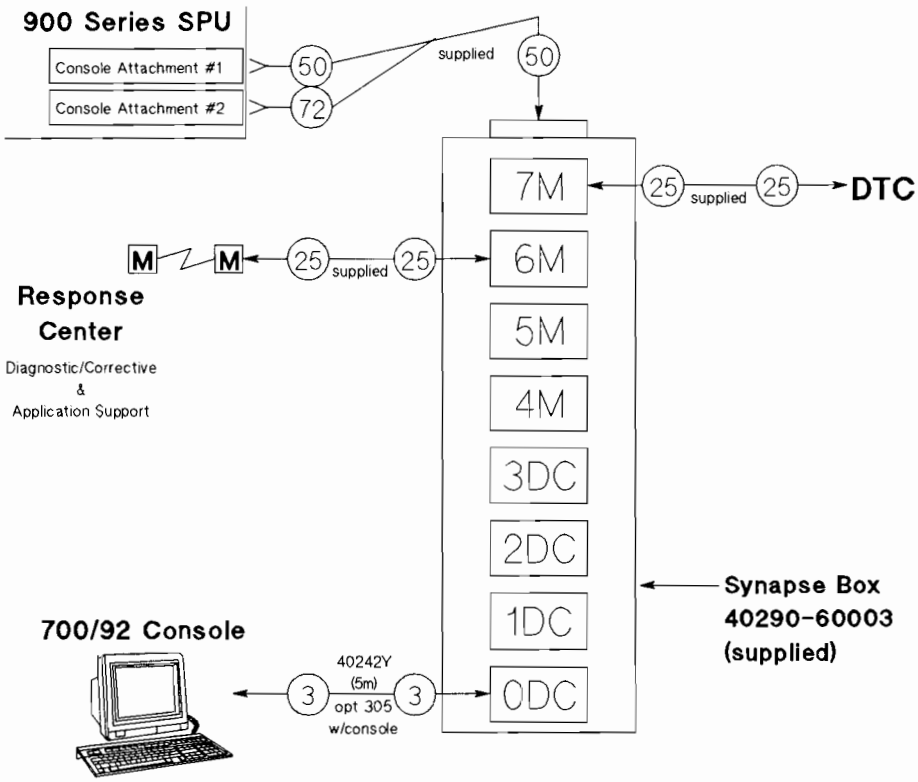
DTC-to-SPU Thick (10Base5) LAN Connection



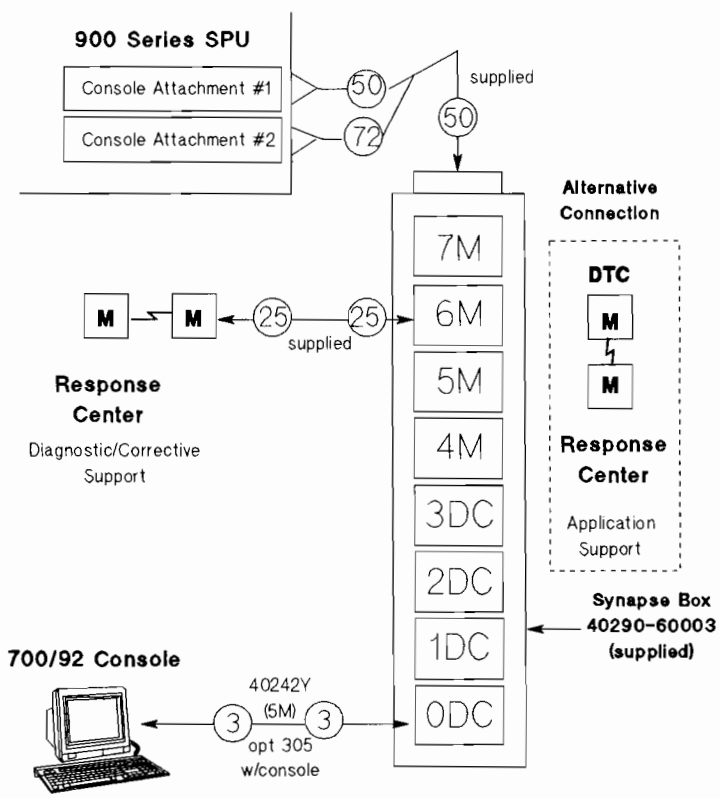
DTC-to-SPU Thin (10Base2) LAN Connection



DTC-to-SPU Thin (10Base2) LAN Connection
(via MFIO or LAN/Console with integrated LANIC and ThinLAN Transceiver)



DTC Console Connection (preferred method)



Alternative DTC Console Connection

8

Software Media and FOS Learning Products

MPE/iX Media Products

One MPE media product (51453A) **MUST** be ordered with each system listed below. Order one option from Group A, one option from Group B, one option from Group C, and one option from Group D.

Media (51453A) Options

	9x7LX	937, 947	957, 967, 977, 987	980/100, 980/200, 980/300, 980/400
Group A - FOS/Database				
Preconfigured System	812	810	811	811
ALLBASE/SQL only	802	800	801	801
TurboIMAGE only	912	910	911	911
MPE/iX only	902	900	901	901
Group B - MPE Release				
Latest release	200	200	200	200
Minimum supported release	231	231	231	240
Group C - Media Type				
DDS Cassette	AAH for all 900 Series systems			
1600 bpi	AA1 for all 900 Series systems			
6250 bpi	AA2 for all 900 Series systems			
Group D - Localized Learning Products				
English Manuals	ABA for all 900 Series systems			
German Manuals	ABD for all 900 Series systems			
Supplied Manual Sets*	9x7LX Core	System Management Core	System Management Core and Core Plus	System Management Core and Core Plus

** Please see MPE/iX Learning Products later in this chapter for contents of these manual sets.*

Note

Ordering option 0D1 of P/N 51453A provides factory loading of subsystem products for Series 9x7LX and 9x7 systems.

One MPE media product (51454A) **MUST** be ordered with each Corporate Business System. Order one option from Group A, one option from Group B, one option from Group C, and one option from Group D.

Media (51454A) Options

	Corporate Business System	Corporate Business System DX
Group A - FOS/Database		
Preconfigured System	Default	Default
ALLBASE/SQL only	910	910
TurboIMAGE only	915	915
MPE/iX only	920	920
Group B - MPE Release		
Latest release	200	200
Minimum supported release	240	240
Group C - Media Type		
DDS Cassette	AAH	AAH
1600 bpi	AA1	AA1
6250 bpi	AA2	AA2
Group D - Localized Learning Products		
English Manuals	ABA	ABA
German Manuals	ABD	ABD
Group E - Software Bundles		
Delete system software bundle	N/A	931
Delete performance software bundle	N/A	932
Basic system - no additional software	933 (must order)	933
Supplied Manual Sets*	System Management Core and Core Plus	System Management Core and Core Plus

** Please see MPE/iX Learning Products later in this chapter for contents of these manual sets.*

Note

Ordering option 0D1 of P/N 51454A provides factory loading of subsystem products. Refer to page 4-7 for information on pre-load.

Media Option	MPE/iX Release
200	Latest Release
220	Release 2.2
230	Release 3.0
231	Release 3.1 for 9x7LX and 9x7 systems only
240	Release 4.0

For preconfigured Series 9x7LX, 9x7, and Corporate Business Systems, the operating system will be installed at the factory and the software support tape and license will ship with the system.

One or more of the 900 Series preconfigured systems' database management systems may be deleted by specifying one of the following preconfigured system options.

- Option 910: ALLBASE/SQL only (deletes TurboIMAGE).
- Option 915: TurboIMAGE only (deletes ALLBASE/SQL)
- Option 920: MPE/iX only (deletes ALLBASE/SQL and TurboIMAGE).
- Option 930: SPU hardware only (deletes ALLBASE/SQL, TurboIMAGE, and FOS). The FOS software product (3265xA) must be ordered separately when ordering option 930. **ICON only**

Ordering FOS Separately

When ordering system option 930 (SPU hardware only), FOS licenses must be ordered separately.

- When system option 930 is specified, order FOS license product 32651A to receive MPE/iX only **or** order FOS license product 32652A to receive MPE/iX, ALLBASE/SQL, and TurboIMAGE. Ordering FOS product 32651A creates an **MPE/iX only system.** Ordering FOS product 32652A creates a **preconfigured system.** The appropriate 51453A MPE media product and options must also be ordered whenever ordering the FOS product.

Ordering MPE/iX Server Separately

When ordering the server option 100 on the HP 3000 system product (except for the Series 980 and CS DX and CS systems), both 51453A MPE FOS Media and 36396A MPE Server Media products must be ordered.

Ordering Add-On Terminal Support

When upgrading an HP 3000 Server System purchased with option 100 to provide terminal support, A1153A Add-on Terminal Support Servers must be ordered to add terminal support.

Product/Option Number	Description
A1153A	Add-on Terminal Support for Servers - includes a class/concurrent license to use MPE/iX on specific 900 Series
opt. 821	Upgrades Server 917LX
opt. 822	Upgrades Server 927LX
opt. 839	Upgrades Series 920, 922LX, 937LX, 937
opt. 814	Upgrades Server 922RX
opt. 842	Upgrades Server 922, 925, 932
opt. 852	Upgrades Server 935, 947, 948
opt. 853	Upgrades Server 949, 957LX, 957
opt. 864	Upgrades Server 967LX, 967, 977, 987

MPE Media Software Products (3265XA)

	Description
Product #	
32651A	Fundamental Operating System (FOS). Includes a class/concurrent license to use MPE/iX operating system, VPLUS, KSAM, tools, utilities, and English manual set.
32652A (ICON Only)	Preconfigured system software. Includes a class/concurrent license to use MPE/iX operating system, TurboIMAGE, ALLBASE/SQL, VPLUS, KSAM, tools, utilities, and English manual set.
32653A	System Software Upgrade for SQL-only system configurations. It adds a class/concurrent license to use TurboIMAGE/iX database software to these systems.
Option #	
416	For use on Series 917LX by one to eight users
426	For use on Series 927LX by one to 20 users
436	For use on Series 937LX by one to 32 users
437	For use on Series 937 by one to 32 users
446	For use on Series 947LX by one to 100 users
447	For use on Series 947 by one to 100 users
456	For use on Series 957LX by one to 64 users
457	For use on Series 957 by one to 64 users
466	For use on Series 967LX by one to 100 users
467	For use on Series 967 by one to 100 users
477	For use on Series 977 by one to 100 users
487	For use on Series 987 by one to 100 users
480	For use on Series 980/100 by unlimited users
482	For use on Series 980/200 by unlimited users
483	For use on Series 980/300 by unlimited users
484	For use on Series 980/400 by unlimited users
490	For use on CS 990 and 992/100 by one to 160 users
492	For use on CS 992/200, 992/300, 992/400 by unlimited users

MPE/iX Learning Products

The table below outlines which manual sets are shipped with each 900 Series system. Additional sets may be ordered by using the corresponding product number in the table below:

Manual Set (order number)	9x7LX	937, 947	957, 967, 977, 987, 980, CS
Series 9x7LX System Management Core (A1707-92001)	X		
System Management Core (36367A)		X	X
System Management Core Plus (36368A)			X

Series 9x7LX System Management Core

These two sets of learning products allow for efficient operation of Series 9x7LX systems. These sets are shipped automatically with 917LX, 927LX, 937LX, 947LX, 957LX, and 967LX systems. This is the only system documentation shipped with 9x7LX systems. The set consists of the following learning products:

Learning Product	Order Number
Series 9x7LX Video Introduction Kit	B2640A
Series 9x7LX System Documentation	A1707-92001
- Setting Up and Maintaining Your System	A1707-90001
- Concepts Guide	A1707-90003
- Using Your System	A1707-92002
- HP EasyTime/iX Quick Reference Pocket Card	B1940-90001
- MPE/iX Day-to-Day Tasks Pocket Card	Not available separately
- Preparing Additional Software Products for Use on the HP 3000 Series 9x7LX	36123-90014
- HP 3000 and HP 9000 PA-RISC Customer Computer Support Log	A1703-90012

Individual learning products can be ordered by using the corresponding order number provided in the table above.

Series 9x7 System Documentation

The System Management Core manual set (36367A) ships automatically with all HP 3000 Series 9x7 systems. Additionally, the System Management Core Plus manual set (36368A) ships automatically with all HP 3000 Series 957, 967, 977, and 987 systems. The following manuals are specific to the HP 3000 Series 9x7 systems. Individual manuals may be purchased by using the corresponding order provided in the table below:

Learning Product	Order Number
HP 3000 and HP 9000 PA-RISC Customer Computer Support Log	A1703-90012
HP 3000 Series 9x7 Family Computer Systems/Operator Handbook	A1707-96010
MPE/iX HP 3000 Series 9x7 Software Startup Manual	36123-90015

Series 980 System Documentation

Series 980 systems will automatically ship with the following manual sets:

Learning Product	Order Number
System Management Core	36367A
System Management Core Plus	36368A

Corporate Business Systems - System Management Core

CS customers will receive the System Management Core (36367A) and System Management Core Plus (36368A) sets. Special application, availability, and performance software documentation sets will be shipped if these products are purchased.

Learning Product	Order Number
System Management Core	36367A
System Management Core Plus	36368A
System Dictionary Set	36371A
ALLBASE Manual Set	36372A
Availability Software Set	B2496A
Performance Software Set	B2493A

System Management Core 36367A

These learning products aid users in efficient operation of an MPE/iX system. This set ships with systems listed on page 8-4. Additional sets can be ordered separately by using product number 36367A. Individual learning products (except where marked with an asterisk) can be ordered by using the corresponding order number provided in the table below:

Learning Product	Order Number
MPE/iX Commands Reference Manual (Volumes 1 and 2)	32650-60115
MPE/iX Documentation Guide	32650-90144
MPE/iX Quick Reference Guide	32650-90032
Performing System Operations Tasks	32650-90137
Performing System Management Tasks	32650-90004
MPE/iX Error Messages Manuals (Volumes 1, 2, and 3)	32650-60016
EDIT/3000 Reference Manual	03000-90012
TurboIMAGE/iX Database Management System Reference Manual	30391-90001
QUERY/V Reference Manual	30000-90042
KSAM/3000 Reference Manual	30000-90079
Using KSAM/XL	32650-90168
Native Mode Spooler Reference Manual	32650-90166
Up and Running with HP ALLBASE/SQL	36389-90011
Configuring Systems for Terminals, Printers, and Other Serial Devices	32022-61000

System Management Core Plus 36368A

This set provides additional detail for the management of complex MIS centers and large networks, as well as more advanced system management and administration tasks. This set ships automatically with the 900 Series systems listed in the table on page 8-4. Additional sets can be ordered separately by using product number 36368A. Individual learning products can be ordered by using the corresponding part number provided in the table below.

Learning Product	Order Number
MPE/iX Glossary of Terms and Acronyms	32650-90146
FCOPY Reference Manual	32212-90003
SORT-MERGE/XL General User's Guide	32650-90082
MPE/iX System Utilities Reference Manual	32650-90081
System Startup, Configuration, and Shutdown Reference Manual	32650-90042
Controlling System Activity	32650-90155
Volume Management Reference Manual	32650-90045
Using the Node Management Services (NMS) Utilities	32022-61005
Troubleshooting Terminal, Printer, and Serial Device Connections	32022-61002
Customizing Terminal and Printer Type Files, Using Workstation Configurations	5959-2870

Programming Core 36369A

This set is designed for basic programming environments. It describes the mechanics of compiling and linking as well as other MPE/iX programming techniques. This set does not ship with any system unless ordered separately by the customer. Use product number 36369A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below.

Learning Product	Order Number
Getting Started as an MPE/iX Programmer	32650-90008
HP Compiler Library/XL Reference Manual	32650-90029
HP Link Editor/XL Reference Manual	32650-90030
MPE Segmenter Reference Manual	32650-60026
Berkeley Sockets/iX Reference Manual	32650-90363

Programming Core Plus 36370A

This is a general reference set for larger, more advanced programming environments. This set does not ship with any system unless specified. It must be ordered separately by the customer. Use product number 36370A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below.

Learning Product	Order Number
Accessing Files, Trap Handling, and Data Types Conversion	32650-60010
Process Management, Resource Management, and Interprocess Communication Programmer's Guide	32650-60011
Native Language, Message Catalogs, and User Logging Kit	32650-60012
VPLUS/XL Reference Manual, Using VPLUS	32209-60002
Hi-Li/XL Reference Manual	32424-60001
MPE/iX Asynchronous Serial Communications Programmer's Reference Manual	32022-61001
MPE/iX Intrinsics Reference Manual	32650-90028
KSAM/3000 Reference Manual	30000-90079
Using KSAM XL	32650-90168
TurboIMAGE/XL Database Management System Reference Manual	30391-90001
QUERY/V Reference Manual	30000-90042
MPE/iX Error Message Manuals (Volumes 1, 2, and 3)	32650-60016
Getting System Information Programmer's Guide, Command Interpreter Access and Variables Programmer's Guide	32650-60021

ALLBASE Set 36372A

This set is designed for programmers who use ALLBASE, Hewlett-Packard's relational database management system. This set ships with CS systems only. For other systems, it must be ordered separately by the customer. Use product number 36372A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below.

Learning Product	Order Number
ALLBASE/SQL Pascal Application Programming Guide	36216-60008
ALLBASE/SQL COBOL Application Programming Guide	36216-90006
ALLBASE/SQL C Application Programming Guide	36216-90023
ALLBASE/SQL FORTRAN Application Programming Guide	36216-90030
ALLBASE/SQL Reference Manual	36216-90001
ALLBASE/ISQL Reference Manual	36216-90004
ALLBASE/SQL Database Administration Guide	36216-90005
ALLBASE/SQL Message Manual	36216-90009
ALLBASE/SQL Quick Reference Guide	36216-90038
ALLBASE/SQL Release F.0 Application Programming Bulletin for MPE/iX	36216-90063
Up and Running with ALLBASE/SQL	36389-90011
ALLBASE/NET User's Guide	36216-90031

System Dictionary Set 36371A

This set is designed for programmers who use the HP System Dictionary/XL product. This set ships with CS systems only. For other systems, it must be ordered separately by the customer. Use product number 36371A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below:

Learning Product	Order Number
Data Dictionary Managing Information Networks Primer	5958-8527
HP System Dictionary/XL Self-Paced Customer Training	32254-61000
HP System Dictionary/XL General Reference Manual Volume I	32256-61003
HP System Dictionary/XL General Reference Manual Volume II	32256-61004
HP System Dictionary/XL Intrinsics Reference Manual	32256-61001
HP System Dictionary/XL Utilities Reference Manual	32256-61002
HP System Dictionary/XL SDMAIN Reference Manual	32256-61000
HP System Dictionary/XL COBOL Definition Extractor Reference Manual	32257-61000

General Usage Set 36373A

This set provides additional basic information about the usage of MPE/iX systems. It is designed to help users speed through their learning curves with the system. This set does not ship with any system. It must be ordered separately by the customer. Use product number 36373A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below.

Learning Product	Order Number
MPE/iX Quick Reference Guide	32650-90032
MPE/iX Commands Reference Manual (Volumes 1 and 2)	32650-60115
Using the 900 Series HP 3000: Fundamental Skills	31126A Opt. 001
Using the 900 Series HP 3000: Advanced Skills	31126A Opt. 002
Using the 900 Series HP 3000: Setup Tape (1600 bpi)	31126A Opt. 003
Using the 900 Series HP 3000: Setup Tape (DAT)	31126A Opt. 004

Migration Set 30231A

This set is designed to aid in the migration from MPE V systems to MPE/iX systems. This set does not ship with any system. It must be ordered separately by the customer. Use product number 30231A to order this set. Individual learning products can be ordered by using the corresponding order numbers provided in the table below.

Learning Product	Order Number
MPE V to MPE/XL: Getting Started (self-paced training)	30367-60002
MPE V to MPE/XL: Getting Started (self-paced training - mentor's guide)	30367-60002
Introduction to MPE/iX for MPE V System Administrators	30367-90003
MPE/XL Languages Migration Guides (PASCAL, FORTRAN, COBOL)	31502-60004
SPL to HP C/XL Migration Guide	30231-60001
Migration Process Guide	30367-90002
Switch Programming Guide	32650-60030
Introduction to MPE/XL for MPE V Programmers	30367-60004

Additional Learning Products

The following learning products are purchasable separately using the order numbers below.

Languages

Learning Product	Order Number
HP RPG/XL Programmer's Guide	30318-60001
HP RPG/XL Reference Manual	30318-60002
HP RPG/XL Utilities Reference Manual	30318-60003
HP RPG/XL Pocket Guide Card	30318-90002
HP Pascal/iX Reference Manual	31502-90001
HP Pascal/iX Programmer's Guide	31502-90002
HP COBOL II/XL Reference Manual	31500-90001
HP COBOL II/XL Programmer's Guide	31500-60002
HP COBOL II/XL Quick Reference Guide	31500-60003
HP COBOL II/XL Reference Manual Supplement	31500-90005
HP FORTRAN 77/XL Reference	31501-90010
HP FORTRAN 77/XL Programmer's	31501-90011
HP Symbolic Debugger/XL User's Guide	31508-60003
HP C/iX Library Reference Manual	30026-90001
HP C Programmer's Guide	31506-60002
HP C/iX Reference Manual	31506-90005
HP Business BASIC/XL Reference Manual	32715-60001
HP Business BASIC/XL Migration Guide	32715-60002

Data Communications

Learning Product	Order Number
Managing Host-Based X.25 Links Quick Reference Card	36939-61003
HP 3000/iX Network Planning and Configuration Guide	36922-61023
Configuring and Managing Host-Based X.25 Links	36939-61004
Netware for the HP 3000 System Administration MPE/iX 4.0 Supplement	32020-61015
NS3000/XL NMMGR Screens Reference Manual	36922-61003
NS3000/XL Operations and Maintenance Reference Manual	36922-61005
NS3000/XL Error Messages Reference Manual	36923-61000
Using NS3000/XL Network Services	36920-61000
NetIPC 3000/XL Programmer's Reference Manual	36920-61005
NS Cross-System NFT Reference Manual	36920-61003
HP SNMP/XL User's Guide	36922-61029
NS X.25 3000/V System Link Guide	24405-90002
HP SNA Server/Access User's Guide	30254-61000
HP SNA Link/XL Node Manager's Guide	30291-61000
HP SNA Products: AS/400 Guide	5960-1629
HP SNA NRJE User/Programmer's Reference Manual	30292-61001
HP SNA NRJE Node Manager's Guide	30292-61000
HP SNA IMF Programmer's Reference Manual	30293-61005
HP SNA IMF/XL Node Manager's Guide	30293-61000
HP SNA Products	30291-61005
SNA DHCF/XL User Support Guide	36935-61001
SNA DHCF/XL Node Manager's Guide	36935-61002
SNA DHCF/XL Application Programmer's Manual	36935-61003
SNA DHCF/XL Diagnostic Message Manual	36935-61004
APPC Subsystem on MPE/XL Node Manager's Guide	30294-61002
HP SNADS/XL HPDesk Gateway Adminstrator's Guide	32006-61001
HP SNADS/XL Node Manager's Guide	32006-61002
HP SNADS/XL SNA/XL Distribution Services	32006-61003
HP SNADS/XL HP Desk User Support Guide	32006-61004
HP OpenView System Manager User's Guide	36936-61001
HP OpenView System Manager Manager's Guide	36936-61002
Using HP OpenView DTC Manager	D2355-90001
Installing and Managing HP ARPA File Transfer Protocol Network Manager's Guide	36957-61001
HP ARPA File Transfer Protocol User's Guide	36957-61002

Data Communications (continued)

Learning Product	Order Number
Asian SNA/IMF/XL User Support Guide (Taiwanese)	30293-60211
Asian SNA/IMF/XL User Support Guide (Japanese)	30293-60221
Asian SNA/IMF/XL User Support Guide (Korean)	30293-60231
Using SNA IMF Pass Thru	30293-61008
SNA IMF Programmer's Reference Manual	30293-61005
LU6.2 API Application Programmer's Reference Manual	30294-61000
LU6.2 API/XL Node Manager's Guide	30294-61001
RJE User/Programmer Reference Manual	30295-61001
RJE/XL Node Manager's Guide	30295-61002
NS over SNA/XL Configuration Guide	30296-61000
HP FTAM/XL User's Guide	36972-61001
Installing, Configuring, and Starting OSI/XL Network Manager's Guide	36971-61001
OSI/XL Operations and Maintenance Reference Manual	36971-61002
Installing and Administering HP LAN Manager/XL	32015-61001
HP LAN Manager/XL Programmer's Reference Manual	32015-61003
HP X.400/HP Desk Node Administrator's Guide	32055-90001
Using HP Desk Manager Connected to X.400 User's Guide	32055-90002
Netware for the HP 3000 Installation	32020-61001
Netware for the HP 3000 system Administration	32020-61002
Netware for the HP 3000 User Basics for DOS Workstations	32020-61003
Netware for the HP 3000 Utilities Reference	32020-61004
Netware for the HP 3000 Concepts	32020-61005
Netware for the HP 3000 System Error Messages	32020-61006
Novell Installation and Maintenance, Netware for MacIntosh	32020-61010
Novell Basic Operations, Netware for MacIntosh	32020-62011
Novell Netware 286 External Bridges Supplement	32020-61012
Novell Netware Requestor for OS/2	32020-61013
Novell Netware Supplements	32020-61014
Netware for the HP 3000 system Administration MPE/iX Supplement	32020-61015

Programmer Productivity Tools

Learning Product	Order Number
HP Toolset/XL Reference Manual	36044-60001
INFORM/V User's Guide	32246-60002
REPORT/V Reference Manual	32245-60001
Getting Started With TRANSACT	32247-60002
HP TRANSACT Reference Manual	30138-60001
Virtuoso COBOL Sample Library Reference Manual	30426-60001
Virtuoso Code Generator Reference Manual	30422-60001
HP EDIT Reference Manual	30316-90001
Learning HP EDIT	30316-90002
HP EDIT Quick Reference Card	Not available separately
Getting Started with HP Software Revision Controller, Implementation Guide, User's Guide	30234-60002
HP Browse/XL User's Guide	36384-60001
HP Search/XL User's Guide	36383-60001

Other Learning Products Available

Learning Product	Order Number
Silhouette Reference Manual	30302-60003
ALLBASE/NET User's Guide	36216-90031
Dictionary/3000 Reference Manual	32244-61000
SORT-MERGE/XL Programmer's Guide	32650-60059
System Debug Reference Manual	32650-60017
AutoRestart/XL User's Guide	36375-60062
SPU Switchover/XL User's Guide	36378-90001
TurboSTORE/XL II User's Guide	36388-90001
VPLUS/Windows Programmer's Guide	36393-90002
Magneto-Optical Media Manager User's Guide	36398-90001
TurboSTORE/XL Reference Manual	30319-60002
Mirrored Disk/iX User's Guide	30349-90003
ALLBASE/DB2 CONNECT User's Guide	30700-90001
ALLBASE/TurboCONNECT Administrator's Guide	36385-90001
DBchange Plus User's Guide	36386-90001

9

Hardware and Software Support

Customer Support Services

Hewlett-Packard's customer support services are designed to ensure long-term, productive use of HP 3000 systems. Support is available throughout the life of a system to meet the needs of particular applications and working environment. HP offers a complete range of customer support services for the HP 3000 systems:

- A Premier Account Support Program provides a premium level of complete service and support for Corporate Business Systems customers
- Hardware maintenance service provides various levels of hardware support for systems, workstations, and office products
- A comprehensive network support program covers HP and multivendor networks
- A choice of software support programs provides the level of software support that best meets customer's needs
- 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 3000 products.

Premier Account Support Program

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) managers 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 Planning

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 3000 Corporate Business System 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 from the Systems Support Organization (SSO), the Professional Services Organization (PSO), and the HP Response Center. Each product contains the following premium deliverables, all designed to make the Corporate Business Systems manager successful:

- A new 24 x 7 hardware support service level with immediate response
- An enhanced level of software support with expanded 24 x 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 x 7 network support for the system
- Two person weeks of customer training
- An account containing on-site consulting time, so that the customer gets consulting activities focused on meeting their unique business needs. For example, a customer can receive one day every other week for account planning and general consulting or a combination of general consulting and specialist activities over a number of days.

In many cases, the up front purchase of fixed-price packages can be financed through the Finance and Remarketing Division (FRD). This helps customers to better manage their cash flow and makes it easier to purchase support for their corporate business systems.

Hardware Maintenance Services

An on-site warranty for 90 days is included for each HP 3000 system and all HP computer products purchased with the system. After the warranty period, service can be continued under an HP support agreement. All HP hardware services include parts and labor for remedial maintenance.

HP SuccessLine service, HP's hardware maintenance service, provides high-quality support that enables the customer to maximize computer system uptime and productivity. It provides superior value and the flexibility to choose response times and coverage periods.

When the customer purchases an HP 3000 support agreement, a CE is assigned to the account personally manages the maintenance program. The CE performs preventive maintenance on a regularly scheduled basis and, if necessary, adjusts or replaces parts to ensure a continued high level of performance. The CE also installs equipment, updates the customer's system with engineering improvements, monitors the customer's site environment, and maintains a current system log.

HP's remote support is included with HP hardware support for HP 3000 systems. A communications link via phone line and a qualified modem enables specialists in the HP Response Center to access an HP 3000 system and remotely run tests and diagnose functional problems.

HP Predictive Support is also included with hardware support for HP 3000 systems. HP Predictive Support software provides early warning of potential problems in HP disk drives, magnetic tape media, and system memory. This allows the customer to avoid unscheduled downtime and increase system availability.

Should the customer's system require troubleshooting, the CE has the training and materials to rapidly resolve most problems. The CE stays on site until the customer's problem is solved, even if this involves working beyond the customer's coverage hours. For very difficult problems, the CE can initiate an escalation procedure that enlists all the HP resources necessary to provide a solution.

Features included in HP 3000 support agreements are detailed below.

HP SuccessLine Service Features

- Account-assigned CE
- HP Predictive Support software
- Work to completion
- Remote support
- Escalation management program
- Preventive maintenance
- HP Response Center network
- Engineering improvements
- Local parts inventory
- Site environment survey
- Warrantee enhancement
- Installation add-ons

HP SuccessLine service offers the customer the flexibility to choose from four service levels:

Priority Plus Support

If the customer's applications are extremely critical and call for maximum availability, this service level provides them with maximum coverage hours and days and HP's best possible response. This coverage is ideal for crucial applications or multiple shift operations.

Priority Support

If the customer requires maximum availability during standard business hours and evenings and HP's best possible response, then this service level is a good choice. On-site assistance is available for several business hours beyond the standard business day, and HP will respond to the customer's service request as quickly as possible. This coverage is provided during the normal work week.

Next Day Support

If the customer's application allows for service delivery on the following business day, then this service level is the most cost-effective solution for system support. This solution is ideal for the customer with spare or substitute equipment. HP engineers arrive on site as quickly as possible to begin solving the problem.

Scheduled Support

If the customer has HP workstation and office products, this service level offers the lowest-cost on-site support. It is an economical support solution for the customer with alternative PCs or workstations and users who run less critical applications. An HP engineer makes a scheduled weekly visit to a central site. To qualify for HP SuccessLine service scheduled support, the customer's monthly charges for a site for this service level must exceed a minimum dollar amount.

Support Selection Guide for HP SuccessLine Service

	Priority Plus	Priority	Next Day	Scheduled
Coverage Hours	24 hours 7 days	8 a.m.-9 p.m. Monday-Friday	8 a.m.-5 p.m. Monday-Friday	8 a.m.-5 p.m. Monday-Friday
Response Time	Best response; not to exceed 4 hours	Best response; not to exceed 4 hours	Next working day	Scheduled weekly visits
Usage Environment	Highly critcal	Urgent	Less critical	Workstation/office products only; multiple units

For HP workstation or office products, HP Customer Return service offers an additional low-cost alternative. This service offers support for situations where applications are not critical and service economy is a priority. With this service, the customer returns the product to an HP Customer Service Center for repair. Within 3 days of its arrival, the repaired unit will be shipped (prepaid) back to the customer via normal land carrier.

HP can also fully supports selected non-HP terminals and PCs and multivendor PC local area networks (LANs).

HP Multivendor Network Support Program

The Network Life Cycle

HP recognizes that successful network management does not begin or end with the purchase of network products. The customer begins by recognizing a need to improve the organization's information flow, then plans a network that will meet those needs. Implementation follows design, with the equipment purchased and installed, the customer's people trained to use and manage it, and the system fully tested and operational. Once the network is implemented, the customer operates it as part of business. However, new information needs are always emerging that require planning for changes and enhancements, thus creating a continuous process: the network life cycle.

Integrated, Flexible Assistance

HP's objective is to give the customer complete, integrated, and flexible support solutions. Recognizing that different support needs occur at different stages of the cycle, HP offers a variety of network support services. The HP Mulitivendor Network Support program integrates services so that they work logically together and so that the work performed at one stage increases the effectiveness of services performed at a later stage. The program is also flexible. HP recommends only the services that complement their customer's capabilities. Using HP's highly regarded implementation and support planning process, HP tailors various aspects of each service to the customer's unique needs. For special needs, HP can provide custom consulting services that allow the customer to leverage HP's considerable experience in network support.

HP Network Consulting

HP provides experienced network consultants who develop a custom network design that can best support the customer's business needs. A range of service modules enables the customer to tailor services to ensure successful network implementation and operation.

HP WireTest

HP evaluates the suitability of the customer's existing cables prior to implementing a new or upgraded network.

HP CableSite

HP takes responsibility for the design and installation of the cable infrastructure needed for information transport over LANs.

HP Network Startup

HP coordinates the installation and testing of the customer's HP and multivendor network to ensure that it operates as designed.

HP NetAssure

HP provides a single point of contact for troubleshooting and managing fault resolution on the customer's HP and multivendor network.

NP Network Operations

HP can efficiently operate and manage a customer's network 24 hours a day, 7 days a week, working through HP Customer Network Centers worldwide.

HP's customer education offers a wide variety of network training, from classroom to self-paced or even custom programs delivered at the customer's site.

Software Support Services

HP's software support program provides HP 3000 computer users with help in implementing and operating HP software solutions. Different levels of assistance and problem-solving are available, and services can be customized for a particular customer or site.

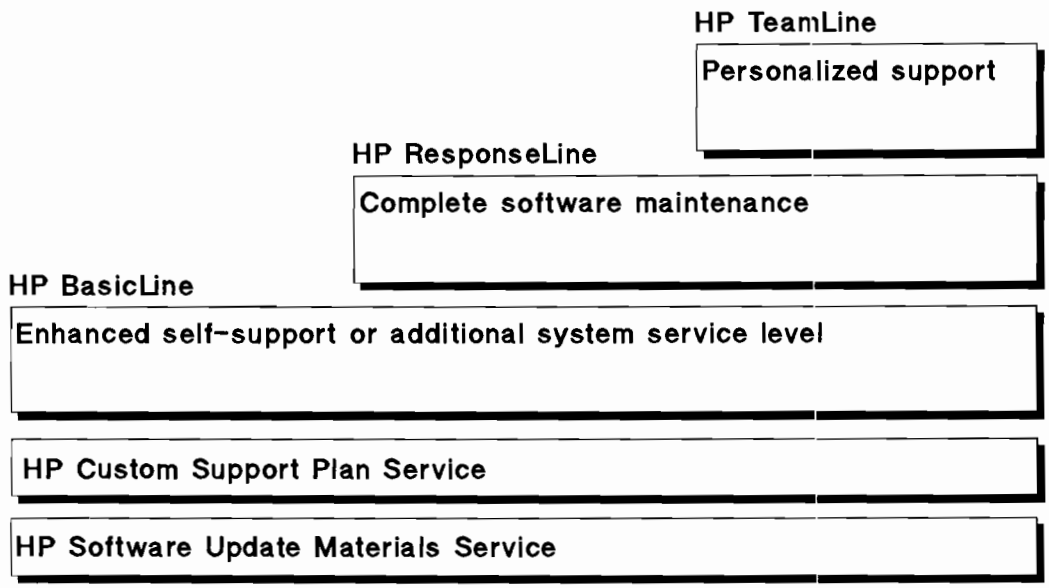
Software support is an extremely powerful selling and customer satisfaction tool. Most of its strength comes from the tremendous flexibility and range built into the various support options available to your customers.

HP's software support is provided on a per-system basis. For each system, the customer chooses one of three software support services for HP 3000 systems:

- HP TeamLine (top-level software support)
- HP ResponseLine (complete software maintenance)
- HP BasicLine (economical basic service or additional system service level)

The customer also orders:

- HP Software Update Materials service (where software and manual updates are needed)



HP's Software Support for HP 3000 Systems

HP TeamLine

HP TeamLine software support service for HP 3000 systems is our premier, top-of-the-line software support service. It provides customers with personalized software support and on-site applications assistance. A locally assigned account consultant becomes familiar with your customer's specific system environment and manages all software support issues.

Key features:

- HP account support consultant
- Proactive future support planning
- Personalized technical assistance to help the customer use the HP system most effectively
- Periodic technical and support management reviews

This service offers the closest relationship between HP and the customer by providing personalized assistance in addition to industry leading telephone and remote support. HP ResponseLine support is a prerequisite for this service. HP TeamLime Upgrade service is purchased on top of HP ResponseLine service.

Account Support Consultant

The account support consultant is an integral part of the HP TeamLine software support service, and becomes a valuable part of the customer's team. This consultant:

- Understands HP systems
- Understands the customer's business
- Helps plan how HP systems and the customer's applications can best fit together

HP ResponseLine

HP ResponseLine software support service for HP 3000 systems provides a complete software maintenance service for HP 3000 customers. HP ResponseLine delivers this through a comprehensive set of software maintenance features with guaranteed coverage and response times.

Key features:

- HP Response Center access for software problem-solving and product-usage assistance
- Remote diagnostics through an HP-installed remote support modem
- Electronic call submittal via HP SupportLine electronic support, with callback within two hours or next-day written response
- PowerPatch
- On-site visit by an HP representative if the problem cannot be solved remotely
- All the features of HP BasicLine

Extended Hours

Extended hours HP Response Center support is available for HP 3000 customers. For customers who perform system maintenance functions outside of HP's normal business hours, such as backups and software update installations, extended-hours support provides telephone assistance and remote diagnostics. Operating system, system interrupts, and select data communications software support is available 24 hours a day, 7 days a week. Extended coverage is also provided for HP Desk: 24 hours a day, 5 days a week, and 4:00 am to 8:00 pm (U.S. eastern time) on weekends. For Europe and Intercon, contact the local support management for hours and availability.

Electronic Call Submittal

HP ResponseLine software support service provides unlimited access to the HP Response Center and HP SupportLine on-line electronic databases. Customers can call the HP Response Center with software problems or usage questions, or submit an electronic call through HP SupportLine.

The customer may choose between guaranteed telephone response within two hours or next-day written response to calls submitted electronically. In addition, HP ResponseLine software support service features a well-defined escalation management procedure for critical software problems.

PowerPatch

PowerPatch tapes include operating system data communication and subsystem patches that resolve many known problems proactively, before the customers see them. The customer can request tapes from the response center and receive them within 3 days in the U.S. or 1 week outside the U.S.

HP BasicLine

HP BasicLine software support service for HP 3000 systems is a self-maintenance service for customers with significant HP 3000 software experience who do not require direct support contact with HP. In addition, HP BasicLine provides a cost-effective support alternative for customers with multiple systems.

Key features:

- Read-only access to HP SupportLine electronic support, HP's electronic databases of current, comprehensive support information used by the HP Response Center
- Right to use software updates for all licensed software
- Right to use updates copied from another system to additional systems (for customers with multiple HP 3000 systems)

HP SupportLine

HP SupportLine problem-solving databases have powerful browse and keyword search facilities that enable customers to find solutions to problems and questions quickly. HP SupportLine contains:

- New product news
- Problem-solving information
- HP Response Center application notes
- Software status bulletins
- Common questions and answers
- Technical tips

HP BasicLine customers have read-only access to databases.

HP Custom Support Plan

Although most customers' requirements are met by the standard HP 3000 software support offerings, HP Custom Support Plan service lets you tailor a solution to specialized needs.

Here are some examples of where HP Custom Support Plan service may be used:

- The customer wants you to modify existing service deliverables
- The customer wants to add education and consulting services to the contract
- The customer wants simplified ordering, with a single line-item quote

For more information, refer to CSP guidelines (HP publication number 5959-7862), available at the Literature Distribution Center.

HP Software Update Materials

HP Software Update Materials service provides software update materials directly to customers. The service provides:

- Software updates: operating system updates and software product updates
- Software format: floppy disk, cartridge tape, digital data storage (DDS), compact disk, or 1/2-inch magnetic tape
- Manual updates: reference and user manual updates, the HP communicator software release bulletins, and software status bulletins
- Manual format: paper or CD-ROM

Configuring Software Support

Configure software support on a per-system basis, following a series of well-defined steps:

1. Choose the appropriate software support service: HP TeamLine, HP ResponseLine or HP BasicLine.
2. Select the appropriate processor tier for the system.
3. Add applications options and additional service options, if required.
4. Select the appropriate update materials service.

Processor Tiers

Pricing for HP's software support services is based on the processor tiers. A single tier may contain one or more processor types.

Applications Options

When the customer purchases one of the three services for a specified processor tier, most of the software that resides on the system is automatically supported. The exeception are specified application software products determined to be more difficult for the HP Response Center or field to support. In the case of these products, an applications option is required to receive support for purchasing them.

Application options contain families of related software products. All products that reside under an application option are called "trigger products," because the presence of one or more of these products necessitates the purchase of the application option.

Application options exist only under HP TeamLine and HP ResponseLine software support services. They extend the features of these services to the software supported under the option. Application options typically increase the number of reviews or HP Response Center callers.

For example, under a typical HP ResponseLine contract, the customer is entitled to one HP Response Center caller and one alternate. If the customer has a product that triggers the purchase of an application option, the customer receives an additional HP Response Center caller and alternate with the purchase of this option.

Additional Service Options

Each of the three support services has specified deliverables. Additional service options provide customers with the option to purchase multiples of these deliverables, if desired.

For instance, an HP TeamLine software support service customer can purchase an additional account review or an additional HP Response Center caller. Additional services are limited to specified support services.

Guidelines for Quoting HP's Software Support

Each system must be configured separately. HP maintains a specific system handle for each system under software support.

Each system must have HP ResponseLine or HP BasicLine software support service. HP TeamLine Upgrade service is purchased on top of HP ResponseLine to obtain TeamLine level software support for your customer.

For each service, the customer must order one processor tier. The processor tier determines the price of the service.

For HP TeamLine or HP ResponseLine software support service only. If any applications to be supported belong to an application family, the corresponding application option must be ordered.

If any update materials are required, HP Operating System Update Materials service must be ordered. This provides operating system media and documentation updates. One processor tier and one media type must be ordered with this product.

If any subsystem or application materials are required, HP Software Update Materials service must be ordered. Order this product once for each subsystem or application software product. If a software product is a bundle, it must be separated into its individual component products. (See Software Support Appendix H.) HP Operating System Update Materials service must be ordered as a prerequisite to this product.

Materials may be copied to any system that has the original software license and is supported by HP ResponseLine or HP BasicLine software support service.

Software Support for Multiple Systems

A customer with more than one system may choose to support additional systems through a single central system manager, thereby centralizing the support burden of these systems and saving money.

Support Service for Additional Systems. An HP 3000 system manager for HP ResponseLine service may call the HP Response Center on behalf of their other HP 3000 systems covered by HP BasicLine software support service Therefore, any system that can be supported through another HP ResponseLine service need only be supported with HP BasicLine service. Note that if a problem cannot be resolved remotely, HP will escalate, free of charge, only to systems with HP ResponseLine service or HP BasicLine service located at the same site as the central system with HP ResponseLine service.

Materials may be copied to any supported system having the original software license.

Software Support Configuration Aids

HP's software support information is updated monthly and is available through the Customer Support Hotline on HPDesk:

Subject	Index Number
Software Support Appendices	SW01
Software Support Quote Worksheets	SW02
Software Support Price Lists	SW03

To request a copy, sent an HPDesk message as follows:

```
Intray > SEND
Subject: _____________
To: CUSTOMER SUPPORT HOTLINE/HP5000
Text:  //
Message > MAIL
```

Make sure to type only one subject per request. You should receive your copy back from the Hotline within 48 hours.

Software Support Quote Worksheet

Use a quote worksheet when configuring and quoting software support. There is one quote worksheet for each software support service. Each worksheet lists all relevant components: services offered, processor tiers, applications options, additional services, and software materials services.

Quote worksheets are updated monthly to reflect current system and program information. To receive an updated set of software support quote worksheets, send a desk message to: *CUSTOMER SUPPORT HOTLINE - Subject SW02*

Software Support Appendices

Appendix		Description
B	Supported commercial PC Software	Listing of all software supported under the Commercial PC program
C	HP Software Support Credit and Discount	Explanation of current program
E	Applications Options and Products	Listing of all applications options and corresponding trigger products
H	Bundled Product Reference	Listing of all known bundled software products and their corresponding components
J	Software Support Training Requirements	Listing of required training courses for HP TeamLine and HP ResponseLine customers
K	Supported HP Vectra PC Software	Listing of all software supported under the HP Vectra PC program

The two most frequently used Appendixes are E, "Applications Options and Products," and H, "Bundled Product Reference." Appendix H is especially important because HP's software support program does not support bundled software products. Therefore, every software product must be unbundled—that is, broken down into its components for support purposes. Appendix H provides a reference to aid you in this process.

Software support appendices are updated monthly. To receive an updated set of appendixes, send a desk message to: *CUSTOMER SUPPORT HOTLINE - Subject SW01*

Price Lists

HP's software support price lists are updated monthly. To receive a package containing a complete set of price lists, send a desk message to: *CUSTOMER SUPPORT HOTLINE - Subject SW03*

Manufacturing HP 3000 Series 950

Software Configuration Materials

	Product	Description	Materials
Operating system	32651A	MPE/iX FOS	Y
No charge update	36391A	TurboIMAGE	Y
Software products	30368A	SQL	Y
	32256A	System Dictionary/XL	Y
	36920A	NS3000/XL	Y
	36923A	ThinLAN/XL	Y
	32926A	MM/Adv Ver	Y
	32636A	Product Planning	Y
	32270A	PM	Y
	32920A	PCM	Y
	32399A	SCM	Y
	34006A	Purchashing	Y
	32308A	AP	Y
	36070	BRW	Y

Support Configuration

Product/Option Number	Quantity	Total
H2000A + T00 HP TeamLine 3000		
#0F5 Manufacturing applications	1	12
#0F7 Financial applications	1	12
#0LG Integrated PC office MB	1	12
#0FA Additional management review	2	24
H2072A + S00 HP OS Materials 3000		
#AA2 6250 BPI Tape	1	12
H2004A + S00 HP SW Materials 3000		
36373A + Q00 MUS General Usage	1	12

Notes:

MM II/Core needs to be unbundled in the software configuration. Check software support Appendix H for complete bundled product information.

HP SQL, HP System Dictionary, and HP TurboIMAGE databases all need to be added to the software support configuration for inclusion on the update tape. HP TurboIMAGE, however, is a no-charge update.

Development Series 58

Software Configuration Materials

	Product	Description	Materials
Operating system	32558B	Series 58	Y
No charge updates	30539B	Disk cache	Y
Software products	30240A	ThinLAN/V	Y
	32344A	NS3000/V	Y
	32233A	COBOL II/V	Y
	36570A	HP DESK	Y

Support Configuration

Product/Option Number	Quantity	Total
H2003A + H00 HP BasicLine 3000		
#0J5 44, 48, 58	1	12
#0FZ software distribution CD-ROM	1	12
H2072A + S00\HP OS materials 3000		
#0J5 44, 48, 58	1	12
#0LB CD-ROM media	1	12
H2004A + S00 HP software materials 3000		
#0J5 44, 48, 58	4	48
#0LB CD-ROM media	4	48

Notes:

The customer will get his software updates on CD-ROM media. Option #0FZ provides the actual HP-IB CD-ROM drive. (U.S. only.)

Software Configuration Materials

	Product	Description	Materials
Operating system	32563A	MICRO 3000GX	Y
No charge updates	30539B	DiscCache	N
	35303A	HP Easytime	Y
Software Products	30240A	ThinLAN/V	N
	32344A	NS3000/V	N
	B1727A	Resource Sharing V	Y
	B1726B	Information Access V Server	Y
	B2502A	Information Access PC	Y
	D1811A	NS-User Server	Y

Support Configuration

Product/Option Number	Quantity	Total
H2002A + L00\HP BasicLine 3000		
#0J9 MICRO 3000LX, GX, XE	1	12
H2072A + S00\HP OS materials 3000		
#0J9 MICRO 3000 LX, GX, XE	1	12
#0LB CD-ROM media	1	12
H2004A + S00 HP SW materials 3000		
#0J9 MICRO 3000LX, GX, XE	2	24
#0LB CD-ROM media	2	24
H2016A + S00 HP SW materials PC	2	24
#0A9 RTC 10 PCs	2	24

Notes:

This system will also be updated from CD-ROM. The configuration provides an additional compact disc and codewords.

PC updates for the ThinLAN link are included on this configuration.

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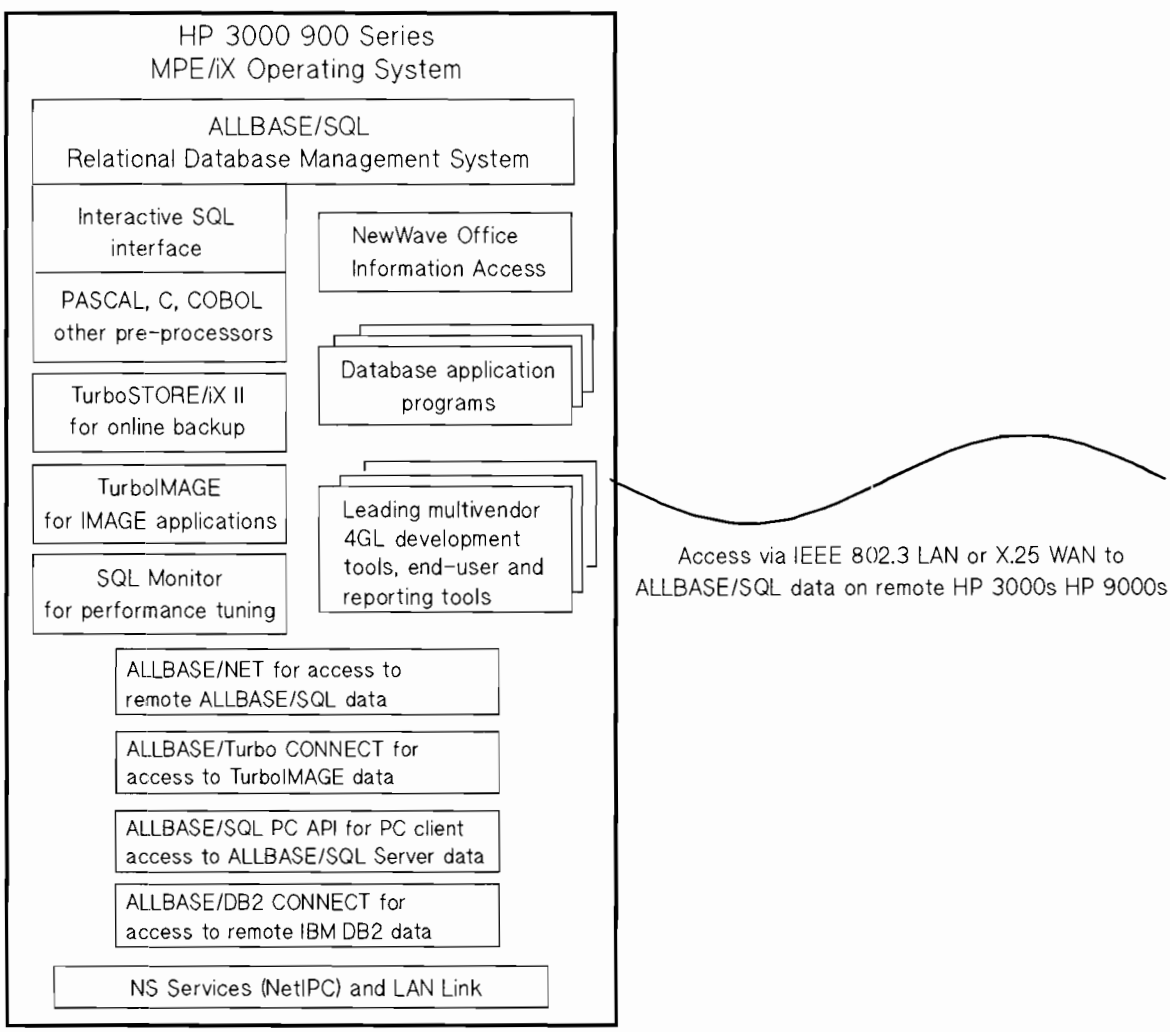
Miscellaneous Configuration Information

HP ALLBASE/SQL

ALLBASE/SQL Configuration Guidelines

ALLBASE/SQL is HP's relational database management system (RDBMS) on the HP 3000 900 Series family of systems. It offers OLTP customers the best performing RDBMS on PA-RISC for mission critical applications, interoperability with other vendors' database and tools offerings, and superior data integrity and supportability.

ALLBASE/SQL on the HP 3000 requires the MPE/iX operating system.



HP ALLBASE/SQL Database on HP 3000 900 Series Systems

Beyond MPE/iX, the software requirements for ALLBASE/SQL depend on the extensions used to interoperate with other software components in a heterogeneous environment. Table 1 outlines these requirements for the following products: ALLBASE/NET, ALLBASE/Turbo CONNECT, and ALLBASE/DB2 CONNECT.

Software Requirements for Extensions to ALLBASE/SQL

Product	Software Requirements on HP 3000	Other Software Requirements
ALLBASE/NET 30604A	ALLBASE/SQL NS Services	
ALLBASE/Turbo CONNECT	ALLBASE/SQL TurboIMAGE	
ALLBASE/DB2 CONNECT	ALLBASE/SQL LU 6.2 SNA Link (includes PSI card)	IBM software on IBM Mainframe: MVS, DB2, CICS, VTAM Gupta Technologies, Inc. software on IBM mainframe: SQL Host (Hardware: IBM 37x5/37x0 SNA communications hardware; modem)
ALLBASE/SQL PC API B2463A	ALLBASE/SQL A.E1.16 or later MPE/iX 3.0 or later ALLBASE/NET A.E1.16 or later	4GL Tools (Development: - Gupta SQL Windows or - PowerSoft PowerBuilder Networking: - TCP/IC ARPA/LAN Manager or - Novell Netware (NS)

Note

ALLBASE/SQL requires 3-4 Mbytes of RAM and 8 Mbytes of disk space. See the ALLBASE/SQL Database Administration Guide (36217-90005) for additional requirements based on the particular applications being run.

For guidance on selecting terminals, disks, magnetic tape units and printers, see Chapter 6 on Peripherals.

Site Preparation Data

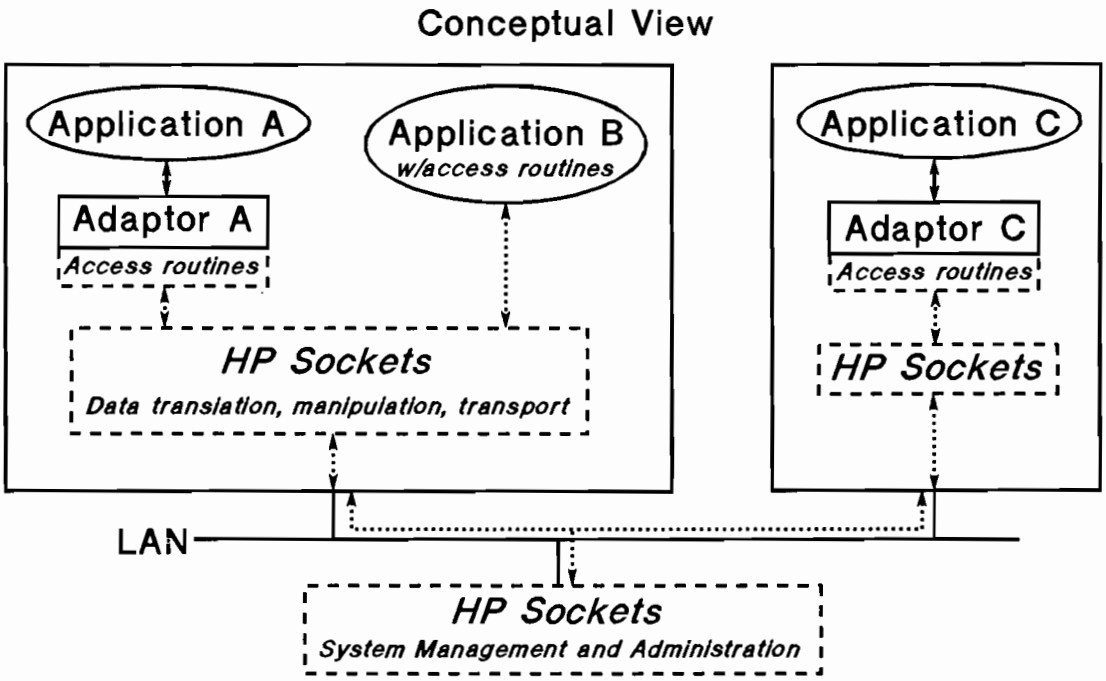
The site preparation information for the 900 Series family of business computers can be found in the following manuals:

	Manual	Part Number
Series 980/100, 980/200, 980/300, 980/400	Site Preparation and Requirements Guide for the HP 3000 Series 950 Family	30190-90007
Disk drives	Disk Product Specification and Site Environmental Requirements	5955-3456
Series 9x7	CE Installation and Configuration Guide	A1707-90008
Corporate Business Systems 990 and 992	Site Preparation and Requirements Guide for the Corporate Business Systems 990 and 992	A1809-90002

HP Software Integration Sockets/XL

HP Sockets is a software tool that enables the seamless integration of existing or new applications. This integration is accomplished with little-to-no modification of the applications. It resolves differences in applications at the data level by providing data manipulation, translation, and record reformating. It also provides for location transparency of the applications. HP Sockets Access Routine Library helps resolve the problems of data access. Data access adaptors may be written in Cobol, C, Pascal, or Fortran.

HP Sockets is supported on MPE/iX and HP-UX. A gateway to IBM/MVS via TCP/IP is also available with the HP Sockets/UX product.



HP Software Integration Sockets

The conceptual view of HP Sockets showing its components is shown in the figure above.

Required products for HP Sockets/XL:

- HP 3000 900 Series running MPE/iX 2.2 or later
- Minimum 24 Mbytes main memory
- 92616A HP Software Integration Sockets (no options required)
- 36923A ThinLAN 3000/XL Link
- 36920A NS 3000/XL Nerwork Services
- 31506A HP C Compiler (needed for compilation and adaptor development; minimum one per LAN environment)

- 30026A LIB C (minimum one per LAN environment)
- System Management and Administration Console -
  The current version of HP Sockets/XL requires an HP 9000 on a LAN with the HP 3000 for system management and administration. Future releases of HP Sockets/XL will support this functionality on the HP 3000 900 Series. The System Management and Administration Console consists of:
  - HP 9000 Series 300, 400, or 800 running HP-UX 7.0 or later**
  - 8 Mbytes of main memory minimum
  - 7 Mbytes of disk space for /usr directory minimum (if HP 9000 applications will also be integrated with HP 3000 applications, 7 Mbytes will also be needed for each /usr node).
  - 92568A HP Software Integration Sockets/UX with Option UAU License to use on one HP 9000 *and* Option AA0 Cartridge tape media option *or* Option AA1 1600 bpi tape media option *or* Option AAH DAT/DDS cartridge media option
  - 36967A LAN for Series 800 *or* 98171A LAN/9000 for Series 300/400 not already equipped with a LAN port

*** HP-UX 8.0 systems also require B2412A C Compiler for Series 800 or B2371A C Compiler for Series 300/400.*

Note that HP Sockets has no relation to UNIX network ARPA sockets.

SPU Switchover/XL

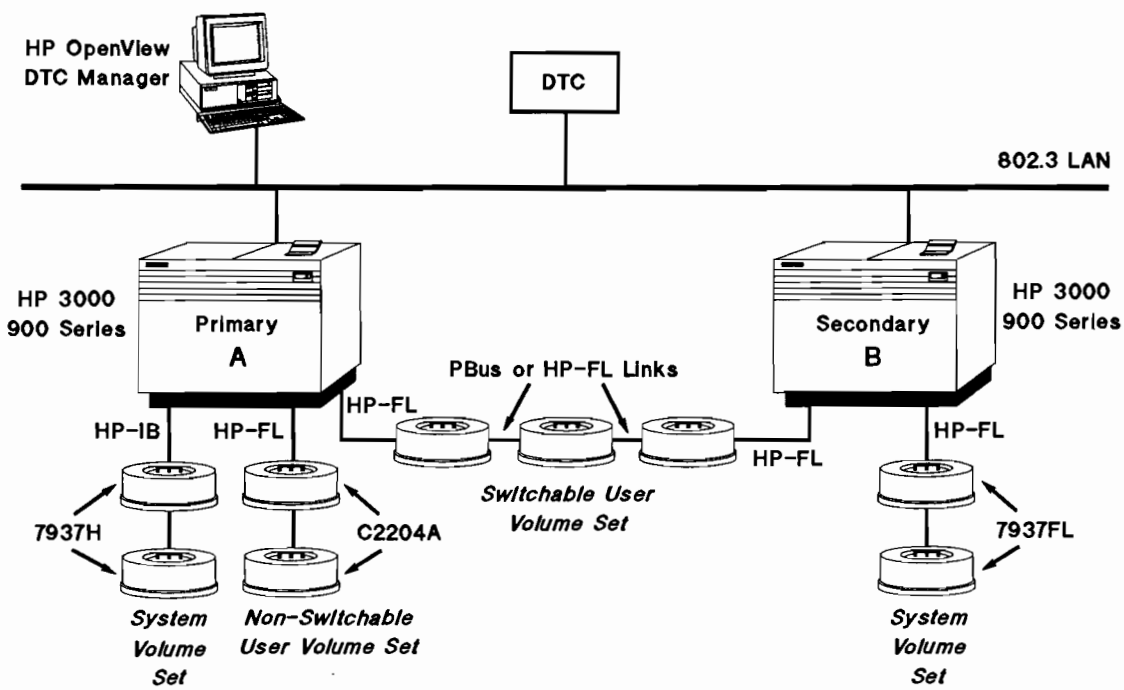
Product Overview

SPU Switchover/XL automatically detects system failures and allows the system operator to initiate switchover between a pair of processors. A key part of the switchover process is the full recovery of user data (including flat files, TurboIMAGE, ALLBASE/SQL and third party databases). In typical situations, this switchover can be accomplished in less than 30 minutes. In this manner, the product enables customers to avoid down time due to scheduled system maintenance or hardware failures.

Hardware Configuration

SPU Switchover/XL is configured to run on a pair of HP 3000 Series 9xx processors. Any combination of Series 9xx processors can be used. When configuring a switchover pair, special consideration must be given to balancing the processing load between the two systems. In a switchover configuration, applications can be running on both the primary and secondary systems. After switchover, applications on the primary are switched over onto the secondary. In this situation, the increased workload on the secondary system can result in degraded system performance.

Hardware configuration for SPU Switchover/XL is shown in the following figure. In the configuration shown one processor (shown here as system "A") is designated as the primary and the other (system "B") is designated as the secondary. Both machines must have system volume sets. In a switchover configuration, there must be at least one user volume set which is connected to both the primary and secondary systems. In addition, either system can have non-switchable user volume sets. Note that for the purpose of determining maximum disk configurations, drives in switchable user volume sets must be considered as belonging to both the primary and secondary systems.



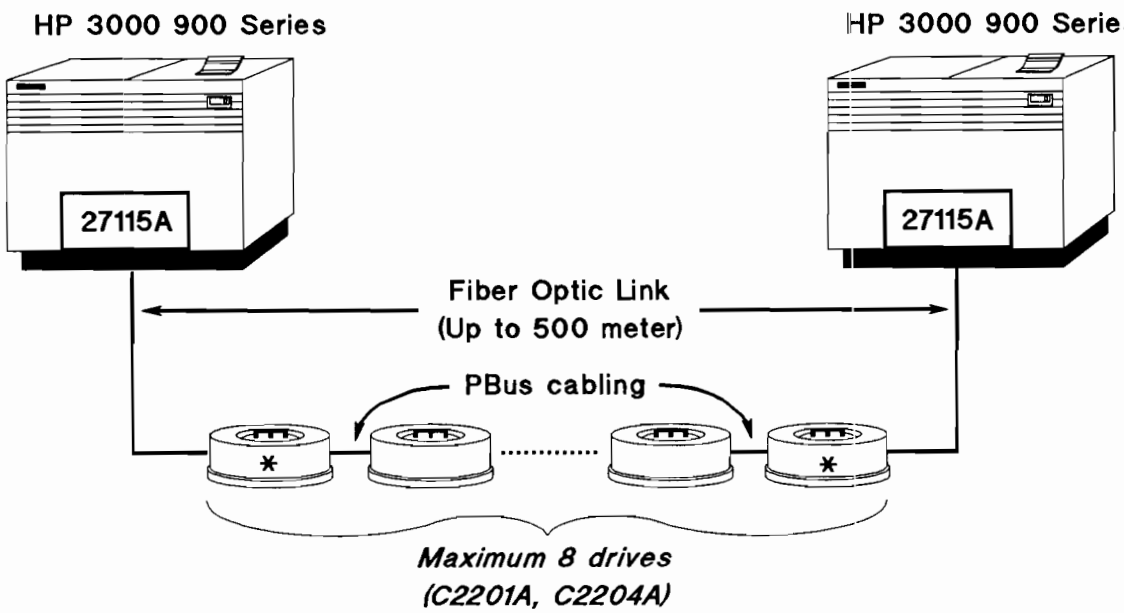
An additional restriction is that all the disk drives in the chain connected between the two systems must be configured as members of a switchable volume set. In the example shown, all three disk drives must be part of a switchable set. Because of this restriction, disk drives in switchable user volume set(s) must be connected to separate HP-FL adapter cards. Disk drives for switchable and non-switchable user volume sets cannot be connected to the same HP-FL adapter card.

The use of the HP Openview DTC Manager product (D2355A) is required in the hardware configuration. The Openview DTC Manager facilitates the re-establishment of terminal and serial printer connections from the primary to the secondary system after switchover.

In a switchover configuration, only the switchable user volume set(s) can be switched between systems. Disk drives in the switchable volume set(s) must contain all the critical user data and applications that are intended to be switched between the two systems. It is not possible to switch data contained in system volumes or non-switchable user volumes between the two systems.

System volume disk drives for each processor can be connected via either HP-IB or HP-FL. Similarly, non-switchable user volume sets (those that are local to a single system) can be connected via either HP-IB or HP-FL. As noted above, disk drives in switchable user volume sets must be connected via HP-FL.

All switchable volume sets must consist of at least one chain made up of 2-8 fiber optic based disk drives (either 7937FL, C2201A, or C2204A). Disk drives in a chain need not all be of the same type. Both ends of the chain for a switchable volume set must be connected via a fiber optic link to a HP-FL device adapter card in the primary and secondary systems. Disk drives that are not at the ends of a chain can be connected by P-bus or HP-FL links.



* Must be standard C2201A, C2204A

Note

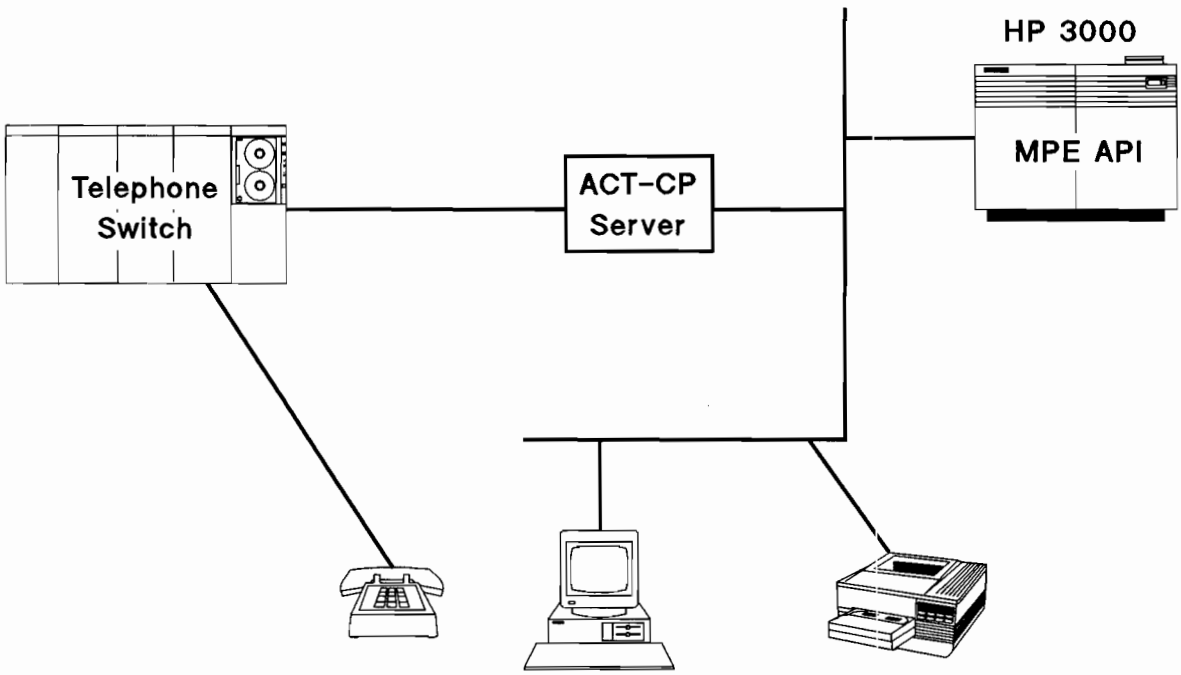
Care must be taken when ordering C220x drives for a switchover configuration. C220x drives can be ordered with option 1BG which deletes fiber optic circuitry. Drives ordered with this option cannot be field upgradeable to the fiber optic interface. At a minimum, the two C220x drives at the end of a chain must be installed with the fiber optic interface. Detailed information is provided in Chapter 5.

Software Configuration

Only one software license is needed for SPU Switchover/XL to run on a pair of HP 3000 900 Series systems. The SPU Switchover product requires MPE/iX 3.0 or a subsequent release. Note that both processors in a pair must have the same operating system software release revision. Additional information on software setup and configuration is provided in the SPU Switchover/XL User's Guide (36378-90001).

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 to the purpose of the call to a terminal or workstation.



ACT Call Processing Server

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 preconfigured bundle (hardware and software) that is customer installable. There are two types of ACT-CP Servers:

- 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

The ACT-CP Server communicates with the APIs over a ThinLAN connection, so you will need to insure that the HP 3000 has a LAN link connection. Because ACT utilizes standard TCP/IP sockets / NETIPC, upper level networking services are not required.

ACT Components

HP 32044A opt. 101	ACT Call Processing Server for Northern Telecom Meridian PBX Preconfigured server
HP 32045A opt. 101	ACT Call Processing Server for Northern Telecom DMS100 Central Office Preconfigured server
HP 32077A opt. 310 opt. 315 opt. 320 opt. 330 opt. 335 opt. 340 opt. 350	HP 3000 ACT Call Processing API for Tier 1 SPUs for Tier 2 SPUs for Tier 3 SPUs for Tier 4 SPUs for Tier 5 SPUs for Tier 6 SPUs for Tier 7 SPUs

ACT Support

Since ACT will always interoperate with telephone switch and a multi-vendor environment, support is extremely important. Support for ACT can be divided into two categories: required and highly recommended.

Required

Hardware Support:

- ACT Server hardware
- An active HP hardware support contract on the computer system for the APIs

Software Update Service:

- ACT Server software - H2089A + S00
- An active HP software update service on the computer system for the APIs

Service Level:

- ACT Server Response Line support
  - #101 Northern Telecom PBX (H2087A + H00)

  or

  ACT Basic Line
  - #101 Northern Telecom PBX (H2088A + L00)
- ACT API Response Line for HP 3000 APIs (H2087A + H00)
  - #200 Low-end MPE/iX
  - #201 Midrange MPE/iX
  - #202 High-end MPE/iX

Highly Recommended

Installation:

- ACT Server - 32044A + 17A
- HP 3000 API - 32077A + 17A

Multivendor Network Support (NetAssure):

- ACT Server - 32044A + 16B
- Northern Telecom PBX - 50052P

Consulting:

- ACT Assessment - HP ConsultLine H2355A Module N
- ACT Project Management - HP ConsultLine H2355A Module 9
- Application Assistance - HP ConsultLine H2405A Module N

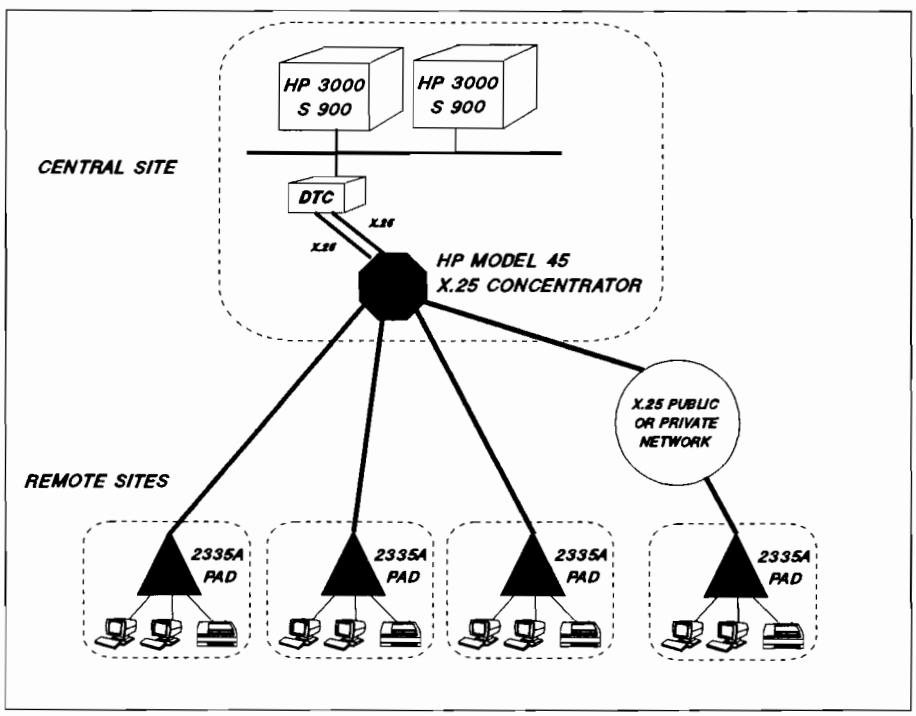
X.25 Access Communication

Introduction

The HP X.25 Access products family includes includes cost-effective, entry-level products such as the HP 2335A Asynchronous PAD and the HP Model 45 X.25 Multiprotocol concentrator which are used to concentrate remote/distributed site access to HP 3000 systems central site.

The X.25 Access products allow:

- Remote Terminal access to HP 3000 systems
- Concentration of multiple X.25 access lines in one location
- Integration of HP and IBM systems on one access point
- Turn-key solution to interconnect dispersed sites



Configuration Choices

The HP 2335A X.25 Multiplexer and the HP Model 45 X.25 Multiprotocol concentrator allow the following features :

- Remote Terminal access to HP 3000 systems
- Concentration of multiple X.25 access lines in one location
- Integration of HP and IBM systems on one access point
- Turn-key solution to interconnect dispersed sites

Both 2335A and Model 45 are performance products that can typically fully use the physical line bandwith at speeds up 64 Kilobits-per-second. The HP Model 45 is a high performance X.25 concentrator which is able to switch up to 1000 data packets per second.

X.25 Access Networking Products for HP 3000 Systems

Communication Product	For HP 3000 Model	Product Number	Capabilities
X.25 PAD and Stat Mux	All	2335A	Connection of terminals and printers to public and private X.25 networks
4 modem connect ports	All	Option 123	
Cable	All	40220A	Cable between HP 2335A and ATP/DTC printer ports
Cable	All	40221A	Cable between HP 2335A and ATP/DTC terminal ports
Model 45 Desktop (up to 8 ports)	All	J2000A	Concentrate multiple X.25 connections into a central HP 3000 system. It includes X.25, Asynchronous and SNA/SDLC. One extra J2000A can be added.
Model 45 Tower (up to 20 ports)	All	J2001A	Concentrate multiple X.25 connections into a central HP 3000 system. It includes X.25, Asynchronous and SNA/SDLC. Up to 4 extra J2001A can be added.
Model 45 additional 4 port card	All	J2004A	Additional 4 port card (includes X.25, Asynchronous and SNA/SDLC software)
Monitor/KB package (optional)	All	J2007A	Monitor/keyboard package for network management of Model 45
Model 45 cable	All	J2008A	Quadrivial cable - 4 DTC connectors
Model 45 cable	All	J2009A	Quadrivial cable - 2 DTE + 2 DCE connectors
Model 45 cable	All	J2010A	Quadrivial cable - 4 DCE connectors
Model 45 cable	All	J2011A	Quadrivial cable - 3 DTE + 1 DCE connectors
Model 45 cable	All	J2012A	Quadrivial cable - 1 DTE + 3 DCE connectors

For further technical information, please refer to the HP Networking communications Specification Guide (Product-Number 2335A/J2000A/J2001A).

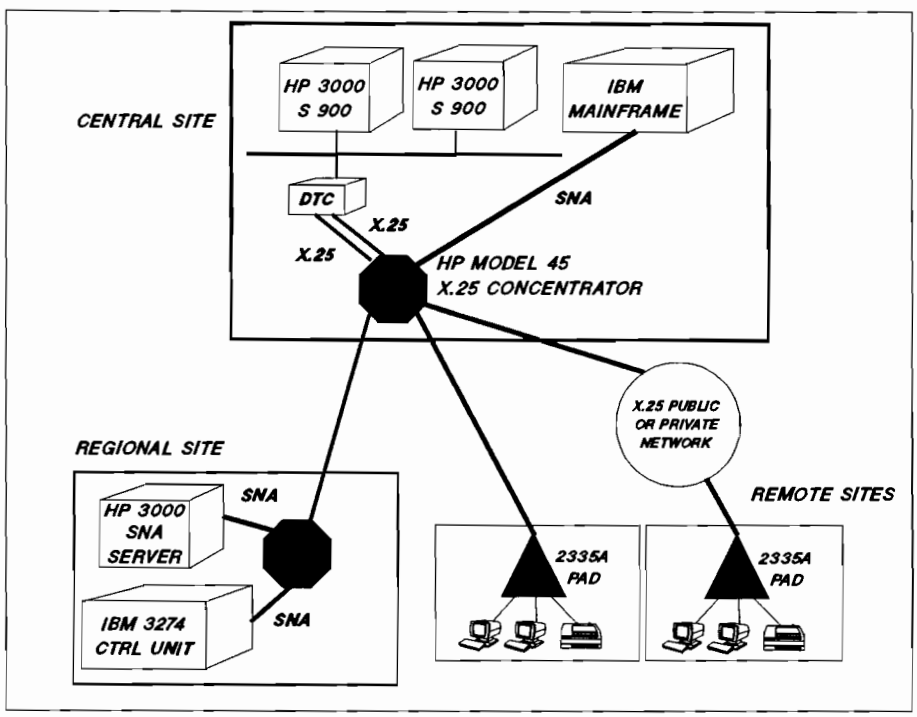
IBM Access communication

Introduction

Many HP customers are also IBM customers. This is the reason why HP offers IBM communication facilities on HP systems to connect them to IBM mainframes (HP LU 6.2 API, HP SNA/XL, IMF, ...) over point-to-point dedicated leased lines using the IBM SNA/SDLC or IBM Bisynch communication protocols.

Among these customers, many of them want to be able to interconnect different sites - with multiple devices (HP systems, IBM mainframes, IBM controllers, DEC systems or other systems/mainframes) at each site - over one single communication infrastructure that will reduce the number of dedicated leased line costs and increase the control of the communication infrastructure by reducing the amount of communication equipment.

The HP Model 45 as a Multiprotocol PAD is, in this case, the perfect low-cost solution to concentrate and transport the data coming from multiple IBM and HP systems into one or multiple locations.



For further technical information, please refer to the HP Networking Communications Specification Guide (Product-Number J2000A/J2001A).

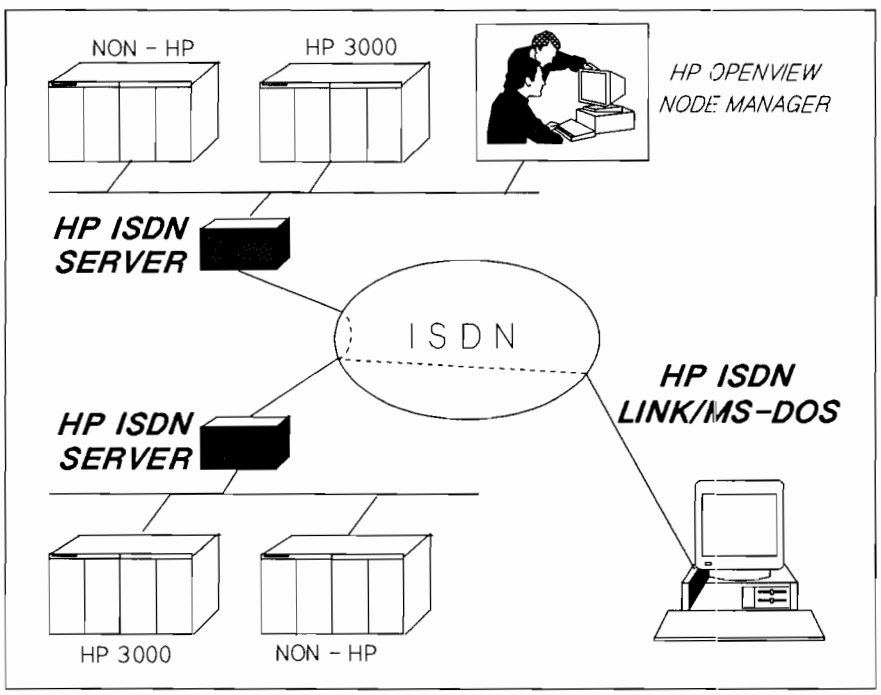
ISDN Communication

Introduction

The new HP ISDN product family is another living example of Hewlett-Packard's commitment to open, standard-based, wide-area communication. It includes the HP ISDN Server and HP ISDN Link/MS-DOS products. It allows HP 3000s and non-HP systems located in widely dispersed locations to transfer data over ISDN as if they were on the same LAN.

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 PC's to a central LAN and for access to HP3000 systems 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 very attractive for TCP-IP based applications that require LAN-to-LAN or PC-to-LAN large file transfers. Such applications include: image management, batch file transfers, ARPA FTP services,....

Typical customer environment includes at least 2 or 3 of the following characteristics:

- Multiple, geographically dispersed sites with LAN-to-LAN connectivity needs
- Standalone, remote PC's needing access to central hosts or servers for file/database transfers
- On-demand, high transmission bandwith requirements for infrequent file transfers

- TCP-IP, multivendor based computing environments

For further technical information for ISDN products, please refer to the HP Networking Communications Specification Guide (Product-Number J2101A/J21021A/J2103A).

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