

HP 3000 COMPUTER SYSTEMS SYSTEM CONFIGURATION GUIDE



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LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the most recent version of each page in the manual. To verify that your manual contains the most current information, check the dates printed at the bottom of each page with those listed below. The date on the bottom of each page reflects the edition or subsequent update in which that page was printed.

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CONFIGURING HP 3000 SYSTEMS

This configuration guide is designed to help in the configuration of HP 3000 systems. It is comprised of separate sections for the Series 37, Series 39/42, Series 48, and Series 68, and sections on upgrading and cabling. For each system type, a comprehensive checklist or "Configuration Worksheet" is provided for recording general configuration information, such as number and type of terminals, discs, tape drives, etc. The worksheet functions as a common reference guide for determining the hardware needed, for testing the validity of the configuration, and for subsequent ordering of the actual HP 3000 system.

The system configuration sections also provide a review of the standard and required equipment comprising a minimum and maximum system configuration along with general configuration guidelines to aid in the completion of the worksheets. These sections include products which are still supported on HP 3000 systems but may no longer be orderable from Hewlett-Packard. This allows greater flexibility in situations where customers may own older peripherals and accessories.

Using the worksheets and configuration guidelines, there are six steps required to correctly configure an HP 3000 system:

1. Decide What is Needed.

Before using any of the configuration aids provided in this portion of the manual, the characteristics of the desired configuration must already be determined. Specifically, the number and type of terminals, disc drives, magnetic tape drives, printers, data communication lines, card readers, memory size, and terminal connections must be known.

2. Fill out the Configuration Worksheet.

After determining the specific devices desired on the system, fill out the appropriate configuration worksheets following the guidelines provided in this manual.

3. Verify the Configuration.

Use the guidelines and information provided on the worksheets and the text to double check that the proposed configuration is valid and does not violate any of the system maximums or physical limitations.

4. Order Options and Cables.

Cables and options for HP 3000 peripherals *must* be specified when ordering an HP 3000 system. Both the system configuration text and the peripherals and terminals cabling chapters of this manual provide information on cabling. Please check the peripherals and terminals cabling chapters for a detailed listing of different HP 3000 peripheral products and the options and requirements associated with each.

5. Order Optional Software.

Order optional software products separately. Note that Network Link products require separately ordered software packages.

6. Order Additional Computer Services.

Other Hewlett-Packard services which should be considered when ordering a new system include the following:

- Hardware and Software Support Services (Chapter 6)
- Training Courses
- Consulting
- Manuals
- Supplies provided by HP Computer Supplies Operation

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SERIES 37 AND SERIES 37XE MINIMUM SYSTEM CONFIGURATION

The HP 3000 Series 37 Office Computer is available in two distinct system configurations to best meet customers' needs: the Series 37 Package and the Series 37XE. An upgrade product is also available for those customers whose computing needs grow from the Series 37 to the Series 37XE.

The System Processing Unit (SPU) is at the heart of both Series 37s. It includes:

- Central Processing Unit (CPU) with System Clock.
- One Peripheral Interface Channel (PIC).
- Error Correcting Memory.
- One Advanced Terminal Processor (ATP37).
- One Expansion Slot Supporting Add-On Memory, PIC, ATP37, or INP Boards.

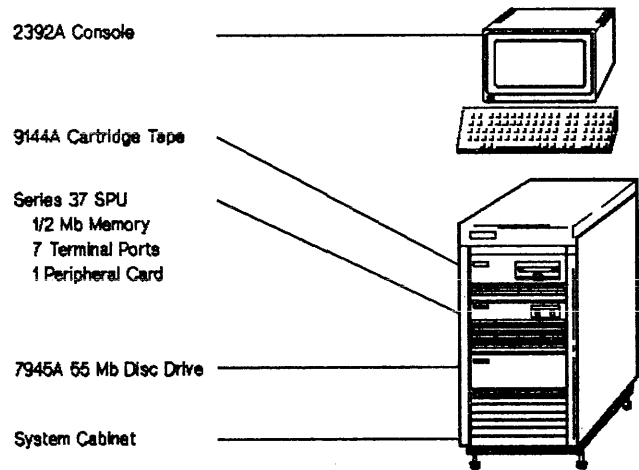
The SPU is rack mounted in a system cabinet with built-in power tap.

Supplied Hardware

Series 37 Package:

- SPU with 512 Kb Memory.
- 9144A Cartridge Tape Drive (67 Mb).
- 7945A Winchester Disc Drive (55 Mb).
- Two 1m HP-IB Cables for Tape and Disc.
- 2392A System Console with Cable (Option 304).

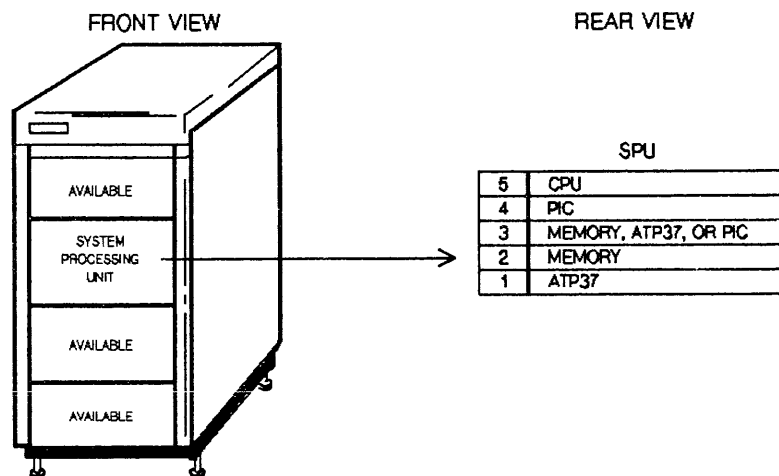
SERIES 37 PACKAGED SYSTEM



Series 37XE Package:

- SPU with 1 Mb Memory.
- I/O Expansion Unit providing five additional card slots.

SERIES 37 (SPU)

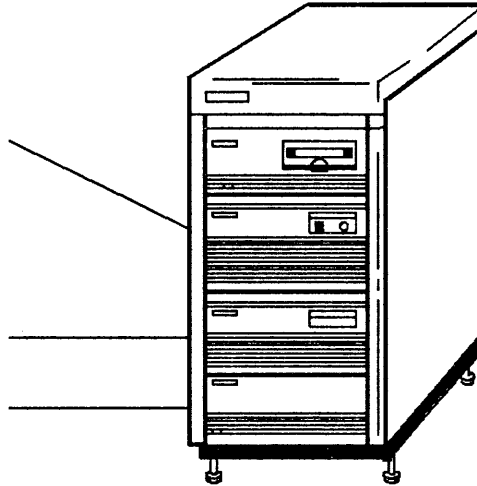


SERIES 37XE

Series 37 SPU
1 Mb Memory
7 Terminal Ports
1 Peripheral Card

I/O Expansion Unit

System Cabinet



Required Hardware Ordered Separately

Series 37 Package:

- None.

Series 37XE:

- One System Console: 2392A with Cable (Option 304).
- One Magnetic Tape Drive for System Backup and Software Updates: 9144A, 7974A, 7978A, 7914CT, or 7914ST.
- One System Disc: 7945A, 7914P, 7914ST, 7914CT, 7933H or 7935H.

Supplied Software

Standard on each Series 37 is the Fundamental Operating Software (FOS) which includes:

- Multiprogramming Executive (MPE) Operating System.
- Text Editor (EDIT/3000).
- File Copying Utility (FCOPY/3000).
- Sort and Merge Package (SORT-MERGE/3000).
- Data Base Management System (IMAGE/3000).
- Data Base Inquiry Language (QUERY/3000).
- Data Entry and Forms Management Software (VPLUS/3000).
- Keyed Sequential Access Method Software (KSAM/3000).
- A Complete User Manual Set is supplied with the system hardware.

All of the Fundamental Operating Software is included in the system but must still be ordered separately. (See the section on MPE Media Products). Both the Series 37 and Series 37XE run MPE-V/E as their standard operating system. However, disc caching is not included.

SERIES 37 AND SERIES 37XE MAXIMUM SYSTEM CONFIGURATION GUIDELINES

Ordering the Series 37 Package

The Series 37 Package is a bundled set of products to which package discounts are applied when ordered together. All products in the package **MUST** be ordered in the quantities stated and no substitutions are allowed.

To obtain the Series 37 Package, order the following products:

- One 32449A SPU with 512 Kb memory.
- One 7945A 55 Mb Disc Drive.
- One 9144A 67 Mb Cartridge Tape Drive.
- One 2392A System Console with Option 304 (cable).

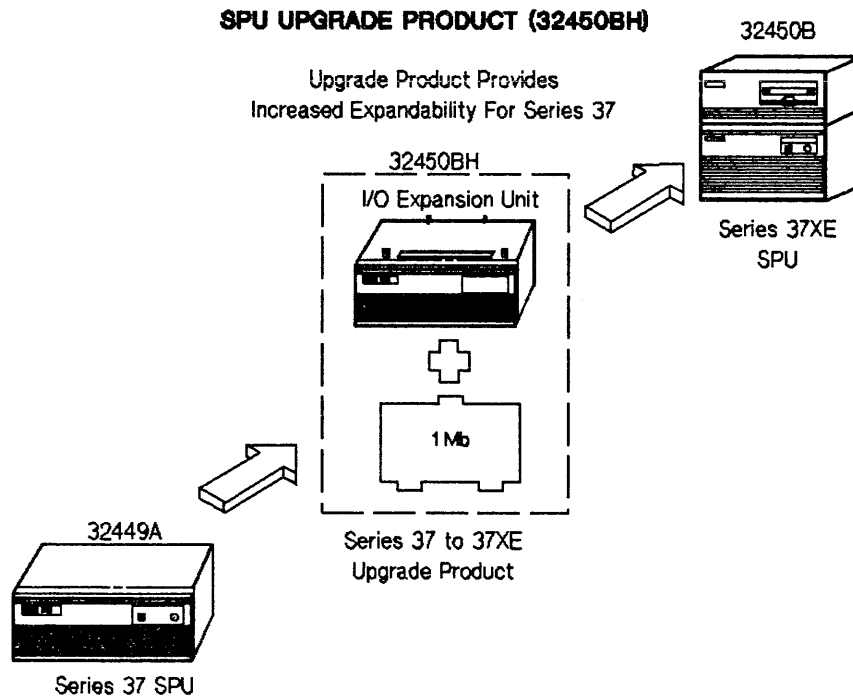
Also, one MPE Media Product for MPE-V/E must be ordered. See MPE Media Products section for

ordering information. All components of the Series 37 Package are customer installable, but HP site preparation and installation may be ordered separately. See Customer Installability section for more information.

Ordering the Series 37XE and the Series 37XE Upgrade

The Series 37XE is an unbundled SPU with 1 Mb of memory and one Extender Card Cage with five additional I/O slots. It is obtained by ordering product 32450B. The power supplies, system cabinet, and HP site prep, and installation are included with this product number. One MPE Media Product for MPE-V/E must also be ordered.

The Series 37 can be upgraded to the Series 37XE by ordering product number 32450BH. This provides an I/O Extender Unit with five card slots plus 1 Mb additional memory. Option 190 to this upgrade deletes the 1 Mb memory card.



MPE Media Products

One MPE Media Product **MUST** be ordered with every HP 3000 Series 37 system to designate the media type (cartridge tape or 1600 cpi magnetic tape). The MPE Media Product for the Series 37 is 51450A (MPE-V/E). Option 600 must be ordered to designate the Series 37/37XE SPU. To designate cartridge tape media, order Option 022. Option 051 should be specified only when a 1600 cpi tape drive is included in the system configuration. The latest version of the Fundamental Operating Software (FOS) is obtained by ordering Option 200.

Memory Expansion

The Series 37 comes standard with 512Kb of memory while the Series 37XE comes with 1 Mb of memory. Maximum memory on the Series 37 is 2 Mb which is achieved with either one 2 Mb memory board (30462A) or two 1 Mb memory boards (30456A). Memory can also be expanded for the Series 37 when initially ordering the 32449A SPU by specifying Option 508 (replaces 512 Kb memory with 1 Mb) or Option 509 (replaces 512 Kb memory with 2 Mb). Series 37XE memory can be expanded from 1 Mb to 2 Mb at initial order by specifying Option 509 with the 32450B SPU. The following table indicates which memory configurations are supported on the Series 37:

Series 37/37XE Supported Memory Configurations

MEMORY BOARD	MEMORY SIZE	CONFIGURATION		
		512Kb	1Mb	2Mb
30461A	512Kb	1	N/A	N/A
30456A	1Mb	—	1	2
30462A	2Mb	—	—	1

N/A = NOT AVAILABLE

As you can see from the table, combinations of different types of memory boards are not available. Return credits are available for memory upgrades. To obtain a return credit for a 512 Kb board, order 30461AN. To obtain a return

credit on a 1 Mb board, order 30456AN. A maximum of two return credits can be applied to any Series 37 memory upgrade purchase. Please refer to the latest Corporate Price List for current ordering information.

The Card Cage

The Series 37 and the Series 37XE use the same SPU card cage configuration. It contains five slots, four of which are predetermined at shipment. In addition to the SPU card cage, the Series 37XE uses a second card cage with five slots for I/O Expansion. All card slots supply power and connect to the Synchronous Intermodule Bus (SIMB) located on the backplane. The SIMB provides communications between the I/O cards, the memory subsystem, and the CPU. Slot 3 in the SPU card cage and Slots 1-5 in the Extender are available for expansion.

Series 37/37XE Card Cages

SPU

5	CPU
4	PIC
3	MEMORY, ATP37, OR PIC
2	MEMORY
1	ATP37

EXTENDER

5	INP OR PIC
4	INP, ATP37, OR PIC
3	INP, ATP37, OR PIC
2	INP, ATP37, OR PIC
1	INP, ATP37, OR PIC

Card Cage Restrictions

- A maximum of two memory boards are supported on the Series 37. The first memory board is installed in Slot 2. The second memory board **MUST** be installed in Slot 3 of the SPU card cage.
- Because ATP37s have junction panels, they cannot be placed adjacent to one another.

- INPs cannot be placed directly above an ATP37.
- ATP37s cannot be placed in Slot 5 in the Extender.
- Slots 1, 2, 4, and 5 in the SPU card cage are predetermined.
- The I/O Extender has the restrictions shown in the figure above.
- INPs and extra PICs are not customer installable and must be installed by an HP Customer Engineer.

Peripheral Interface Channel

The Peripheral Interface Channel (PIC) is a hardware controller used to interface HP-IB (IEEE-488 protocol) devices to the Series 37 and Series 37XE. Each PIC is a board that uses one card slot and supports one HP-IB cabling system. Each PIC supports up to six devices and eight electrical device loads. These devices include: tape drives, disc drives, system printers, and Network Links (INPs). Their HP-IB cables daisy-chain to the PIC's 25-pin connector. The number of peripherals which may practically be connected to a single PIC depends on peripheral speed, cable length, and performance considerations. One Peripheral Interface Channel is standard with each Series 37 or 37XE.

Two high speed PICs are supported on the Series 37 Package. Three PICs are supported on the 37XE two of which are high speed while the third supports INPs only. Whether a PIC is high speed or low speed is simply a function of the speed of the device attached to a PIC. A PIC is considered high speed if it has one or more high speed devices connected to it. The only low speed devices which attach to a PIC are INPs. To obtain additional PICs, order 30459A. For many peripherals, the electrical device load is fixed; however, several currently supported peripherals can be configured for a range of electrical device loads by a CE at the customer site.

The maximum length of cable that can be used to connect a group of devices within one HP-IB system is 7m plus 1m per device. The maximum length of cable, 15m, may be distributed among the devices in a linear daisy-chain configuration. This allows the user some flexibility in locating the HP-IB devices at varying distances from the SPU by adjusting the device loads. Caution should be taken if individual cable length exceeds 4 meters. Peripheral cabling information can be found in Chapter Four and in the Chapter One Appendix.

The following table shows all the HP-IB devices which are supported on the Series 37/37XE, along with their electrical device loads and high vs. low-speed classification. All HP-IB peripherals supported on the Series 37/37XE are high-speed with the exception of the INP (Network Link).

HP-IB Devices

Devices	Description	Supported Maximums		Device Speed	Device Load Std(Var.)
		S/37	S/37XE		
MASS STORAGE					
7945A	55 Mb Disc Drive	4	4	High	1
7914P	132 Mb Disc Drive	4	4	High	1
7914ST	132 Mb Disc & Magnetic Tape	2	2	High	2 (2-4)
7914CT	132 Mb Disc & Cartridge Tape	2	2	High	2 (2-4)
7933H	404 Mb Fixed Media Disc	4	4	High	1
7935H	404 Mb Removable Media Disc	4	4	High	1
Maximum Disc Drives Supported		8	8		
BACKUP DEVICES					
9144A	1/4 in. Cartridge Tape	2	2	High	1
7974A	1600 cpi Magnetic Tape Drive	2	2	High	1 (1-3)
7978A	6250 cpi Magnetic Tape Drive	2	2	High	1 (1-3)
Maximum Tape Drives Supported		2	2		
SYSTEM LINE PRINTERS					
2563A	300 lpm Dot Matrix	2	2	High	1 (1-7)
2565A	600 lpm Dot Matrix	2	2	High	1 (1-7)
2566A	900 lpm Dot Matrix	2	2	High	1 (1-7)
Maximum Line Printers Supported		2	2		
SYSTEM PAGE PRINTERS					
2680A	45 ppm Laser Page Printer	2	2	High	4 (1-8)
2688A	12 ppm Desktop Laser Printer	2	2	High	4 (1-8)
Maximum Page Printers Supported		2	2		
DATA COMMUNICATION LINKS					
N/A	INP Network Link	1	3	Low	1

Peripherals

Disc Drives

One system disc is required on the Series 37 and the Series 37XE: 7945A, 7914P, 7914CT, 7914ST, 7933H, or 7935H. The following table lists the maximum number of each type of disc drive that is supported on the Series 37 and Series 37XE:

Series 37/37XE Maximum Disc Drive Configuration:

7945A Disc	4
7914P Disc (Option 140)	4
7914CT Storage Unit	2
7914ST Storage Unit	2
7933H Disc	4
7935H Disc	4
Total Disc Drives	8

The 7945A provides 55Mb of storage and is the system disc bundled into the Series 37 Package. The 7914ST is provided with a 2m cable, while the other drives are shipped with 1m HP-IB cables. These disc drives each have their own controllers and do not support slave drives.

Integrated Storage Units

Three Integrated Storage Units are available on the Series 37: the 7914P, the 7914ST, and the 7914CT. However, the Series 37 does not support the Integrated Cartridge Tape in the 7914P or the 7914ST. When you order the 7914P, delete the cartridge tape unit with Option 140. The 7914ST combines into a single package a 7914P rackmounted disc drive and a 7974A tape drive. A second 7914P disc drive can be added to the same cabinet by specifying Option 114.

The 7914CT combines the 7914P disc drive with a 9144A 1/4" cartridge tape unit. Two 1m HP-IB cables are included for the disc drive and the tape unit.

Magnetic Tape Drives

A 7914ST or 7914CT Integrated Storage Unit, a 9144A cartridge tape, or a 7974A or 7978A magnetic tape is required for system backup and distribution of software updates for the Series 37 and Series 37XE. One 9144A is included in the Series 37 Package. These tape devices do not support slave drives. Please see the table below for the specific device maximums:

Series 37/37XE Maximum Tape Drive Configuration:

9144A/7914CT	2
7974A/7914ST	2
7978A Tape	2
Total Tape Drives	2

The 9144A is a 1/4" cartridge tape drive offering excellent backup performance and reliability. It can be used to backup on-line storage capacities up to 132 Mb for a 512 Kb system memory configuration and up to 220 Mb for a 1 Mb or 2 Mb system memory configuration. On-line storage greater than 220 Mb requires the use of a 1600 or 6250 cpi tape drive.

Flexible Disc Drive

The 9895A disc drive with Option 010 is used for data transfer from IBM Systems 3, 32, 34, and 36. Only one 1.02 Mb 9895A drive is supported on the Series 37. An HP-IB cable must be ordered separately.

Output Spooling

To avoid having a terminal or batch process tied up as a real-time printer server, and to allow multiple processes access to a printer, MPE can "spool" output to a print file or "spool file". When output is spooled, the SPU is not delayed by a low-speed output device; instead, the output is written to a temporary disc file. When the print job has been spooled and the output device becomes available, MPE manages the printing. This leaves the terminal or process free to do other work.

There are several types of spooled output devices. Any I/O device configured as a printer may be spooled; however, MPE will not necessarily support the full feature set of that printer. The HP-IB system printers discussed in the next section are spooled devices.

Of the serial connected printers, the 2932A and 2934A may be "local" or "remote" spooled. The 2601A, 2602A, 2686A, and 2687A are supported in a local spooled configuration only. (Modem connection is not supported).

System Printers

Three system line printers and two system page printers are available on the Series 37 via HP-IB connection to the PIC. The line printers supported on the Series 37 are the 2563A (300 lpm dot matrix), the 2565A (600 lpm dot matrix) and the 2566A (900 lpm dot matrix). To obtain a 4m cable for each of these, order Option 337.

The 2680A is a 45 ppm Laser Printer, and the 2688A is a 12 ppm Laser Desktop Printer. An 8m HP-IB cable is included with Option 337.

The maximum number of each type of system printer that can be supported on the Series 37 is shown in the following table:

Series 37/37XE Maximum System Printer Configuration:

2563A/2565A/2566A	2
2680A/2688A	2

Data Communications

Advanced Terminal Processor (ATP37)

All serial devices are connected to the Series 37 through the Advanced Terminal Processor (ATP37). The ATP37 provides seven RS-232 ports: six for three-pin ATP direct connection, and one for 25-pin full duplex modem connection.

The Series 37 supports a maximum of two ATP37s; this translates to a maximum of 14 terminals or 14 serial devices. Two of these connections may be made with modems on the Series 37.

The 37XE supports four ATP37s or 28 terminals and serial devices. Four of these connections may be made via modem. To obtain additional ATP37s, order product 30460A.

The table below summarizes terminal support on the Series 37 and Series 37XE. Note that multipoint terminal configurations are NOT supported.

Series 37/37XE Maximum Terminal Configuration:

	S/37	S/37XE
Direct Connect	12	24
Modem Connect	2	4
Total RS-232 Ports	14	28

Terminals

The 2392A Office Display terminal is the system console bundled into the Series 37 Package and must be ordered with Option 304 to receive the cable. It is also the required system console for the 37XE. The 2392A is also available as an add-on terminal for all Series 37s. Other terminals supported on the Series 37 include the 2623A, the 2393A, the 2394A, the 2624B, the 2625A, and the 2628A.

The HP 150 Touchscreen PC is supported as a terminal on the Series 37s. Cabling information for all these workstations may be found on Pages 4-29 and 4-30.

Serial Printers

The Series 37 and Series 37XE support up to three remote spooled 2932A and 2934A serial printers through the ATP37. When used as remote spooled printers, they are connected to the ATP37 via a modem.

The Series 37/37XE can support 2601A and 2602A daisywheel printers via the ATP37 through local direct connection only. Modem connection is not supported. The 2601A, 2602A, 2932A, and 2934A may also be attached as slave devices to terminals under the control of applications programs.

Both the 2686A and the 2687A desktop laser printers are available on the Series 37 and Series 37XE as serial printers for local direct connection only. Cables must be ordered separately; see Page 4-30 for a list of available cables.

When the 2687A printer is configured, no other serial printers may be connected to the Series 37 or 37XE. Otherwise a maximum of three serial printers are supported on the Series 37 and Series 37XE for connection via the ATP37. The following table shows individual device maximums:

Series 37/37XE Maximum Serial Printer Configuration:

2601A/2602A Daisywheel	3
2932A/2934A Dot Matrix	3
2686A Laser Jet	1
2687A Desktop Laser	1*
Total Serial Printers	3

* No other serial printer may be configured.

System Console

The 2392A terminal and cable (Option 304) are included in the Series 37 Package for use as the system console. It is also the required console for the Series 37XE but must be ordered separately with a cable (Option 304). Ordering the console with this cable option will use one three-pin direct connect ATP37 port.

Support Link Modem

Under HP's Remote Support Program, Series 37 customers will receive the Support Link II modem if they order Response Center Support (RCS) or Account Management Support (AMS) contracts at the same time as the system is purchased. Please see Chapter Six for a discussion of Hewlett-Packard support products.

INP Network Links

An INP (Intelligent Network Processor) provides one communication line that can be used by DS, RJE, IMF, or MRJE software. A maximum of one INP is supported on the Series 37 Package and a maximum of three INPs are supported on the Series 37XE. An INP can only be ordered as part of a Network Link.

Each Network Link includes an INP, and requires one I/O card slot in the Series 37 card cage. The INP counts as one device load on a PIC and is considered a low speed device. Each Network Link includes both a 1m HP-IB cable, for connecting the INP to a PIC, and an external cable (which must be specified by a Network Link option). Refer to the latest Corporate Price List for a list of current Network Link products and their options.

Customer Installability

Hardware

The Series 37 Package is the first HP 3000 which customers may install by themselves. This includes factory-installed options ordered with the system such as add-on memory, ATP37s, etc. Other customer installable devices include additional 7945A disc drives, 9144A cartridge tape drives, and all terminals, personal computers, plotters, and serial printers (except the 2687A laser printer). A typical hardware installation takes two or three hours. The number of devices which are customer installable are limited to what fits into the four-module system cabinet. A second cabinet for any device requires HP Site Prep and Installation, orderable separately. Additional information on Customer Installable products may be found in the data sheet on Customer Installability available in each sales office.

Software

Most Series 37 software can be installed "automatically" or only requires the running of a simple job to be installed. Typically this installation job utilizes simple commands which are executed from the system console. Some software requires installation by Hewlett-Packard due to more complex initial configuration efforts. A typical software installation takes 3-4 hours. Refer to the data sheet on Customer Installability for more information on which products are customer installable.

Series 37/37XE Configuration Worksheet

Product Number	Description	Quantity
I. The SPU.		
A. Series 37 Package:		
Each product MUST be ordered to obtain the Series 37 Package minimum configuration.		
32449A	Series 37 SPU with 512 Kb Memory, PIC, and ATP37.	1A _____
Opt. 001	Add-On ATP37 (Not required)	1B _____
Opt. 508 or Opt. 509	Expands memory to 1 Mb (Not required) Expands memory to 2 Mb (Not required)	1C _____
7945A	55 Mb Disc Drive with Cable	1D _____
9144A	67 Mb Cartridge Tape Drive with Cable	1E _____
2392A Opt. 304	System Console Console cable	1F _____
51450A	MPE-V/E Media Product	1G _____
Opt. 022 or Opt. 051	Cartridge Tape Media 1600 cpi Tape Media	1H _____
Opt. 600	Series 37/37XE SPU	1I _____
B. Series 37XE:		
32450B	Series 37XE System Processing Unit with 1 Mb Memory, ATP37, PIC, Extender Card Cage with five I/O slots, and HP Site Prep and Installation.	2A _____
Opt. 509	Expands memory to 2 Mb	2B _____
51450A	MPE-V/E Media Product	2C _____
Opt. 022 or Opt. 051	Cartridge Tape Media 1600 cpi Tape Media	2D _____
Opt. 600	Series 37/37XE SPU	2E _____
C. Series 37 to Series 37XE Upgrade:		
32450BH	I/O Extender Unit with five card slots, 1 Mb additional Memory, and HP Site Prep and Installation.	3A _____
Opt. 190	Deletes the 1 Mb Memory Card	3B _____

Series 37/37XE Configuration Worksheet

Product Number	Description	Quantity
II. Memory Expansion		
<p>Total Memory Size Desired. Maximum Memory Size is 2 Mb. Different size memory boards cannot be used together on any Series 37. Memory Expansion options may also be ordered with the SPU. See Section I.</p>		
		4A _____
30456A	1 Mb Add-on Memory Card	4B _____
or		
30462A	2 Mb Add-on Memory Card	4C _____
<p>Return Credits are available for Memory Upgrades. A maximum of two return credits can be applied to any Series 37 Memory Upgrade purchase.</p>		
30461AN	Return Credit for a 512 Kb Board.	4D _____
30456N	Return Credit for a 1 Mb Board.	4E _____

III. Mass Storage.

A. Integrated Storage Units

7914P Opt. 140	132 Mb Integrated Storage Unit. (The Integrated Cartridge Tape is not supported on the Series 37. Option 140 to delete the tape must be ordered.) A 1m HP-IB cable is included. (MAX=4).	5A _____
7914ST	132 Mb Disc and 1600 cpi Magnetic Tape. Option 114 adds a second 7914P disc drive in the same cabinet. The 7914ST includes two 2m HP-IB cables. Enter the quantity of discs here and quantity of tapes in line 7B. (MAX=2).	5B _____
7914CT	132 Mb 7914P Disc and one-quarter inch Cartridge Tape. Two 1m HP-IB cables are included for the disc drive and the tape unit. Enter also on line 7A. (MAX=2).	5C _____
	Total 7914 Drives (Sum of lines 5A, 5B, and 5C; MAX=4).	5 _____

B. Disc Drives

7945A	55 Mb Disc Drive (Includes a 1m HP-IB cable; calculation should include 7945A from line 1D; MAX=4.)	6A _____
7933H	404 Mb Fixed Media Disc (Includes a 1m HP-IB cable; MAX=4.)	6B _____

Series 37/37XE Configuration Worksheet

Product Number	Description	Quantity
7935H	404 Mb Removable Media Disc (Includes a 1m HP-IB cable; MAX=4.)	6C _____
	Total Disc Drives (Sum of lines 5, 6A, 6B, and 6C; MAX=8.)	6 _____
	The maximum support of eight disc drives requires that two PICs be configured on the Series 37/37XE.	

IV. Magnetic Tape Drives.

9144A/ 7914CT	One-quarter inch Cartridge Tape. Order cable separately with 9144A. 7914CT includes two 1m HP-IB cables. (MAX=2; calculation should include 9144A from line 1E.)	7A _____
7974A/ 7914ST	1600 cpi Magnetic Tape Drive with a 2m HP-IB cable. (MAX=2).	7B _____
7978A	6250 cpi Magnetic Tape Drive. A 2m HP-IB cable is included. (MAX=2).	7C _____
	Total Tape Drives (Sum of lines 7A, 7B, and 7C; MAX=2).	7 _____

V. Other Peripherals.

9895A	8-1/4" Flexible Disc Drive (Option 010; order HP-IB cable separately; MAX=1.)	7 _____
	This unit is used only for media transfer from IBM System 3, 32, 34, 36, and 38. Only one drive is supported on the Series 37. It is not supported as a backup device.	

VI. System Printers.

2563A	300 lpm Dot Matrix Printer (Option 337 includes a 4m HP-IB cable; MAX=2.)	9A _____
2565A	600 lpm Dot Matrix Printer (Option 337 includes a 4m HP-IB cable; MAX=2.)	9B _____
2566A	900 lpm Dot Matrix Printer (Option 337 includes a 4m HP-IB cable; MAX=2.)	9C _____
	Total Line Printers (Sum of lines 9A, 9B, and 9C; MAX=2)	9 _____
2680A	45 ppm Intelligent Page Printer (Option 337 includes an 8m HP-IB cable; MAX=2.)	10A _____

Series 37/37XE Configuration Worksheet

Product Number	Description	Quantity
2688A	12 ppm Desktop Laser Printer (Option 337 includes an 8m HP-IB cable; MAX=2.)	10B _____
	Total Page Printers (Sum of lines 10A and 10B; MAX=2.)	10 _____

VII. Data Communications.

A. Serial (RS-232-C) Devices (Enter quantities in lines below.):

Devices	Description	Supported Maximums		ATP37 Connections	
		S/37	S/37XE	Direct	Modem
TERMINALS					
2392A	Office Display	14	28	_____	_____
2393A	Graphics Display	14	28	_____	_____
2394A	Data Entry Display	14	28	_____	_____
2623A	B & W Graphics Display	14	28	_____	_____
2624B	Data Entry Display	14	28	_____	_____
2625A	Dual System Display	14	28	_____	_____
2628A	Word Proc./Graphics	14	28	_____	_____
PERSONAL COMPUTERS					
HP 150	The Touchscreen PC	14	28	_____	_____
SERIAL PRINTERS					
2601A	40 cps Daisywheel	3	3	_____	N/A
2602A	20 cps Daisywheel	3	3	_____	N/A
2932A	200 cps Dot Matrix	3	3	_____	_____
2934A	100/200 cps Dual Mode	3	3	_____	_____
2686A	8 ppm LaserJet	1	1	_____	N/A
2687A*	12 ppm Text Laser	1	1	_____	N/A
Maximum Serial Printers Supported		3	3		
TOTALS:		MAX=14	MAX=28	11 _____	12 _____

* Only one serial printer may be configured when it is the 2687A.

Line 11: MAX=12 for Series 37; MAX=24 for Series 37XE.

Line 12: MAX=2 for Series 37; MAX=4 for Series 37XE.

Series 37/37XE Configuration Worksheet

Product Number	Description	Quantity
B. Advanced Terminal Processor (ATP37)		
<p>Each ATP37 supports one modem-connected device and six direct-connected devices. If line 11 is greater than "6" or line 12 is greater than "1", then add-on ATP37s must be ordered (up to a maximum of four ATP37s on the Series 37XE). Each ATP37 uses one card slot. See the Card Cage section in the text for card card restrictions.</p>		
30460A	Add-on ATP37 (MAX=1 for Series 37; MAX=3 for Series 37XE.)	13 _____
C. INP Network Links		
30251A	BSC Link. For use with 30248A/R RJE, 30249A/R MRJE, or 30250A/R IMF.	14A _____
30270A	Point-to-Point Hardwired Link for HP 3000. Requires 32185A/R DS Network Service.	14B _____
30271A	Point-to-Point Modem Link for HP 3000. Requires 32185A/R DS Network Service.	14C _____
32187A	X.25 Network Link for HP 3000. Requires 32185A/R DS Network Service unless used solely for X.25 Terminal I/O.	14D _____
	Total number of Links (INPs). (Sum of lines 14x; for Series 37, MAX=1; for Series 37XE, MAX=3.)	14 _____

VIII. I/O Expansion.

A. Peripheral Interface Channels (PICs)

30259A	<p>Optional PICs (MAX=2). One PIC is supplied standard with the Series 37 and Series 37XE. To configure PICs, you must consider peripheral speed, electrical device loads, cable lengths, and system performance. Only two high-speed PICs are supported; a third PIC may be ordered to support INPs only.</p>	15 _____
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B. Card Slots

The sum of:

Lines 4B and 4C - Memory Expansion	16A _____
Line 13 - Add-on ATP37s	16B _____
Line 14 - INP Links	16C _____
Line 15 - Add-on PICs	16D _____
Total of lines 16x; Series 37 Package MAX=1; Series 37XE MAX=6.	16 _____

Series 39 and 42

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HP 3000 SERIES 39 AND 42 MINIMUM SYSTEM CONFIGURATION

Integrated Storage Unit. When the Series 42 is ordered with Options 011, 012, or 014, the corresponding integrated storage unit must be ordered with the cartridge tape unit.

Supplied Hardware:

- Central Processing Unit.
- System Clock.
- Control and Maintenance Processor.
- Two General I/O Channels (GICs) for System Disc and Backup Tape Drive. (These GICS are not included with box swap upgrade system orders.)
- 512 Kb (Series 39); 1 Mb (Series 42) Fault Control Memory with Controller.
- System Mainframe Cabinet including Card Cage and Power Supplies Supporting the CPU, up to 3 Mb Memory, and 13 I/O Card Slots.
- Support Link Modem.

Required Hardware Ordered Separately:

- One System Console: Any HP 262x or 239x terminal.
- One System Console Cable: See Page 4-29.
- One Asynchronous Data Communications Controller (ADCC-Main) to connect the console to the system.
- One Magnetic Tape Drive for System Backup: 7914ST, 7914TD, 7970E, 7971A, 7974A, or 7978A required for systems with more than 132 Mb disc storage. A 9144A, 7914CT, 7911P, 7912P, or 7914P with integrated cartridge tape may be used for systems having 132 Mb or less disc storage.
- One System Disc: 7945A, 7920M, 7925M, 7933H, or 7935H Master Disc Drive or 7911P, 7912P, 7914P, 7914CT, 7914TD or 7914ST

Supplied Software:

Standard on each HP 3000 system is the Fundamental Operating Software which includes:

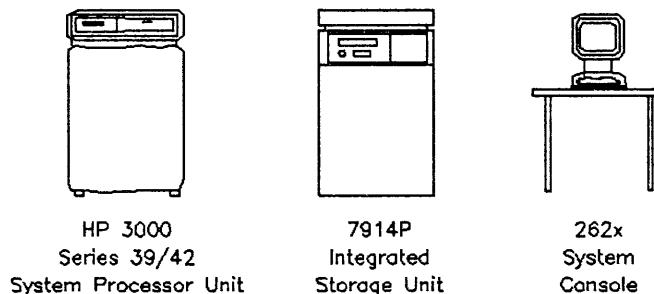
- Multiprogramming Executive (MPE) Operating System.
- Text Editor (EDIT/3000).
- File Copying Utility (FCOPY/3000).
- Sort and Merge Package (SORT-MERGE/3000).
- Data Base Mgmt. System (IMAGE/3000).
- Data Base Inquiry Language (QUERY/3000).
- Data Entry and Forms Management Software (VPLUS/3000).
- Keyed Sequential Access Method Software (KSAM/3000).
- A complete User Manual Set is supplied with the system hardware. (For a manual listing, please see the chapter on Manuals.)

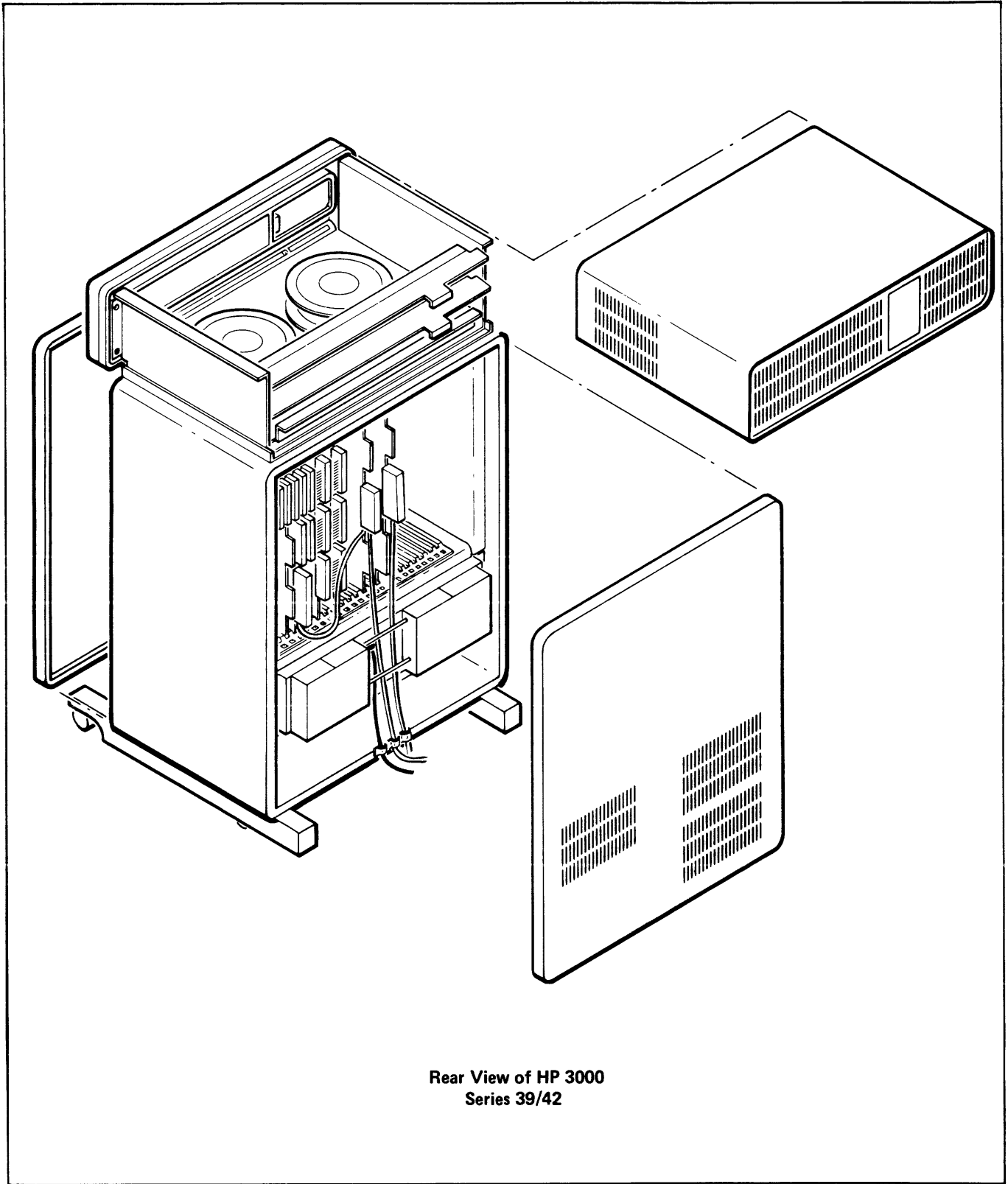
All of the Fundamental Operating Software is included in the system but must still be ordered separately. Please see the section on MPE Media Products.

The Series 42 also includes Disc Caching, an I/O performance product, which is not a part of the Fundamental Operating Software. Disc caching can be added to the Series 39; it is not supplied as a standard feature.

Note that the customer and CE will need to work together on site preparation prior to system installation.

HP 3000 Series 39/42 Minimum System Configuration Example





Rear View of HP 3000
Series 39/42

HP 3000 SERIES 39 AND SERIES 42 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

Ordering the System Processor Unit

The Series 39 System Processor Unit (SPU) can be obtained by ordering product number 32514B. The Series 39 runs MPE-V/P as its standard operating system, but is field upgradeable to a High-Performance Series 39 by ordering product 30539B. The High-Performance Series 39 can run MPE-V/E or MPE-V/P. Order 30539B with Option 408 to substitute MPE-V/E (firmware) for MPE-V/P.

The Series 42 can be obtained by ordering either product number 32542B for new systems or 32542BH for box swap upgrades. A packaged system credit is available by ordering 32542B with Option 014 along with a 7914P disc drive. The Series 42 runs MPE-V/P as its standard operating system. If you wish to substitute MPE-V/E (firmware), order Option 409 with product 32542B or 32542BH.

MPE Media Products

One MPE Media Product MUST be ordered with every HP 3000 system to designate both the MPE type (MPE-V/P or MPE-V/E) and the media type (cartridge tape or 1600 cpi magnetic tape). The two MPE Media Products are 51450A (MPE-V/E) and 51451A (MPE-V/P). Option 601 on either product specifies the Series 39 SPU while Option 602 designates the Series 42. To designate cartridge tape, you must specify Option 022; for 1600 cpi magnetic tape media, you must order Option 051. The latest version of the Fundamental Operating Software (FOS) is specified by Option 200. Please see a current Corporate Price List for ordering other versions of FOS.

Memory Expansion

The Series 39 comes with 512 Kb of memory standard in the minimum configuration. System memory sizes of .5 Mb, .75 Mb, 1 Mb, 1.5 Mb, 2 Mb, and 3 Mb are supported. Memory can be expanded to 1 Mb by ordering Option 507 with the Series 39 System Processor Unit (product number 32514B). Memory can also be expanded by ordering memory expansion modules including: .25 Mb (30171A), .5 Mb (30092A), and 1 Mb (30161A). (Note that only .25 Mb and 1 Mb boards are manufactured. Therefore, product 30092A is composed of two .25 Mb boards.) The following table indicates which products you should order to obtain a desired memory configuration:

Series 39 Memory Expansion Order Quantity

	Series 39 Memory Size (Mb)						
	STD	.5	.75	1	1.5	2	3
30161A 1 Mb Memory						1	2
30092A 512 Kb Memory					1		
30171A 256 Kb Memory		1					
Series 39 Option 507 (Expand Memory to 1024 Kb)			1	1	1	1	

The Series 42 comes with a 1 Mb memory board standard in the minimum configuration. System memory sizes of 1 Mb, 1.5 Mb, 2 Mb, and 3 Mb are supported. Memory can be expanded by ordering memory expansion modules including .5 Mb (30092A) and 1 Mb (30161A). The following table indicates which products you should order to obtain a desired memory configuration:

Series 42 Memory Expansion Order Quantity

		Series 42 Memory Size (Mb)			
		STD			
		1	1.5	2	3
30161A	1 Mb Memory			1	2
30092A	512 Kb Memory		1		

Disc Caching

The **Series 42** comes with Disc Caching, an I/O performance product, standard. Because the **Series 39** is targeted for small configurations, it does not have disc caching as a standard feature. However, as the application load on a Series 39 grows, you may wish to add disc caching by ordering product 30539B. When disc caching is added to the Series 39, the standard operating system will continue to be MPE-V/P. If you wish to substitute MPE-V/E when disc caching is added, order Option 408 with product 30539B. Be sure to order the correct MPE Media Product, also.

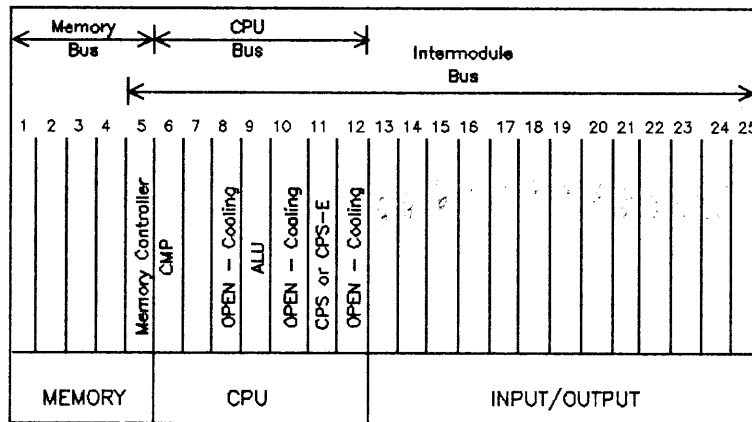
The Card Cage

The Series 39 and Series 42 use the same card cage configuration. The card cage has 25 slots.

Slots 1 through 5 support system memory modules and the memory controller which is configured in slot 5. Slots 6 through 12 house the CPU cards. (For the purpose of correct ordering, it is not necessary to be concerned with the configuration of cards in the CPU portion of the card cage.) Slots 13 through 25 support the following I/O cards: Asynchronous Data Communications Controllers (ADCCs), Advanced Terminal Processors (ATPs), General I/O Channels (GICs), Intelligent Network Processors (INPs), Local Area Network Interface Controllers (LANICs), and 261X Line Printer Interface (LPI) cards (26069A).

All slots supply power. Slots 1 through 5 connect to the memory bus, and slots 6 through 12 connect to the CPU bus. The Intermodule Bus (IMB) connects slots 5 through 25 providing communications between the I/O cards, the memory subsystem, and the CPU. The Series 39 and Series 42 support only one IMB, and this IMB does not require an interface card in the card cage. (For a more extensive discussion of the function of the IMB, please see the IMB section in the Series 68 maximum configuration guide.) The following figure depicts the Series 39/42 card cage.

Please photocopy this page and use it as a worksheet:



Series 39/42 Card Cage

Card Cage Restrictions:

- ADCC-Main and ADCC-Extender cards must be adjacent to each other in alternating fashion.
- ATP/SIB and ATP/AIB cards must be adjacent to each other.
- Include the two standard GICs and the required and separately ordered ADCC-Main in your configuration.
- The LANIC must be placed in the I/O portion of the card cage in any of slots 13 through 25.

Junction Panels

The Series 39 and Series 42 do not have junction panels on the system cabinet. Cables connect directly to the edges of cards in the card cage and drop to the floor in the rear of the SPU. Cables from the ADCC cards terminate at small connection boxes that house four terminal ports and lie on the floor.

The ATP Expansion Packages (30273A or 30274A) provide a separate junction panel box which is connected by cables to the AIB cards.

The LANIC cable attaches directly to the edge of the LANIC card, and the other end of the cable attaches to the frame at the bottom of the SPU cabinet in the rear.

LANIC

The Local Area Network Interface Controller (LANIC) is the hardware controller that interfaces to the Local Area Network (LAN). A LANIC uses one I/O card slot and connects to one LAN. A maximum of one LANIC per system is supported.

The LANIC is a high-speed channel which is placed on the Intermodule Bus (IMB). The other type of high-speed channel is a GIC with one or more high-speed devices attached. The Series 39 and Series 42 systems can support one LANIC and up to two high-speed GICs.

General I/O Channels

A General I/O Channel (GIC) is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the Series 39 and Series 42. Each GIC is a board that uses one I/O card slot and supports one HP-IB cabling system. The number of peripherals which may be connected to a single GIC depends on maximum device limits, peripheral speed, cable length, and performance considerations. Please refer to the GIC discussion in the Chapter One Appendix for a complete explanation of these rules. Note that the internal HP-IB cabling length between the GIC and the outside of the system is 1m for the Series 39 and Series 42 rather than the 2m length that the Series 48 and 68 require.

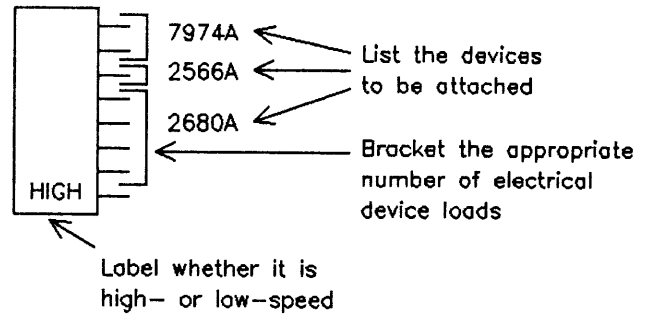
Order product 30079A to obtain additional GICs. You must also specify Option 040 to obtain the proper GIC cable for the Series 39 or Series 42.

A maximum of four GICs are supported on the Series 39 and Series 42. No more than two of these GICs may have high-speed devices attached to them. Please refer to the peripheral table in the Chapter One Appendix for a definition of high-speed devices and a high-/low-speed classification of supported devices.

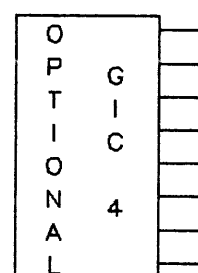
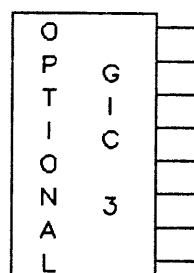
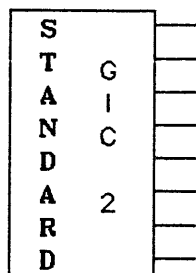
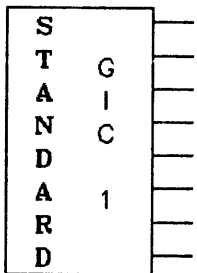
Summary: GIC Attachment Restrictions

- A maximum of six devices may be attached to a GIC with one or more high-speed devices attached.
- Unless other restrictions apply, low-speed peripherals can share a GIC with high-speed devices.
- Some low-speed devices require a dedicated GIC to which no other devices may be attached. (See the GIC Interface table in Chapter One Appendix.)
- The 2608A line printer cannot be attached to a GIC with high-speed devices.
- The 2608S line printer can share a GIC with all high-speed devices except the 7906M, 7920M, and 7925M family of disc drives.
- It is not recommended that the same GIC be used for connecting the main system backup tape drive and the system disc (LDEV1). System performance may be degraded with such a configuration when the tape drive is in use.

How to Use the GIC Worksheet



Please photocopy this page and use it as a GIC configuration worksheet:



Peripherals

Disc Drives

One 7945A (55 Mb), 7911P (28 Mb), 7912P (65 Mb), 7914P/CT (132 Mb), 7914TD (132 Mb), 7914ST (132 Mb), 7920M (50 Mb), 7925M (120 Mb), 7933H (404 Mb), or 7935H (404 Mb) hard disc drive is required as the system disc (LDEV1).

The following table lists the maximum number of each type of disc drive that can be configured on the Series 39 and Series 42:

Series 39/42 Maximum Disc Drive Configuration:

7945A Disc	4
7911P/7912P/7914P/7914TD/7914ST Discs w/Cartridge Tape	1
7914TD Storage Unit	1
Total 7911P/7912P Discs	4
7914CT Storage Unit	4
Total 7914P Discs	8
7914ST Storage Unit	4
792x Master Discs	2
792x Slave Discs	7
793x Discs	8
Total Discs	8

The 7920M and 7925M are master disc drives and can each support up to seven slave disc drives. These slave drives are ordered as 7920S or 7925S and do not have their own controllers. They connect to the controller in the master drive and are not part of the HP-IB cabling. The 7945A, 7911P, 7912P, 7914P, 7914TD, 7914CT, 7914ST, 7933H, and 7935H disc drives each have their own controllers.

With the 7920M and 7925M, Option 102 must be ordered to obtain the HP-IB interface and a two meter HP-IB cable. Each 7920S and 7925S comes standard with two non-HP-IB cables, a disc drive multiunit cable, and a data cable. Both are used to connect to 7920M or 7925M master drives.

Disc performance may vary depending on the specific configuration of discs, controllers, and GICs. Check with an HP performance specialist if you have performance concerns.

Integrated Storage Units

The 7911P, 7912P, and 7914P are integrated storage units that include both a Winchester disc drive and an integral cartridge tape unit standard. *Only one 7911P, 7912P, or 7914P with the cartridge tape unit is supported on the Series 39 and Series 42.* A maximum of four 7911P or 7912P and a maximum of eight 7914P disc drives are supported. Because only one cartridge tape unit is allowed on the system, additional 7911P, 7912P, or 7914P units must be ordered with the cartridge tape delete Option, Number 140, specified.

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a 1m HP-IB cable standard. If you order the cartridge tape unit on any of these integrated storage units, you must also order Option 001 which supplies a controller for the cartridge tape unit and a 1m HP-IB cable. *The cartridge tape unit requires its own dedicated GIC.*

The 7914TD and 7914ST combine into a single package a 7914 rackmounted disc drive, a half-inch tape drive, and an optional cartridge tape unit (Option 002). The 7914TD includes a 7970E master tape drive. The 7914ST includes a 7974A tape drive. A second 7914P type disc drive can be added to the same cabinet by specifying Option 114. (Option 114 will automatically delete the cartridge tape unit for the additional disc drive.) The 7914TD and 7914ST are supplied with HP-IB cables standard--one 2m cable for the disc drive, a 6m cable with the 7970E drive, or a 2m cable with the 7974A. When Option 002 is ordered, the cartridge tape drive, a controller, and a 1m HP-IB cable are shipped.

The 7914CT combines the 7914P disc drive with a 9144A cartridge tape unit which does not require a dedicated GIC or separate controller. Two 1m HP-IB cables are shipped with the 7914CT. The Series 39 and Series 42 support up to four 7914CT drives.

Magnetic Tape Drives

An integrated cartridge tape unit or a 9144A, 7970E, 7914TD, 7971A, 7974A, 7914ST, 7976A or 7978A magnetic tape drive is required for system backup and distribution of software updates for the Series 39 and Series 42. If more than 132 Mb of hard disc storage are configured on a Series 39 or Series 42, a half-inch tape drive (1600 cpi or greater) must be configured on the system.

Only one 7970E master tape drive can be configured on the Series 39 and Series 42. It requires a dedicated GIC and can support up to three slave tape drives. Both the 7914TD and 7971A include 7970E tape drives. The 7914ST includes a 7974A tape drive. The 9144A, 7974A, 7976A, and 7978A do not support slave drives; each drive has its own controller.

The following table lists the maximum number of each type of tape drive that can be configured on the Series 39 and Series 42. You may have *one* integrated cartridge tape drive (in 7911P, 7912P, or 7914P) in addition to these maximums.

Series 39/42 Maximum Tape Drive Configuration:

9144A Cartridge Tape Drive	4
7970E/7971A/7914TD Masters	1
7970E/7971A Slaves	3
7974A/7914ST Tape Drives	4
7976A Tape Drive	2
7978A Tape Drive	4
Total Tape Drives	4

The 7970E master tape drive comes standard with a 6m HP-IB cable. Each 7970E slave drive comes with a 6.1m (non-HP-IB) multiunit cable for tape drives.

The 7971A is a package of one or two 7970E tape drives in various master and/or slave drive configurations. Please see the HP 3000 Price Guide for the list of your options. Included with the options chosen are the appropriate cables. Note that the dual master drive 7971A Option 344 is not supported on the Series 39 and Series 42 because only one master 7970E drive is allowed.

The 7974A, 7976A, and 7978A are shipped with a 2m HP-IB cable standard. Each 7976A must include Option 416 for the Series 39 and Series 42. The 7974A and 7978A do not require a system option. You must specify Option 800 to obtain the 800 cpi capability on the 7974A.

The 9144A one-quarter inch cartridge tape drive is shipped without an HP-IB cable for GIC connection. See Page 4-8 for cable information.

System Printers

The following table lists the maximum number of each type of system printer that can be configured on the Series 39 and Series 42:

Series 39/42 Maximum System Printer Configuration:

Line Printers:	
2608A/2608S	2
2563A/2565A/2566A	4
2611A/2613A/2617A/2619A	2
Total Line Printers Supported	4
Intelligent Page Printers	
2680A	2
2688A	2(3)*
Total Page Printers	2(3)*
Total System Printers Supported	4

* HP-IB Extender support in parentheses.

The 261x family of line printers does not connect directly to a GIC; rather, each one uses a 1m HP-IB ribbon cable between the 26069A translator and the GIC card. The line printer

itself can be up to 500 feet away. The printer is connected by a parallel differential current drive line to the interface card (26069A). To obtain the interface card, internal cables, and 15m parallel differential cable, order Option 340. Cabling beyond 15 meters must be ordered as a special from Boise Division.

The 2608A, 2608S, 2563A, 2565A, and 2566A are dot matrix line printers that attach directly to GICs. They do not require an interface card in the I/O card cage. The standard 2608A includes an HP-IB interface and a 2m HP-IB cable. For the 2608S, 2563A, 2565A, and 2566A, order Option 340 to obtain the HP-IB interface and 4m HP-IB cable. Note that the 2608S cannot share a GIC with a 7906M, 7920M or 7925M disc drive. Furthermore, the 2608A cannot be configured on a GIC with high-speed devices attached.

Order Option 340 with the 2680A or 2688A to obtain the Series 39 or Series 42 subsystem with 8m HP-IB cable. Specify Option 099 with the 2680A to replace the 8m cable with a 2m cable. This option is not available on the 2688A. The 2680A and 2688A attach directly to a GIC and do not require an interface card in the I/O card cage.

The 2563A, 2565A, 2566A, 2680A, and 2688A printers may be connected via HP-IB Extenders. See the HP-IB Extender section in the Chapter One Appendix.

Other Peripherals

Flexible Disc Drive

Only one 1.2 Mb flexible disc drive is supported on the Series 39 or Series 42. Product 9895A must be ordered with Option 010 to specify a single master drive. The flexible disc drive attaches to a GIC. Order the HP-IB cable separately.

Card Reader

The 30106A 80-column card reader interfaces to the Series 39 and Series 42 through a dedicated GIC. You must have either Option 333 or the 30309A upgrade kit to provide a 2m HP-IB cable. When a card reader is configured on the system, a power line conditioner is required. The 30106A

and 30309A are no longer orderable. (They will be supported until December 31, 1989.)

Power Line Conditioners

In many areas AC power line disturbances can interfere with system operation, and possibly cause data corruption or even system failures. "Dirty" lines from local utilities or noise generated by electrical equipment on customer premises can cause these problems. Please consult with your site preparation CE concerning any such power line conditioner needs you may have. Your CE will have a list of recommended power line conditioners that may be purchased through local third parties.

Multiple System Access Selector

The 26075A Multiple System Access Selector is a switch box that allows up to three HP 3000s to share either a 2680A or a 7976A. An operator can manually switch the peripheral to be active on any one of the sharing systems. A maximum of one (1) 26075A may be connected to a system. Other devices on the same GIC must be "downed" when switching the 26075A. Therefore, the switchbox cannot be on the same GIC as a disc drive. When determining HP-IB cable length, include 0.5m for the 26075A.

Data Communications

Terminal Connection

Point-to-point connections are made to the Series 39 and Series 42 through either the Asynchronous Data Communications Controller (ADCC) or the Advanced Terminal Processor (ATP). The ADCC and ATP support local (RS-232) and remote (full duplex) terminal and serial printer connections. The ATP also supports local RS-422 point-to-point connections. ATP support is provided only through the ATP Expansion Package (30273A or 30274A).

Multipoint connections are made to the Series 39 and Series 42 through the MTS Modem Link or the MTS Data Link in combination with Multipoint Terminal Support Service software. The Link products provide an Intelligent Network Processor (INP) board and related cables.

The following table summarizes the number of terminals supported on the Series 39 and Series 42, with and without the ATP Expansion Package:

Series 39/42 Maximum Terminal Configuration:

	ADCC Only	ADCC/ ATP EXP.
Direct Connect		
• via ADCC	32	32
• via ATP	0	48
• total direct connect	32	60
Modem Connect		
• via ADCC	31	32
• via ATP	0	24
• total modem connect	31	44
Multipoint	55	55
Maximum Terminal Support	56	92

All 56 or 92 terminals can be logged on when the system is running either MPE-V/P or MPE-V/E. The maximum of 56 or 92 terminals includes all point-to-point, multipoint, system console, DS virtual, and X.25 PAD terminals. The number of terminals per multipoint line is normally determined by response time considerations, but may be restricted by the specific cabling option chosen. You may also use the 2333A multipoint or 2334A X.25 cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 39 and Series 42 via the Data Link or via modems and phone lines. The 2334A permits a group of up to 16 devices to communicate via X.25 Packet Switched Networks.

Support Link Modem

Under the HP Remote Support Program, all new (non-upgrade) Series 39 and Series 42 systems are shipped with a free HP Support Link Modem (35031A).

System Console

The system console *MUST* be configured on an ADCC. One point-to-point connected 262x or 2392A terminal must be ordered as the system console. A cable must also be ordered; order Option 301/303/305 for direct connect RS-232, Option 301 for U.S. modem connect, or Option 302 for Europe modem connect cables. (Although no longer orderable, the 2382A, 264X, and 2635B terminals are supported as system consoles.)

Asynchronous Data Communications Controller

The ADCC on the Series 39 and Series 42 consists of two products: the ADCC-Main (30018A) and the ADCC-Extender (30019A). Option 040 must be ordered with each of these products to obtain the correct internal cable. Each ADCC card uses one slot in the I/O section of the card cage. ADCC-Mains and ADCC-Extenders must be ordered (and installed) in alternating fashion (e.g. Main, Extender, Main, Extender, etc.). Each ADCC supports four RS-232 devices. The Series 39 and Series 42 support a maximum of eight ADCCs (32 devices). *A minimum of one ADCC-Main MUST be ordered with the system to attach the system console and up to three other RS-232 devices, including the Support Link Modem.*

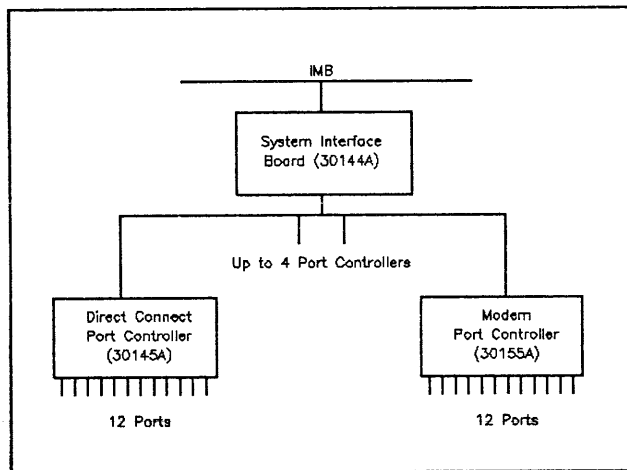
Advanced Terminal Processor

The ATP on the Series 39 and Series 42 is obtained by ordering either the ATP Direct Connect Expansion Package (30273A) or the ATP Modem Expansion Package (30274A). Each Expansion Package contains the System Interface Board (SIB), one Port Controller (either Direct Connect or Modem) which includes the Asynchronous Interface Board (AIB), and a free-standing junction panel box. The minimum ATP configuration supports twelve terminals and requires two card slots in the I/O section of the card cage. Additional ports can be obtained in groups of twelve by ordering either the ATP Direct Connect Port Controller (30145A) or the ATP Modem Port Controller (30155A). Option 042 must be ordered with each of these products to provide the correct internal cable.

Each Direct Connect Port Controller (AIB) supports both RS-232 and RS-422 terminal connections. Twelve RS-422 ports are provided standard with each AIB, but they can be converted to RS-232 ports in groups of four by ordering Option 002. For example, to get a Direct Connect Port Controller with twelve RS-232 ports, you would order one 30145A with three Option 002s.

The SIB and AIB each require a card slot in the I/O section of the card cage. Each AIB includes a terminal port miniboard which uses one junction panel cutout in the free-standing junction panel box. The Series 39 and Series 42 support a maximum of four Direct Connect, two Direct Connect with one Modem, or two Modem Port Controllers (including the ATP Expansion Package).

**ATP Subsystem Structure
on Series 39/42**
With the ATP Expansion Package



Output Spooling

For a discussion of output spooling and a description of spooled device categories, please see the section on Output Spooling in the Series 68 maximum configuration guidelines. Information on MTS printers can also be found in that section.

The following table indicates the maximum number of spooled devices supported on the Series 39 and Series 42:

Series 39/42 Maximum Spooled Device Configuration:

SYSTEM PRINTERS:

Line Printers: (HP-IB)	
2608A/2608S	2
2563A/2565A/2566A	4
261x	2
Total Line Printers	4
Page Printers:	
2680A	2
2688A	2(3)*
Total Page Printers	2(3)*
Total System Printers	4
SERIAL CONNECTED PRINTERS:	
2601A/2602A/2631B	8
2932A/2933A/2934A	8
2563A (ADCC/ATP)	1(3)**
2687A Page Printer (ADCC/ATP)	1(2)**
Total Serial Connected Printers:	8

* HP-IB Extender support in parentheses.

** Two 2687As or three 2563As are supported when connected to the ATP, while only one 2687A or 2563A is supported on the ADCC. The ATP uses direct memory access when offloading spoolfiles while the ADCC must run channel programs. Therefore, the ATP is more efficient and puts a smaller burden on the CPU.

The spooled device support numbers stated in the table above are based on performance considerations. If the system is running **MPE-V/P**, operating system table sizes could limit the number of simultaneously active spooled printers.

In order to determine the maximum number of spooled devices which can be configured on an **MPE-V/P** system, the following formula must be used:

Max. Spooled Devices =

$$256 - (1.25 \times \text{\#Sessions and Jobs}) - \text{\#INPs}$$

16

where: **\#Sessions and Jobs** = the maximum number of sessions *and* jobs which will be supported on the system

\#INPs= the number of Network Links (INPs) which will be configured on the system

After plugging in the values for the number of sessions and jobs and also the number of INPs, the maximum number of spooled devices will have been derived. *Take the result and round it down to the nearest whole number.* It is evident from this formula that the number of spooled devices a system can support will vary with the customer's configuration and application mix.

With the expanded tables of **MPE-V/E**, there is no longer a software tables limitation that further restricts the number of spooled devices on a Series 39 or Series 42 running **MPE-V/E** beyond the number of devices listed in the table above. System performance considerations are responsible for restricting the number of spooled devices to these limits. Note that the appropriate table structure must be configured for this number of spooled devices to be supported.

Serial Connected Printers and Plotters

The Series 39 and Series 42 support up to eight remote spooled 293x or 2631B serial printers through the ADCC or through the ATP via RS-232-C connections. When used as remote spooled printers, they are connected to an ADCC or ATP direct connect port via hardwired cable or to an ADCC or ATP modem port via a modem. 2631B printers must include Option 331 to obtain the RS-232-C remote spooled printer capability.

The Series 39 and Series 42 can support 2601A and 2602A daisywheel printers via the ADCC or ATP through local direct connection only. Modem connection is not supported. The 2601A, 2602A, 2631B, and 293x printers can also be attached as slave devices to terminals under the control of application programs.

The 2563A line printer is also supported on the Series 39 and 42 in a serial configuration. RS-232-C (ADCC/ATP) and RS-422 (ATP) hardwire connections are available; modem connections are not supported. One must specify Option 049 for RS-232-C and Option 050 for RS-422 interfaces in the 2563A printer. Cables must be ordered separately; refer to Page 4-30 for further details. Do not order the subsystem option (Option 340) for the 2563A when it is being used as a serial printer.

The 2687A laser printer is only available as a serial printer. Both RS-232-C and RS-422 hardwired connections are supported, but modem connection is not available. Option 340 must be specified to obtain the Series 39 and Series 42 subsystem. Cables need to be ordered separately; please refer to Page 4-30 for a list of available cables for the 2687A.

HP plotters can be configured as remote RS-232 devices, as slave devices to terminals and personal computers, or as eavesdrop devices between the terminal and the ADCC or ATP. As slave devices, both HP-IB and RS-232-C connections may be possible depending upon the individual plotter. Only RS-232-C connections are available in an eavesdrop configuration or when connected point-to-point to an ADCC or ATP.

Network Link Products (INPs)

A maximum of three Network Link products may be used concurrently on a Series 39 or Series 42. Any number of links can be supported, but only three sets of Link hardware may be installed and/or configured. Each Network Link provides one communication line for use by one or more of the Network Services (DS, RJE, MRJE, IMF, NRJE, MTS, or NS).

Each set of Link hardware includes an Intelligent Network Processor (INP), and requires one I/O card slot in the Series 39 or Series 42 card cage. The INP counts as one device load on a GIC and is considered a low-speed device.

A 1m HP-IB ribbon cable is included for connecting the INP to a GIC. An external cable is also included but must be specified by a particular option when ordering, based on the connection desired. Please refer to the latest HP 3000 Price Guide for a complete list of options.

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
I. System Processor Unit.		
32514B or 32542B	Series 39 System Processor Series 42 System Processor	1A _____ 1B _____
MPE MEDIA PRODUCT		
<p>A Media Product must be ordered with each HP 3000 system. Media Products for Series 39/42 systems contain version options and media options which must be selected to properly specify the correct FOS for your customer. Options indicated below apply to both 51450A and 51451A.</p>		
51450A or 51451A	MPE V/E Media Product MPE V/P Media Product	1C _____ 1D _____
Opt. 601 or Opt. 602	Series 39 SPU Series 4x SPU	1E _____ 1F _____

II. Memory Expansion.

Total Memory Size (Standard memory is .5 Mb on the Series 39 and 1 Mb on the Series 42, MAX=3; 2.5 Mb configurations are not supported.)

2A _____

For configurations above the standard memory support, please refer to the Memory Expansion section in the text to decide which are the appropriate options or products to order.

32514B Opt. 507	Series 39 Memory Expansion to 1 Mb	2B _____
30161A	1 Mb Memory Module for Series 39, 4x	2C _____
30092A	512 Kb Memory Module for Series 39, 4x	2D _____
30171A	256 Kb Memory Module for Series 39, 40, 42	2E _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
III. Disc Drives.		
A. Storage Units <i>with</i> Integrated Cartridge Tape.		
One of the following may be included:		
7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001) (MAX=1) (Two 1m HP-IB cables are included.)	3A _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001) (MAX=1) (Two 1m HP-IB cables are included.)	3B _____
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001) (MAX=1)* (Two 1m HP-IB cables are included.)	3C _____
* If ordered with Series 42 SPU, please specify Option 014 with product 32542B to receive the packaged system discount.		
7914ST Opt. 002	132 Mb Mass Storage Subsystem <i>with Integrated</i> Cartridge Tape (Option 002) (MAX=1) Because the 7914ST may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check Lines 5B and 11D to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), disc drive (2m), and tape drive (2m). (Also enter on line 11D in Tape Drive section.)	3D _____
7914TD Opt. 002	132 Mb Mass Storage Subsystem <i>with Integrated</i> Cartridge Tape (Option 002) (MAX=1) Because the 7914TD may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check Lines 5C and 11B to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), disc drive (2m), and tape drive (6m). (Also enter on line 11B in Tape Drive section.)	3E _____
Total Integrated Storage Units <i>with</i> Integrated Cartridge Tape (Sum of Lines 3x, MAX=1)		3 _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
B. Mass Storage Products (No Integrated Cartridge Tape).		
7911P	28 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted, MAX=4) (A 1m HP-IB cable is included.)	4A _____
7912P	65 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted, MAX=4) (A 1m HP-IB cable is included.)	4B _____
	Total 7911P/7912P Disc Drives (Sum of Lines 3A, 3B, 4A and 4B, MAX=4)	4 _____
7914P	132 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted) (A 1m HP-IB cable is included.)	5A _____
7914ST Discs	132 Mb Mass Storage Subsystem (MAX=4) (Without Option 114, this subsystem contains one drive. With Option 114, the subsystem contains two drives. Enter the total number of disc drives on Line 5B. The number of 7914ST products ordered may be less depending on the number of subsystems with two drives.) (For cabling information, see Line 3D.) (Also enter on line 11D in Tape Drive section)	5B _____
7914TD Discs	132 Mb Mass Storage Subsystem (MAX=1) (Without Option 114, this subsystem contains one drive. With Option 114, the subsystem contains two drives. Enter the total number of disc drives on Line 5C. (For cabling information, see Line 3E.) (Also enter on line 11B in Tape Drive section)	5C _____
7914CT	132 Mb Integrated Storage Unit Containing 9144A Cartridge Tape (MAX=4) (Includes two 1m HP-IB cables.) (Also enter on line 11A in Tape Drive Section.)	5D _____
	Total 7914P/14TD/14ST/14CT Type Disc Drives (MAX=8, Total of Lines 3C, 3D, 3E, and 5x)	5 _____
7920M	50 Mb Master Disc Drive (A 2m HP-IB cable is included with Option 102.)	6A _____
7925M	120 Mb Master Disc Drive (A 2m HP-IB cable is included with Option 102.)	6B _____
	Total 7920/25 Master Disc Drives (Sum of Lines 6x) (MAX=2)	6 _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
7920S	50 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.)	7A _____
7925S	120 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.)	7B _____
	Total 7920/25 Slave Disc Drives (Sum of Lines 7x, MAX=7. This maximum would also require a 7920/25 Master Disc Drive because a master drive is required to support up to seven Slave Drives.)	7 _____
7945A	55Mb Winchester Disc Drive (Includes 1m HP-IB Cable) (MAX=4)	8 _____
7933H/ 7935H	404 Mb Disc Drive (MAX=8) (A 1m HP-IB cable is included.)	9 _____
	Total Disc Drives and Integrated Storage Units (Sum of Lines 4, 5, 6, 7, 8, and 9; MAX=8)	10 _____

IV. Magnetic Tape Drives.

9144A/ 7914CT	One-quarter (1/4) inch Cartridge Tape Drive (Order cable separately with 9144A. Two 1m HP-IB cables included with 7914CT.) (MAX=4)	11A _____
7970E/ 7971A/ 7914TD	1600 cpi Master Tape Drive Subsystem (MAX=1, each master supports up to three Slave Tape Drives; each tape drive includes a 6m HP-IB cable.) (Also, enter 7914TD on line 3E or 5C in Disc Drive Section.)	11B _____
7970E	Slave Tape Drive Subsystem (MAX=3); A 6.1m multiunit cable is included.	11C _____
7974A/ 7914ST	1600 cpi (800 cpi optional) Magnetic Tape Subsystem (MAX=4); A 2m HP-IB cable is included. (Also enter 7914ST on line 3D or 5B in Disc Drive Section.)	11D _____
7978A	6250/1600 cpi Magnetic Tape Subsystem (MAX=4); A 2m HP-IB cable is included.	11E _____
	Total Magnetic Tape Drives (Sum of Lines 11x, MAX=4)	11 _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
V. System Printers.		
2608S	400 lpm Dot Matrix Printer (MAX=2) Option 340 includes a 4m HP-IB cable.	12A _____
2563A/ 2565A/ 2566A	300, 600, and 900 lpm Dot Matrix Printers (Option 340); (MAX=4); a 4m HP-IB cable is included.	12B _____
261xA	Line Printer Series (e. g., 2611A and 2619A) (MAX=2) (A 15m parallel differential cable is included with Option 340.)	12C _____
	Total Line Printers (Sum of Lines 12x, MAX=4)	12 _____
2680A/ 2688A	Intelligent Page Printers (MAX=2) (An 8m HP-IB cable is included with Option 340.) See the discussion in Chapter One Appendix regarding the connection of printers via HP-IB Extenders.	13 _____
	Total System Printers (Sum of Lines 12 and 13, MAX=4)	14 _____

VI. Serial Printers.

2601A	40 cps Daisywheel Printer (MAX=8); (2601A includes RS-232 cable)	15A _____
2602A	25 cps Daisywheel Printer (MAX=8); order cable separately.	15B _____
293x	200 cps Dot Matrix Printer (MAX=8); (Order cable separately.)	15C _____
2563A	Dot Matrix Printer (Option 049 for RS-232 or Option 050 for RS-422); (MAX=1 with ADCC and 3 with ATP); (order cable separately.)	15D _____
2687A	12ppm Laser Page Printer (Option 340); (MAX=1 with ADCC or 2 with ATP); (order cable separately.)	15E _____
	Total Serial Printers (Sum of lines 15x, MAX=8)	15 _____

VII. Other Peripherals.

9895A	Flexible Disc Drive (Option 010, MAX=1) (Order HP-IB cable separately.)	16 _____
26075A	Multiple System Access Selector (MAX=1); (order cables separately.)	17 _____

Series 39/42 Configuration Worksheet

VIII. Data Communications.

A. Workstations, Plotters, and Printers (Enter quantities in lines below):

NOTE: Cabling must be ordered separately for these devices!

	Connection Method				
		Pt-to-Pt with ATP or ADCC			
			Direct Connect		
Product	Daisychain* Multipoint	ADCC/ATP Modem	ATP Type 422	ADCC/ATP Type 232-C	Terminal Attached
Display Terminals					
239x	N/A*	_____	_____	_____	N/A
2623A	N/A*	_____	_____	_____	N/A
2624B	_____	_____	_____	_____	N/A
2625A	_____	_____	_____	_____	N/A
2626A	_____	_____	_____	_____	N/A
2626W	N/A*	_____	_____	_____	N/A
2627A	N/A*	_____	_____	_____	N/A
2628A	_____	_____	_____	_____	N/A
Plotters					
7470A	N/A	_____	N/A	_____	_____
7475A	N/A	_____	N/A	_____	_____
7550A	N/A	_____	N/A	_____	_____
7580A/B	N/A	_____	N/A	_____	_____
7585B	N/A	_____	N/A	_____	_____
Data Collection Terminals					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
3081A	_____	_____	N/A	_____	N/A
Subtotal (this page)	18A _____	19A _____	20A _____	21A _____	22A _____

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

Series 39/42 Configuration Worksheet

Connection Method					
Pt-to-Pt with ATP or ADCC					
Direct Connect					
Product	Daisychain* Multipoint	ADCC/ATP Modem	ATP Type 422	ADCC/ATP Type 232-C	Terminal Attached
Serial Printers**					
2932A	N/A	_____	_____	_____	_____
2934A	_____	_____	_____	_____	_____
2563A	_____	N/A	_____	_____	N/A
2601A	N/A*	N/A	N/A	_____	_____
2602A	N/A*	N/A	N/A	_____	_____
Page Printers**					
2687A	N/A	N/A	_____	_____	N/A
Personal Office Computers					
Touchscreen (150)	N/A*	_____	_____	_____	N/A
Subtotal (this page)	18B _____	19B _____	20B _____	21B _____	22B _____
Subtotal (previous page)	18A _____	19A _____	20A _____	21A _____	22A _____
Totals (both pages)	18 _____	19 _____	20 _____	21 _____	22 _____

Line 18: MAX = 55

Line 19: MAX = 44

Sum of lines 19, 20, and 21: MAX = 60

Sum of lines 18, 19, 20, and 21: MAX = 92

Sum of lines 20 and 21: MAX = 60

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

** Note device maximums in Section VI of the worksheet.

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

B. ATP Advanced Terminal Processors

The Series 39 and 42 support one (1) ATP Expansion Package for ATP support. Either the 30273A Direct Connect ATP Expansion Package or the 30274A Modem Connect Expansion Package can be used. Each includes the first Direct Connect or Modem Port Controller (12 ports) plus one System Interface Board (SIB). Additional Port Controllers may be ordered for the Series 39 and Series 42 up to the following maximum combinations which include the initial 12 ports: 1) Maximum of four Direct Connect Port Controllers; 2) Maximum of two Direct Connect Port Controllers with one Modem Port Controller; 3) Maximum of two Modem Port Controllers.

Step #1:

Determine the number of ATP modem ports needed from line 19 (MAX=24).

23A _____

Determine the number of ATP direct connect ports needed (Sum of line 20 and line 21 (MAX=48)).

23B _____

(Note: The above maximums may not be reached simultaneously.)

Step #2:

Determine what products you should order using the following table. Select the appropriate column and row corresponding to your modem and direct connect port requirements and order the products indicated at their intersection. (Unused modem ports may be used for RS-232-C direct connections.)

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

ATP Direct Connect Port Controllers Required	ATP Modem Port Controllers Required		
	0 (0 ports)	1 (up to 12 ports)	2 (up to 24 ports)
0 (0 ports)		1 30274A 1 Opt. 042	1 30274A 1 Opt. 042 1 30155A 1 Opt. 042
1 (up to 12 ports)	1 30273A 1 Opt. 042	1 30274A 1 Opt. 042 1 30145A 1 Opt. 042	Not Supported
2 (up to 24 ports)	1 30273A 1 Opt. 042 1 30145A 1 Opt. 042	1 30274A 1 Opt. 042 2 30145A 2 Opt. 042	Not Supported
3 (up to 36 ports)	1 30273A 1 Opt. 042 2 30145A 2 Opt. 042	Not Supported	Not Supported
4 (up to 48 ports)	1 30273A 1 Opt. 042 3 30145A 3 Opt. 042	Not Supported	Not Supported

** Note that additional direct connect and modem ports may be connected using the ADCC. (See Section C.)*

30274A	Modem Connect ATP Expansion Package (Option 042) includes 12 modem ports and one SIB. (MAX=1).	24A _____
30155A	ATP Modem Port Controller provides 12 RS-232 modem ports (Option 042).	24B _____
30273A	Direct Connect ATP Expansion Package (Option 042) includes 12 RS-422 ports and one SIB. (MAX=1).	24C _____
30145A	ATP Direct Connect Port Controller provides 12 RS-422 ports (Option 042).	24D _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

Step #3:

For each 30273A and 30145A ordered above, you must order the appropriate number of Options 002 in order to obtain the right mix of RS-232-C versus RS-422 ports from line 20. Each Direct Connect Port Controller and Expansion Package comes standard with 12 RS-422 terminal connections. They are converted to RS-232 connections in groups of four by ordering Option 002 as indicated in the matrix below:

For each 30273A or 30145A (24C and 24D):

# Options 002	# RS-422 ports	# RS-232-C ports
0	12	0
1	8	4
2	4	8
3	0	12

Total Option 002s 24E _____

C. ADCC Asynchronous Data Communications Controller

If you require more than 24 modem ports or more than 48 direct connect ports, you must order the ADCC. At a minimum, you must order one (1) ADCC-Main to support the system console; it cannot be supported on the ATP.

ADCC ports required (Total of lines 19 and line 21 minus the number of RS-232-C ATP ports configured (line 24E multiplied by "4") and modem ATP ports configured (lines 24A and 24B multiplied by "12")). If zero, enter "1" for System Console. 25 _____

Total ADCC-Main and ADCC-Extender cards required (Divide line 25 by "4" and round up to the nearest integer; MIN=1; MAX=8) 26 _____

30018A ADCC-Main (Divide line 26 by "2" and round up to the nearest integer; internal cables included with Option 040; external cables for devices must be ordered separately.) 27 _____

30019A ADCC-Extender (line 26 minus line 27) (Internal cables included with Option 040; external cables for devices must be ordered separately.) 28 _____

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
IX. Network Links (INPs).		
	HP to HP System Lines (30270A, 30271A, 32187A, 32188A)	29A _____
	HP to IBM System Lines (30246A, 30251A)	29B _____
	Multipoint Lines (32026A, 32027A, 32028A)	29C _____
	Local Area Network (30242A) (MAX=1)	29D _____
	Total number of Links (INPs) (Sum of lines 29A, 29B, and 29C; MAX=3)*	29 _____

* Additional Links without hardware (Option 390) may be supported.

X. I/O Expansion.

A. General I/O Channels (GICs)

To determine the number of GICs required on the system, refer to the discussion on GICs in the Series 39/42 maximum system configuration section of this chapter.

(Note: To configure GICs you must take into consideration peripheral speed, electrical device loads, cable lengths, peripheral incompatibilities and system performance. These are discussed in detail in the Chapter One Appendix.)

A figure showing four (4) GICs has been included in the GIC section of this chapter for your use as a configuration worksheet.

30079A Optional GICs (MAX=2). Two GICs are shipped standard with a new system order; box swap upgrade systems do not include the two standard GICs. Internal cables are included by ordering Option 040; external HP-IB cables are supplied with devices unless otherwise indicated.

30 _____

B. Junction Mounting Panels

The Series 39/42 SPU only requires junction mounting panels when ATPs are configured. The ATP Expansion Package provides sufficient space on its junction mounting panel for the supported ATP configurations.

Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
C. I/O Card Slots		
The sum of:		
	Line 12C -- 261x Line Printer Interface	31A _____
	Line 29 -- Network Links (INPs)	31B _____
	Line 26 -- ADCC Cards	31C _____
	Line 24B -- Modem Port Controllers (AIBs)	31D _____
	Line 24D -- Direct Connect Port Controllers (AIBs)	31E _____
	Port Controller provided with ATP Expansion Package (line 24A <u>or</u> line 24C)	31F _____
	One SIB provided with ATP Expansion Package (Enter zero (0) if both Line 31D and Line 31E are blank; otherwise, enter one (1).)	31G _____
	Line 30 -- Optional GICs	31H _____
	Standard GICs (2)	31I _____
	Line 29D - LANIC	31J _____
	Total of Lines 31x; MAX=13	31 _____

Series 48

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HP 3000 SERIES 48 MINIMUM SYSTEM CONFIGURATION

Supplied Hardware

- Central Processing Unit.
- System Clock.
- Control and Maintenance Processor.
- Two General I/O Channels (GICs) for System Disc and Backup Tape Drive. (These GICs are not included with box swap system upgrades.)
- Two Mb Fault Control Memory with Controller.
- System Mainframe Cabinet including Card Cages and Power Supplies supporting the CPU, up to four Mb Memory, and 26 I/O Card Slots.
- Built-in Isolation Transformer.
- Support Link Modem.

Required Hardware Ordered Separately

- System Console: Any 262x or 239x terminal.
- System Console Cable: See Page 4-29.
- One System Disc: 7945A, 7920M, 7925M, 7933H or 7935H Master Disc Drive or 7911P, 7912P, 7914P, 7914CT, 7914TD or 7914ST Integrated Storage Unit.
- One Asynchronous Data Communications Controller (ADCC-Main) to connect the console to the system.
- One Magnetic Tape Drive for System Backup: 7914TD, 7914ST, 7970E, 7971A, 7974A, or 7978A.

Supplied Software

Standard on each HP 3000 system is the Fundamental Operating Software which includes:

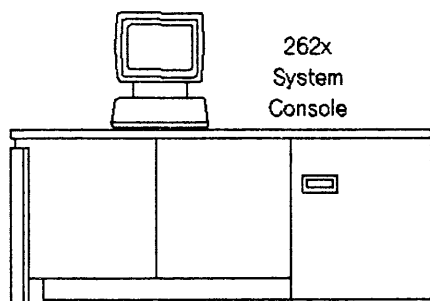
- Multiprogramming Executive (MPE) Operating System.
- Text Editor (EDIT/3000).
- File Copying Utility (FCOPY/3000).
- Sort and Merge Package (SORT-MERGE/3000).
- Data Base Mgmt. System (IMAGE/3000).
- Data Base Inquiry Language (QUERY/3000).
- Data Entry and Forms Management Software (VPLUS/3000).
- Keyed Sequential Access Method Software (KSAM/3000).
- A complete User Manual Set is supplied with the system hardware. (For a Manual Listing, please see the chapter on Manuals.)

All of the Fundamental Operating Software is included in the system, but still must be ordered separately. Please see the section on MPE Media Products.

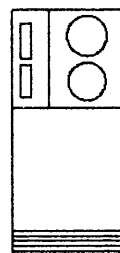
The Series 48 also includes Disc Caching, an I/O performance product, which is not a part of the Fundamental Operating Software.

Note that the customer and CE need to work together on site preparation prior to system installation.

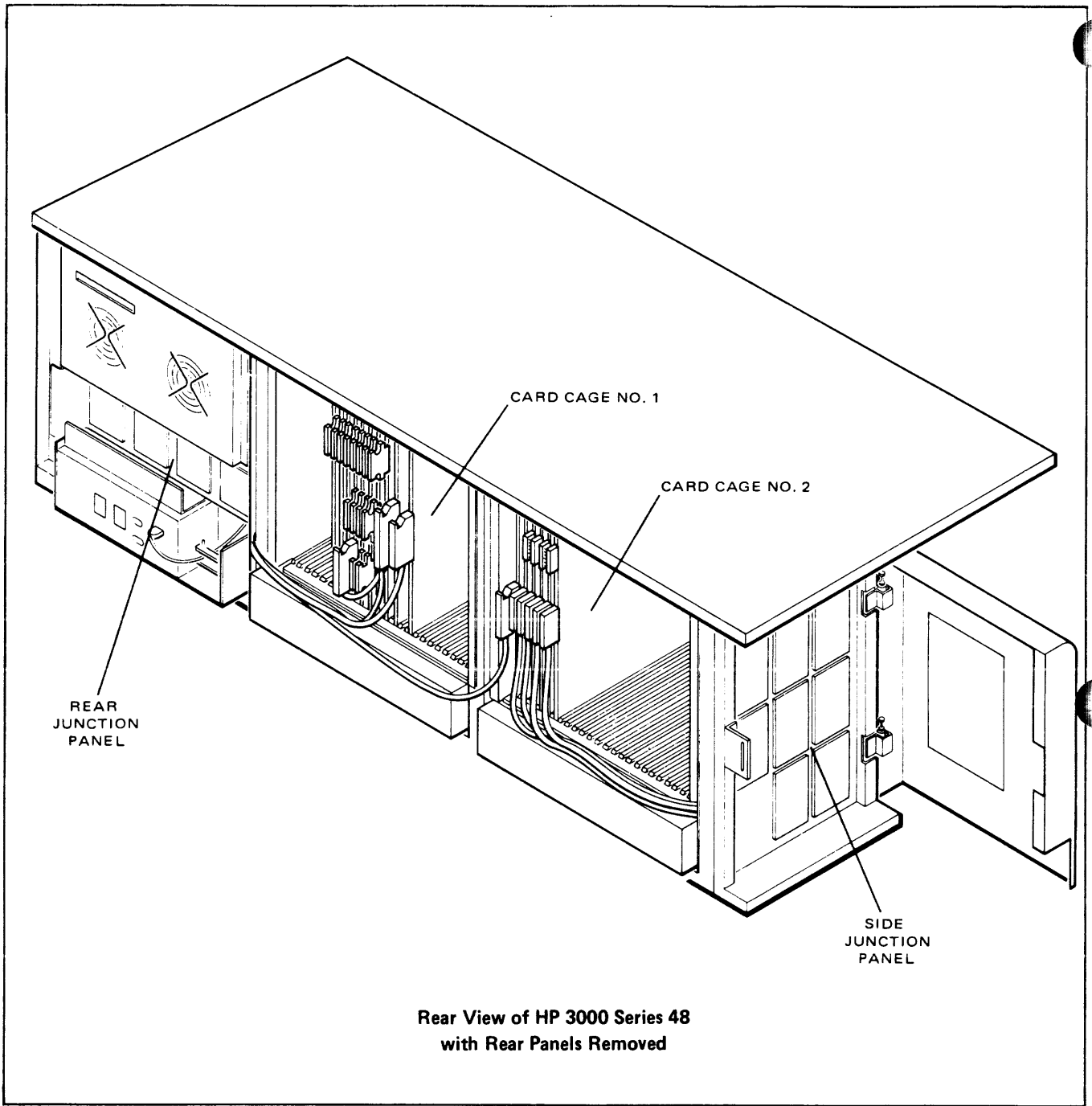
HP 3000 SERIES 48 MINIMUM SYSTEM CONFIGURATION EXAMPLE



HP 3000
Series 48



7914ST
Tape and Disc
Drive Combination



HP 3000 SERIES 48 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

Ordering the System Processor Unit (SPU)

To obtain the Series 48 System Processor Unit order product number 32548B for new systems or 32548BH for box swap upgrades.

The Series 48 runs MPE-V/P with disc caching as its standard operating system. If you wish to substitute MPE-V/E, order Option 410 with product 32548B or 32548BH.

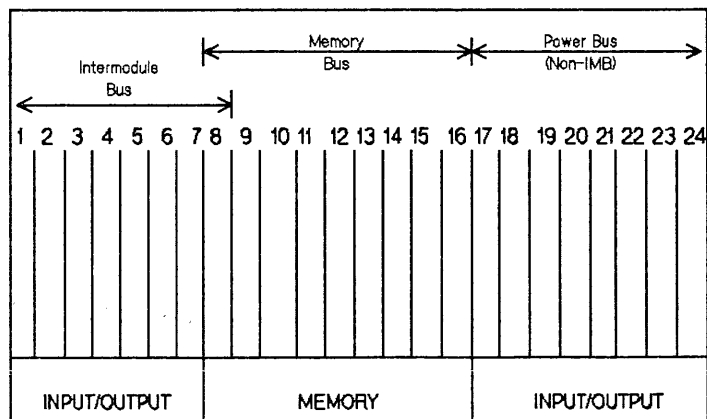
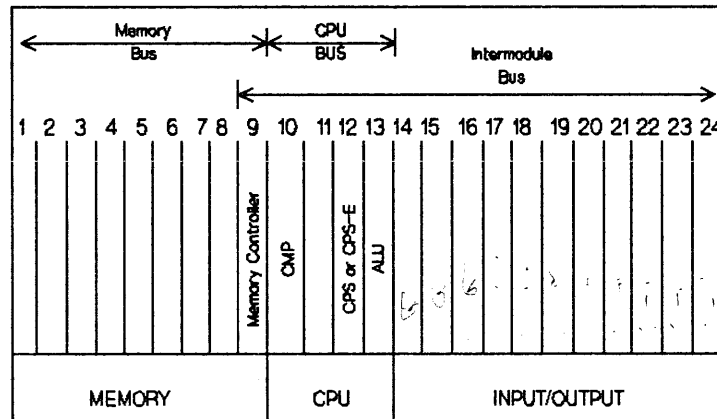
MPE Media Products

One MPE Media Product must be ordered with every HP 3000 system to designate both the MPE type (MPE-V/P or MPE-V/E) and the media type (cartridge tape or 1600 cpi magnetic tape). The two MPE Media Products are 51450A (MPE-V/E) and 51451A (MPE-V/P). Option 602 must be specified for the Series 48. To designate 1600 cpi magnetic tape, you must order Option 051; for cartridge tape media, you need to order Option 022.

The Card Cages

The Series 48 comes standard with two side-by-side card cages. Each card cage has 24 card slots as shown in the figure below:

Please photocopy this page and use it as a worksheet:



Configuration Restrictions for I/O Portions of the Card Cages

- ADCC-Main and ADCC-Extender cards must be adjacent to each other.
- ATP/SIB and ATP/AIB cards must be adjacent to each other.
- A maximum of six ATP/AIB cards may be configured when the system includes two memory controllers.
- Remember also to include the two standard GICs and the required ADCC-Main in your configuration.

In the first card cage, slots 1 through 8 support system memory modules. The standard memory controller is configured in slot 9. Slots 10 through 13 house the CPU cards. (For the purpose of correct ordering, it is not necessary to be concerned with the configuration of cards in the CPU portion of the card cage.) Slots 14 through 24 support I/O cards including those cards for the Advanced Terminal Processor (ATP), Asynchronous Data Communications Controller (ADCC), the Local Area Network Interface Controller (LANIC), General I/O Channel (GIC), Intelligent Network Processor (INP), and 261X Line Printer Interface (LPI).

In the second card cage, slots 1 through 7 and 17 through 24 support I/O cards. Slots 1 through 7 will support any of the I/O cards listed in the previous paragraph. Slots 17 through 24 are not connected to the IMB and can support only INP and LPI cards. Slots 9 through 16 support memory modules when a separately-ordered memory controller is placed in slot 8.

There are a total of 26 slots in both card cages that support I/O cards. Of this total, 18 I/O slots are directly connected to the IMB.

All card cage slots supply power. In card cage 1, slots 1 through 9 connect to the memory bus, and slots 10 through 13 connect to the CPU bus. The Intermodule Bus (IMB) connects slots 9 through 24 in card cage 1 and slots 1 through 8 in card cage 2. This IMB provides communications between the I/O cards, the memory subsystem, and the CPU.

The Series 48 supports one IMB which does not require an interface card in either card cage. (For a more extensive explanation of the function of the IMB please see the IMB discussion in the Series 68 maximum configuration section.) Slots 8 through 16 in card cage 2 connect to another memory bus. Slots 17 through 24 provide power only.

The LANIC card must be placed in the I/O portion of the card cage to be connected to the IMB. The LANIC can be placed in slots 14 through 24 of card cage 1, or slots 1 through 7 of card cage 2.

Memory Expansion

The Series 48 comes with two 1 Mb memory boards standard in the minimum configuration. System memory sizes of 2 Mb, 2.5 Mb, 3 Mb, 3.5 Mb, and 4 Mb are supported.

Memory can be increased by ordering memory expansion modules including: 0.5 Mb (30092A) and 1 Mb (30161A). The 0.5 Mb memory product is comprised of two 256 Kb memory boards, each requiring a card slot. The 1 Mb product consists of a single 1 Mb board.

Configurations with the 0.5 Mb product also require a separately-ordered memory controller (30094A, the Add-on Series 44/48 Memory Controller). This memory controller will be configured in slot 8 of card cage 2 and the 256 Kb boards will be placed adjacent to it. The following table indicates which products you should order to obtain a desired memory configuration:

Series 48 Memory Expansion Order Quantity

	Series 48 Memory Size (Mb)					
	STD	2	2.5	3	3.5	4
30161A 1 Mb Memory				1	1	2
30092A 512 Kb Memory			1		1	
Series 44/48 Memory Controller			1		1	

When upgrading the memory of an installed Series 44 system, it is possible to have a different mix of 256 Kb and 1 Mb memory boards than shown. An additional memory controller is needed whenever 256 Kb boards are used in a memory configuration exceeding 2 Mb. The additional memory controller must be installed in the second card cage. If the system is configured with two memory controllers, the maximum number of ATP ports will be reduced because of card cage restrictions. Please refer to the Card Cage and Advanced Terminal Processor sections.

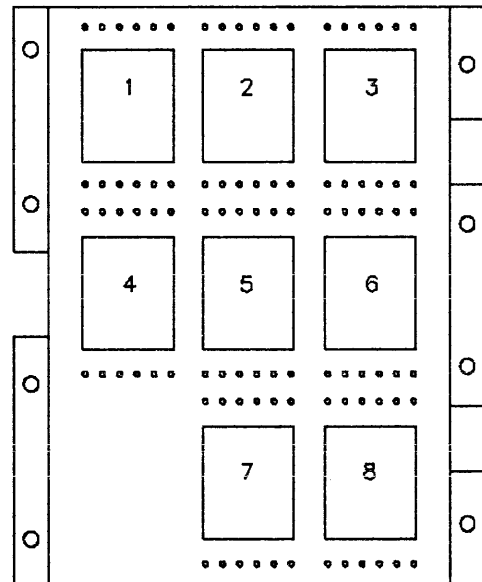
Please photocopy this page and use it as a junction mounting panel worksheet:

Junction Panels

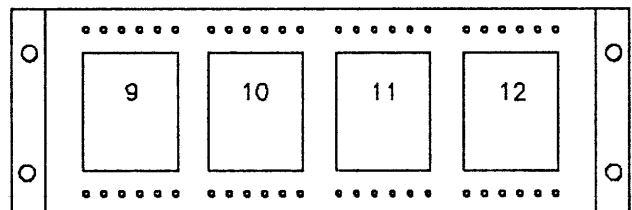
Junction panels are used in the connection of GIC, INP, ADCC, ATP/AIB, LANIC and LPI cards to peripherals, terminals, and other systems. The number of these devices permitted in a configuration may be restricted by the amount of available junction panel space.

The Series 48 has two junction panels: one on the side and one on the rear. These panels allow external cabling for terminals, peripherals, and other systems to connect to internal system cabling.

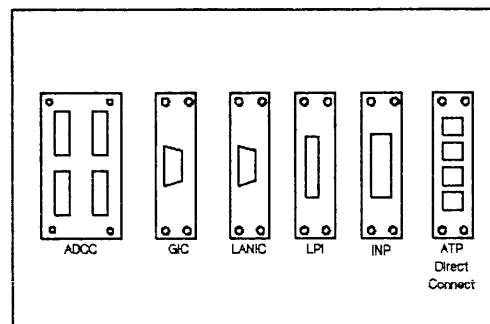
Side Junction Panel



Rear Junction Panel



Junction Mounting Panel Types



Junction Panel Rules:

The Series 48 junction panels are composed of 12 useable "cutouts" which are numbered from 1 to 12 in the preceding figures.

- Junction mounting panels that cover one-third of a cutout are used for each GIC, LPI, LANIC, and INP. One-third of a cutout is also required for each group of four ATP Direct Connect Ports.
- Junction mounting panels that cover one-half of a cutout are used for each ADCC-Main or ADCC-Extender.
- Cutout numbers 2, 3, 5, 6, 7, and 8 can be used for ATP terminal connections. Other cutouts cannot be used for the ATP because of inadequate space behind the junction panel for the ATPs junction mounting panel motherboard and the associated terminal port mini-boards.
- Only cutout numbers 2, 3, 5, 6, 7, and 8 can be used for the LANIC connection. Other cutouts cannot be used because they will cause the LANIC cable to bend.
- All cutouts may be used for ADCC connections, but not concurrently. A maximum of 15 ADCC boards are supported. Therefore, the largest number of cutouts that the ADCC could consume is 7.5.
- When using the ATP Expansion Package (30273A or 30274A), cables from the AIB cards terminate at a remote junction panel box. Modem Port Controller are mounted only on this remote junction panel.

LANIC

The Local Area Network Interface Controller (LANIC) is the hardware controller that interfaces to the Local Area Network (LAN). Each LANIC uses one I/O card slot and connects to one LAN.

A maximum of one LANIC per system is supported. The LANIC is placed on the Intermodule Bus (IMB) and is a high-speed channel. The other type of high-speed channel is a GIC with one or more high-speed devices attached. Series 48 systems can support one LANIC and up to two high-speed GICs.

General I/O Channels

A General I/O Channel (GIC) is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the Series 48. Each GIC is a board that uses one I/O card slot and supports one HP-IB cabling system. The number of peripherals which may be connected to a single GIC depends on maximum device limits, peripheral speed, cable length, and performance considerations. Please refer to the GIC discussion in the Chapter One Appendix for a complete explanation of these rules. Note that the internal HP-IB cabling length between the GIC and the junction panels is two meters for the Series 48.

Order 30079A to obtain additional GICs. You must also specify Option 044 to obtain the proper GIC cable for the Series 48.

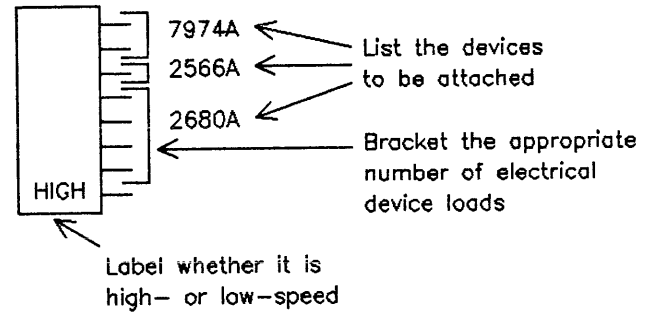
A maximum of five GICs are supported on the Series 48. No more than two of these GICs may have high-speed devices attached to them. Please refer to the peripheral table in the Appendix for a definition of high-speed devices and a high-/low-speed classification of supported devices.

Summary: GIC Attachment Restrictions

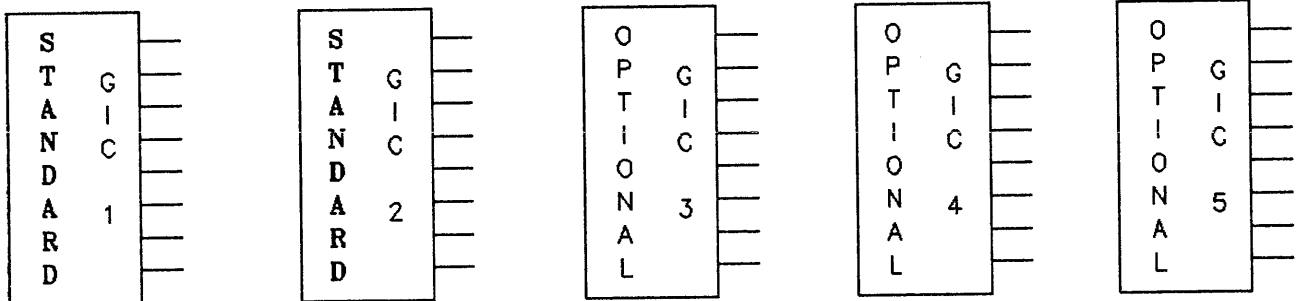
- A maximum of six devices may be attached to a GIC with one or more high-speed devices attached.
- Unless other restrictions apply, low-speed peripherals can share a GIC with high-speed devices.
- Some low-speed devices require a dedicated GIC to which no other devices may be attached. (See the GIC Interface table in Chapter One Appendix.)
- The 2608A line printer cannot be attached to a GIC with high-speed devices.
- The 2608S line printer can share a GIC with all high-speed devices except the 7906M, 7920M, and 7925M family of disc drives.

- It is not recommended that the same GIC be used for connecting the main system backup tape drive and the system disc (LDEV1). System performance may be degraded with such a configuration when the tape drive is in use.

How to Use the GIC Worksheet



Please photocopy this page and use it as a GIC configuration worksheet:



Peripherals

Disc Drives

One 7945A (55 Mb), 7911P (28 Mb), 7912P (65 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7914CT (132 Mb), 7914ST (132Mb), 7920M (50Mb), 7925M (120 Mb), 7933H (404 Mb), or 7935H (404 Mb) hard disc drive is required as the system disc (LDEV1).

The following table lists the maximum number of each type of disc drive that can be configured on the Series 48:

Series 48 Maximum Disc Drive Configuration:

7945A Disc	4
7911P/7912P/7914P/7914TD/ 7914ST Discs w/Cartridge Tape	1
Total 7911P/7912P Disc	4
7914CT Storage Unit	4
7914TD Storage Unit	2
7914ST Storage Unit	4
Total 7914P/7914TD/ 7914ST/7914CT	8
792x Master Discs	2
792x Slave Discs	14
793x Discs	8
Total Discs	16

The 7920M and 7925M are master disc drives and each can support up to seven slave disc drives. These slave drives are ordered as 7920S or 7925S and do not have their own controllers. They connect to the controller in the master drive and are not part of the HP-IB cabling. The 7945A, 7911P, 7912P, 7914P, 7914TD, 7914CT, 7914ST, 7933H, and 7935H disc drives each have their own controllers.

With the 7920M and 7925M, Option 102 must be ordered to obtain the HP-IB interface and a two meter HP-IB cable. Each 7920S and 7925S comes standard with two non-HP-IB cables, a disc drive multiunit cable and a data cable. Both are used to connect to 7920M or 7925M master drives.

Disc performance may vary depending on the specific configuration of discs, controllers, and GICs. Check with an HP performance specialist if you have performance concerns.

Integrated Storage Units

The 7911P, 7912P, and 7914P are integrated storage units that include both a Winchester disc drive and an integral cartridge tape unit as standard. *Only one 7911P, 7912P, or 7914P with the cartridge tape unit is supported on the Series 48.* A maximum of four 7911P or 7912P and a maximum of eight 7914P disc drives are supported. Because only one cartridge tape unit is allowed on the system, additional 7911P, 7912P, or 7914P units must be ordered with the cartridge tape delete Option 140 specified.

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a 1m HP-IB cable standard. If you order the cartridge tape unit on any of these integrated storage units, you must also order Option 001, which supplies a controller for the cartridge tape unit and a 1m HP-IB cable. *The cartridge tape unit requires its own dedicated GIC.*

The 7914TD and 7914ST combine into a single package a 7914 rackmounted disc drive, a half-inch tape drive, and an optional cartridge tape unit (Option 002). The 7914TD includes a 7970E master tape drive. The 7914ST includes a 7974A tape drive. A second 7914P disc drive can be added to the same cabinet by specifying Option 114. (Option 114 will automatically delete the cartridge tape unit for the additional disc drive.)

The 7914TD and 7914ST are supplied with HP-IB cables standard--one 2m cable for the disc drive, a 6m cable with the 7970E tape drive, or a 2m cable with the 7974E tape drive. When Option 002 is ordered, the cartridge tape drive, a controller, and a 1m HP-IB cable are shipped.

The 7914CT combines the 7914 disc drive with a 9144A cartridge tape unit which does not require a dedicated GIC (do not confuse 7914CT with cartridge tape in 7914P disc drive) or separate controller. Two 1m HP-IB cables are shipped with the 7914CT. A maximum of four 7914CT drives are supported on the Series 48.

Magnetic Tape Drives

A 7970E, 7914TD, 7971A, 7974A, 7914ST, 7976A, or 7978A magnetic tape drive is required for system backup for the Series 48.

The 7970E master tape drive requires a dedicated GIC and can support up to three slave tape drives. Both the 7914TD and 7971A include 7970E tape drives. The 7914ST includes a 7974A tape drive. The 9144A, 7974A, 7976A, and 7978A do not support slave drives; each drive has its own controller.

The following table lists the maximum number of each type of tape drive that can be configured on the Series 48. You may have one integrated cartridge tape drive in addition to these maximums.

Series 48 Maximum Tape Drive Configuration:

9144A Cartridge Tape Drive	4
7970E/7971A/ 7914TD Masters	2
7970E/7971A Slaves	6
7974A/7914ST Tape Drives	4
7976A Tape Drives	2
7978A Tape Drive	4
Total Tape Drives	8

The 7970E master tape drive comes with a 6m HP-IB cable standard. Each 7970E slave drive comes with a 6.1m (non-HP-IB) multiunit cable for tape drives.

The 7971A is a package of one or two 7970E drives in various master and/or slave drive configurations.

The 7974A, 7976A and 7978A are shipped with a 2m HP-IB cable standard. Each 7976A must include Option 516 for the Series 48. The 7974A and 7978A do not require a system option. You must specify Option 800 to obtain the 800 cpi capability on the 7974A.

The 9144A 1/4" cartridge tape drive is shipped without an HP-IB cable. See Page 4-8 for cable information.

System Printers

The following table lists the maximum number of each type of system printer that can be configured on the Series 48:

Series 48 Maximum Printer Configuration:

Line Printers:	
2608A/2608S	2
2563A/2565A/2566A	4
2611A/2613A /2617A/2619A	4
Total Line Printers Supported	4
Intelligent Page Printers:	
2680A	2
2688A	2(3*)
Total Page Printers	2(3*)
Total System Printers Supported	6

* HP-IB Extender Support.

The 261x family of line printers does not connect directly to a GIC; rather, each one uses a 1m HP-IB ribbon cable between the 26069A translator and the GIC card. The line printer itself can be up to 500 feet away. The printer is connected by a parallel differential current driven line to a separate junction mounting panel.

An internal cable connects the interface card to the junction mounting panel. To obtain the interface card (26069A), internal cables, and external 1.5m parallel differential cable, order Option 344. Cabling beyond 15 meters must be ordered as a special from Boise Division.

The 2608A, 2608S, 2563A, 2565A and 2566A are dot matrix line printers that attach directly to GICs. They do not require a separate interface card in the I/O card cage. The standard 2608A includes a HP-IB interface and a 2m HP-IB cable. For the 2608S, 2563A, 2565A and 2566A, order Option 344 to obtain the HP-IB interface and 4m HP-IB cable. Note that the 2608S cannot share a GIC with a 7906M, 7920M, or 7925M disc drive. Furthermore, the 2608A cannot be configured on a GIC with high-speed devices attached.

To obtain the Series 48 subsystem with 8m HP-IB cable for the 2680A or 2688A, order Option 344. Specify Option 099 with the 2680A to replace the 8m cable with a 2m cable. This option is not available on the 2688A. The 2680A and 2688A attach directly to a GIC and do not require a separate interface card in the I/O card cage.

The 2563A, 2565A, 2566A, 2680A and 2688A printers may be connected via HP-IB Extenders. See the HP-IB Extender Section in the Chapter One Appendix.

Other Peripherals

Flexible Disc Drive

Only one 1.2 Mb flexible disc drive is supported on the Series 48. Product number 9895A must be ordered with Option 010 to specify a single master drive. The flexible disc drive attaches to a GIC. Order the HP-IB cable separately.

Card Reader

The 30106A 80-column card reader interfaces to the Series 48 through a dedicated GIC. You must have either Option 333 or the 30309A upgrade kit to provide a 2m HP-IB cable. When a card reader is configured on the system, a power line conditioner is required. The 30106A and 30309A are no longer orderable. (They will be supported until December 31, 1989.)

Power Line Conditioners

In many areas AC power line disturbances can interfere with system operation, possibly causing data corruption or even system failures. "Dirty" lines from local utilities or noise generated by electrical equipment on customer premises can cause these problems. Please consult with your site preparation CE concerning any such power line conditioner needs you may have. Your CE will have a list of recommended power line conditioners that may be purchased through local third parties.

Multiple System Access Selector

The 26075A Multiple System Access Selector is a switch box that allows up to three HP-IB system processor units to share either a 2680A or a 7976A. An operator can manually switch the peripheral to be active on any one of the sharing systems. A maximum of one 26075A may be connected to a system. Other devices on the same GIC must be "downed" when switching the 26075A. Therefore, the switchbox cannot be on the same GIC as a disc drive. When determining HP-IB cable length, include 0.5m for the 26075A.

Data Communications

Terminal Connection

Point-to-point connections are made to the Series 48 through either the Asynchronous Data Communications Controller (ADCC) or the Advanced Terminal Processor (ATP). The ADCC and ATP support local (RS-232) and remote (full duplex) terminal and serial printer connections. The ATP also supports local RS-422 point-to-point connections. ATP modem support is provided only through the ATP Expansion Package (30274A).

Multipoint connections are made to the Series 48 through the MTS Modem Link or the MTS Data Link in combination with Multipoint Terminal Support Service Software. The Link products provide an Intelligent Network Processor (INP) board and related cables.

The following table summarizes the number of terminals supported on the Series 48, with and without the ATP Expansion Package.

Series 48 Maximum Workstation Terminal Configuration:

	Without ATP E/P	With ATP E/P
Direct Connect		
• via ADCC	60	60
• via ATP	72	96
• total direct connect	104	120
Modem Connect		
• via ADCC	60	60
• via ATP	0	48
• total modem connect	60	88
Multipoint	95	95
Maximum Terminal Support	152	152

All 152 terminals can be logged on when the system is running MPE- V/E, while only 110 terminals can log on when running MPE-V/P. The maximum of 152 terminals includes all point-to-point, multipoint, system console, DS virtual, and X.25 PAD terminals. The number of terminals per multipoint line is normally determined by response time considerations, but may be restricted by the specific cabling option chosen. You may also use the 2333A multipoint or 2334A X.25 cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 48 via the MTS Data Link or via modems and phone lines. The 2334A permits a group of up to 16 devices to communicate via X.25 Packet Switched Networks.

Support Link Modem

Under the HP Remote Support Program, all (non-upgrade) Series 48 systems are shipped with a free HP Support Link Modem (35031A).

System Console

The system console *MUST* be configured on an ADCC. One point-to-point connected 262x or 2392A terminal must be ordered as the system console. A cable must also be ordered; order Option 301/303 /305 for direct connect RS-232, Option 301 for U.S. modem connect, or Option 302 for European modem connect cables. (Although no longer orderable, the 2382A, 264x, and 2635B terminals are supported as system consoles.)

Asynchronous Data Communications Controller

The ADCC on the Series 48 consists of two products: The ADCC-Main (30018A) and the ADCC-Extender (30019A). Option 044 must be ordered with each of these products to obtain the correct internal cable. Each ADCC card uses one slot in the I/O section of the card cage. ADCC-Mains and ADCC-Extenders must be ordered (and installed) in alternating fashion (e.g. Main, Extender, Main, Extender, etc.). Each ADCC supports four RS-232 devices. The Series 48 supports a maximum of 15 ADCCs (60 devices). *A minimum of one ADCC-Main MUST be ordered with the system to attach the system console* and up to three other RS-232 devices, including the Support Link Modem.

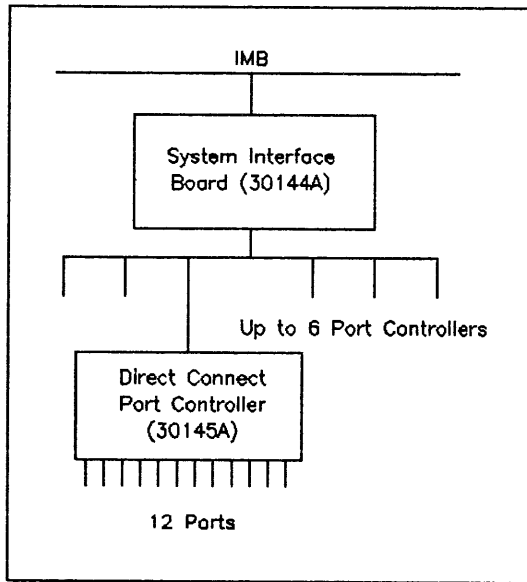
Advanced Terminal Processor

The ATP on the Series 48 consists of several combinations of the following five products: ATP System Interface Board (SIB) (30144A), ATP Direct Connect Port Controller (30145A), ATP Modem Port Controller (30155A), ATP Direct Connect Expansion Package (30273A), or the ATP Modem Expansion Package (30274A).

A basic ATP subsystem on the Series 48 consists of either a) the System Interface Board with one Direct Port Controller or b) one of the ATP Expansion Packages. This subsystem is then expanded through addition of Direct Connect or Modem Port Controller boards; however, the *Modem Port Controllers may only be used with the ATP Expansion Package.*

Each Direct Connect or Modem Port Controller product includes both an Asynchronous Interface Board (AIB), which occupies a slot in the card cage, and the associated junction mounting panel motherboard and terminal port mini-boards.

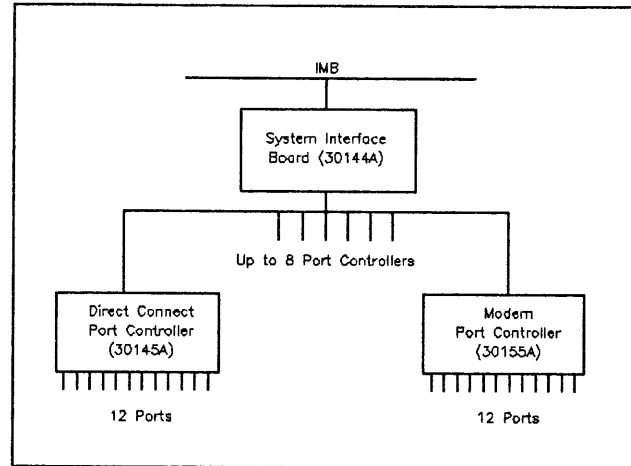
ATP Subsystem Structure Without ATP Expansion Package



When the ATP is configured on the Series 48, the minimum required subsystem consists of one SIB and one AIB. The minimum ATP configuration requires two I/O slots, supports up to 12 terminals, and uses one junction panel cutout. Without use of the ATP Expansion Package, the maximum ATP subsystem on the Series 48 is one SIB and six Direct Connect Port Controllers, supporting 72 terminals and consuming seven I/O slots.

Each Direct Connect Port Controller (AIB) supports both RS-232 and RS-422 terminal connections. Twelve RS-422 ports are provided standard with each AIB, but they can be converted to RS-232 ports in groups of four by ordering Option 002. For example, to get a Direct Connect Port Controller with 12 RS-232 ports, you would order one 30145A with three Option 002's. If the Direct Connect Port Controller will be mounted on the system junction panel, do not order Option 048 on product 30145A.

ATP Subsystem Structure With the ATP Expansion Package



Each ATP Expansion Package contains the System Interface Board (SIB), one Port Controller (either Direct Connect or Modem) which includes the Asynchronous Interface Board (AIB), and a free-standing junction panel box. Additional ports can be obtained in groups of 12 by ordering either the ATP Direct Connect Port Controller (30145A) or the ATP Modem Port Controller (30155A). Option 048 must be ordered with each of these products (30145A, 30155A, 30273A, 30274A) to provide the correct internal cable.

A maximum subsystem on the Series 48 consists of one SIB and eight Direct Connect or four Modem Port Controllers. This maximum sub-system is available only when using the ATP Expansion Package (30273A or 30274A). This configuration supports a maximum of 96 direct connect or 48 modem ports, consuming nine or five I/O slots respectively. To achieve the system maximum of 120 point-to-point terminals, this maximum ATP subsystem of eight AIBs (96 direct connect ports) and six additional ADCCs (24 more ports) must be ordered.

Single bay models of the Series 44/48 must be expanded to two bays before installation of the ATP Expansion Package. If the system has two card cages but also contains two memory controllers (see Memory Expansion section), then a maximum of six AIBs will be supported on the system. These six AIBs may include up to four Modem Port Controllers.

Output Spooling

For a discussion of output spooling and description of spooled device categories, please see the section on Output Spooling in the Series 68 Configuration section. Information on MTS printers can also be found in that section.

The following table indicates the maximum number of spooled devices supported on the Series 48:

Series 48 Maximum Spooled Device Configuration:

SYSTEM PRINTERS:	
Line Printers: (HP-IB)	
2608A/2608S	2
2563A/2565A/2566A	4
26ix	4
Total Line Printers	4
Page Printers:	
2680A	2
2688A	2(3*)
Total Page Printers	2(3*)
Total System Printers	6
SERIAL CONNECTED PRINTERS:	
2601A/2602A/2631B	8
2932A/2933A/2934A	8
2563A (ADCC/ATP)	1(3)**
2687A Page Printer (ADCC/ATP)	1(2)**
Total Serial Connected Printers:	8

* HP-IB Extender support.

** Two 2687As or three 2563As are supported when connected to the ATP, while only one is supported on the ADCC. The ATP uses direct memory access when offloading spoolfiles while the ADCC must run channel programs. Therefore, the ATP is more efficient and puts a smaller burden on the CPU.

The spooled device support numbers stated in the table above are based on performance considerations. If the system is running MPE-V/P, operating system table sizes could limit the number of simultaneously active spooled printers. In order to determine the maximum number of spooled devices which can be configured on an MPE-V/P system, the following formula must be used:

Max. Spooled Devices =

$$\frac{[256 - (1.25 \times \#Sessions \text{ and Jobs}) - \#INPs]}{16}$$

where: #Sessions and Jobs= the maximum number of sessions *and* jobs which will be supported on the system

#INPs= the number of Network Links/Intelligent Network Processors which will be configured on the system

After plugging in the values for the number of sessions and jobs and also the number of INPs, the maximum number of spooled devices will have been derived. *Take the result and round it down to the nearest whole number.* It is evident from this formula that the number of spooled devices a system can support will vary with the customer's configuration and application mix.

With the expanded tables of MPE-V/E, there is no longer a software tables limitation that further restricts the number of spooled devices on the Series 48 running MPE-V/E beyond the number of devices listed in the table on the previous page. System performance considerations are responsible for restricting the number of spooled devices to these limits. Note that the appropriate table structure must be configured for this number of spooled devices to be supported.

Serial Connected Printers and Plotters

The Series 48 supports up to eight remote spooled 293x or 2631B serial printers through the ADCC or through the ATP via RS-232 connections.

When used as remote spooled printers, they are connected to an ADCC or ATP modem port via a modem. 2631B printers must include Option 331 to obtain the RS-232 remote spooled printer capability.

The Series 48 can support 2601A and 2602A daisywheel printers via the ADCC or ATP through local direct connection only. Modem connection is not supported. The 2601A, 2602A, 2631B, and 293x printers can also be attached as slave devices to terminals under the control of application programs.

The 2563A line printer is also supported on the Series 48 in a serial configuration. RS-232 (ADCC/ATP) and RS-422 (ATP) hardware connections are available; modem connections are not supported. One must specify Option 049 for RS-232 and Option 050 for RS-422 interfaces in the 2563A printer. Cables must be ordered separately; see Page 4-30 for further details. Do not order the subsystem option (Option 344) for the 2563A when it is being used as a serial printer.

The 2687A laser printer is available on the Series 48 as a serial printer only. Both RS-232 and RS-422 hardwired connections are supported, but modem connection is not available. Option 344 must be specified to obtain the Series 48 subsystem. Cables need to be ordered separately; see Page 4-30 for a list of available cables for the 2687A.

HP plotters can be configured as remote RS-232 devices, as slave devices to terminals and personal computers, or as eavesdrop devices between the terminal and the ADCC or ATP. As slave devices, both HP-IB and RS-232 connections may be possible depending upon the individual plotter.

Only RS-232 connections are available in an eavesdrop configuration or when connected point-to-point to an ADCC or ATP.

Network Link Products (INPs)

A maximum of seven Network Link products may be used concurrently on a Series 48. Any number of links can be supported, but only seven sets of Link hardware may be installed and/or configured. Each Network Link provides one communication line for use by one or more of the Network Services (DS, RJE, MRJE, IMF, NRJE, MTS, or NS).

Each set of Link hardware includes an Intelligent Network Processor (INP), and requires one I/O card slot in the Series 48 card cage. The INP counts as one device load on a GIC and is considered a low-speed device.

A 1m HP-IB ribbon cable is included for connecting the INP to a GIC. An external cable is also included but must be specified by a particular option when ordering, based on the connection desired. Please refer to the latest HP 3000 Price Guide for a complete list of options.

Series 48 Configuration Worksheet

Product Number	Description	Quantity
I. System Processor Unit.		
32548B	Series 48 System Processor	1A _____
MPE Media Product		
A Media Product must be ordered with each HP 3000 system. Media Products for Series 48 systems contain version options and media options which must be selected to properly specify the correct FOS for the customer.		
51450A OR 51451A	MPE V/E Media Product	1B _____
	MPE V/P Media Product	1C _____
Opt. 602	Series 4x SPU (applies to both 51450A and 51451A)	1D _____

II. Memory Expansion.

Total Memory Size (Standard memory is 2 Mb, MAX=4)

2A _____

For configurations above the standard 2 Mb order:

30161A	1 Mb Memory Module for Series 4x	2B _____
30092A	512 Kb Memory Module for Series 4x	2C _____
30094A	Add-on Series 4x Memory Controller (needed for 2.5 and 3.5 Mb configurations)	2D _____

III. Disc Drives.

A. Storage Units *with* Integrated Cartridge Tape.

One of the following may be included:

7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001, MAX=1) (Two 1m HP-IB cables are included.)	3A _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001, MAX=1) (Two 1m HP-IB cables are included.)	3B _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Option 001, MAX=1) (Two 1m HP-IB cables are included.)	3C _____
7914ST Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Integrated Cartridge Tape (Option 002, MAX=1) Because the 7914ST may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check lines 5B and 11D to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), disc drive (2m), and tape drive (2m). (Also enter on line 11D in Tape Drive section.)	3D _____
7914TD Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Integrated Cartridge Tape (Option 002, MAX=1). The 7914TD may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, so you will need to check lines 5C and 11B to ensure that the totals for those lines do not violate device support maximums (A 6m, a 2m, and a 1m HP-IB cable is included with each tape drive, disc drive, and cartridge tape, respectively.) (Also enter on line 11B in Tape Drive section.)	3E _____
Total Integrated Storage Units <i>with</i> Integrated Cartridge Tape (Sum of lines 3x, MAX=1)		3 _____
B. Mass Storage Products (No Integrated Cartridge Tape).		
7911P	28 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted, MAX=4) (A 1m HP-IB cable is included.)	4A _____
7912P	65 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted, MAX=4) (A 1m HP-IB cable is included.)	4B _____
Total 7911P/7912P Disc Drives (Total of Lines 3A, 3B, 4A and 4B, MAX=4)		4 _____
7914P	132 Mb Integrated Storage Unit (Option 140, Cartridge Tape Deleted, MAX=8) (A 1m HP-IB cable is included.)	5A _____
7914ST Discs	132 Mb Mass Storage Subsystem (MAX=4) (Without Option 114, this subsystem contains one drive. With Option 114, the subsystem contains two drives. Enter the total number of disc drives on Line 5B. (For cabling information, see Line 3D.) (Also enter on line 11D in Tape Drive section.)	5B _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
7914TD Discs	132 Mb Mass Storage Subsystem (MAX=2) (Without Option 114, this subsystem contains one drive. With Option 114, the subsystem contains two drives. Enter the total number of disc drives on Line 5B.) (For cabling information, see Line 3E.) (Also enter on line 11B in Tape Drive section.)	5C _____
7914CT	132 Mb Integrated Storage Unit containing 9144A cartridge tape drive. (MAX=4) (Includes two 1m HP-IB cables.) (Also enter on line 11A in Tape Drive section.)	5D _____
	Total 7914P/7914TD/7914ST/7914CT Disc Drives (MAX=8, total of lines 3C, 3D, 3E, and 5x.)	5 _____
7920M	50 Mb Master Disc Drive (A 2m HP-IB cable is included with Option 102.) (MAX=2)	6A _____
7925M	120 Mb Master Disc (A 2m HP-IB cable is included with Option 102.) (MAX=2)	6B _____
	Total 7920/7925 Master Disc Drives (Sum of Lines 6x), (MAX=2)	6 _____
7920S	50Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	7A _____
7925S	120 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	7B _____
	Total 7920/7925 Slave Disc Drives (Sum of Lines 7x), (MAX=14). This maximum would also require two 7920/7925 Master Disc Drives because each Master Drive supports up to 7 Slave Drives.)	7 _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
7945A	55 Mb Winchester Disc Drive (includes 1m HP-IB cable) (MAX=4)	8 _____
7933H/ 7935H	404 Mb Disc Drive (MAX=8) (A 1m HP-IB cable is included.)	9 _____
Total Disc Drives & Integrated Storage Units (Sum of Lines 4, 5, 6, 7, 8 and 9) (MAX=16)		10 _____

IV. Magnetic Tape Drives.

9144A/ 7914CT	1/4 inch Cartridge Tape Drive (Order cable separately with 9144A. Two 1m cables included with 7914CT). (MAX=4)	11A _____
7970E/ 7971A/ 7914TD	1600 cpi Magnetic Tape Master Drive Subsystem (MAX=2, each master supports up to 3 Slave Tape Drives) (Each tape drive includes a 6m HP-IB cable.) (Also enter 7914TD on line 3E or 5C in Disc Drive section.)	11B _____
7970E	Slave Tape Drive Subsystem (MAX=6) (A 6.1m multiunit cable is included.)	11C _____
7974A/ 7914ST	1600 cpi (800 cpi optional) Magnetic Tape Subsystem (MAX=4) (2m HP-IB cable included.) (Also enter 7914ST on line 3D or 5B in Disc Drive section.)	11D _____
7978A	6250/1600 cpi Magnetic Tape Subsystem (MAX=4); (2m HP-IB cable included.)	11E _____
Total Magnetic Tape Drives (Sum of lines 11x, MAX=8)		11 _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
V. System Printers.		
2608S	400 lpm Dot Matrix Printer (MAX=2). Option 344 includes a 4m HP-IB cable.	12A _____
2563A/ 2565A/ 2566A	300, 600 and 900 lpm Dot Matrix Printers (Option 344) (MAX=4) (A 4m HP-IB cable is included.)	12B _____
261xA	Line Printer Series (e. g., 2611A and 2619A) (MAX=4) (A 15m parallel differential cable is included with Option 344.)	12C _____
	Total Line Printers (Sum of lines 12x, MAX=4)	12 _____
2680A/ 2688A	Intelligent Page Printers (MAX=2) (An 8m HP-IB cable is included with Option 344.) See discussion in Chapter One Appendix regarding connection of printers via HP-IB Extenders.	13 _____
	Total System Printers (Sum of Lines 12 and 13, MAX=6)	14 _____

VI. Serial Printers.		
2601A	40 cps Daisywheel Printer (MAX=8) (2601A includes RS-232 cable.)	15A _____
2602A	25 cps Daisywheel Printer (MAX=8) (Order cable separately.)	15B _____
293x	200 cps Dot Matrix Printer (MAX=8) (Order cable separately.)	15C _____
2563A	300 lpm Dot Matrix Printer (Option 049 for RS-232 or Option 050 for RS-422) (MAX=1 with ADCC or 3 with ATP) (Order cable separately.)	15D _____
2687A	12 ppm Laser Page Printer (Option 344) (MAX=1 with ADCC, MAX=2 with ATP) (Order cable separately.)	15E _____
	Total Serial Printers (Sum of lines 15x, MAX=8)	15 _____

VII. Other Peripherals.		
9895A	Flexible Disc Drive (Option 010, MAX=1) (Order HP-IB cable separately.)	16 _____
26075A	Multiple System Access Selector (MAX=1) (Order cable separately.)	17 _____

Series 48 Configuration Worksheet

VIII. Data Communications.

A. Workstations, Plotters, and Printers (Enter quantities in lines below):

NOTE: Cabling must be ordered separately for these devices!

	Connection Method				
		Pt-to-Pt with ATP or ADCC			
				Direct Connect	
Product	Daisychain* Multipoint	ADCC/ATP Modem	ATP Type 422	ADCC/ATP Type 232-C	Terminal Attached
Display Terminals					
239x	N/A*	_____	_____	_____	N/A
2623A	N/A*	_____	_____	_____	N/A
2624B	_____	_____	_____	_____	N/A
2625A	_____	_____	_____	_____	N/A
2626A	_____	_____	_____	_____	N/A
2626W	N/A*	_____	_____	_____	N/A
2627A	N/A*	_____	_____	_____	N/A
2628A	_____	_____	_____	_____	N/A
Plotters					
7470A	N/A	_____	N/A	_____	_____
7475A	N/A	_____	N/A	_____	_____
7550A	N/A	_____	N/A	_____	_____
7580A/B	N/A	_____	N/A	_____	_____
7585B	N/A	_____	N/A	_____	_____
Data Collection Terminals					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
3081A	_____	_____	N/A	_____	N/A
Subtotal (this page)	18A _____	19A _____	20A _____	21A _____	22A _____

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A and 2932A.

Series 48 Configuration Worksheet

	Connection Method				
	Pt-to-Pt with ATP or ADCC				
	Direct Connect				
Product	Daisychain* Multipoint	ADCC/ATP Modem	ATP Type 422	ADCC/ATP Type 232-C	Terminal Attached
Serial Printers** 2932A 2934A 2563A 2601A 2602A	N/A _____ N/A* N/A*	_____ N/A N/A N/A	_____ _____ N/A N/A	_____ _____ _____ _____	_____ N/A _____ _____
Page Printers** 2687A	N/A	N/A	_____	_____	N/A
Personal Office Computers Touchscreen (150)	N/A*	_____	_____	_____	N/A
Subtotal (this page)	18B _____	19B _____	20B _____	21B _____	22B _____
Subtotal (previous page)	18A _____	19A _____	20A _____	21A _____	22A _____
Totals (both pages)	18 _____	19 _____	20 _____	21 _____	22 _____

Line 18: MAX = 95

Line 19: MAX = 88

Sum of lines 19, 20, and 21: MAX = 120

Sum of lines 18, 19, 20, and 21: MAX = 152

Sum of lines 20 and 21: MAX = 120

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A and 2932A.

** Note device maximums in Section VI of worksheets.

Series 48 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

B. Advanced Terminal Processors (ATP).

Step #1:

Determine:

- | | |
|---|----------|
| a. Number of ATP modem ports needed from line 19 (MAX=48) | 23 _____ |
| b. Number of ATP direct connect ports needed; sum of lines 20 and 21 (MAX=96) | 24 _____ |
| c. Additional ports may be connected using the ADCC. (See Section C.) | |

Step #2:

Determine what products you should order to satisfy your *ATP modem port* requirement using the following table.

ATP Modem Ports Required

1-12	13-24	25-36	37-48
1 30274A	1 30274A	1 30274A	1 30274A
1 Opt. 048	1 Opt. 048	1 Opt. 048	1 Opt. 048
	1 30155A	1 30274A	1 30274A
	1 Opt. 048	1 Opt. 001	1 Opt. 001
		1 Opt. 048	1 Opt. 048
		1 30155A	2 30155A
		1 Opt. 048	2 Opt. 048

Please note that ATP Modem Port Controllers are supported on the Series 48 ONLY if the system includes an ATP Expansion Package (either modem or direct connect). In addition, only 24 modem ports are supported per ATP Modem Expansion Package. The additional Modem Expansion Package must be ordered with Option 001 to delete the SIB.

- | | | |
|---------------|--|-----------|
| 30274A | ATP Modem Expansion Package (order Option 048) from table above. | 25A _____ |
| 30155A | ATP Modem Port Controllers (order Option 048) from table above. | 25B _____ |

Series 48 Configuration Worksheet

Step #3:

Determine what products you should order to satisfy your *ATP direct connect* port requirement using the following table. Select the appropriate column and row, corresponding to your modem and direct connect port requirements, and order the products indicated at their intersection. Unused modem ports may be used for RS-232-C direct connections. *Note that all columns indicating modem port requirements greater than zero (0) assume that you have already ordered Modem Port Controllers and the Modem Expansion Package in Step #2.*

# ATP Direct Connect Ports Required	# ATP Modem Ports Required				
	0 Modem Ports	1-12 Modem Ports	13-24 Modem Ports	25-36 Modem Ports	37-48 Modem Ports
1-12 Direct Ports	1 30273A 1 Opt. 048	1 30145A	1 30145A	1 30145A	1 30145A
13-24 Direct Ports	1 30273A 1 Opt. 048 1 30145A	2 30145A	2 30145A	2 30145A	2 30145A
25-36 Direct Ports	1 30273A 1 Opt. 048 2 30145A	3 30145A	3 30145A	3 30145A	3 30145A
37-48 Direct Ports	1 30273A 1 Opt. 048 3 30145A	4 30145A	4 30145A	4 30145A	4 30145A
49-60 Direct Ports	1 30273A 1 Opt. 048 4 30145A	5 30145A	5 30145A	5 30145A	N/S
61-72 Direct Ports	1 30273A 1 Opt. 048 5 30145A	6 30145A	6 30145A	N/S	N/S
73-84 Direct Ports	1 30273A 1 Opt. 048 6 30145A	6 30145A 1 30145A 1 Opt. 048	N/S	N/S	N/S
85-96 Direct Ports	1 30273A 1 Opt. 048 6 30145A 1 30145A 1 Opt. 048	N/S	N/S	N/S	N/S

Series 48 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

Notes:

- (1) The highest numbers for the row and column selected above will be the actual number of ports received (e.g. in the 13-24 port range, 24 ports will be provided).
- (2) Use your total ATP direct connect port requirement minus the number of ATP modem ports used for RS-232-C direct connections to select the appropriate row in the table on the previous page.
- (3) This table configures all add-on Direct Connect Port Controllers, whenever possible, on the system side junction panel in order to preserve the free-standing junction panel space for add-on Modem Port Controllers. However, you may install add-on Direct Connect Port Controllers on a free-standing junction panel. In that case you must order Option 048 with product 30145A to obtain the right cable. Note that there are no advantages in doing so.
- (4) If no modem ports are required, the ATP Expansion Package is not mandatory. Up to 72 direct connect ports may be configured with one SIB (30144A) and six Direct Connect Port Controllers (30145A).
- (5) N/S = Not Supported.

30145A	ATP Direct Connect Port Controller from preceding table.	25C _____
30273A	ATP Direct Connect Expansion Package from preceding table.	25D _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

Step #4:

You must order the appropriate number of Option 002s for each 30273A and 30145A in order to obtain the right number of RS-232-C versus RS-422 ports from line 20. Use the following table to determine the number of Option 002s you should order per 30273A and 30145A.

Per 30273A or 30145A:

# Option 002s	# RS-422 ports	# RS-232-C ports
0	12	0
1	8	4
2	4	8
3	0	12

Total Option 002s: Line 25C plus 25D, times "12", minus line 20, divided by "4".

25E _____

Step #5:

30144A System Interface Board (SIB). Order ONLY if you have not ordered an ATP Expansion Package (30273A or 30274A) and are still ordering ATP Direct Connect Port Controllers. (MAX=1)

26 _____

Series 48 Configuration Worksheet

Product Number	Description	Quantity
C. ADCC Asynchronous Data Communications Controller.		
<p>If you require more than 96 direct connect ports or more than 48 modem ports, you must order the ADCC (MAX=120 point-to-point devices). <i>At a minimum, you must order one ADCC-Main to support the system console; it cannot be supported on the ATP.</i></p>		
	ADCC ports required [(Total of lines 19 and 21) minus the number of RS-232-C ATP direct connect ports configured and ATP modem ports configured, i.e., sum of (lines 24A and 24B times "12") and (line 25E times "4")].	27 _____
	Total ADCC-Main and ADCC-Extender cards required (Divide line 27 by "4" and round up to the nearest integer) (MIN=1; MAX=15)	28 _____
30018A	ADCC-Main (Divide line 28 by "2" and round up to the nearest integer; internal cables included with Option 044; external cables for devices must be ordered separately.)	29 _____
30019A	ADCC-Extender (line 28 minus line 29; internal cables included with Option 44; external cables for devices must be ordered separately.)	30 _____

IX. Network Links.

HP to HP System Lines (30270A, 30271A, 32187A and 32188A)	31A _____
HP to IBM System Lines (30246A and 30251A)	31B _____
Multipoint Lines (32026A, 32027A and 32028A)	31C _____
Local Area Network (30242A) (MAX=1)	31D _____
Total number of Links (INPs) (Sum of Lines 31A, 31B and 31C; MAX=7*)	31 _____

* Additional Links without hardware (Option 490) may be supported.

Series 48 Configuration Worksheet

Product Number	Description	Quantity
-------------------	-------------	----------

X. I/O Expansion.

A. General I/O Channels (GICs).

To determine the number of GICs required on the system, refer to the discussion on GICs in the Series 48 maximum system configuration section of this chapter. *A figure showing five GICs has been included in the previous section on GICs for your use as a configuration worksheet.*

(Note: To configure GICs you must take into consideration peripheral speed, electrical device loads, cable lengths, peripheral incompatibilities and system performance. This information is contained in the Chapter One Appendix.)

30079A	Optional GICs (MAX=3. Note that two GICs are shipped standard with a new system order. Box swap upgrade systems do not include the two standard GICs; internal cables included by ordering Option 044; external HP-IB cables are supplied with devices.)	32 _____
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Series 48 Configuration Worksheet

Product Number	Description	Quantity
B. Junction Mounting Panels.		
The sum of:		
Line 12C - 261X Line Printer Series		33A _____
Line 31 - Network Links/INPs		33B _____
GICs included standard with system		33C _____
Line 32 - Optional GICs		33D _____
ATP Direct Connect Controllers (AIBs)		
Line 25C and line 25D times "3"		33E _____
ADCCs:		
Line 28 times "1.5"		33F _____
Line 31D - LANIC		33G _____
Total of lines 33x		33 _____

Each Series 48 has 12 junction panel cutouts. Three junction mounting panels for GICs, LPIs, or INPs can be configured on a cutout. Each direct connect AIB uses three junction mounting panels (12 ports) and consumes a full cutout. Junction mounting panels for Modem Port Controllers are housed only in the remote junction panel box of the ATP Expansion Package. Direct Connect Port Controllers may be mounted there as well. ADCCs have larger junction mounting panels than other devices. Two ADCC junction mounting panels (8 ports) consume a full cutout. *A figure accompanying junction panel configuration rules has been included in the section on junction panels. Please use this as a configuration worksheet to ensure that you have stayed within the limitations of the junction panel configuration rules.*

C. I/O Card Slots.

I/O Card Slots Required

The sum of:

Line 12C - 261x Line Printer Interface Cards	34A _____
Line 31 - Network Links/INPs	34B _____
Line 28 - ADCC Cards	34C _____
Line 25A and 25B - Modem Port Controllers	34D _____
Line 25C and 25D - Direct Connect Port Controllers (AIB)	34E _____
Line 26, 25A or 25D - System Interface Boards (SIB) (MAX=1)	34F _____
Line 32 - Optional GICs	34G _____
GICs included standard	34H _____
Line 31D - LANIC	34I _____
Total of lines 34x, (MAX=26)	34 _____

Series 68

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SERIES 70 UPDATE

The information below is intended to explain only the differences between the Series 70 and the Series 68. With the exception of the items below, the Series 70 and Series 68 follow identical configuration guidelines.

Complete configuration information on the Series 68 (32468C) is contained in Chapter One of the HP 3000 Configuration Guide.

Information on the Series 70, including ordering instructions, may be found in the Series 70 Sales Guide in the HP 3000 System Reference Guide.

PRODUCT NUMBER: 32471A/32471AH

DESCRIPTION: HP 3000 Series 70 SPU and Series 70 Box Swap Upgrade

INCLUDES: * New CPU Boards with 128 Kb Memory Cache
* 8 Mb Memory Standard

PRODUCT NUMBER: 30443A/30443B/30444A/30444B

DESCRIPTION: Series 64A/64B/68A/68B,C to Series 70 Field Upgrade

INCLUDES: * New CPU Boards with 128 Kb Memory Cache

THINGS TO BE AWARE OF:

- * Series 70 requires MPE-V/E UA-MIT or later. The MPE-V/E Media Product (50154 with Options 051, 280 & 605) must also be ordered.
- * Maximum memory support on the Series 70, as with all S/6x systems, is 16 Mb. S/6x systems with more than 8 Mb require MPE-V/E U-MIT or later. Earlier versions of MPE will support up to 8 Mb maximum memory on S/6x.
- * No memory is included in the Series 70 field upgrade product. However, memory may be added, at a discount off list price, as Option 500 on the 30443A/30443B/30444A/30444B field upgrades to the Series 70.
- * Memory may also be added at a discount off list price when ordering a Series 70 SPU or Box Swap Upgrade. Order Option 500 on the 32471A or 32471AH to expand from 8 Mb to 12 Mb. Refer to the Series 70 Sales Guide for details.

HP 3000 SERIES 68 MINIMUM SYSTEM CONFIGURATION

Supplied Hardware

- Central Processing Unit
- System Clock
- Diagnostic Control Unit (DCU)
- Two General I/O Channels (GICs): for System Disc and Backup Tape Drive (These GICs are not included with box swap system upgrade orders.)
- Four (4) Megabytes Fault Control Memory with Controller
- 8 Kb Cache Memory
- System Mainframe Cabinet including Card Cage and Power Supplies for CPU, Cache, I/O Adapter, up to 8 Mb Main Memory, and Writeable Control Store
- Standard I/O Bay with Card Cage, includes 24 I/O Card Slots
- 60 Kb of Writeable Control Store (WCS)
- Built-in Isolation Transformers for the System Processor
- Support Link Modem
- A 2m HP-IB Cable to Increase Disc Cabling Flexibility

Required Hardware Ordered Separately

- One System Console: HP 45851A Touchscreen II with 9123D Disc Drive.
- One System Console Cable (See Page 4-30.)
- One System Disc: 7914P, 7914CT, 7914TD, 7914ST, 7920M, 7925M, 7933H or 7935H Master Disc Drive.
- One Advanced Terminal Processor (One System Interface Board *and* One Port Controller) to interface the system console.
- One Magnetic Tape Drive for System Backup: 7914TD, 7914ST, 7970E, 7971A, 7974A, or 7978A.

Supplied Software

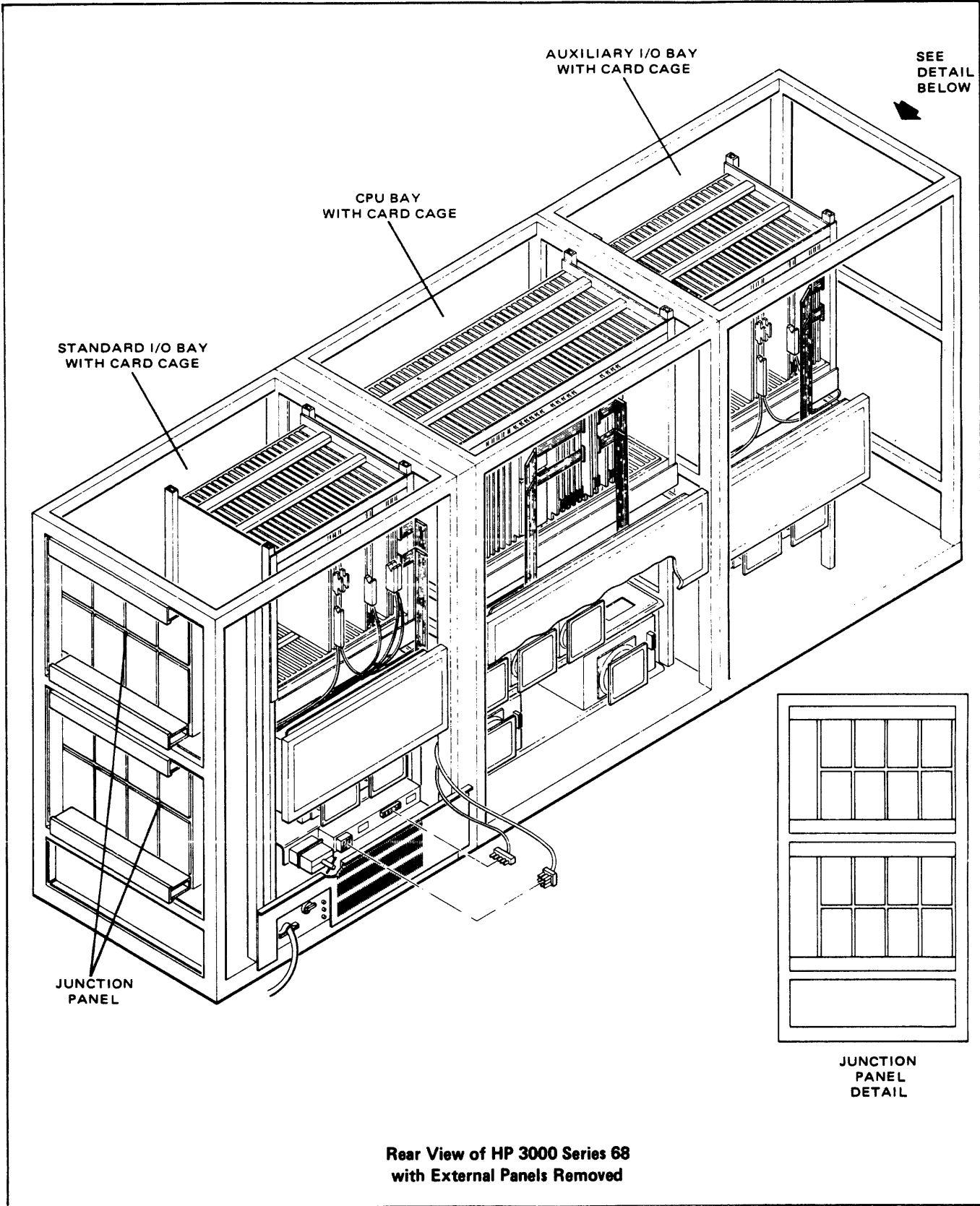
Standard on each HP 3000 system is the Fundamental Operating Software which includes:

- Multiprogramming Executive (MPE) Operating System
- Text Editor (EDIT/3000)
- File Copying Utility (FCOPY/3000)
- Sort and Merge Package (SORT-MERGE/3000)
- Data Base Mgmt. System (IMAGE/3000)
- Data Base Inquiry Language (QUERY/3000)
- Data Entry and Forms Management Software (HP VPLUS/3000)
- Keyed Sequential Access Method Software (KSAM/3000)
- A complete User Manual Set and Diagnostic Set is supplied with the system hardware. (For a Manual listing, please see the Chapter on Manuals.)

All of the Fundamental Operating Software is included in the system, but must still be ordered separately. Please see the section on MPE Media Products.

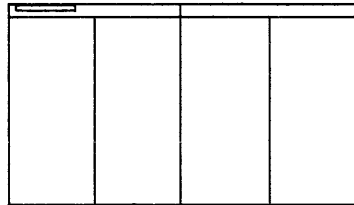
The Series 68 includes Disc Caching, an I/O performance product, which is not a part of the Fundamental Operating Software. Also included is the Series 68 Console Communications Program, which enables the Touchscreen II to function as the system console. This software is contained on a 3.5 inch diskette which is supplied with the Series 68.

The customer and CE will need to work together on site preparation prior to the installation of the Series 68, as the room must be prepared for the environmental and power requirements of the Series 68.

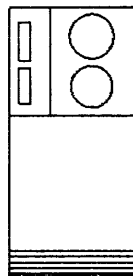


Rear View of HP 3000 Series 68
with External Panels Removed

HP 3000 Series 68
Minimum System Configuration Example



HP 3000
Series 68
with Standard I/O Bay



7914ST
Tape and Disc
Drive Combination



Touchscreen II
System Console

HP 3000 SERIES 68 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

MPE-V

The Series 68 runs MPE-V/E as its standard operating system. If you wish to substitute MPE-V/P, order Option 411 with product 32468C (new system orders) or with 32468CH (box swap upgrade orders).

MPE Media Products

One MPE Media Product **MUST** be ordered with every Series 68 system to designate which version of the operating system should be shipped with the system (MPE-V/E or MPE V/P). The two MPE Media Products are 51450A (MPE-V/E) and 51451A (MPE-V/P). Option 604 must be ordered to designate the Series 68; Option 051 should be ordered to specify 1600 cpi media. The operating system will then be shipped directly to the customer on 1600 cpi magnetic tape.

Memory Expansion

One four megabyte module using 256 Kb RAM fault-control memory is supplied with the System Processor Unit. System memory sizes of 4 - 16 Mb are supported in 1 Mb increments, with any mix of 1 Mb and 4 Mb boards. Expansion beyond 8 Mb requires MPE-V/E U-MIT or later.

Additional memory may be added by ordering product 30142A (1 Mb memory expansion module) or 30165A (4 Mb memory expansion module). Memory boards are configured into the CPU card cage and do not use I/O bay card cage slots. Any 4 Mb boards must precede 1 Mb boards in the CPU card cage memory slots.

For the purpose of correct ordering, it is not necessary to be concerned with the configuration of cards in the CPU card cage. CPU card cage slots are specifically designed for particular cards. As long as the I/O and memory support limits described in this guide are followed, you will not exceed the capacity of the CPU card cage.

I/O Bay Card Cages

Ordering

The Series 68 (product 32468C for new orders or product 32468CH for box swap upgrades) comes standard with one I/O bay including card cage. To order the optional second or "Auxiliary" I/O bay including card cage with the initial system order, please specify Option 250 on product 32468C or 32468CH.

For a Series 68 installed with only the standard I/O bay, the optional auxiliary I/O bay can be added later by ordering either product 30464A or 30464B. Check with your CE if there is any question as to which product to order. The "A" or "B" designation relates to the type of power supplies used. You will encounter an "A" system only when the system was a Series 64 and has been field upgraded to a Series 68. Note, however, that not all upgrades from the Series 64 have the "A" power supplies. "B" type Series 64s were first shipped in April, 1983.

Slot Availability

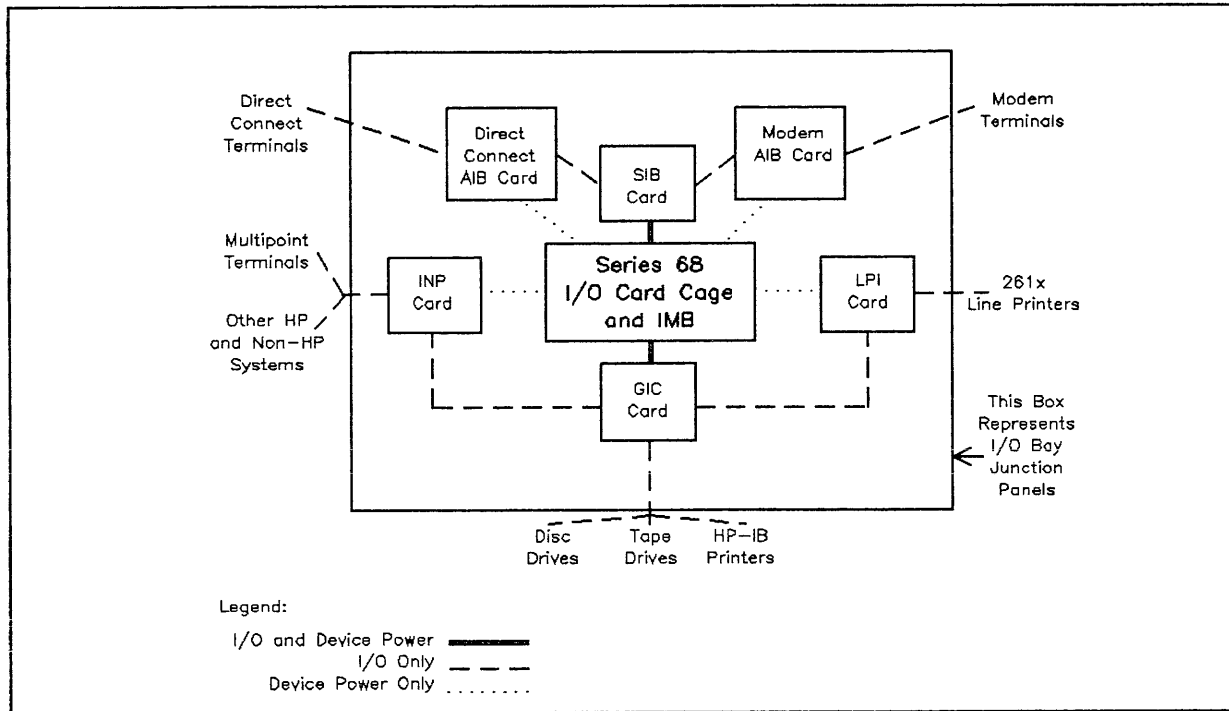
With the standard I/O bay card cage the Series 68 has a total of 24 I/O card slots; with the auxiliary I/O bay card cage, the total number of I/O slots increases to 48. These card slots are available to supply power to the following cards/boards:

- Intermodule Bus (IMB) interface cards (30143A)
- ATP/System Interface Boards (SIBs) (30144A)
- ATP/Direct Connect or Modem Port Controllers (30145A and 30155A, respectively)
- General I/O Channel (GIC) cards (30079A)

- Network Link/Intelligent Network Processor (INP) cards (formerly product 30020B)
- Local Area Network Interface Controller (LANIC) cards (included in 30242A)
- 261x Line Printer Interface (LPI) cards (26069A, which are included with the 261x printer product)

Five card cage slots in the standard I/O card cage will be filled by one IMB interface card (in slot 24), and two GICs, (all three of which are standard on the system) and by one SIB and one AIB (both of which must be ordered separately). When the two I/O bay configuration is ordered, these five cards are configured in the first I/O bay card cage, and one additional IMB interface card is configured in slot 24 of the second I/O bay card cage.

Conceptual Schematic of Series 68 I/O Configuration



The Intermodule Bus (IMB)

IMBs allow GICs, SIBs, and the LANIC in the I/O bay card cage to communicate with the CPU and Memory Modules in the CPU card cage. INPs, AIBs, and 261X LPIs do not communicate directly with an IMB system. Through internal, inter-board cabling, INPs and 261X LPIs connect to GICs. In a similar manner, AIBs connect to SIBs.

Each Series 68 I/O bay card cage requires at least one IMB to communicate with modules in the CPU card cage. These IMBs consist of an IMB interface card, a data path or bus embedded in the backplane, two cards configured in the CPU card cage (a central system bus interface card and an I/O buffer board), and two cables.

An IMB is supplied standard with each I/O bay ordered, and its interface card must be configured in slot 24 of each card cage. One additional IMB can be ordered as a separate product. This single, optional IMB can be installed as a second IMB on either one of the I/O bay card cages. (This IMB is known as the "I/O Adapter Module", product 30143A.) This optional IMB may help improve

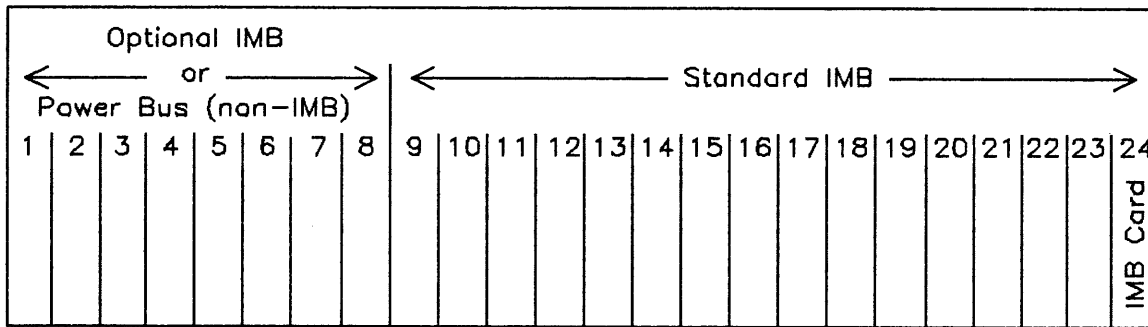
performance on large configuration systems and systems with heavy I/O usage. To determine whether your system would benefit from the optional IMB, please consult with an HP performance specialist.

A maximum of two IMBs are supported on a Series 68 with one I/O bay. A maximum of three IMBs are supported on a Series 68 with two I/O bays. *Any system with 3 IMBs must run MPE-V/E. A maximum of 2 IMBs are supported on a system running MPE-V/P regardless of whether it has one or two I/O bays.*

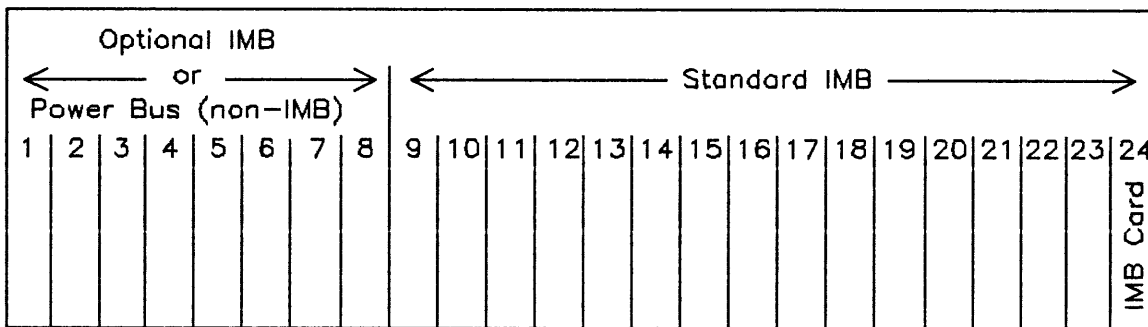
The optional IMB interface card must be configured in slot 8 of either I/O card cage for SIBs and GICs to be configured in slots 1 through 7. When there is no IMB interface card in slot 8, slots 1 through 8 act only as a power bus supplying power to AIB, INP, and 261X LPI cards.

Please photocopy this page and use it as an I/O bay card cage configuration worksheet:

Standard I/O Bay I/O Card Cage



Auxiliary I/O Bay I/O Card Cage



Please check to see that your configuration does not violate the following card cage rules. Except for the restrictions imposed by this set of rules, cards may be configured anywhere in the card cage.

I/O Bay Card Cage Rules

- IMB interface, GIC, SIB, AIB, INP, LANIC, and LPI cards each require one slot.
- One IMB comes standard with each I/O card cage and must be placed in slot 24. One optional IMB can be configured in either (but not both) I/O card cage. This optional IMB must be placed in slot 8 in order for the GICs and SIBs to be configured in slots 1 to 7. When not configured with an IMB interface card, slots 1 through 8 simply supply power and support only AIBs, INPs, and 261x LPIs.
- AIBs and their controlling SIB must be adjacent to one another.
- INPs cannot be placed side-by-side in slots 1 and 2. The same is true of slots 9 and 10.
- The LANIC card must be placed in the I/O portion of the card cage and be connected to the IMB.

Remember to include the two standard GICs and the separately ordered SIB and AIB for the minimum system configuration.

Junction Panels

Junction panels are used in the connection of GIC, LANIC, INP, AIB, and LPI cards to peripherals, terminals, or other systems. The number of these devices permitted in a configuration may be restricted by the number of junction panel spaces available. Junction panels are found on the outside ends of each I/O bay and allow external cabling for terminals, peripherals and other systems to connect to internal system cabling.

Each I/O bay provides 48 junction mounting panels for a total of 96 junction mounting panels in the two I/O Bay Series 68 configuration. On each bay the 48 mounting panels of the junction panel are separated into two sets of 24 mounting panels, one above the other.

Please photocopy this page and use it as a junction mounting panel worksheet.

Standard I/O Bay Junction Panel

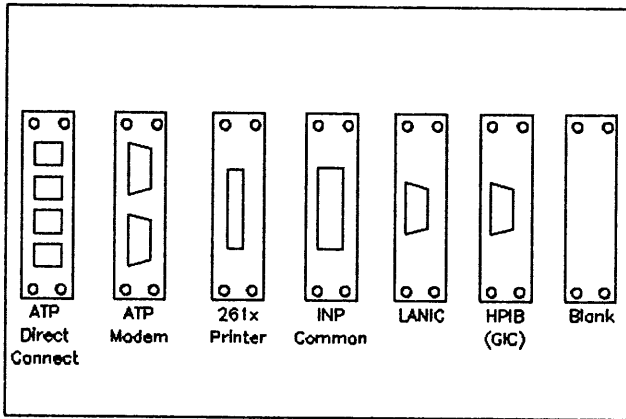
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Auxiliary I/O Bay Junction Panel

Junction Panel Rules

- There are 48 mounting panels per I/O bay junction panel.
- GIC, LANIC, INP, and LPI cards that are connected to external devices each require one mounting panel.
- Direct Connect ATP products each require 3 mounting panels that must be side-by-side. Each Direct Connect product supports up to 12 terminal ports or 4 terminal ports per mounting panel.
- Modem Port ATP products each require 6 mounting panels which must be side-by-side. Each Modem product supports up to 12 terminal ports or 2 terminal ports per mounting panel.
- Mounting panels can only be used to connect devices to GIC, LANIC, INP, AIB, and LPI cards that are in the same I/O card cage.
- *• The bottom 12 mounting panels on the standard I/O bay are reserved for connections to GICs, LANICs, INPs, and LPIs.

Junction Mounting Panel Types



LANIC

The Local Area Network Interface Controller (LANIC) is a hardware controller for interfacing to the Local Area Network (LAN). Each LANIC uses one I/O card slot and connects to one LAN. A maximum of one LANIC card per system is supported.

The LANIC connects directly to an Intermodule Bus (IMB) and is a high-speed channel. The other type of high-speed channel is a GIC with one or more high-speed devices attached.

A Series 68 system supports up to three IMBs. *Each IMB can support a maximum of two high-speed channels.* This maximum can be either two high-speed GICs, or a high-speed GIC and a LANIC. A maximum system (three IMBs) can have either six high-speed GICs or five high-speed GICs and a LANIC.

General I/O Channels

A General I/O Channel (GIC) is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the Series 68. Each GIC is a board that uses one I/O bay card slot, supports one HP-IB cabling system, and uses one junction mounting panel when connected directly to external devices. An HP-IB system may be used to connect from one to eight HP-IB peripherals. Peripherals connected to one GIC are linked together with HP-IB cables and connect to a single mounting panel. The number of peripherals which may be connected to a single GIC depends on peripheral speed, cable length restrictions, and performance considerations.

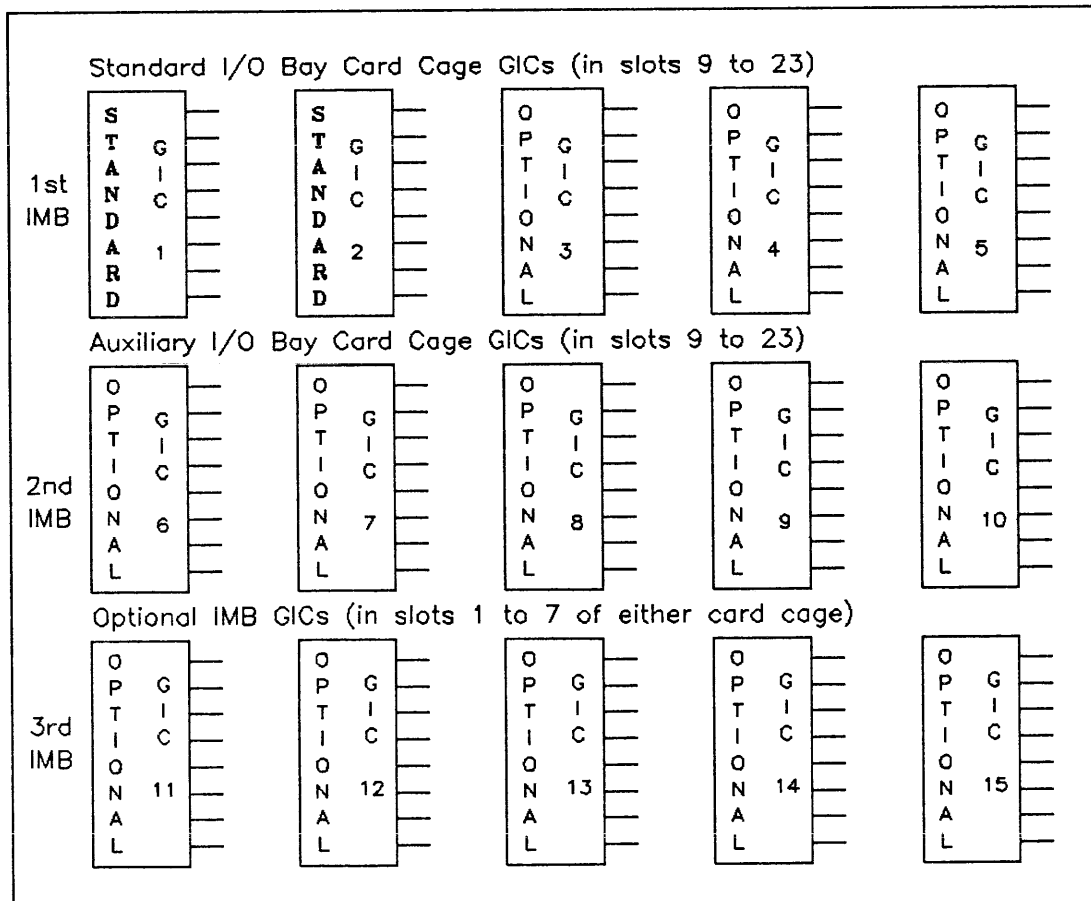
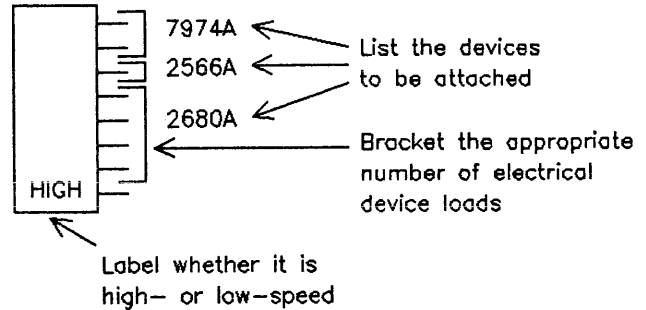
Up to five GICs are supported on each IMB. Thus, in the maximum configuration with two I/O bays and three IMBs, a maximum of 15 GICs are supported. Order product 30079A to obtain a GIC. You must also specify Option 064 to obtain the internal GIC cable for the Series 68. See the Chapter One Appendix for details on supported peripherals and cabling requirements.

Summary: GIC Attachment Restrictions

- A maximum of six devices may be attached to a GIC with one or more high-speed devices attached.
- Unless other restrictions apply, low-speed peripherals can share a GIC with high-speed devices.
- Some low-speed devices require a dedicated GIC to which no other devices may be attached. (See the GIC Interface table in the Chapter One Appendix.)
- The 2608A line printer cannot be attached to a GIC with high-speed devices.
- The 2608S line printer can share a GIC with all high-speed devices except the 7906M, 7920M, and 7925M family of disc drives.

- It is not recommended that the same GIC be used for connecting the main system backup tape drive and the system disc (LDEV1). System performance may be degraded with such a configuration when the tape drive is in use.

How to Use the GIC Worksheet



PERIPHERALS

Disc Drives

One 7920M (50 Mb), 7925M (120 Mb), 7914CT (132 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7914ST (132 Mb), 7933H (404 Mb), or 7935H (404 Mb) disc drive is required as the system disc (LDEV1) and must be ordered separately for the Series 68.

The following table lists the maximum number of each type of disc drive that can be configured on the Series 68 with one or two I/O bays:

Series 68 Maximum Disc Drive Configuration:

	1 I/O Bay	2 I/O Bays
7911P/7912P/7914P/ 7914TD/7914ST Discs w/Cartridge Tape	1	1
Total 7911P/7912P	1	1
7914TD Discs	2	2
7914CT Discs	4	4
7914ST Discs	4	4
Total 7914TD/7914ST/ 7914P/7914CT Discs	8	8
7945A Discs	4	4
792x Master Discs	16	16
792x Slave Discs	14	14
793x Discs	16	24
Total Discs	16	24

The 7920M and 7925M are master disc drives and can each support up to seven slave disc drives. These slave drives are ordered as 7920S or 7925S

and do not have their own controllers. They connect to the controller in the master drive and are not part of the HP-IB cabling. The 7945A, 7911P, 7912P, 7914P, 7914TD, 7914CT, 7914ST, 7933H, and 7935H disc drives each have their own controllers.

With the 7920M and 7925M, Option 102 must be ordered to obtain the HP-IB interface and a 2m HP-IB cable. Each 7920S and 7925S comes standard with two non-HP-IB cables, a disc drive multiunit cable and a data cable. Both are used to connect to 7920M or 7925M master drives.

Each 7933H and 7935H disc drive is shipped with a 1m HP-IB cable standard. The 7945A is not supported as LDEV1 on the Series 68.

Disc performance may vary depending on the specific configuration of discs, controllers, GICs, and IMBs. Check with an HP performance specialist if you have performance concerns.

Integrated Storage Units

The 7911P, 7912P, and 7914P are integrated storage units that include both a Winchester disc drive and an integral Cartridge Tape unit standard. Only one 7911P or 7912P is supported on the Series 68; it must be ordered with the cartridge tape unit; and it cannot be configured as the system disc (LDEV1). A maximum of eight 7914Ps are supported. A 7914P hard disc drive can be configured as the system disc (LDEV1). Because only one cartridge tape unit is allowed on the system, additional 7914P units must be ordered with the cartridge tape delete Option 140 specified.

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a 1m HP-IB cable standard. If you order the cartridge tape unit on any of these integrated storage units, you must also order Option 001 which supplies a controller for the cartridge tape unit and a 1m HP-IB cable. *The cartridge tape unit requires its own dedicated GIC.*

The 7914TD and 7914ST combine into a single package a 7914 rackmounted disc drive, a 1/2" tape drive, and an optional cartridge tape unit (Option 002). The 7914TD includes a 7970E master tape drive. The 7914ST includes a 7974A tape drive. A second 7914 disc drive can be added

to the same cabinet by specifying Option 114. (Option 114 will automatically delete the cartridge tape unit for the additional disc drive.) The 7970E master tape drive will support up to three slave devices. The 7914TD and 7914ST are supplied with HP-IB cables standard -- one 2m cable for the disc drive, a 6m cable with the 7970E tape drive, or a 2m cable with the 7974A tape drive. When Option 002 is ordered, the cartridge tape drive, a controller, and a 1m HP-IB cable is shipped.

The 7914CT combines the 7914 disc drive with a 9144A cartridge tape unit which does not require a dedicated GIC or separate controller (do not confuse 7914CT with cartridge tape in 7914P disc drive). Two 1m HP-IB cables are shipped with the 7914CT. The 9144A cartridge tape unit is not supported as a cold load device on the Series 68. In addition, it cannot be placed on the same GIC as either the system disc or the cold load device.

Magnetic Tape Drives

A 7970E, 7914TD, 7971A, 7974A, 7914ST, 7976A, or 7978A magnetic tape drive is required for system backup and distribution of software for all Series 68s and must be ordered separately. Both the 7914TD and 7971A include a 7970E tape drive. The 7970E master tape drive can support up to three slave tape drives. The 7914ST includes a 7974A tape drive. The 7974A, 7976A and 7978A do not support slave drives; each drive has its own controller.

The following table lists the maximum number of each type of tape drive that can be configured on the Series 68 with one or two I/O bays. You may have one integrated cartridge tape drive (in 7911P, 7912P, or 7914P) in addition to these maximums.

Series 68 Maximum Tape Drive Configuration:

	1 or 2 I/O Bays
9144A Cartridge Tape Drive	4
7970E/7971A/7914TD Masters	2
7970E/7971A Slaves	6
7974A/14ST Tape Drives	4
7976A Tape Drive	2
7978A Tape Drive	4
Total Tape Drives	8

The 7970E master tape drive comes with a 6m HP-IB cable standard. Each 7970E slave drive comes with a 6.1m (non-HP-IB) multiunit cable for tape drives.

The 7971A is a package of one or two 7970E tape drives in various master and/or slave drive configurations. Please see the HP 3000 Price Guide for the list of your options. Included with the options chosen are the appropriate cables.

The 7914TD includes a 7970E tape drive. The 7914ST includes a 7974A tape drive. For a description of the 7914TD and 7914ST configuration options see the paragraph in the Integrated Storage Unit section.

The 7974A, 7976A, and 7978A are shipped with a 2m HP-IB cable standard. Each 7976A must include Option 616 for the Series 68. The 7974A and 7978A do not require a system option. You must specify Option 800 to obtain the 800 cpi capability on the 7974A.

The 9144A one-quarter inch cartridge tape drive is supported on the Series 68 but not as a cold load device. In addition, it cannot share a GIC with either the system disc or the cold load device.

Up to four 9144As are supported on the Series 68. The 9144A is shipped without a HP-IB cable; please see Page 4-8 for cabling information.

System Printers

The following table lists the maximum number of each type of system printer that can be configured on the Series 68 with one or two I/O bays:

Series 68 Maximum Printer Configuration:

	1 or 2 I/O Bays
Line Printers:	
2608A, 2608S	4
2563A/2565A/2566A	4
2611A/2613A/2617A/ 2619A	4
Total Line Printers Supported	8
Intelligent Page Printers:	
2680A	2
2688A	4(5)*
Total Page Printers	4(5)*
Total System Printers Supported	10

* HP-IB Extender support in parentheses.

The 261X family of line printers does not connect directly to a GIC; rather, each one uses a 1m HP-IB ribbon cable between the 26069A translator and the GIC card. The line printer itself can be up to 500 feet away. The printer is connected by a parallel differential current driven line to a separate junction mounting panel. An internal cable connects the interface card to the junction mounting panel.

To obtain the 26069A interface card, internal cables, and external 1.5m parallel differential cable, order Option 364. Cabling beyond 1.5m must be ordered as a special from Boise Division.

The 2608A, 2608S, 2563A, 2565A, and 2566A are dot matrix line printers that attach directly to

GICs. They do not require an additional interface card in the I/O card cage, nor do they use an extra junction mounting panel space beyond the one used by the GIC. The standard 2608A includes an HP-IB interface and a 2m HP-IB cable. For the 2608S and 256X, order Option 364 to obtain the HP-IB interface and 4m HP-IB cable. Note that the 2608S cannot share a GIC with a 7920M or 7925M disc drive. Furthermore, the 2608A cannot be configured on a GIC with high-speed devices attached.

If the 2608S or 2563A is to be configured as a multipoint printer, it will be connected to an INP. Please see the Output Spooling section of this chapter.

Order Option 364 to obtain the Series 68 subsystem with 8m HP-IB cable for the 2680A. Specify Option 099 with the 2680A to replace the 8m cable with a 2m cable. This option is not available on the 2688A. The 2680A and 2688A are similar to the 2608A/S in that they attach directly to a GIC and do not require an interface card in the I/O card cage.

The 2563A, 2565A, 2566A, 2680A, and 2688A printers may be connected via HP-IB Extenders. See the HP-IB Extender Section in the Chapter One Appendix.

Other Peripherals

Flexible Disc Drive

Only one 1.2 Mb flexible disc drive is supported on the Series 68. Product 9895A must be ordered with Option 010 to specify a single master drive. The flexible disc drive attaches to a GIC. Order the HP-IB cable separately.

Card Reader

The 30106A 80-column card reader interfaces to the Series 68 through a dedicated GIC. You must have either Option 333 or the 30309A upgrade kit to provide a 2m HP-IB cable. When a card reader is configured on the system, a power line conditioner is required. The 30106A and 30309A are no longer orderable. (They will be supported until December 31, 1989.)

Power Line Conditioners

In many areas AC power line disturbances can interfere with system operation, possibly causing data corruption or even system failures. "Dirty" lines from local utilities or noise generated by electrical equipment on customer premises can cause these problems. Please consult with your site preparation CE concerning any such power line conditioner needs you may have. Your CE will have a list of recommended power line conditioners that may be purchased through local third parties.

Multiple System Access Selector

The 26075A Multiple System Access Selector is a switch box that allows up to three HP 3000s to share either a 2680A or a 7976A. An operator can manually switch the peripheral to be active on any one of the sharing systems. A maximum of one (1) 26075A may be connected to a system. Other devices on the same GIC must be "downed" when switching the 26075A. Therefore, the 26075A cannot be on the same GIC as a disc drive. When determining HP-IB cable length, include 0.5 meter for the 26075A.

Data Communications

Terminal Connection

Point-to-point connections are made to the Series 68 through the Advanced Terminal Processor (ATP). The ATP supports modem, RS-232, and RS-422 connections. Multipoint connections are made to the Series 68 through the MTS Modem Link or the MTS Data Link in combination with Multipoint Terminal Support Service Software. The Link products provide an INP board and related cables.

The following table summarizes the number of terminals supported on the Series 68:

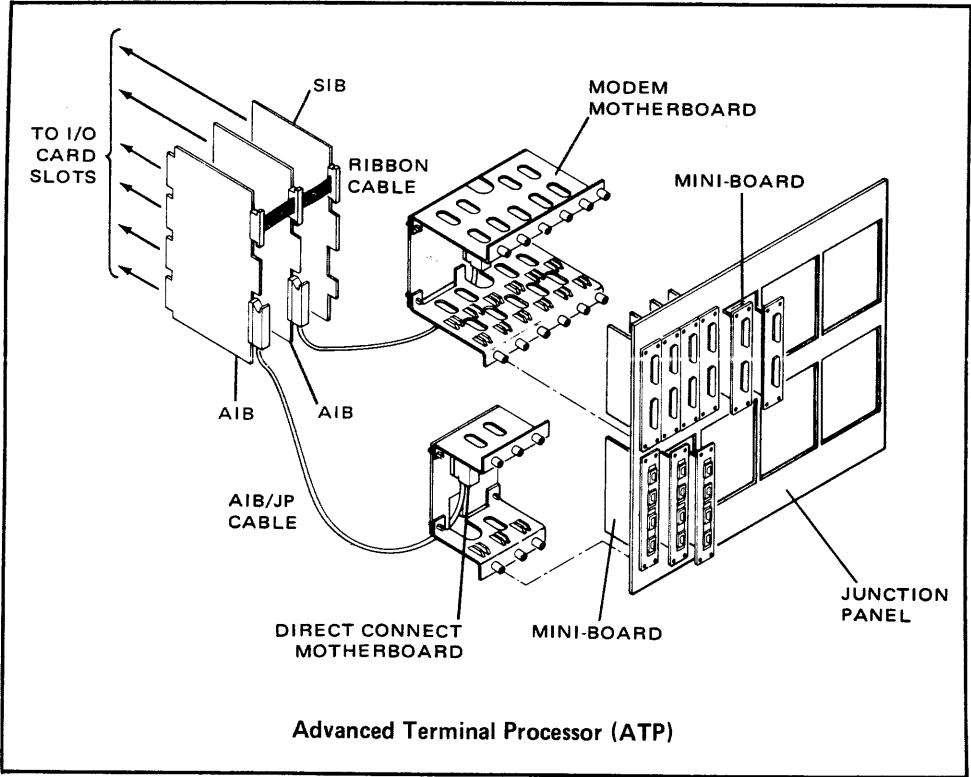
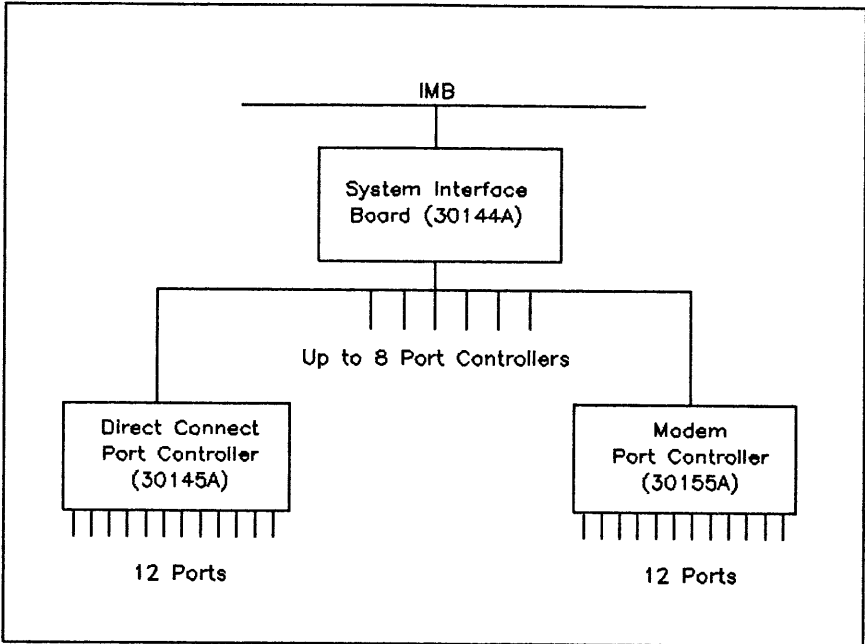
Series 68 Maximum Terminal Configuration:

	1 I/O Bay		2 I/O Bays	
	MPE-V/P	MPE-V/E	MPE-V/P	MPE-V/E
Direct Connect	144	144	144	336
Modem	84	84	143	168
Total Pt-to-Pt	144	144	144	336
Multipoint	151	335	151	335
Total	152	400	152	400

When running MPE-V/P, a maximum of 110 terminals can be logged on the system. When running MPE-V/E, 400 terminals can be logged on. While 400 terminals may be simultaneously logged on to a Series 68 running MPE-V/E, performance considerations may limit the number of simultaneous active sessions. The number of active sessions that can be supported is dependent on both the application and response time requirements. For many customer applications, 200 active sessions is a realistic maximum. This active session limit includes all point-to-point, multipoint, system console, and DS virtual terminals. Please consult with an HP performance specialist to determine the number of sessions that can be simultaneously active with a particular application.

The number of terminals per multipoint line is normally determined by response time considerations, but may be restricted by the specific cabling option chosen. You may also use the 2333A multipoint or 2334A X.25 cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 68 via the MTS Data Link or via modems and phone lines. The 2334A permits a group of up to 16 devices to communicate with the Series 68 via X.25 Packet Switched Networks.

ATP Subsystem Structure



System Console

One point-to-point connected 45851A Touchscreen II with 9123D disc drive must be ordered as the system console. In addition, one of the following cables must be ordered: 13242x (direct connect RS-232), 13242P (direct connect RS-422), 13242N (U.S. Modem), or 13242M (European Modem). For console printing, the 2934A (Option 046) dot-matrix printer or the 2225A Thinkjet printer are supported with the Touchscreen II, and must be connected via the HP-IB interface.

The Series 68 Console Communications Program is also required. It is contained on a 3.5-inch diskette which is supplied with the Series 68 or may be obtained by ordering P/N 32342-60002.

Also supported as the system console are the 2647F with Option 890 and the 2642A with Option 964.

Advanced Terminal Processor (ATP)

As shown in the preceding figure, the ATP on the Series 68 consists of three products: ATP System Interface Board (SIB), 30144A; ATP Direct Connect Port Controller, 30145A; and ATP Modem Port Controller, 30155A. Each Direct Connect or Modem Port Controller product includes both an Asynchronous Interface Board (AIB) (which occupies a slot in the I/O bay card cage) and the associated junction mounting panel motherboard and terminal port mini-boards. *The ATP Expansion Packages (30273A and 30274A) are NOT supported on the Series 68.*

The minimum required ATP subsystem on the Series 68 consists of one SIB and one Port Controller Product. One modem ATP product is recommended to connect the Support Link Modem for remote diagnostics; however, it is not required. If a Modem Port Controller is not configured, the Support Link Modem will be connected to the DCU port. This connection method will cause system hardware status reports to be unavailable while the diagnostics are being run.

The minimum ATP configuration requires two I/O slots, supports up to 12 terminals, and uses three junction mounting panels for the direct connect product or six junction mounting panels for the

modem product. A maximum subsystem consists of one SIB and eight port controller products, supporting 96 terminals and consuming nine I/O slots. For the maximum direct connect terminal configuration in two I/O bays (336 terminals), three maximum ATP subsystems and one partial ATP subsystem are needed.

Each Direct Connect Port Controller supports RS-422 and RS-232 connections. This direct connect product comes standard with 12 RS-422 ports which can be converted to RS-232 ports in groups of four by ordering Option 002, (which replaces an RS-422 mini-board with an RS-232 mini-board). Thus, 0, 4, 8, or 12 RS-232 ports may be ordered on a single Direct Connect Port Controller by specifying the appropriate quantity of Option 002 (0, 1, 2, or 3).

When ordering a Series 68, it is important to note that it does not automatically come with junction panels. The junction panel is ordered at the time the ATP is ordered. This is done by ordering either Option 001 or 003 with product 30145A or 30155A. The difference between Option 001 and Option 003 is that Option 001 provides the junction panel for the standard I/O Bay and Option 003 provides the junction panel for the auxiliary I/O Bay (30464A/B or 32468C Option 250).

To add the Auxiliary I/O Bay (30464A/B) and the ATP to a Series 68 system that has already been installed, specify Option 003 with product 30145A or 30155A. If ordering the Auxiliary I/O Bay without an ATP, you must specify Option 251 on either product 30464A/B, 30468A/B or 32468C/CH to obtain the junction panels.

Support Link Modem

Under the HP Remote Support Program, all non-upgrade system orders will be shipped with a free HP Support Link Modem (35031A).

Output Spooling

To avoid having a terminal or batch process tied up as a real time printer server, and to allow multiple processes access to a printer, MPE can "spool" output to a print file or "spool file". When output is spooled, the SPU is not delayed by a

low-speed output device; instead, the output is written to a temporary disc file. When the print job has been spooled and the output device becomes available, MPE manages the printing. This leaves the terminal or batch process free to do other work.

Spooled Output Devices

There are several types of spooled output devices. This section discusses only printers. Note that any I/O device configured as a printer may be spooled; however, MPE will not necessarily support the full feature set of that printer.

A) SYSTEM PRINTERS

System printers are printers that guarantee data integrity, ensure print job independence, and report operational status to the system. System printers include the following HP-IB Printers: 256x, 261x type, 2608A, and 2608S line printers; and 2680A and 2688A page printers. These printers are connected to a GIC via HP-IB cabling.

B) MTS PRINTERS

MTS printers can be connected to the HP 3000 in one of three ways: (1) directly connected to the multipoint line using an MTS interface in the printer, (2) through a 2333A Multipoint Cluster Controller using a standard RS-232-C interface in the printer, or (3) to the second port of a 2624B terminal (connected directly to a multipoint line) using the Bypass Mode of the 2624B and a standard RS-232-C interface in the printer. Printers and terminals can be linked together to form a workstation network using either the MTS Data Link Connection or the MTS Synchronous Modem Link.

The 2563A, 2608S, 2933A and 2934A printers, with their respective multipoint interfaces, can all be attached directly to a multipoint line. Using the 2563A or the 2608S in this configuration provides a high-speed remote printing capability. A dedicated line of at least 9600 baud is recommended to achieve up to 300 lpm with the 2563A and a 19,200 baud line is recommended to achieve up to 400 lpm with the 2608S.

The 2333A Multipoint Cluster Controller provides local or remote control for up to 16 RS-232-C

point-to-point devices (or 32 model 3081A terminals connected to eight Port Current Loop Interface cards) when used in conjunction with either the MTS Data Link Connection or the MTS Synchronous Modem Link. The 2563A, 2601A/02A/31B, and the 2932A/33A/34A printers with RS-232-C interfaces are supported by the 2333A as XON-XOFF printers. As with direct connect multipoint printers, printers on a 2333A can either be spooled or under the control of an application program.

Another way in which printers are supported in an MTS environment is through connection to the second port of a 2624B terminal. This is an RS-232-C printer connection that allows the user to work at a terminal while other users can access the printer by taking advantage of the Bypass Mode feature of the 2624B. Both spooling and dedicated application usage are supported. Character printers (as opposed to line printers) are supported in this configuration.

The number of MTS printers should be limited to four per MTS line, and a maximum of 16 MTS printers per system. The aggregate baud rate of the printers should not exceed the baud rate of the MTS line to which they are attached. The performance of printers on an MTS line is dependent upon the speed of that line, the printer's priority, the traffic pattern, and the processor load.

C) SERIAL CONNECTED PRINTERS

1) 2631B/293x Printers. These printers have an RS-232-C interface supplied standard. Referred to as "local" or "remote" spooled, these printers may be connected point-to-point either by modem or hardwired.

2) Generic Serial Printers (including 2601A and 2602A). These printers have RS-232-C data communications ports supplied standard. To use the MPE spooler, they must be attached in a local point-to-point configuration.

3) Serial Connected Line Printers (2563A). The 2563A can be spooled in a hardwired RS-232 (Option 049) or RS-422 (Option 050) configuration. Modem connection is not supported.

4) Serial Connected Page Printers (2687A). The 2687A can be spooled in a hardwired RS-232-C or RS-422 configuration. Modem connection is not supported.

While printers usually are configured to use the spooler, most can also be configured to run "hot" under programmatic control. The 2680A and 2688A are the exceptions. They must be spooled; running "hot" is not permitted.

Series 68 Maximum Spooled Device Configuration:

	<u>1 or 2 I/O Bays</u>
SYSTEM PRINTERS:	
Line Printers: (HP-IB)	
2608A/S	4
2563A/2565A/2566A	4
261x	4
Total Line Printers	8
Page Printers:	
2680A	2
2688A	4(5)*
Total Page Printers	4(5)*
Total System Printers	10
SERIAL CONNECTED PRINTERS:	
2601A/2602A/2631B	16
2932A/2933A/2934A	16
2563A	6
2687A Page Printer	4
Total Serial Connected Printers:	16

* HP-IB Extender support in parentheses.

The spooled device support numbers stated in the table above are based on performance considerations.

If the system is running MPE-V/P, operating system table sizes could limit the number of simultaneously active spooled printers. MPE-V/P operating system tables effectively limit the total number of spooled printers on the system to 16.

In order to determine the maximum number of spooled devices which can be configured on an MPE-V/P system, the following formula must be used:

Max. Spooled Devices =

$$256 - (1.25 \times \#Sessions \text{ and Jobs}) - \#INPs$$

16

where: #Sessions and Jobs = the maximum number of sessions and jobs which will be supported on the system

#INPs = the number of Network Links/INPs which will be configured on the system

After plugging in the values for the number of sessions and jobs and also the number of INPs, the maximum number of spooled devices will have been derived. *Take the result and round it down to the nearest whole number. It is evident from this formula that the number of spooled devices a system can support will vary with the customer's configuration and application mix.*

e.g. *A system running at peak periods, with 28 sessions, 4 batch jobs and 3 INPs configured, can support the following number of spooled devices:*

Max. Spooled Devices =

$$\frac{256 - (1.25 \times 32) - 3}{16} = 13.3$$

Rounding this result down means that a maximum of 13 spooled devices can be supported on the system.

With the expanded tables of MPE-V/E there is no longer a software tables limitation that further restricts the number of spooled devices on a Series 68 running MPE-V/E beyond the number of devices listed in the table above. System performance considerations are responsible for restricting the number of spooled devices to these limits. Note that the appropriate table structure must be configured for this number of spooled devices to be supported.

Serial Connected Printers and Plotters

The Series 68 supports remote spooled 293x or 2631B serial printers through the ATP via RS-232-C connections. When used as remote spooled printers, they are connected to an ATP direct connect port via hardwired cable or to an ATP modem port via a modem. 2631B printers must include Option 331 to obtain the RS-232-C remote spooled printer capability.

The Series 68 can support 2601A and 2602A daisywheel printers via the ATP through local direct connection only. Modem connection is not supported. The 2601A, 2602A, 2631B, and 293x printers can also be attached as slave devices to terminals under the control of application programs.

The 2563A line printer is also supported on the Series 68 in a serial configuration. RS-232-C and RS-422 hardwire connections are available; modem connections are not supported. One must specify Option 049 for RS-232-C and Option 050 for RS-422 interfaces in the 2563A printer. Cables must be ordered separately; see Page 4-30 for further details. Do not order the subsystem option (Option 364) for the 2563A when it is being used as a serial printer.

The 2687A laser printer is only available on the Series 68 as a serial printer. Both RS-232-C and RS-422 hardwired connections are supported, but modem connection is not available. Option 364 must be specified to obtain the Series 68 subsystem. Cables need to be ordered separately; see Page 4-30 for a list of available cables for the 2687A.

HP plotters can be configured as slave devices to terminals and personal computers or as eavesdrop devices between the terminal and the ATP. As slave devices, both HP-IB and RS-232-C connections may be possible depending upon the individual plotter. Only RS-232-C connections are available in an eavesdrop configuration or when connected point-to-point to an ATP.

Network Link Products (INPs)

A maximum of 16 Network Link products (sets of Link hardware) are supported on a Series 68 with the standard I/O bay. An additional eight, for a total of 24, Links can be operated concurrently on the Series 68 when the auxiliary I/O bay is used and the system is running MPE-V/E. A maximum of 16 sets of Link hardware are supported on a Series 68 running MPE-V/P regardless of whether the system has one or two I/O bays.

Each set of Link hardware includes an Intelligent Network Processor (INP), and requires one I/O card slot in the Series 68 card cage and one junction mounting panel. The INP counts as one device load on a GIC and is considered a low-speed device.

A 1m HP-IB ribbon cable for connecting the INP to a GIC, and a non-HP-IB cable for connecting the INP to the junction mounting panel, are included. An external cable is also included but must be specified by a particular option when ordering based on the connection desired. Please refer to the latest HP 3000 Price Guide for a complete list of options.

Series 68 Configuration Worksheet

Product Number	Description	Quantity
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I. Memory Expansion.

	Total Memory Size (Standard memory is 4 Mb, MAX=16)	1 _____
30142A	1 Mb Memory Module for Series 6X	2A _____
30165A	4 Mb Memory Module for Series 6X	2B _____

II. Disc Drives.

A. Storage Units *with* Integrated Cartridge Tape:

One of the following may be included:

7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3A _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3B _____
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3C _____
7914ST Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Cartridge Tape (Opt. 002, MAX=1.) Because the 7914ST may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check lines 4B and 9C to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), tape drive (2m), and disc drive (2m). (Also enter on line 9C in Tape Drive section.)	3D _____
7914TD Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Cartridge Tape (Opt. 002, MAX=1.) Because the 7914TD may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check lines 4C and 9A to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), tape drive (2m), and disc drive (6m). (Also enter on line 9A in Tape Drive section.)	3E _____
	Total Integrated Storage Units <i>with</i> Cartridge Tape (Sum of Lines 3x, MAX=1)	3 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
B. Mass Storage Products (No Integrated Cartridge Tape):		
7914P	132 Mb Integrated Storage Unit (Opt. 140, Cartridge Tape Deleted, MAX=8) (A 1m HP-IB cable is included.)	4A _____
7914ST Disc	132 Mb Mass Storage Subsystem (MAX=4) (Without Opt. 114, this subsystem contains one drive. With Opt. 114, the subsystem contains <i>two</i> drives.) Enter the <i>total</i> number of disc drives on line 4B. The number of 7914ST products ordered may be less depending on the number of subsystems with two drives. (For cabling information, see line 3D.) (Also enter on line 9C in Tape Drive section.)	4B _____
7914TD Disc	132 Mb Mass Storage Subsystem (MAX=2) (Without Opt. 114, this subsystem contains one drive. With Opt. 114, the subsystem contains <i>two</i> drives.) Enter the <i>total</i> number of disc drives on line 4C. The number of 7914TD products ordered may be less depending on the number of subsystems with two drives. (For cabling information, see line 3E.) (Also enter on line 9A in Tape Drive section.)	4C _____
7914CT Disc	132 Mb Integrated Storage Unit containing 9144A Cartridge Tape. (MAX=4). Two 1m HP-IB cables are included. (Also enter on line 9E in Tape Drive section.)	4D _____
	Total 7914P/14ST/14TD/14CT Disc Drives (MAX=8, total of lines 3C, 3D, 3E, and 4x)	4 _____
7920M	50 Mb Master Disc Drive (A 2m HP-IB cable is included with Opt. 102.) (MAX=16)	5A _____
7925M	120 Mb Master Disc Drive (A 2m HP-IB cable is included with Opt. 102.) (MAX=16)	5B _____
	Total 7920/25 Master Disc Drives (Sum of Lines 5x) (MAX=16)	5 _____
7920S	50 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	6A _____
7925S	120 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	6B _____
	Total 7920/25 Slave Disc Drives (Sum of Lines 6x) (MAX=14. This maximum will require two 7920/25 Master Disc Drives because each master drive supports up to 7 Slave Drives)	6 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
7933H/ 7935H	404 Mb Disc Drive (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system) (A 1m HP-IB cable is included.)	7 _____
	Total Disc Drives & Integrated Storage Units (Sum of lines 3A, 3B, 4, 5, 6, and 7) (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system)	8 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
III. Magnetic Tape Drives.		
7970E/ 7971A/ 7914TD	1600 cpi Master Tape Drive Subsystem (MAX=2.) Each master supports up to three Slave Tape Drives. Each tape drive includes a 6m HP-IB cable. (Also enter 7914TD on line 3E or 4C.)	9A _____
7970E	Slave Tape Drive Subsystem (MAX=6) (A 6.1m multiunit cable is included.)	9B _____
7974A/ 7914ST	1600 cpi (800/600 cpi optional) Magnetic Tape Subsystem (MAX=4) (A 2m HP-IB cable is included.) (Also enter 7914ST on line 3D or 4B.)	9C _____
7978A/ 7978B	6250/1600 cpi Magnetic Tape Subsystem (MAX=4) (A 2m HP-IB cable is included.)	9D _____
9144A/ 7914CT	One-quarter (1/4) inch Cartridge Tape Drive. (Order cable separately with 9144A. Two 1m HP-IB cables are shipped with 7914CT.) (MAX=4)	9E _____
Total Magnetic Tape Drives (Sum of lines 9x, MAX=8)		9 _____

IV. System Printers.		
2608S	400 lpm Dot Matrix Printer (MAX=4). Option 364 includes a 4m HP-IB cable.	10A _____
2563A/ 2565A/ 2566A	300, 600, and 900 lpm Dot Matrix Printers (MAX=4) (A 4m HP-IB cable is included.)	10B _____
261xA	Line Printer Series (e.g., 2611A and 2619A) (MAX=4) (A 15m parallel differential cable is included with Option 364.)	10C _____
Total Line Printers (Sum of lines 10x, MAX=8)		10 _____
2680A	Intelligent Page Printer (MAX=2) (An 8m HP-IB cable is included with Option 364.)	11A _____
2688A	Page Printer (MAX=4; 5 via Extenders) (An 8m HP-IB cable is included with Option 364.) See discussion in Chapter One Appendix regarding connection of 2688A via HP-IB Extenders.	11B _____
Total Page Printers (Sum of lines 11x, MAX=4)		11 _____
Total System Printers (Sum of Lines 10 and 11, MAX=10)		12 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
V. Serial Printers.		
2601A	40 cps Daisywheel Printer (MAX=16) (2601A includes RS-232 cable)	13A _____
2602A	25 cps Daisywheel Printer (MAX=16) (Order cable separately.)	13B _____
293x	200 cps Dot Matrix Printer (MAX=16) (Order cable separately.)	13C _____
2563A	300 lpm Dot Matrix Printer (Opt. 049 for RS-232 or Opt. 050 for RS-422. Order cable separately.) (MAX=6)	13D _____
2687A	12 ppm Laser Page Printer (Opt. 364), (MAX=4) (Order cable separately.)	13E _____
	Total Serial Printers (Sum of lines 13x, MAX=16)	13 _____

VI. Other Peripherals.

9895A	Flexible Disc Drive (Opt. 010, MAX=1) (Order HP-IB cable separately.)	14 _____
26075A	Multiple System Access Selector (MAX=1) (Order cables separately.)	15 _____

Series 68 Configuration Worksheet

VII. Data Communications.

A. Workstations, Plotters, and Printers (Enter quantities in lines below):

NOTE: Cabling must be ordered separately for these devices!

	Connection Method				
		Pt-to-Pt with ATP			
			Direct Connect		
Product	Daisychain* Multipoint	Modem	Type 422	Type 232-C	Terminal Attached
Display Terminals 239x 2623A 2624B 2625A 2626A 2626W 2627A 2628A System Console (HP Touchscreen II)	N/A* N/A* _____ _____ N/A* N/A* _____ N/A*	_____ _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____ _____	N/A N/A N/A N/A N/A N/A N/A N/A N/A
Plotters 7470A 7475A 7550A 7580A/B 7585B	N/A N/A N/A N/A N/A	_____ _____ _____ _____ _____	N/A N/A N/A N/A N/A	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____
Data Collection Terminals 3075A 3076A 3077A 3081A	_____ _____ _____ _____	_____ _____ _____ _____	N/A N/A N/A N/A	_____ _____ _____ _____	N/A N/A N/A N/A
Subtotal (this page)	16A _____	17A _____	18A _____	19A _____	20A _____

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

Series 68 Configuration Worksheet

	Connection Method				
	Pt-to-Pt with ATP				
	Direct Connect				
	Daisychain* Multipoint	Modem	Type 422		Type 232-C
Serial Printers** 2932A 2934A 2563A 2601A 2602A	N/A _____ N/A* N/A*	_____ N/A N/A N/A	_____ _____ N/A N/A	_____ _____ _____ _____ _____	_____ N/A _____ _____
Page Printers** 2687A	N/A	N/A	_____	_____	N/A
Personal Office Computers Touchscreen (150)	N/A*	_____	_____	_____	N/A
Subtotal (this page)	16B _____	17B _____	18B _____	19B _____	20B _____
Subtotal (previous page)	16A _____	17A _____	18A _____	19A _____	20A _____
Totals (both pages)	16 _____	17 _____	18 _____	19 _____	20 _____

Line 16: MAX=335 (one or two I/O bays);

MAX=151 (one or two I/O bays with MPE-V/P).

Line 17: MAX=84 (one I/O bay); MAX=168 (two I/O bays);

MAX=143 (two I/O bays with MPE-V/P).

Sum of lines 17, 18, and 19: MAX=144 (one I/O bay or two I/O bays with MPE-V/P);

MAX=336 (two I/O bays)

Sum of lines 16, 17, 18, and 19: MAX=400 (one or two I/O bays)

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

** Note device maximums in Section V of worksheet.

Series 68 Configuration Worksheet

Product Number	Description	Quantity
B. Network Links:		
	HP to HP System Lines (30270A, 30271A, 32187A, 32188A)	21A _____
	HP to IBM System Lines (30246A, 30251A)	21B _____
	Multipoint Lines (32026A, 32027A, 32028A)	21C _____
	Local Area Network (30242A)	21D _____
	Total number of Links (INPs) (Sum of lines 21A, 21B, and 21C; MAX=16 with one I/O bay; MAX=24 with two I/O bays and MPE-V/E.)*	21 _____
*Additional Links without hardware (with Opt. 490) are supported.		

VIII. I/O Expansion.

A. ATP Advanced Terminal Processors:

Step #1: Determine the number of modem connections desired and the appropriate number of Modem Port Controllers to order.

30155A	Modem Port Controller (Line 17 divided by "12" and rounded up to the next integer.) (Internal cables included; external cables for devices must be ordered separately.)	22 _____
--------	---	----------

Step #2: Determine the number of modem ports that are not to be used for modem connection and can be used for RS-232-C local direct connections to the Modem Port Controller.

(Note: Modem ports must be ordered in groups of 12. Therefore, you could have up to 11 available for RS-232-C direct connection.)

	Unused modem ports [{"12" times line 22) minus line 17]	23 _____
--	---	----------

Step #3: Based on the desired number of RS-422 connections, RS-232-C connections, and extra modem ports; calculate the number of Direct Connect Port Controllers required and the mix of RS-422 and RS-232-C ports on the controller. Allow room for expansion.

(Note: Each Direct Connect Port Controller supports 12 terminal connections. It is configured with RS-422 ports standard but can be converted to RS-232-C ports in groups of four (4) by ordering the appropriate number of Opt. 002s.)

Series 68 Configuration Worksheet

Product Number	Description	Quantity
	Number of Direct Connect RS-232-C ports connected through Direct Connect Port Controllers (Line 19 minus line 23, enter "0" if the result is less than "0".)	24 _____
	Groups of 4 RS-232-C connections to Direct Connect Port Controllers. (Divide line 24 by "4" and round up to the next integer.)	25 _____
	Groups of 4 RS-422 connections to Direct Connect Port Controllers. (Divide line 18 by "4" and round up to the next integer.)	26 _____
30145A	Direct Connect Port Controller (Divide sum of lines 25 and 26 by "3" and round up to the next integer.) (Internal cables included; external cables for devices must be ordered separately.)	27 _____
	Quantity of Opt. 002s: Replaces 4 RS-422 ports with 4 RS-232 ports. (Equals line 25.)	28 _____
30144A	System Interface Board (SIB) (Divide the sum of lines 22 and 27 by "8" and round up to the next integer.) (Internal cables are included.)	29 _____
B. General I/O Channels:		
To determine the number of GICs required on the system, refer to the text and to the Appendix.		
(Note: To configure GICs you must take into consideration IMBs peripheral speed, electrical device loads, cable lengths, peripheral incompatibilities and system performance.)		
<i>A figure showing 15 GICs (the maximum supported configuration on a two I/O Bay Series 68) has been included in the section on GICs in this chapter for your use as a configuration worksheet.</i>		
30079A	Optional GICs (MAX=8 on a one I/O Bay system and MAX=13 on a two I/O Bay system. Two GICs are shipped standard with a new system order. Box swap upgrade systems do not include the two standard GICs.) Internal cables included by ordering Opt. 064; external HP-IB cables are supplied with devices.	30 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
-------------------	-------------	----------

C. Junction Mounting Panels:

The sum of:

Line 10C - 261X Line Printer Series	31A	_____
Line 21 - Network Links/INPs	31B	_____
GICs included standard with system (zero if box swap upgrade)	31C	_____
Line 30 - Optional GICs	31D	_____
ATP Direct Connect and Modem Port Controllers:		
Line 22 times "6"	31E	_____
Line 27 times "3"	31F	_____
Line 21D - LANIC	31G	_____
Total of lines 31x	31	_____

Each I/O Bay has 48 mounting panels. *A figure depicting the junction panel has been included in the section on junction panel configuration rules. Please use this as a configuration worksheet to ensure that you have stayed within the limitations of the junction panel configuration rules.* In addition, to plan the configuration of the ATP at installation, please see the following worksheet appendix.

D. I/O Card Slots:

I/O Card Slots Required

The sum of:

Line 10C - 261X Line Printer Interface Cards	32A	_____
Line 21 - Network Links/INP Cards	32B	_____
Line 22 - Modem Port Controllers (AIB)	32C	_____
Line 27 - Direct Connect Port Controllers (AIB)	32D	_____
Line 29 - System Interface Boards (SIB)	32E	_____
Line 30 - Optional GICs	32F	_____
GICs included standard (zero if box swap upgrade)	32G	_____
Line 33 - Optional IMB (See note below.)	32H	_____
Standard IMBs (one per I/O Bay) (See note below.)	32I	_____
Line 21D - LANIC	32J	_____
Total of Lines 32x	32	_____

Each I/O Bay has a MAX of 24 Card Slots.

Series 68 Configuration Worksheet

Product Number	Description	Quantity
	<p>Note: At this point in configuring the Series 68, you should already have an idea whether you require the second I/O Bay because of: a) Discs (Line 8), b) INPs (Line 21), c) GICs (Line 30), d) Junction panel space (Line 31) or f) I/O Card Slots (Line 32). If, however, none of the above have required you to order the Auxiliary I/O Bay and you require a second IMB, you have a choice of obtaining that second IMB by ordering the Auxiliary I/O Bay or by ordering the optional IMB for configuration as a second IMB on the standard I/O Bay.</p> <p>The "corner case" in this second IMB decision occurs when 22 I/O Card Cage slots are already filled. The two IMBs would each require one slot of the two remaining slots in the standard I/O Bay and all card slots would be full.</p> <p><i>If your configuration is at all close to this corner case, it is highly recommended that you order the Auxiliary I/O Bay to obtain the second IMB rather than ordering the optional IMB for the standard bay. This will ensure room to expand the system easily in the future, as needs grow.</i></p>	
30143A	Optional I/O Adapter Module (the product name for the IMB) (MAX=1.) When product 30143A is ordered, it can be configured as a second IMB on either I/O Bay. (Cables are supplied.)	33 _____

IX. System SPU and I/O Bays.

Having completed Parts I through VIII of this configuration worksheet, you should know whether you require a one or a two I/O Bay configuration.

A. To Order an SPU with One I/O Bay, Order:

32468C	HP 3000 Series 68 System Processor Unit	
	<p>The standard I/O Bay will include an IMB, card cage and power supply. You must also order Opt. 001 on the first ATP/AIB (30145A or 30155A) for the junction panels to be configured with the system. Please see the following worksheet appendix on Series 68 ATP Junction Panel Pre-Configuration.</p>	34 _____

Series 68 Configuration Worksheet

Product Number	Description	Quantity
B. To Order an SPU with Two I/O Bays, Order:		
32468C	HP 3000 Series 68 System Processor Unit	
	plus	
Opt. 250	Add expansion bay and I/O adapter (IMB)	35 _____
	Each I/O Bay will include an IMB, card cage, and power supply. You must order both options 001 and 003 on the first ATP/AIB (30145A or 30155A) for the junction panels to be configured with the system on both I/O Bays. Please see the following worksheet appendix on the Series 68 ATP Junction Panel Pre-Configuration.	

X. MPE Media Products

A Media Product *must* be ordered with each HP 3000 Series 68. Options apply to both 51450A and 51451A.

51450A or 51451A	MPE-V/E Media Product MPE-V/P Media Product (If MPE-V/P is desired, you must also order Opt. 411 on the SPU (32468C) to substitute MPE-V/P for MPE-V/E.)	
Opt. 604	Series 6x SPU	
Opt. 051	1600 cpi Magnetic Tape Media	36 _____

Series 68 Configuration Worksheet Appendix

Series 68 ATP Junction Panel

Pre-Configuration

When ordering a Series 68, it is important to note that it does not automatically come with junction panels. The junction panel is ordered at the time the ATP is ordered. This is done by ordering either Option 001 or 003 with product 30145A or 30155A. The difference between Option 001 and Option 003 is that Option 001 provides the junction panel for the standard I/O Bay and Option 003 provides the junction panel for the auxiliary I/O Bay (30464A/B or 32468C Option 250).

The Series 68 with two I/O Bays offers significant flexibility in I/O junction panel configuration. This includes great flexibility when installing ATP Subsystems. The following configurations show the recommended installations. The ATP configuration worksheet will help you plan for the installation.

ATP SIB Configuration

1. For a 1-SIB system, the SIB is installed on the Standard I/O Bay panel.
2. For a 2-SIB system, one SIB is installed on the Standard I/O Bay panel and one SIB is installed on the Auxiliary I/O Bay panel.
3. For a 3-SIB system, one SIB is installed on the Standard I/O Bay panel and two SIBs are installed on the Auxiliary I/O Bay panel.
4. For a 4-SIB system, two SIBs are installed on the Standard I/O Bay panel and two SIBs are installed on the Auxiliary I/O Bay panel.

To add the Auxiliary I/O Bay (30464A/B) *and* the ATP to a system that has already been installed at a customer's site, specify Option 003 with product 30145A or 30155A. Complete the worksheet on the following page using *only* the "Auxiliary I/O Bay Junction Panels".

(Note: If ordering the Auxiliary I/O Bay without an ATP, you must specify Option 251 on either product 30464A/B or 30468A/B (with Option 250) to obtain the junction panels.)

Series 68 Configuration Worksheet Appendix

ATP Configuration Worksheet

(Please Duplicate.)

Procedures:

For the appropriate Junction Panel, mark where the ATP should be installed. Use the legend below to indicate the placement of the products. GICs, LANICs, INPs, and 261X Line Printers should also be configured on the panels to ensure that you have adequate space.

G=GIC
(1 mounting panel each)

I=INP
(1 mounting panel each)

M=ATP Modem Connect
(6 mounting panels each)

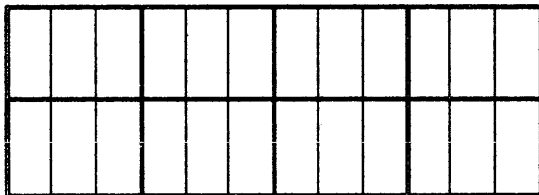
LP= 261X Line Printer (1 mounting panel each)

D422=ATP Direct Connect Type 422 (3 mounting panels each)

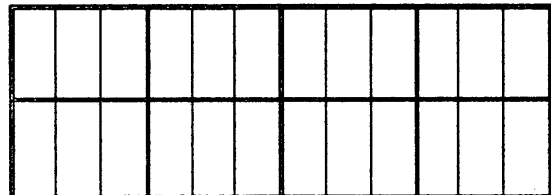
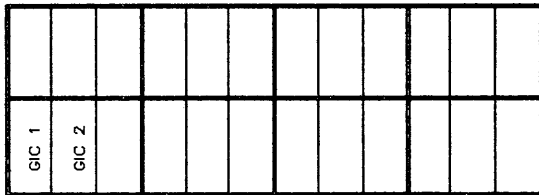
D232=ATP Direct Connect Type 232 (3 mounting panels each)

L=LANIC
(1 mounting panel)

Standard I/O Bay Junction Panel



Auxiliary I/O Bay Junction Panel



Bottom Row Reserved *

* The bottom 12 mounting panels on the standard I/O bay are reserved for connections to GICs, LANICs, INPs, and LPs.

2

Upgrade Configuration Rules

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UPGRADING HP 3000 SYSTEMS

Overview

Upgrades to the current HP 3000 systems, are available from previous HP 3000 systems as well as from HP 2000 and HP 300 systems. These upgrades are designed to provide a smooth growth path for applications and organizations which are expanding.

Upgrades can take one of two forms: the *field upgrade* or the *box swap upgrade*. In the case of a field upgrade, the customer's original hardware is retained, including peripherals, and additional hardware and software are added to the System Processing Unit (SPU). It is the simplest of upgrades and can be achieved with minimum cost and disruption.

The second upgrade path is the *box swap upgrade*, during which the original SPU is removed and a new one is put in its place. The original system is returned to Hewlett-Packard for credit toward the new one. In addition to replacing the SPU, a box swap upgrade may involve conversion or replacement of some peripherals. Support of peripherals is determined both by the peripherals interface (e.g. HP-IB) and by the version of the operating system on the new SPU. Please check the tables and the discussion following them in this chapter for specific details on peripheral conversion.

Installation and Deinstallation

The SPU being upgraded must have been installed at the customer's site for at least six months. Documentation of the installation or proof of support for at least six months may be required. Deinstallation of the original SPU and installation of the new SPU should take place at the same facility and at the same time. Normal deinstallation and installation charges are included in the price of the upgrade.

Site Preparation

When changing SPUs, the site preparation requirements could differ. It is important to have a site preparation specialist visit the site if there is a question as to its suitability.

Return Credits

Return credits towards box swap upgrade purchases are available for SPUs and for some peripherals and accessory equipment. For a current list, consult the latest Corporate Price List.

UPGRADING FROM SERIES III OR PRE-SERIES III SYSTEMS TO MPE V SYSTEMS

Many peripherals on the earlier HP 3000 systems will be incompatible with current systems because of the different I/O structures. An exception would be the peripherals on a Series III equipped

with an HP-IB interface module (30341A). In this case the peripherals attached to the interface module can be carried over to the new system.

The following table of Series III and Pre-Series III peripherals identifies at a glance which peripherals need conversion or are not supported on the newer systems.

Peripherals	Not Supp.	Supp.	Conversion Required
Discs			
7933H 404 Mb, fixed		X	
7935H 404 Mb, removable		X	
7925M 120 Mb Master			12745A
7925S 120 Mb Slave*		X	
7925A 120 Mb			13037U, Opt. 102
7920M 50 Mb Master			12745A
7920S 50 Mb Slave*		X	
7920A 50 Mb			13037U, Opt. 102
7905A (13180B) 15 Mb	X		
7900A (30110A) 5 Mb	X		
2888A (30102A) 47 Mb	X		
2600A (30103A) fixed head	X		
Magnetic Tape Drives			
7976A 6250 cpi		X	
7970E Master 1600 cpi			26072A
7970E Slave 1600 cpi		X	
7970B 800 cpi	X		
30215A additional Mag Tape Interface	X		
Page Printer			
2680A Page Printer		X	

* Slave versions of the 7920/7925 disc drive are supported on HP-IB systems only when the master drive (7920M/7925M) is included in the configuration. The 7920S/7925S may also be converted to master drives. (See disc discussion following.)

Peripherals	Not Supp.	Supp.	Conversion Required
Line Printers			
2619A 1000 lpm			26069A
2618A 1250 lpm	X		
2617A 600 lpm			26069A
2614A 600 lpm	X		
2613A 300 lpm			26069A
2611A 600 lpm			26069A
2610A 200 lpm	X		
2608A 400 lpm			26002A, Opt. 046
2607A 200 lpm	X		
Serial Printers			
2631A 180 cps		X	
2631B 180 cps		X	
2601A Daisy Wheel		X	
2602A Daisy Wheel		X	
2762A/B Printer Terminal	X		
2749B Teleprinter	X		
Terminals			
262x		X	
264x		X	
2382A		X	
2703A		X	
2641A in APL mode	X		
ASR 33/35/37	X		
Execuport	X		
Datapoint 3300	X		
Memorex 1240	X		
MiniBee	X		
Communications Interfaces			
30010A INP*	X		
30032A ATC	X		
30032B ATC	X		
3055A SSLC	X		
30360A HSI	X		
Other Products			
30104A Paper Tape Reader	X		
30105A Paper Tape Punch	X		
30119A Card Reader Punch	X		
30126A Calcomp Interface	X		
30300B Programmable Controller	X		
30301B Real-time Programmable Controller	X		
30106A Card Reader (non-HP-IB version)			30309A

* INPs are replaced by Network Link Products.

Peripheral and Accessory Conversion Notes: Series III to MPE-V Based System

Discs

There are two conversions possible for 7920/7925 master disc drives when moving from a Series III type system to an HP-IB system. Pre-Series III systems and the original two-bay Series III were configured with the disc controller in the SPU. To add the controller and the HP-IB interface to these drives, order a 13037U with Option 102. This upgrade will also convert a slave disc drive to a master drive. Later Series III models ("low-cost") had the disc controller in the drive rather than in the SPU. To convert these drives to HP-IB, you need to order a 12745A master disc drive interface upgrade.

Magnetic Tape Drives

There are also two possible conversions for 7970E master tape drives to HP-IB systems: either lo-boy or upright. Both require the 26072A Master Magnetic Tape Drive HP-IB Conversion Kit. If the drive is in a vertical mount, specify Option 001. In addition, if the serial number is less than 1822A-0000, order Option 002. A vertical mount tape drive will also require the 7971A cabinet, 26078A. Remember to order the dedicated GIC for every 7970E master tape drive.

Card Reader

The Series III 30106A Card Reader is supported on Series 4x and 6x systems with the 30309A upgrade kit. (The 30106A and 30309A are no longer orderable from HP.)

Line Printers

2611/13/17/19 line printers need a new line printer interface, 26069A, with the appropriate system option when converting to HP-IB systems.

The options are:

- 26069A Line Printer Interface
- Opt. 340 Cable Set for Series 39,40,42
- Opt. 344 Cable Set for Series 44,48
- Opt. 364 Cable Set for Series 64,68

2608A printers need a 26002A Line Printer Interface for conversion. Include option 046 for the HP-IB interface.

Serial Printers

Although no conversion is necessary for the supported serial printers, new cables may be necessary. See the terminals cabling matrix in Chapter Four for more information.

Terminals

The Series 4x, 5x, 6x, and 7x will support the following terminal types: 4, 6, 9, 10, 12-16, 18-22. Terminal types which are supported on Series III and pre-Series III systems but are not supported on current systems are 0-3, 5, and 11.

Communications Interfaces

For terminal communication, either ADCCs (Asynchronous Data Communications Controller) or ATPs (Advanced Terminal Processor) must be ordered to replace the ATC (Asynchronous Terminal Controller). See the appropriate system section in Chapter One for specific details on ADCCs and ATPs.

Intelligent Network Processors (INPs) must also be completely replaced with the appropriate Network Link products.

General I/O Channels

General I/O Channels (GICs) are not included with a system upgrade. When upgrading from a non-HP-IB system, a minimum of two GICs (30079A) must be ordered.

Configuring the New System

Once you have determined what peripherals are available to be carried over to the new system, you are ready to complete the system configuration. Refer to Chapter One for information on configuring the system.

EXAMPLE OF A SERIES III TO SERIES 68 UPGRADE

Assume a Series III system with the following configuration:

- SPU
- 2 Mb memory
- 2645A System Console
- 32 terminal ports
- Discs:
 - 1 7920M
 - 1 7920S
 - 2 7925S
- 7970E tape drive with 30215A mag tape controller
- 2619A line printer
- 30010A INP (Used for HP to HP DS line)

The system is to be upgraded to a Series 68 with the following configuration:

- SPU
- 4 Mb memory
- 60 terminal ports
- Discs:
 - 1 7920M
 - 1 7920S
 - 2 7925M
- 7970E tape drive
- 2619A line printer
- Network Link (INP) for HP to HP Hardwired Connection

The following equipment will be returned for credit:

- SPU
- 30215A mag tape controller
- 256 Kb memory

The following should be ordered:

- | | |
|-----------|--|
| 32468CH | Series 68 SPU with 3 Mb memory |
| Opt. 603 | Upgrade from Series III |
| 51450A | MPE Media Product |
| Opt. 604 | Series 68 SPU |
| 30165A | Additional 4 Mb of memory |
| 45851A | Series 6x System Console (Order cable.) |
| 9123D | Disc Drive |
| 3 30079A | GICs |
| Opt. 064 | Internal cable |
| 30144A | SIB |
| 30145A | Direct connect port controller |
| Opt. 001 | First controller on system |
| 4 30145A | Additional direct connect controllers port |
| * 26072A | Tape drive conversion (for 7970E) |
| 26069A | Printer interface (for 2619A) |
| Opt. 364 | Series 6x subsystem |
| ** 12745A | Disc drive conversion (for 7920M) |
| 2 13037U | Disc drive conversion (for 7925S to 7925M) |
| Opt. 102 | HP-IB Interface |
| 30270A | DS Hardwired Link |
| Opt. 435 | Series 68 to HP 3000 Connection |

The following products cannot be used on the new system. Return credits may be available. Consult your HP 3000 Price Guide.

- 2645A System Console (can be used as a user terminal)
- 30032A ATC
- 30010A INP
- 1.5 Mb memory

* In addition, a new cabinet (26078A) may be required.

** If the Series III system to be upgraded was the older type with the controller in the SPU, an additional 13037U would be ordered instead of the 12745A.

UPGRADING FROM AN MPE V SYSTEM TO AN MPE V SYSTEM

When upgrading to an MPE V system system (Series 30, 33, 37, 37XE, 40/42 or 44/48) most peripherals will be supported on the new system.

Existing GICs can also be carried over except from the Series 37/37XE. However, in many cases, new cables are required. The following table identifies which peripherals can be carried straight to the new system. If the peripheral needs conversion, the rightmost column contains the part number of the conversion product needed.

Peripherals	Not Supp.	Supp.	Conversion Required
Discs			
9895A, Opt. 010, 1.2 Mb		X	
7933/7935H 404 Mb		X	
7925M Opt. 102, 120 Mb Master		X	
7925S 120 Mb Slave*		X	
7920M, Opt. 102, 50 Mb Master		X	
7920S, 50Mb Slave*		X	
7914P, Opt. 001, 132 Mb		X	
7914TD, 132 Mb disc and 7970E tape drive		X	
7914ST 132 Mb disc and 7974A tape drive		X	
7912P, Opt. 001, 65 Mb		X	
7945A, 55 Mb		X	
7911P, Opt. 001, 28 Mb		X	
7906M, Opt. 102, 19.6 Mb, Master		X	
7906S, 19.6 Mb, Slave		X	
7902A flexible disc	X		
Magnetic Tape Drives			
7978A 6250/1600 cpi		X	
7976A 6250/1600 cpi		X	
7974A 1600/800 cpi		X	
7970E, Opt. 426,436;7971A, Opt. 340 serial number less than 2034A-0000			26072A, Opt. H01
serial number greater than 2034A-0000		X	
7970E, Opt. 421, slave		X	
9144A Cartridge Tape		X	
Page Printer			
2680A Page Printer		X	
2687A/2688 Desktop Page Printers		X	
Line Printers			
2619A 1000 lpm		X	26069A
2617A 600 lpm		X	upgrade kit:
2613A 300 lpm		X	see cable
2611A 600 lpm		X	matrix on
2608A 400 lpm		X	page 2-9
2608S 400 lpm		X	(2619/17/13/11
2563A 300 lpm		X	only)
2565A/66A 600/900 lpm		X	

* Remember to carry over a 7920M/7925M when carrying over any slave drives (7920S/7925S).

Peripherals	Not Supp.	Supp.	Conversion Needed
Serial Printers			
2631B 180 cps		X	
2631A 180 cps	X		
2601A Daisy Wheel		X	
2602A Daisy Wheel		X	
2672A/B Printing Terminal	X		
2749B Teleprinter	X		
2563A 300 lpm		X	
2932/33/34A Printer		X	
Terminals			
239x		X	
262x		X	
264x		X	
2382A		X	
2703A		X	
2641A in APL mode	X		
ASR 33/35/37	X		
Execuport	X		
Datapoint 3300	X		
Memorex 1240	X		
MiniBee	X		
Communications Interfaces			
30144A ATP SIB		X	
30145A ATP Direct Connect Port Controller		X**	
30155A Modem Port Controller		X**	
30273A ATP Expansion Package*		X*	
30274A ATP Expansion Package*		X*	
30018A ADCC (Main)*			30021C*
30019A ADCC (Extender)*			30021C*
30020A INP*		X*	
30460A ATP37	X		
General I/O Channels			
30079A GIC (S/39,4X,6X)			30022A
30459A PIC (S/37)	X		
Other Products			
30106A Card Reader, (HP-IB version)		X	
26075A Multiple System Access Selector		X	

* Not supported on Series 68.

**Cables may need to be ordered.

Peripheral and Accessory Conversion Notes: MPE V SYSTEM to MPE V SYSTEM

Discs

HP-IB discs which were used on previous HP-IB systems can be carried over without conversion to the new system. The 7902A flexible disc is not supported on current systems.

If the customer is upgrading a Series 30/33 system with a built-in 7902A flexible disc drive and the customer wants a flexible disc on the new system, a new 9895A (with option 010) flexible disc drive must be ordered. The media for the 7902A disc drive should not be used with the 9895A flexible disc drive as it will damage the drive heads and itself because of its softer material. It should be used only once to copy its data to 9895A media.

Magnetic Tape Drives

Tape drives with HP-IB interfaces can be retained without conversion for the new systems with one exception; for 7970E option 426 tape drives with a serial number less than 2034A-0000, a conversion, 26072A option H01, is needed.

Line Printers

All HP-IB line printers are supported on the Series 39, 4x, 5x, 6x and 7x systems. Only the 2611A/13A/17A/19A printers need conversion (new cables) when transferring between HP-IB systems as indicated below.

26069A Cable Matrix for 2611A/13A/17A/19A Printers

New System	Existing System			
	30	33	39/40/42	44/48
39/42	None	26069-60005	Same Cable	30090-60051 26069-60005
48/68 48/58/68/70	26069-60002 26069-60003	26069-00008	26069-60002 26069-60003	Same Cable

Terminals

The Series 4x, 5x, 6x and 7x will support the following terminal types: 4, 6, 9, 10, 12-16, 18-22. Terminal types which are not supported on current systems are 0-3, 5, and 11.

Although no conversion is necessary for supported terminal types, new cables may be required. See the terminal cabling section in Chapter Four for more information.

Communications Interfaces

When upgrading from one system with ADCCs (Asynchronous Data Communication Controller) to another, new cables (30021C) must be ordered for each ADCC Main and Extender beyond the first ADCC Main in the system. Note that ADCCs are not supported on the Series 6x/7x.

The ATP37 cannot be transferred to other systems so either ADCCs or Advanced Terminal Processors (ATPs) must be ordered when upgrading from a Series 37 or 37XE.

The ATP Expansion Package cannot be transferred from the Series 4x/5x to the Series 6x/7x; however, SIBs and AIBs may be transferred.

The 30020A INP (Intelligent Network Processor) is supported on the Series 42 and 48 Network Link product. It is not supported on the Series 68 which requires the 30020B INP. All new INP-based Network Link products contain the 30020B INP.

General I/O Channels

General I/O Channels (GICs) may be transferred to all MPE V systems except the Series 37/37XE. For each GIC being carried over, order one 30022A cable with the proper system option number as indicated in the HP3000 Computer Systems Price Guide.

The Series 37/37XE Peripheral Interface Channel (PIC) is not transferable to other MPE V systems. One PIC must be returned with the system when upgrading, and a minimum of two GICs must be ordered with the new SPU.

Memory

In most cases, memory cannot be switched between different size SPUs except within the Series 39/4X family. However, upgrading from a Series 39/4X to a Series 48 may result in a non-supported memory configuration. The final Series 48 memory size must be one of the following: 2, 2.5, 3, 3.5, or 4Mb. Since the Series 48 upgrade includes 2 Mb of main memory when shipped, the only combinations of memory which may be added are: .5, 1, 1.5, or 2 Mb. If the add-on memory configuration includes 256Kb boards (as in the .5Mb product 30092A), a separate memory controller (30094A) **MUST** be ordered. Refer to the Series 48 section in Chapter One for further detail.

Configuring the New System

Once you have determined what peripherals are available to be carried over to the new system, you are ready to complete the system configuration. Refer to Chapter One for information on configuring the system.

EXAMPLE OF A SERIES 30 TO SERIES 58 UPGRADE

Assume a Series 30 system with the following configuration:

- SPU
- 1 Mb memory
- 2649E System Console
- 7902A built-in flexible disc
- 12 terminal ports (2 ADCC Main, 1 Extender)
- 2 GICs
- 7920M disc drive
- 7970E tape drive (serial number greater than 2034A-xxxx)
- 2608S line printer

The system is to be upgraded to a Series 58 with the following configuration:

- SPU
- 2 Mb memory
- 2392A System Console
- 24 terminal ports (12 modem, 12 direct connect)
- 7920M disc drive
- 7970E tape drive
- 2608S line printer

The following should be ordered:

32558BH	Series 58 SPU with 2 Mb memory
Opt. 607	Upgrade from Series 30A
51451A	MPE Media Product
Opt. 602	Series 58 SPU
Opt. 051	1600 cpi tape
2392A	System Console (order cable option)
2 30021C	ADCC cable (for second Main, Extender)
30144A	SIB
30145A	AIB direct connect port controller
2 30022A	GIC cables
Opt. 044	

The following equipment will be returned for credit:

- SPU
- 2649E System Console
- 7902A built-in flexible disc
- 256 Kb memory

The additional 768 Kb of memory cannot be carried over to the new system. All other equipment can be carried over.

UPGRADING FROM AN MPE V SYSTEM TO AN MPE XL SYSTEM

due to changes in the I/O system. The following table identifies which peripherals are supported on the MPE XL based system and any conversion required. An F indicates that future support is planned.

When upgrading from an MPE V based system, not all peripherals will be supported on the new system

Peripherals	Not Supp.	Supp.	Conversion Required
Discs:			
9895A, Opt. 010, 1.2 Mb	X		
7945A, 55 Mb	X		
7933XP/7935XP, 404Mb	F		
7933H/7935H, 404Mb		X	
7925M, Opt. 102, 120 Mb Master	X		
7925S, 120 Mb Slave	X		
7920M, Opt. 102, 50 Mb Master	X		
7920S, 50 Mb Slave	X		
7914CT	F		
7914P, Opt. xxx, 132 Mb	F		
7914P, with integrated tape	X		
7914ST, 132 Mb disc and 7974A tape drive	F		
7914TD, 132 Mb disc and 7970E tape drive	X		
7912P, Opt. 001, 65 Mb	X		
7911P, Opt. 001, 28 Mb	X		
7906M, Opt. 102, 19.6 Mb Master	X		
7906S, 19.6 Mb Slave	X		
7902A, flexible disc	X		
Magnetic Tapes:			
7978A/B, 6250/1600 cpi		X	
7976A, 6250/1600 cpi	X		
7974A, 1600/800 cpi		X	
7971A,	X		
7970B,	X		
7970E Master	X		
7970E, Opt. 421, Slave	X		
9144A Cartridge Tape	F		
Integrated Cartridge Tape	X		

Peripherals	Not Supp.	Supp.	Conversion Required
Page Printers: 2680A 2687A 2688A	 F	 X X	
Line Printers: 2567B 1200 1pm 2566A/B, 900 1pm 2565A, 600 1pm 2564B 600 1pm 2563A, 300 1pm 2619A, 1000 1 pm 2617A, 600 1pm 2613A, 300 1pm 2611A, 600 1pm 2608A, 400 1pm 2608S, 400 1pm	 F F F X X X X X X X	 X X	

Peripheral and Accessory Conversion Notes: MPE V System to MPE XL System

Discs

If supported, HP-IB discs which were used on previous MPE V systems can be carried over without conversion to the new system.

Magnetic Tape Drives

If supported, tape drives with HP-IB interfaces can be retained without conversion for the 900 Series systems.

Line Printers

If supported, HP-IB line printers can be moved to the new system without conversion.

Workstations

The 900 Series will support the following terminal types: 10, 18, 21, 22. Terminal types which are not supported are: 0-6, 9, 11-16, 19-20. See the support matrices in Chapter One Appendix to determine which workstations are supported.

Although no conversion is necessary for the supported workstations, new cables may be necessary if the terminals were previously attached via an ADCC. See the DTC workstation cabling section in Chapter Four for more information.

Note that some 262x workstations will require a ROM update in order to be supported. See the Supported Workstation matrix in Chapter One Appendix for details.

Communications Interfaces

ADCCs, ATPs, INPs, and LANICs from MPE V based systems cannot be transferred to the 900 Series.

Channels

General I/O Channels (GICs) and Peripheral Interface Channels (PICs) may not be carried over to the 900 Series.

Memory

Memory cannot be transferred from the MPE V systems to the 900 Series.

Configuring the New System

Once you have determined what peripherals are available to be carried over to the new system, you are ready to complete the system configuration. Refer to Chapter One for information on configuring the system.

EXAMPLE OF A SERIES 68 TO SERIES 930 UPGRADE

1. Assume a Series 68 system with the following configuration:

- SPU
- 8 Mb memory
- 2nd IMB
- 2649F System Console
- 70 terminal ports
- 3 GICs
- 5 7933H disc drives
- 1 7925M master disc drive
- 7978A tape drive
- 2619A line printer
- 20 2392A terminals
- 20 2624B terminals
- 20 2647A terminals
- 20 HP150 PCs
- 10 2934A serial printers

2. The system is to be upgraded to a Series 930 with the following configuration:

- SPU
- 16 Mb memory
- 2392A System Console
- 3 DTCs w/100 terminal ports (18 modem, 80 RS-232 direct connect)
- 50 HP150 PCs
- 30 2392A terminals
- 20 2624B terminals
- 10 2934A serial printers
- 6 7933H disc drives
- 7978A tape drive
- 2566B line printer

3. The following items will be carried over to the new system.

- 5 7933H disc drives
- 7978A tape drive
- 20 2392As
- 20 2624Bs (ROM date codes were OK)
- 20 HP150s

4. The following should be ordered:

- 1 32480AH Series 930 Preconfigured system with 16 Mb memory, 2 HP-IB Channels
 - Opt 626 upgrade from S/68 w/8 Mb
- 1 19742A Floating Point Coprocessor
- 1 27113A HP-IB Channel
- 1 51453A MPE Media Product
 - Opt 730 Preconfigured System
 - Opt 200 Latest MPE XL release
 - Opt 051 1600 cpi tape
- 1 2392A System Console
 - Opt 305 (cable option)
- 1 2345A DTC (1st location)
 - 3xOpt 803 8 RS-232 local ports
 - Opt 625 6 Modem ports
- 1 2345A DTC (2nd location)
 - 3xOpt 803 8 RS-232 local ports
 - Opt 625 6 modem ports
- 1 2345A DTC (3rd location)
 - 4xOpt 803 8 RS-232 local ports
- 1 7933H Disc Drive
- 1 2566B Printer
 - Opt 393 for Series 930
- 30 2392A Block Mode Terminals
- 10 HP150 Personal Computers

5. The following equipment will be returned for credit. *Verify this list with each sale, return credit amounts and availability are subject to change.*

- SPU w/8 Mb, 2 GICs, 1 IMB (opt 626)
- 2619A Printer (2619AN return credit)
- 7925M Disc (7925MN return credit)
- ATP (SIB/AIBs)
- 1 GIC
- 1 IMB

UPGRADE ORDERING MATRIX

CURRENT SYSTEM	UPGRADE TO ORDER				
	Series 37XE	Series 39HP	Series 42	Series 42XP	Series 48
Pre-Series II	N/A	N/A	Box Swap 32542BH Opt. 601	N/A	Box Swap 32548BH Opt. 601
Series II	N/A	N/A	Box Swap 32542BH Opt. 602	N/A	Box Swap 32548BH Opt. 602
Series III	N/A	N/A	Box Swap 32542BH Opt. 603 Opt. 613	N/A	Box Swap 32548BH Opt. 603 Opt. 613
Series 30	N/A	N/A	Box Swap 32542BH Opt. 607 Opt. 608	N/A	Box Swap 32548BH Opt. 607 Opt. 608
Series 33	N/A	N/A	Box Swap 32542BH Opt. 605 Opt. 606	N/A	Box Swap 32548BH Opt. 605 Opt. 606
Series 37	Field Upgrade 32450BH	N/A	Box Swap 32542BH Opt. 617	N/A	Box Swap 32548BH Opt. 617
Series 37XE	N/A	N/A	Box Swap 32542BH Opt. 618	N/A	Box Swap 32548BH Opt. 618
Series 39	N/A	Field Upgrade 30539B	N/A	Field Upgrade 30550A	Box Swap 32548BH Opt. 614
Series 39 High Performance	N/A	N/A	N/A	Field Upgrade 30550A Opt. 042	N/A
Series 40	N/A	N/A	Field Upgrade 30542B	Field Upgrade 30550A	Box Swap 32548BH Opt. 611

UPGRADE ORDERING MATRIX (Cont.)

CURRENT SYSTEM	UPGRADE TO ORDER			
	Series 58	Series 68	Series 70	Series 930
Pre-Series II	Box Swap 32558AH Opt. 601	Box Swap 32468CH Opt. 601	Box Swap 32471AH Opt. 601	Box Swap 32480AH Opt. 601
Series II	Box Swap 32558AH Opt. 602	Box Swap 32468CH Opt. 602	Box Swap 32471AH Opt. 602	Box Swap 32480AH Opt. 602
Series III	Box Swap 32558AH Opt. 603 Opt. 613	Box Swap 32468CH Opt. 603 Opt. 613	Box Swap 32471AH Opt. 603 Opt. 613	Box Swap 32480AH Opt. 603 Opt. 613
Series 30	Box Swap 32558AH Opt. 607 Opt. 608	Box Swap 32468CH Opt. 607 Opt. 608	Box Swap 32471AH Opt. 607 Opt. 608	Box Swap 32480AH Opt. 607 Opt. 608
Series 33	Box Swap 32558AH Opt. 605 Opt. 606	Box Swap 32468CH Opt. 605 Opt. 606	Box Swap 32471AH Opt. 605 Opt. 606	Box Swap 32480AH Opt. 605 Opt. 606
Series 37	Box Swap 32558AH Opt. 617	Box Swap 32468CH Opt. 617	Box Swap 32471AH Opt. 617	Box Swap 32480AH Opt. 617
Series 37XE	Box Swap 32558AH Opt. 618	Box Swap 32468CH Opt. 618	Box Swap 32471AH Opt. 618	Box Swap 32480AH Opt. 618
Series 39	Box Swap 32558AH Opt. 614	Box Swap 32468CH Opt. 614	Box Swap 32471AH Opt. 614	Box Swap 32480AH Opt. 614
Series 39 High Performance	Box Swap 32558AH Opt. 621	N/A	Box Swap 32471AH Opt. 621	Box Swap 32480AH Opt. 621
Series 40	Box Swap 32558AH Opt. 611	Box Swap 32468CH Opt. 611	Box Swap 32471AH Opt. 611	Box Swap 32480AH Opt. 611

UPGRADE ORDERING MATRIX (Cont.)

CURRENT SYSTEM	UPGRADE TO ORDER				
	Series 37XE	Series 39HP	Series 42	Series 42XP	Series 48
Series 42	N/A	N/A	N/A	Field Upgrade 30550A Opt. 042	Box Swap 32548BH Opt. 615
Series 42XP	N/A	N/A	N/A	N/A	N/A
Series 44	N/A	N/A	N/A	N/A	Field Upgrade 30548B
Series 48	N/A	N/A	N/A	N/A	N/A
Series 58	N/A	N/A	N/A	N/A	N/A
Series 64	N/A	N/A	N/A	N/A	N/A
Series 68	N/A	N/A	N/A	N/A	N/A
Series 70	N/A	N/A	N/A	N/A	N/A

UPGRADE ORDERING MATRIX (Cont.)

CURRENT SYSTEM	UPGRADE TO ORDER			
	Series 58	Series 68	Series 70	Series 930
Series 42	Box Swap 32558AH Opt. 615	Box Swap 32468CH Opt. 615	Box Swap 32471AH Opt. 615	Box Swap 32480AH Opt. 615
Series 42XP	N/A	Box Swap 32468CH Opt. 619	Box Swap 32471AH Opt. 619	Box Swap 32480AH Opt. 619
Series 44	Field Upgrade 30558A	Box Swap 32468CH Opt. 609	Box Swap 32471AH Opt. 609	Box Swap 32480AH Opt. 609
Series 48	Field Upgrade 30558A Opt. 048	Box Swap 32468CH Opt. 616	Box Swap 32471AH Opt. 616	Box Swap 32480AH Opt. 616
Series 58	N/A	Box Swap 32468CH Opt. 620 Opt. 622	Box Swap 32471AH Opt. 622	Box Swap 32480AH Opt. 622
Series 64	N/A	Field Upgrade 30468A/B*	Field Upgrade 30443A/B**	Box Swap 32480AH Opt. 623
Series 68	N/A	N/A	Field Upgrade 30444A/B**	Box Swap 32480AH Opt. 624 Opt. 625 Opt. 626
Series 70	N/A	N/A	N/A	Box Swap 32480AH Opt. 627 Opt. 628 Opt. 629

* There is no Series 64 to Series 68C field upgrade product. Instead, order 30468A/B and add memory as desired.

** Upgrade from a 64A/68A to 30443A/30444A. Upgrade from a 64B/(68B/68C) to 30443B/(30444B).

SERIES 930 UPGRADE PRODUCT DESCRIPTION

32480AH Upgrade to an HP 3000 Series 930 Preconfigured System

208V/60 Hz; single phase; 16 Mb error correcting memory; 2 CIO Busses; 2 HP-IB Channels; 1 802.3 LANIC, Thick & ThinLAN connection H/W; support modem; remote diagnostic capability; system cabinet; Fundamental Operating Software (MPE XL Operating System, EDIT/V, FCOPY/XL, SORT-MERGE/XL, TurboIMAGE/V, QUERY/V, VPLUS/V, KSAM/V), ALLBASE/XL; System Dictionary/XL; complete user manual set.

The following are required for the Series 930 and must be ordered separately or converted/transferred from the system being upgraded:

- MPE Media Product (51453A)
- One System disc drive (7933H or 7935H)
- One Distributed Terminal Controller (2345A) with one Interface product (option 625, 803, or 805)
- One System console (2392A) terminal with EMP protect cable (option 305)
- One Magnetic tape drive (7974A or 7978A/B)
- 802.3 LAN cabling; Thick or Thin

Options*:

- 601 Upgrade from pre-Series II w/128 Kb or HP 2000 w/128 kb
- 602 Upgrade from Series II w/128 Kb
- 603 Upgrade from Series III w/256 Kb
- 605 Upgrade from Series 33 A/B w/256 Kb, 2649E
- 606 Upgrade from Series 33 C/U w/256 Kb, 2649E
- 607 Upgrade from Series 30 A/B w/256 Kb, 2649E
- 608 Upgrade from Series 30 C/U w/256 Kb, 2649E
- 609 Upgrade from Series 44 w/1 Mb memory
- 611 Upgrade from Series 40 w/no memory
- 613 Upgrade from Series III w/256 Kb and 30341A HP-IB Adapter
- 614 Upgrade from Series 39 w/no memory
- 615 Upgrade from Series 42 w/no memory
- 616 Upgrade from Series 48 w/ 1 Mb
- 617 Upgrade from Series 37 w/no memory
- 618 Upgrade from Series 37XE w/no memory
- 619 Upgrade from Series 42XP w/2 Mb
- 622 Upgrade from Series 58 w/2 Mb
- 621 Upgrade from Series 39HP w/no memory
- 623 Upgrade from Series 64 w/2 Mb
- 624 Upgrade from Series 68 w/2 Mb

SERIES 930 UPGRADE PRODUCT DESCRIPTION (CONT.)

Options*:

625	Upgrade from Series 68 w/4 Mb
626	Upgrade from Series 68 w/8 Mb
627	Upgrade from Series 70 w/2 Mb
628	Upgrade from Series 70 w/4 Mb
629	Upgrade from Series 70 w/8 Mb

* Note that these options are Rxx in Europe instead of 6xx, ie. Opt 624 = Opt R24.

SERIES 68 UPGRADE PRODUCT DESCRIPTION

32468CH Upgrade to an HP 3000 Series 68

208V/60 Hz; three phase; 4 megabytes fault control memory; 1 Intermodule Bus; support modem; remote diagnostic capability; system cabinet; disc caching; Series 68 Console Communication Program; Fundamental Operating Software (MPE-V/E Operating System, EDIT/3000, FCOPY/3000, SORT-MERGE/3000, IMAGE/3000, QUERY/3000, VPLUS/3000, KSAM/3000, and facility to execute compiled programs without the source language compiler on the system); complete user manual set.

The following are required for the Series 68 and must be ordered separately or converted/transferred from the system being upgraded:

- MPE Media Product (51450A)
- Two General I/O Channels (30079A)
- System disc drive (7925M with Option 102; 7920M with Option 102; 7933H; 7935H; 7914P; 7914ST; 7914CT; or 7914TD)
- Advanced Terminal Processor with one System Interface Board (30144A) and one port controller, [either modem (30155A) or direct connect (30145A)] with Option 001
- System console (45851A Touchscreen II PC, cable, and 9123D disc drive running Console Communication Program Software; 2647F with Option 890 and cable; or 2642A with Option 964).
- Magnetic tape drive (7970E with Option 426; 7971A with Option 340, 343 or 344; 7974A; 7978A/B; 7976A with Option 416; 7914ST; or 7914TD)

Options:

- 015 380V/50 Hz, three phase operation
- 016 415V/50 Hz; three phase operation
- 250 Add Expansion Bay with I/O Adapter (IMB)
- 251 Junction panels, required if Expansion Bay is ordered and no ATP is ordered
- 411 Substitute MPE-V/P for MPE-V/E
- 601 Upgrade from pre-Series II w/128 Kb or HP 2000
- 602 Upgrade from Series II w/128 Kb
- 603 Upgrade from Series III w/256 Kb
- 605 Upgrade from Series 33 A/B w/256 Kb, 2649E
- 606 Upgrade from Series 33 C/U w/256 Kb, 2649E
- 607 Upgrade from Series 30 A/B w/256 Kb, 2649E
- 608 Upgrade from Series 30 C/U w/256 Kb, 2649E
- 609 Upgrade from Series 44 w/1 Mb memory
- 611 Upgrade from Series 40 w/no memory
- 613 Upgrade from Series III w/256 Kb and 30341A HP-IB Adapter
- 614 Upgrade from Series 39 w/no memory
- 615 Upgrade from Series 42 w/no memory
- 616 Upgrade from Series 48 w/ 1 Mb

30468A Series 64A to Series 68A Field Upgrade

To be ordered when upgrading from a 32460A Series 64, using original power supply.

Upgrade includes Disc Caching software and 1 megabyte of memory. Order MPE Media Product (51450A) separately.

Options:

- 190 Delete 1 Mb memory
- 250 Add Expansion Bay and I/O Adapter (IMB)
- 251 Junction panels, required if Expansion Bay is ordered and no ATP is ordered
- 411 Substitute MPE-V/P for MPE-V/E

30468B Series 64B to Series 68B Field Upgrade

To be ordered when upgrading from a 32460B Series 64, using enhanced power supply.

Upgrade includes Disc Caching software and 1 megabyte of memory. Order MPE Media Product (51450A) separately.

Options:

- 190 Delete 1 Mb memory
- 250 Add Expansion Bay and I/O Adapter (IMB)
- 251 Junction panels, required if Expansion Bay is ordered and no ATP is ordered
- 411 Substitute MPE-V/P for MPE-V/E

SERIES 48 UPGRADE PRODUCT DESCRIPTION

32548BH Upgrade to an HP 3000 Series 48

220-240V/60 Hz; single phase; 2 megabytes fault control memory; support modem; remote diagnostic capability; system cabinet; isolation transformer; disc caching; Fundamental Operating Software (MPE-V/P operating system, EDIT/3000, FCOPY/3000, SORT-MERGE/3000, IMAGE/3000, QUERY/3000, VPLUS/3000, KSAM/3000, and facility to execute compiled programs without the source language compiler on the system); complete user manual set.

The following are required for the Series 48 and must be ordered separately or converted/transferred from the system being upgraded.

- MPE Media Product (51451A)
- Two General I/O Channels (30079A)
- System disc drive (7911P, 7912P, 7914P; 7914TD; 7914CT; 7914ST; 7925M with Option 102; 7920M with Option 102; 7933H; or 7935H)
- ADCC-Main with cable (30018A with Option 044) to support the system console
- System console (2392A, 262x, 264x, 2382A or 2635B. Cable must be ordered separately except for 2635B.)
- Magnetic tape drive (7970E with Option 426; 7971A with Option 340, 343 or 344; 7976A with Option 416; 7974A; 7914TD, 7914ST, or 7978A.)

Options:

- 015 220-240V/50 Hz operation
- 022 Software on cartridge tape
- 410 Substitute MPE-V/E for MPE-V/P
- 601 Upgrade from pre-Series II w/128 Kb or HP 2000
- 602 Upgrade from Series II w/128 Kb
- 603 Upgrade from Series III w/256 Kb
- 605 Upgrade from Series 33 A/B w/256 Kb, 2649E
- 606 Upgrade from Series 33 C/U w/256 Kb, 2649E
- 607 Upgrade from Series 30 A/B w/256 Kb, 2649E
- 608 Upgrade from Series 30 C/U w/256 Kb, 2649E
- 611 Upgrade from Series 40 w/no memory
- 613 Upgrade from Series III w/256 Kb and 30341A
HP-IB Adapter
- 614 Upgrade from Series 39 w/no memory
- 615 Upgrade from Series 42 w/no memory
- 617 Upgrade from Series 37 with no memory
- 618 Upgrade from Series 37XE with no memory

30548B Series 44 to Series 48 Field Upgrade

Upgrade includes Disc Caching software, 1 megabyte of memory, and CPS CPU board (if Option 410 is ordered). Order MPE Media Product (51451A) separately.

Options:

- 190 Delete 1 Mb memory
- 410 Substitute MPE-V/E for MPE-V/P

30085B HP 300 to Series 48 Upgrade

See preceding page for description of the Series 48 upgrade product. Order MPE Media Product (51451A) separately.

Options:

- 015 220-240V/50 Hz operation
- 022 Software on cartridge tape
- 410 Substitute MPE-V/E for MPE-V/P
- 610 Return credit for HP 300 Model 10 (31032A)
- 615 Return credit for HP 300 (31033A)
- 620 Return credit for HP 300 Model 20 (31034A)
- 630 Return credit for HP 300 Model 30 (31035A)
- 650 Return credit for 31204A 128 Kb memory module
- 670 Return credit for 31030A HP 300 workstation

SERIES 42 UPGRADE PRODUCT DESCRIPTION

32542BH Upgrade to an HP 3000 Series 42

120V/60 Hz; single phase; 1 megabyte fault control memory; support modem; remote diagnostic capability; system cabinet; disc caching; Fundamental Operating Software (MPE-V/P operating system, EDIT/3000, FCOPY/3000, SORT-MERGE/3000, IMAGE/3000, QUERY/3000, VPLUS/3000, KSAM/3000, and facility to execute compiled programs without the source language compiler on the system); complete user manual set.

The following are required for the Series 42 and must be ordered separately or converted/transferred from the system being upgraded:

- MPE Media Product (51451A)
- Two General I/O Channels (30079A)
- System disc drive (7911P, 7912P, 7914P; 7914CT; 7914TD or 7914ST; 7925M with Option 102; 7920M with Option 102; 7933H; or 7935H)
- ADCC-Main with cable (30018A with Option 040) to support the system console
- System console (2392A, 262x, 264x, 2382A or 2635B. Cable must be ordered separately except for 2635B.)
- Magnetic tape drive (7970E with Option 426; 7971A with Option 340, 343 or 344; 7976A with Option 416; 7974A; 7914TD; 7914ST, or 7978A) required for system with more than 132 Mb disc storage. A cartridge tape drive (integrated into the 7911P, 7912P, or 7914P with Option 001 or a 9144A) may be used for system with 132 Mb or less disc storage.

Options:

- 015 220-240V/50 Hz operation
- 022 Software on cartridge tape
- 409 Substitute MPE-V/E for MPE-V/P
- 601 Upgrade from pre-Series II w/128 Kb or HP 2000
- 602 Upgrade from Series II w/128 Kb
- 603 Upgrade from Series III w/256 Kb
- 605 Upgrade from Series 33 A/B w/256 Kb, 2649E
- 606 Upgrade from Series 33 C/U w/256 Kb, 2649E
- 607 Upgrade from Series 30 A/B w/256 Kb, 2649E
- 608 Upgrade from Series 30 C/U w/256 Kb, 2649E
- 617 Upgrade from Series 37 with no memory
- 618 Upgrade from Series 37XE with no memory

30542B Series 40 to 42 Field Upgrade

Upgrade includes Disc Caching software, 1 megabyte of memory, and CPS CPU board (if Option 409 is ordered). Order MPE Media Product (51451A) separately.

Options:

- 190 Delete 1 Mb memory
 - 409 Substitute MPE-V/E for MPE-V/P
-

30076B HP 300 to Series 42 Upgrade

See preceding page for description of the Series 42 upgrade product. Order MPE Media Product (51451A) separately.

Options:

- 015 200-240V/50Hz operation
- 022 Software on cartridge tape
- 409 Substitute MPE-V/E for MPE-V/P
- 610 Return credit for HP 300 Model 10 (31032A)
- 615 Return credit for HP 300 (31033A)
- 620 Return credit for HP 300 Model 20 (31034A)
- 630 Return credit for HP 300 Model 30 (31035A)
- 650 Return credit for HP 300 31204A 128 Kb memory module
- 670 Return credit for 31030A HP 300 workstation

SERIES 39 AND SERIES 37XE FIELD UPGRADE DESCRIPTIONS

30539B Series 39 to High-Performance Series 39 Field Upgrade

Upgrade includes Disc Caching software, 512 Kb of memory (set of two 256 Kb boards) and CPS CPU board (if Option 408 is ordered). Order MPE Media Product (51451A) separately.

Options:

- 170 Delete 256 Kb memory
- 180 Delete 512 Kb memory
- 408 Substitute MPE-V/E for MPE-V/P

32450BH Series 37 to 37XE Field Upgrade

Upgrade includes I/O Expansion Unit with 1 megabyte of memory. Order MPE Media Product (51450A) separately.

Options:

- 015 200-240 VAC System Operation
- 190 Delete 1 megabyte of memory

EQUIPMENT TO BE RETURNED

When upgrading a system, the equipment being returned for credit must be deinstalled and shipped to Hewlett-Packard at the time the new system is being installed. The following list specifies the equipment that *must* be returned with each

system. Instructions on where to return equipment are included in the Installation Manual for the new system or in the Notice of Return (NOR) packet sent to the CE prior to deinstallation.

System Upgraded	Equipment to be Returned
Pre-Series II	SPU 128 Kb memory 1 30215A mag tape controller 1 13037 disc controller 1 30032A/B ATC
Series II	SPU 128 Kb memory 1 30215A mag tape controller 1 13037 disc controller 1 30032A/B ATC
Series III	SPU 256 Kb memory 1 30215A mag tape controller 1 13037 disc controller 1 30032A/B ATC
Series 33A/B	SPU 256 Kb memory 2649E System Console Built-in flexible disc drive
Series 33C/U	SPU 256 Kb memory 2649E System Console
Series 30A/B	SPU 256 Kb memory 2649E System Console Built-in flexible disc drive
Series 30C/U	SPU 256 Kb memory 2649E System Console

EQUIPMENT TO BE RETURNED (Cont.)

System Upgraded	Equipment to be Returned
Series 37/37XE	SPU PIC ATP37 Cabinet I/O Extender* (Series 37XE only)
Series 40/42	SPU 0-2 Mb memory
Series 44/48/58	SPU 1-2 Mb memory
Series 64/68/70	SPU 2-8 Mb memory 2 GICs 1 1MB

Field Upgrade	Equipment to be Returned
Series 39 to High Performance Series 39 w/opt 408 for MPE-V/E	1 PCS CPU board 1 CTL CPU board
Series 40 to Series 42 w/ opt 409 for MPE-V/E	1 PCS CPU board 1 CTL CPU board
Series 44 to 48 w/ opt 410 for MPE-V/E	1 PCS CPU board 1 CTL CPU board
Series 39/40/42 to Series 42XP Series 44/48 to Series 58	1 ALU CPU board 1 CMP CPU board 2 CTL & PCS CPU boards or 1 CPS CPU board or 1 CPS-E CPU board Memory Controllers 256kb Memory boards

3

System Sizing and Performance

This section is for insertion of the HP 3000
Performance Guide or other materials.

Appendix A

HP 3000 Family System Comparison

The new 1984 family of HP 3000 Business Computers offers a wide range of price and performance capabilities.

The HP 3000 family is completely compatible from the entry level Series 37 to the Series 68 distributed mainframe.

HP 3000 PROCESSOR COMPARISON

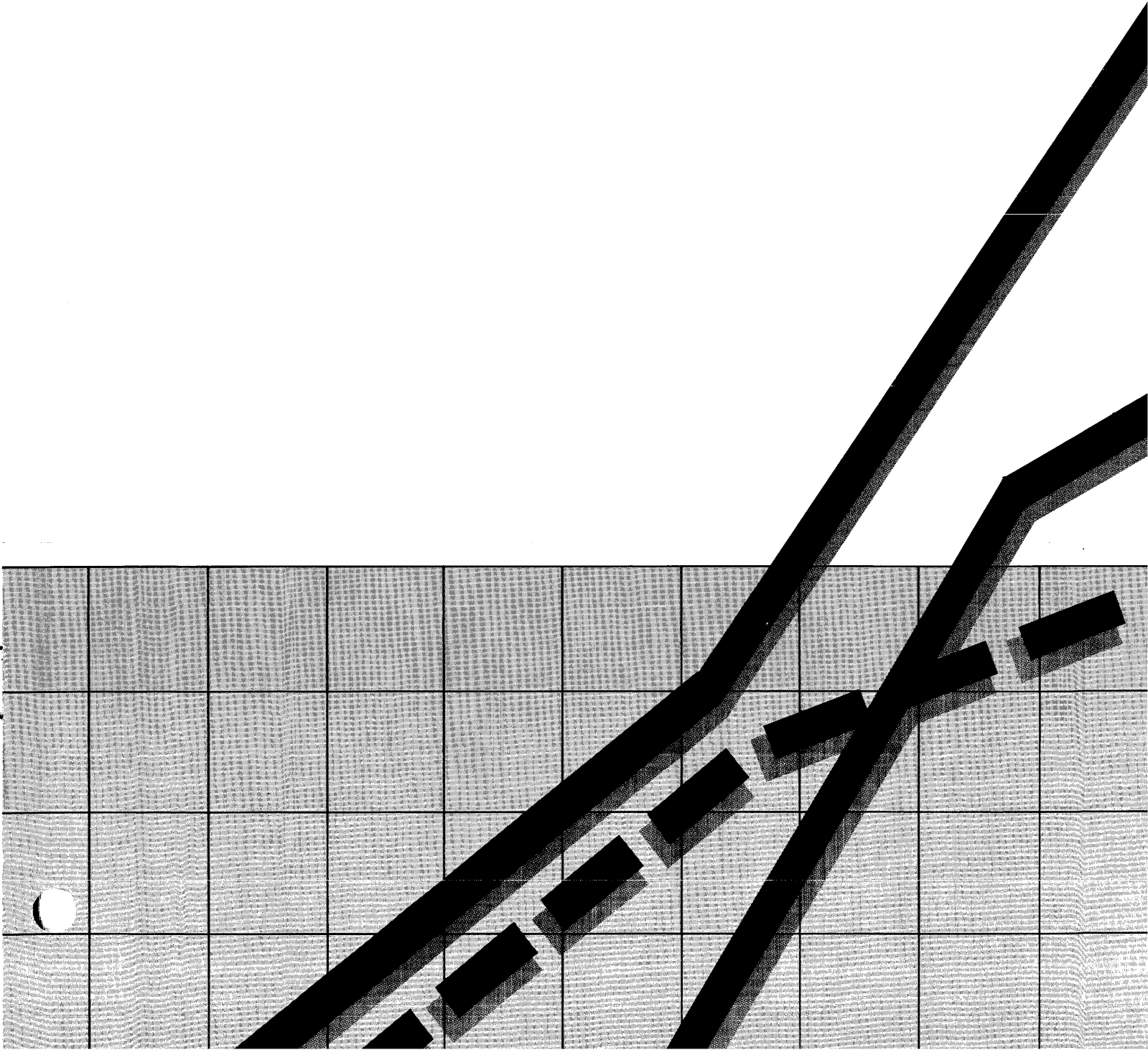
FEATURES	SERIES					
	30	37	37XE	42	48	68
Relative Performance	.6	1	1	2	2	5
Main Memory (Mb)	1	.5-2	1-2	1-3	2-4	3-8
Terminals	32	14	28	92	152	400
Disc Storage (Gb)		2.1	2.1	3.2	4.2	9.7
Tape Drives		2	2	4	8	8
Data Comm Links		1	3	3	7	24
Introduction Date		9/84	9/84	6/83	6/83	6/83
SPU Price		\$12K	\$20K	\$39.8K	\$67.5K	\$186K

COMPARISON OF S/37 & S/III
 37 III
 .9 1

HP 3000 Computer Systems



Performance/Configuration Guide for Distribution Management Systems



This simple guide provides general help for configuring appropriate hardware for OM/3000 and SFD/3000. Skim the entire guide before beginning the step-by-step instructions.

You provide the *number of terminals* and *percent activity* information for each product used, determine the *final load factor*, and look up SPU and Disc Requirements. Then, using the Memory Worksheet, figure out the general main memory requirements.

WARNING

The system configurations suggested by this guide are based on CPU, memory, and disc I/O requirements only. Factors such as table limitations, data communications performance, and supported configuration limitations are not addressed. These additional issues must also be considered when evaluating a proposed system configuration.

All projections are based on the best information currently available about the products. These projections have not been tested on large configurations. Use caution when dealing with marginal configurations.

HEWLETT-PACKARD DOES NOT WARRANT OR REPRESENT THAT THE INDICATED HARDWARE CONFIGURATION WILL BE OPTIMAL FOR ANY PARTICULAR CUSTOMER APPLICATION.

Introduction

This configuration guide presents a step-by-step procedure that can be used to select an approximate system configuration suitable for use with a specified mix of Hewlett-Packard Distribution Management applications. The basic sequence of steps follows:

1. Determine the TOTAL LOAD FACTOR for a specified mix of applications/users with the aid of the SYSTEM LOAD WORKSHEET.
2. Use the TOTAL LOAD FACTOR calculated to determine a suitable processor model from the PROCESSOR SELECTION CHART.
3. Use the TOTAL LOAD FACTOR calculated to determine the recommended number of master disc drives from the MASTER DISC DRIVE SELECTION CHART.
4. Use the MEMORY WORKSHEET to determine the recommended memory size for the system.
5. Use the DISC SPACE WORKSHEET to determine the number of needed disc drives.

The selection of processor model, disc drive configuration, and memory size should be treated as approximate guidelines only. These guidelines are designed to select systems that usually will provide a satisfactory level of overall performance. Other factors should be considered, such as supported peripheral configurations, etc.

Determining the Total Load Factor

To calculate the TOTAL LOAD FACTOR, use the SYSTEM LOAD WORKSHEET on page 4. (You may wish to make several copies of this worksheet for future use.) Each line in the worksheet must be filled in. For each application to be included in the system, repeat Steps 1 through 4.

Step 1. Selecting USAGE LEVELS

For each application selected, scan the application descriptions on page 3 to determine the USAGE LEVEL that most closely matches the anticipated usage of the product.

Note that the level of usage refers to *how* the product is used, not to how much the product is used.

Step 2. Selecting the NUMBER OF TERMINALS

Include all the connected terminals that are primarily for the selected application and usage level. Write this value in the column labeled NUMBER OF TERMINALS.

Step 3. Selecting the PERCENT ACTIVE Value

The PERCENT ACTIVE Value is used to compensate for users who perform non-computer office activities in addition to using the selected application. There are two alternative approaches for selecting this number. Using either of the following methods, estimate a value and place it in the column labeled PERCENT ACTIVE. This value should be entered as a decimal number between 0 and 1.

PERCENT ACTIVE Estimation Method #1

If a large number of users will be using the product, estimate what fraction of the users will actually be active during peak periods of the day. Allow for the fact that some users may be preparing information for editing, answering phones, etc. PERCENT ACTIVE levels greater than 80% are very uncommon.

As an example, consider a department with twenty SOE users that are entering and editing orders on a "full-time" basis. At any given time, it is likely that

about five of the users are filing papers or placing phone calls. In this case, only fifteen out of the twenty terminals, or 75%, are active.

PERCENT ACTIVE Estimation Method #2

If a small number of terminals are used, it may be easier to estimate the PERCENT ACTIVE value as follows:

Imagine a one hour interval during a period of peak system load. Estimate the number of minutes out of the hour the average user of this application is actively working at the terminal. Be sure to exclude any time the user will be performing other activities such as filing papers, answering phones, etc. In a typical office, a "full-time" order processing person may spend only 45 minutes of each hour actually working at the terminal. In this example, the users should be classified as 75% active.

Step 4. Calculating the NET LOAD

Multiply together the entries (from Steps 1 through 3) on each line of the worksheet to obtain a NET LOAD for that application and usage level. Write this value in the worksheet's far-right column labeled NET LOAD.

Consider the following example of ten terminals of complex pricing SOE users that are 75% active.

$$\begin{array}{rcccccc} \text{Number of Terminals} & \times & \text{Percent Active} & \times & \text{Load Factor} & = & \text{Net Load} \\ 10 & \times & 0.75 & \times & 6.0 & = & 45.00 \end{array}$$

Step 5. Calculating the TOTAL LOAD FACTOR

After you have repeated Steps 1 through 4 for each application to be included, calculate the TOTAL LOAD FACTOR by adding all of the NET LOAD values. Enter this value on the bottom of the SYSTEM LOAD WORKSHEET. This TOTAL LOAD FACTOR will be used to select both processor and disc drive configuration.

Processor Selection

Once the TOTAL LOAD FACTOR has been determined, the appropriate HP 3000 processor can be selected from the PROCESSOR SELECTION CHART (see page 5). In selecting a processor, consider the following factors:

1. The Series 39, 40, 42, 44 and 48 processors have the same computational power. The distinction between systems comes from differences in the memory and peripheral configurations that are supported. The selection of the upper limits of the ranges of the Series 39 and Series 42 as shown in the chart are somewhat arbitrary. If your load factor places the system in the Series 48 range, but the Series 42 or Series 39 can provide sufficient memory and peripheral connectivity, then you may use one of these smaller systems.
2. If your load factor indicates that two systems are suitable, select between the two based on price and performance. If performance is the key issue, the larger system will provide better performance and room for future growth.
3. It is advisable to repeat your TOTAL LOAD FACTOR calculation and examine the consequence of possible variations in workloads.
4. It is always advisable to compare your results with experience. If your customer already has a system with a similar workload, make sure your results are consistent. If not, it is likely that you may have incorrectly selected the values in the worksheet.
5. Consult an experienced and/or Performance Specialist-trained Systems Engineer.

Disc Drive Configuration Selection

The TOTAL LOAD FACTOR can also be used to select a suitable disc drive configuration for the system. Since disc caching can reduce the number of disc I/Os taking place on a system, systems using disc caching will require fewer disc drives to obtain the same level of performance.

Some notes about disc drive selection:

1. The number of disc drives recommended includes only master disc drives. Additional slave disc drives do not affect performance. (Only the older disc drive models are available as slave disc drives, e.g., 7925S, 7920S, and earlier models.)

2. As with processor selection, consider the price/performance concerns of the customer. If a range of disc drives is suitable, the larger number will usually provide better system performance.
3. Remember to consider the storage capacity requirements of the system.

Memory Size Selection

The SYSTEM LOAD FACTOR alone cannot be used to determine the memory required for the system. Instead, a second worksheet, the MEMORY WORKSHEET, is provided on page 6.

After filling in the number of terminals used for each process, the next step is to estimate what percent of the users of each group are active at any one time. Review your SYSTEM LOAD WORKSHEET if necessary to obtain an approximate value for each group as a whole. Enter this value as a decimal number between 0 and 1 on the MEMORY WORKSHEET.

Multiply the number of terminals by the percent active factor selected, then by the memory size load factor. Enter this value in the right side column. Fill in the rest of the worksheet as described on the worksheet. Finally, total up the entire right hand column to obtain an approximate memory size in megabytes.

This worksheet should also be filled out for a worst-case (100% active) workload. This will help to ensure that response is acceptable during peak times. Only terminals that will be active during peak hours should be counted as 100% active. Processes that will not be active during peak hours should be counted as 0% active.

Disc Space Selection

The amount of required disc space depends on the number of inventory items, customers, vendors, and orders kept on disc storage. To calculate the disc space requirements, use the DISC SPACE WORKSHEET provided on page 7.

Use a separate sheet for each company, branch, or separate location to be placed on the same system. (You may not want to use lines B and/or D, if the customers and vendors are the same for all companies, however.) Recognize the potential for growth and place the growth factor in the calculation up front. Better to overallocate than underallocate!

Application Descriptions

SOE, SOTRANS, SOREGULR, SOBATCH Sales Order Entry Processes

Simple Pricing	This usage level is a little more than just list pricing and overrides. It includes some discounts stated at the specific item level, with either volume breaks or column pricing.
Complex Pricing	Allows discounts and pricing as in SIMPLE. In addition, discounts that apply to each item in a group of items are allowed.
Amalgamated Pricing	End-of-order pricing which determines the discount based on the volume of categories of items on an order.
Order Changer	Calling up existing orders and modifying quantities, item number, price, etc. Also, an occasional line addition or deletion.

SOTRANS, SOFUTURE Scheduled Order Entry Processes

Future Orders	Entering a special type of order that will cause automatic creation of orders at a future time or times. Pricing is same as SIMPLE above.
Future Complex	Same as Future above using COMPLEX PRICING.

SOPRINT, POPRINT Order Printing Processes

Live Printer	A 1200 baud printer is used as a real-time printer, not spooled. The print program must wait for the printer to complete before continuing.
Spooled Printer	The print program runs at high speed (but for a shorter time) writing to a spool file. The spool file is later printed to any type of printer.
All Other Programs	A mixture of work that would be considered average load for the program.

Customer name

Site

Date

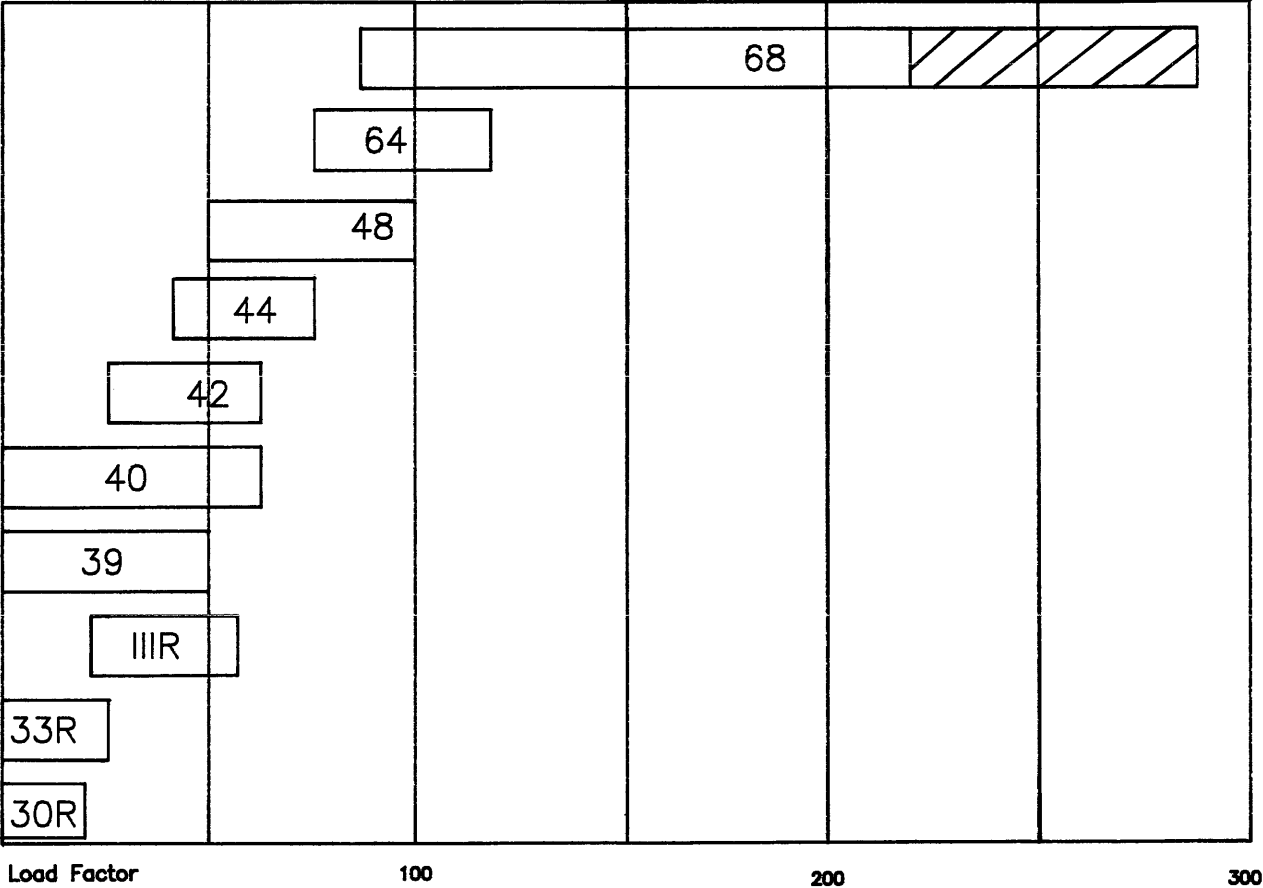
Prepared by

System Load Worksheet

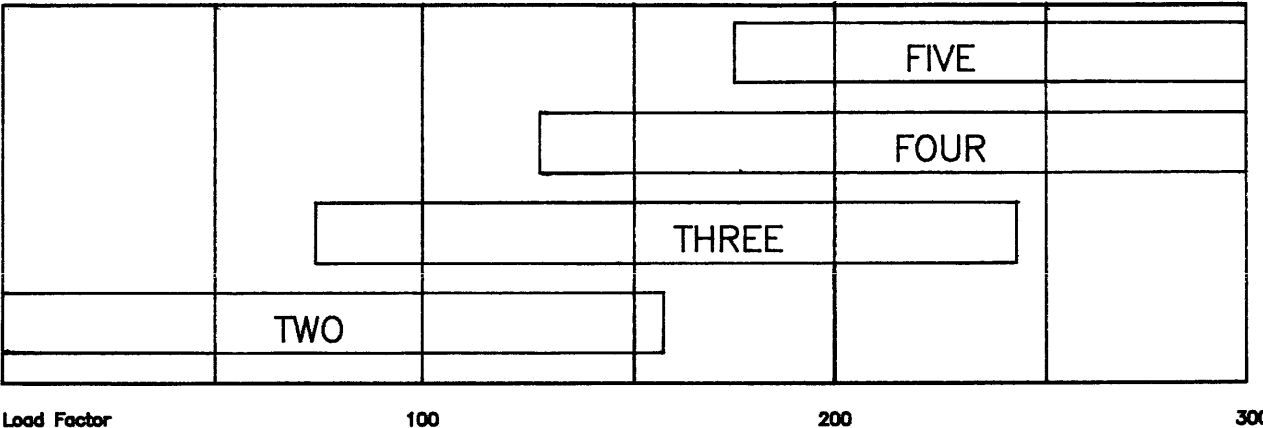
Program Name	Usage Level	Number of Terminals		Percent Active		Load Factor		Net Load
SOE	Simple pricing	_____	×	. _____	×	5.0	=	_____
SOE	Complex or Amalg	_____	×	. _____	×	6.0	=	_____
SOE	Complex and Amalg	_____	×	. _____	×	6.5	=	_____
SOE	Order Changer	_____	×	. _____	×	8.5	=	_____
SOTRANS	Simple pricing	_____	×	. _____	×	6.0	=	_____
SOTRANS	Complex or Amalg	_____	×	. _____	×	7.0	=	_____
SOTRANS	Complex and Amalg	_____	×	. _____	×	7.5	=	_____
SOTRANS	Order Changer	_____	×	. _____	×	8.0	=	_____
SOTRANS	Order Shipper	_____	×	. _____	×	9.0	=	_____
SOTRANS	Future Orders	_____	×	. _____	×	9.0	=	_____
SOTRANS	Future Complex	_____	×	. _____	×	10.0	=	_____
SOBATCH	Simple pricing	_____	×	. _____	×	5.0	=	_____
SOREGULR	Simple pricing	_____	×	. _____	×	6.0	=	_____
SOREGULR	Complex or Amalg	_____	×	. _____	×	7.0	=	_____
SOREGULR	Complex and Amalg	_____	×	. _____	×	7.5	=	_____
SOREGULR	Order Changer	_____	×	. _____	×	8.0	=	_____
SOFUTURE	Future Orders	_____	×	. _____	×	9.0	=	_____
SOFUTURE	Future Complex	_____	×	. _____	×	10.0	=	_____
SOPRINT	Live Slow Printer	_____	×	. _____	×	11.0	=	_____
SOPRINT	Spooled Printer	_____	×	. _____	×	49.0	=	_____
SOSHIP	Moderate	_____	×	. _____	×	8.0	=	_____
ARCASH	Moderate	_____	×	. _____	×	4.0	=	_____
ARORDERS	Moderate	_____	×	. _____	×	4.0	=	_____
POTRANS	Moderate	_____	×	. _____	×	8.0	=	_____
POPRINT	Live Printer	_____	×	. _____	×	10.0	=	_____
POPRINT	Spooled Printer	_____	×	. _____	×	45.0	=	_____
POREC	Moderate	_____	×	. _____	×	7.0	=	_____
POINV	Moderate	_____	×	. _____	×	7.0	=	_____
POINV	Heavy	_____	×	. _____	×	10.0	=	_____

Add all NET LOAD values to obtain the TOTAL LOAD FACTOR = _____

PROCESSOR SELECTION CHART



MASTER DISC DRIVE SELECTION CHART



Customer name

Site

Date

Prepared by

Memory Worksheet

Program Name	Number of Terminals		Percent Active		Load Factor		Memory Required
SOE	(1 + _____)	×	. _____	×	0.05	=	_____
SOTRANS	(1 + _____)	×	. _____	×	0.05	=	_____
SOREGULR	(1 + _____)	×	. _____	×	0.05	=	_____
SOBATCH	(1 + _____)	×	. _____	×	0.05	=	_____
SOFUTURE	(1 + _____)	×	. _____	×	0.05	=	_____
SOPRINT	_____	×	. _____	×	0.10	=	_____
SOSHIP	_____	×	. _____	×	0.07	=	_____
ARCASH	_____	×	. _____	×	0.07	=	_____
POTRANS	(1 + _____)	×	. _____	×	0.05	=	_____
POREC	_____	×	. _____	×	0.08	=	_____
POINV	_____	×	. _____	×	0.08	=	_____
POPRINT	_____	×	. _____	×	0.08	=	_____
APxxxx (any AP prog)	_____	×	. _____	×	0.07	=	_____
GLxxxx (any GL prog)	_____	×	. _____	×	0.07	=	_____
Memory for operating system						=	.25
Memory for Disc Caching						=	_____
Suggested values: 0.50 for Series 39, 42							
1.00 for Series 48							
1.00 for Series 68 (small configuration)							
2.00 for Series 68 (large configuration)							
Add all quantities together to get the							
MINIMUM RECOMMENDED MEMORY SIZE IN MEGABYTES						=	=====

Customer name

Site

Date

Prepared by

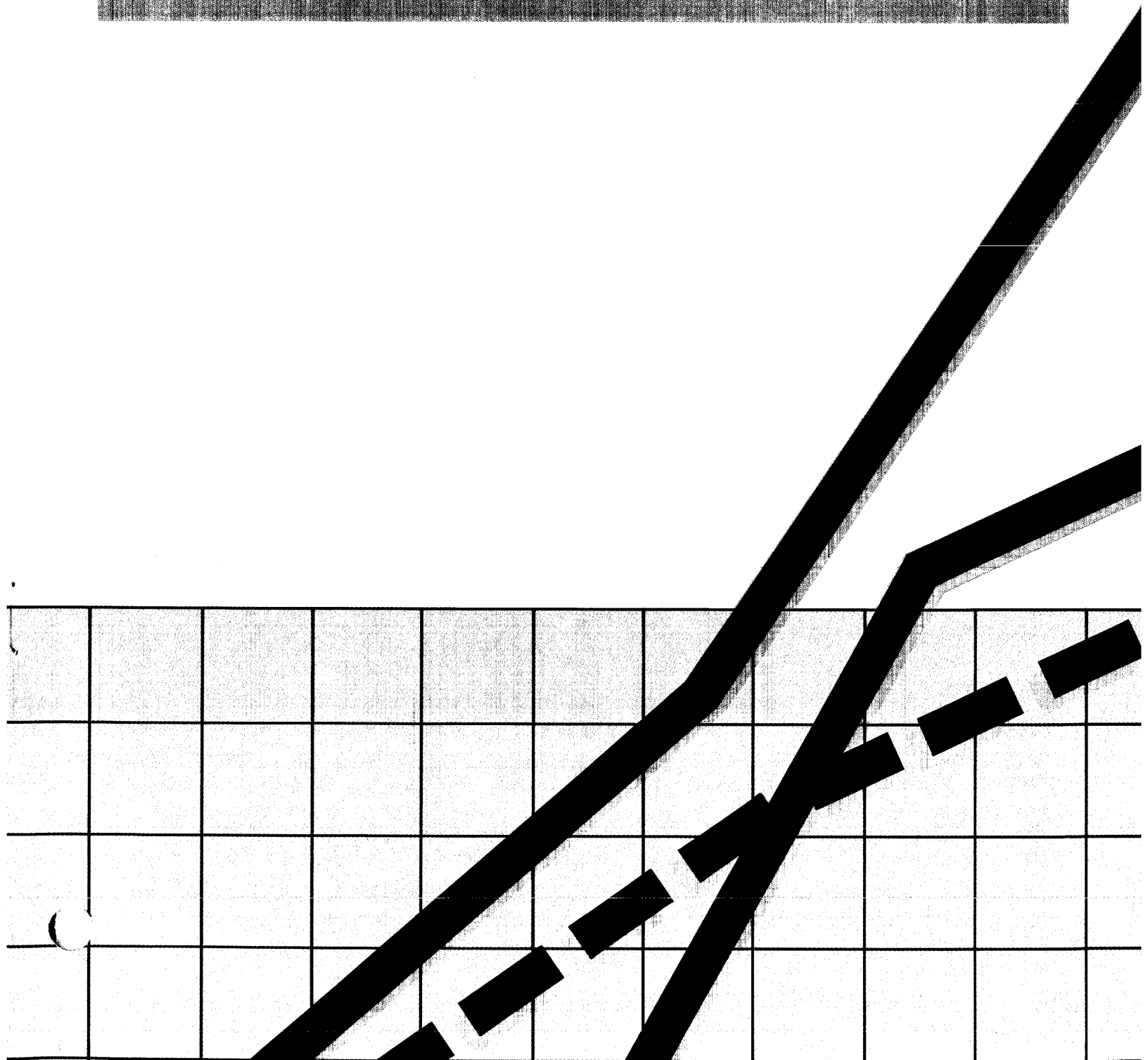
Disc Space Worksheet

A. Number of items	_____	×	2.20	_____	_____
B. Number of customers	_____	×	2.00	_____	_____
C. a. orders/month	_____	×	2.00	_____	_____
b. lines/orders	_____	×	C.a. × .67	_____	_____
c. comments/order	_____	×	C.a. × .28	_____	_____
d. sum of a + b + c				_____	_____
e. number of months history on line				_____	_____
f. multiply C.d. × C.e.					_____
D. Number of vendors	_____	×	2.00	_____	_____
E. a. POs per month	_____	×	2.30	_____	_____
b. lines per PO	_____	×	E.a. × 1.60	_____	_____
c. comments per PO	_____	×	E.a. × .28	_____	_____
d. sum of a + b + c				_____	_____
e. number of months history on line				_____	_____
f. multiply E.d. × E.e.					_____
F. Sum of A + B + C.f. + D + E.f.					_____
G. Multiply F × 2.5 (all other data sets)					_____
H. Multiply G × 256 (bytes per sector)					_____
I. MPE System Requirements – bytes					<u>20,000,000</u>
J. SFD/3000 or OM/3000 System Requirements – bytes					<u>20,000,000</u>
K. Additional bytes required (for such use as USAGE reporting, PRICING subsystem, etc.)					_____
L. Total required bytes H + I + J + K					_____
L ÷ 380,000,000 = number of 400MB discs (round UP)					_____
L ÷ 114,000,000 = number of 120MB discs (round UP)					_____

HP 3000 Computer Systems



Performance Guide



The performance of HP 3000 Computer Systems and related products is application dependent. The performance obtained in a user environment will depend on the particular application workload. The throughput rates and response times indicated in this guide relate only to the application workloads described herein.

HEWLETT-PACKARD DOES NOT WARRANT OR REPRESENT THAT THE PERFORMANCE DATA STATED HEREIN WILL BE ACHIEVED FOR ANY PARTICULAR CUSTOMER APPLICATION.

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Introduction

Hewlett-Packard is committed to providing the right business system for your application needs.

The purpose of this guide is to show you the performance of the different HP 3000 systems to help you determine the best Hewlett-Packard solution for your needs.

This guide is intended to provide information for two groups of customers:

1. Customers who are considering purchasing HP business computers for the first time. The results provide an understanding of the performance capabilities of the HP 3000 product line and the relative position of each HP 3000 hardware product.
2. Existing customers who require this information in order to economically plan their future growth needs. These needs may be met through system expansion, system upgrades, or the purchase of additional systems.

The performance data shown here should be used only as a general comparison between different HP 3000 configurations and versions of MPE. This information is intended to serve as a guideline in sizing systems. Actual system performance will vary depending on application design, load, and configuration.

Products Tested

The products which have been performance tested for the purposes of this guide include HP 3000 Computer Systems and Data Communications products. The HP 3000 System Performance section includes data which positions the Series 30R/33R, the Series III, the Series 39, the Series 40, the Series 42, the Series 44, the Series 48, the Series 64, and the Series 68.

Hewlett-Packard Consulting Services

Hewlett-Packard offers on-site Systems Engineering consulting, both as standardized services and on a time-and-materials basis, in order to help maximize the productivity of HP 3000 systems. The standardized consulting products presently available for the HP 3000 include:

Installation Management

This service is designed to help the System Manager of a new installation become immediately productive by reducing start-up problems, customizing procedures to your objectives, and planning for long-term operational success. This includes discussion and recommendations on performance variables, methods, problem management, disaster recovery, job scheduling and load management.

System Performance Evaluation

This service can help to optimize system performance by identifying bottlenecks and their causes, and by recommending a strategy for corrective action. An HP 3000 Performance Specialist uses HP performance tools to analyze the system workload, identify system bottlenecks (both current and potential), and suggest improvements for better system performance. For more information on Hewlett-Packard Consulting Services, please contact your HP Sales Representative.

Hewlett-Packard Performance Products

In addition to Hewlett-Packard system performance consulting, there are several Hewlett-Packard software products available which enable you to measure and tune the performance of your HP 3000 system:

OPT/3000

On-line Performance Tool (OPT/3000) is an interactive software program which enables the user to identify system bottlenecks and observe how the system resources are being utilized. OPT/3000 uses graphical displays to show what percentage of the CPU is busy, how memory is being used, and how many I/O's are being performed on each disc. It also shows which users are consuming critical system resources.

APS/3000

Application Program Sampler (APS/3000) is an on-line software tool which helps programmers identify CPU bottlenecks in the source code of application programs. APS/3000 will graphically show which areas of a program are consuming the most CPU resources. The programmer can then tune his application to run more efficiently and increase overall system performance based on the results obtained from APS/3000.

For more information on Hewlett-Packard performance products, please contact your HP Sales Representative.

System Performance Test Description

Nature of the Tests

These tests were run using a general purpose EDP mix which will be described in a later section. This mix was held constant while factors such as the system processor, main memory, disc storage capacity and number of discs, terminal load, and versions of the operating system were varied. The altering of each of these variables shows how system performance is impacted when running a given scenario.

Definitions

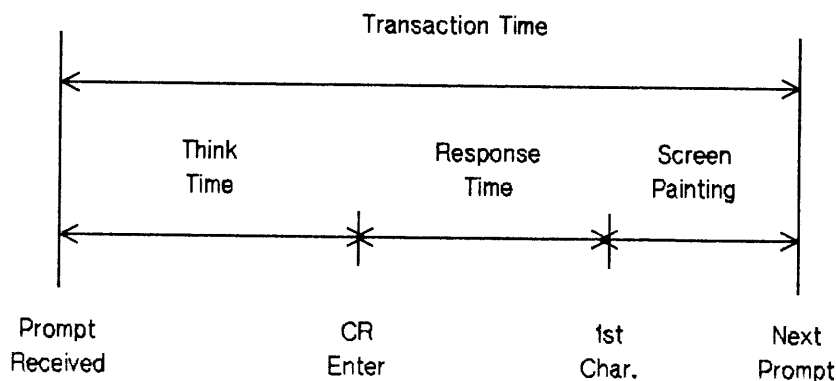
These definitions are provided so that the following data may be interpreted in a consistent manner.

Think time: The time measured from when a user receives a prompt from the system to when the **RETURN** or **ENTER** key is pressed. Think time includes the time the user may spend thinking before entering a transaction as well as the time spent typing.

Response time: The time measured from when the **RETURN** or **ENTER** key is pressed until the first character of a response is received on the user's screen. The graphs in this guide show a "weighted average" response time which is determined by weighing the response time of each application run in the test in relation to the transaction rate of that application.

Transaction: The total of *think time*, *response time* and the screen "paint" time. It is the time from user prompt to user prompt.

Transaction Rate: The number of transactions completed during a set period of time. The transaction rates shown in this guide are for one hour periods.



Testing Technology

The tests were conducted using two Hewlett-Packard proprietary software performance tools, **TEPE** and **MPEDCP/DRP**.

TEPE (Terminal Emulator and Performance Evaluator), is a tool which was developed to test large on-line terminal configurations. Users are emulated by running the **TEPE** program on one or more HP 3000s which are linked via terminal connections to the system being tested (System Under Test). The **SUT** actually performs work as if live users were sitting at terminals entering data. The **TEPE** systems, or systems driving the **SUT**, send and receive data which is collected for later analysis of response times and transaction rates. **TEPE** also provides the flexibility to vary the think time, typing speed and terminal speed.

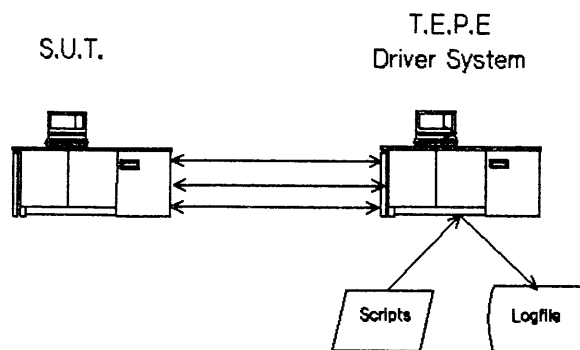
A performance test using **TEPE** consists of three phases:

Phase I: *A defined workload is put onto the test systems.* This workload includes all programs and data that will be used. "Scripts" must be developed for each emulated terminal. A script includes all messages to be sent to the **SUT** and also includes messages describing the operation of the terminal such as the think time and whether the terminal is to operate in character or block mode.

Phase II: *Actual testing.* After connecting the **TEPE** system(s) to the **SUT**, the number of terminals to be emulated must be defined and a script file name assigned to each terminal. **TEPE** will then begin sending and receiving messages from the **SUT**. These messages and a timestamp of when the messages were sent and received will be written to a logfile.

Phase III: *Analysis of the logfile created in Phase II.* Response times and transaction rates are calculated during this phase.

MPEDCP, MPE Data Collection Program runs on the **SUT** during the test. This tool collects a variety of performance related information, including CPU utilization information, disc I/O rates, and memory usage information. Samples are collected and written to a logfile which may be analyzed after the testing phase is completed. This tool consumes only 1 - 3% of the available CPU, so it has a negligible impact on the overall system performance. **MPEDRP**, MPE Data Reduction Program, is run after the test is completed to summarize the data collected by **MPEDCP**.



Test Environment

The standard application workload which was used for testing HP 3000 systems is the same workload which has been used in previous HP 3000 performance guides. By using the same mix, we are able to compare this set of results with our earlier test results. This mix may be representative of a general purpose EDP environment, but the main intent is to provide a consistent set of test results across the HP 3000 product line. The application mix consisted of on-line and batch jobs running concurrently. All databases and updated files were restored to their initial condition before each test. File placement was by default.

On-line mix:

The mix consisted of 60% application programming transactions using VPLUS/3000 and IMAGE/3000, 20% QUERY/3000 transactions, and 20% program development transactions and MPE commands.

The time between transactions varied from three to ten seconds. The tests on the older systems, the Series III R and Series 30/33R, were run with the terminals at 2400 baud while all other tests were completed with the terminals running at 9600 baud.

- **VPLUS/3000 and IMAGE/3000:** This application consisted of a 2500 line COBOL program which performs 48 file inquiries, 14 files updates and 7 file add transactions in each loop of the script. This includes regular screen changes which are typical of a database inquiry/update application. Data set locking was used. The database consisted of 2500 entries organized into 10 master datasets and 8 detail datasets. VPLUS/3000 block mode data entry consisted of six screens and one main menu screen. Reviews were performed in groups of three or four. Adds and updates were done one at a time. The application is an on-line patient admission and charge collection system. The think times varied from four to ten seconds.
- **Data Inquiry:** QUERY/3000 was used for on-line database inquiry and reporting. The database used was the same as described above with the inquiries consisting of ten FINDs and nine REPORTs being performed on one of the detail datasets. The detail dataset consisted of 445 entries. The FINDs are performed on a search item which is accessed randomly through the master data set. A QUERY/3000 procedure file is used to define the report format. The think times varied from four to ten seconds.
- **Program Development/System Management:** A 1200-line COBOL program was compiled and linked but was not executed. EDIT/3000 was used to TEXT, MODIFY, and KEEP a 500-line program source file. System status commands were also executed in some of the scripts (SHOWTIME, SHOWJOB, SHOWME, REPORT, LISTF and HELP) as well as file control commands (BUILD, FILE, SAVE, and PURGE) and one utility program (LISTEQ). The think times varied from three to six seconds.

Batch mix:

Two or more jobs were run in batch mode, while the on-line sessions were active. The jobs were the same except that the second job logged on and waited for seconds before executing. Each job compiled and linked the 1200-line COBOL program but did not execute it. Then, each job executed a 1000-line COBOL program which consisted of a 500-line program and called a 500-line subroutine. The main program was an order, shipment, and inventory program which sorted 2500 120-byte records twice and created one report for each sort. The COBOL internal sort was used for the sorting in these jobs. The data file had a blocking factor of 16. Both sorts were ascending order sorts using two keys. The report which was generated was written to a null file. The number of batch jobs run simultaneously during one test varied with the number of terminals being tested. Two additional batch jobs were run for approximately every 50 terminals tested. For the 10 to 50 terminal tests, two batch jobs were run; for 60 to 100 terminals four batch jobs were executing, etc.

Test Limitations

As mentioned earlier, the mix used for this set of tests is intended to provide information on the relative performance of systems in the HP 3000 product line. System performance is *extremely* application dependent and caution should be exercised in making comparisons between this mix and other system loads.

This mix provides a consistent set of performance information for the HP 3000 from the older Series III and Series 30/33 models through the current Series 68. However, this mix may not be as typical for the current Series 68 customer as it was or is for the Series III customer. As HP introduces larger systems and additional software, it becomes increasingly difficult to define a typical HP 3000 workload.

The scenario used for these system performance tests is subject to the following limitations:

1. For larger configurations, the system mix was relatively light compared to the workloads used in many actual production environments.
2. The average transaction completed approximately ten disc I/Os, which is much lower than many large database applications.
3. The database used was smaller than most databases in the larger (Series 48 and Series 68) HP 3000 configurations. This smaller database provided exceptional results on some of the larger memory configuration tests with disc caching enabled, due to large portions of this database being cached.

Current Product Line Comparison

HP 3000 Performance Testing Results

The HP 3000 family consists of a broad range of commercial systems. The Series 30R/33R, Series IIIIR, Series 40R, and Series 44R (the older systems), are now being re-marketed. The Series 30R performance is identical to that of the Series 33R with the same memory size, the primary difference being that the Series 33R offers more I/O expandability. The Series 30R, Series 33R, Series IIIIR, and Series 39 represent the low-end of the HP 3000 product line. The Series 40, 42, 44, and 48 perform in the mid-range, and the Series 64 and Series 68 are the highest performing systems.

Figures 1 and 2 show the relative performance of the HP 3000 family by comparing both the response times and the transaction rates of the systems running the EDP mix. Typical customer configurations for each system are represented:

Series IIIIR: 2 Mb Memory, four HP 7925 disc drives (1 master and 3 slaves), MPE IV, 10 - 50 terminals.

Series 39: 1 Mb Memory, one HP 7914 disc drive (132 Mb), MPE V/P (disc caching not included), 10 - 30 terminals.

Series 42: 2 Mb Memory, two HP 7933H disc drives (404 Mb), MPE V/E (disc caching enabled), 10 - 30 terminals, ADCC terminal connections.

Series 48: 4 Mb Memory, two HP 7933H disc drives, MPE V/E (disc caching enabled), 10 - 90 terminals, ATP terminal connections.

Series 68: 6 Mb Memory, four HP 7933H disc drives, MPE V/E (disc caching enabled), 50 - 180 terminals.

Conclusions

For the Series 39, with a 1 Mb configuration, acceptable performance was achieved with 10 to 20 terminals. With the addition of more terminals, the system became increasingly memory bound. For the Series 39, I/O was also a bottleneck at 30 terminals since in these tests there was only one disc drive and no disc caching.

The Series 42 performance was equal to or better than the Series III performance in all tests completed.

In these tests, the Series 48 was able to run 90 terminals simultaneously with just over two second response time. However, between 70 and 90 terminals, CPU saturation was reached so that adding additional terminals beyond 90 with this mix would result in a performance degradation.

The Series 68, as shown here, completed over 40,000 transactions an hour with 2 second response time at 180 terminals. Up to 400 terminals can be logged on simultaneously to the Series 68, but it is recommended that no more than 200 be actively processing at any one time for acceptable performance under most workloads.

Figure 1:

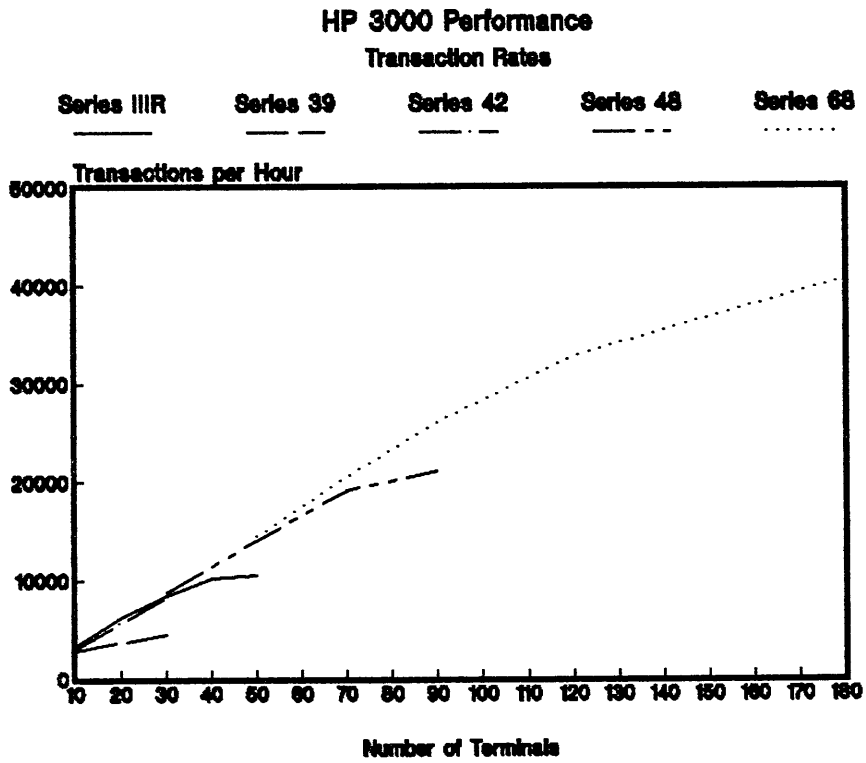
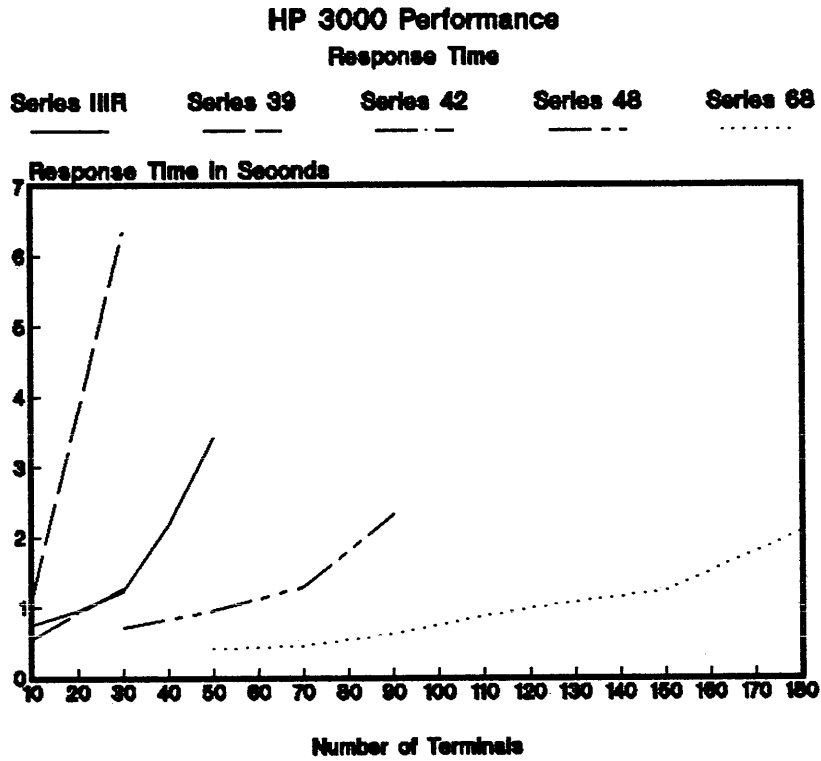


Figure 2:

Upgrade Performance

"Box Swap" Upgrades

Figures 3 - 6 show the performance that can be achieved by upgrading older HP 3000 models to larger, higher performance models. Performance of some of the more common upgrade paths are shown here.

Box Swap Upgrade Configurations:

Series 30/33: 1 Mb memory, two HP 7925 disc drives (one master and one slave), MPE IV.

Series III: 2 Mb memory, four HP 7925 disc drives (one master and three slaves), MPE IV.

Series 40: 2 Mb memory, two HP 7933H disc drives, MPE IV.

Series 44: 2 Mb memory, two HP 7933H disc drives, MPE IV, ADCC terminal connections.

Series 48: 4 Mb memory, two HP 7933H disc drives, MPE V/E, ATP terminal connections.

Series 68: 4 Mb memory, four HP 7933H disc drives, MPE V/E.

Figures 3 and 4 show the increases in performance that were achieved by upgrading a Series 30/33, Series III, or Series 40 to a Series 48. The Series 48, which was tested for configurations of 30 to 90 terminals, provided up to a 70% improvement in response time over the older systems at the 30 terminal level. The Series 48 was able to efficiently run almost twice as many terminals as the Series III with no degradation in response time.

Figures 5 and 6 show the relative performance improvements that may be observed when upgrading a Series 30/33, Series III, or Series 44 to a Series 68. Response time was reduced by up to 79% when a Series 44 was compared to a Series 68 running the EDP mix. The Series 68 was able to run three times as many terminals and complete three times as many transactions as the Series III with almost the same response time.

Figure 3:

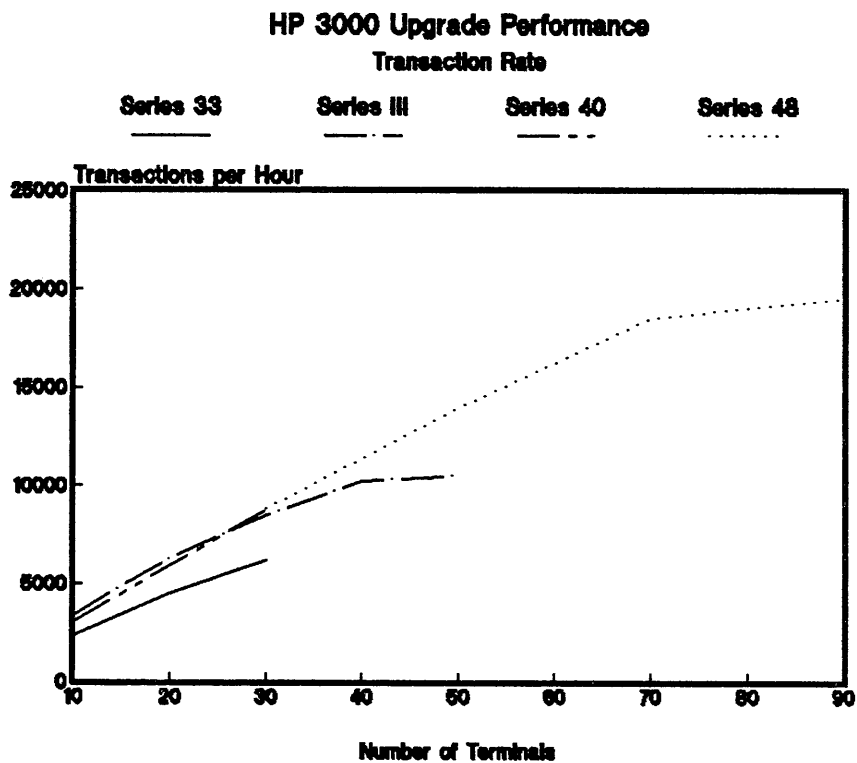
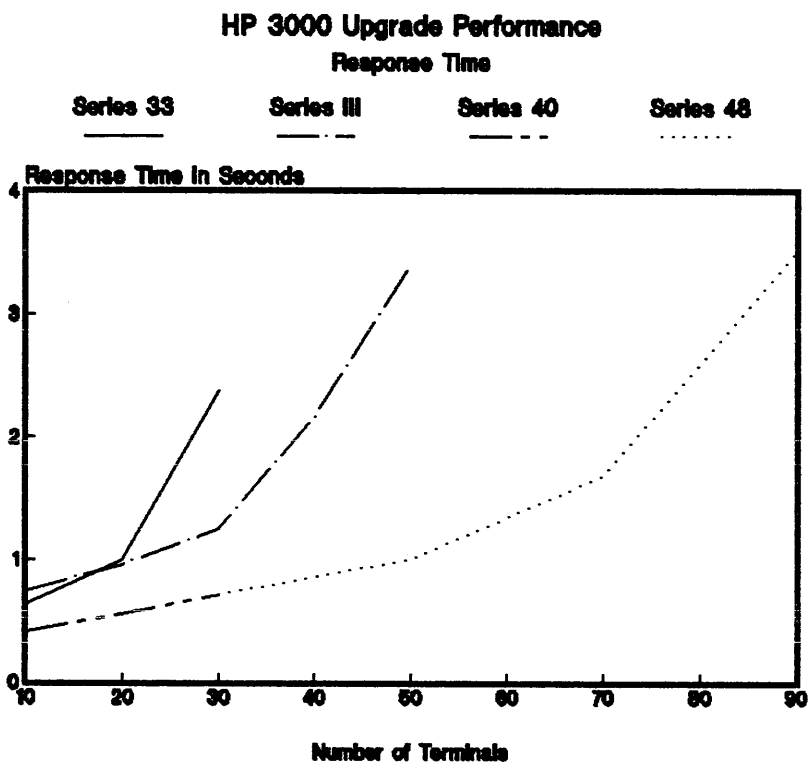


Figure 4:

Figure 5:

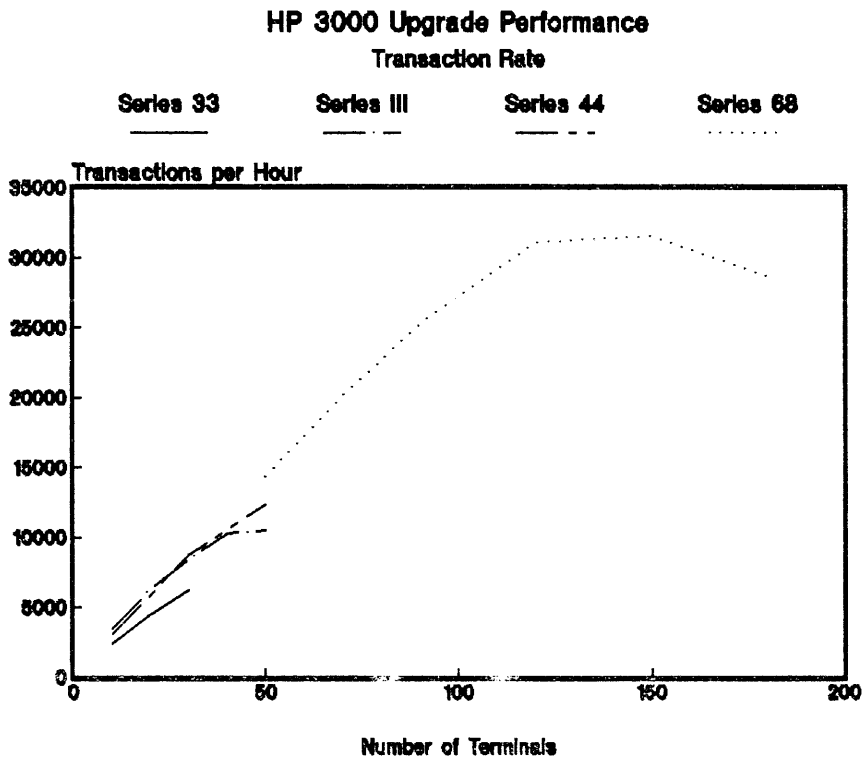
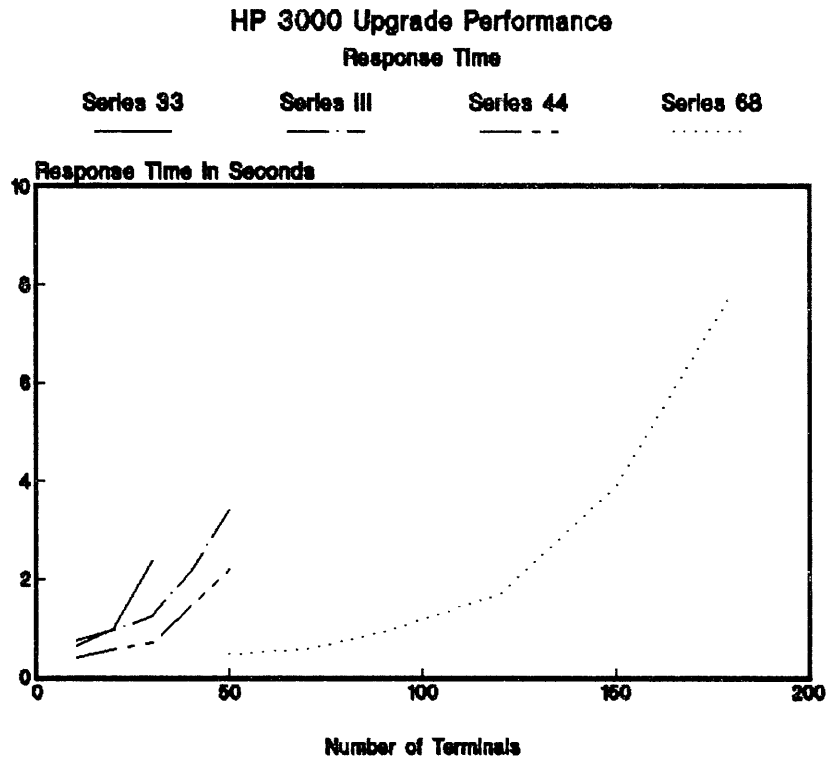


Figure 6:

"Field" Upgrades

Field upgrades include a new, higher-performance version of MPE with disc caching software and 1 Mb of memory. Upgrading a Series 40, 44, or 64 to a 42, 48, or 68 respectively involves changing two system variables. Figures 7 - 10 show the performance effects of this type of upgrade.

Series 40 to Series 42 Upgrades

Figures 7 and 8 show the performance improvement that might be achieved by upgrading a Series 40 to a Series 42. In our testing, adding the additional 1 Mb of memory and the caching software provided as much as a 92% improvement in response time and a 46% improvement in throughput. Both the Series 40 and Series 42 were tested with two HP 7933H disc drives. The Series 42 can run this mix with very good performance at 30 terminals but the Series 40 was under severe memory pressure at the 30 terminal point.

Series 44 to Series 48 Upgrades and Series 64 to Series 68 Upgrades

Figures 9 and 10 show the performance improvements resulting from upgrades to the Series 48 and Series 68.

A 2 Mb Series 44 running MPE IV was compared to a 3 Mb Series 48 running MPE V/P. The Series 44 and Series 48 were both configured with two HP 7933H disc drives on the same GIC and ADCC's as the terminal connections. This data shows that response time was improved by up to 50% with this upgrade. The performance improvement was due to the addition of disc caching and additional memory which relieved the I/O bottleneck by taking advantage of available CPU resources.

The Series 64 to Series 68 upgrade data was taken from a 4 Mb Series 64 running MPE IV which was upgraded to 6 Mb of memory running MPE V/E. Both systems were configured with four HP 7933H disc drives split across two GIC's. The expanded tables version of MPE allowed double the number of terminals to run with two second response time. Under MPE IV, because of table limitations, only 90 sessions of this mix could be running concurrently.

Figure 7:

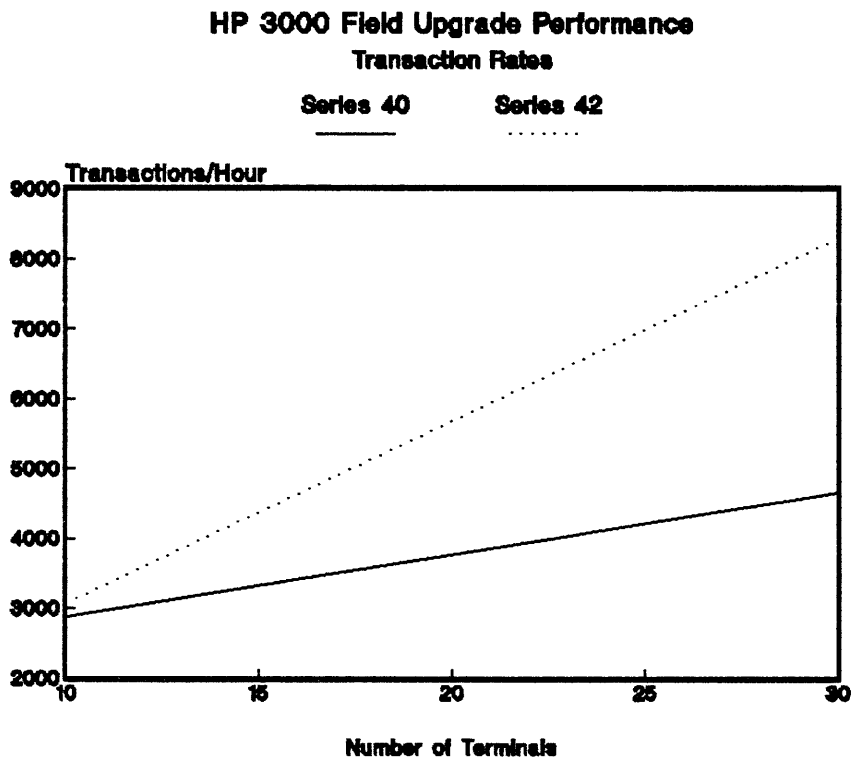
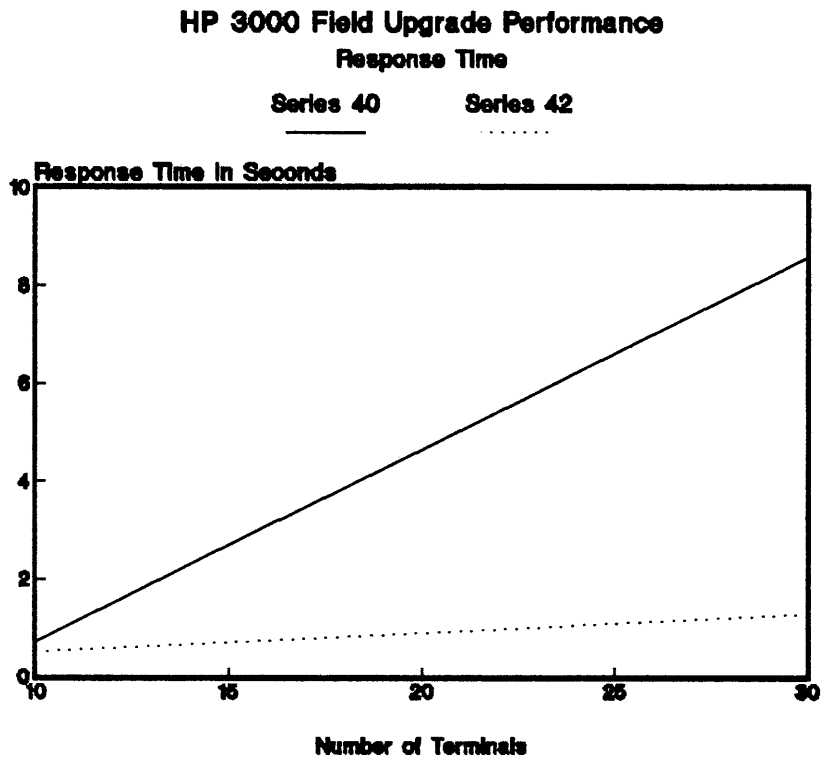


Figure 8:

Figure 9:

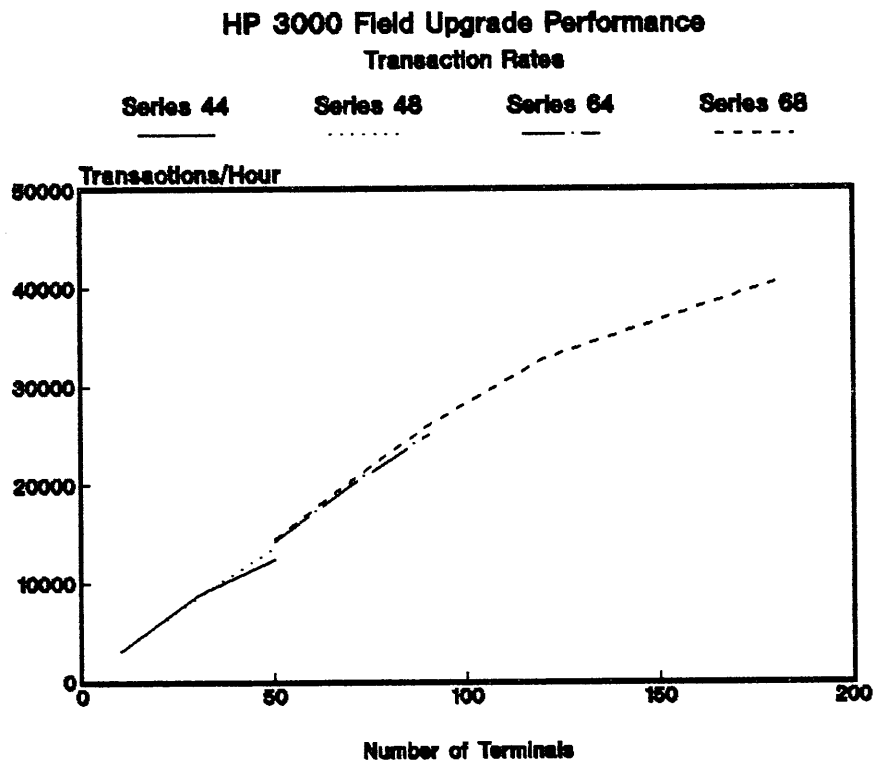
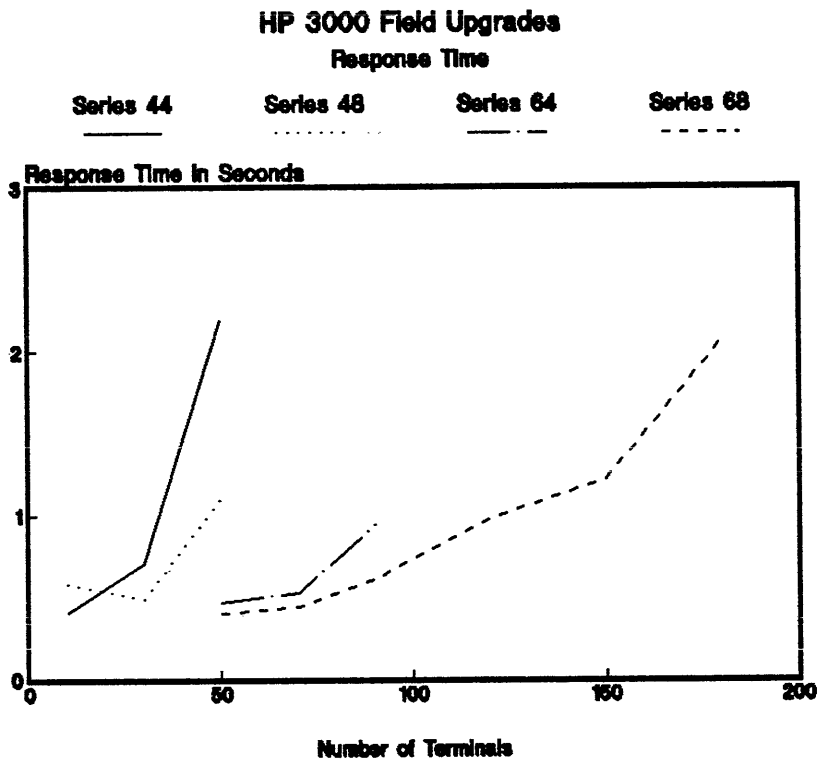


Figure 10:

Effects of Changes to System Variables

The data presented in the previous section shows the differences when HP 3000 systems are upgraded either through "box swaps" or field upgrades. These changes involve modifying more than one system variable. In this section, one system variable at a time is isolated to determine its effect on overall system level performance. The variables discussed are memory, disc caching, operating system versions, and number of disc drives.

Effects of Additional Memory

Figures 11 - 13 show how additional memory affected response time for the EDP mix. As can be seen from the graphs for both the Series 42 and Series 48, additional memory allowed considerably more terminals to be added before significant performance degradation occurred.

The Series 42 configuration consisted of two HP 7933H disc drives on one GIC, with ADCC's for terminal connections, and was operating under MPE V/P. For the Series 42, 2 Mb is a sufficient memory configuration until more than 30 terminals are running simultaneously.

The Series 48 was configured for two HP 7933H disc drives on one GIC, using the ATP for terminal connections, and was running MPE V/E. On the Series 48, there is negligible difference between the 3 and 4 Mb configurations until more than 50 terminals are running. The Series 68 was running MPE V/E and was configured for four HP 7933H disc drives split across two GIC's. On the Series 68, the system becomes memory bound with 4 Mb at 120 terminals, but there was virtually no difference in response time between the 6 and 8 Mb configurations.

These figures show that more memory is not always significantly better--even when disc caching is enabled. In the mix used here, the systems are functioning satisfactorily with less than maximum memory, except where heavily loaded (for example, the Series 48 tests with 70 and 90 terminals).

Figure 11:

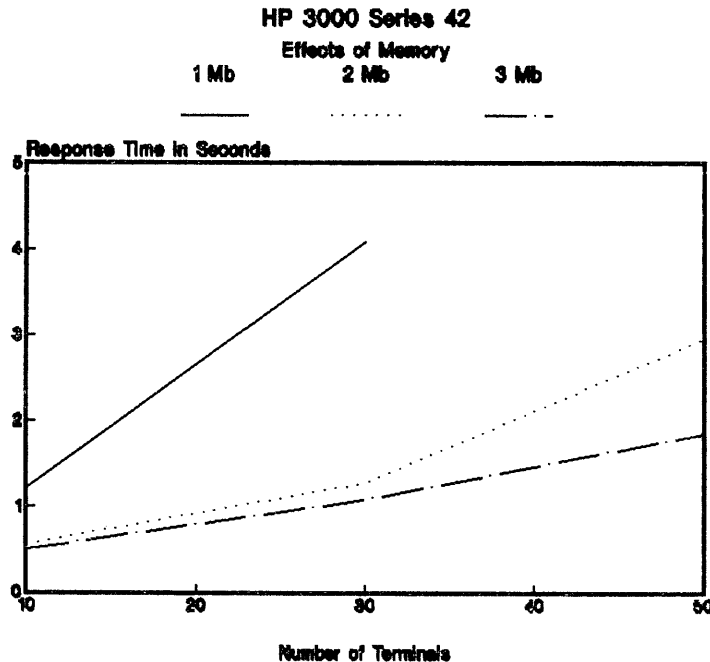


Figure 12:

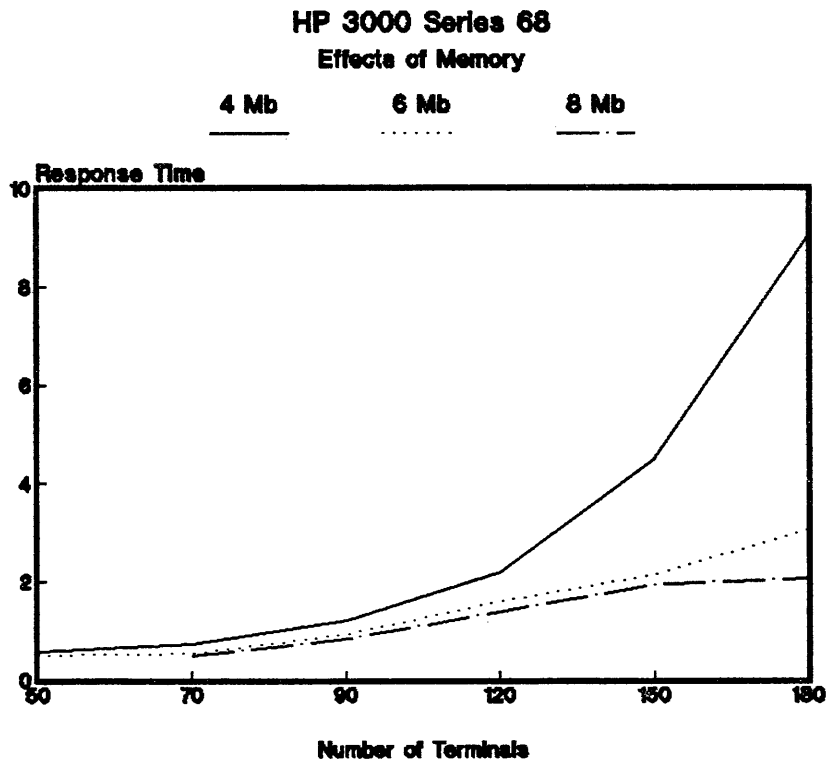
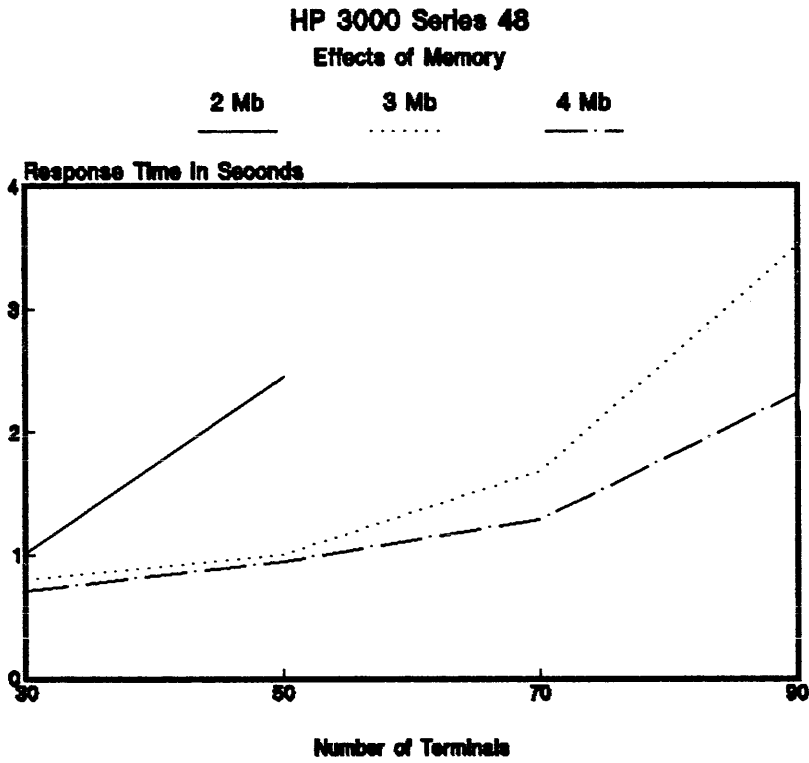


Figure 13:

Effects of Disc Caching and Versions of MPE V

Figures 14 to 19 show the differences in performance when disc caching is enabled for systems running both versions of MPE V: MPE V/P and MPE V/E.

Note: The following graphs indicate a difference in response time between MPE V/E and MPE V/P for some configurations and system loads. However, for those situations which indicated a significant difference, the response time was only one to two seconds and the difference would probably not be noticed by the users.

Figures 14 and 15 show the effects of disc caching on the Series 42. The Series 42 was configured with 3 Mb of main memory, two HP 7933H disc drives on one GIC, and ADCC's for the terminal connections. The tests run under MPE V/E operating system did not use any of the expanded table features. Disc caching provided up to a 34% improvement in response time using this mix. All response times were less than two seconds except for the MPE V/E, non-cached 50 terminal test. There was very little difference in throughput between MPE V/P and MPE V/E on the Series 42 as shown by Figure 14.

Figure 14:

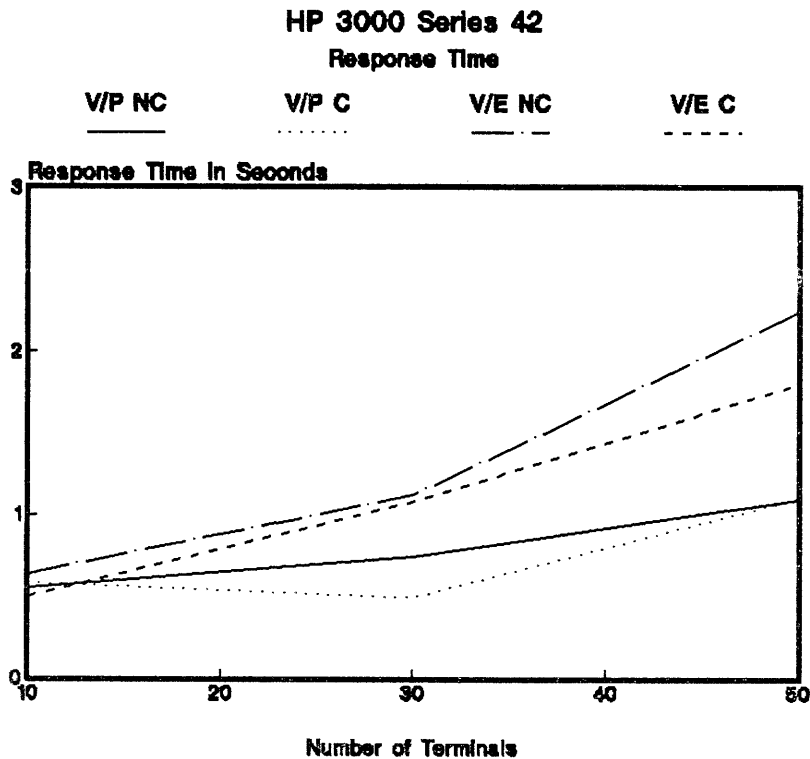
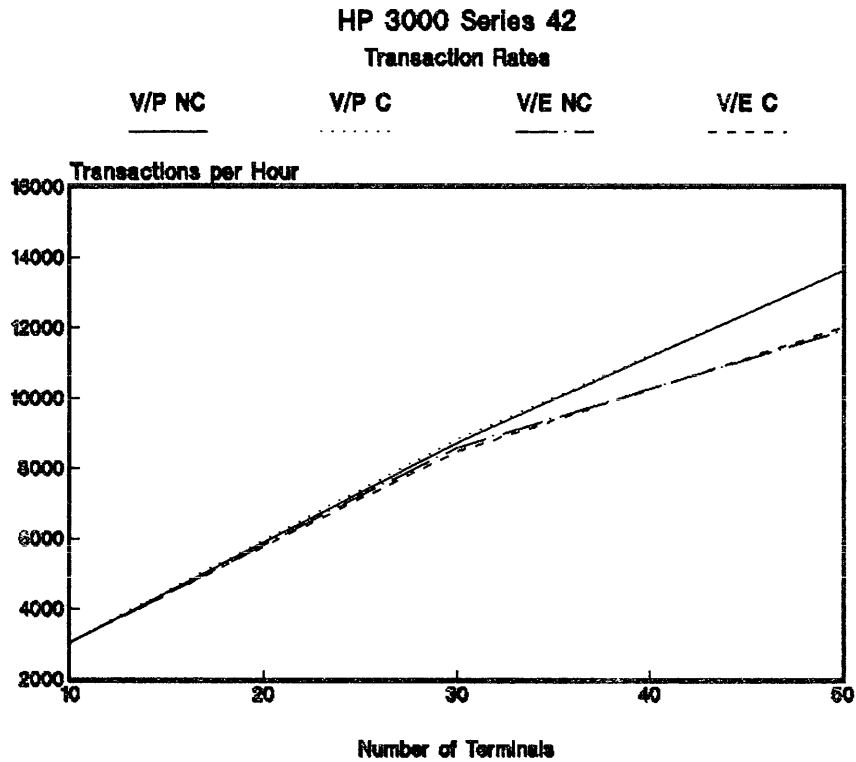


Figure 15:



Caching improvements on the Series 48 are shown in Figures 16 and 17. The Series 48 configuration consisted of 4 Mb of main memory, two HP 7933H disc drives on one GIC, and ATP's for terminal connections. In all cases tested with the EDP mix, disc caching reduced response time and increased transaction throughput. Disc caching performs well with application mixes such as the EDP mix which do not require an excessive amount of CPU or main memory resources.

The effects of disc caching and the different versions of MPE V on the Series 68 are shown in Figures 18 and 19. The Series 68 was configured with 6 Mb of main memory and four HP 7933H disc drives split between two GIC's. As can be seen from these two figures, there was almost no performance difference between the two operating systems on the high-end 3000 system. With MPE V/E, the Series 68 ran more than twice as many terminals simultaneously than with MPE V/P with almost no difference in response time between 90 terminals and 180 terminals. Note that it appears as if only two lines are shown in Figure 19. The MPE V/E lines do not show up because there is virtually no difference in throughput between the two versions of the operating system.

Figure 16:

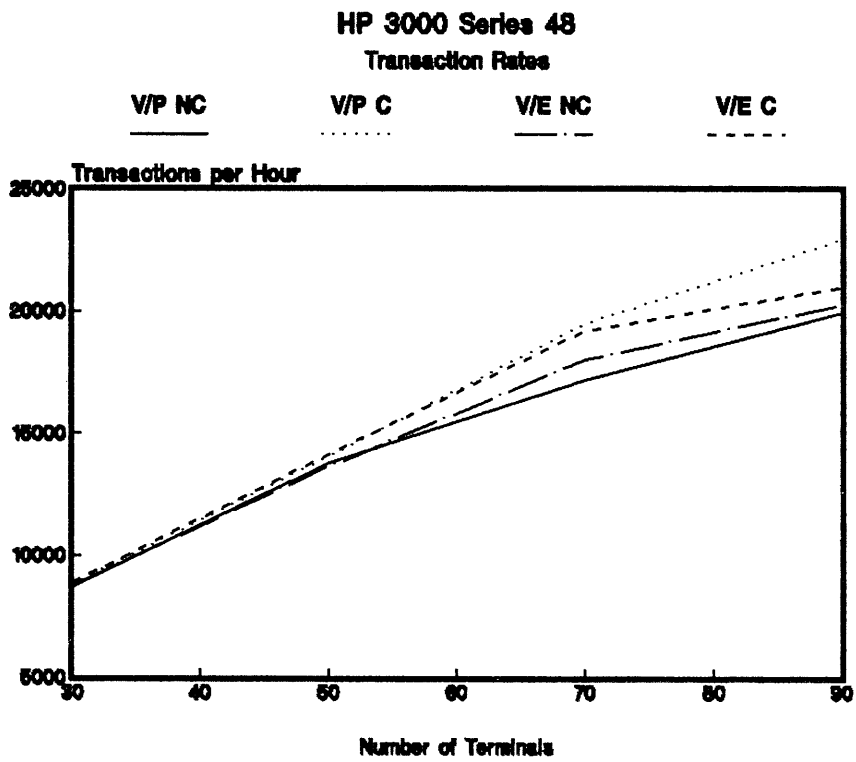
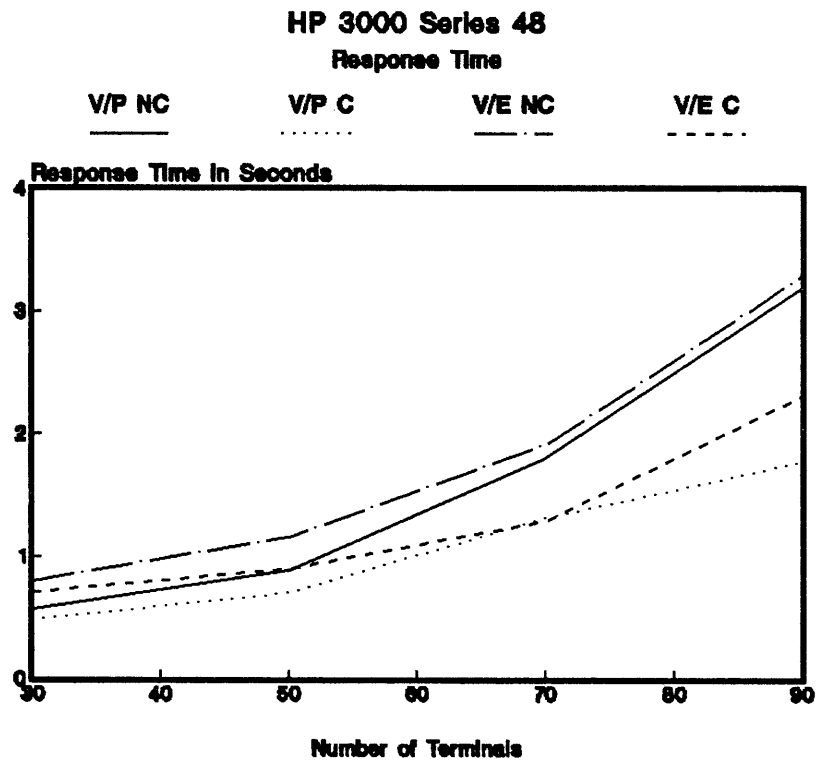


Figure 17:

Figure 18:

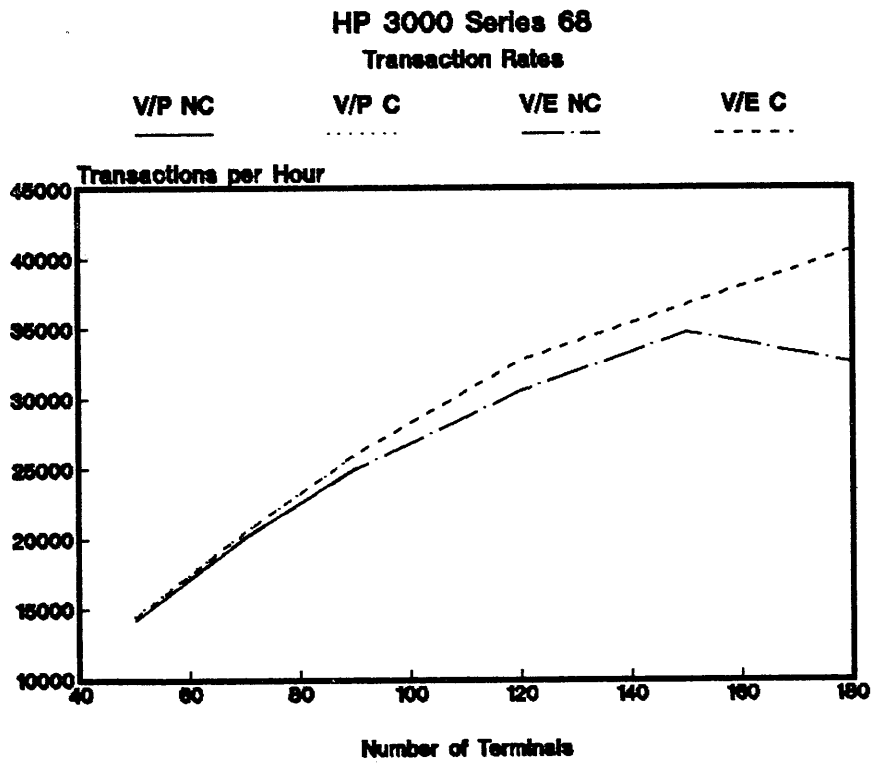
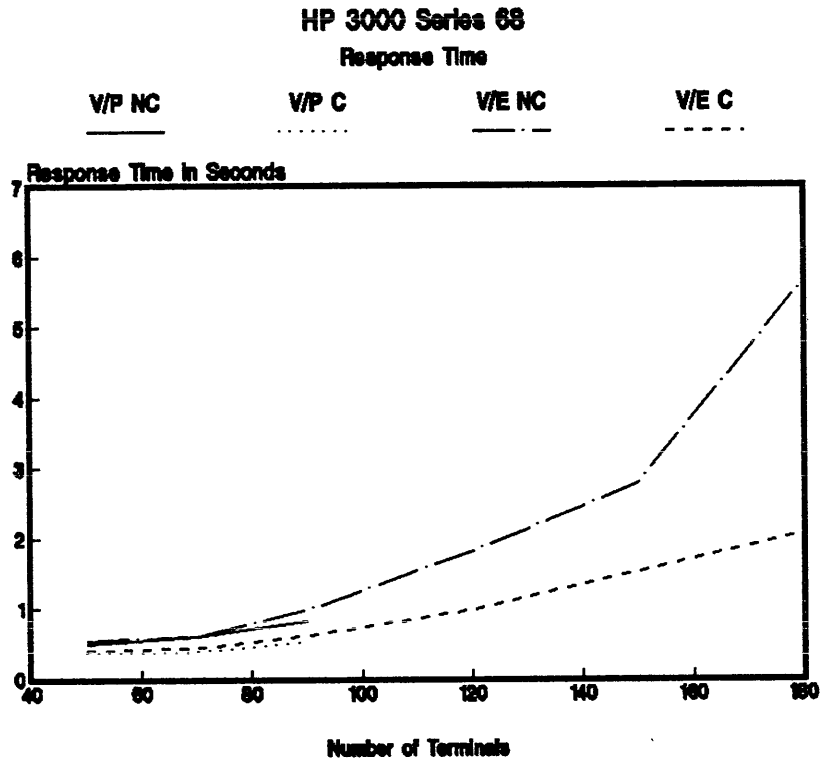
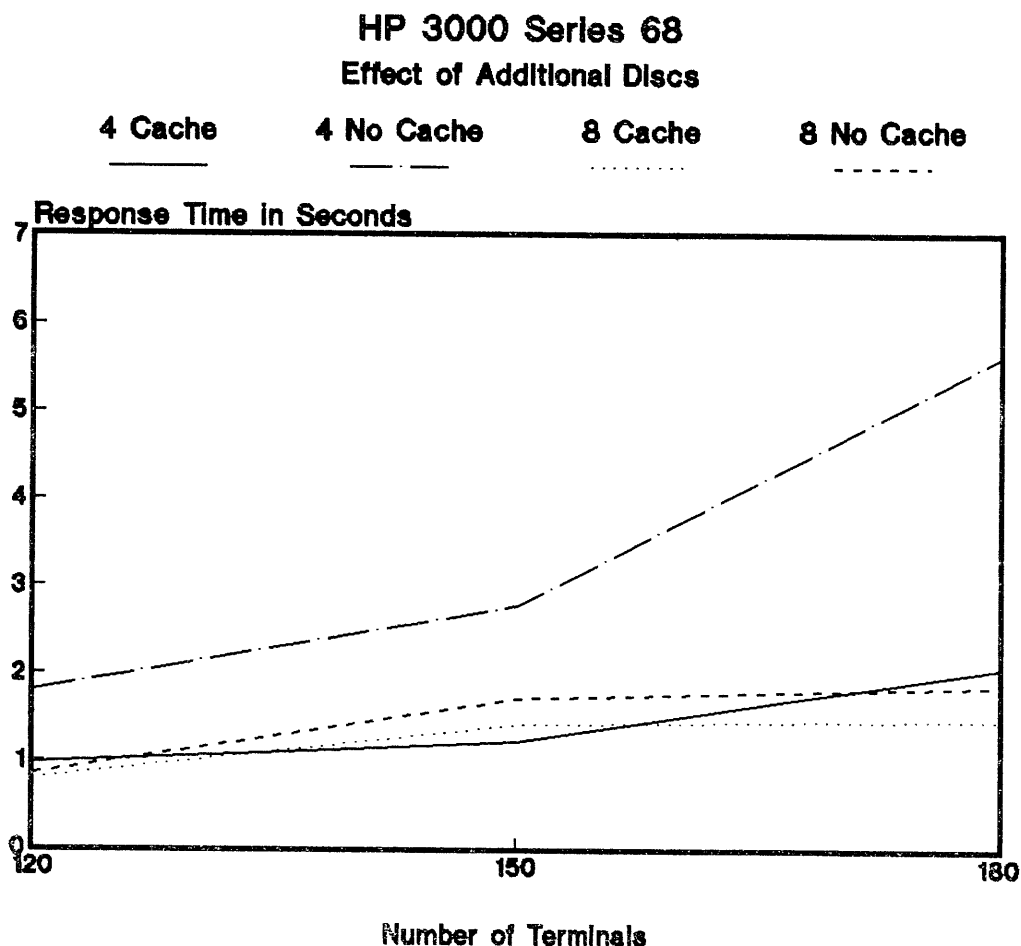


Figure 19:

Effect of Additional Discs

Figure 20 shows the effect on system performance as measured by response time when the number of discs was varied on a Series 68 running MPE V/E with 6 Mb of main memory. The tests with four discs were run with two HP 7933H's per GIC on two GIC's. The eight disc tests were run using HP 7933H disc drives, two per GIC, four per IMB. Without disc caching enabled, an I/O bottleneck existed with four discs. When four additional discs were added, the response time was reduced by as much as 74%. However, when disc caching was enabled, even with only four disc drives and 180 terminals active, no I/O bottleneck existed. With disc caching enabled, the additional four disc drives did not provide much of a performance improvement.

Figure 20:



Questions and Answers

As Hewlett-Packard introduces larger and more powerful HP 3000 systems and peripherals it becomes increasingly complex to size and configure these systems. This section answers some of the commonly asked questions regarding HP 3000 sizing and configuration under the MPE V operating system.

Systems

Will the Series 68 actually run 400 terminals?

The Series 68 *will* support 400 sessions *logged on* at one time. However, for most typical application mixes, only about 200 sessions can be *simultaneously accessing* the system with acceptable performance. The actual number of active sessions with acceptable performance will depend on the application mix and the desired response time.

What are the MIP ratings of the various HP 3000 systems?

Hewlett-Packard does not use MIP's (Millions of Instructions per Second) as a measure to position HP 3000 CPU's. A CPU's MIP rating will provide an absolute value for how many instructions can be performed by that CPU in one second, but it does not provide any indication of overall system performance. There is also danger in attempting to compare MIP ratings across different vendors' systems because the number of instructions executed depends upon the CPU's architecture and the complexity of its instruction set. It is entirely possible for one CPU to have a lower MIP rating than another and significantly outperform that system in terms of throughput. For this reason, we prefer to performance position our systems on the basis of *system* throughput rather than CPU instruction speeds. The chart below shows the relative systems performance for each system mentioned in this guide.

RELATIVE SYSTEMS PERFORMANCE

SERIES 30/33R	.30
SERIES III	.60
SERIES 39	1.00
SERIES 42	1.00
SERIES 48	1.00
SERIES 68	3.00

How can I optimize my CPU utilization?

The way to optimize CPU utilization is to reduce contention for the CPU. There are a variety of ways that CPU contention can be reduced. Load management techniques which would shift heavy loads to non-peak timeframes or between systems can help alleviate the contention. APS/3000 (Application Program Sampler) can be used to identify user code which inefficiently uses the CPU.

Memory

When is more memory needed?

If more than 10% of all disc I/O's performed are I/O's performed to manage memory, then the system is probably experiencing a memory shortage and additional memory would improve performance. One way of monitoring the time spent managing main memory is to use the software tool OPT/3000 for memory analysis.

In general, memory pressure is most likely to occur on systems with less than 2 Mb of main memory. On larger systems (4 Mb and above), other resources (such as CPU or I/O) will probably be saturated before memory.

How much main memory does MPE V/E require?

The smallest memory configuration supported under MPE V/E is 1/2 Mb (512 Kb). The increased capabilities of MPE V/E require larger code segments than MPE IV, some of which *must* be resident in main memory at all times. Also, with the expanded tables features of MPE V/E, some of the system tables may require more main memory than in the past.

It is recommended that your system contain at least 1 Mb of memory above what is needed to efficiently run your applications if disc caching is enabled. In many applications, especially those which do a large amount of sequential I/O, extra memory will provide significant performance improvements with disc caching.

I/O and Disc Caching

How is I/O performed on the HP 3000?

There are several steps to the I/O process on the HP 3000. If disc caching is not enabled on the system, the I/O is performed as follows:

1. The user application program requests an I/O through the MPE file system.
2. The file system handles any necessary buffering, blocking, etc., then passes control to the MPE I/O system to perform the actual I/O.
3. A SEEK command, which moves the heads of the disc to the proper cylinder where the required data resides, is executed. This takes about 25 ms on the average.
4. Once the SEEK is completed, the I/O system issues a command to read or write data to the disc drive. The rotational latency, (the time it takes for the disc platter to spin around to the position where the required data is under the disc heads), takes approximately 11 ms. The data is then transferred to the CPU. The transfer time is dependent upon how much data is being transferred, but the average time for typical MPE transfers is about 2 ms.
5. When the data is transferred from disc, the I/O system returns control to the MPE file system which handles any blocking or buffering and then returns to the user's application program.

The entire process of completing a physical I/O takes about 40 ms.

For many HP 3000 systems, I/O has been a bottleneck. Disc caching has greatly reduced this constraint. When disc caching is enabled, the MPE file system calls the caching system which checks the areas in main memory where cached data may reside. If the required data is found in main memory (a cache hit), the time to complete an I/O is reduced from 40 ms to approximately 5 ms. This reduction in I/O time greatly improves overall system performance. If the data is not already resident in main memory (a cache miss), a physical I/O to disc must then occur. This lengthens the time slightly for the individual physical I/O; however, each I/O transfers larger amounts of data when caching is enabled so that the overall number of I/O's is still greatly reduced in most cases.

In what environments does disc caching provide the greatest improvement in performance?

Disc caching will significantly improve the performance of HP 3000 systems when:

1. The CPU utilization is low before caching is enabled. For the Series 42 and Series 48, a CPU that is less than or equal to 60% busy is best. For the Series 68, the CPU should be not more than 70% utilized before caching for the most benefit.
2. Excess main memory is available. Memory management I/O should be not exceed 5% of the total I/O.
3. The main memory size is at least 2Mb on a Series 42, 3 Mb on a Series 48, and 4 Mb on a Series 68.
4. The data locality is high. Disc caching will work best when the same files are accessed frequently or in a sequential access environment.
5. The ratio of READs to WRITEs is high -- 3:1 or higher. The greatest benefit from caching is derived on READs.

Are there some environments where disc caching does not provide a performance improvement or causes a degradation?

Yes, it is possible that disc caching may not provide a performance improvement but cause a degradation. This can occur when:

1. CPU utilization is greater than 70% on a Series 4X or greater than 85% on a Series 6X before caching is enabled. Disc caching requires some CPU resources to execute effectively.
2. There is no excess main memory while running a pre-cached operating system. (Memory management I/O is greater than 10% of all system I/O). If there is no excess main memory, disc caching has no "room" to operate.
3. The system is configured for less than 2 Mb of memory on a Series 42, 3 Mb of memory on a Series 48, or 4 Mb of memory on a Series 68.
4. Data locality is poor. If the I/O is highly random, it is possible that the extra overhead associated with searching through main memory and incurring a cache miss and then having to do a physical I/O will cause system performance degradation.
5. Ratio of READs to WRITEs is low -- less than 2:1 When an application is write intensive, there may not be as significant of a performance improvement when caching is enabled because every cached WRITE must be posted to disc. However, once a WRITE has logically completed, the process does not have to wait for that WRITE to be posted to disc; this can be handled by disc caching in the background. The process can move to the next transaction without waiting for the physical update to occur.

Do I have to give up some of this performance gain if I want database integrity?

While most users of I/O intensive applications will experience significant performance gains with disc caching, it is most effective in applications in which multiple users share the same information. Applications which share databases usually benefit greatly. Disc caching not only reduces the contention for these databases, but it also reduces the lock service times of the database control blocks because I/O requests can be serviced more quickly. Because so much information may be stored in main memory at one time, new intrinsics and commands have been developed to preserve data base integrity when disc caching is enabled. These features may have an impact on system performance; however, their use is optional. For more information on the disc caching commands and IMAGE/3000 changes for disc caching, please refer to *Communicator 3000*, Volume 2, Issue 1.

If I'm using disc caching, should I still split heavily accessed files between discs?

In the past, before MPE V the spreading of related files (for example, master and detail data sets) across master disc drives could provide significant performance improvements. With disc caching we still recommend doing this to some extent, however it is not as much of an issue as it was in the past. One recommendation is to put those files which are randomly accessed or heavily updated on the same disc and not enable caching for that disc. Those files which are accessed sequentially or are not updated should be placed together on a disc and that disc cached.

Should I still follow the same rules in adding disc master disc drives, GIC's, and IMB's?

The limitations for physical I/O rates are the same as they have been with previous versions of MPE. The maximum number of physical I/O's a disc can sustain for extended periods of time is around 30 per second. As a guideline, the maximum number of physical I/O's sustained per channel is around 45 - 50 per second. If your physical I/O rate is at that level, adding a second GIC may improve performance. When the number of sustained balanced physical I/O's is above 85 per second per Intermodule Bus (IMB) an additional IMB should be added. For many applications, however, the number of physical I/O's has been greatly reduced with disc caching and therefore the need to add additional master disc drives, GIC's for discs and IMB's is also reduced. We used to operate under the theory that the way to maximize I/O throughput was to have as many smaller master disc drives as possible so that there are as many paths to the data as possible. With disc caching, because the need to perform physical I/O's is greatly reduced and because locality of data is important, the need for extra spindles for performance reasons no longer exists.

How much performance difference, if any, should I expect in moving from MPE V/P to MPE V/E?

For most environments, there will be at most only a slight degradation in overall performance as measured by transaction throughput and response time with MPE V/E over MPE V/P (5 to 12 %). Most users should not notice this difference. The degradation may be greater than that if:

1. MPE V/E is run on a system with less than 2 Mb of main memory or
2. MPE V/E is run on a system with CPU utilization greater than 85% with MPE IV or MPE V/P.

The upgrade from an MPE IV system to MPE V/E should provide performance improvements as well as offering additional functionality.

Data Communications Products Performance

The performance data presented here indicates some of the differences in performance between alternatives for data communications. This data by no means provides sufficient information to design complete applications or system configurations. Data communications performance evaluation requires consideration of many factors simultaneously, because they interact. Among the design variables affecting throughput and CPU utilization are: line speed, line quality, protocol choice, packet or line buffer size, X.25 level 2 and 3 window sizes, user buffer size, type of specific data comm product activity, directions of use, numbers of users, data compressability, basic CPU speed, MPE file blocking factors, and other system loads. This list is representative of the types of factors which must be considered in evaluating data communications performance. For more details we recommend that you consult your data communications specialist SE, who will have more extensive performance information available with which to design or evaluate your proposed application.

POINT-TO-POINT SPOOLED PRINTERS ON ATP AND ADCC

With the release of MPE V/E several new spooled printers can now be attached to the HP3000 in a point-to-point configuration using the ATP or the ADCC. This enhancement allows the placement of a shareable printing resource at a greater distance from the CPU than an HP-IB connection would allow. These spooled printers fall into three groups:

Character Printers: HP 2631B, HP 2932A, HP 2933A, HP 2934A
Page Printer : HP 2687A
Line Printer : HP 2563A

These connection of these printers was tested for throughput and CPU overhead at different baud rates. The differences between printers in a group was minimal; therefore the data from the testing of the printers is summarized in Tables 1-3.

Test Environment

The tests were run on a Series 48 (and Series 68 also for the HP 2932A), running MPE V/E. These systems were not running any other jobs during the tests. Files large enough to ensure 10 minutes of active printing were sent to the printers. The line length was varied; for the HP 2932A and HP 2563A, F132 was a file with 60 lines of 132 characters + CR + LF on each page. F60 was a file with 60 lines of 60 characters + CR + LF on each page. For the HP 2687A, F80 contained 60 lines of 78 characters + CR + LF on each page. F50 was 60 lines of 50 characters + CR + LF on each page.

Conclusions

The data indicates that connection of these printers to a serial port does not necessarily limit the total throughput of the printer. However, the higher speed page and line printers do consume a significant percentage of the CPU when running at full speed, particularly when connected to the ADCC. Care should be taken when configuring systems with these connections, and ATP ports should be used to connect the HP 268X and HP 2563A printers whenever possible.

Table 1. HP 2932 Character Printer Performance

speed	test file	ADCC Series 4x		ATP Series 4x		ATP Series 6x	
		% cpu util.	thruput char/sec	% cpu util.	thruput char/sec	% cpu util.	thruput char/sec
2400	F132	5.6	176	2.3	176	1.7	176
2400	F60	8.8	152	3.8	153	2.9	153
1200	F132	3.2	112	1.3	112	1.0	112
1200	F60	5.7	106	2.6	107	1.9	107

Note: Performance figures for HP 2932A and HP 2934A were similar; HP 2631B results were slightly lower.

Table 2: HP 2687A Laser Printer Performance

speed	test file	ADCC Series 4x		ATP Series 4x	
		% cpu util.	thruput pages/min	% cpu util.	thruput pages/min
19200	F80	not appl.	not appl.	9.8	8
19200	F50	not appl.	not appl.	14.8	12
9600	F80	21.0	8	9.5	8
9600	F50	27.7	12	14.4	12
4800	F80	13.1	6	6.3	6
4800	F50	16.7	7	9.8	7

Table 3: HP 2563A Line Printer Performance

speed	test file	ADCC Series 4x		ATP Series 4x	
		% cpu util.	thruput lines/min	% cpu util.	thruput lines/min
19200	F132	not appl.	not appl.	8.02	300
19200	F60	not appl.	not appl.	7.65	300
9600	F132	19.05	300	7.84	300
9600	F60	16.65	300	7.68	300
4800	F132	12.32	194	5.28	198
4800	F60	16.30	300	7.36	300

MTS PRINTER PERFORMANCE

The performance and CPU utilization of line printers on a multipoint link were tested for both the HP 3000 Series 48 and 68. The tests measured the number of lines printed per minute and the CPU utilization at various line speeds. Figures 1 and 2 depict the results of these tests.

Test Environment

The tests were performed with a single printer on the multipoint line printing 132 character lines. Neither the type of the multipoint line (asynchronous or synchronous) nor how the printer was configured (as a termtyp 18 or 22 device) had much of an impact on the printer performance or CPU utilization. The effects of multiple printers on a multipoint line (using the HP 2333A cluster controller) are basically linear extrapolations of the single printer data. However, a large number of devices on a HP 2333A may use up the buffer space of the HP 2333A. If this situation occurs, additional polling and control commands will be transmitted between the HP3000 and the HP 2333A, resulting in higher CPU utilization. Refer to the MTS manual for the rules and guidelines of configuring printers on a multipoint line.

Conclusions

The speed (lpm) of line printers on a multipoint line is primarily a function of the multipoint line speed. The type of printer and the model of CPU have very little to do with the actual throughput. While printers will perform very close to their maximum speed (at appropriate line speeds), they will run a few lines per minute less than the rated speed due to interactions between the spooler, the printer's buffering mechanism and the bisync protocol.

As would be expected, the CPU utilization of printers (the HP 2563A in this example) is less on the Series 68 than on the Series 48, since the constraining factor is how much data can be transmitted across a multipoint line at a given speed. Generally, the CPU utilization on the Series 68 was about half that of the Series 48 in the tests performed.

Figure 1:

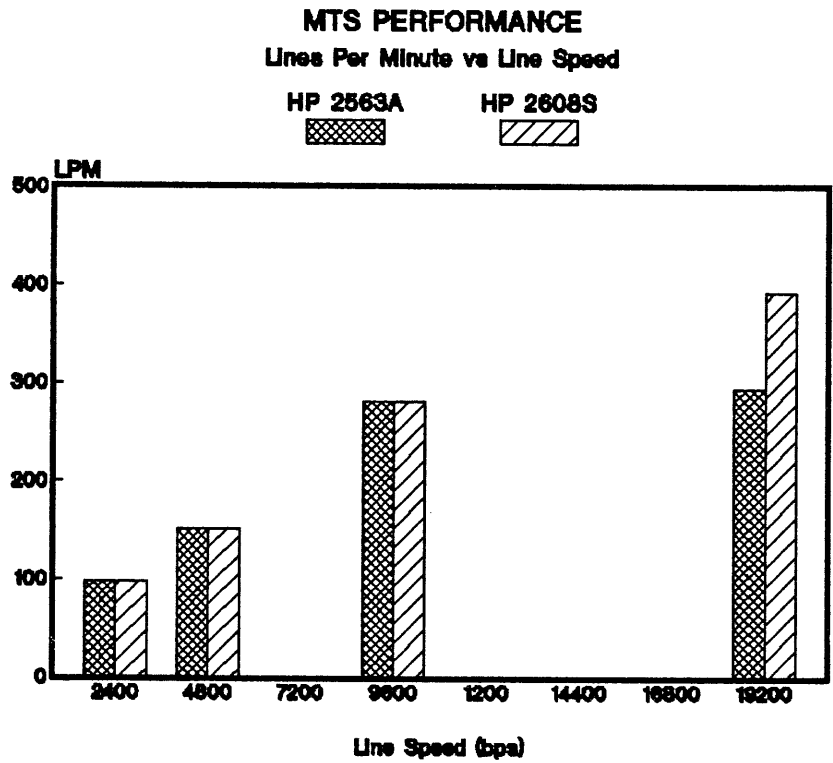
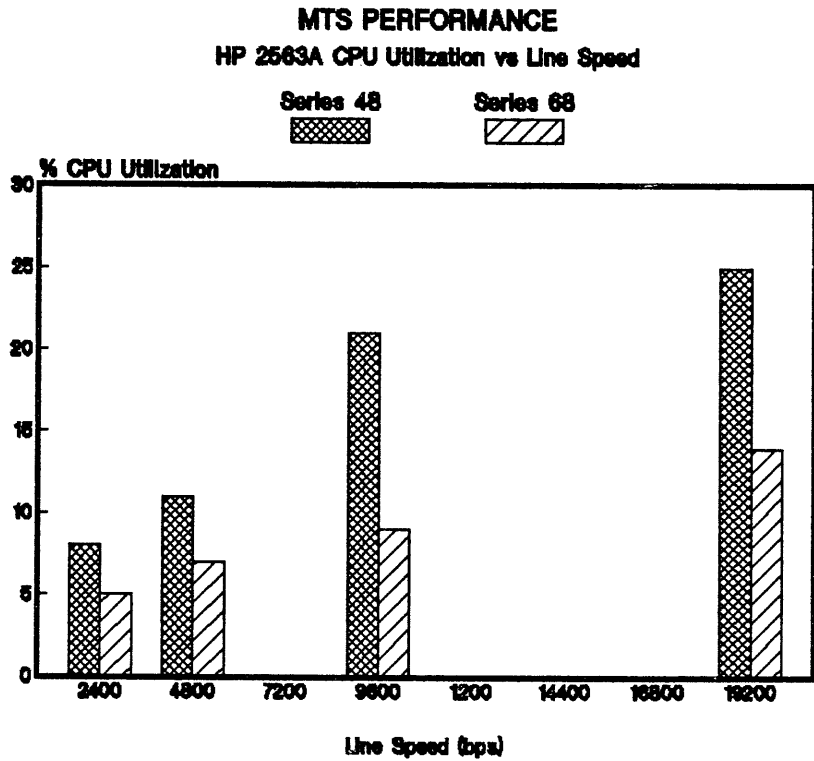


Figure 2:



REMOTE JOB ENTRY (RJE)

Figures 3 and 4 illustrate CPU utilization and effective CPU time per record processed for standalone operation of RJE on an HP 3000 with an HP 2680A Laser Printer. Tests were performed on 9.6 kbps and 56 kbps leased lines. Disc caching was not enabled for the MPE V/E tests.

Test Environment

- Series 48
- 2 MB memory
- Line speeds: 9.6 kbps and 56 kbps
- 400 byte buffer
- Dataset 1 (2501 characters/page)
- Light host load

Conclusions

- RJE utilized 1.0% - 2.5% more of the CPU under MPE V/E than under MPE IV (11.8% vs. 10.8% at 9.6 kbps and 43.1% vs. 40.6% at 56 kbps).
- Effective CPU time per record processed was approximately 10% greater under MPE V/E than under MPE IV.
- Under both MPE V/E and MPE IV, RJE operation at 56 kbps increased CPU utilization by a factor of approximately 4, while CPU time per record was affected only slightly. Throughput at 56 kbps was approximately 4 times throughput at 9.6 kbps.

Figure 3:

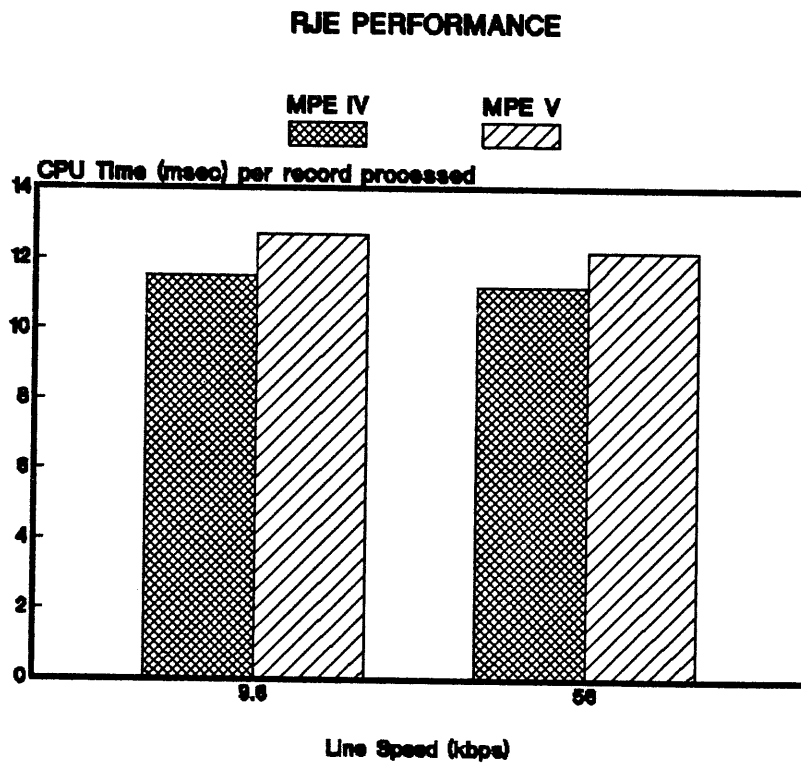
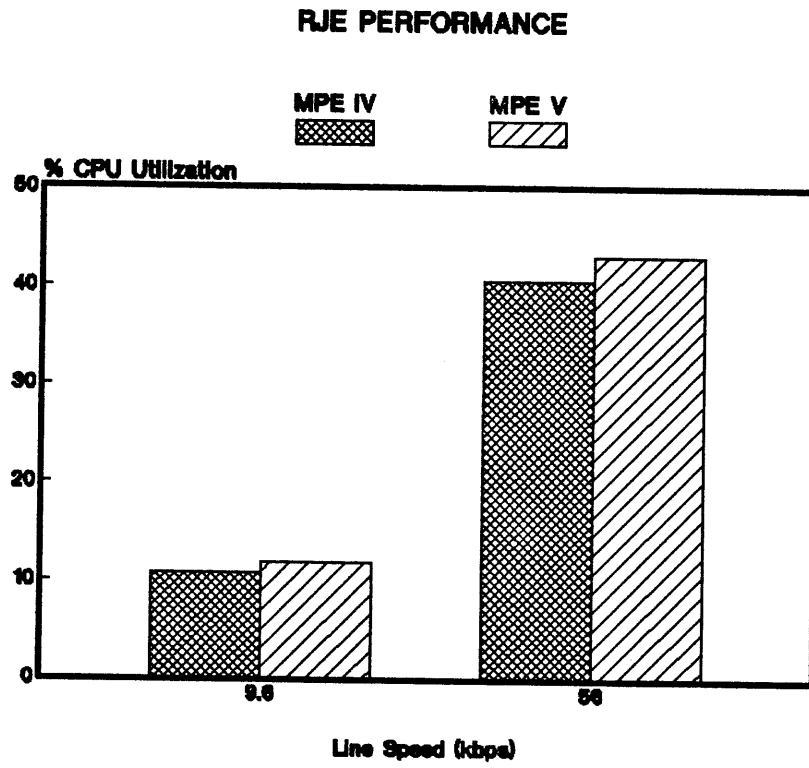


Figure 4:

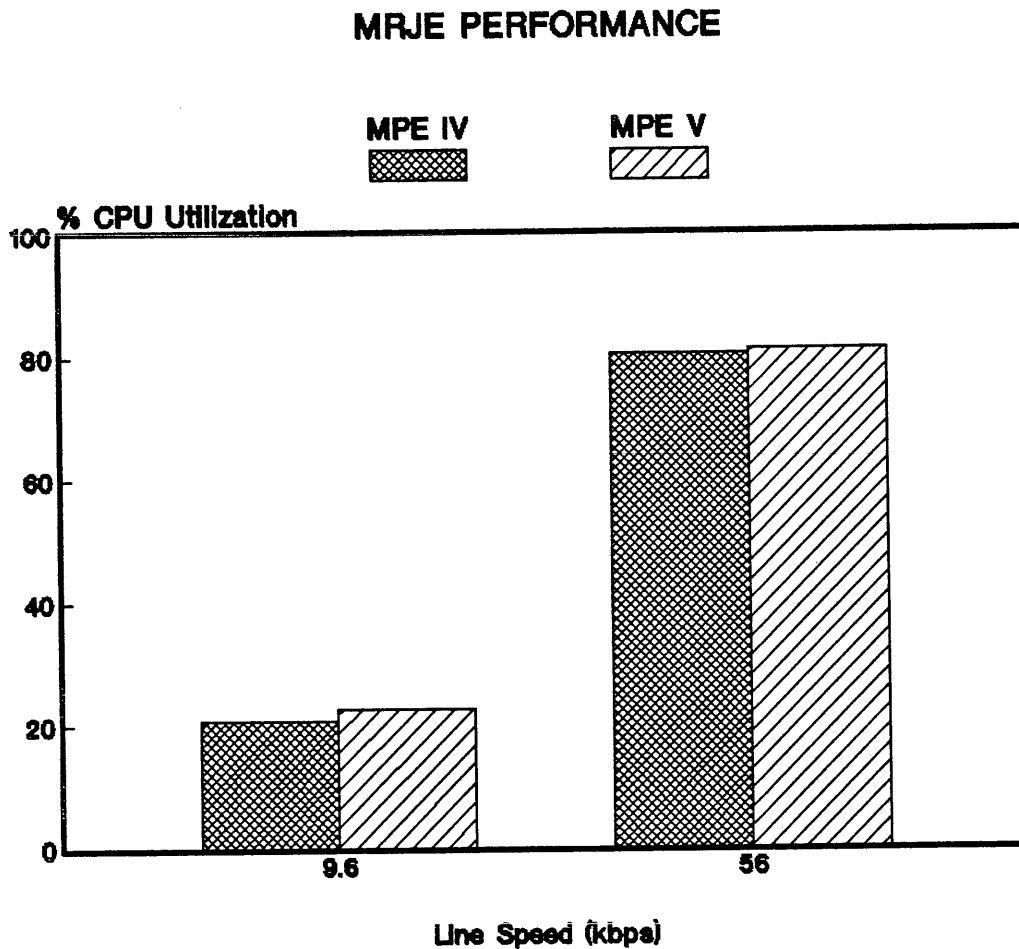
MULTILEAVING REMOTE JOB ENTRY (MRJE)

Figures 5 and 6 illustrate CPU utilization and effective CPU time per record processed for standalone operation of MRJE on an HP 3000 with an HP 2680A Laser Printer. Tests were performed on 9.6 kbps and 56 kbps leased lines. Disc caching was not enabled for the MPE V/E tests.

Test Environment

- Series 48
- 2 MB memory
- Line speeds: 9.6 kbps and 56 kbps
- 400 byte buffer, 1 print stream at 9.6 kbps
- 2000 byte buffer, 2 print streams at 56 kbps
- Dataset 1 (2501 characters/page)
- Light host load

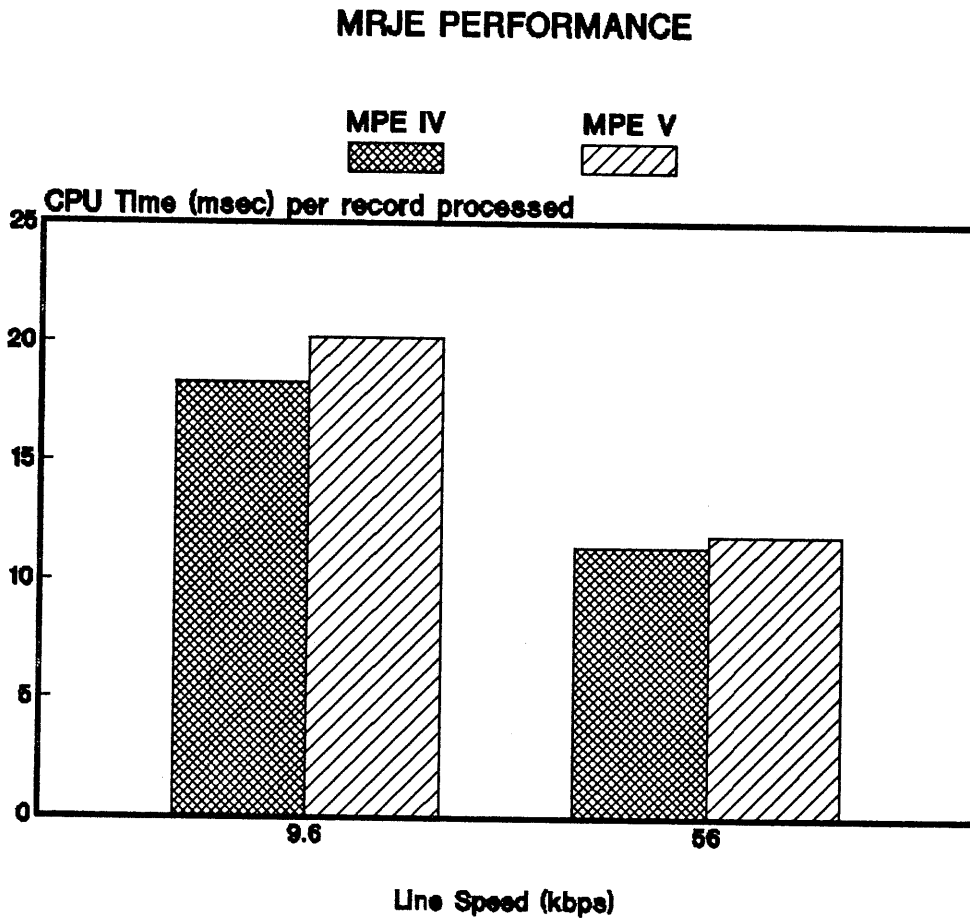
Figure 5:



Conclusions

- MRJE utilized 0.7% - 2.0% more of the CPU under MPE V/E than under MPE IV (22.7% vs. 20.7% at 9.6 kbps and 81.2% vs. 80.5% at 56 kbps).
- Effective CPU time per record processed was 5% - 10% greater under MPE V/E than under MPE IV.
- Relative to RJE, MRJE with one print stream and 400-byte buffers at 9.6 kbps had 92% greater CPU utilization, 59% greater CPU time per record, and 21% greater throughput.
- Increased throughput by a factor of 6 relative to one print stream and 400-byte buffers at 9.6 kbps. This was due to increasing CPU utilization and reducing CPU time per record to 12 msec (comparable to RJE with 400 byte buffers at 9.6 kbps).
- At 56 kbps, MRJE can effectively utilize the capacity of both the HP 3000 and the HP 2680A Laser Printer. Using 2000-byte buffers at 56 kbps, MRJE can support laser printing of two logical pages per physical page.

Figure 6:



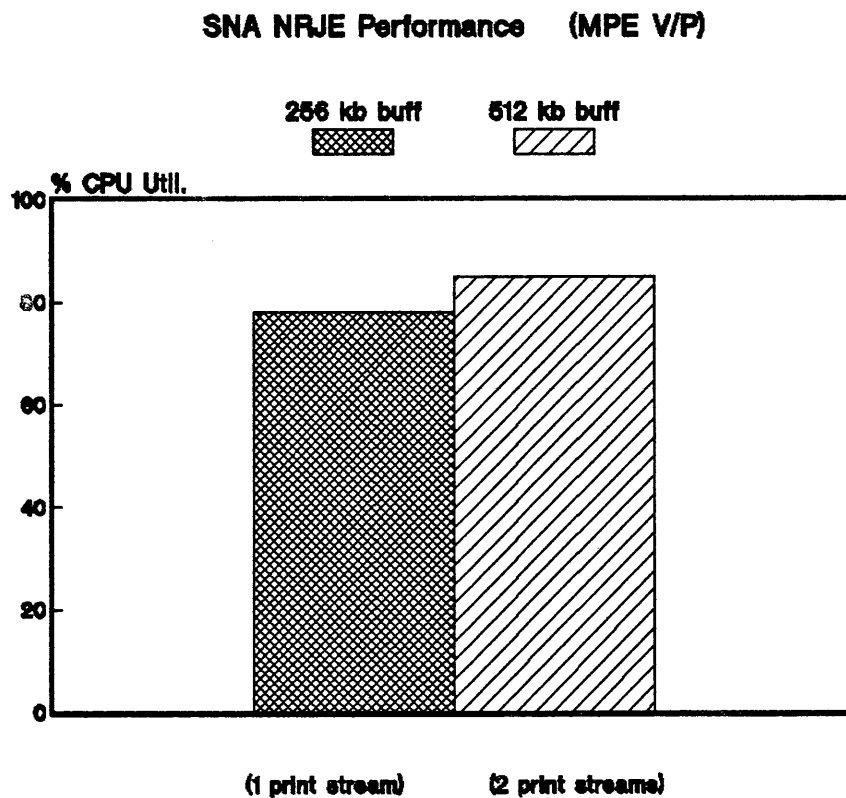
SNA NETWORK REMOTE JOB ENTRY (NRJE)

Figures 7 and 8 illustrate CPU utilization and effective CPU time per record processed for standalone operation of SNA NRJE under MPE V/P on an HP 3000 with an HP 2680A Laser Printer. Tests were performed on a 56 kbps leased line. (Note: SNA NRJE will be supported on MPE V/P Delta 1, E Delta 1 and T-Mit.)

Test Environment

- Series 42
- 2 MB memory
- 56 kbps line speed
- 256 byte buffer using 1 print stream
- 512 byte buffer using 2 print streams
- Dataset 1 (2501 characters/page)
- Light host load

Figure 7:



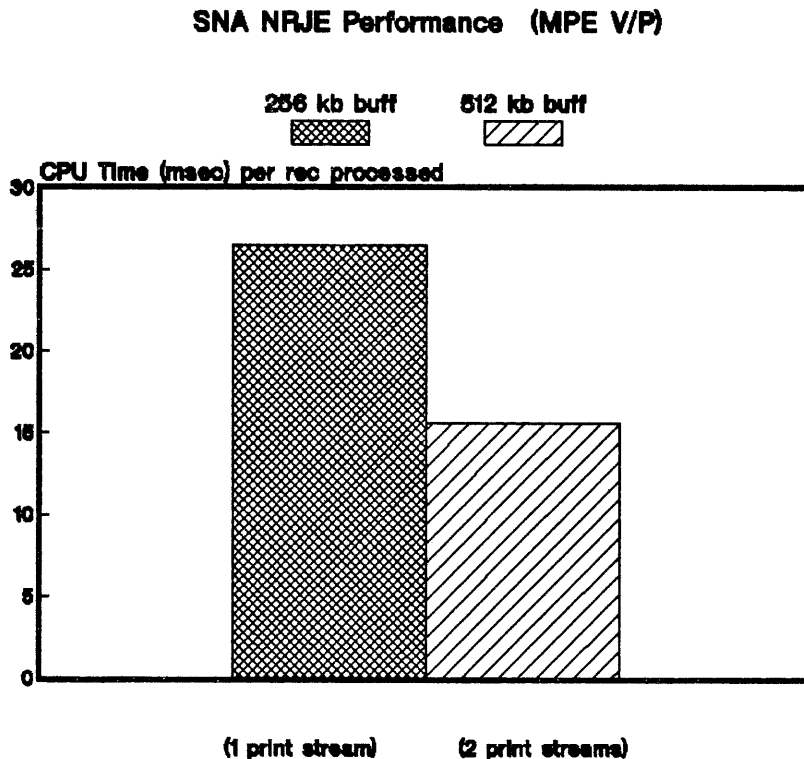
Conclusions

- Using two print streams and 512 byte buffers increased CPU utilization to 85% compared to 78% with one print stream and 256-byte buffers.
- Using two print streams and 512 byte buffers decreased CPU time per record from 26.5 msec to 15.6 msec.
- After adjusting for buffer size differences, performance measured with SNA NRJE was comparable to performance with MRJE. SNA NRJE performance under MPE V/E may differ from performance under MPE V/P.
- At 56 kbps, SNA NRJE can effectively utilize the capacity of both the HP 3000 and the HP 2680A Laser Printer. SNA NRJE can support laser printing of one logical page per physical page. (MRJE, by using 2000-byte buffers at 56 kbps, can support laser printing of two logical-pages per physical page.)

NOTE

HP recommends additional memory with SNA NRJE for good performance. Generally, approximately 1 MB is required above what would be required without NRJE. (Each system should have at least 2 MB main memory.)

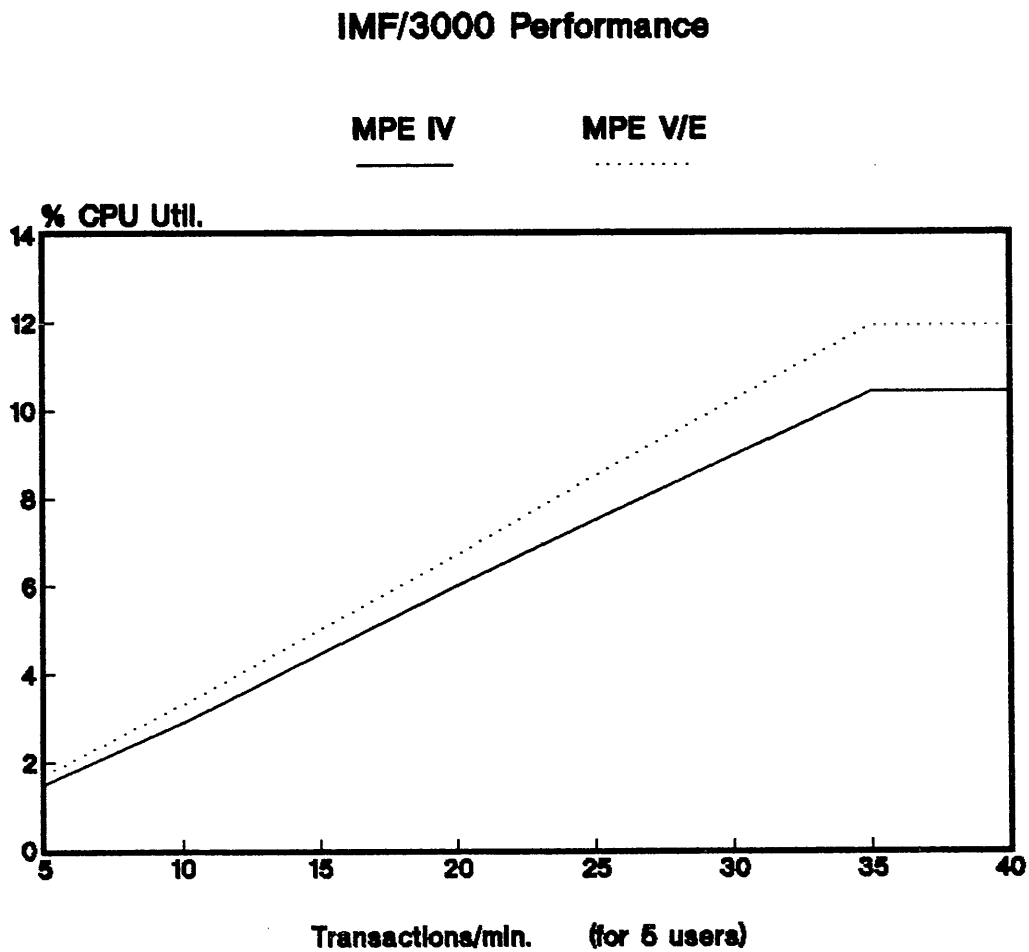
Figure 8:



INTERACTIVE MAINFRAME FACILITY (IMF)

Figure 9 illustrates CPU utilization under MPE IV and MPE V/E for standalone operation of IMF in Programmatic Mode. Pass-Thru operation is not affected by differences between MPE IV and MPE V/E.

Figure 9:



Test Environment

- Series 48
- 1 Mb main memory
- 9.6 kbps line speed
- 500 characters from host
- 250 characters from IMF
- 5 devices open
- Light host load

Conclusions

- CPU utilization reached saturation at 11.9% for MPE V/E and 10.4% for MPE IV.
- The CPU load when using either bisync or SDLC protocols is nearly identical. The user need not consider CPU performance in choosing the line protocol.
- No conclusions can be drawn for response times, which are very application-specific and dependent upon the environment in which IMF is operating. For a given application and environment, response times under MPE IV and MPE V should not differ significantly.
- In general, IMF performance under MPE V should not differ significantly from performance under MPE IV.

X.25 BLOCK MODE TERMINAL COMMUNICATION

With the release of MPE IV Q-Delta 2, HP 3000 users can now run their VPLUS applications over X.25 Public Data Networks (PDN's) and on the HP 2334A X.25 Terminal Cluster Controller. Users can further enhance the performance of their VPLUS applications by migrating to MPE V. The data below, which was collected by connecting the indicated number of terminals to an HP 3000 at 9600 baud through a HP 2334A Cluster Controller over an X.25 PAD, indicate that terminal response time and throughput improve with almost no impact on CPU utilization.

The most favorable results were achieved in configurations using four terminals. Terminal response time with this configuration running MPE V is 7% faster than the MPE IV configuration. Throughput, measured in characters per second, improves 7%. Despite these improvements, CPU utilization only increased 0.1%.

X.25 performance is a function of the PDN to be used, network configuration and network congestion. The data summarized below was collected using GTE/Telenet. The block size used was 128. To optimize performance when running block mode X.25 over a PDN, the block size should be an integral multiple of the packet size being used on the network. The tests were run on an HP 3000 Series 48 with HP 2624B terminals and no other applications on the system.

Figure 10:

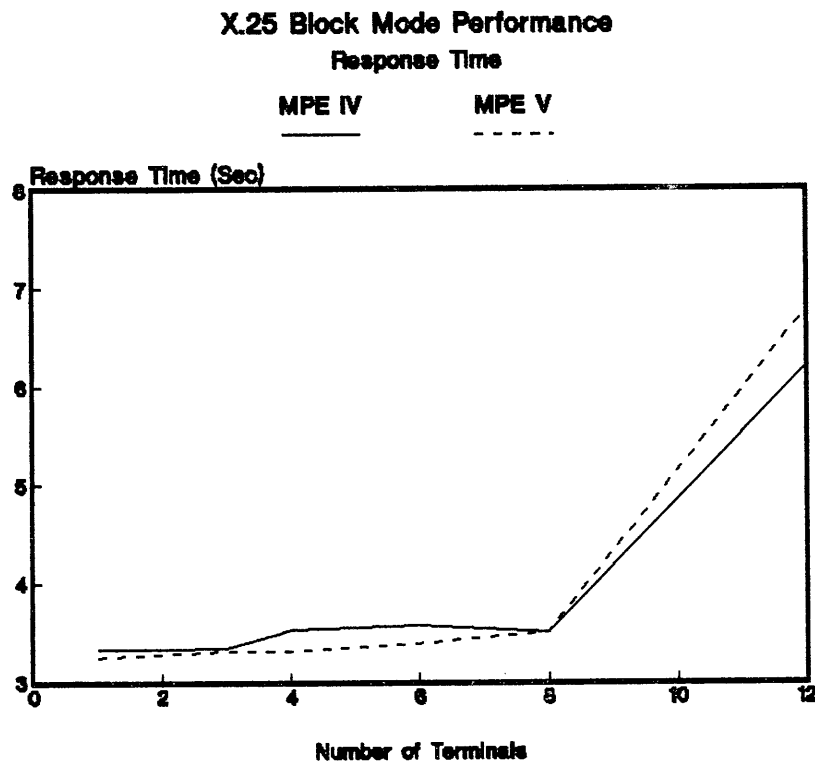


Figure 11:

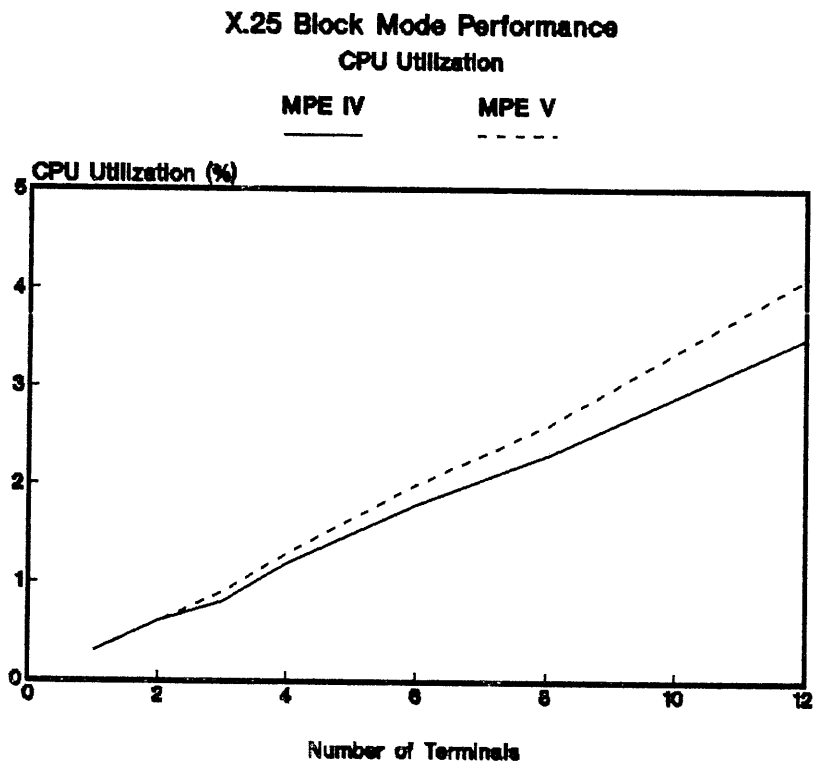
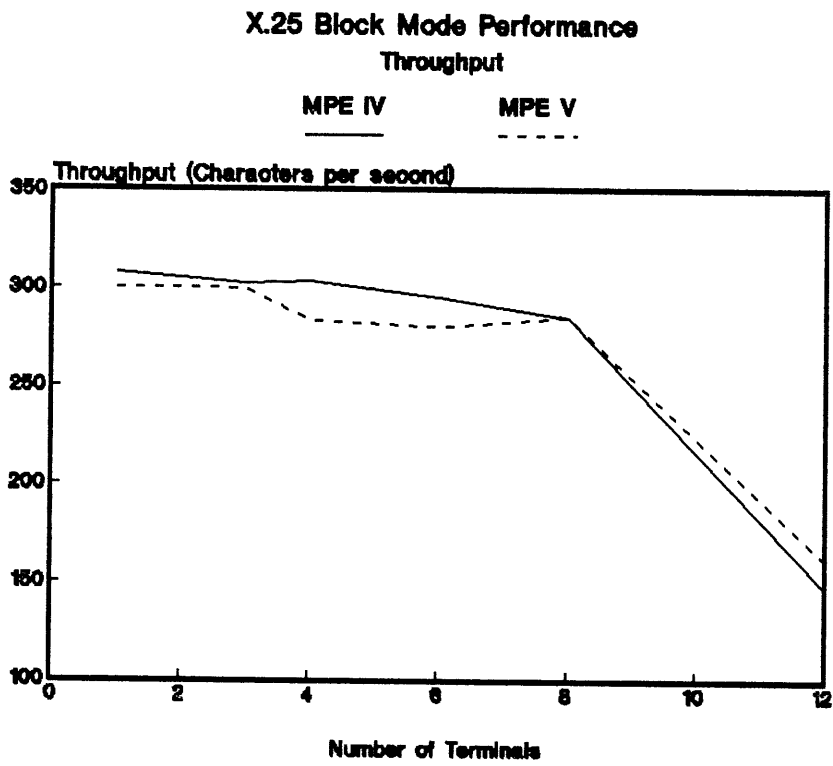


Figure 12:

DISTRIBUTED SYSTEMS

Figure 13 illustrates the increased throughput provided by DSCOPY -- the network file transfer facility of Distributed Systems (DS) under MPE V versus MPE IV. Figure 14 illustrates the improved CPU time per 1000 characters transferred.

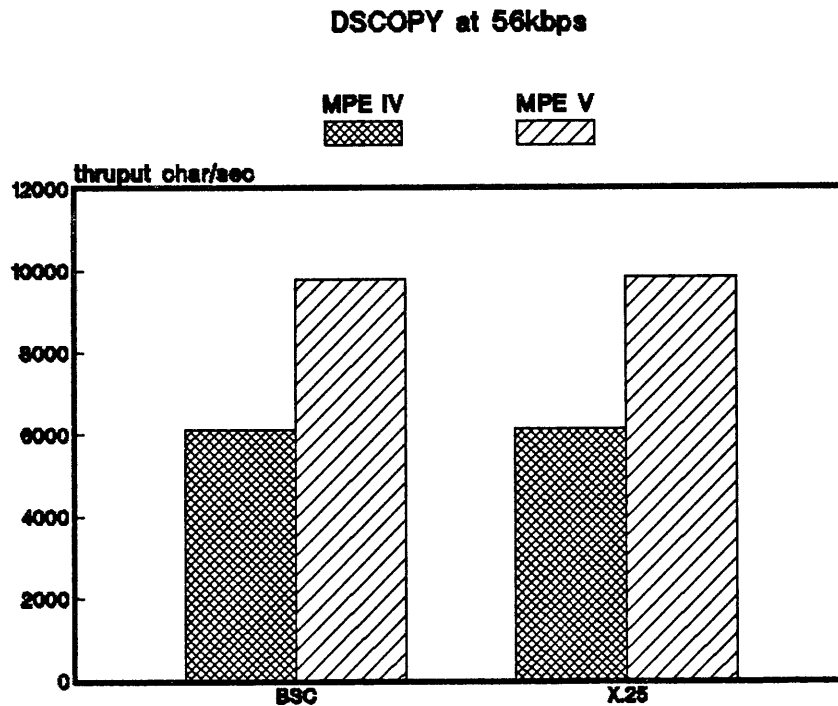
Test Environment

These DS performance tests were run between a Series 68 and a Series 48 processor, each with 2 MB of main memory and one master disc drive. Communication was through directly connected INP's, with a line speed of 56 kbps. For MPE V tests, disc caching was enabled.

Additional test parameters are:

- Blocking factor = 16
- Compression enabled
- Line Buffer = 1024 words
- Lightly loaded system, single user

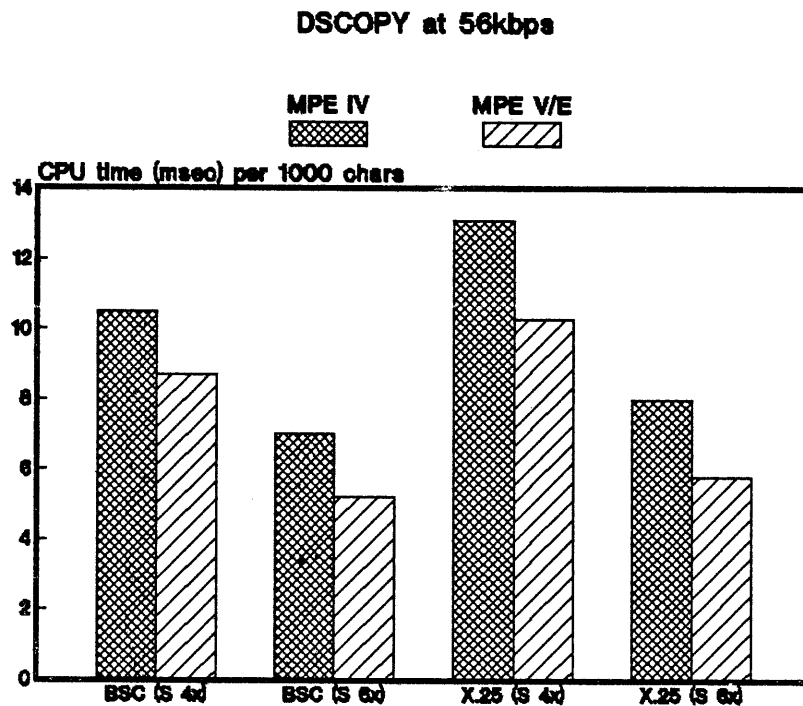
Figure 13:



Conclusions

- The DSCOPY throughput under MPE V is improved by 60% over the throughput under MPE IV.
- Communication over X.25 provides slightly better throughput than over the bisynchronous protocol link.
- CPU time per character transferred is decreased by 25% on the Series 64 and by 17% on the Series 44.
- Under MPE V, DSCOPY over X.25 requires up to 20% more CPU time per character than DSCOPY over the bisynchronous protocol link.

Figure 14:



4

System Cabling

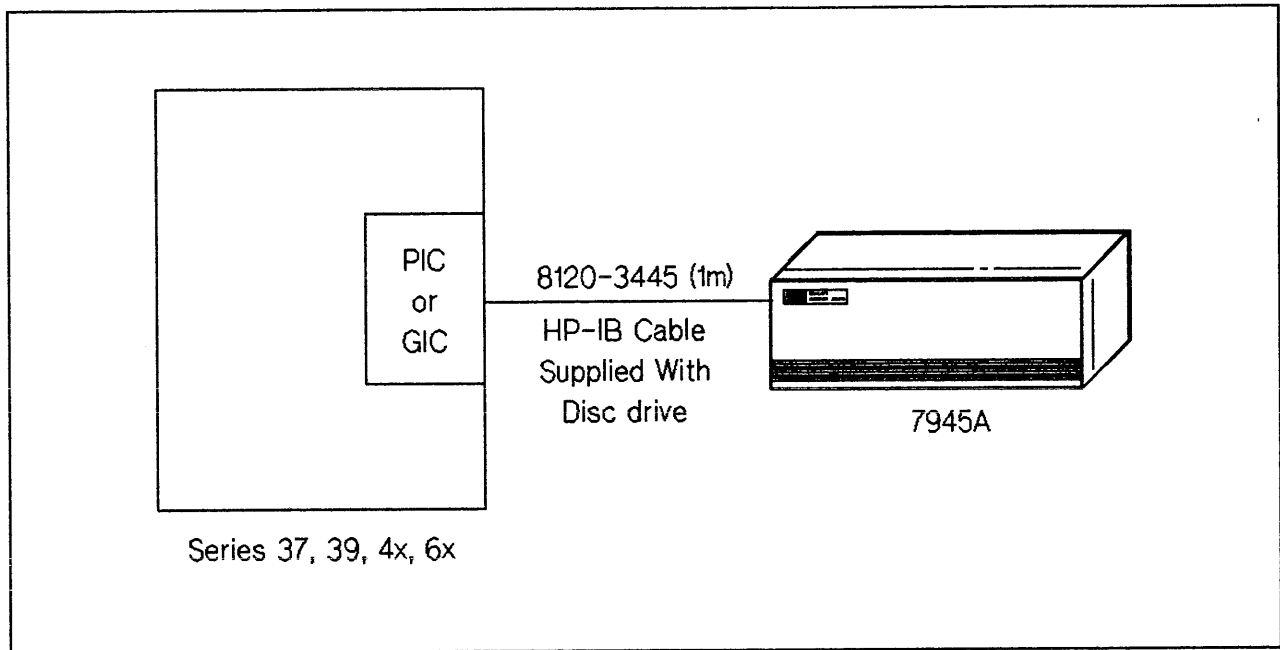
Peripheral Cabling	4-1
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Peripheral Cabling

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Disc Drives

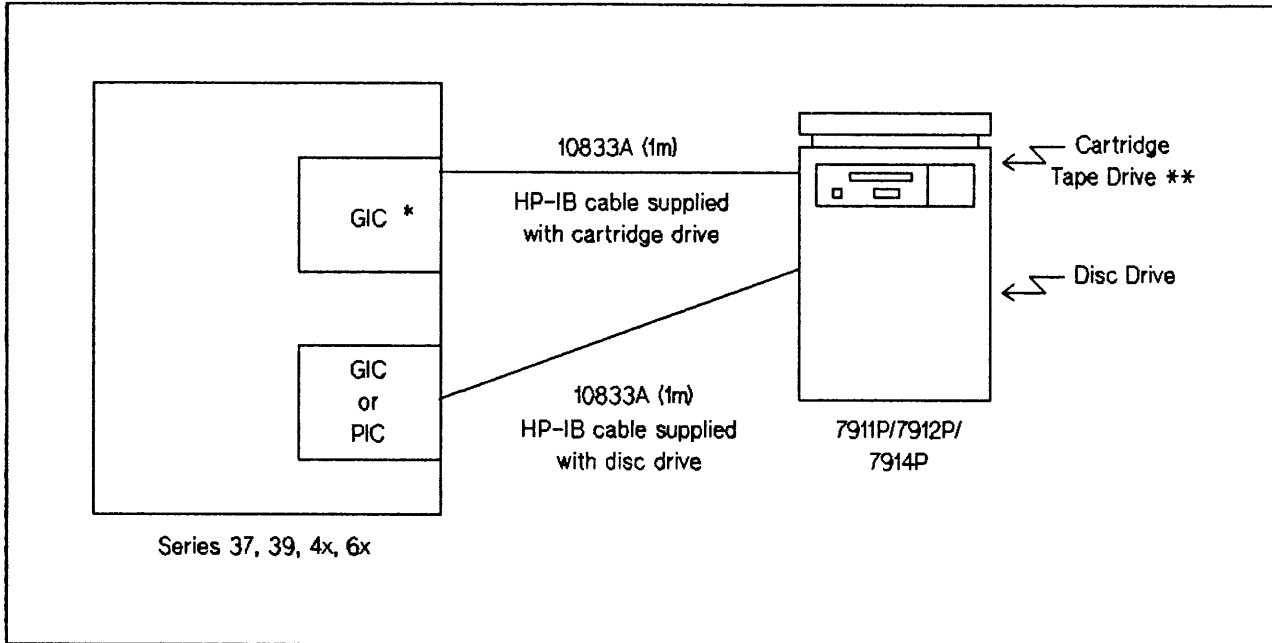
Cable Configuration for 7945A Disc Drive (55 Mb)



- The 7945A is a high-speed device shipped with one device load.
- The 7945A is supported on MPE-V/E.
- Maximum of four 7945A drives per system.
- Series 6x only: The 7945A cannot be configured on the same GIC as the system disc or the cold load device. It cannot be used as the system disc.
- The 7945A has a 0.0m internal cable.

Disc Drives

Cable Configuration for 7911P,7912P,7914P Disc Drives



* Dedicated GIC is required for cartridge tape drive. Maximum of one cartridge tape drive per system.

** Not supported on Series 37.

- Additional disc drives may be added to the configuration shown above:

Series 37, 37XE: Maximum of four 7914P drives are supported per Series 37 system; however, the Integrated Cartridge Tape is NOT supported, so the deletion Option 140 must be specified.

Series 39, 4x: Maximum of four 7911P,7912P and eight 7914P drives supported per Series 39 and Series 4x system.

Series 6x: Maximum of one 7911P,7912P and eight 7914P drives supported per system.

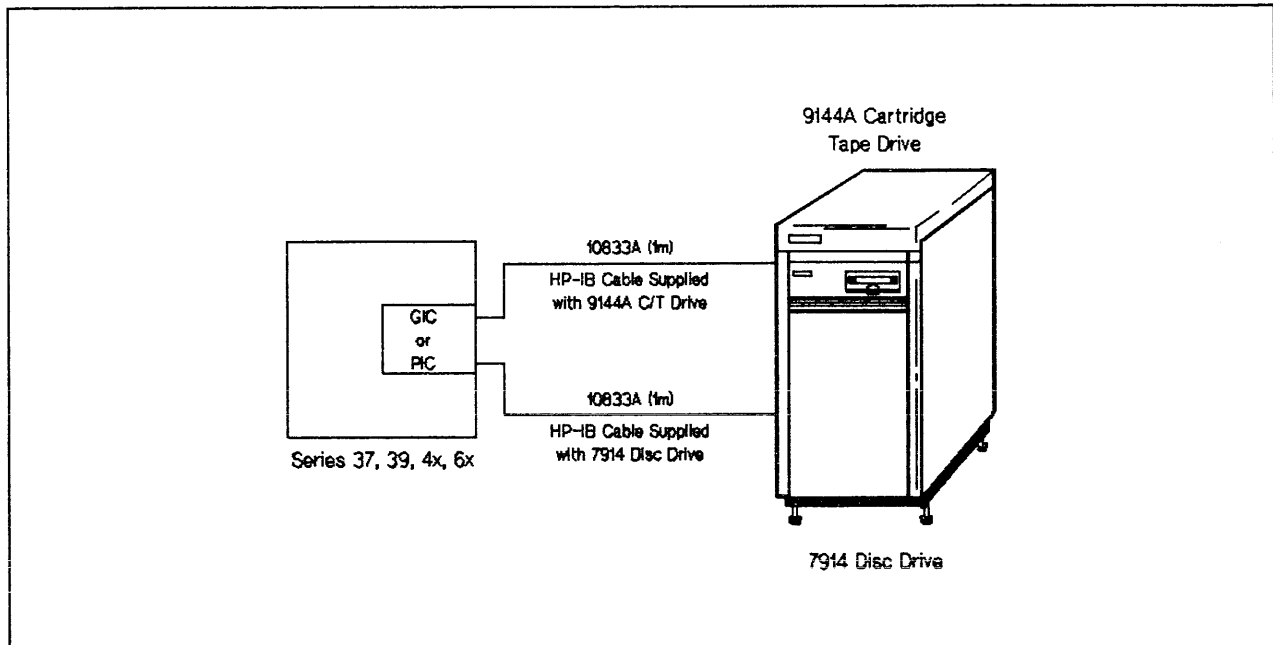
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- The 7911P,7912P, and 7914P also include 1.0m of cabling internal to the drive which must be considered for calculating maximum HP-IB cable length. The 7911P,7912P, and 7914P are high-speed devices.

Disc Drives

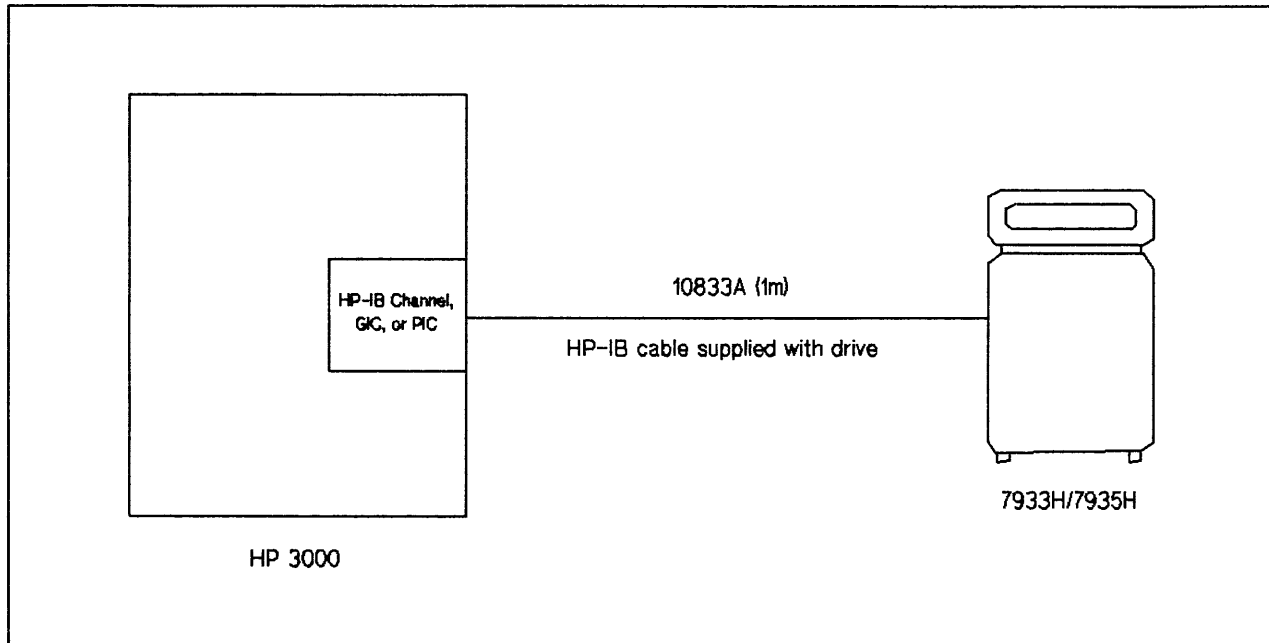
Cable Configuration for 7914CT Disc Drive



- The 7914CT includes a 9144A cartridge tape drive and a 7914 disc drive. Each component has one device load and both are high-speed devices.
- The 7914CT includes 1m of internal HP-IB cabling in the disc drive component which must be considered for calculating maximum HP-IB cable length.
- **Series 37/37XE:** Maximum of two 7914CTs supported.
- **Series 39, 4x, 6x:** Maximum of four 7914CTs supported per system.
- The 7914CT requires MPE-V/E.
- Refer to 9144A, Page 4-8, and 7914P, Page 4-2, for further support requirements.

Disc Drives

Cable Configuration for 7933H, 7935H Disc Drives (404 Mb)

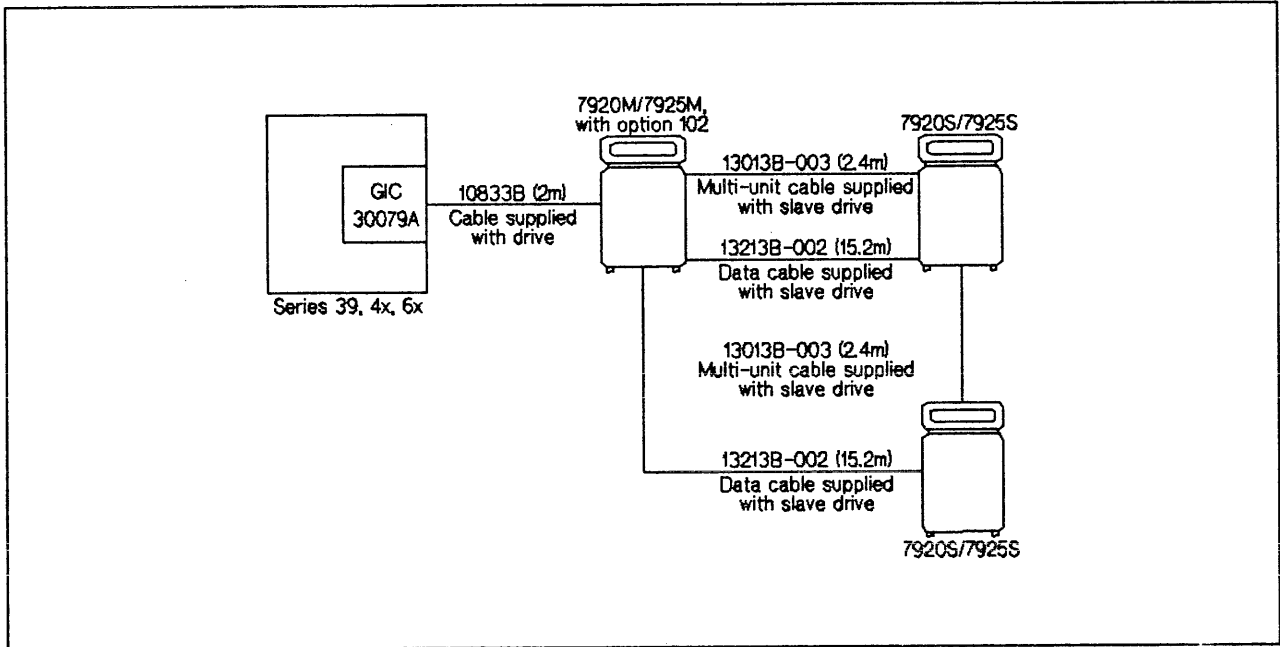


- The 7933H and 7935H are high-speed devices with one device load.
- The 7933H and 7935H include 0.0m of internal HP-IB cable.
- Additional disc drives may be added to the configuration shown above:
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Disc Drives

Cable Configuration for 7920, 7925 Disc Drives



- The 7920M and 7925M drives are high-speed devices with one device load.
- **Series 39, 40, 42:** Maximum of two master 7920M and 7925M drives supported per system. Up to seven slave drives are supported per system, all of which may be connected to a single master drive. (Two slave drives are shown connected in the above cable diagram.)
- **Series 44, 48:** Maximum of two master 7920M and 7925M drives supported per system. Maximum of 14 slave drives per system. Up to seven slave drives are supported per master drive.
- **Series 6x:** Maximum of 16 master 7920M and 7925M drives supported per system. Maximum of 14 slave drives are supported per system. Up to seven slave drives are supported per master drive.
- Cumulative HP-IB cable length cannot exceed 6.0m. See Chapter One Appendix for complete discussion of HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- Maximum limit for multi-unit and data cables is 75 ft. (22.9m). Multi-unit expansion cables available are:

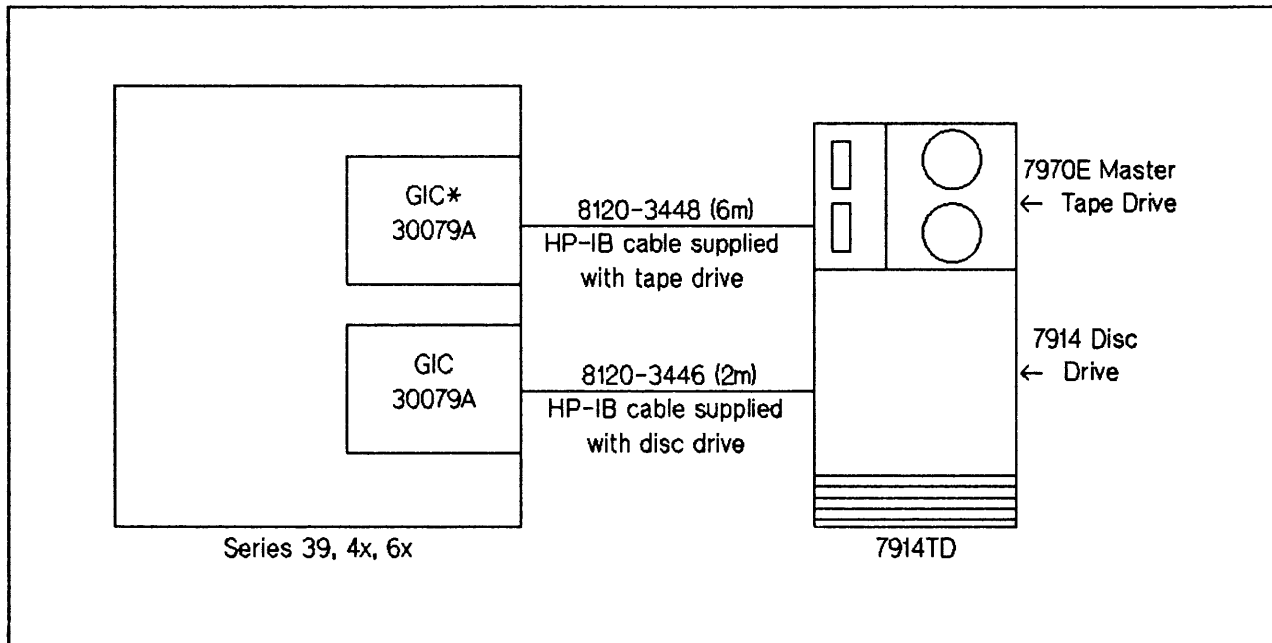
Cable Length	Product Number
1.8m	13013B
3.7m	13013B-001
5.5m	13013B-002

- Data cables available are:

Cable Length	Product Number
3m	13213B
7.6m	13213B-001
15.2m	13213B-002

Mass Storage Subsystems

Cable Configuration for 7914TD Mass Storage Subsystem

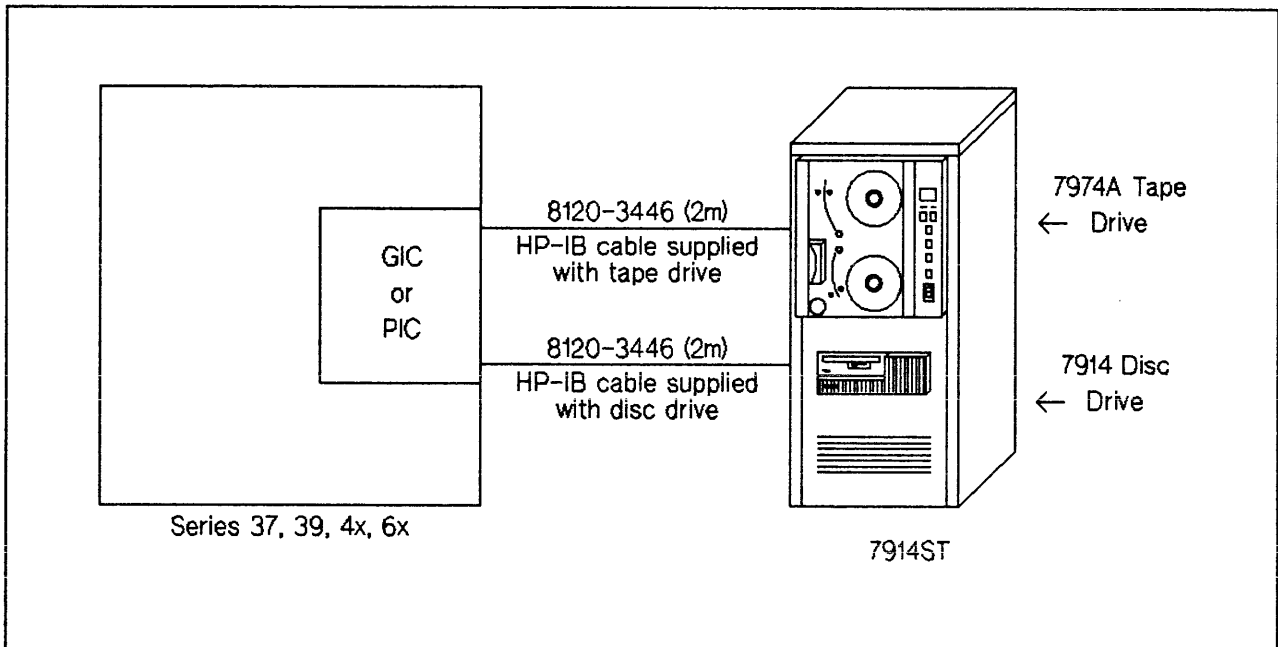


* Dedicated GIC is required for 7970E tape drive. Up to three slave tape drives may be supported on the 7970E master drive.

- A cartridge tape drive may also be supported in this configuration by ordering 7914TD option 002. The cartridge tape drive requires the addition of its own dedicated GIC.
- Series 39/42: Maximum of one 7914TD supported.
- Series 48, 68: Maximum of two 7914TDs supported.
- Additional disc drives may be supported on the disc GIC. Use standard configuration rules for additional disc drive support.
- The 7914TD is not supported on Series 37/37XE.
- See also cabling diagrams for 7914P and 7970E.

Mass Storage Subsystems

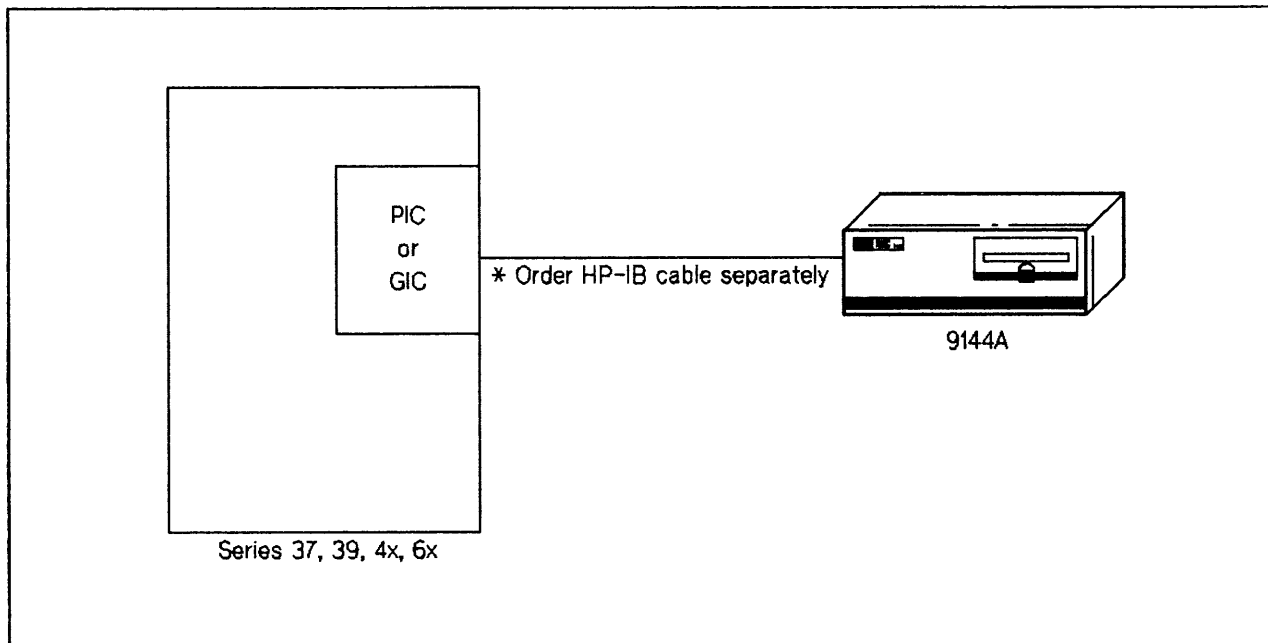
Cable Configuration for 7914ST Mass Storage Subsystem



- A cartridge tape drive may be added (except on Series 37) by ordering option 002 on the 7914ST. The cartridge tape drive requires a dedicated GIC.
- **Series 37, 37XE:** Maximum of two 7914STs are supported per system.
- **Series 39, 4x, and 6x:** Maximum of four 7914STs are supported.
- See 7974A and 7914P cabling diagrams for additional information.

Tape Drives

Cable Configuration for 9144A Cartridge Tape Drive



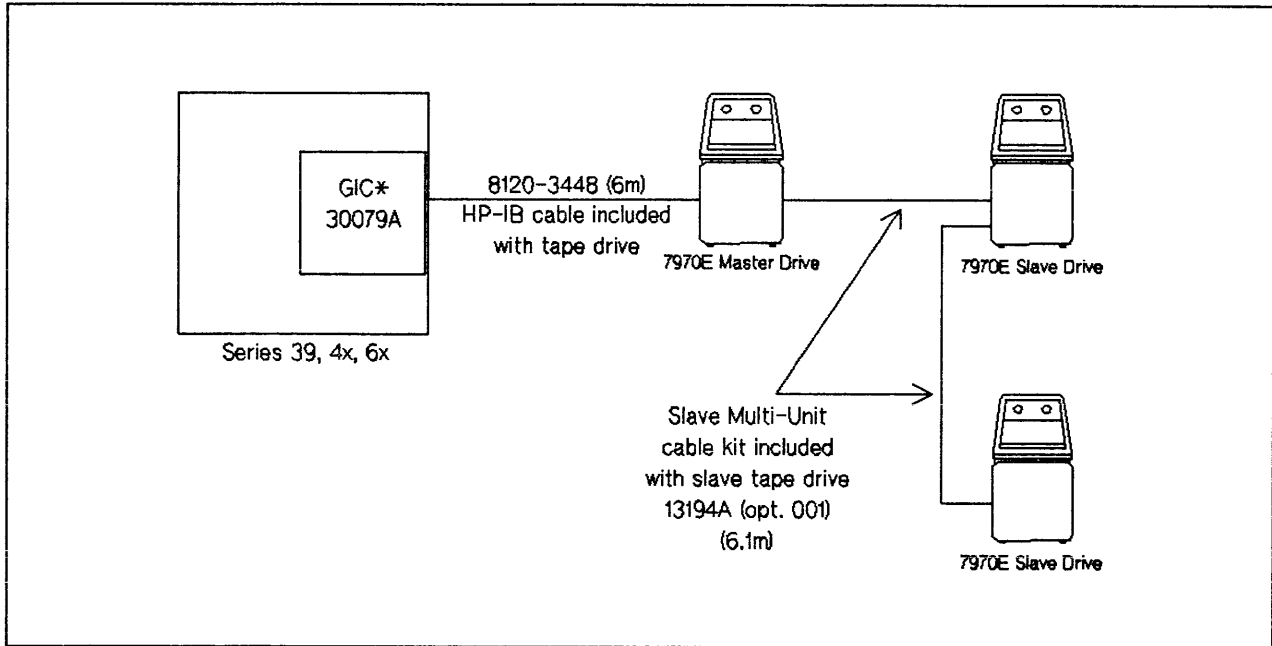
* HP-IB Cables (order one):

Cable Length	Product Number
0.5m	10833D
1m	10833A
2m	10833B

- The 9144A is a high-speed device with one device load.
- The 9144A is supported on MPE-V/E.
- **Series 37, 37XE:** Maximum of two 9144As supported.
- **Series 39, 40, 40SX, 42:** Maximum of four 9144As supported. Requires CPS-E microcode to be supported as cold load device.
- **Series 44, 48:** Maximum of four 9144As supported. Not supported as cold load device.
- **Series 6x:** Maximum of four 9144As supported. Not supported as cold load device. Cannot share GIC with system disc or cold load device.

Tape Drives

Cable Configuration for 7970E Master Tape Drive



* Dedicated GIC is required for 7970E master drive.

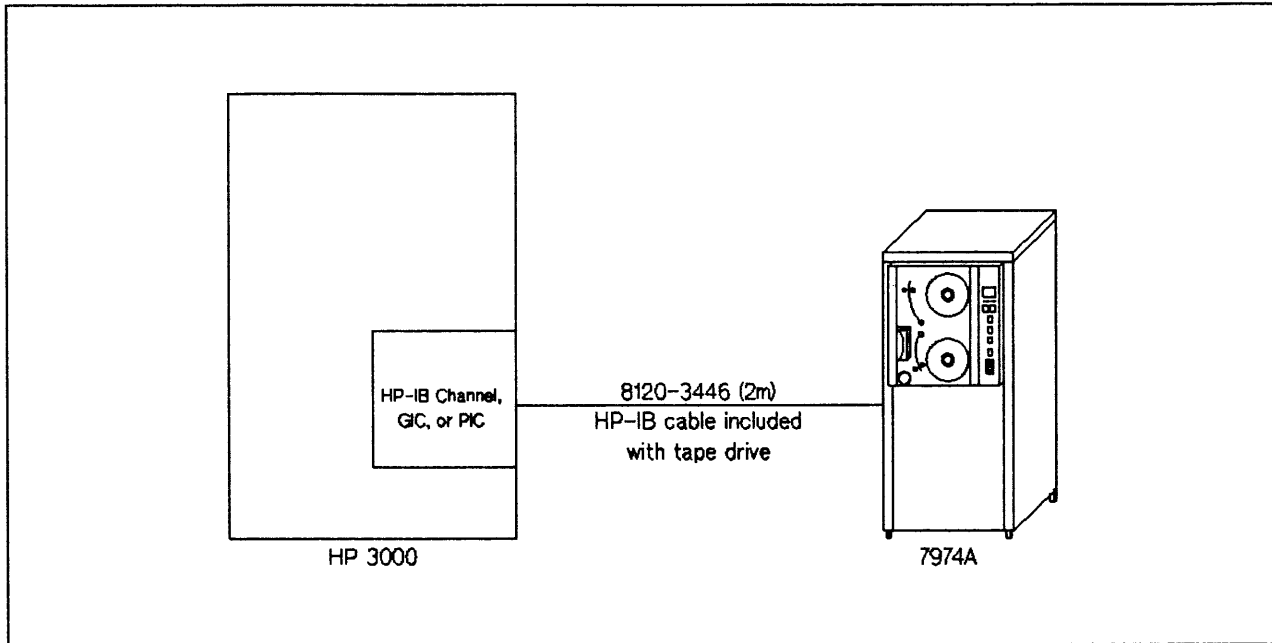
- **Series 39, 40, 42:** Maximum of one master drive supported per system.
- **Series 44, 48, 6x:** Maximum of two master drives supported per system. Each master disc requires a dedicated GIC. Up to three slave drives are supported per master drive. (Two slave drives are shown connected in the above diagram.)

- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Tape Drives

Cable Configuration for 7974A Tape Drive



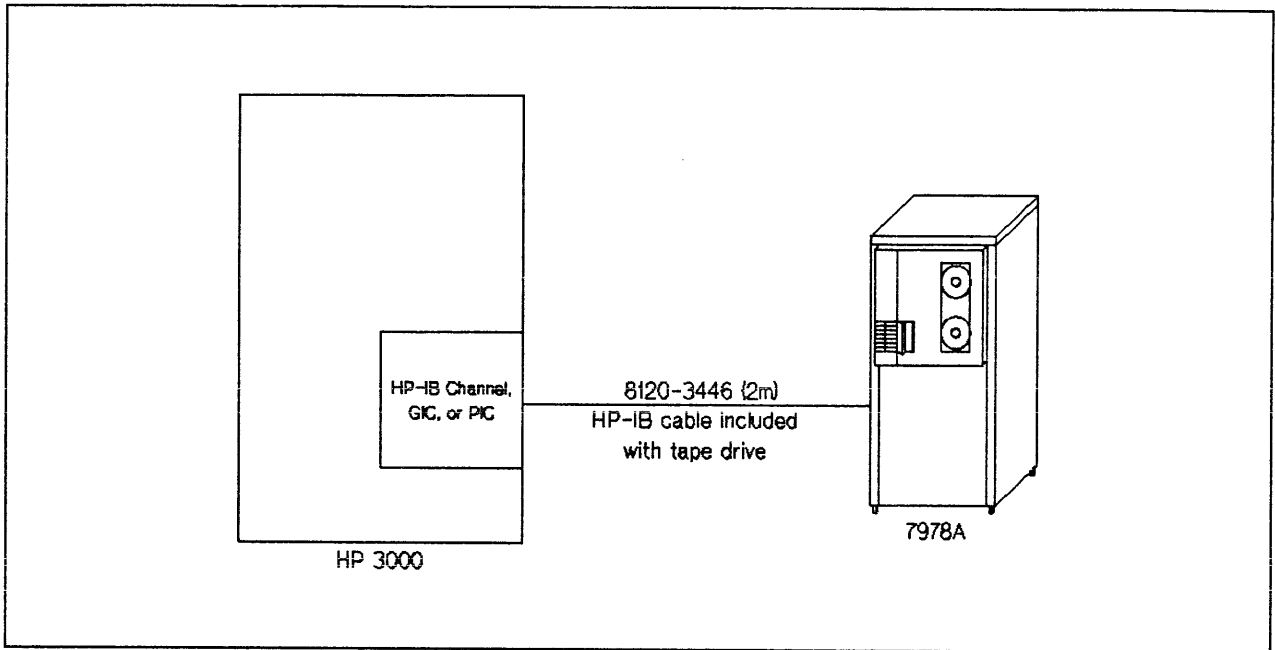
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- There is 1.0m of HP-IB cabling that is internal to the 7974A and must be considered when calculating maximum HP-IB cable length.
- The 7974A is a high-speed device shipped with one device load (variable from 1 to 3).

Tape Drives

Cable Configuration for 7978A/B Tape Drive



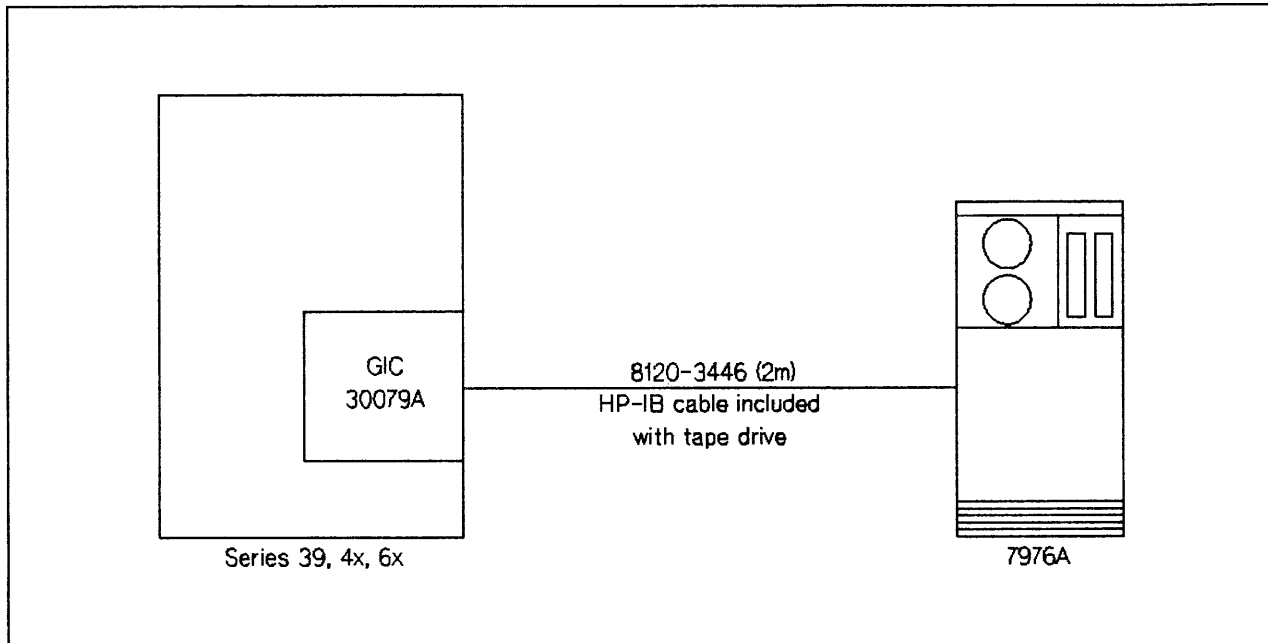
- The 7978A/B is a high-speed device shipped with one device load (variable from 1 to 3).
- There are 0.0m of HP-IB internal cabling in the 7978A/B.

- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Tape Drives

Cable Configuration for 7976A Tape Drive

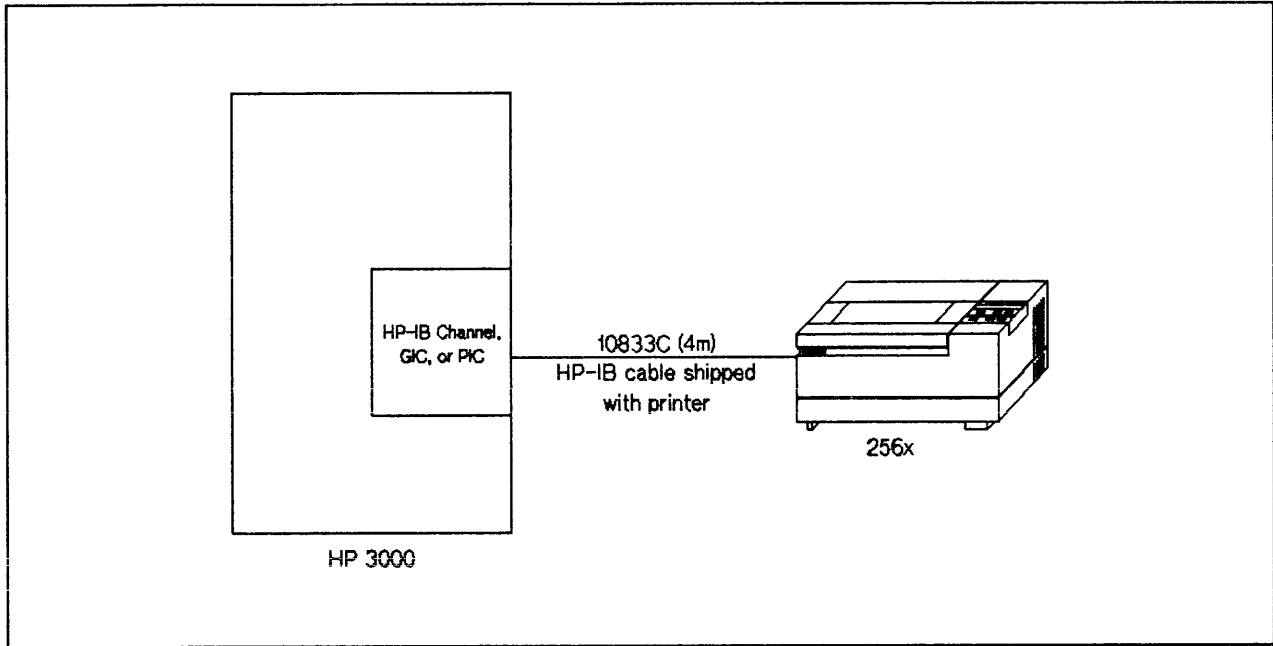


- Maximum of two 7976A drives supported per system.
- Not supported on Series 37/37XE.
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:
 - There are 2.0m of HP-IB cabling that are internal to the 7976A and must be considered for calculating maximum HP-IB cable length.
 - The 7976A is a high-speed device shipped with two HP-IB loads (variable from 1 to 4 loads).

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Printers

Cable Configuration for 256x Printers



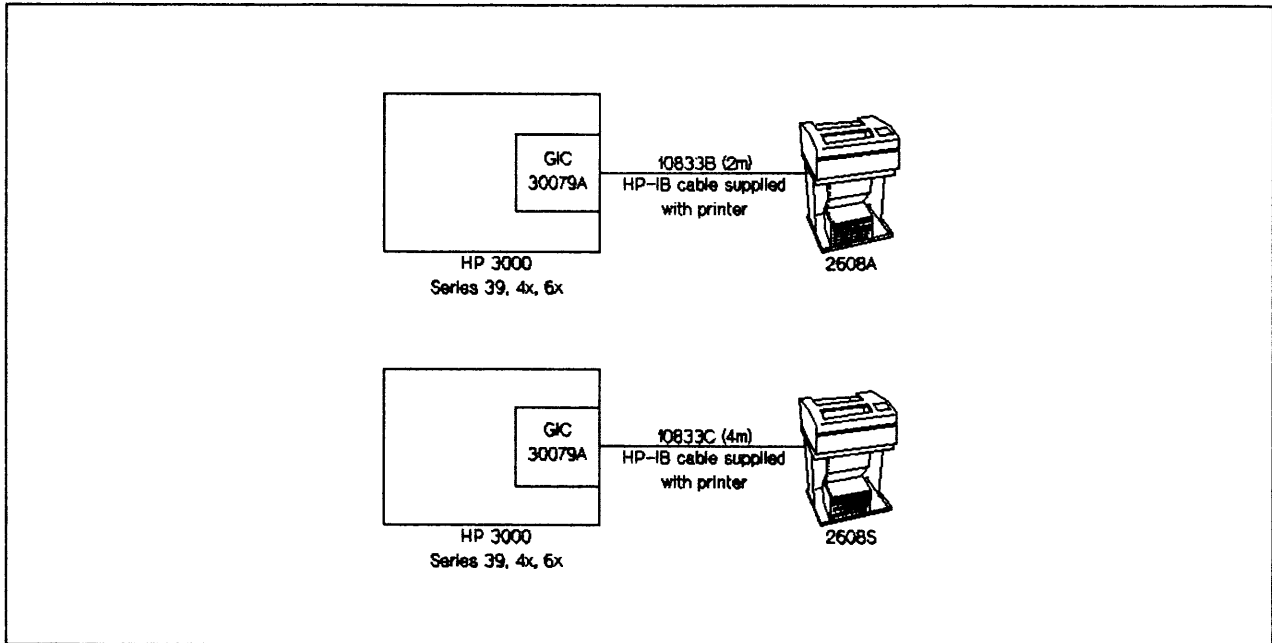
- The 256x printers are high-speed devices shipped with one device load (variable from 1 to 7). When configured via HP-IB extenders, however, they become low-speed devices. (See discussion on HP-IB extenders in Chapter One Appendix and HP-IB Extender Cabling diagram on Page 4-18.)
- The 2563A (only) may be configured also on an MTS Network Link (by ordering Option 055) or as an RS-232-C or RS-422 serial printer on the Series 39/4x/58/6x/70 systems (by ordering options 049 (RS-232) or 050 (RS-422)).
- Connection of the 256x printers via HP-IB Extenders is supported. Refer to Page 4-18 or to the Chapter One Appendix.

- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Printers

Cable Configuration for 2608A, 2608S Printers



- The 2608A and 2608S are not supported on Series 37/37XE.
- **2608A:** Maximum supported HP-IB cable length for 2608A is 6m. The 2608A is a low-speed device which cannot share a GIC with high-speed devices.
- **2608S:** The 2608S is a high-speed device, but cannot share the GIC with 7920, 7925 disc drives. It is shipped with one device load (variable from 1-7). Maximum supported HP-IB cable length for 2608S is 13.0m. A 1.0m internal cable is included.

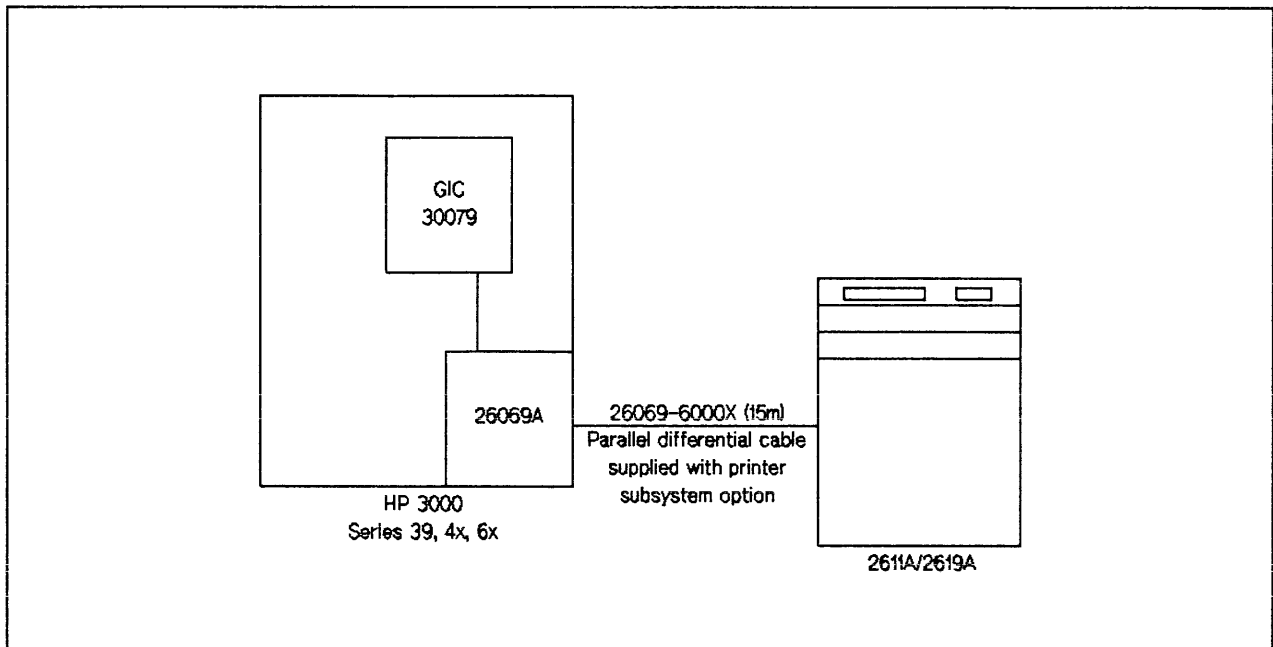
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

The 2608S with Option 055 may be configured on an MTS line. (See Pages 4-37 and 4-38 for cabling diagrams.)

Printers

Cable Configuration for 2611A, 2619A Printers



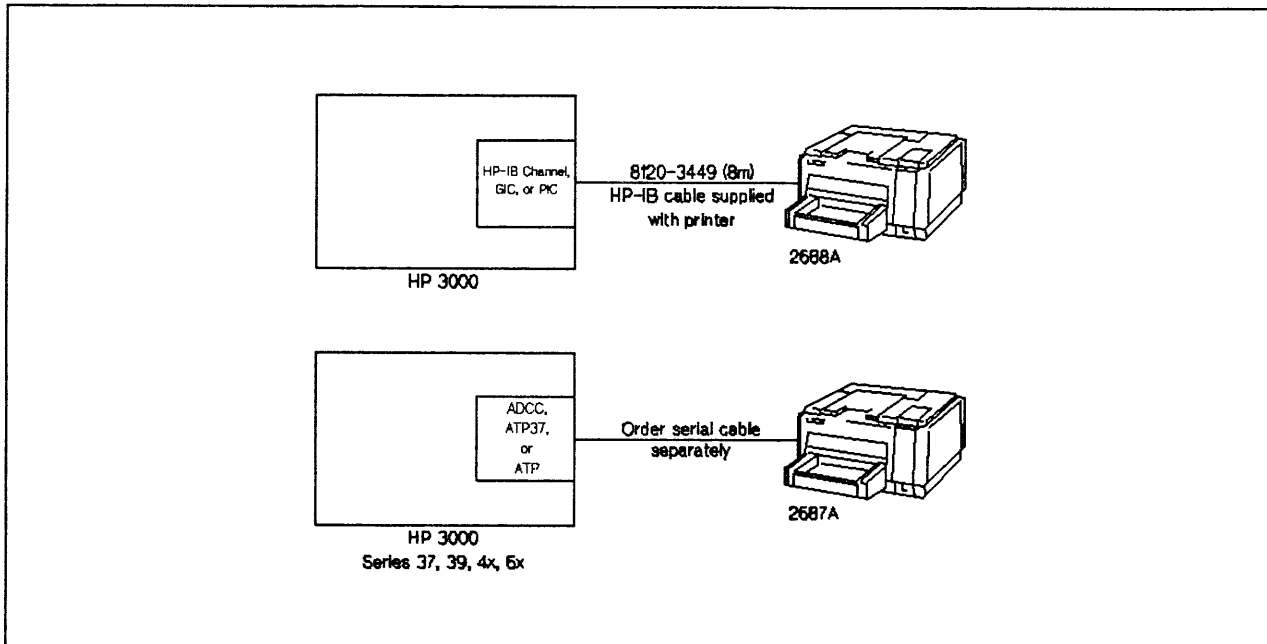
- The 26069A Line Printer Interface (LPI) is supplied with the 2611A and 2619A printer when the corresponding subsystem option is ordered. The 26069A is a board which requires a separate card slot and is connected to the GIC via an internal 1.0m HP-IB cable.
- **Series 39,42:** Maximum of two 261x printers are supported.
- **Series 48, 68:** Maximum of four 261x printers.
- The external cable between the printer and the Line Printer Interface is system-dependent as follows:

Series 39: 26069-60005
Series 4x: 26069-60003
Series 6x: 26069-60003

- Expansion cables are made-to-order upon request for distances of up to 500 ft. Contact Boise Division for quote.
- The 2611A and 2619A are not supported on Series 37.

Printers

Cable Configuration for 2687A, 2688A Page Printers

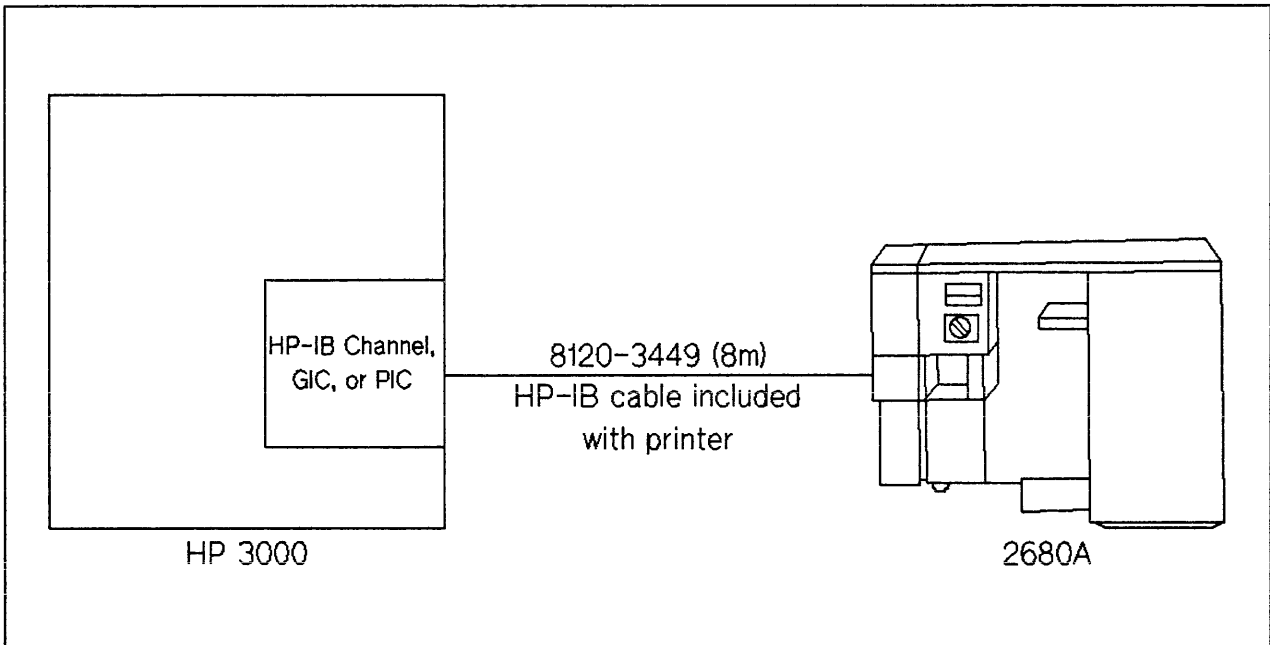


- The 2688A is a high-speed device which is shipped with four device loads (variable from 1 to 8). It includes a 1.0m internal HP-IB cable.
- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:
 - Connection of the 2688A via HP-IB Extenders is supported. Information on HP-IB Extenders can be found on Page 4-18 and in the Chapter One Appendix.
 - When the 2687A is used on the Series 37, no other serial printer may be configured.
 - Cable product numbers for the 2687A are listed on Page 4-30.

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Printers

Cable Configuration for 2680A Page Printer

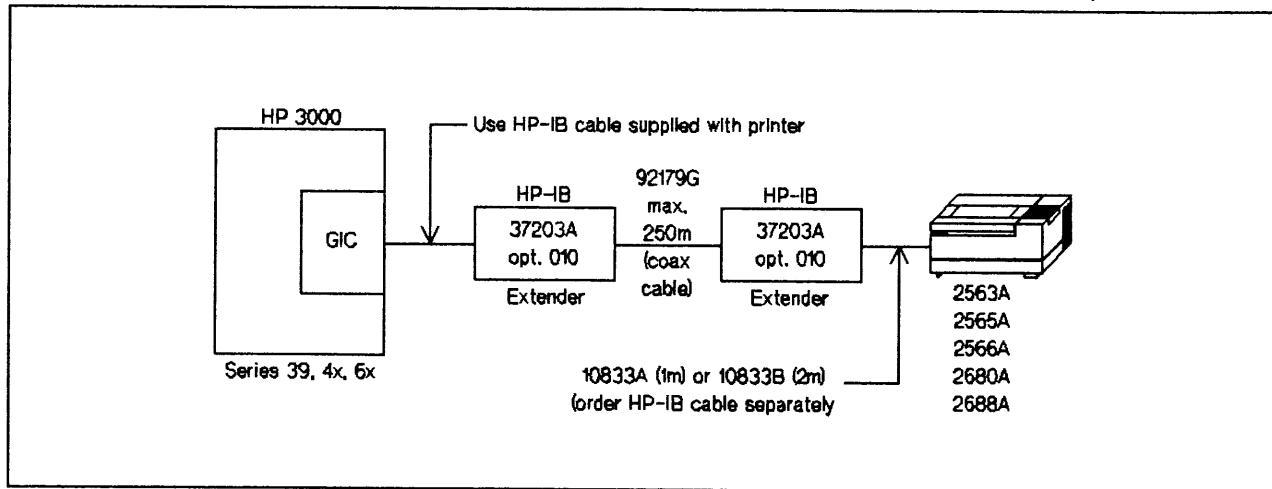


- The 2680A is a high-speed device shipped with four device loads (variable from 1 to 8).
- The 2680A has a 1.0m internal HP-IB cable. See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:
 - Connection of the 2680A via HP-IB Extenders is supported. Information on HP-IB Extenders can be found on Page 4-18 and in the Chapter One Appendix.
 - For connection of a second 2680A, a 2.0m HP-IB cable is available by ordering the 2680A with Option 099.

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Printers

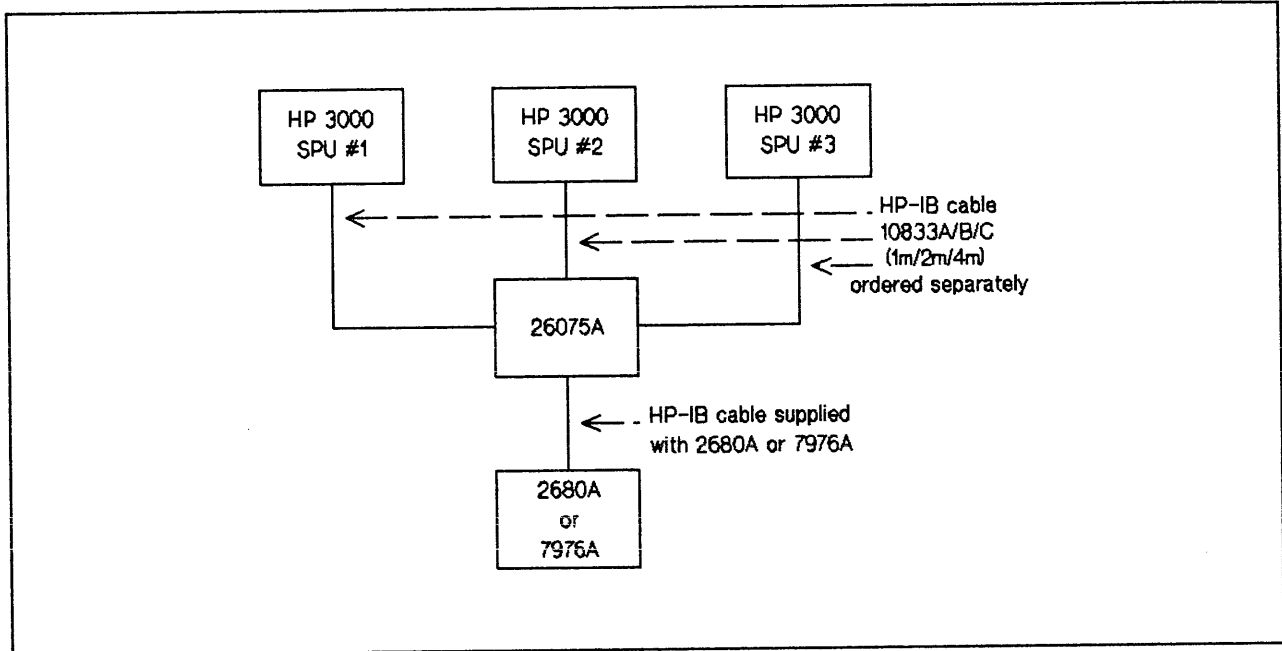
Single Printer Cabling with HP-IB Extenders (37203A)



- The Extender pair may be up to 250m apart. A separate coax cable (92179G) needs to be ordered. Please refer to the section on HP-IB Extenders in the Chapter One Appendix or consult your CE.
- The 1m or 2m HP-IB cable required from Extender to printer must be ordered separately (10833A=1m; 10833B=2m). The cable shipped with the printer may be used to connect an Extender to the GIC.
- Printers configured via HP-IB Extenders require a dedicated GIC which is considered low-speed.
- HP-IB Extender support for the 256x, 2680A, and the 2688A printers requires MPE-V/E (or later MIT).
- There are particular rules for HP-IB loads and cable length when configuring multiple printers on a single Extender pair which vary from standard GIC connection rules. The "Seven- plus-one-meter" rule for cabling does not apply. Please refer to the Chapter One Appendix and consult with your CE for each multiple printer situation.

HP-IB Peripheral Selector

Cable Configuration for 26075A Multiple System Access Selector (Maximum Configuration)



- The 26075A is an HP-IB switchbox designed to switch a 2680A or 7976A between up to three HP 3000 Series 39, 4x, or 6x CPUs (not on Series 37). An operator can switch the peripheral manually to be active on any of the sharing systems.
- The Selector includes 0.5m of internal HP-IB cable and represents no loads on the GIC.
- Only the 2680A, 7976A are supported.
- The 26075A CANNOT share a GIC with any disc drives.

- See Chapter One Appendix for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

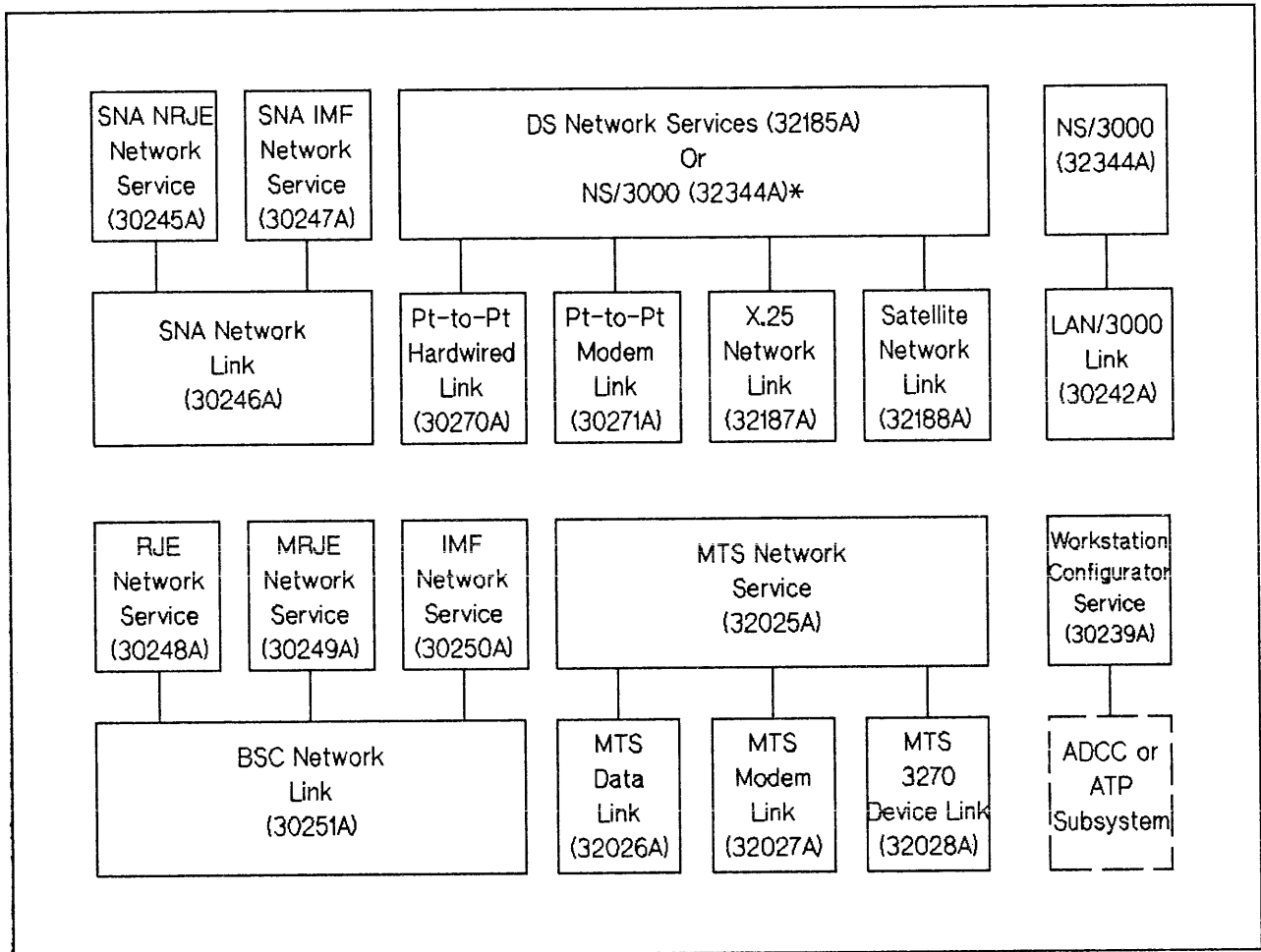
Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

System Communication Products

HP 3000 Data Communications Products	4-21
Local Area Network	4-22
PBX Connections	4-23
HP 3000 to HP Systems Communications	4-25
HP 3000 to IBM Communications	4-27

HP 3000 Data Communication Products

Network Link and Service Products Matrix

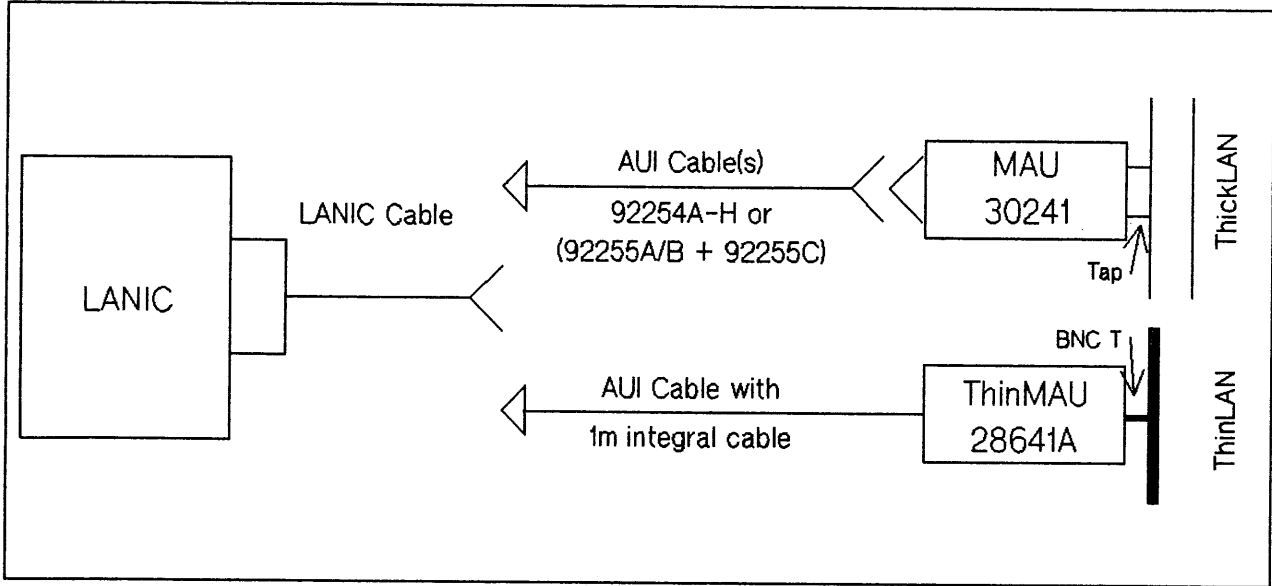


* NS/3000 requires the LAN/3000 Link (30242A).

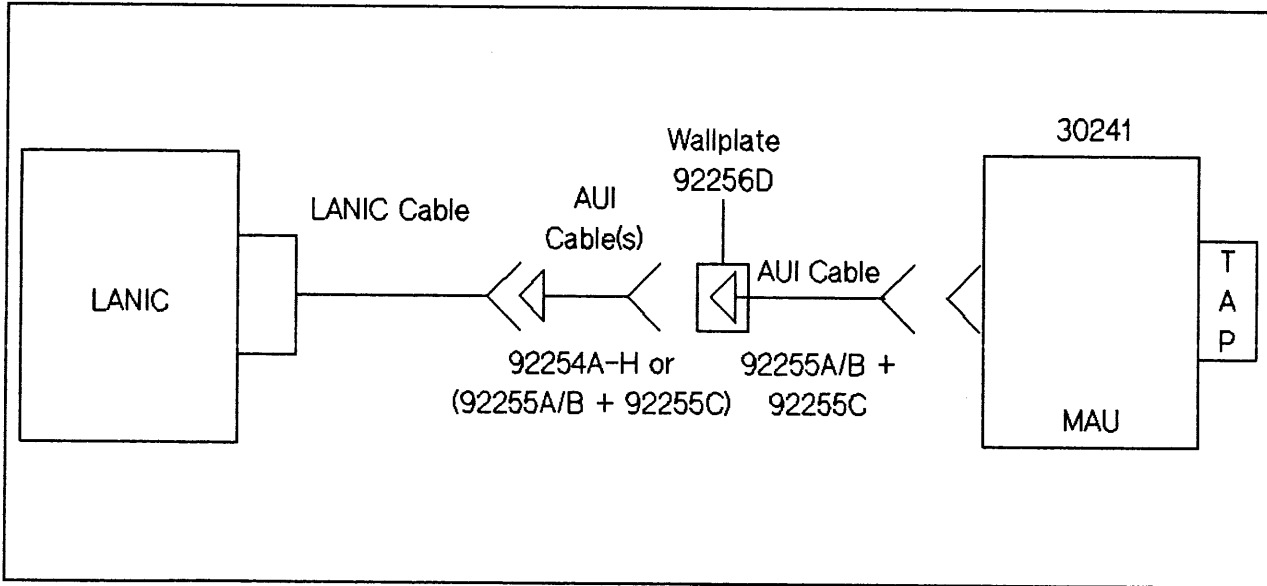
- Complete details on the products in this matrix can be found in the HP 3000 Data Communications Products Specification Guide.

Local Area Network

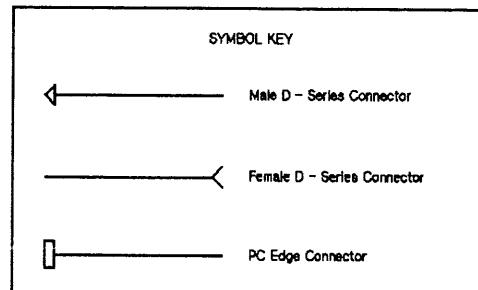
LANIC to MAU Connection (Thick and Thin Coax)



LANIC to MAU Connection with Wallplate (Thick Coax)

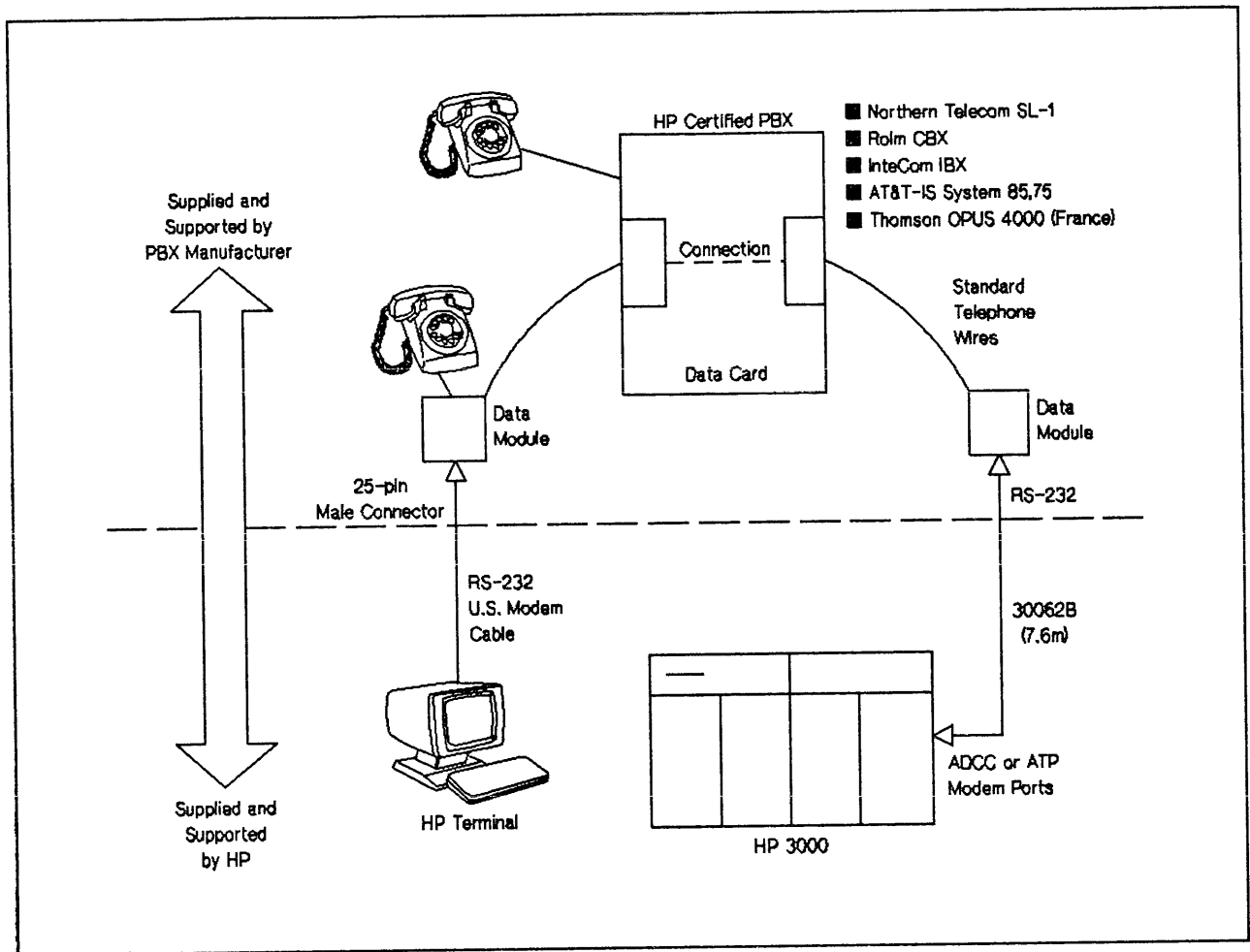


- Multiple cable segments can be used between the LANIC cable and the MAU. In the wallplate case, multiple segments can be used from the LANIC cable to the wallplate, and from the wallplate to the MAU. The segment with the male connector attached to the wallplate must be unconnected.



PBX Connections

Point-to-Point PBX Cable Configuration



- The appropriate modem cable to order for each of the terminal devices can be found on Pages 4-29 and 4-34.

- ATP connection to the data module *must* be via Modem Connect Port Controllers.

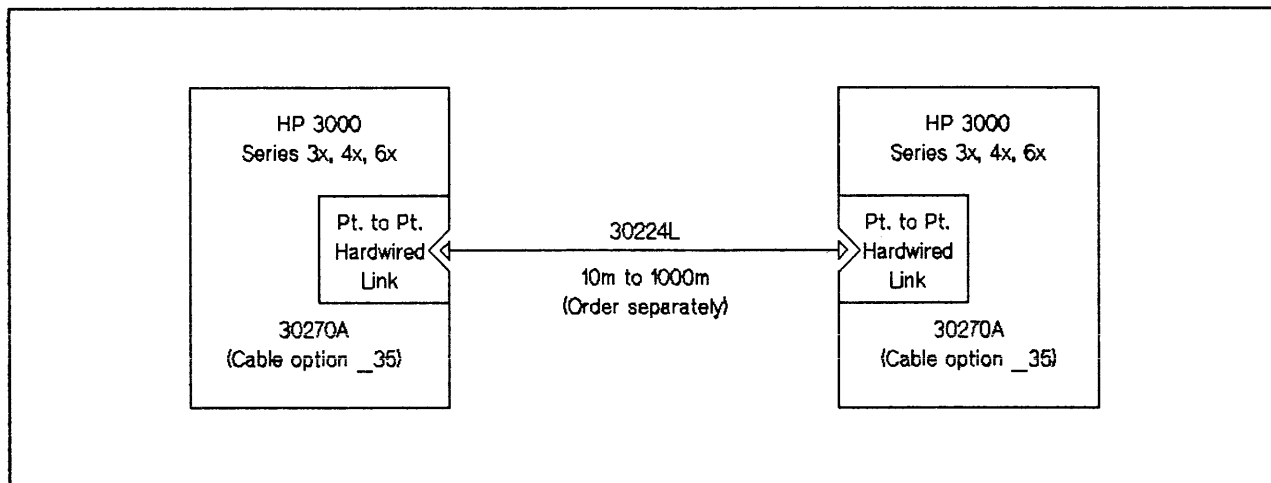
PBX Connections

Certified PBX Equipment

Manufacturer	PBX Model	Data Module
Northern Telecom	SL-1A, SL-1M, SL-1LE, SL-1VLE, SL-1XL, SL-IS, SL-1MS, SL-IN, SL-1XN, SL-1L, SL-IVL	Add-on Data Module (ADM) QMT-7, QMT-8, AIM, MCDS
ROLM Corporation	VSCBX, SCBX, MCBX, VLCBX	Data Terminal Interface (DTI)
InteCom, Inc.	IBX S/40	Intelligent Telephone Equipment (ITE) Data Interface Unit (DIU)
AT&T-IS	DIMENSION System 85 System 75	Data Modules PDM, DTDM
Thomson (France)	OPUS 4000	TNA 4020-U24

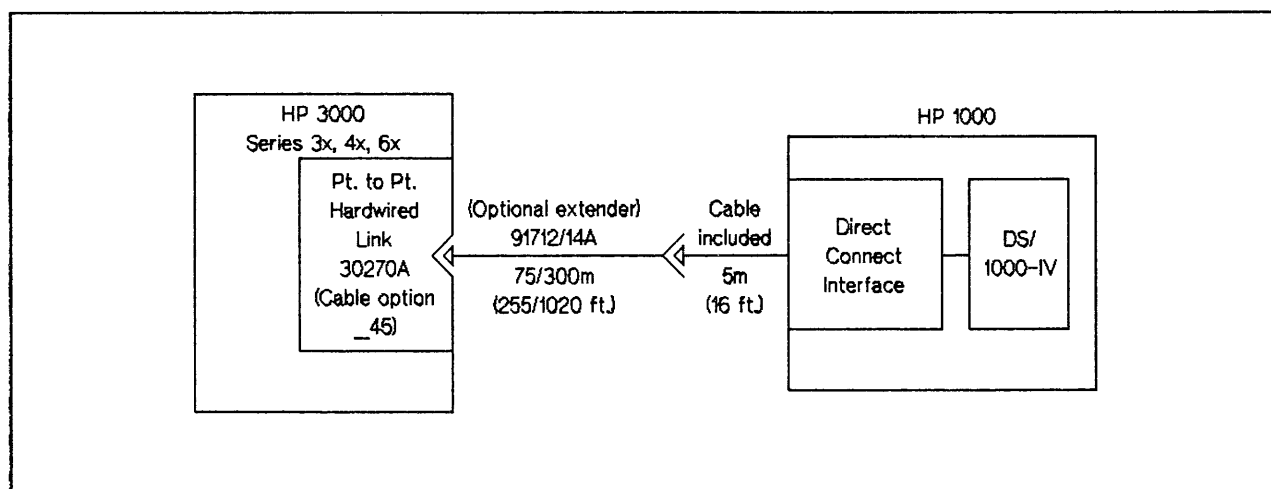
HP 3000 to HP Systems Communications

HP 3000 to HP 3000 Direct Connection Requires 32185A DS Network Service



- The 30270A Option 135 includes INP and 30224C internal cable. The 30270A Options 335 and 435 include INP and 30224B internal cable.

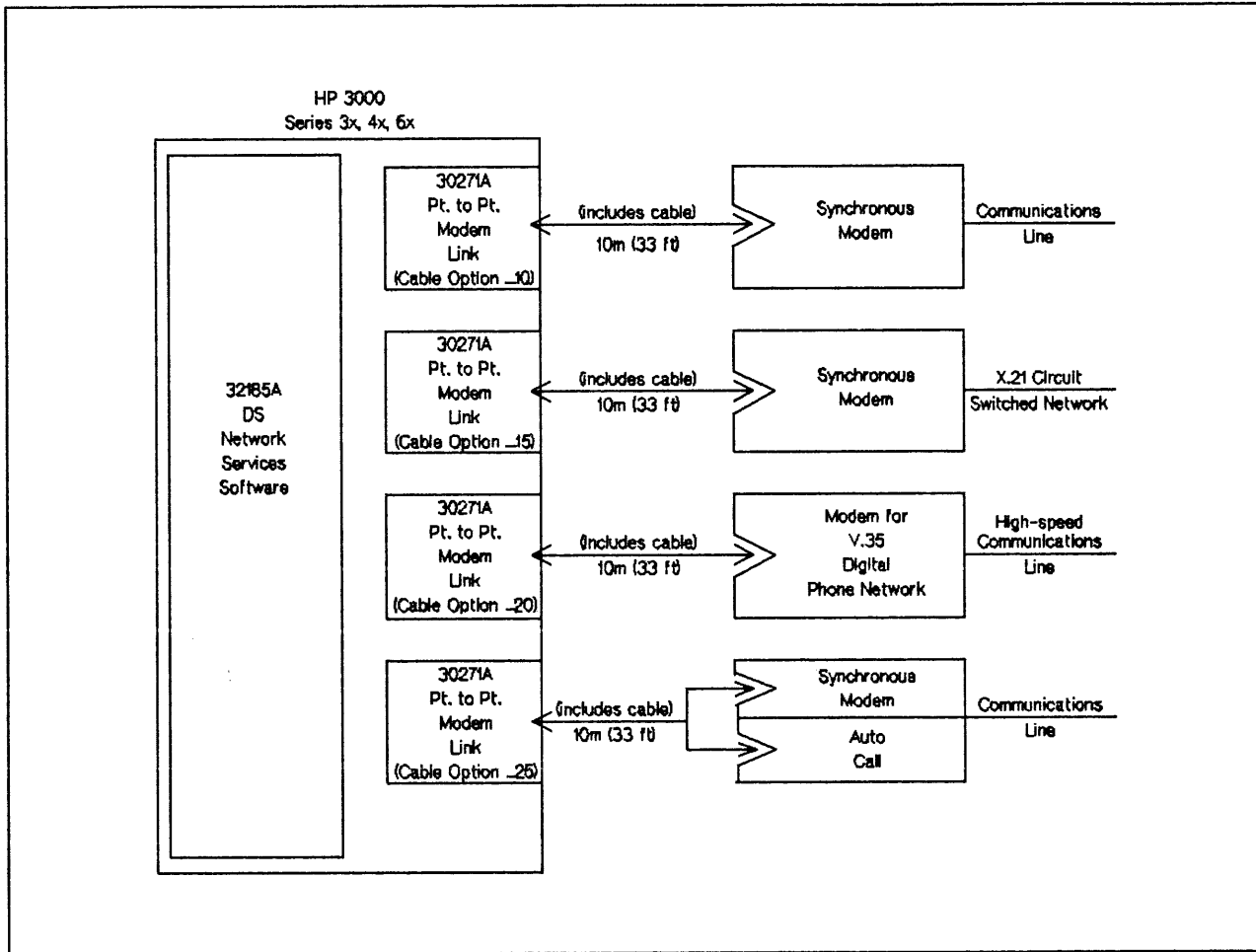
HP 3000 to HP 1000 Direct Connection Requires 32185A DS Network Service



- The 30270A with Option 145 includes 30244F cable and INP. The 30270A with Option 345 or 445 includes 30221F cable and INP.
- Supported maximum distance is 4,000 feet (1220 m).

HP 3000 to HP Systems Communications

HP 3000 Point-to-Point Modem Link to HP 3000, HP 1000, HP 250, or HP 9845 Requires 32185A/R DS Network Services Software

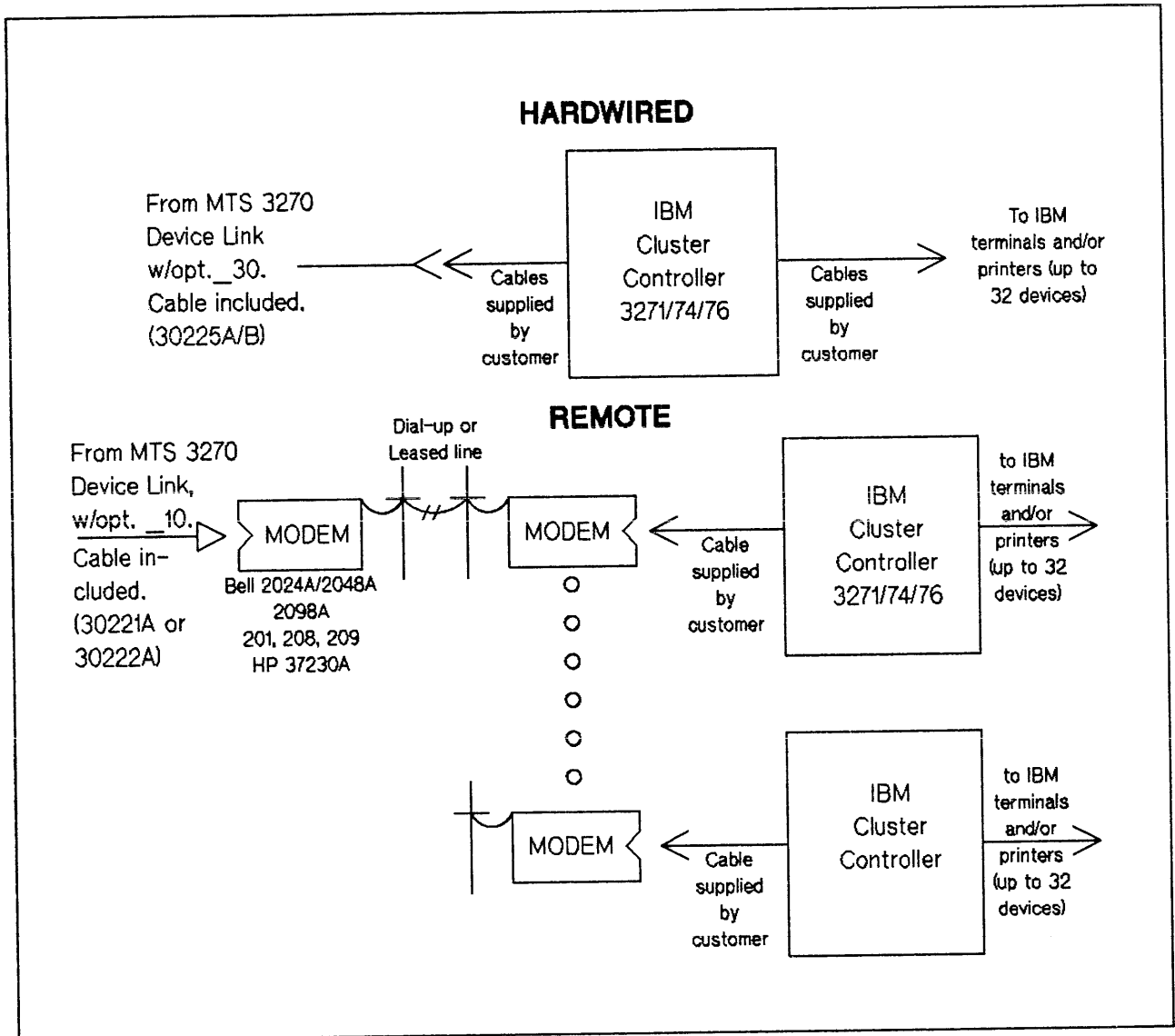


- Modems supported are Bell 201C, 208A/B, 209A, 2024A, 2048A, 2096A, 500B and HP 37230A. For Auto Dial Capability, Bell 801C Auto Call Unit is supported.

- Point-to-Point Modem Link includes INP internal cables and 10m external cable.

HP 3000 to IBM Communications

MTS 3270 Device Link Connections



- MTS 3270 Device Link requires Multipoint Terminal Support Service Software (32025A/R).

Workstation Cabling

MPE XL HP 3000 Distributed Terminal Controller Cabling	4-28.1
MPE XL Console Cabling	4-28.4
HP 3000 MPE V Point-to-Point Terminal Cabling	4-30
X.25 Workstation Cabling	4-36
Multipoint (MTS) Cabling	4-37

Workstation Cabling

MPE XL Distributed Terminal Controller (DTC) Cabling

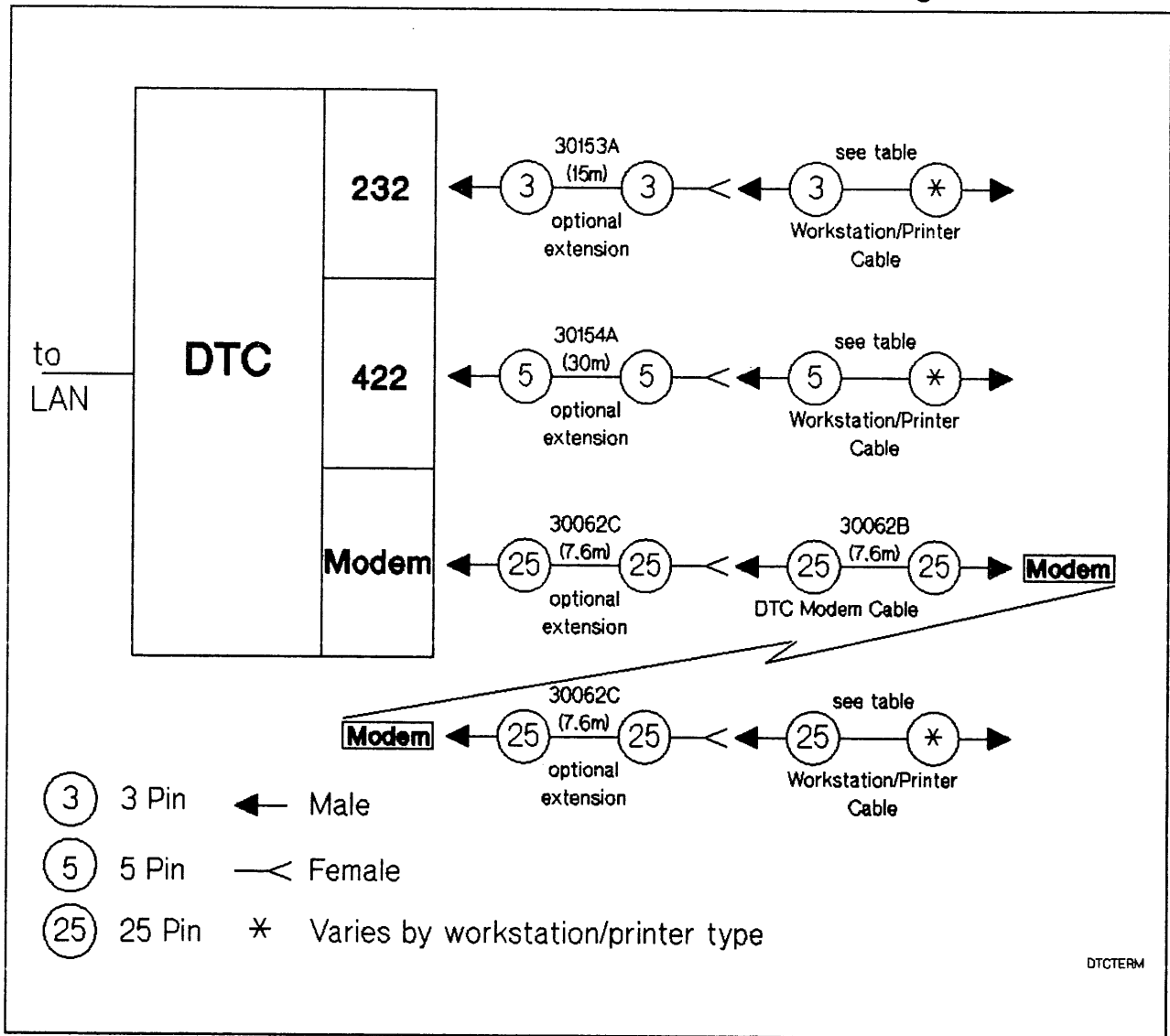
Most of the cables in the table below may be ordered as options on the terminal or printer product. Please refer to a current HP 3000 Price Guide for specific option numbers.

PRODUCT	RS-232-C (3-pin)	RS-422 (5-pin)	U.S. Modem (25-pin)	European Modem (25-pin)
239x (port 1)	40242X (5m)	40242P (5m)	40242M (5m)	40242M (5m)
239x (port 2)	40242X (5m)	N/A	40242M (5m)	40242M (5m)
2622A 2624B (port 1) 2627A (port 1)	13222X (5m)	13222P (5m)	13222N (5m)	13222M (5m)
2624B (port 2)	13242X (5m)	N/A	13242N (5m)	13242M (5m)
150/Touchscreen Vectra	13242X (5m)	13242P (5m)	13242N (5m)	13242M (5m)
PortablePLUS	92221M (1.5m) plus 30152A (5m)	N/A	92221M (1.5m)	92221M (1.5m)
2686A	92218D (15m)	92218C (15m)	N/A	N/A
2934A	13242X (5m)	13242P (5m)	13242N (5m)	13242M (5m)
Extension Cables	30153A (15m)	30154A (30m)	30062C (7.6m)	30062C (7.6m)

- RS-232 connections may not exceed 15m (50 ft); RS-422 connections may not exceed 1220m (4000 ft).

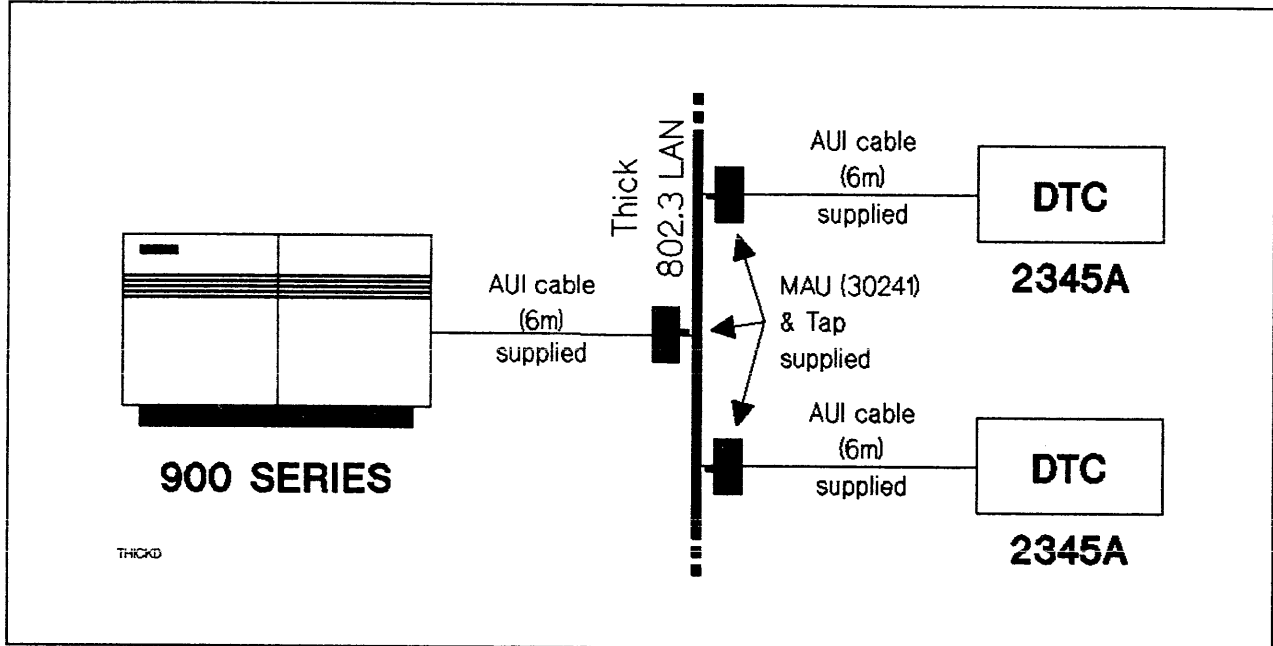
Workstation Cabling

DTC-to-Workstation/Serial Printer Cabling

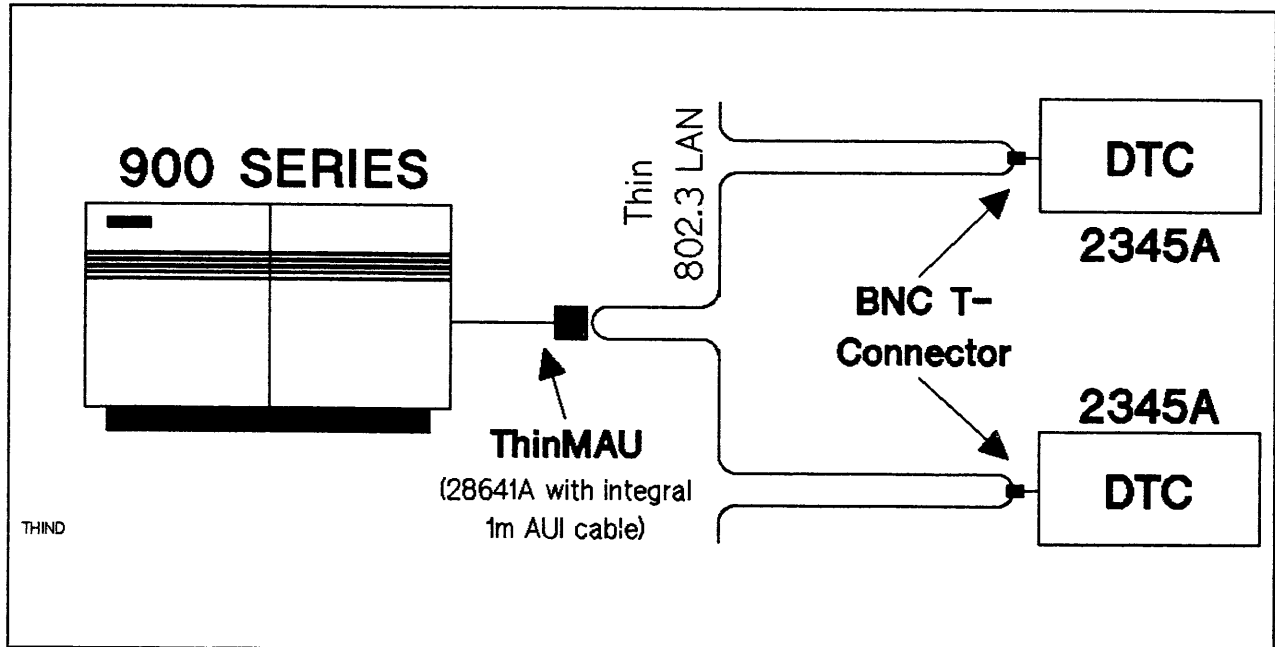


Workstation Cabling

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

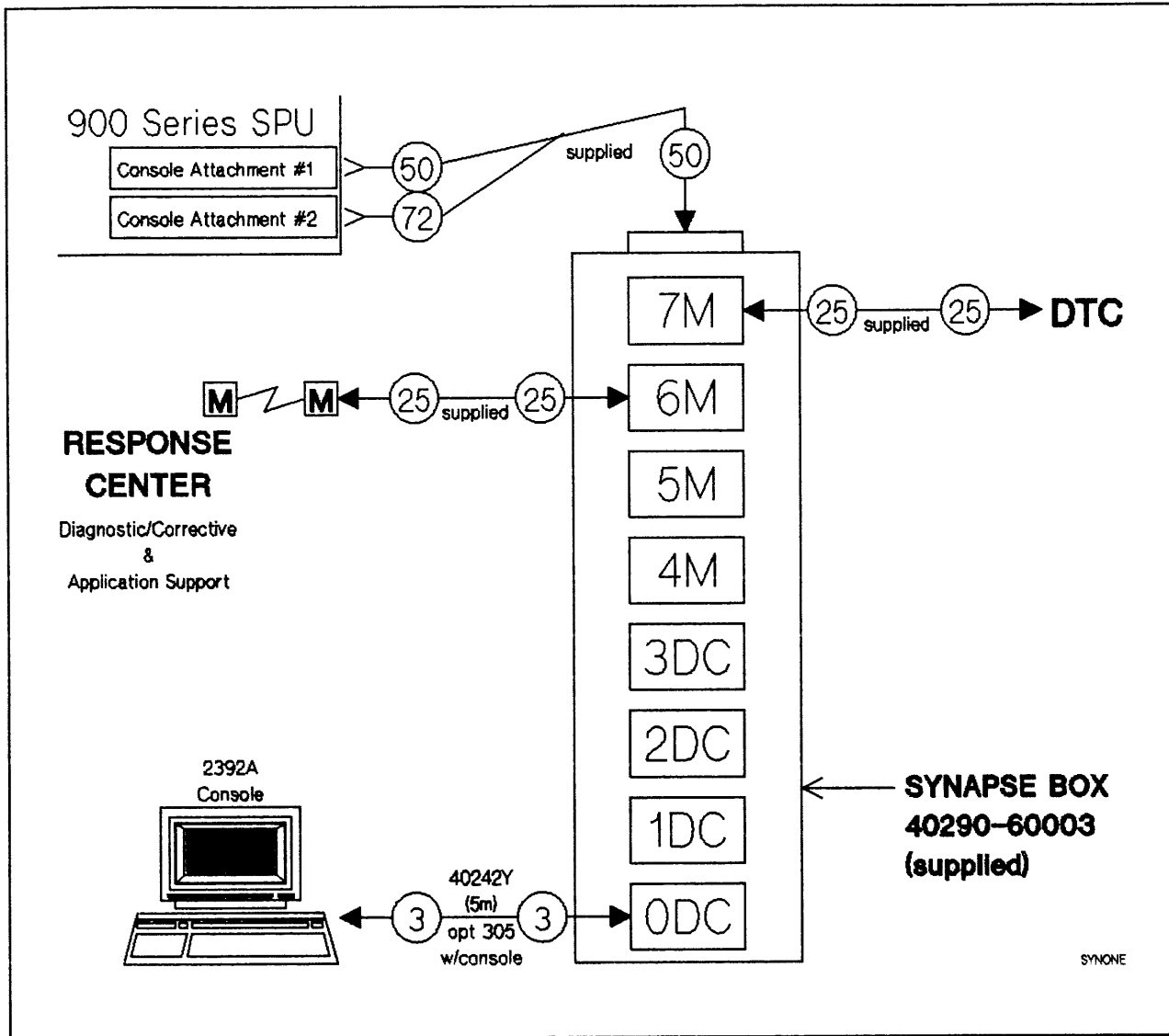


DTC-to-SPU Thin (10Base2) LAN Connection



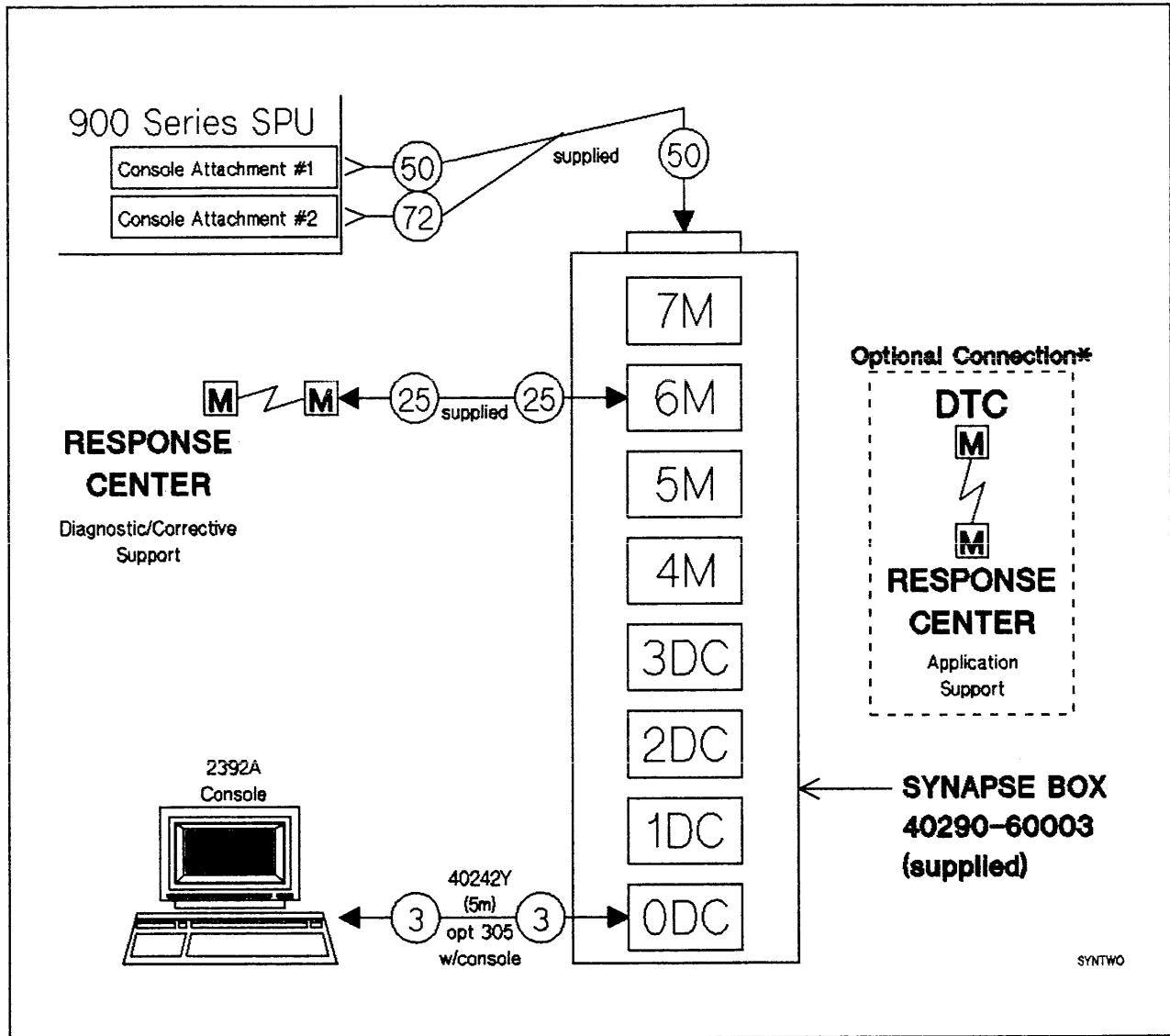
Console Cabling

Local DTC Console Connection



Console Cabling

Alternative DTC Console Connection



* Support of certain HP applications (utilizing screen modes other than VIEW) requires this additional connection for the remote console to simulate a user workstation.

Workstation Cabling

MPE V HP 3000 Point-to-Point Terminal Cabling

Most of the cables in the table below may be ordered as options on the terminal or printer product. Please refer to a current HP 3000 Price Guide for specific option numbers.

Terminal or Printer	ADCC RS-232 (25-pin)	ATP & ATP37 RS-232 (3-pin)	ATP RS-422 (5-pin)	U.S. Modem (25-pin)	European Modem (25-pin)
2382A* (port 1)	13242N/Y 40242C (5m)	13242X (5m)	N/A	13242N (5m)	13242M (5m)
239x (port 1)	40242M/C/Y (5m)	40242X (5m)	40242P (5m)	40242M (5m)	40242M (5m)
2392x (port 2 RS-232) 2621B*	40242M/C/Y (5m)	40242X (5m)	N/A	40242M (5m)	40242M (5m)
2622A* 2623A 2624B 2626A* 2627A* (port 1)	13222N/C/Y (5m)	13222X (5m)	13222P (5m)	13222N (5m)	13222M (5m)
2625A 2628A (port 1)	13242N/Y 40242C (5m)	13242X (5m)	13242P (5m)	13242N (5m)	13242M (5m)
2624B 2626A* (port 2)	13242N/C/Y (5m)	13242X (5m)	N/A	13242N (5m)	13242M (5m)
264x* 307x*	13232N/Y/C ** (4.5m)	13232X (5m)	13232I (5m)	13232N (4.5m)	13232M (4.5m)

* Not supported on Series 37.

** Cable 13232Y not supported on 2647F.

- RS-232 connections may not exceed 15m (50 ft); RS-422 connections may not exceed 1220m (4000 ft).

Workstation Cabling

MPE V HP 3000 Point-to-Point Terminal Cabling (Cont.)

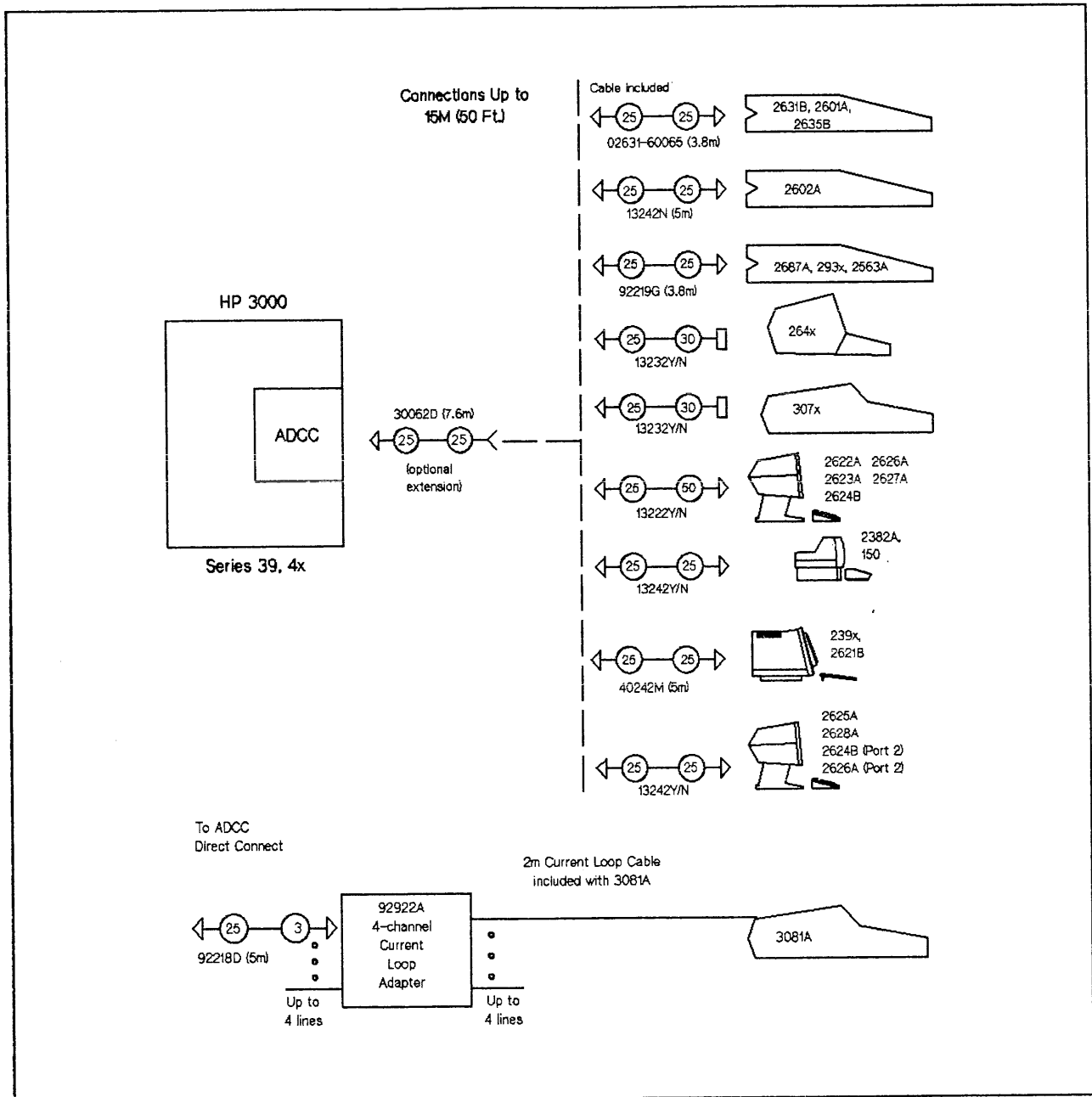
Most of the cables in the table below may be ordered as options on the terminal or printer product. Please refer to a current HP 3000 Price Guide for specific option numbers.

Terminal or Printer	ADCC RS-232 (25-pin)	ATP & ATP37 RS-232 (3-pin)	ATP RS-422 (5-pin)	U.S. Modem (25-pin)	European Modem (25-pin)
HP 150 (Touch-screen)	13242N/Y (5m)	13242X (5m)	13242P (5m)	13242N (5m)	N/A
2686A (S/37 only)	N/A	92218D (5m)	N/A	N/A	N/A
2601A	Cable included w/printer (3.8m)	13242X (5m)	N/A	N/A	N/A
2602A	13242N (5m)	13242X (5m)	N/A	N/A	N/A
293x	13242N (5m)	13242X (5m)	13242P (5m)	13242N (5m)	13242M (5m)
2687A	92219G (3.8m)	92218D (5m)	92216C (5m)	N/A	N/A
2563A	92219G (3.8m)	92218D (5m)	92216C (5m)	N/A	N/A
Extension Cables	30062D (7.6m)	30153A (15m)	30154A (30m)	30062C (7.6m)	30062C (7.6m)

- RS-232 connections may not exceed 15m (50 ft); RS-422 connections may not exceed 1220m (4000 ft).

Workstation Cabling

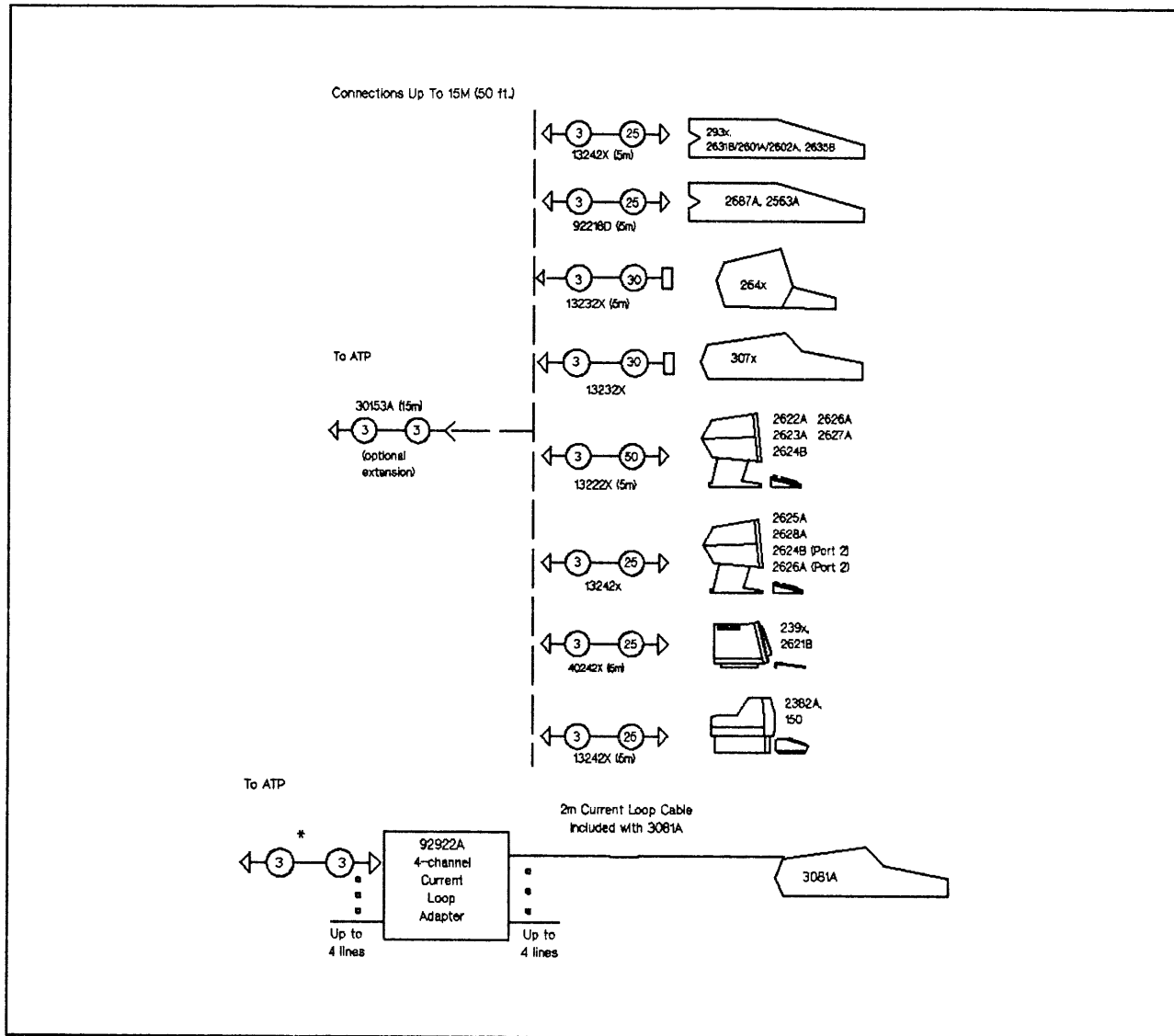
Point-to-Point Cable Configuration for ADCC (Direct Connect Type RS-232)



- The 3081A workstation is shipped with a 2m current loop cable to connect with either the 92922A four-channel or the 92923A single channel adapter. A longer cable may be substituted by ordering 92179H (maximum length: 150 meters).

Workstation Cabling

Point-to-Point Cable Configuration for ATP (Direct Connect Type RS-232)

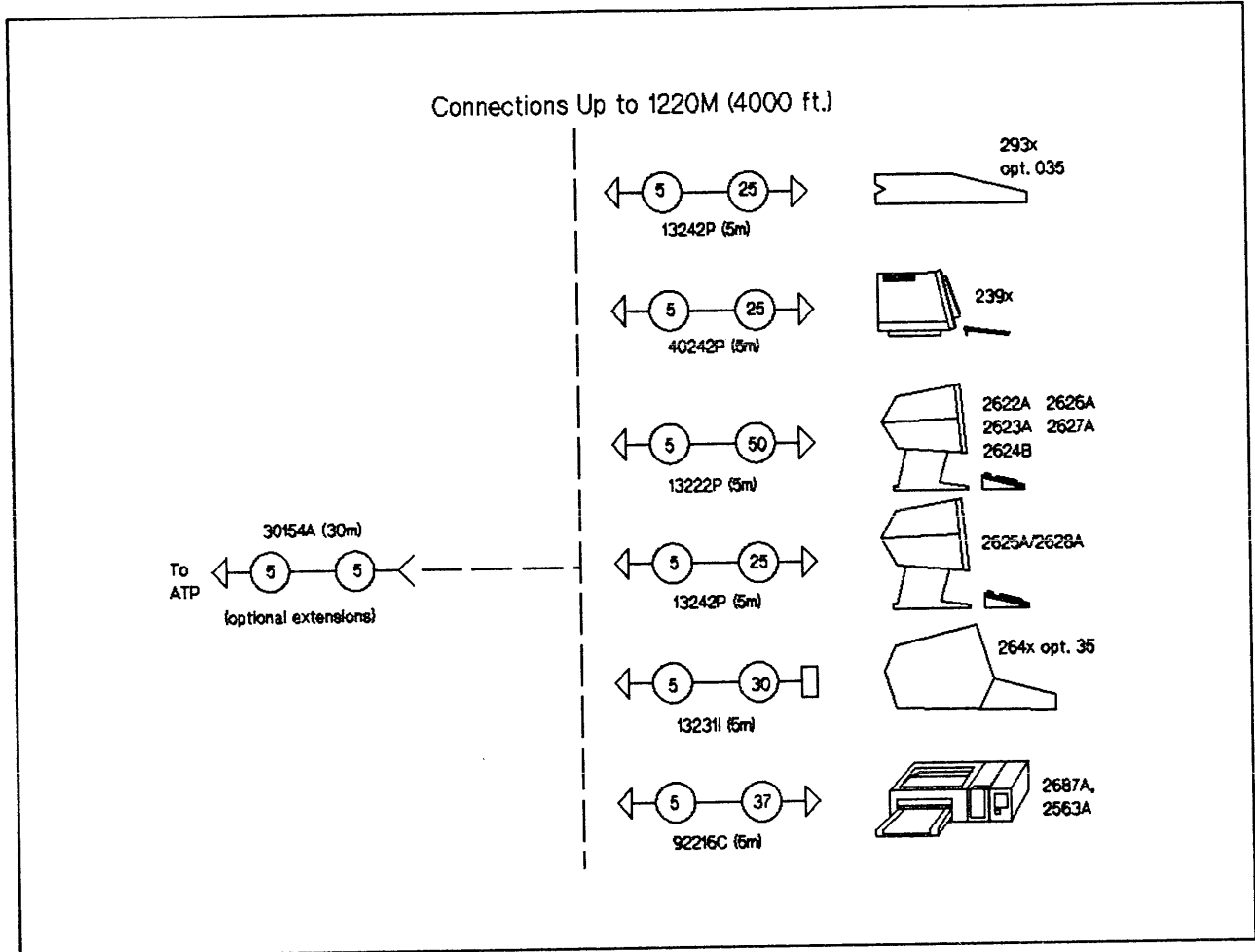


* An RS-232C interface cable for the ATP must be fabricated by the customer.

- Direct Connect Type 232 is an RS-232 implementation with a special HP three-pin connector.
- Adapter cable 30152A can convert installed terminals to an ATP configuration.
- The 3081A workstation is shipped with a 2m current loop cable to connect with either the 92922A four-channel or the 92923A single channel adapter. A longer cable may be substituted by ordering 92179H (maximum length: 150 meters).

Workstation Cabling

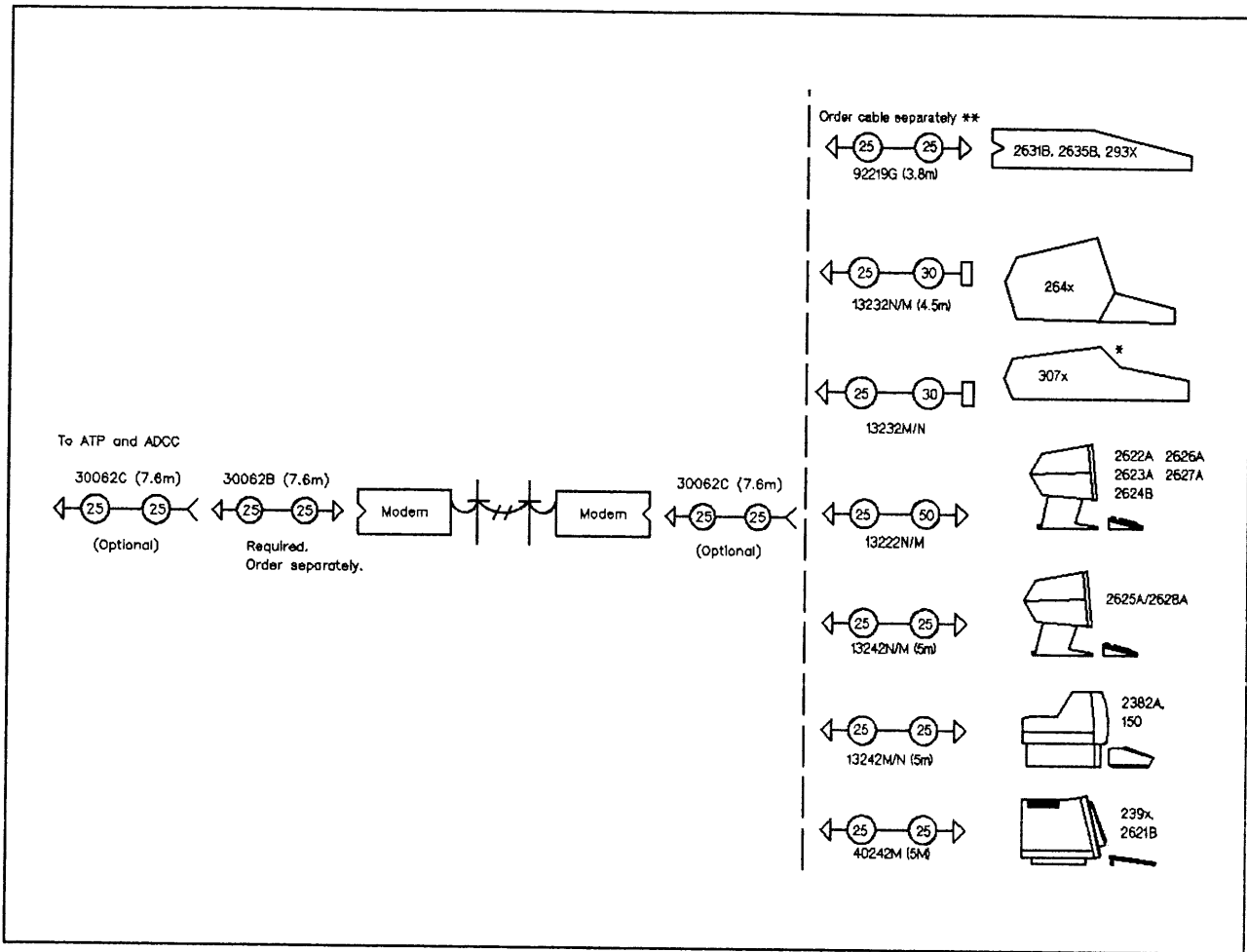
Point-to-Point Cable Configuration for ATP (Direct Connect Type RS-422)



- Direct Connect Type 422 is an RS-422 implementation with a special HP five-pin connector, available only on port 1 of terminal.
- Terminals must contain either 13266E, 13260E or Option 035 interface for use with HP Direct Connect Type 422. Exceptions are the 239x, 2625A, 2627A, and 2628A, which come standard with RS-422 capability.
- HP Direct Connect Type 422 is not available on the 2621B or 2382A.

Workstation Cabling

Point-to-Point Cable Configuration for ADCC and ATP (Remote)



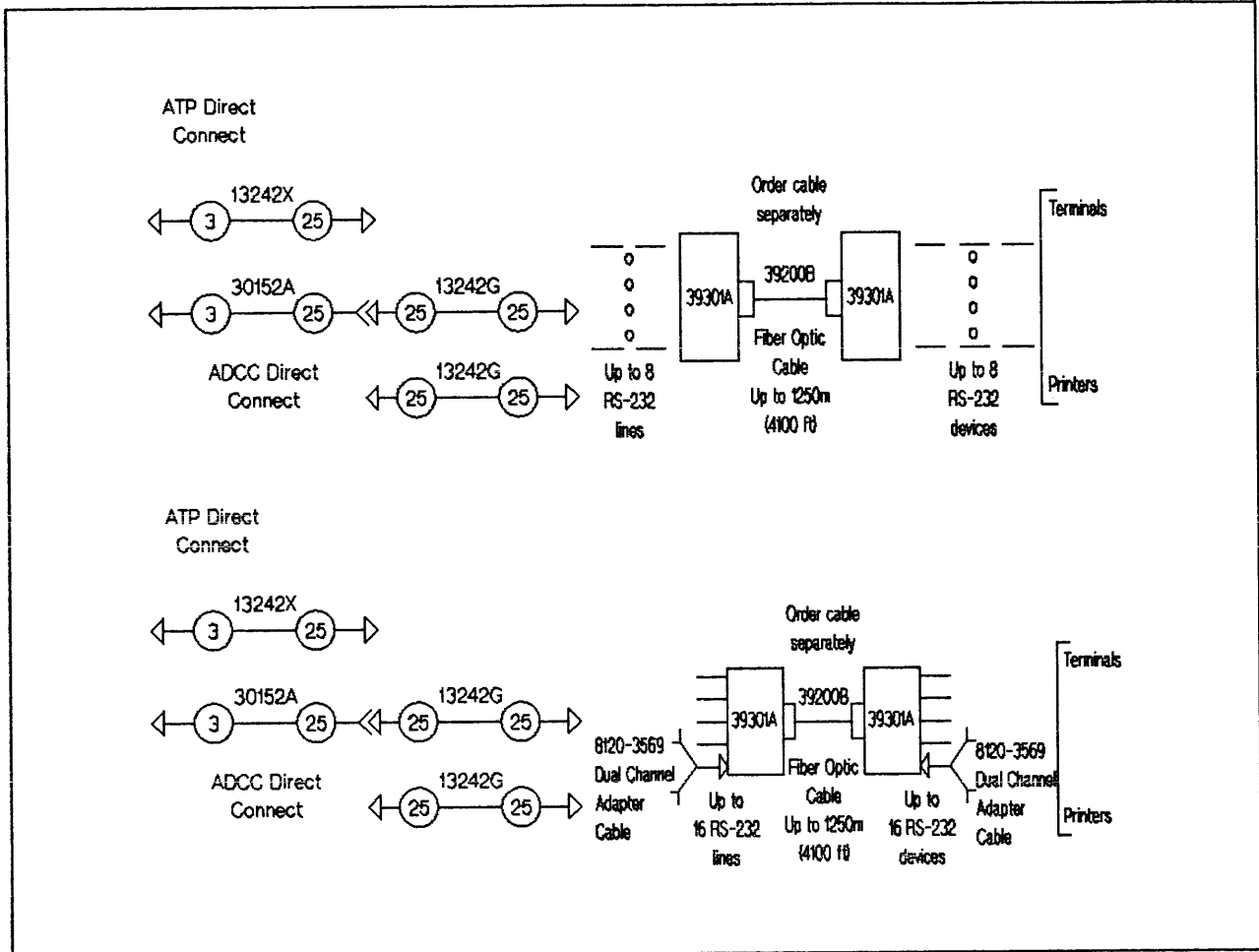
* For use with full duplex modems only.

** Cable included with 2631B and 2635B.

- For port 2 of 2626A/W, 2624A/B, and 2703A, order 13242M/N, male/male, 25-pin/25-pin, 5m.

Workstation Cabling

Point-to-Point Connections with RS-232 (v.24) Fiber Optic Multiplexer

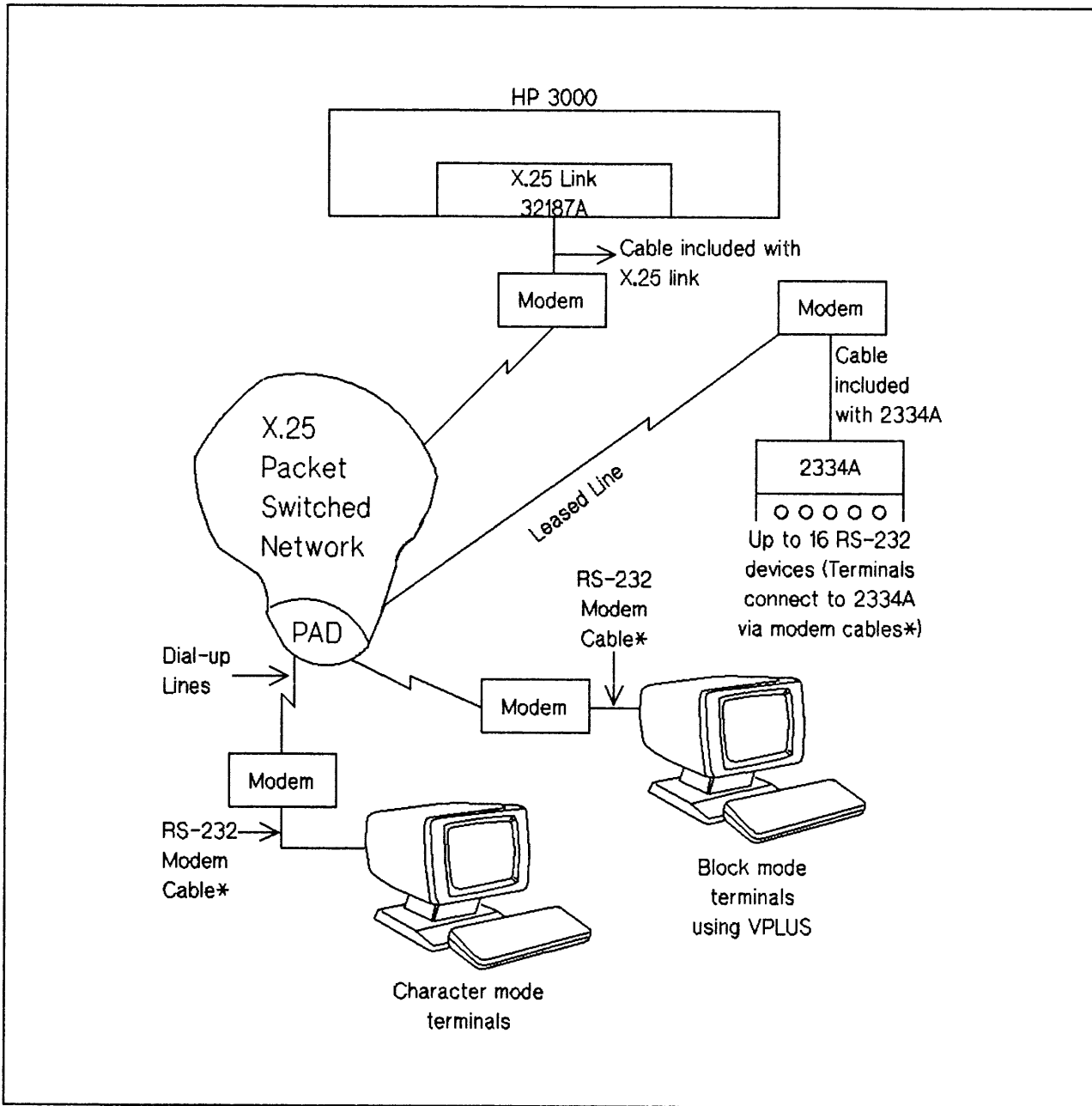


- Terminal and printer cables are listed in the table on Page 4-29. A 25-pin male RS-232 connector is required to connect with the 39301A Fiber Optic Multiplexer.

- Dual Channel Adapter Cable (8120-3569) allows up to 16 devices to be connected to a 39301A Fiber Optic Multiplexer. Eight cables per 39301A (16 per pair of 39301As) must be ordered to achieve this maximum.

X.25 Workstation Cabling

X.25 Workstation Configurations via X.25 Network Link

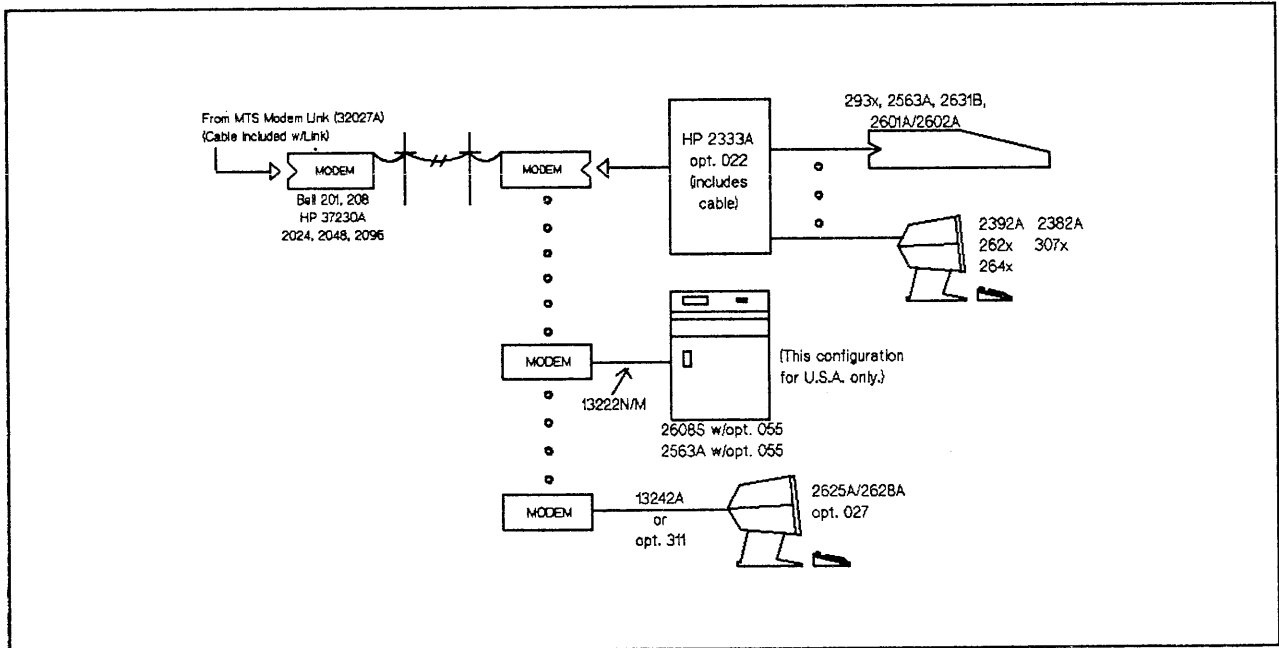
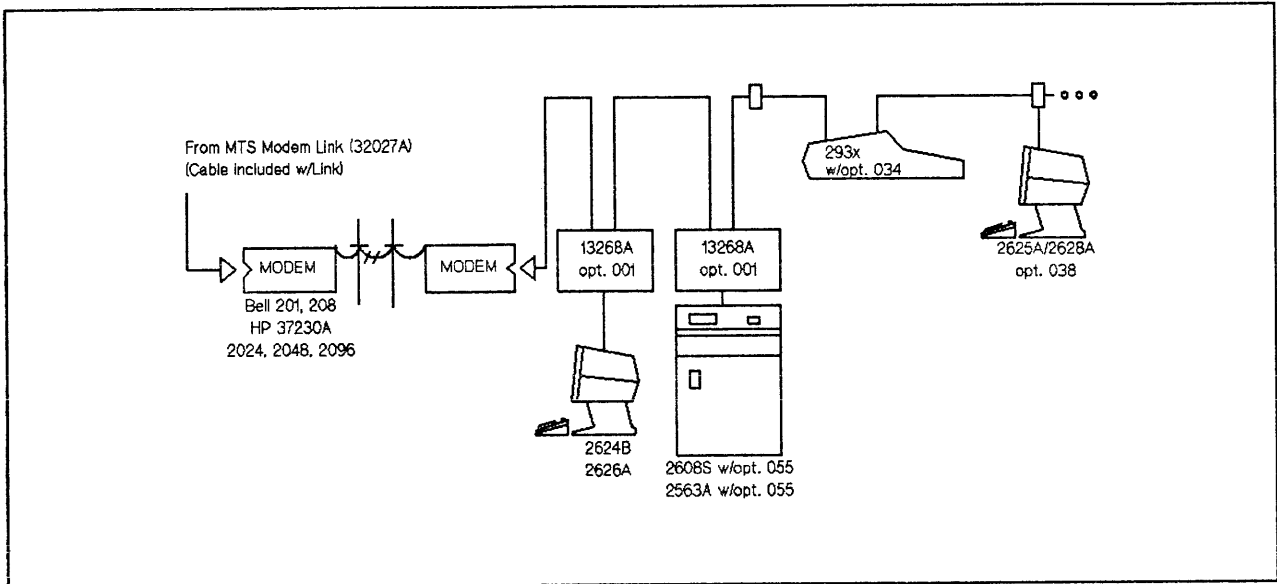


* See terminal cabling on page 4-29 for correct modem cables for each RS-232 device.

- Please refer to the HP 3000 Data Communications Products Specifications Guide (5954-0442) for a complete discussion of X.25 communications.

Multipoint (MTS) Cabling

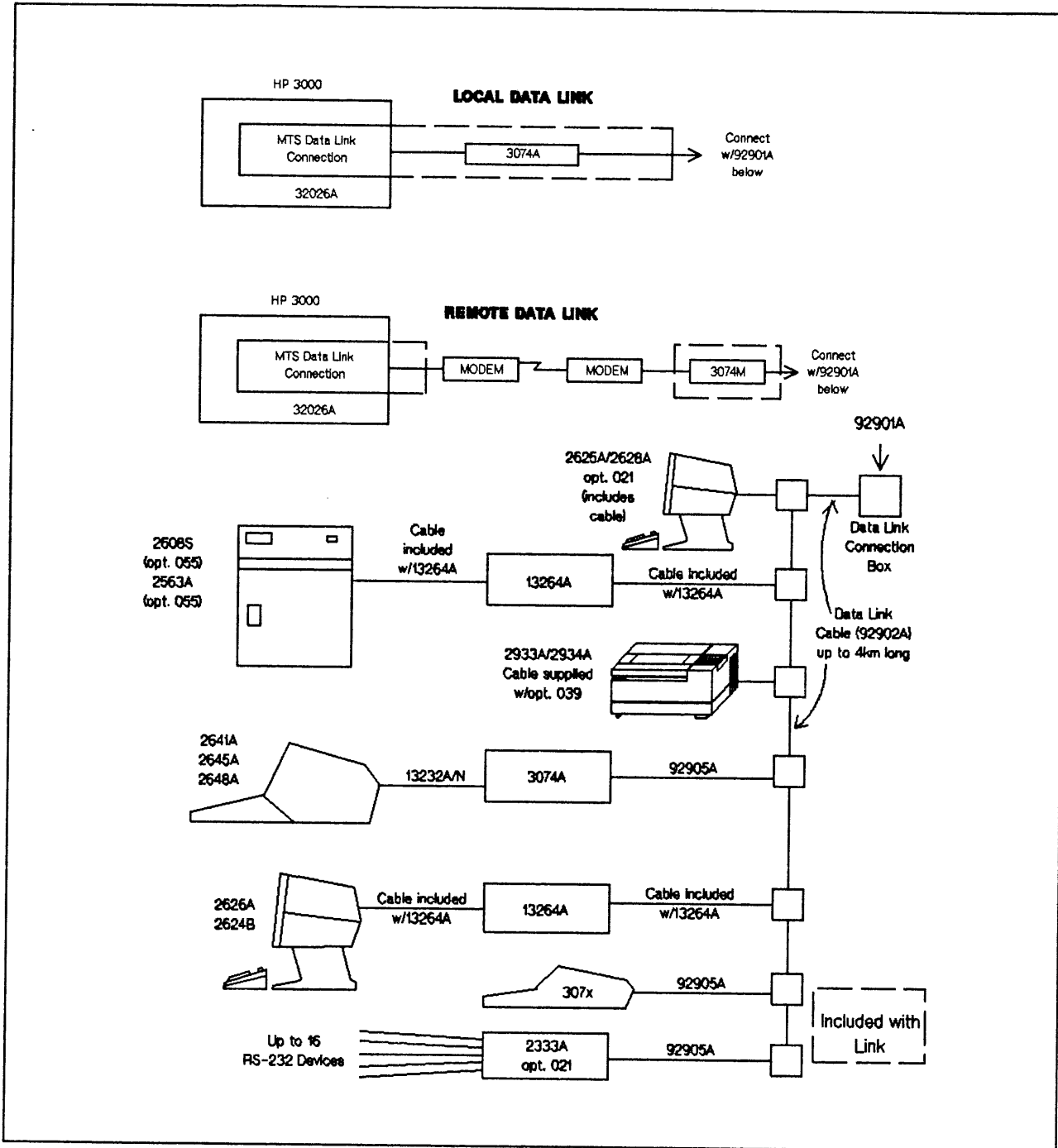
MTS Modem Link Connection (Synchronous)



- The MTS Modem Link (32027A) requires Multipoint Terminal Support Service Software (32025A/R).
- There can be only one 2608S printer on an MTS line.
- Multiple low-speed (serial) printers may be configured provided the aggregate printer speed does not exceed the line speed.
- Additional configuration examples may be found in the MTS Reference Manual (32193-90002).

Multipoint (MTS) Cabling

MTS Data Link Connection (32026A)



- The MTS Data Link requires Multipoint Terminal Support Service Software (32025A/R).
- Only one 2608S or 2563A is allowed on the Data Link when shared with terminals.
- Multiple low-speed (serial) printers may be configured provided the combined printer speed does not exceed the Data Link line speed.

Eavesdrop and Slave Configurations

HP 3000 Business Graphics	4-39
Eavesdrop Cabling	4-40
Graphics Tablet	4-41
Slaved HP-IB Plotters	4-42
Slaved Printers	4-43

HP 3000 Business Graphics Workstations

The HP 3000 Business Graphics Software products--HPEasyChart, DSG/3000, and HPDraw may be used with a variety of HP terminals, plotters, printer/plotters, printers, and graphics tablets.

A graphics workstation consists of any combination of the following products ordered separately:

1. A graphics terminal/workstation
2. A graphics plotter or printer/plotter
3. A graphics printer
4. A graphics tablet
5. A copy of graphics software

- HPEasyChart (32109A)
- DSG/3000 (32250A)
- HPDraw (32108A)
- or the HP 3000 Business Graphics Package (32110A) which includes all three of the products above.

The table below indicates which graphics terminals, plotters, printer/plotters, printers, and graphics tablets may be used in a graphics workstation.

DSG/3000 and HPEasyChart also support the following terminals for chart definition only (i.e., no screen graphics):

2382A
2622A
2624A/B
2626A/W
2641A
2642A
2645A

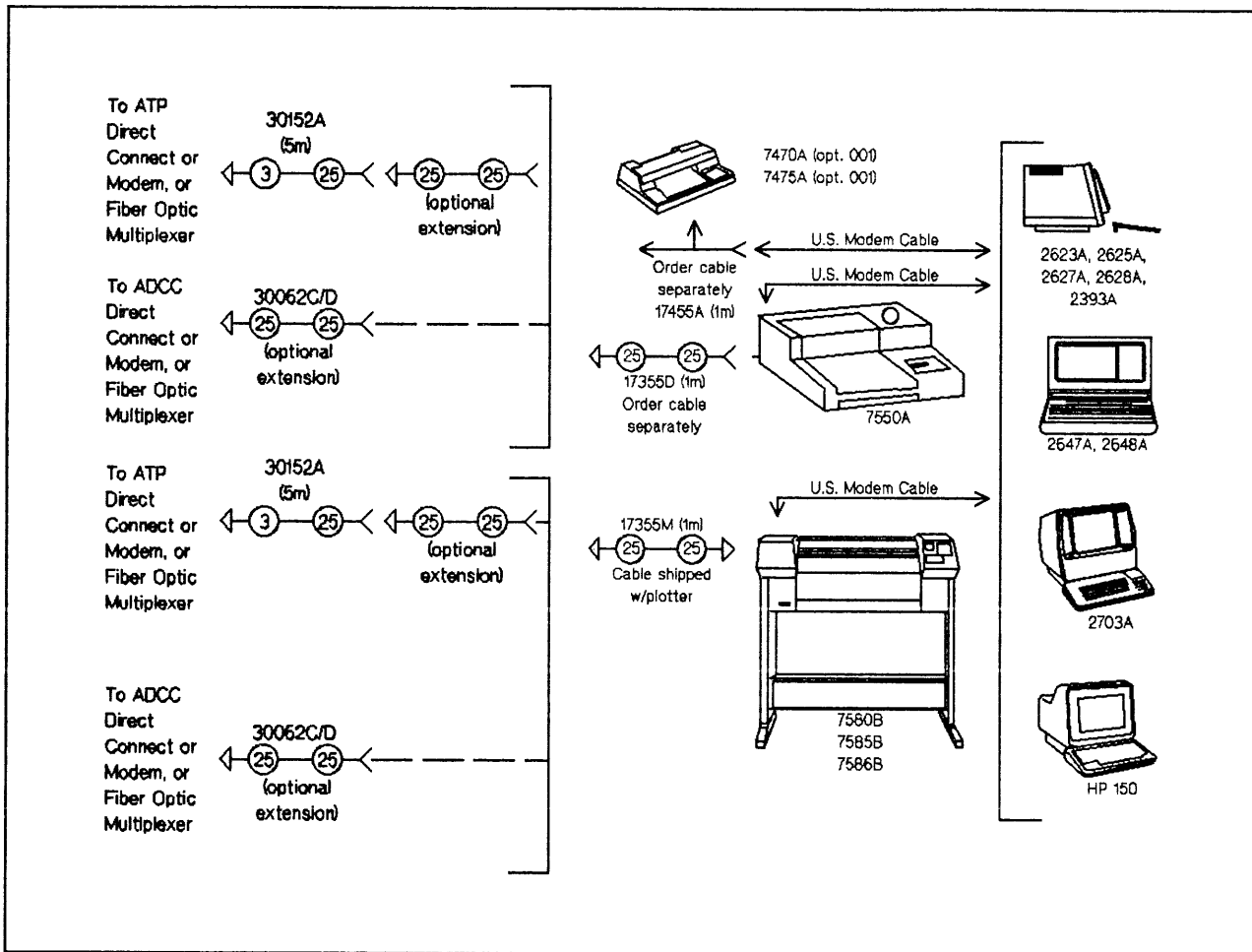
Hardware Supported Under HP 3000 Business Graphics Software-- HPEasyChart, DSG/3000, HPDraw

Graphics Terminals	Plotters and Printer/Plotters	Printers	Tablets ⁽¹⁾
2393A 2623A 2625A (2) 2627A 2628A (2) 2647A/F 2648A 2703A HP 150	7220A/C/S/T 7221A/B/C/S/T 7225A/B 7240A 7245A/B 7470A 7475A 7550A (4) 7580A/B 7585A/B 7586B (5) 9872A/B/C/S/T	2563A (2,3) 2565A (2,3) 2566A (2,3) 2608S (3) 2680A (2,3) 2688A	17623A

- (1) Tablet support applies only to HPDraw with the 2623A or 2627A terminal.
- (2) Graphics support is an option on these devices.
- (3) Additional software is required to support graphics on these devices.
- (4) HPDraw cannot utilize the replot feature of the 7550A.
- (5) The 7586B only supports 7585B features on the HP 3000.

Eavesdrop Cabling

Eavesdrop Plotter Configuration

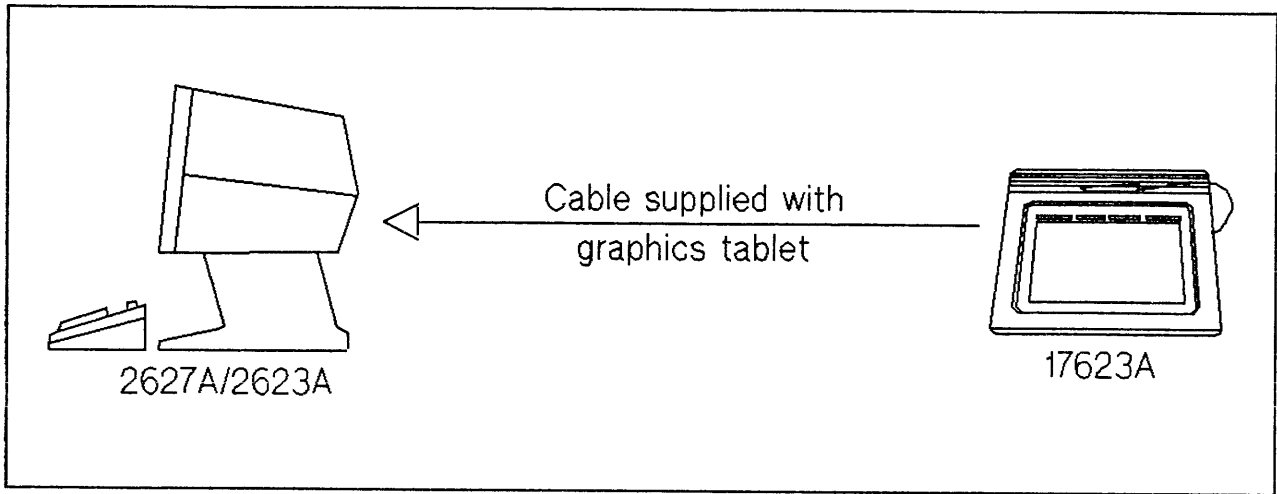


- Terminals and plotters may be supported via modem. See Page 4-34 of this guide for modem configuration.

- See Page 4-29 for U.S. modem cables for specific terminals.

Graphics Tablet

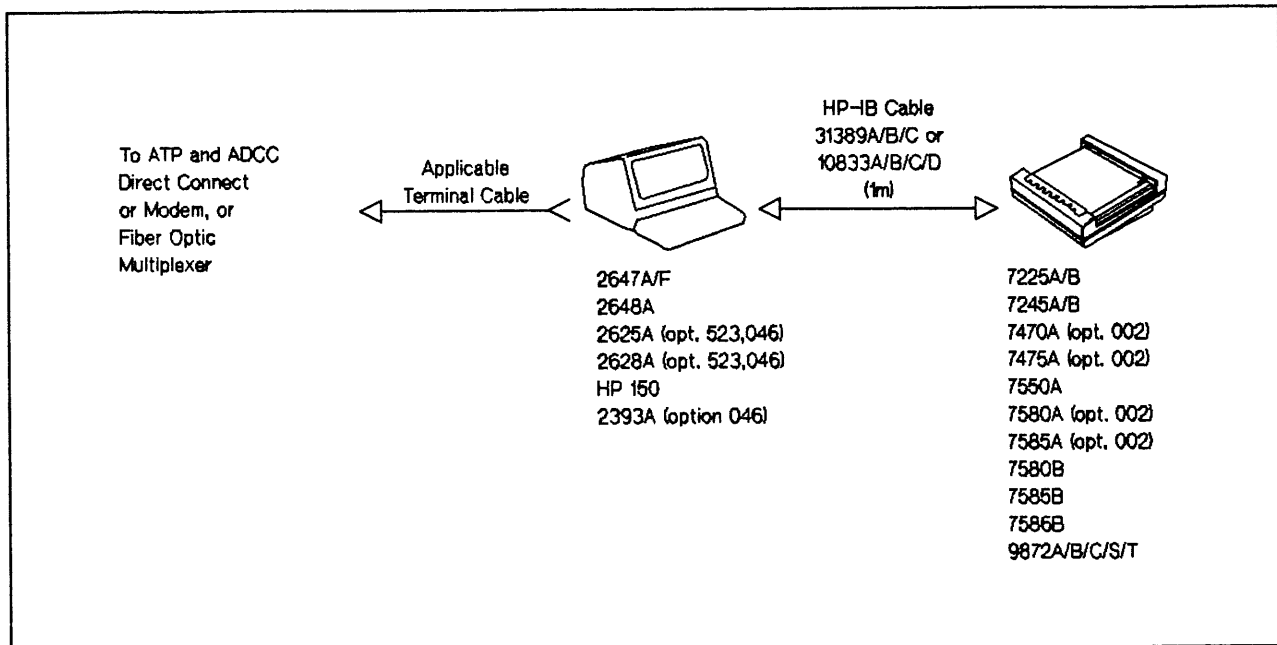
Graphics Tablet Configuration



- Tablet support applies only to HPDraw with the 2623A or 2627A graphics terminal. The 17623A Graphics Tablet can be used with HPDraw for function key selection, field value selection, figure sketching, and area filling of shapes.
- The tablet connects to an interface module which is mounted on the rear of the terminal. This module plugs into the keyboard receptacle on the terminal. The tablet and the keyboard both plug into the interface module.
- The terminal/tablet combination may be used with both the Direct Connect Terminal and Eavesdrop Plotter configurations.

Slaved HP-IB Plotters

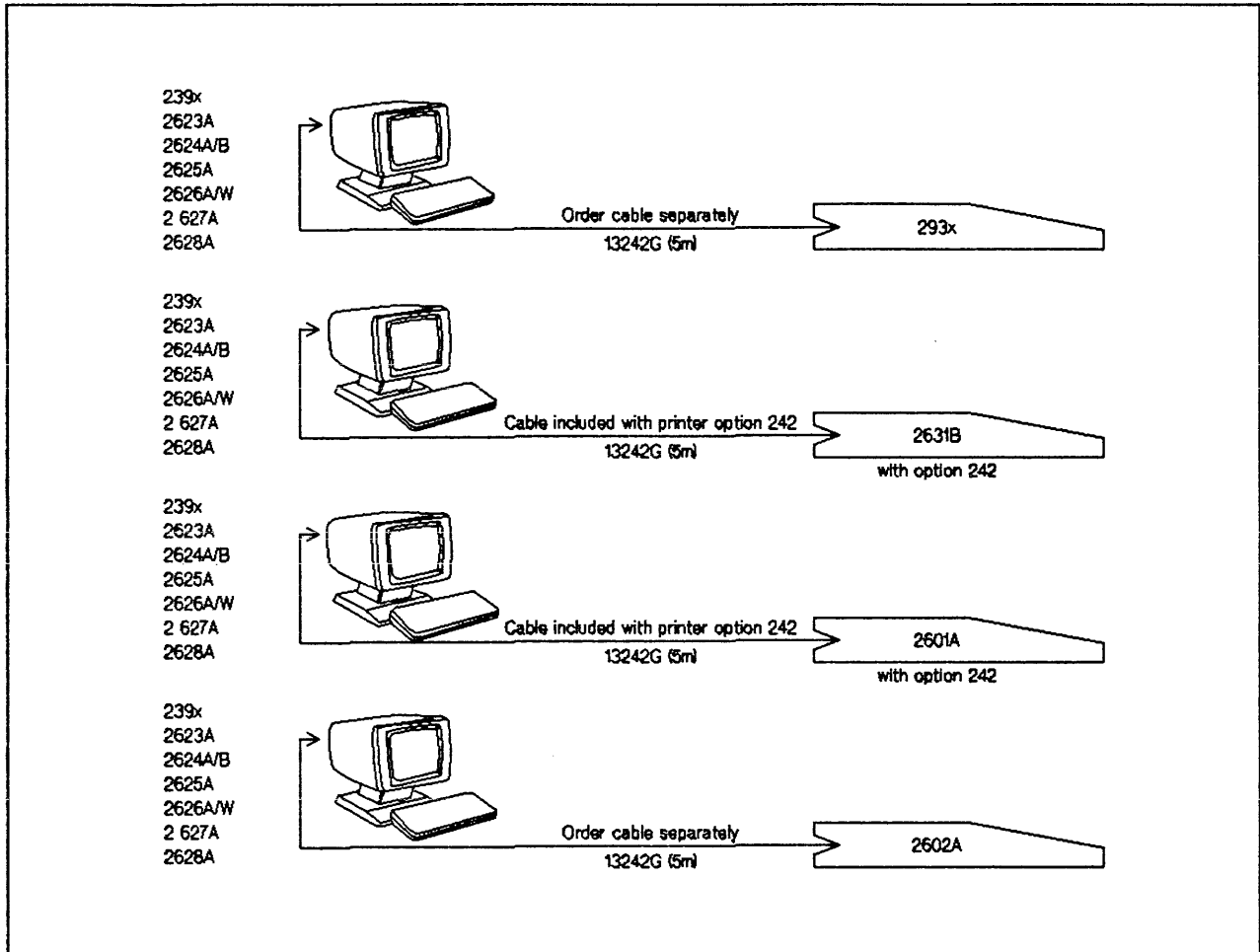
HP-IB Plotter Configuration



- Terminals and plotters may be supported via modem. See Page 4-34 of this guide for modem configuration.
- See matrix on Page 4-29 for applicable terminal cables.
- The 7586B only supports 7585B features on the HP 3000.

Slaved Printers

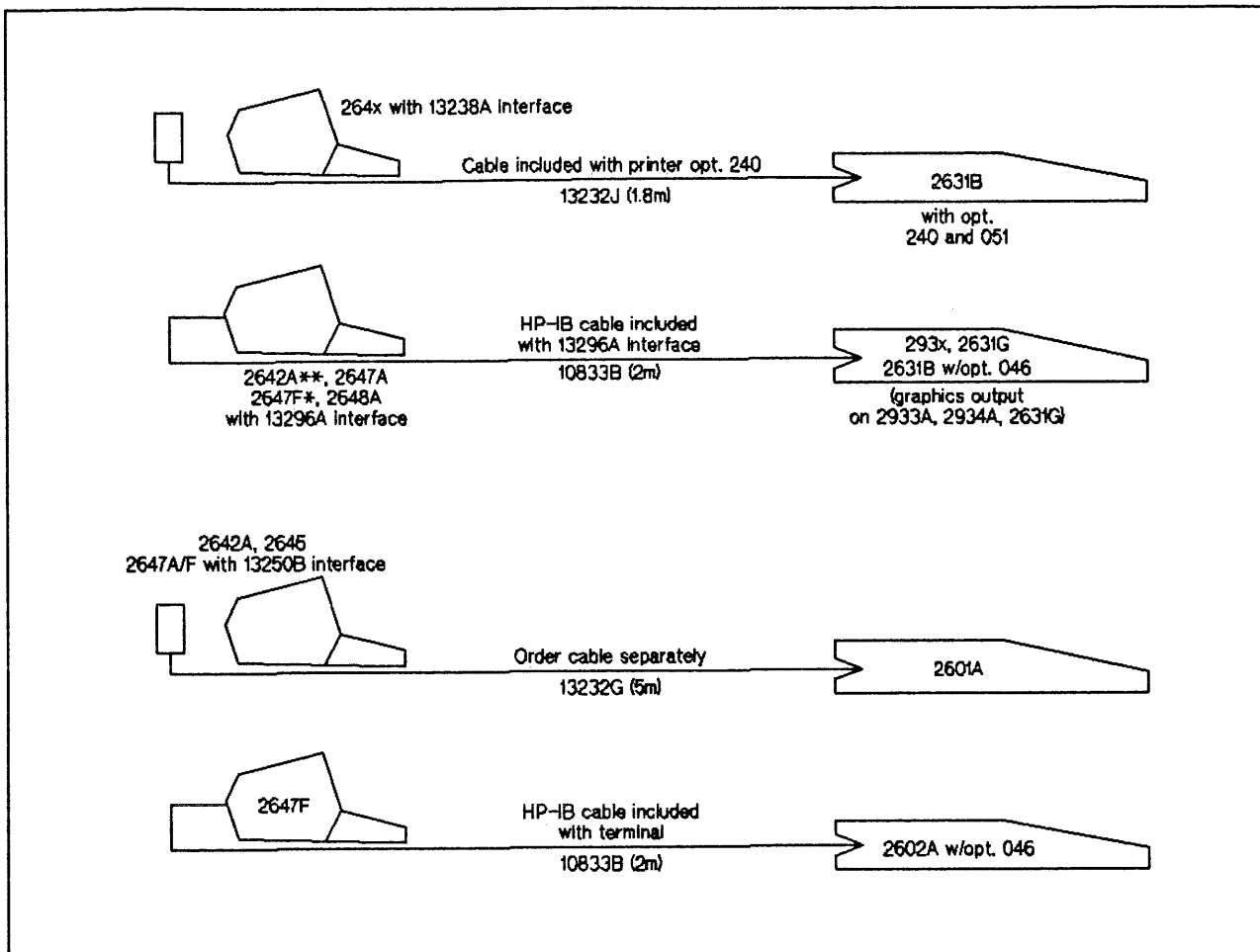
262x Workstations to Slave Printers



- Printer is interfaced to port 2 of 262x terminal, except on 2625A (port 1).
- The 2933A and 2934A printers support graphics output.
- Port 2 obtained on 239x by ordering Option 092.

Slaved Printers

264x Workstations to Slave Printers



* The 2647F has the 13296A HP-IB interface as standard.

** The 2642A does not support graphics.

- Option 240 for 2631B provides 13238A duplex register interfacing board for 264x terminal, 13232J cable, and substitutes 8-bit parallel interface for standard 2631B interface.

- The 2933A, 2934A, and 2631G printers support graphics output from the screens of the terminals indicated--not directly from the software used.

5

MANUALS

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HP 3000 System Manuals

In addition, the User Manual Set may be ordered as product number 30380M. (See the HP 3000 Price Guide for ordering and pricing information.)

Each HP 3000 system is shipped with a complete User Manual Set. Manuals included in the set are shown below.

Description	Manuals Included with System
3000 Series 37,39,40,42,44,48,64, and 68 User Manual Set	General Information Manual (5953-7583) EDIT/3000 (03000-90012) FCOPY/3000 (03000-90064) Using the HP 3000 (03000-90121) MPE V System Operation and Resource Management Reference Manual (32033-90005) MPE V Commands Reference Manual (32033-90006) MPE V Intrinsics (32033-90007) MPE V Utilities Reference Manual (32033-90008) MPE Segmenter (30000-90011) MPE Debug/Stack Dump (30000-90012) Compiler Library (30000-90028) QUERY/3000 Reference Manual (30000-90042) Software Pocket Guide (30000-90049) KSAM/3000 (30000-90079) Using Files (30000-90102) MPE File System (30000-90236) HP VPLUS/3000 Reference Manual (32209-90001) SORT-MERGE/3000 (32214-90002) IMAGE/3000 (32215-90003) Turbo IMAGE Reference Manual (32215-90050) Site Planning and Preparation Set (30140-60085) (For Series 64 and 68 only) Site Planning and Preparation Set (30000-60029) (For Series 39 and 4x only) Diagnostic Manual (30070-60068) (For Series 39 and 4x only) Installation Manual for Series 64 (30140-90007) Installation Manual for Series 39, 40 and 42 (30170-90002) Installation Manual for Series 44 and 48 (30090-90002)

Software Manuals

Languages

Product Number	Description	Manuals Included with Software
32100A/R	SPL/3000 Compiler	SPL Pocket Guide (32100-90001) SPL/3000 Reference Manual (30000-90024) SPL Textbook (30000-90025)
32102B/R	FORTTRAN/3000 Compiler	FORTTRAN/3000 Reference Manual (30000-90040) FORTTRAN/3000 Pocket Guide (32102-90002)
32104A/R	RPG/3000 Compiler	RPG/3000 Reference Manual (32104-90001) RPG Listing Analyzer (32104-90003) RPG Utilities (32104-90006)
32105*/R	APL/3000 (runs on Series III only)	APL Reference Manual (32105-90002) APL Pocket Guide (32105-90003) APL Firmware
32106A/R	Pascal/3000 Compiler	Pascal/3000 Reference Manual (32106-90001) Pascal/3000 Pocket Guide (32106-90002)
32111A/R	BASIC/3000 Compiler and Interpreter	BASIC for Beginners (03000-90025) BASIC/3000 Pocket Guide (03000-90050) BASIC/3000 Interpreter Manual (30000-90026) BASIC/3000 Reference Manual (32103-90001)
32116A/R	FORTTRAN 77 Compiler	FORTTRAN 77 Reference Manual (5957-4685) FORTTRAN 77 Conversion Guide (5957-4691) FORTTRAN 77 Programmer's Guide (5957-4686) FORTTRAN 77 Quick Reference Guide (5957-4687)
32213*/R	COBOL/3000 Compiler	COBOL/3000 Reference Manual (32213-90001) Using COBOL/3000 (32213-90003)
32233A/R	COBOL II/3000 Compiler	COBOL II/3000 Reference Manual (32233-90001) COBOL/3000 to COBOL II/3000 Conversion Guide (32233-90005)

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* The "First Copy" has been discontinued. The "Right-to-Copy" products will be supported until 1987.

Software Manuals

Data Communications: Network Services

Product Number	Description	Manuals Included with Software
30239A/R	Workstation Configurator	Workstation Configurator Reference Manual (30239-90001) Point-to-Point Workstation I/O Reference Manual (30000-90250)
30245A/R	SNA NRJE Network Remote Job Entry	SNA NRJE User/Programmer Reference Manual (30245-90001)
30247A/R	SNA IMF Interactive Mainframe Facility	SNA IMF User/Programmer Manual (30247-90001) SNA IMF Installation and Troubleshooting Manual (30247-90002)
30248A/R	RJE Remote Job Entry	2780/3780 Emulator Reference Manual (30000-90047)
30249A/R	MRJE Multileaving Remote Job Entry	MRJE Reference Manual (32191-90001) MRJE User/Programmer Reference Manual (30249-90001)
30250A/R	IMF Interactive Mainframe Facility (3270) Emulator	IMF Reference Manual (32229-90001)
32025A/R	MTS Multipoint Terminal Support	MTS Reference Manual (32193-90002)
32185A/R	DS Distributed Systems Software	DS HP 3000 to HP 3000 User/Programmer Reference Manual (32189-90001) DS HP 3000 to HP 1000 Reference Manual for the HP 3000 User (32189-90005)
32344A/R	Network Services/3000	NS/3000 User/Programmer Reference Manual (32344-90001)

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Software Manuals

Data Communications: Network Links

Product Number	Description	Manuals Included with Software
30242A	LAN Link	No manuals.
30246A	SNA Link	SNA Link Node Management for NRJE Reference Manual (30246-90001) Getting Started with SNA (30246-90002) SNA Link Services Reference Manual (30246-90003)
30251A	BSC Link	No manuals
30270A 30271A	Point-to-Point Hardwired/Modem Network Link	DS HP 3000 to HP 3000 Network Administrator Manual (32189-90002)
32187A	X.25 Network Link	X.25 for the HP 3000 Reference Manual (32191-90001) DS HP 3000 to HP 3000 Network Administrator Manual (32189-90002)

Software Manuals

Programmer Productivity Tools

Product Number	Description	Manuals Included with Software
32244A/R	Dictionary/3000 Data Dictionary	Dictionary/3000 Reference Manual (32244-90001)
32245A/R	Report/3000 Report Writer	Report/3000 User's Guide (32245-90001)
32246A/R	Inform/3000 User's Report Generator	Inform/3000 User's Guide (32246-90001)
32247A/R	Transact/3000 Transaction Processing Language and Processor	Transact/3000 Reference Manual (32247-90001)
32248A/R	Programmer Productivity Package (Report/3000, Dictionary/3000, and Transact/3000)	Dictionary/3000 Reference Manual (32244-90001) Report/3000 User's Guide (32245-90001) Transact/3000 Reference Manual (32247-90001)
32258A/R	HP Report Writer Package (Report/3000, Inform/3000, Dictionary/3000)	Report/3000 User's Guide (32245-90001) Inform/3000 User's Guide (32246-90001) Dictionary/3000 Reference Manual (32244-90001)
32350A/R	HP Toolset Program Development System (Requires COBOLII/3000 or Pascal/3000)	HP Toolset Reference Manual (32350-90001)
32351A/R	COBOL Productivity Package (HPToolset, COBOLII, Dictionary)	HPToolset Reference Manual (32350-90001) COBOLII/3000 Reference Manual (32233-90001) Dictionary/3000 Reference Manual (32244-90001)

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Software Manuals

Personal Productivity Center Software

Product Number	Description	Manuals Included with Software
32108A/R	HPDraw Text and Figure Presentation Graphics	HPDraw Reference Manual (32108-90001)
32109A/R	HPEasyChart Chartmaker Graphics	HPEasyChart Reference Manual (32109-90001)
32112A/R	HPMENU Interactive Office Menu Facility	HPMENU Administration Manual (32112-90001) HPMENU Quick Reference Guide (32112-90002)
32113A/R	HPMap	HPMap Reference Guide (32113-90001) Mapping Application Casebook (32113-90002)
32119A/R	HPWORD Intrinsic	Programmatic Access to HPWORD Documents Manual (32119-90001)
32120A/R	HPWORD Word Processing *	Using HPWORD (32120-90035) Getting Started with HPWORD (32120-90032) Printing with HPWORD (32120-90034) HPWORD Quick Reference Guide (32120-90033) HPWORD Administrators Manual (32120-90022) HPWORD Self-paced Training Learning HPWORD Part One (32120-90020) Learning HPWORD Part Two (32120-90021)
32132A/R	HPListKeeper Personal Information Mgmt.	HPListKeeper User's Guide and Reference Manual (32132-90001)
32133A/R	Deluxe Visicalc/3000	Deluxe Visicalc/3000 User's Manual (32133-90005) Deluxe Visicalc/3000 Quick Reference Guide (32133-90006)
32250A/R	HP DSG/3000 Decision Support Graphics	HP DSG/3000 Reference Manual (32250-90001) HP DSG/3000 Quick Ref. Guide (32250-90002)

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Software Manuals

Personal Productivity Center Software (Cont.)

Product Number	Description	Manuals Included with Software
36561A/R	HPSPELL - American Dictionary	HPSPELL Handbook (36561-90001) HPSPELL Administration (36561-90002)
36561UA/R	HPSPELL - British Dictionary	HPSPELL Handbook (36561-90001) HPSPELL Administration (36561-90002)
36562A/R	HPSPELL - American & English Dictionary	HPSPELL Handbook (36561-90001) HPSPELL Administration (36561-90002)
36570A/R	HPDESKMANAGER Electronic Mail System	Using HPDESKMANAGER III (36570-90038) Programmatic Access to HPDESKMANAGER III Manual (36570-90040) HPDESKMANAGER Reference Cards (pack of ten) (36570-90039) Administrators Guide to HPDESKMANAGER III (36570-90004) HPDESKMANAGER III Trainer's Notes (36570-90029) Using HPSLATE (36570-90030)
36572A/R	HPTELEX Interface Software*	HPTELEX Reference Guide (36572-90001) HPTELEX Quick Reference Guide (36572-90002)
36573A	Series 100/Desklink	Series 100/Desklink Reference Manual (36573-90001)
36576A/R	HPSLATE Screen Based Word Processing*	HPSLATE Reference Guide (36576-90001) Learning HPSLATE (36576-90002)
36578A/R	TDP/3000 Text and Document Processor	TDP/3000 Reference Manual (36578-90001) Using TDP/3000 (36578-90002) TDP/3000 Quick Reference Guide (36578-90003)
36580A/R	IFS/3000 Interactive Formatting System	Format Design Reference Manual (36580-90001)
36581A/R	IDS/3000 Interactive Design System	Character & Logo Design Reference Manual (36581-90001) Forms Design Reference Manual (36581-90002)

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* = Foreign language versions are available. Contact your HP sales representative for details.

Software Manuals

Manufacturing Systems Application Software

Product Number	Description	Manuals Included with Software
32260A/R	Materials Mgmt/3000 Model 25 *	Same as 32916 without Factory Order.
32267A/R	Advanced Customization for MM/3000	System Reference Manual Set (32265-60001) Advanced Customization Guide (32267-90001)
32270A/R	Production Mgmt/3000 Model 30	System Administrator Manual (32270-90031)
32275A/R	HP Maintenance Management Model 20	Managing Parts Catalog and Work Orders- User Reference (32276-90001) Managing Parts Catalog and Work Orders- User Tutorial (32276-90002) System Reference Volume 1 (32276-90005) System Reference Volume 2 (32276-90006)
32276A/R	HP Maintenance Management Model 30	Managing Parts Catalog and Work Orders- User Reference (32276-90001) Managing Parts Catalog and Work Orders- User Tutorial (32276-90002) System Reference Volume 1 (32276-90005) System Reference Volume 2 (32276-90006) Managing Inventory and Purchase Orders- User Reference (32276-90003) Managing Inventory and Purchase Orders- User Tutorial (32276-90004)
32279A/R	Advanced Customization for HP Maintenance Mgmt.	Advanced Customization Guide (32267-90001) System Reference Manual Volume 1 (32276-90005) System Reference Manual Volume 2 (32276-90006)
32620A/M	HP JIT	HP JIT User Reference Manual (32620-90001) HP JIT System Reference Manual (32620-90002)
32630A/R	Advanced Customization for PM/3000	Advanced Customization Guide (32267-90001) System Reference Manual Volume 1 (32270-90038) System Reference Manual Volume 2 (32270-90043)

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* = "A" product not available in the U.S.

Foreign language versions of MM/3000 and PM/3000 are available except where noted otherwise.

Software Manuals

Manufacturing Systems Application Software (Cont.)

Product Number	Description	Manuals Included with Software
32631A/R	Advanced Customization for HP JIT	Advanced Customization Guide (32267-90001) System Reference Manual (32620-90002)
32903A/R	Materials Mgmt/3000 Model 20	Parts and Bills of Materials (32260-90002) Routings and Workcenters (32260-90003) Managing Inventory and Orders (32260-90113) System Reference Manual Set (32265-60001)
32904A/R	Materials Mgmt/3000 Model 10	Parts and Bills of Materials (32260-90002) Routings and Workcenters (32260-90003) Managing Inventory and Orders (32260-90113) System Reference Manual Set (32265-60001)
32905A/R	Material Requirements Planning/3000	Material Requirements Planning (32260-90008)
32906A/R	Master Production Scheduling/3000	MPS and Rough Cut Resource Planning (32260-90001)
32907A/R	Standard Product Costing/3000	Standard Product Costing (32260-90009)
32908A/R	Factory Order Entry/3000 (English Only)	Factory Order Entry (32908-90001)
32909A/R	Lot Control and Traceability/3000	Managing Inv. and Orders for Lot Control (32909-90001) Genealogy Reporting and Archive Mgmt. (32909-90002) Parts and Bills for Lot Control (32909-90003)
32910A/R	Materials Mgmt/3000 Model 10 to 20 Upgrade	Customization and Operations (32265-90002)
32911A/R	Production Mgmt/3000 Model 20	Defining the Shop (32270-90001) Managing the Order (32270-90002) Data Capture Terminal (32270-90004) System Reference Manual Volume 1 (32270-90038) System Reference Manual Volume 2 (32270-90043)

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Foreign language versions of MM/3000 and PM/3000 are available except where noted otherwise.

Software Manuals

Manufacturing Systems Application Software (Cont.)

Product Number	Description	Manuals Included with Software
32912A/R	Production Mgmt/3000 Model 10	Defining the Shop (32270-90001) Managing the Order (32270-90002) Data Capture Terminal (32270-90004) System Reference Manual Volume 1 (32270-90038) System Reference Manual Volume 2 (32270-90043)
32913A/R	Capacity Requirements Planning/3000	CRP and IOA (32270-90003)
32914A/R	Production Mgmt/3000 Model 10 to 20 Upgrade	Customization and Operations (32265-90002)
32916A/R	Materials Mgmt/3000 Model 30	Parts and Bills of Material (32260-90002) Routings and Workcenters (32260-90003) Managing Inventory and Orders (32260-90113) Material Requirements Planning (32260-90008) Standard Product Costing (32260-90009) MPS and Rough Cut Resource Planning (32260-90001) Factory Order Entry (32908-90001) System Reference Manual Set (32265-60001)
32917A/R	Factory Order Entry/3000 for Existing Customers	Factory Order Entry (32908-90001)

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Software Manuals

Financial Systems Applications Software

Product Number	Description	Manuals Included with Software
32296A/R	HPPay	HPPay User's Manual (32296-90001) HPPay user Reference Manual (32296-90002) HPPay System Reference Manual (32296-90003) HPPay Report Writer Manual (32296-90005)
32305A/R	HP General Ledger	HP Financial Accounting System Operation Manual (32304-90001) HP Financial Accounting System Customization Manual (32304-90002) HP General Ledger User's Manual (32305-90001) HP General Ledger System Customization Manual (32305-90002)
32306A/R	HP Dual Ledger	HP Dual Ledger User's Manual (32306-90001) HP Dual Ledger System Reference (32306-90002)
32307A/R	HP Allocator	HP Allocator User's Manual (32307-90001) HP Allocator System Ref. Manual (32307-90002)
32308A/R	HP Accounts Payable	HP Financial Accounting System Operation Manual (32304-90001) HP Financial Accounting System Customization Manual (32304-90002) HP Accounts Payable User's Manual (32308-90001) HP Accounts Payable System Reference Manual (32308-90002)
32309A/R	HP Accounts Receivable	HP Financial Accounting System Operation Manual (32304-90001) HP Financial Accounting System Customization Manual (32304-90002) HP Accounts Receivable User's Manual (32309-90001) HP Accounts Receivable System Reference Manual (32309-90002)
32310A/R	HP Report Facility	HP Report Facility User's Manual (32310-90001)
32311A/R	HP Interface Facility	HP Interface Facility User's Manual (32311-90001)

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Software Manuals

Financial Systems Applications Software (Cont.)

Product Number	Description	Manuals Included with Software
32312A/R	HP General Accounting	HP Financial Accounting Systems Operation Manual (32304-90001) HP General Ledger User's Manual (32305-90001) HP Accounts Payable User's Manual (32308-90001) HP Accounts Rec. User's Manual (32309-90001)
32920A/R	HP Production Cost Management	HP PCM Inventory Cost Control User Manual (32920-90001) HP PCM Implementation and Maintenance Manual (32920-90002) HP PCM System Reference Manual Volume 1 (32920-90003) HP PCM Variance Cost Control User Guide (32920-90006) HP PCM System Reference Manual Volume 2 (32920-90007) HP PCM Product Evaluation Guide (32920-90301)

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Software Manuals

Semiconductor Productivity Network Information Systems

Product Number	Description	Manuals Included with Software
33900A/R/Z	IC-10 Integrated Circuit Manufacturing System	IC-10 Volume 1, Setting Up (33900-90106) IC-10 Volume 2, Collecting Data (33900-90107) IC-10 Volume 3, Using Reports (33900-90109) IC-10 Installation/Maintenance (33900-90205)
33902A/R/Z	TD-10 Transaction and Display Processor	TD-10 Master Glossary of Terms (33902-90020) TD-10 User Manual (33902-90100) TD-10 Quick Reference Manual (33902-90500)
33903A/R/Z	EN-10 Engineering Data Collection Sys.	EN-10 User Manual (33903-90100)
33904A/R/Z	EA-10 Engineering Analysis System	EA-10 User Manual (33904-90100) EA-10 Operations Manual (33904-90200) EA-10 Stat Guide (33904-90900)
33911A/R/Z*	CA-10 Cost Accounting System Module I	CA-10 Volume 1, Getting Started (33912-90100) CA-10 Volume 2, Reporting Cycle (33912-90101) CA-10 Volume 3, Using Runjob (33912-90102) CA-10 Volume 4, Reports (33912-90103)
33912A/R*	CA-10 Cost Accounting System Module II	See 39911Z Manual Set.
33913A/R/Z	PL-10 Manufacturing Planning System	PL-10 User Manual (33913-90100) PL-10 System Administrator Manual (33913-90500) PL-10 Self-Paced Training (33913TA)
33920A/R/Z	OL-10 Operation Level Tracking System	OL-10 User Manual (33920-90201) OL-10 Field Description Guide (33920-90202)
33921A/R/Z	PC-10 Process Control/Equip. Supervision	PC-10 User Manual (33921-90100) PC-10 Field Description Guide (33921-90102)
33930A/R/Z	TC-10 Tester Collection/Data Stuffer	TC-10 User Manual (33930-90100)
33931A/Z	Nexus Utilities Source Code	Nexus Utilities Manual Set (33931-90100)

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Z = Manual without software.
* = Requires division approval.

Software Manuals

Semiconductor Productivity Network Information Systems (Cont.)

Product Number	Description	Manuals Included with Software
33942JA/JR	ENHANSYS LEA Extract Interface	Manuals shipped directly from ENHANSYS, Inc.
33943JA/JR	ENHANSYS Data Transport	Manuals shipped directly from ENHANSYS, Inc.
33944JA/JR	ENHANSYS Base System	Manuals shipped directly from ENHANSYS, Inc.

Software Manuals

Distribution Software

Product Number	Description	Manuals Included with Software
36401A/M	HP SFD II System for Distributors	<p>Technical Document Set (36401K) includes:</p> <ul style="list-style-type: none"> Sales Order Manual Inventory Management Manual Accounts Receivable Manual Purchase Order Manual Accounts Payable Manual General Ledger Manual Data Base Technical Manual <p>User Manual Set (36401Z) includes:</p> <ul style="list-style-type: none"> User's Guide Self Study Manual User's Guide Introduction Manual User's Guide Problems & Solutions
36403A/M	HP SFD I System for Distributors	All manuals listed for HP SFD II and System Manager's Reference Set (36403Z) includes: System Function Manual, Reports Manual, and the Operations Manual.
36414A/M	HP INVISION	Two copies (2) HP INVISION User Manual (36414Z)
36415A/M	OM/3000 Order Management	<p>User Manual Set (36415Z) includes:</p> <ul style="list-style-type: none"> User's Guide Self Study Manual User's Guide Introduction Manual User's Guide Problems & Solutions <p>Technical Document Set (36415K) includes:</p> <ul style="list-style-type: none"> Sales Order Manual Inventory Management Manual Accounts Receivable Manual Data Base Technical Manual

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Software Manuals

Additional Applications Software

Product Number	Description	Manuals Included with Software
30302A/M	Silhouette/3000	Silhouette Reference Manual (30302-90001)
32180A/R	APS/3000 Application Program Sampler	APS/3000 Reference Manual (32180-90001) APS/3000 Pocket Guide (32180-90003)
32199A/R	Flexible Disccopy/ 3000	Flexible Disccopy Manual (32199-90001)
32205B/R/M	Scientific Library	Scientific Library Reference Manual (30000-90027)
32238A/M	OPT/3000 On-Line Performance Tool	OPT/3000 Reference Manual (32238-90001) Two (2) OPT/3000 Pocket Cards (32238-90002)
32900B/R	SIS/3000 Student Information System	SIS/3000 Reference Manual (32900-90001) SIS/3000 Technical Manual (32900-90005) SAS/3000 Reference Manual (32901-90001) SAS/3000 Technical Manual (32901-90005)
32902A/R	CIS/3000 College Information System	CIS/3000 Reference Manual (32902-90003) CIS/3000 Technical Manual (32902-90005)

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6

Software and Hardware Support

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HP 3000 SOFTWARE SUPPORT SERVICES

Hewlett-Packard offers a broad range of software support services, designed with flexibility and cost-effectiveness in mind, to ensure customer satisfaction with HP 3000 computer systems. Since support needs differ, a range of services is available to tailor a support plan appropriate to each customer.

Account Management Support (AMS)

The cornerstone of Account Management Support (AMS) is an account-assigned Software Engineer (SE). The SE performs regularly scheduled Support Management Reviews at the customer's site, providing an opportunity to establish a comfortable, ongoing relationship. Software Release Planning sessions, conducted prior to each major software release, enable customers to better plan and manage the update process. These activities ensure that the customer successfully utilizes HP software and support services. In addition, Account Management Support customers receive all the benefits of Response Center Support.

Features

- Account-assigned Software Engineer
 - Support Management Reviews
 - Software Release Planning
- Access to HP's Response Center for telephone assistance
- HP Remote Support
- On-site assistance
- HP TREND System Performance Analysis
- Software problem reporting and the Software Status Bulletin
- Right to use software, firmware, and manual updates on one system
- HP 3000 Communicator (digest of articles relevant to programming the HP 3000)

Custom Support Plan (CSP)

For Account Management Support customers requiring support beyond the personalized assistance already included, HP now offers an annual support plan tailored to fit each customer's individual needs (subject to local availability). The Custom Support Plan (CSP) provides a means for delivering specific additional services such as extra account visits, multiple site support coordination, consulting services, or training courses. CSPs are available to all Account Management Support customers.

Response Center Support (RCS)

Response Center Support provides all software assistance over the telephone from one of several HP Response Centers. The goal is to provide assistance to customers with critical problems within 15 minutes, while providing a two-hour response in all other cases. Actual response times are typically under one hour. RCS is an attractive alternative for customers performing little or no development work, or customers experienced with AMS, but who no longer require the personalized attention provided with account management.

Although on-site assistance is not part of the RCS agreement, customers can always purchase it on a time and materials basis. Response Center Support customers also receive all updates and material provided through Software Materials Subscription.

Features

- Access to HP's Response Center for telephone assistance
- HP Remote Support
- Software problem reporting and the Software Status Bulletin
- Right to use software, firmware, and manual updates on one system
- HP 3000 Communicator (digest of articles relevant to programming the HP 3000)

Software Materials Subscription (SMS)

Software Materials Subscription keeps customers current on changes and improvements to HP software. Updated software and documentation material arrive by mail, while a technical periodical and bulletin for users provides application hints and current information on software. Since SMS includes no Software Engineering assistance, either on-site or by telephone, any customer selecting the service should be self-sufficient and prepared to pay separately for any needed HP assistance. Naturally, any Software Engineering assistance is available on a time and material basis.

Features

- Right to use software, firmware, and manual updates on one system.
- Software problem reporting through the mail and the Software Status Bulletin.
- HP 3000 Communicator (digest of articles relevant to programming the HP 3000).

HP Remote Support

HP Remote Support is a standard feature of AMS, RCS, and multiple system software support for the HP 3000. The HP Support Link II (dedicated support modem) is provided with most systems* to allow software assistance remotely. This ability increases uptime through quicker, more effective support. HP Remote Support includes many important benefits:

Rapid Assistance - Your HP Support Link II makes it possible to provide most software support without the additional time required for responding on-site. For example, software patches can easily be downloaded when needed. However, if on-site support is necessary to resolve problems, remote diagnostics provide for more rapid resolution because the Software Engineer has been briefed with the results of the remote interrogation of your system.

*Series 37 customers receive the HP Support Link II Modem if AMS or RCS support is ordered with the Operating System at the time of system purchase.

Access to the Worldwide Resources of the HP Support Network - with HP Remote Support, a team of hardware and software specialists can rapidly focus on complex problems.

NOTE: HP Remote Support may not be available in all locations. Consult the local HP office to determine availability.

Multiple System Software Support

Customers with more than one HP 3000 who want to support additional systems from a central location may order multiple system software support. All telephone and on-site assistance is provided through the central site system manager on behalf of problems identified at the additional system site.

Features

- On-site assistance through the central system (Account Management Support only)
- Response Center coverage through the central system.
- HP Remote Support through the central system.
- Right to copy and use support materials delivered to the central site.
- Delivery and installation of firmware updates

Additional Response Center Caller

This service provides an additional Response Center caller for AMS, RCS, and multiple system software support customers. Each additional caller is provided the same Response Center benefits as the System Manager, except that no requests may be made for on-site assistance by a Hewlett-Packard Software Engineer. Only the designated System Manager under AMS coverage may request on-site assistance. The service is orderable as many times as desired by personnel trained in the same manner as the System Manager; each person must be specified by name as the authorized caller.

Product Structure

All systems software products are grouped into "Categories" such as Data Communications, Languages, and Utilities, and applications software products into "Families" such as Manufacturing, Office, and Factory Automation Applications. Hewlett-Packard sells the Language Category, for instance, as one service, rather than separating the service into many different product numbers. This benefits customers by reducing the price of software support.

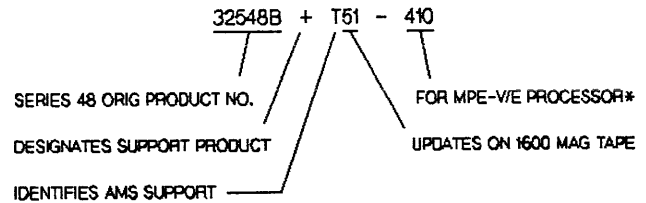
"Category" support extends the level of support chosen on the operating system to all system software products falling into that category. For Account Management Support customers, for instance, this means the right to call the Response Center with questions or problems, and if still unresolved, to request on-site assistance.

"Family" support performs the same function as category support, but is independent of the operating system; that is, applications software may have a different level of support than the operating system. For example, a customer may purchase Response Center Support for their operating system and systems software, but Account Management Support for their Manufacturing Applications such as MM/3000. If a customer orders Software Materials Subscription on the operating system, however, mixing support levels is not allowed.

CONFIGURING SOFTWARE SUPPORT

Support Services Product Numbering

As shown below, support products are ordered using the ORIG product number and a plus (+) symbol followed by a three character suffix. The first character of the suffix is a letter that identifies the software support service.



* Processor options are required only for selected products.

Letter	Software Support Service
C	Category Support
H	Response Center Support
P	Additional Response Center Caller
Q	Manual Update Service
S	Software Materials Subscription
T	Account Management Support
V	Additional System Coverage
W	Extended Software Materials Subscription
J	Custom Support Plan
V	Extended Category Support
V	Extended Family Support
N	Software Notification Service

The last two characters designate update media. A media option must always be specified for the operating system on the central system. All subsystem and application software updates are automatically delivered to customers on the same media as the operating system. A media option is also required for a Software Materials Subscription for any software in the Personal Computer Applications Family only.

Software Support For Operating Systems

Central System

AMS (T) - Account Management Support - Includes a local account SE, on-site assistance, one Response Center caller (System Manager) and alternate for telephone assistance, and a Software Materials Subscription. The example above shows how to order AMS for a Series 48 running MPE-V/E.

RCS (H) - Response Center Support - Supports one Response Center caller and one alternate for telephone assistance and provides a Software Materials Subscription. RCS for a Series 48 running MPE-V/E would be ordered as 32548B+H51-410.

SMS (S) - Software Materials Subscription - Provides software and manual updates, Software Status Bulletin, and HP 3000 Communicator magazine. SMS for a Series 48 running MPE-V/E would be ordered as 32548B+S51-410.

Additional Systems and Additional Response Center Caller

ASC (V) - Additional System Coverage - Extends AMS or RCS coverage of the central site operating system to one additional system under the same system manager. All support is delivered through the central system. ASC includes the right to make one copy of the central site operating system material updates for use on an additional system. ASC for a Series 48 running MPE-V/E would be ordered as 32548B+V00-410. A media option is required for an additional system if: 1. the customer wants Hewlett-Packard to provide material updates directly; 2. if the additional system has software not found on the central system; and 3. if the additional system is a different series than the central system.

Ext SMS (W) - Extended Software Materials Subscription - Provides the right to make one copy of all central system material updates for use on one additional system. Ext SMS for a Series 48 running MPE-V/E would be ordered as 32548B+W00-410. A separate set of updates on 1600 magnetic tape would require ordering 32548B+W51-410 in addition to 32548B+W00-410.

ARCC (P) - Additional Response Center Caller - Adds one Response Center caller to that included in the AMS or RCS support service.

Support For Subsystem And Application Software

Materials Support Only

SMS (S) - Software Materials Subscription - Provides software and manual updates. SMS must be ordered for EACH subsystem and EACH item of application software on the system. If AMS or RCS is ordered for the operating system, a Category or Family support product is ALSO required. SMS for HPSLATE would be ordered as 36576A+S00.

Ext SMS (W) - Extended Software Materials Subscription - Provides the right to make one copy of all central system material updates for use on one additional system. Ext SMS for HPSLATE would be ordered as 36576A+W00.

MUS (Q) - Manual Update Service - Provides one copy of updates to software reference manuals. MUS is ordered at the product level for application software and at the category level for subsystem software.

Local Support and/or Telephone Assistance

Category and Family Support. All Hewlett-Packard software, except operating systems, is separated into software support groups. Groups of subsystem software are referred to as "Categories". Groups of application software are called "Families". If AMS or RCS support is ordered for the operating system, Category support products must be ordered for the subsystems and Family support must be ordered for the application software IN ADDITION to an SMS product for each software product.

CAT (C) - Category Support - Extends level of operation system support to the subsystem software. Support for the Language Category is ordered as 99081B+C00.

Ext CAT (V) - Extended Category Support - Extends CAT on the central system to one additional system. All support is delivered through the central system. For the Language Category, this would be ordered as 99081B+V00.

AMS (T)/RCS (H) - Family Support - Provides Account Management or Response Center Support for application software. The customer receives a new Response Center caller and one alternate for each family supported. AMS customers also receive local assistance. Support for the Manufacturing Family would be ordered as 99101B+T00 for AMS or 99101B+H00 for RCS.

Ext FAM (V) - Extended Family Support - Extends Family Support on the central system to one additional system. All support is delivered through the central system. Support for the Manufacturing Family is extended to an additional system by ordering 99101B+V00, regardless of whether the service on the central system is AMS or RCS.

HARDWARE MAINTENANCE SERVICES

All Hewlett-Packard computer products can be covered by one of HP's hardware maintenance services. Provided by highly-skilled, HP-trained Customer Engineers, these services are designed to assure maximum effectiveness for your system at a known monthly charge. Service coverage hours and response times can be selected to best fit your system uptime requirements and different Maintenance Services are offered both for systems and for workstation products. The System Products Hardware Maintenance Service Matrix and the Workstation Products Hardware Maintenance Service Matrix summarize and compare the features of each maintenance service.

System Products Maintenance Services

Levels of system support vary with your application needs. Consequently, HP offers a wide range of services with various price/ performance levels to fit these needs. Although cost, hours of coverage and CE response time vary with different services, there are several important features included in all of HP's system maintenance services.

When you purchase an HP System Support Agreement, a Customer Engineer (CE) is personally assigned to your account to manage your maintenance program. As part of that account management, your CE will perform preventive maintenance measures on a regularly scheduled basis. If necessary, your Customer Engineer will adjust equipment or replace worn-out parts to ensure that your HP 3000 series 930 is maintained at its optimum performance specifications. Your CE will also install additional system hardware on agreement, update your system with engineering improvements, monitor your site environment periodically and maintain a current system log.

HP Remote Support is another feature included in all system maintenance services. A communications link, via a phone line and an HP-provided Support Link II modem*, enables specialists in our Response Centers to access your system to run tests and diagnose functional problems remotely. Using this remote capability and additional proprietary software, HP now provides Predictive Support, which can identify problems before they affect system availability and thus reduce the need for inscheduled maintenance. (*HP 3000 Series 37 customers receive the Support Link II modem when purchasing AMS or RCS on the Operating System at the time of system purchase. All other HP 3000 Series customers receive the modem with the system purchase. In addition, Predictive Support is not available on the Series 930 at first release.)

Should your system require emergency service, your HP Customer Engineer has the training and materials to resolve most problems rapidly. The CE will stay on-site until your problem is solved, even if this involves working beyond your coverage hours. For very difficult problems, your Customer Engineer initiates an escalation plan which enlists all HP resources necessary to provide a solution.

Additional features included in all system support agreements are detailed in the System Products Hardware Maintenance Service Matrix.

Guaranteed Uptime Service*

If your HP 3000 applications call for a very high level of system availability, Guaranteed Uptime Service provides a minimum of 99% uptime coverage for the system core (CPU and one or two system-domain disc drives). Whenever your uptime percentage for a three-month period is reported below 99%, you receive a credit equal to one month of the service charges for the products covered. Guaranteed Uptime Service assures you of a 4 hour on-site response time and service that provides around-the-clock, continuous coverage.

*(note that Guaranteed Uptime Service is not currently available on the HP 3000 Series 930).

Standard System Maintenance Service

Next to Guaranteed Uptime Service, this program provides the fastest response and most comprehensive hardware support for business and technical applications. This same-day service program provides on-site response within 4 coverage hours. Support coverage is from 8 a.m. to 9 p.m. every day of the standard workweek (excluding HP holidays). Extended coverage options are available which can provide service up to 7 days per week, 24 hours per day.

Basic System Maintenance Service

If your business operates primarily during standard working hours and can tolerate a one-workday service response, then this service is the economical choice for you. Coverage is from 8 a.m. to 5 p.m., Monday through Friday (excluding HP holidays) within 100 miles of a Service Responsible Office. Longer response times are offered beyond 100 miles (an improved response time and After Coverage Hours service are also available at additional cost on a per-incident basis).

Workstation Products Maintenance Services

A range of support is available for terminals, desktop or personal computers and their associated peripherals. The following contractual programs are specifically tailored to the support requirements of workstation products, providing them with time-effective and cost-effective support. All on-site services are available at specified response times within 100 miles of Service Responsible Offices.

Priority On-Site Service

This service gives you four-hour response on critical-use workstation products, between the hours of 8 a.m. and 5 p.m. Monday through Friday. For workstations requiring extra hours of coverage, you can purchase extended hours contractually for workstations located with a system with the same extended coverage hours. You can also obtain After Coverage Hours support on a per-incident basis for stand-alone workstations.

Next Day on-Site Service

Next Day On-Site Service gives you next-day response between the hours of 8 a.m. and 5 p.m., Monday through Friday. After Coverage Hours support and improved response time are also available on a per-incident basis.

Scheduled On-Site Service

This service offers the lowest on-site support costs for your HP workstation products. With a minimum of 25 eligible units, HP will make scheduled weekly visits to a single, central site which you may specify. "Units" include CPU's, mass storage devices and output devices, so a typical personal computer "system" may comprise three to four units. With the savings from this service, you can purchase one or more spare units to back up products used for critical applications.

Courier Return Service

This economical and user-convenient service provides on-site pickup of your workstation or personal computer. Our designated courier packs and delivers your product from your desk to our service center and, in most cases, returns it to you within four days of your call.

Customer Return Service

For sites not located within our Courier zones, our service centers offer return-to-HP service for your workstation products. Products returned by you to our service center will be repaired within three days of their arrival and shipped back to you prepaid via normal land freight.

Standard Coverage Per-Incident Service

This service improves the response time for Basic System, Next Day On-Site or Priority On-Site Service to that of Standard System Service for a fixed charge. For calls received between 8 a.m. and 5 p.m., Monday through Friday the per-incident charge gives you response within four hours, up until 9 p.m.

System Products

Hardware Maintenance Service Matrix

Maintenance Service Features	Guaranteed Uptime Service**	Standard System Service	Basic System Service
Remote Support Response Time	30 Minutes	30 Minutes	Next Day
On-Site Response Time Within 100 Miles* Within 200 Miles* Within 300 Miles*	99% Uptime Not Available Not Available	4 Hour 8 Hour 12 Hour	Next Day 2 Days 3 Days
Coverage Hours Per Day	24 Hour	13 Hr., 8AM-9PM 16 Hr., 8AM-12AM 24 Hour	8AM-5PM
Coverage Days Per Week	7 Days	5 Days, Mon-Fri 6 Days, Mon-Sat 7 Days, Mon-Sun	5 Days, Mon-Fri
Predictive Support**	YES	YES	YES
Preventive Maintenance	YES	YES	YES
Add-on Installation	YES	YES	YES
Engineering Improvements	YES	YES	YES
Account Assigned CE	YES	YES	YES
Site Surveys	YES	YES	YES
Warranty Enhancements	YES	YES	YES
Out-of-Coverage Option	NO	YES	YES
Upgrade Response Option	NO	NO	YES

* From an HP SRO (Service Responsible Office)

** (Not Available for 900 Series at First Release)

Workstation Products

Hardware Maintenance Service Matrix

Maintenance Service Features	Priority On-Site Service	Next Day On-Site Service	Scheduled On-Site Service
Remote Support Response Time	Not Available	Not Available	Not Available
On-Site Response Time Within 100 Miles* Within 200 Miles* Within 300 Miles*	Four working hours Eight working hours Twelve working hours	Next Day 2 Days 3 Days	Scheduled Weekly Visit Not Available Not Available
Coverage Hours Per Day	8AM-5PM	8AM-5PM	8AM-5PM
Coverage Days Per Week	Mon-Fri	Mon-Fri	Scheduled, Mon-Fri
Scheduled Preventive Maintenance	NO	NO	NO
Add-on Installation	NO	NO	NO
Engineering Improvements	YES	YES	YES
Account Assigned CE	NO	NO	NO
Site Surveys	NO	NO	NO
Warranty Enhancements***	SOME	SOME	SOME
Out-of-Coverage Option	YES	YES	YES
Upgrade Response Option	NO	YES	YES

* From an HP SRO (Service Responsible Office)

** Service from HP Customer Service Centers

*** Available for three-month-warranted products only

Workstation Products (continued)

Hardware Maintenance Service Matrix

Maintenance Service Features	Courier Return Service	Customer Return Service	
Remote Support Response Time	Not Available	Not Available	
On-Site Response Time Within 100 Miles* Within 200 Miles* Within 300 Miles*	N/A**	N/A**	
Coverage Hours Per Day	8AM-5PM	8AM-5PM	
Coverage Days Per Week	Mon-Fri	Mon-Fri	
Scheduled Preventive Maintenance	NO	NO	
Add-on Installation	NO	NO	
Engineering Improvements	YES	YES	
Account Assigned CE	NO	NO	
Site Surveys	NO	NO	
Warranty Enhancements***	SOME	NO	
Out-of-Coverage Option	NO	NO	
Upgrade Response Option	NO	NO	

* From an HP SRO (Service Responsible Office)

** Service from HP Customer Service Centers

*** Available for three-month-warranted products only

7

Site Preparation Data

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Environmental Specifications

System Processor Units

	Relative Humidity (Operating) --recommended (non-condensing)	Recommended Operating Temperature	Line Voltage (VAC) and Frequency
Series 37/37XE	20-80%	50 ^o -104 ^o F (10 ^o -40 ^o C)	100-120 @ 48-66 Hz 200-240 @ 48-66 Hz
Series 39/40/42	40-60%	68 ^o -78 ^o F (20 ^o -25.5 ^o C)	120 @ 50/60 Hz 220 @ 50/60 Hz Single Phase
Series 44/48/58	40-60%	68 ^o -78 ^o F (20 ^o -25.5 ^o C)	210 @ 60 Hz 220 @ 50 Hz Single Phase
Series 64/68/70	40-60%	68 ^o -78 ^o F (20 ^o -25.5 ^o C)	208 @ 60 Hz 380 @ 50 Hz 415 @ 50 Hz Three Phase
Series 930	40-60%	68-77 ^o F (20-25 ^o C)	200-240 @ 50-60 Hz Single Phase

Note: The Series 37 was designed for use in an office environment and is the only HP 3000 which is supported on carpet. All other HP 3000 Computer Systems should not be installed in a carpeted environment. Complete site preparation details can be found in the Site Planning and Preparation Guide.

Distributed Terminal Controller

	Relative Humidity (Operating) --recommended (non-condensing)	Recommended Operating Temperature	Line Voltage (VAC) and Frequency
DTC	5-95% @ 40 ^o C	32-131 ^o F (0-55 ^o C)	115 @ 50/60 Hz 230 @ 50/60 Hz

Physical Dimensions

System Processor Units

Dimension	Height	Depth	Width	Weight
Series 37/37XE (in cabinet)	720 mm (29 in.)	711 mm (28.5 in.)	375 mm (15 in.)	33 Kg (73 lbs.)
Series 39	101.6 cm (40.0 in.)	56.9 cm (22.4 in.)	61.0 cm (24.0 in.)	86 Kg (190 lbs)
Series 40/42/42XP	101.6 cm (40.0 in.)	56.9 cm (22.4 in.)	61.0 cm (24.0 in.)	86 Kg (190 lbs)
Series 44/48 One Card Cage	72.4 cm (28.5 in.)	79.4 cm (31.25 in.)	183.5 cm (72.25 in.)	109 Kg (240 lbs)
Series 64/68/70	122 cm (48 in.)	66 cm (26 in.)	176 cm (69 in.)	522 Kg (1150 lbs.)
Series 930	100 cm (39 in.)	80 cm (31.5 in.)	120 cm (47.2 in.)	318 Kg (700 lbs.)

Distributed Terminal Controller

Dimension	Height	Depth	Width	Weight
DTC	22.2 cm (8.7 in.)	44 cm (17.3 in.)	42.5 cm (16.7 in.)	16-22 Kg (35-48 lbs.)

Electrical Characteristics

System Processor Units

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
Series 37/37XE	840 VA	100-120 @ 48-66 Hz	7.0A
	960 VA	200-240 @ 48-66 Hz	4.0A
Series 39	1020 VA	120 @ 50/60 Hz	8.5A
	990 VA	220 @ 50/60 Hz	4.5A
Series 42/42XP	1020 VA	120 @ 50/60 Hz	8.5A
	990 VA	220 @ 50/60 Hz	4.5A
Series 48/58 Two Card Cages	2751 VA	210 @ 60 Hz	13.1A
	2728 VA	220 @ 50 Hz	12.4A
Series 68B	4328 VA	208 @ 60 Hz three-phase	12.0A/phase
	8566 VA	380 @ 50 Hz three-phase	13.0A/phase
	8640 VA	415 @ 50 Hz three-phase	12.0A/phase
Series 930	2700 VA	200-240 @ 50-60 Hz	13.0A

Distributed Terminal Controller

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
DTC	150 VA	115 @ 50/60 Hz	1.3A
		230 @ 50/60 Hz	0.65A

Note: To calculate total system BTU output, add up the volt-amperes for all products configured and use the following equation:

$$\text{Total BTU/HR} = (\text{Total VOLTAMPS} * .85) * 3.414$$

If the power factor is known, it should be substituted for ".85".

Electrical Characteristics

Magnetic Tape Drives

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
9144A Cartridge Tape Drive	110 VA	90-125 @ 48-66 Hz	.88A
	110 VA	180-250 @ 48-66 Hz	.44A
7970E Magnetic Tape Drive	230 VA	115 @ 60 Hz	2.0A
	391 VA	230 @ 50 Hz	1.7A
7970E Opt. 426 Magnetic Tape Drive (Master)	288 VA	115 @ 60 Hz	2.5A
	322 VA	230 @ 50 Hz	1.4A
7974A Magnetic Tape Drive	450 VA	100 @ 50/60 Hz	4.5A
	540 VA	120 @ 50/60 Hz	4.5A
	418 VA	220 @ 50/60 Hz	1.9A
	456 VA	240 @ 50/60 Hz	1.9A
7976A Magnetic Tape Drive	1849 VA	117 @ 60 Hz	15.8A
	1804 VA	220 @ 50 Hz	8.2A
7978A/B Magnetic Tape Drive	313 VA	90-125 @ 48-66 Hz	2.5A
	313 VA	198-250 @ 48-66 Hz	1.25A

Note: BTU/HR - (VOLTAMPS* .85)* 3.414

Electrical Characteristics

Disc Drives

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
7906S Disc Drive (Slave)	684 VA 704 VA	120 @ 60 Hz 220 @ 50 Hz	5.7A 3.2A
7906M Disc Drive (Master)	960 VA 990 VA	120 @ 60 Hz 220 @ 50 Hz	8.0A 4.5A
7911P Disc Drive	564 VA 572 VA	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7912P Disc Drive	564 VA 572 VA	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7914P** Disc Drive	564 VA 572 VA	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7920S Disc Drive (Slave)	612 VA 660 VA	120 @ 60 Hz 220 @ 50 Hz	5.1A 3.0A
7920M Disc Drive (Master)	888 VA 946 VA	120 @ 60 Hz 220 @ 50 Hz	7.4A 4.3A
7925S Disc Drive (Slave)	528 VA 484 VA	120 @ 60 Hz 220 @ 50 Hz	4.4A 2.2A
7925M Disc Drive (Master)	804 VA 770 VA	120 @ 60 Hz 220 @ 50 Hz	6.7A 3.5A
7933H Disc Drive	1580 VA 1628 VA	208 @ 60 Hz 220 @ 50 Hz	7.6A (9.3A*) 7.4A (9.0A*)
7935H Disc Drive	1580 VA 1628 VA	208 @ 60 Hz 220 @ 50 Hz	7.6A (9.3A*) 7.4A (9.0A*)
7945A Disc Drive	106 VA 132 VA	90-132 @ 47.5-66 Hz 180-264 @ 47.5-66 Hz	0.8A 0.5A
9895A Flexible Disc Drive	252 VA 194 VA	120 @ 60 Hz 220 @ 50 Hz	2.1A 0.88A

* Includes drive and accessory outlets

** For 7914ST/TD/CT see component devices

Note: BTU/HR = (VOLTAMPS * .85) * 3.414

Electrical Characteristics

Printers

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
2601A Daisywheel Printer	200 VA	100 @ 50/60 Hz	2.0A
	204 VA	120 @ 50/60 Hz	1.7A
	198 VA	220 @ 50/60 Hz	0.9A
	192 VA	240 @ 50/60 Hz	0.8A
2602A Daisywheel Printer	132 VA	120 @ 50/60 Hz	1.1A
	132 VA	220 @ 50/60 Hz	0.6A
	144 VA	240 @ 50/60 Hz	0.6A
2608A Line Printer	1260 VA	120 @ 60 Hz	10.5A
	1166 VA	220 @ 50 Hz	5.3A
2608S Line Printer	1380 VA	100 @ 50/60 Hz	13.8A
	1380 VA	120 @ 50/60 Hz	11.5A
	1254 VA	220 @ 50/60 Hz	5.7A
	1512 VA	240 @ 50/60 Hz	6.3A
2563A Line Printer	400 VA	100 @ 50/60 Hz	4.0A
	396 VA	120 @ 50/60 Hz	3.3A
	440 VA	220 @ 50/60 Hz	2.0A
	408 VA	240 @ 50/60 Hz	1.7A
2565A/66A Line Printers	530 VA	100 @ 50/60 Hz	5.3A
	552 VA	120 @ 50/60 Hz	4.6A
	550 VA	220 @ 50/60 Hz	2.5A
	552 VA	240 @ 50/60 Hz	2.3A
2611A Line Printer	700 VA	100 @ 50/60 Hz	7.0A
	690 VA	115 @ 50/60 Hz	6.0A
	700 VA	200 @ 50/60 Hz	3.5A
	690 VA	230 @ 50/60 Hz	3.0A
2619A Line Printer	1438 VA	115 @ 60 Hz	12.5A
	1449 VA	230 @ 50 Hz	6.3A

Note: BTU/HR = (VOLTAMPS * .85) * 3.414

Electrical Characteristics

Printers (Cont.)

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
2631B Serial Printer	204 VA	120 @ 60 Hz	1.7A
	198 VA	220 @ 50 Hz	0.9A
2631G Graphics Printer	270 VA	100 @ 50/60 Hz	2.7A
	264 VA	120 @ 50/60 Hz	2.2A
	264 VA	220 @ 50/60 Hz	1.2A
	264 VA	240 @ 50/60 Hz	1.1A
2635B Printing Terminal	204 VA	120 @ 60 Hz	1.7A
	220 VA	220 @ 50 Hz	1.0A
2680A Page Printer	4992 VA	208 @ 60 Hz	24A
	5280 VA	220 @ 50 Hz	24A
2686A Page Printer	719 VA	115 @ 60 Hz	6.25A
	750 VA	220 @ 50 Hz	3.41A
	840 VA	240 @ 50 Hz	3.5A
2687A Page Printer	851 VA	115 @ 60 Hz	7.4A
	770 VA	220 @ 50 Hz	3.5A
2688A Page Printer	1219 VA	115 @ 60 Hz	10.6A
	1144 VA	220 @ 50 Hz	5.2A
293x Serial Printer	240 VA	120 @ 60 Hz	2.0A
	374 VA	220 @ 50 Hz	1.7A

Note: BTU/HR=(VOLTAMPS * .85) * 3.414

Electrical Characteristics

Terminals

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
2382A CRT Terminal	75 VA	100 @ 50/60 Hz	0.75A
	90 VA	120 @ 50/60 Hz	0.75A
	165 VA	220 @ 50/60 Hz	0.75A
	180 VA	240 @ 50/60 Hz	0.75A
2392A CRT Terminal	92 VA	115 @ 47/66 Hz	0.8A
	92 VA	230 @ 47/66 Hz	0.4A
2393A CRT Terminal	120 VA	120 @ 47/66 Hz	1.0A
	110 VA	220 @ 47/66 Hz	0.5A
2394A CRT Terminal	92 VA	115 @ 47/66 Hz	0.8A
	92 VA	230 @ 47/66 Hz	0.4A
2621B CRT Terminal	52 VA	120 @ 60 Hz	0.43A
	55 VA	220 @ 50 Hz	0.25A
2622A CRT Terminal	152 VA	110 @ 60 Hz	1.38A
	253 VA	220 @ 50 Hz	1.15A
2623A CRT Terminal	170 VA	100 @ 50/60 Hz	1.7A
	168 VA	120 @ 50/60 Hz	1.4A
	154 VA	220 @ 50/60 Hz	0.7A
	168 VA	240 @ 50/60 Hz	0.7A
2624A CRT Terminal	132 VA	110 @ 60 Hz	1.2A
	132 VA	220 @ 50 Hz	0.6A
2624B CRT Terminal	170 VA	100 @ 50/60 Hz	1.7A
	168 VA	120 @ 50/60 Hz	1.4A
	154 VA	220 @ 50/60 Hz	0.7A
	168 VA	240 @ 50/60 Hz	0.7A
2625A CRT Terminal	170 VA	100 @ 50/60 Hz	1.7A
	168 VA	120 @ 50/60 Hz	1.4A
	154 VA	220 @ 50/60 Hz	0.7A
	168 VA	240 @ 50/60 Hz	0.7A
2626A CRT Terminal	96 VA	120 @ 60 Hz	0.8A
	88 VA	220 @ 50 Hz	0.4A

Note: BTU/HR = (VOLTAMPS * .85) * 3.414

Electrical Characteristics

Terminals (Cont.)

Product	Volt-Amps	Voltage (VAC) and Frequency	Maximum Steady State Current
2626W CRT Terminal	170 VA	100 @ 50/60 Hz	1.7A
	168 VA	120 @ 50/60 Hz	1.4A
	154 VA	220 @ 50/60 Hz	0.7A
	168 VA	240 @ 50/60 Hz	0.7A
2627A CRT Terminal	280 VA	100 @ 50/60 Hz	2.8A
	288 VA	120 @ 50/60 Hz	2.4A
	308 VA	220 @ 50/60 Hz	1.4A
	312 VA	240 @ 50/60 Hz	1.3A
2628A CRT Terminal	170 VA	100 @ 50/60 Hz	1.7A
	168 VA	120 @ 50/60 Hz	1.4A
	154 VA	220 @ 50/60 Hz	0.7A
	168 VA	240 @ 50/60 Hz	0.7A
2641A CRT Terminal	138 VA	115 @ 60 Hz	1.2A
	138 VA	230 @ 50 Hz	0.6A
2645A/N/R/S CRT Terminal	480 VA	120 @ 50/60 Hz	4A
	440 VA	220 @ 50/60 Hz	2A
2647F CRT Terminal	180 VA	120 @ 50/60 Hz	1.5A
	184 VA	230 @ 50 Hz	0.8A
2648A CRT Terminal	196 VA	115 @ 60 Hz	1.7A
	207 VA	230 @ 50 Hz	0.9A
2703A CRT Terminal	660 VA	120 @ 50/60 Hz	5.5A
	770 VA	220 @ 50/60 Hz	3.5A

Note: BTU/HR = (VOLTAMPS * .85) * 3.414

1

APPENDIX

Attaching HP-IB Peripherals	1-1
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ATTACHING HP-IB PERIPHERALS

HP-IB (IEEE 488 protocol) peripherals attach to HP 3000 systems via hardware controllers. On the Series 930, this controller is known as an HP-IB Channel. It is called a General I/O Channel (GIC) on the Series 70/6x/58/4x/39. The controller is called a Peripheral Interface Channel (PIC) on the Series 37/37XE.

HP-IB Channels (Series 930)

Each HP-IB Channel is a board that uses one I/O card slot and supports one HP-IB cabling system. From one to six HP-IB peripherals can be supported by a single HP-IB Channel. These peripherals are linked together by HP-IB cables. The first device in the chain utilizes a special 2m HP-IB cable (included with the HP-IB Channel) to connect directly to the HP-IB Channel card. The practical number of peripherals which may be connected to a single HP-IB Channel depends on cable length restrictions and performance considerations.

General I/O Channels (Series 39-70)

Each GIC is a board that uses one I/O card slot, supports one HP-IB cabling system, and uses one junction mounting panel when connected directly to external devices. An HP-IB system may be used to connect from one to eight HP-IB peripherals. Peripherals connected to one GIC are linked together with HP-IB cables and connect to a single mounting panel. The number of peripherals which may be connected to a single GIC depends on peripheral speed, cable length restrictions, and performance considerations.

Peripheral Interface Channel (Series 37/37XE)

Each PIC is a board that uses one card slot and supports one HP-IB cabling system. Each PIC supports up to six devices. The HP-IB cables daisy-chain to the PIC's 25-pin connector. The number of peripherals which may practically be connected to a single PIC depends on peripheral speed, cable length, and performance considerations.

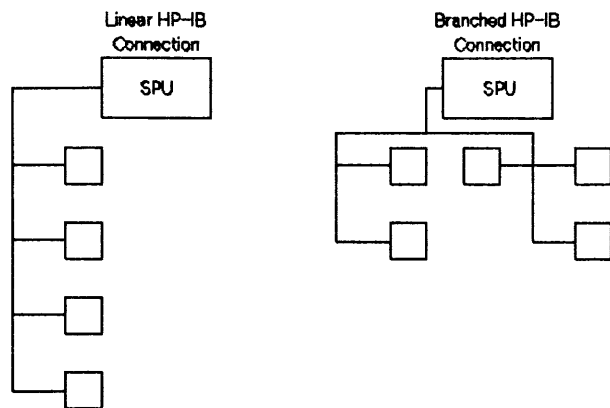
Electrical Device Loads

Up to eight HP-IB electrical device loads are allowed on a single HP-IB Channel, GIC or PIC. Each peripheral may generate between one and eight HP-IB electrical device loads. For many peripherals, the electrical device load is fixed; however, several current peripherals can be configured for a range of electrical device loads by a CE at the customer site. The reasons for this flexibility are illustrated below in an example. (Please see the table on page Appendix 1-3 for a list of supported peripherals and their respective device loads.)

Multiple peripherals may be connected to a HP-IB Channel, GIC or PIC as long as the sum of the electrical device loads does not exceed eight and as long as the combination does not violate other configuration constraints. Note: Some peripherals require a dedicated GIC to which other peripherals cannot be attached. (These peripherals are not supported on the HP-IB Channel or PIC.)

HP-IB Cable Length

The maximum total length of HP-IB cable linked together and connected to a single HP-IB Channel, GIC or PIC is *15 meters*. Multiple peripherals can be linked together along the portion of this cable that is external to the SPU and the peripherals. Peripherals can be linked together either in a line or in a branched layout.



The maximum allowable length of cable is often less than 15 meters in a particular configuration, depending upon the number of electrical device loads connected. (These rules are discussed below.) The total cable length is the sum of the length of all HP-IB cables:

- a) Inside the peripheral devices
- b) Between peripherals
- c) (GIC, PIC) Between the nearest peripheral and the junction panel.
- d) (GIC only) Inside the I/O card cage between the junction panel and the GIC (two meters for the Series 68 and 48, and one meter for the Series 39 and 42)
- e) (HP-IB Channel only) Between the HP-IB Channel card and the 1st device (two meters)
- f) (GIC) Between the GIC card and the INP or 261x cards in the card cage. (Such connections use flat ribbon HP-IB cables, and each has an effective length of one meter.)

All HP-IB cables inside the system and inside the peripheral devices are supplied standard with each product ordered. External HP-IB cables usually are supplied with system peripherals. (Internal HP-IB cable lengths are included in the peripheral table on page Appendix 1-3. External cables are shown in the Chapter Four cabling diagrams.) To increase cabling flexibility, HP-IB cables also can be ordered separately in lengths of one, two, or four meters by ordering product numbers 10833A, 10833B, and 10833C, respectively.

The "Seven Plus One Rule:"

The length of allowable HP-IB cable is a function of the electrical device loads generated by the attached peripherals. By relating electrical device loads to cable length, we are able to optimize data transfer rates, ensuring correct performance. *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.*

High- Versus Low-Speed Peripherals:

Note that there is only one GIC (30079A) and one PIC (30459A). Whether they are considered high- or low-speed depends solely upon which peripherals are attached to it. A GIC or PIC is considered high-speed if it has one or more high-speed devices attached to it. No distinction is made for the HP-IB channel because all supported devices are high-speed.

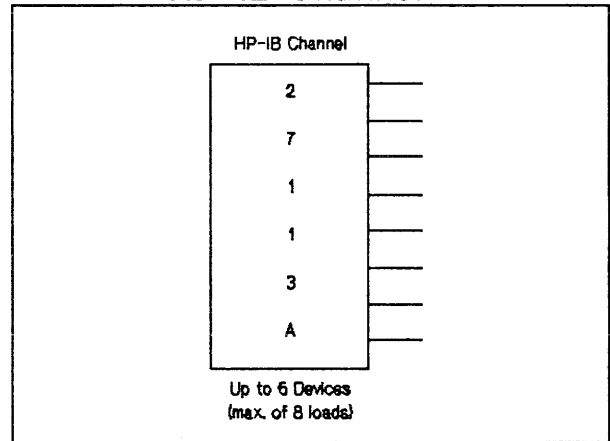
For the Series 39/4x/58/6x/70 system, High-speed peripherals may be attached to no more than two GICs per IMB. Thus, with two IMBs, high-speed peripherals may be attached to as many as four GICs on the Series 68 with only the standard I/O bay. By ordering the auxiliary I/O bay which includes another IMB, two additional GICs for high-speed devices can be configured. The Series 39/4x/58 systems each support two high-speed GICs, since they have only one IMB.

For the Series 37 systems, two high-speed PICs are supported. On the Series 37XE three PICs are supported, two of which are high-speed while the third supports low-speed INPs only.

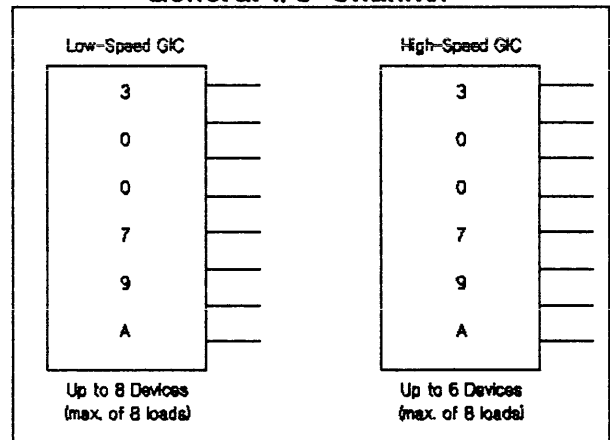
All HP-IB Channels on the Series 930 may be configured with high-speed peripherals.

A maximum of six devices may be attached to each HP-IB Channel or PIC (high- or low-speed). A maximum of six devices may be attached to each high-speed GIC. Up to eight low-speed devices may be attached to a low-speed GIC. These maximums relate to the number of devices and not to electrical device loads. The electrical device load maximum remains at eight per HP-IB Channel, GIC, or PIC.

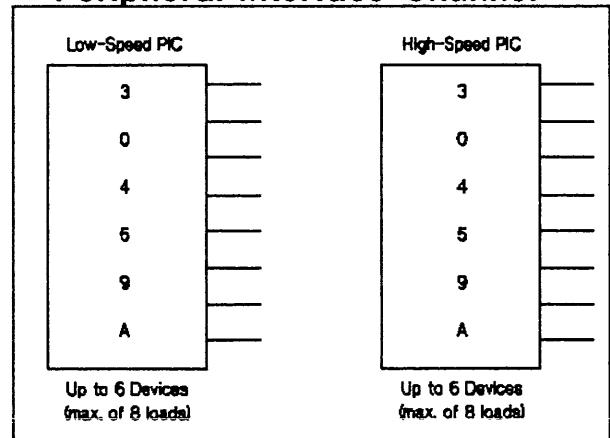
HP-IB Channel



General I/O Channel



Peripheral Interface Channel



HP-IB Interface Requirements of Peripherals:

The following table summarizes the requirements of peripherals and other devices using HP-IB Channels, GICs, or PICs with the Series 37/37XE/39/42/48/58/68/70/930. Note: Not all peripherals are supported on each system. See the Supported Peripherals table for details.

Peripherals	Peripheral Speed*	HP-IB Electrical Device Loads	Internal Device Cable Length (Meters)
Cartridge Tape in 7911P/ 7912P/7914P/7914TD/7914ST	Low	1 (Requires Dedicated GIC)	0
7945A Disc Drive	High	1	0
7911P/7912P Disc Drive	High	1	1
7914P/7914TD/7914CT Disc Drive	High	1	1
7920M/7925M Master Disc Drive	High	1	1
7933H/7935H Disc Drive	High	1	0
7970E/7971A/7914TD (Tape Portion) Master 1/2" Tape Drive	Low *	1 (Requires Dedicated GIC)	0
7974A 1/2" Tape Drive	High	Shipped w/1 (Variable from 1 to 3)	1
9144A/7914CT (Tape Portion)	High	1	0
7914ST Integrated Storage Unit	High	Shipped w/2 (Variable from 2 to 4)	1
7976A 1/2" Tape Drive	High	Shipped w/2 (Variable from 1 to 4)	2
7978A/B 1/2" Tape Drive	High	Shipped w/1 (Variable from 1 to 3)	0
2611A/2613A/2617A/2619A Line Printer Interface Card (26069A)	Low	1	1

* A high-speed peripheral is one that has a data transfer rate on the HP-IB which exceeds 400Kbytes per second.

HP-IB Interface Requirements of Peripherals (Cont.):

Peripherals	Peripheral Speed*	HP-IB Electrical Device Loads	Internal Device Cable Length (Meters)
2608A Line Printer	Low (Do not mix with high)	1	0
2608S Line Printer	High (Do not mix w/ 7906/7920/7925)	Shipped w/1 (Variable from 1 to 7)	1
2563A/2565A/2566A Line Printer	High**	Shipped w/1 (Variable from 1 to 7)	0
2680A/2688A Page Printer	High**	Shipped w/4 (Variable from 1 to 8)	1
Network Link/INP Card	Low	1	1
30106A Card Reader	Low	1 (Requires Dedicated GIC)	0
9895A (Opt. 010) Flexible Disc Drive	Low	1	1
26075A Multiple System Access Selector	High (Do not mix w/discs)	0	0.5

* A high-speed peripheral is one that has a data transfer rate on the HP-IB which exceeds 400Kbytes per second.

** Low-speed device when configured via HP-IB Extenders (37203A); HP-IB Extender requires dedicated GIC which can be shared by two Extender pairs.

Attaching HP-IB Peripherals, GIC Example:

Suppose you need to attach a 7933H disc drive, a 2619A line printer, and a 2680A page printer to a single GIC on a Series 68. Is this configuration allowed, and how much HP-IB cable can you have? (Note: Steps 1-4 also apply to HP-IB Channels and PICs)

1) Check number of devices, device speeds, and electrical device loads:

Yes, the configuration is allowed. The 2619A is a low-speed device; the 2680A and 7933H are high-speed devices; there will be six or fewer devices on this high-speed GIC; and the total number of electrical device loads that are configured at the factory is less than eight, i.e. six in this case.

2) Check the "Seven Meters Plus One Meter Per Electrical Device Load Rule:"

How much cable is allowed?

7 meters	
+ 1 meter	(7933H is configured with one electrical device load)
+ 1 meter	(2619A is configured with one electrical device load)
+ 4 meters	(2680A is configured with four electrical device loads)
<hr/>	
13 meters	(maximum length allowed with electrical device load configuration as shipped from the factory)

3) Check the amount of HP-IB cable available for external wiring:

If you want to connect the peripherals in a straight line, for example, how far from the Series 68 junction panel can the farthest peripheral be? (Note that you could arrange these peripherals in any physical configuration within the total cabling length constraints; i.e., it does not have to be in a straight line — the external cabling layout can use branching.)

13 meters	(maximum length allowed)
- 1 meter	(ribbon cable between 2619A interface card and GIC; see the table above)
- 2 meters	(from GIC to junction panel; standard length allowed for the Series 68 I/O card cage)
- 0 meters	(no 7933H internal cabling; see the table above)
- 1 meter	(2680A internal cable; see the table above)
<hr/>	
9 meters	(cable length remaining for external connections)

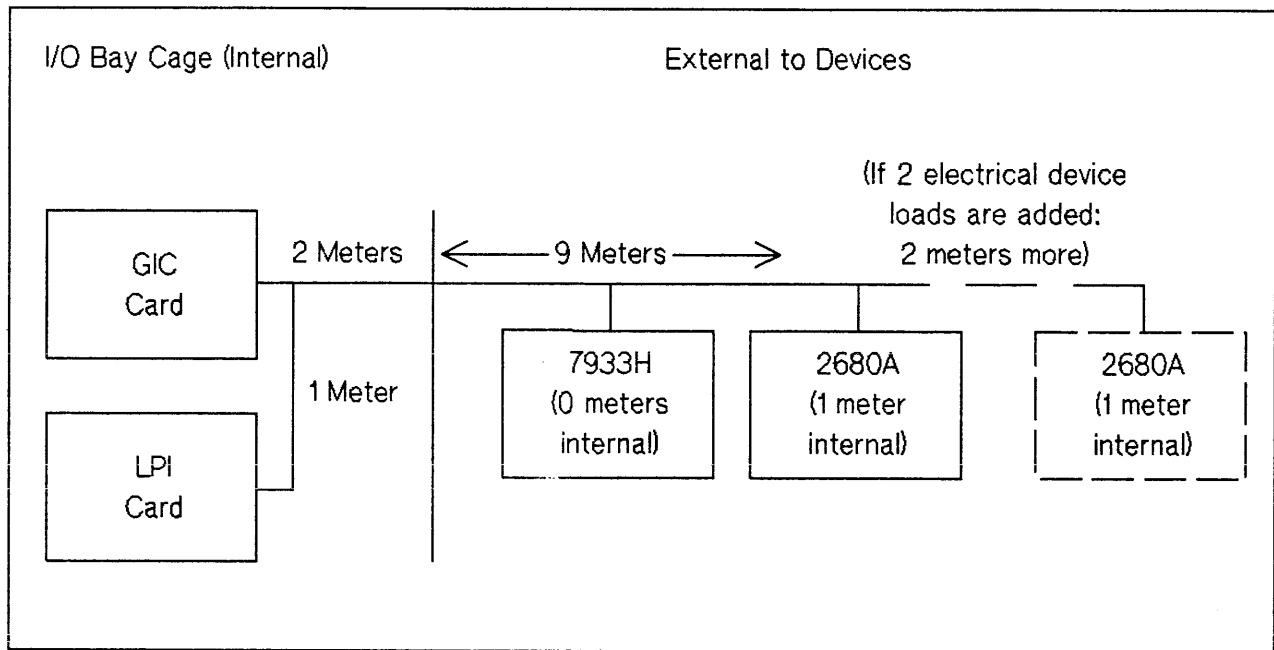
(Note that the 2619A, as well as other 261x line printers, uses HP-IB ribbon cable only between the interface card and the GIC. The line printer itself can be up to 500 feet away. It is connected by a parallel differential current-driven line that attaches to a separate junction mounting panel and hooks up to the interface card in the I/O card cage.)

4) Vary device loads if necessary and possible:

What if 9 meters is not enough; can you do anything?

Yes. A CE can reconfigure several peripherals in the field for a range of electrical device loads by rearranging resistor modules in the peripheral. For example, the 2680A could be reconfigured for six instead of four electrical device loads. This would allow the farthest peripheral to be placed two meters farther away or 11 meters away in this example. (Note, however, that by doing this, eight electrical device loads now have been configured on this GIC, leaving no more capacity for adding another peripheral later.)

HP-IB Cable Length Example:



HP 3000 Supported Peripherals

Maximum Peripheral Configurations

(See Configuration Guide Chapter 1 text for subtotal maximums)
 (F = Future support planned, ? = Undetermined, 0 = Not supported)

Devices	37/37XE	39/42 42XP	48/58	68/70 1/2 Bay	930	Notes
A) Maximum CIBs	-	-	-	-	2	-
B) Maximum IMBs	-	1	1	2/3	-	13
C) Maximum SIMBs	1	-	-	-	-	-
D) Max HP-IB Channels	-	-	-	-	8	5
E) Maximum GICs	-	4	5	10/15	-	3
F) Maximum PICs	2/3	-	-	-	-	4
G) Max High-Speed HP-IB Channels	-	-	-	-	8	5
H) Max High-Speed GICs	-	2	2	4/6	-	1,2
I) Max High-Speed PICs	2	-	-	-	-	4
J) Max LANIC Boards	1	1	1	1	2	-
K) Max G/H/I + J	2	3	3	4/6	10	-
L) Max INPs	3	3	7	16/24	-	10
M) Max DTCs	-	-	-	-	16	-
Discs:						
7933H	4	8	8	16	16	6
7935H	4	8	8	16	16	6
7933XP	4	8	8	16	F*	6
7935XP	4	8	8	16	F*	6
7914P	4	8	8	8	F	6,22
7914CT	2	4	4	4	F	6,17,18
7914ST	2	4	4	4	F	6
7945A	4	4	4	4	0	6,18
7920/7925M	0	2	2	16	0	6
7920/7920S	0	7	14	14	0	-
7914TD	0	1	2	2	0	7
7911P/7912P	0	4	4	1	0	6
7906M	0	1	1	0	0	6
7906S	0	6	6	0	0	6
Maximum Total Discs	8	8	16	16/24	24	-

* At this time we are unable to determine whether these drives will be supported at first release.

HP 3000 Supported Peripherals (Cont.)

Maximum Peripheral Configurations

(See Configuration Guide Chapter 1 text for subtotal maximums)

(F = Future support planned, ? = Undetermined, 0 = Not supported)

Devices	37/37XE	39/42 42XP	48/58	68/70 1/2 Bay	930	Notes
1/2" Magnetic Tapes:						
7978A/B	2	4	4	4	4	6
7974A	2	4	4	4	4	6
7914ST	2	4	4	4	F	6
7976A	0	2	2	2	0	6,8
7970E Master/7914TD	0	1	2	2	0	7
7970E Slave	0	3	6	6	0	-
Maximum 1/2" Tapes	2	4	8	8	8	-
1/4" Cartridge Tapes						
9144A/7914CT	2	4	4	4	F	6,17,18
Integrated Tape	0	1	1	1	0	7,11,22
Maximum 1/4" Tapes	2	4	4	4	F	-
Line Printers:						
2567B	2	4	4	4	F	6
2566A/B	2	4	4	4	4	6
2565A	2	4	4	4	4	6
2564B	2	4	4	4	F	6
2563A	2	4	4	4	F	6
2608S	0	2	2	4	0	6,14
2608A	0	2	3	4	0	9
2611A/2613A/2617A/ 2619A	0	2	4	4	0	-
Maximum Line Printers	2	4	4	8	8	-
Page Printers:						
2680A	2	2	2	2	4	6
2688A	2	2(3)	2(3)	4(5)	4	6,16
Maximum Page Printers	2	2(3)	2(3)	4(5)	4	16
Max Line + Page Printers	2	4	6	10	12	-

HP 3000 Supported Peripherals (Cont.)

Maximum Peripheral Configurations

(See Chapter 1 text for subtotal maximums)

(F = Future support planned, ? = Undetermined, 0 = Not supported)

Devices	37/37XE	39/42 42XP	48/58	68/70 1/2 Bay	930	Notes
Serial Printers:						15
2686A RS-232/422	1	2(1)	2(1)	5	10	20
2686A Modem	0	0	0	0	0	-
2934A RS-232/422	3	8	8	16	32	15
2934A Modem	3	8	8	16	32	15
2933A RS-232/422	3	8	8	16	F	15
2933A Modem	3	8	8	16	F	15
2932A RS-232/422	3	8	8	16	F	15
2932A Modem	3	8	8	16	F	15
2564B RS-232/422	0	3(1)	3(1)	6	F	15
2564B Modem	0	0	0	0	0	-
2563A RS-232/422	0	3(1)	3(1)	6	F	15,20
2563A Modem	0	0	0	0	0	-
2687A RS-232/422	1	2(1)	2(1)	4	F	15,20
2687A Modem	0	0	0	0	0	-
2631B RS-232/422	0	8	8	16	0	15
2631B Modem	0	8	8	16	0	15
2603A RS-232/422	3	8	8	16	F	-
2603A Modem	3	8	8	16	F	-
2602A RS-232/422	3	8	8	16	?	-
2602A Modem	3	8	8	16	?	-
2601A RS-232/422	3	8	8	16	?	-
2601A Modem	3	8	8	16	?	-
Max Serial Printers	3	8	8	16	32	-

HP 3000 Supported Peripherals (Cont.)

Maximum Peripheral Configurations

(See Chapter 1 text for subtotal maximums)

(F = Future support planned, ? = Undetermined, 0 = Not supported)

Devices	37/37XE	39/42 42XP	48/58	68/70 1/2 Bay	930	Notes
Other Devices:						
37203A HP-IB Extender	0	4	4	4	F	21
9895A-010 Flexible Disc Drive	1	1	1	1	0	-
30106A Card Reader	0	1	1	1	0	7
26075A Multiple System Access Selector	0	1	1	1	0	19

HP 3000 Supported Peripherals (Cont.)

Notes:

1. Maximum of six devices per high-speed GIC; this may be any mix of high- and low-speed devices (assuming no other restrictions). The number of devices may be limited further by cable lengths, loads and performance.
2. Only two high-speed GICs are allowed per IMB on the Series 6x. To achieve the system maximum of six high-speed GICs, the system must be configured with two I/O Bays, three IMBs, and MPE-V/E or later.
3. Up to five GICs per IMB on the Series 6x.
4. Maximum of six devices per high- or low-speed PIC. The number of devices may be further limited by cable lengths, loads and performance.
5. Maximum of six devices per HP-IB channel. All HP-IB channels may have high-speed devices attached. The number of devices may be further limited by cable length limitations, device loads, and performance considerations.
6. High-speed GIC or PIC only.
7. Requires a dedicated GIC.
8. The minimum main memory requirement for use of the 7976A is as follows:

1 drive	512 Kb
2 drives	768 Kb
9. Cannot share a GIC with high-speed devices.
10. Up to 16 INPs will function at 19.2K bps (2400 CPS); only 10 will run at 56K bps (7000 CPS) on the Series 68 with one I/O bay. On a two-bay Series 68 with MPE-V/E (or later), 24 INPs will function at 19.2K bps, and 15 INPs will run at 56K bps.
11. The Integrated Tape Cartridge is only supported as the primary backup device on the Series 39/40/42 for systems with less than 130 Mb of disc storage.
12. The 9144A is only supported as the primary backup device on the Series 37/37XE/39/40/42 for systems with less than 220 Mb of disc storage.
13. On the Series 68, the third IMB requires the auxiliary I/O Bay and MPE-V/E or later.
14. Must be on a high-speed GIC, but cannot be on the same GIC as a 7906 or 792x disc.
15. These maximums are NOT additive; use of some printers, such as the 2687A, may impact usage of other printers on the Series 37. See the Output Spooling heading in the Series 37, 39/42, 48, and 68 sections of this chapter. Serial-connected printers cannot be used as system printers.

HP 3000 Supported Peripherals (Cont.)

Notes:

16. Number of devices in parentheses indicates support on HP-IB Extenders. Printer is considered a low-speed device when configured via Extenders.
17. The 9144A is supported as a coldload device on Series 37/37XE and on Series 39/40/42 with CPS-E microcode installed. It is not supported as coldload device on Series 44/48/64/68/930.
18. On Series 68, cannot be placed on same GIC as system disc or cold load device.
19. Only supported with 7976 or 2680. Cannot be placed on any GIC that has disc drives attached.
20. Limits reduced on ADCC RS-232 to amount shown in parentheses.
21. Other limits may reduce total, see HP-IB Extender section in this Appendix.
22. Integrated cartridge tape ("Linus") is not supported on the 900 Series.

MPE-V Maximum Terminal Configurations

(Note differences when using ATP Expansion Package.)

	37/37XE	39/42 42XP		48/58		68/70 1 I/O Bay		68/70 2 I/O Bays	
		No Exp. Pkg.	With Exp. Pkg.	No Exp. Pkg.	With Exp. Pkg.	MPE- V/E	MPE- V/P	MPE- V/E	MPE- V/P
Terminals Attached*									
Direct Connect	28	32	60	104	120	144	144	336	144
Modem Connect	4	31	44	60	88	84	84	168	143
Total Point-to-Point	28	32	60	104	120	144	144	336	144
Total Multipoint	--	55	55	95	95	335	151	335	151
Total Terminals Attached	28	56	92	152**	152	400	152	400	152
Sessions***									
Total Sessions Logged On									
MPE-V/P	N/A	92		110		--	110	--	110
MPE-V/E	28	92		152		400	N/A	400	N/A

MPE-XL Maximum Terminal Configurations

(Console does not count toward these maximums.)

	930				
Terminals Attached*					
Direct Connect	400				
Modem Connect	400				
Total Point-to-Point	400				
Total Terminals Attached	400				
Sessions***					
Total Sessions Logged On	400				

* This includes Serial Printers (2934A, 2686A, etc.)

** The maximum number of ADCC terminals on the Series 48 is 60. The maximum number of ATP direct-connect terminals on the Series 48 is 72.

*** The MPE-V session limits include all point-to-point, multipoint, system console and DS virtual terminals. The MPE-XL limits include all point-to-point and virtual terminals. Please consult with a HP Performance Specialist for the number of sessions that can be running a particular application.

Supported Workstations

(S = Supported, F = Future support planned, ? = Undetermined, 0 = No Support)

Devices	37/37XE	39-70	930	
Terminals				
2392A	S	S	S	
2393A	S	S	S	
2394A	S	S	F	
2397A	S	S	S	
2628A	S	S	F	
2627A	0	S	S*	
2626x	0	S	0	
2625A	S	S	F	
2624A	0	S	0	
2624B	S	S	S**	
2623A	S	S	F+	
2622A	0	S	S++	
2621A/B	0	S	0	
2382A	0	S	0	
264xx	0	S	0	
2635x	0	S	0	
2703A	0	S	0	
307xx	0	S	0	
3081x	0	S	0	
Personal Computers				
HP 150A	S	S	S	
HP 150B/Touchscreen	S	S	S	
HP 150 II/Touchscreen II	S	S	S	
Vectra	S	S	S	
Portable	0	0	0	
PortablePLUS	S	S	S	

* ROM date code 3487 or later

** ROM date code 3139 or later

+ ROM date code 3223 or later

++ ROM date code 3199 or later

Disc Support Matrix

(* indicates that restrictions apply, see notes for details)

Disc	LDEV1	System Disc	Private Volume (7)	Serial Disc (7)	Notes
7906M/S*	No	Yes	Yes*	Yes*	1,2,3
7920/7925M*	Yes	Yes	Yes	Yes	1,2
7920/7925S*	No	Yes	Yes	Yes	1,2
7911/7912*	Yes*	Yes	Yes	Yes	1,2,4
7914*	Yes	Yes	Yes	No	2,5
7945A*	Yes*	Yes*	No	No	2,6
7933H	Yes	Yes	Yes	Yes	
7935H	Yes	Yes	Yes	Yes	
7933XP	Yes	Yes	Yes	Yes	5
7935XP	Yes	Yes	Yes	Yes	5

1. Not supported on the Series 37/37XE.
2. Not supported on the Series 930.
3. Only the 10 Mb removable portion of the 7906 disc drive is supported as a private volume or serial disc.
4. 7911/7912 only supported as LDEV1 on the Series 39/40/42/44/48/58.
5. Future support planned for Series 930.
6. 7945A not supported as System Disc (LDEV1) on Series 64/68/70.
7. NOTE: For the 900 Series systems, there is no distinction between Private Volumes and System Volumes. Serial Discs are not supported on the Series 930.

Supported Consoles

STATUS	37/37XE	39 - 58	64 - 70	930	
current	2392A w/Opt. 304	239x*	45851A** TouchscrenII w/ 9123D disc drive	2392A w/Opt. 305	
no longer orderable		262x* 2382A* 264x* 2635B*	2647F w/Opt. 890 2642A w/Opt. 964		

* ADCC connection only

** For use on Series 6x: install DCU ROM date code of 2522 or later, install MPE V/P Delta 1 (or later) or MPE V/E (or later), and order Console Communication Program (p/n 32342-6082, supplied standard with new systems).

Supported Plotters

(S = Supported, F = Future support planned, ? = Undetermined, 0 = No Support)

Devices	37/37XE	39 - 70	930	Notes
Plotters				
7220A/C/S/T	-	S	0	
7221A/B/C/S/T	-	S	0	
7225A/B	-	S	0	
7240A	-	S	0	
7245A/B	-	S	0	
	-			
7440A	-	S	F	
7470A	-	S	?	
7475A	-	S	F	
7550A (1)	-	S	F	
	-			
7585A/B	-	S	?	
7586B (2)	-	S	?	
	-			
9872A/B/C/S/T	-	S	0	

- 1) HP Draw cannot utilize the replot feature of the 7550A
- 2) The 7586B only supports the 7585B features on the HP3000

Supported System Software

(S = Supported, F = Future Support Planned, ? = Undetermined, 0 = No Support)

	MPE V/R	MPE V	MPE XL CM	MPE XL NM
Information Storage				
KSAM	S	S	S	F
IMAGE	S	S	0	0
TurboIMAGE	0	S*	S	0
ALLBASE (IMAGE & SQL)	0	0	0	S
HPSQL/V	0	S	0	0
DBchange	0	S*	S	0
Profiler	0	S*	S	0
Integration & Transparency				
HP Access Central	0	S	F	0
Dictionary	S	S	S	0
System Dictionary	0	S	0	S
Application Development				
Toolset	S	S	0	S
Transact	S	S	S	F
VPlus	S	S	S	S
Reporting & Presentation				
Report	S	S	S	0
Business Report Writer	0	S*	F	F
Inform	S	S	S	F

* U-MIT or later

Supported Languages

(S = Supported, F = Future Support Planned, ? = Undetermined, 0 = No Support)

The 900 Series system have two types of compilers. Native Mode (NM) compilers emit NM object code. Compatibility Mode (CM) compilers produce MPE V object code.

	MPE V/R	MPE V	MPE XL CM	MPE XL NM
COBOL II	S	S	F*	S
COBOL	S	S	0*	0
HP Pascal	0	F	F	S
Pascal	S	S	F*	0
FORTRAN 77	0	S	F*	S
FORTRAN 66	S	S	F*	0
Business Basic	0	S	S	F
Basic	S	S	F*	0
RPG	S	S	S	F
HP C	0	0	0	F
SPL	0	S	S	0
C/3000 (3rd Party)	0	S	F	0

* Run time support of object code at initial release.

Supported Database Access

(S = Supported, F = Future Support Planned, ? = Undetermined, 0 = No Support)

	KSAM	IMAGE MPE V	TurboIMAGE MPE V MPE XL CM		ALLBASE HPIMAGE HPSQL	HPSQL MPE V
Application Development						
Toolset	N/A	N/A	N/A	N/A	N/A	N/A
Transact	S	S	S	S	S*	?
VPlus Forms	N/A	N/A	N/A	N/A	N/A	N/A
FORTRAN 66	S	S	S	S	S*	0
FORTRAN 77	S	S	S	S	S	F
Basic	S	S	S	S	S*	0
HP Business Basic	S	S	S	S	S*	0
Pascal	S	S	S	S	S*	0
HP Pascal	-	-	F	F	S	S
COBOL	S	S	S	S	S*	0
COBOL II	S	S	S	S	S	S
SPL	S	S	S	S	S*	0
RPG	S	S	S	S	S*	0
HPC	0	0	0	0	F	F
Reporting & Presentation						
Report	S	S	S	S	S*	0
BRW	S	0**	S	F	F	F
Inform	S	S	S	S	S*	?
Integration & Transparency						
HP Access Central	0	S	S	F	F	?
Dictionary	S	S	S	S	0	0
System Dictionary	S	S	S	S	F	F

* Accessible through TurboWindow from program in Compatibility Mode

** Existing HPFA customers will receive support

Supported HP Applications

(S = Supported, F = Future support planned, ? = Undetermined, 0 = No Support)

Applications	37/37XE	39 - 70	930 CM	930 NM	
Manufacturing Systems					
Materials Mgmt/3000	S*	S	0	0**	
Production Mgmt/3000	S*	S	0	0**	
HP Maintenance Mgmt	S*	S	F	0	
HP Just-In-Time	S*	S	0	0**	
HP Production Cost Mgmt	S	S	0	0**	
HP Purchasing	0	S	0	0**	
HP Pay	S	S	0	0	
Financial Systems					
HP Financial Accounting	S*	S	F	F	
HP Financial Budgeting	F	F	F	F	
HP IF	S	S	F	F	
GA/3000	0	S	0	0	
Semiconductor Information Systems					
SPN Products	S+	S	0	0	
Distribution Systems					
HP SFD I	S	S	***	***	
HP SFD II	S	S	***	***	
OM/3000	S	S	***	***	
HP INVISION	S	S	***	***	

* 2 Mb system, maximum of 8 terminals

** Future combined product (MM III) will be supported on the 900 Series

*** Ownership transferred to a third party who will determine support

+ Limited support of some modules

Supported HP Applications

(S = Supported, F = Future support planned, ? = Undetermined, 0 = No Support)

Applications	37/37XE	39 - 70	930 CM	930 NM	
Office					
DSG/3000	S	S	F+	0	
HP Draw	S	S	0**	0**	
HP EasyChart	S	S	0**	0**	
HP Map/3000	S	S	0	0	
HP Menu	S	S	0	0	
HP Deskmanager	S	S	F	0	
HP Slate	S	S	0**	0**	
Deluxe VisiCalc/3000	S	S	0**	0**	
HP Word	S	S	0**	0**	
TDP/3000	S	S	S***	0	
HP Spell	S	S	0	0	
HP ListKeeper	S	S	0	0	
HP Telex	S	S	F	0	
Print Central/3000	S	S	F	0	
HP ACCESS Central	S	S	F	0	
Performance Tools & Services					
APS/3000	S	S	0	0	
OPT/3000	S	S	0*	0*	
System Measurement Tool	0	0	0	S	
HP TREND	S	S	0	0	
HP SNAPSHOT	S	S	S	S	
HP CAPPLAN	S	S	S	S	
Miscellaneous					
CIS/3000	0	S	0	0	
SIS/3000	0	S	0	0	
IDS/3000	0	S	S	0	
IFS/3000	S	S	S	0	

* Replaced by System Measurement Tool (SMT).

** Functionally replaced by PC software.

*** text editor only, no graphics integration

+ intrinsics only, for programmatic access

CONFIGURING THE HP-IB EXTENDER ON THE HP 3000

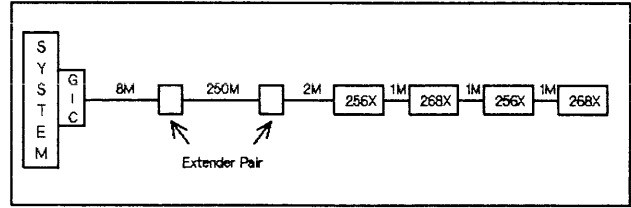
The 37203A HP-IB Extender with option 010 supports the 2563A, 2565A, 2566A, 2680A, and 2688A printers on the HP 3000 Series 4x and 6x. A pair of Extenders (i.e., two Extenders connected by coaxial cable) is required to connect these printers to a system. The HP-IB Extender increases the distance that a printer can be from the HP 3000 processor, making printed output more accessible to end users in an office, manufacturing, or a dedicated "printer room" environment.

Configuration Limits

With the exception of the 2688A, the maximum number of system printers supported per system remains the same when using the HP-IB Extender. (See the table below for system printer maximums.) The Series 4x can support three 2688As with the HP-IB Extender. The Series 6x can support up to five 2688As, three via the Extenders and two connected directly to a GIC.

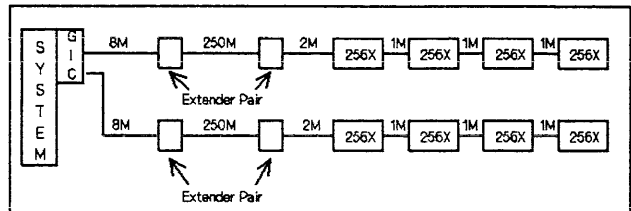
The following set of rules must be adhered to when using the Extender:

- HP-IB Extenders are supported on the HP 3000 4x and 6x systems only, using MPE V/E (G.A0.00) or later. (Option 010 Extenders sold before March 15, 1985, connecting 2688As running Q-Delta-2 (C.01.02) MIT or later are still supported.)
- A maximum of two GICs per system may have HP-IB Extenders connected to them and these GICs become low speed, dedicated (to one or two Extender pairs) channels.
- A maximum of four printers are supported on a pair of Extenders, with any combination of 2563As, 2565As, 2680As, and 2688As, EXCEPT that no more than two printers may be non-impact (2680A or 2688A).



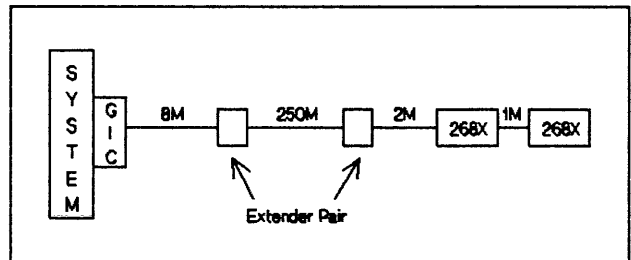
NOTE: A system with two GICs, each with one extender pair, follows the same rules. Do not exceed system printer maximums.

- Two sets of Extender pairs may be used on a single GIC, but only 256XA printers can be installed on either Extender pair.



NOTE: A system with two GICs, each with two extender pairs, follows the same rules. Do not exceed system printer maximums.

- When configuring the 268x printer with Extenders, one pair of Extenders is supported per GIC.



- Coax cable lengths of up to 250 meters are supported between an Extender pair.
- If multiple printers are connected to an Extender pair, a maximum of 1m HP-IB cable can be installed between printers. For complete details on HP-IB cable length and HP-IB device loading restrictions with Extenders, your CE should see Boise Division Service Notes on the HP-IB Extender.

Cabling and Ordering

The 37203A HP-IB Extenders must be ordered in pairs and option 010 is required for use on the HP 3000. (Option 010 insures that the Extender will correctly recover from power fail.)

The HP-IB cable connecting the GIC to the first Extender of the Extender pair may be up to 8m in length. (This supersedes the 2m restriction published in previous documents.) The cable shipped with the printer may be used here. A maximum of 250m of coaxial cable (92179G) connects this Extender to the second Extender. Two BNC male connectors, 92226A, should be ordered with the 92179G cable. Another shielded 2m HP-IB cable (10833B) connects this second Extender to the first printer. The HP-IB cable length between printers is restricted to 1m (10833A).

SYSTEM PRINTER MAXIMUM

<u>PRINTER</u>	<u>S4X</u>	<u>S6X</u>
2563A	4	4
2565A	4	4
2566A	4	4
2680A	2	2
2688A**	3*	5*

* With Extender.

** Note: Regular maximums for the 2688A are two on the S4x and four on the S6x; maximums are increased with Extenders.

Update

HP 3000 System Configuration Guide

TO: Commercial SR's, SE's, CE's

Enclosed is the second update to the HP3000 System Configuration Guide (p/n 5953-7573). This is a complete revision which includes the HP 3000 Series 37, several new peripherals, and some corrections and clarifications. Field inputs have been extremely valuable in the preparation of this update; please keep them coming!

The entire Guide has been updated for products introduced through July 1, 1985. You may also notice that some discontinued products are still mentioned in the text. This will benefit customers whose systems have been installed for a while and customers who are upgrading from earlier systems. Their hardware investment is protected since they will be able to identify which systems can support their older peripherals.

Several new products introduced on August 1 could not be incorporated in this document without significant delay. In order to get this update to you with the basic information you need, we have added insert sheets on the new HP 3000 Series 58, Series 42XP, and Series 68C. These pages may be inserted wherever you will easily find them. Their purpose is to show you the configuration differences of these new products. These products will also be included in the next update of the Electronic Configuration Worksheet, which is available through your Field Marketing Manager.

Due to overwhelming demand, this edition of the System Configuration Guide WILL be available for customer ordering. The entire book, including binder and tabs, may be ordered from Computer Supplies Operation (DMK) as p/n 5953-7573.

Your comments, both positive and negative, are always welcome since they help us support you better. When you have a spare moment, please fill out the enclosed feedback form and let us know how we're doing.

Thank you!

SERIES 42XP UPDATE

The information below is intended to explain the components of the Series 42XP upgrade product. Complete configuration information on the Series 42 is contained in Chapter One of the Configuration Guide. Ordering information on the Series 42XP can be found in the Series 58 Sales Training Manual.

PRODUCT NUMBER: 30550A

DESCRIPTION: Field Upgrade from Series 39, 40, 42 to Series 42XP

INCLUDES:

- * New CPU Boards with 32Kb Memory Cache
- * 2 Mb Memory (Utilizing One 2 Mb Memory Board)
- * Maximum Memory Increased to 6 Mb (from 3Mb on S/42)
- * New Memory Controller
- * Disc Caching

THINGS TO BE AWARE OF:

- * Only 1 Mb and 2 Mb memory boards are supported on the Series 42XP upgrade product. Return credits (30171AN and 30092AN) are available for the 256Kb and 512Kb memory modules. A maximum of four 256Kb boards may be returned when purchasing a Series 42XP Field Upgrade.
- * Disc Caching credit, for customers who have already purchased Disc Caching, is available by ordering option 042.
- * The Series 42XP requires MPE-V/E T-MIT or later version. The MPE-V/E Media Product (51540A with option 602) must be ordered with upgrades from non-MPE-V/E (T-MIT) systems.

SERIES 58 UPDATE

The information below is intended to explain only the differences between the Series 58 and the Series 48. Complete information on Series 48 configuration is contained in Chapter One of the Configuration Guide. Ordering information on the Series 58 can be found in the Series 58 Sales Training Manual. With the exception of the changes below, the Series 58 and Series 48 follow identical configuration guidelines.

PRODUCT NUMBER: 32558A/32558AH (HP 3000 Series 58/Series 58 Upgrade)

- INCLUDES:**
- * New CPU boards with 32Kb Memory Cache
 - * 4 Mb Memory Utilizing two 2 Mb boards (up from 2 Mb on S/48)
 - * Maximum Memory Increased to 8 Mb (from 4 Mb on S/48)
 - * New Memory Controller
 - * Disc Caching
-

PRODUCT NUMBER: 30558A (Series 44/48 to Series 58 Field Upgrade)

- INCLUDES:**
- * New CPU Boards with 32 Kb Memory Cache
 - * 2 Mb Memory (Utilizing One 2 Mb Memory Board)
 - * Maximum Memory Support Increased to 8 Mb (from 4 Mb on S/48)
 - * New Memory Controller
 - * Disc Caching
-

THINGS TO BE AWARE OF:

- * Only six memory boards can be installed in the card cage; therefore, the 8 Mb memory maximum requires either four 2 Mb boards or a combination of 1 Mb and at least two 2 Mb boards.
- * Only 1 Mb and 2 Mb memory boards are supported on the Series 58. Return credits (30171AN and 30092AN) are available for the 256Kb and 512Kb memory modules. A maximum of eight 256Kb boards may be returned when purchasing a Series 58.

- * All memory boards must be placed in the second card cage of the Series 58. Series 44/48 field upgrade customers with only a single card cage system need to purchase the 30087A I/O Expansion Kit.

- * A Disc Caching credit is available by ordering option 048 with the Series 58 Field Upgrade. This applies only to Series 48 systems which already have Disc Caching.

- * The Series 58 requires MPE-V/E T-MIT or later version. The MPE-V/E Media Product (51450A with option 603) must be ordered with upgrades from non-MPE-V/E (T-MIT) systems.

SERIES 68 UPDATE

Effective August 1, 1985, all orders for the HP 3000 Series 68 or Series 68 upgrade must be placed with Product Numbers 32468C/32468CH. This change reflects the increase of minimum memory on new Series 68s from 3 Mb to 4 Mb. The information below is intended to explain only the differences between the Series 68 and the Series 68C. Complete configuration information on the Series 68 is contained in Chapter One of the Configuration Guide, and additional ordering information on the Series 68C may be found in the Series 68C Sales Training Manual.

With the exception of the changes below, the Series 68C and the Series 68A/B follow the identical configuration guidelines.

PRODUCT NUMBER: 32468C/32468CH

DESCRIPTION: HP 3000 Series 68 and Series 68 Box Swap Upgrade

INCLUDES:

- * Series 68 SPU
- * 4 Mb Memory Standard (Instead of 3 Mb)
- * Memory Support Increased to 16 Mb (for all S/6x)

THINGS TO BE AWARE OF:

- * Both 1 Mb and 4 Mb memory boards are supported on all Series 6x systems up to a maximum of 16 Mb.
- * 4 Mb add-on memory is ordered as product 30165A.
- * Return credits (30142AN) are available on up to three 1 Mb memory boards when purchasing a new 4 Mb memory board (30165A).
- * 16 Mb memory support requires MPE-V/E U-MIT, or later, for all Series 6x.
- * The 4 Mb standard memory configuration will initially consist of four 1 Mb boards. This will change to one 4 Mb board in the U.S., effective 8/15/85.

Return to: Computer Systems Division
19111 Pruneridge Avenue
Cupertino, CA 95014

Attention: Product Marketing - 44MF

HP 3000 System Configuration Guide (7/85)

- 1. Do you like the current format? **yes** **no**

- 2. Do you prefer reading: a) single column text? _____
- b) double column text? _____

- 3. Would you like to see: a) more pictures and tables? _____
- b) fewer pictures and tables? _____
- c) leave as is? _____

- 4. Do you use the worksheets in the Configuration Guide? **yes** **no**

- 5. a) Do you use the Electronic Configuration Worksheets available
 on the HP 150? **yes** **no**

- b) If so, is the Electronic Configuration Worksheet a big time saver? **yes** **no**

- 6. What size guide do you prefer? a) current looseleaf? _____
- b) smaller bound version? _____
- c) other? _____

- 7. What would you like to see changed?
- _____
- _____
- _____

- 8. Are there any corrections (please indicate page number)?
- _____
- _____
- _____

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System Reference Guide Update

IBM 4381 Model Groups 11, 12, 13 and 14

New models broaden product line

In early February, IBM announced the Model Groups 11, 12, 13 and 14 to replace the 4381 Model Groups 1, 2 and 3. This announcement increased the high-end performance by 20 to 35% and lowered the entry level performance by around the same amount. At the same time, the price/performance of these systems was improved by 30%. Even with these 'fire sale' price cuts, the IBM 4381 models cost twice as much as comparably performing HP 3000s !

Enhanced Product Line

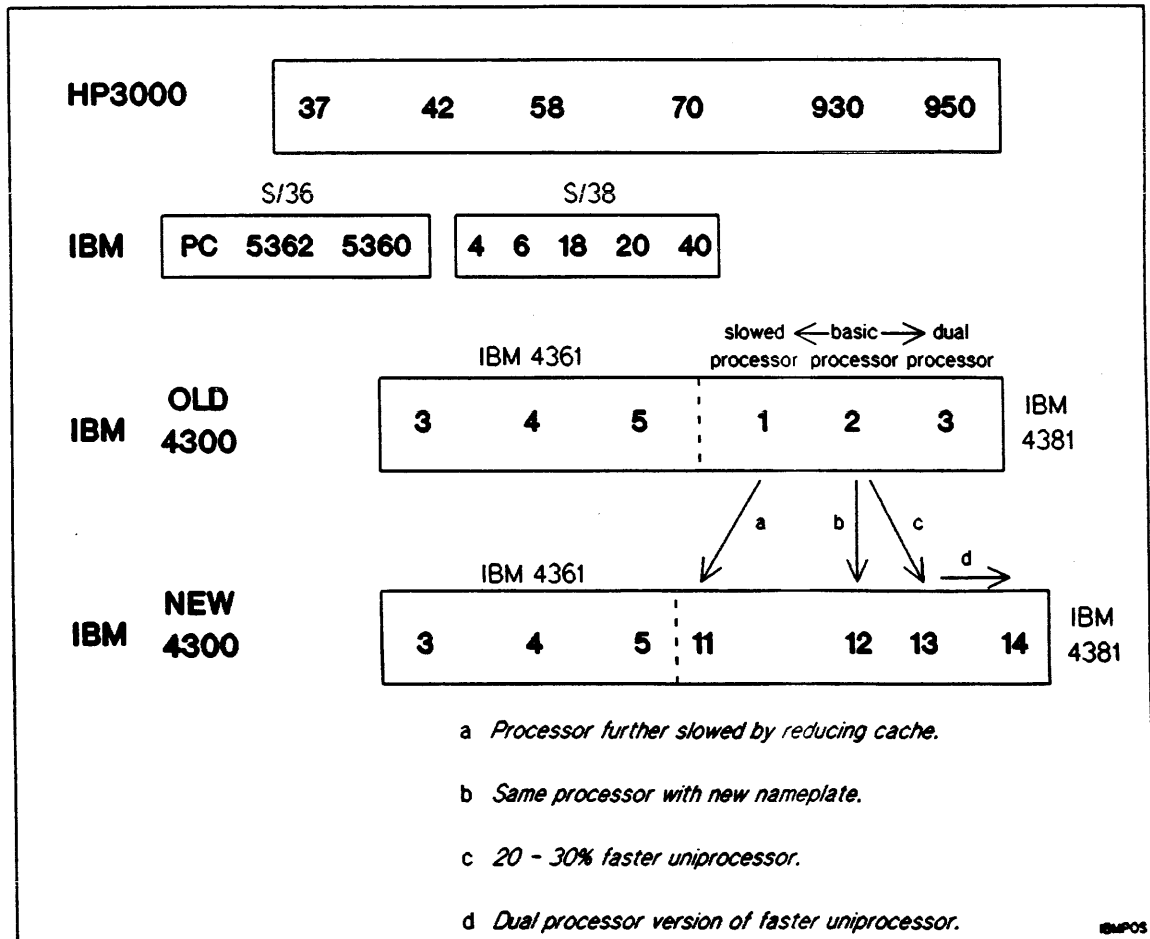
The changes to the 4381 product line have been shown below. While the previous 4381 product line was built around one basic processor, the

Model Group 2, the new line is built around two basic processors. The performance of these products range from the HP 3000 Series 70 to 20 - 35% above the HP 3000 Series 950.

The Model Group 11 now directly competes with the Series 70, whereas the IBM 4361 Model Group 5 is comparable to the Series 68.

The Model Group 12, like its alias the Model Group 2, offers performance comparable to the Series 930. The Series 950 is positioned between the Model Group 13 and 14.

The new HP 3000 products are extremely price competitive with the new IBM 4381 products as is shown in the diagram on the following page.



Lower prices attempt to position IBM 4381 as 'supermini'

Fire Sale price cuts

The magnitude of the price cuts on the product line is best exemplified by the price drop on the Model Group 2 (a.k.a. Model Group 12). In a configuration comparable to a preconfigured Series 930, the MG 2 was priced at \$630,000. A comparably configured MG 12 is now priced at \$450,000 - a price drop of \$180,000 or 29% ! Comparable price/performance improvements have been made across the product line.

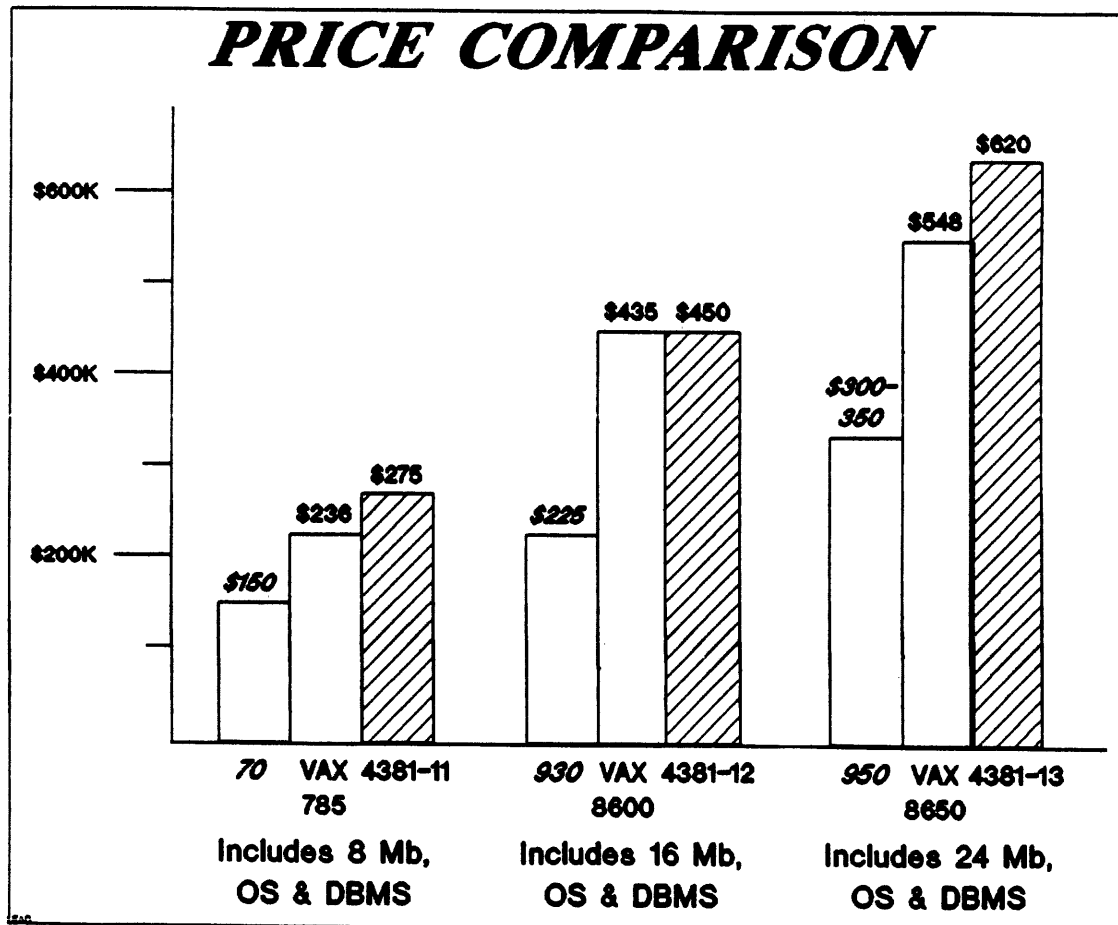
New positioning for an old product

Slow sales of their midrange products have led IBM to the realization that IBM is highly vulnerable in the market for Distributed Data Processing systems and Engineering/Scientific solutions. They are attempting to change the

image of the 4381 product line by describing the 4381 as a 'departmental processor' or as a 'supermini' and avoiding the low-end mainframe positioning. The price cuts are intended to bring pricing more in line with the minicomputer vendors - especially DEC.

The HP 3000 is still way ahead

Even with these price cuts and the revised positioning, the basic facts have not changed. The HP 3000 continues to offer far better price/performance, interactive transaction processing capabilities, compatibility and ease-of-use. Moreover, with HP Precision Architecture, MPE XL and ALLBASE, the HP 3000 offers a path to even better data processing solutions in the future.



System Reference Guide Update

Database Tools Package Restructuring

Package Being Expanded With New Features

Database Tools is a package of tools and utilities to aid the programmer and database administrator in the design, fine tuning, and maintenance of TurboIMAGE databases. The earlier release of this package consisted of one basic product with a set of utilities included; TurboIMAGE Profiler - a database design tool that provides performance and usage statistics to aid in optimal database design, along with the DICTDB utilities - tools for integrity checking of the database and capabilities for selective unloading and loading data sets.

Database Tools Now Combines DBchange & Profiler

The recent announcement of DBchange/V, an interactive utility that performs dynamic restructuring and capacity expansions of a TurboIMAGE database, provided an opportunity to enhance the Database Tools Package. The Database Tools Package is being restructured at a new price to include DBchange. Profiler is now also orderable as a separate product. Before this change, Profiler could only be ordered as part of the package. The DICTDB utilities are now more appropriately included with DBchange and not Profiler.

Product Ordering Structure

For current ordering requirements, the following guidelines should be used:

Part No.	Description	U.S. List Price	
36914A	TurboIMAGE Profiler/V Right-to-Use <i>(must be ordered with option)</i>	*A copy	*R Copy
36914R	TurboIMAGE Profiler/V Right-to-Copy		
Options:			
310	For HP3000 Series 37	\$ 1400	1000
315	Upgrade from Opt. 310 to 320	2100	1470
320	For HP3000 Series 39-70	3500	2450
420	For HP3000 Series 930 in CM	3500	2450
426	Upgrade from Opt. 320 to Opt. 420	NC	NC

Part No.	Description	U.S. List Price	
36020A	TurboIMAGE DBchange/V (plus DICTDB Utilities) Right-to-Use <i>(must be ordered with option)</i>	*A copy	*R Copy
36020R	TurboIMAGE DBchange/V Right-to-Copy		
Options:			
310	For HP3000 Series 37	\$ 2000	1400
315	Upgrade from Opt. 310 to 320	3000	2100
320	For HP3000 Series 39-70	5000	3500
420	For HP3000 Series 930 in CM	5000	3500
426	Upgrade from Opt. 320 to Opt. 420	NC	NC

The restructured Database Tools Package is available on the May 1986 Corporate Price List as follows:

Part No.	Description	U.S. List Price	
36913A	Database Tools Profiler, DBchange & DICTDB Utilities Right-to-Use <i>(must be ordered with option)</i>	*A copy	*R Copy
36913R	Database Tools Right-to-Copy		
Options:			
310	For HP3000 Series 37	\$ 2700	1900
315	Upgrade from Opt. 310 to 320	4100	2900
320	For HP3000 Series 39-70	6800	4800
420	For HP3000 Series 930 in CM	6800	4800
426	Upgrade from Opt. 320 to Opt. 420	NC	NC

System Reference Guide Update

Pascal Developer's Package Product Price Changes

Errors were made in the pricing of the Pascal Developer's Package. These errors are printed on page 50 of the System Sales Overview and were incorrectly entered on the March 1 CPL. The correct prices appear below and in the May Price Guide. They are also reflected in the May 1 CPL.

Prod #	Description	US List Price
31505A	Pascal Developer's Package	\$ 0
310	Pascal/V and Toolset/V for use on Series 37	3,200
315	Upgrade from Series 37 to Series III,30,33,39-70	4,800
320	Pascal/V and Toolset/V for use on Series III,30,33,39-70	8,000
426	Upgrade from Series III,30,33,39-70 to Series 930	3,200
430	Pascal/XL and Toolset/XL for use on Series 930	11,200
015	Upgrade (32106A opt 310) to (31505A opt 320)	6,400
026	Upgrade (32106A opt 320) to (31505A opt 430)	7,200

System Reference Guide Update

Hardware Upgrade Credit Prices

The following upgrade credit products were added to the April 1 CPL and are included in the May Price Guide.

Prod #	Description	Price
30173AN	Series 4x, 58 memory board upgrade credit - 2 Mb	-4000
30165AN	Series 6x, 70 memory board upgrade credit - 4 Mb	-12000
30143AN	InterModule Bus (IMB) upgrade credit	-2000
30464AN	Expansion Bay and InterModule Bus (IMB) upgrade credit	-6000
30144AN	System Interface Board (SIB) upgrade credit	-800
30145AN	Direct Connect Port Controller upgrade credit	-1650
30155AN	Modem Port Controller upgrade credit	-2050
30273AN	Direct Connect ATP Expansion Pack upgrade credit	-2500
30274AN	Modem ATP Expansion Pack upgrade credit	-2900
34299AN	Special 48 port ATP upgrade credit NOTE: This upgrade credit product can be ordered once. It can be ordered only when upgrading from a Series 6x or 70 to a Series 930.	-15000
30079AN	General I/O Channel (GIC) upgrade credit	-400

Customers taking advantage of the Series 930 Special Return Program will receive these hardware upgrade credits after the items have been physically returned. Please refer to the Series 930 Special Return Program section of the HP 3000 Promotions and Pricing Summary (March 1986) for ordering and billing instructions.

System Reference Guide Update

Series 6x, 70 Junction Panel Clarification

A junction panel is a panel of sheet metal attached to the side of a Series 6x SPU, Series 70 SPU, or the Expansion Bay. The panel provides a location to mount GIC, terminal, INP, or LAN connectors. The following chart shows what option to order with the Series 6x, 70 or Expansion Bay so that your customer receives a junction panel only when it is appropriate:

	<i>Ordering New Series 6X,70</i>	<i>Ordering Upgrade from Series 4X,58 to Series 6X,70</i>	<i>Ordering Upgrade from Series 6X to Series 6X,70</i>	<i>Ordering Expansion Bay*</i>
<i>with ATP Port Controllers</i>	Order ATP product option 001 once	Order ATP product option 001 once	No option required	Order ATP product option 003 once
<i>without ATP Port Controllers</i>	NA	Order Upgrade product option 251	No option required	Order Expansion Bay product option 251

** Either as an option to a system or as a stand alone product.*

The first two ordering examples from page 7 of the Series 70 Sales Guide and both ordering examples from page 13 of that same guide are in error. The examples include option 251 in an upgrade order from a Series 6x to a Series 70. The examples would be correct only if an Expansion Bay is also ordered AND an ATP Port Controller is not ordered.

Series 930

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HP 3000 SERIES 930 MINIMUM SYSTEM CONFIGURATION

Series 930 System Hardware

The SPU (product 32481A) includes:

- Central Processing Unit
- 16 Mb Error Correcting Memory with Controllers
- Dual I/O Busses
- Two HP-IB Channels: for HP-IB devices including System Disc and Backup Tape Drive
- One 802.3 LANIC card for communication with Distributed Terminal Controllers
- 6m AUI cable, MAU and tap for SPU attachment to ThickLAN cable; ThinMAU with integrated AUI cable for attachment to ThinLAN cable
- SPU Bay including Card Cages and Power Supplies for CPU, Cache, 2 CIB Adapters, 10 I/O Card Slots, and up to 24 Mb Main Memory
- I/O Bay with 1 Card Cage, Containing 9 I/O Card Slots
- System Clock
- Built-in Isolation Transformers for the System Processor
- Support Link II Modem
- 2 Console Attachment Boards, Cables and Synapse Box for console connection
- Hardware manual set

Required Software Ordered Separately

The Fundamental Operating System (FOS) software product (32650A) includes all the required software for an HP supported system.

- Multiprogramming Executive Operating System (MPE XL)
- MPE V/E U-MIT Compatibility Mode Software
- Text Editor (EDIT/V)
- File Copying Utility (FCOPY/XL)
- Sort and Merge Package (SORT-MERGE/XL)
- Network Model Database Mgmt System (TurboIMAGE/V)
- Database Inquiry Language (QUERY/V)
- Data Entry and Forms Management Software (VPLUS/V)
- Keyed Sequential Access Method Software (KSAM/V)
- Software manual set

Preconfigured System

For ordering convenience and economy, the Preconfigured System product (32480A) includes:

- Series 930 SPU (32481A)
- FOS software (32650A)
- Integrated Network and Relational Database Mgmt System (ALLBASE/XL, 36216A)
- System Dictionary/XL (32256A)

Required Hardware Ordered Separately

In addition to the SPU and FOS, the following items are required for an HP supported system.

- One System Console: HP 2392A Terminal with option 305 (EMP protect cable)
- One System Disc: 7933H or 7935H Disc Drive
- One Tape Drive for System Backup: 7978A/B or 7974A
- One Distributed Terminal Controller (product 2345A) with one Interface product (option 625, 803, or 805)
- 802.3 LAN Cabling: Thick or Thin (SPU includes both ThickLAN and ThinLAN MAUs and AUI cables. DTC includes ThickLAN MAU and AUI cable, ThinLAN connection may be substituted).

MPE Media Products

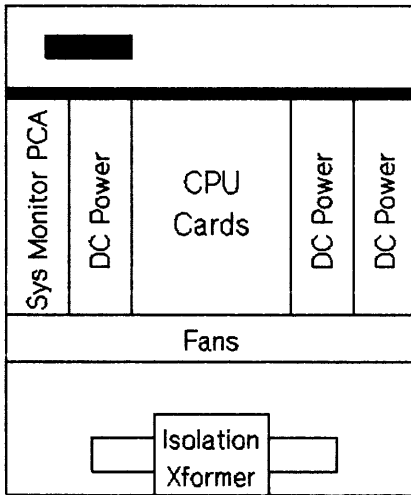
One MPE Media Product (51453A) MUST be ordered with every Series 930. One of options 630 and 730 is necessary. Option 630 designates the Preconfigured System, while option 730 designates the SPU alone. Option 051 specifies 1600 cpi media. One of options 200 or 201 must also be ordered to select the release of MPE XL to deliver. The operating system will then be shipped directly to the customer.

The customer and CE will need to work together on site preparation prior to the installation of the Series 930, as the room must be prepared for the environmental and power requirements of the 930 system.

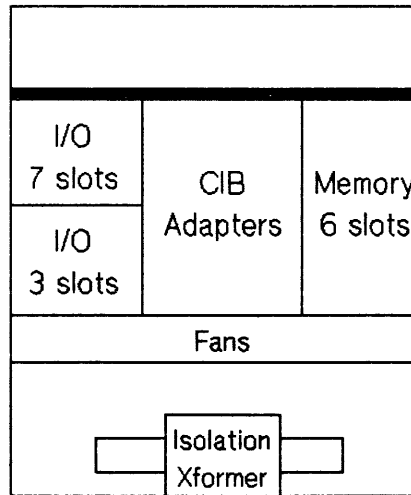
SERIES 930 PACKAGE

SPU BAY

Front View

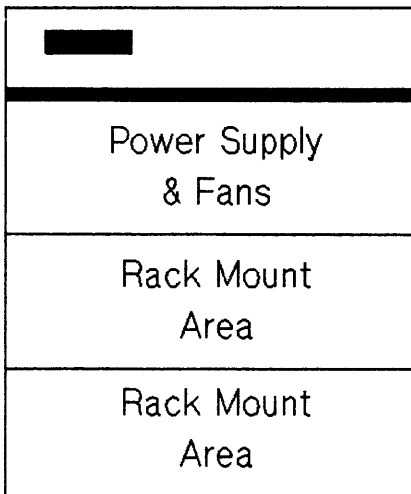


Rear View

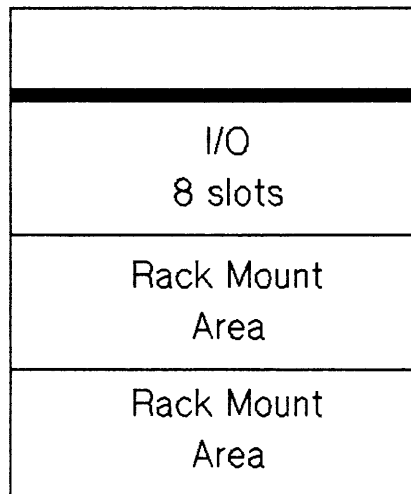


I/O BAY

Front View



Rear View



INDIPACK

HP 3000 SERIES 930 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

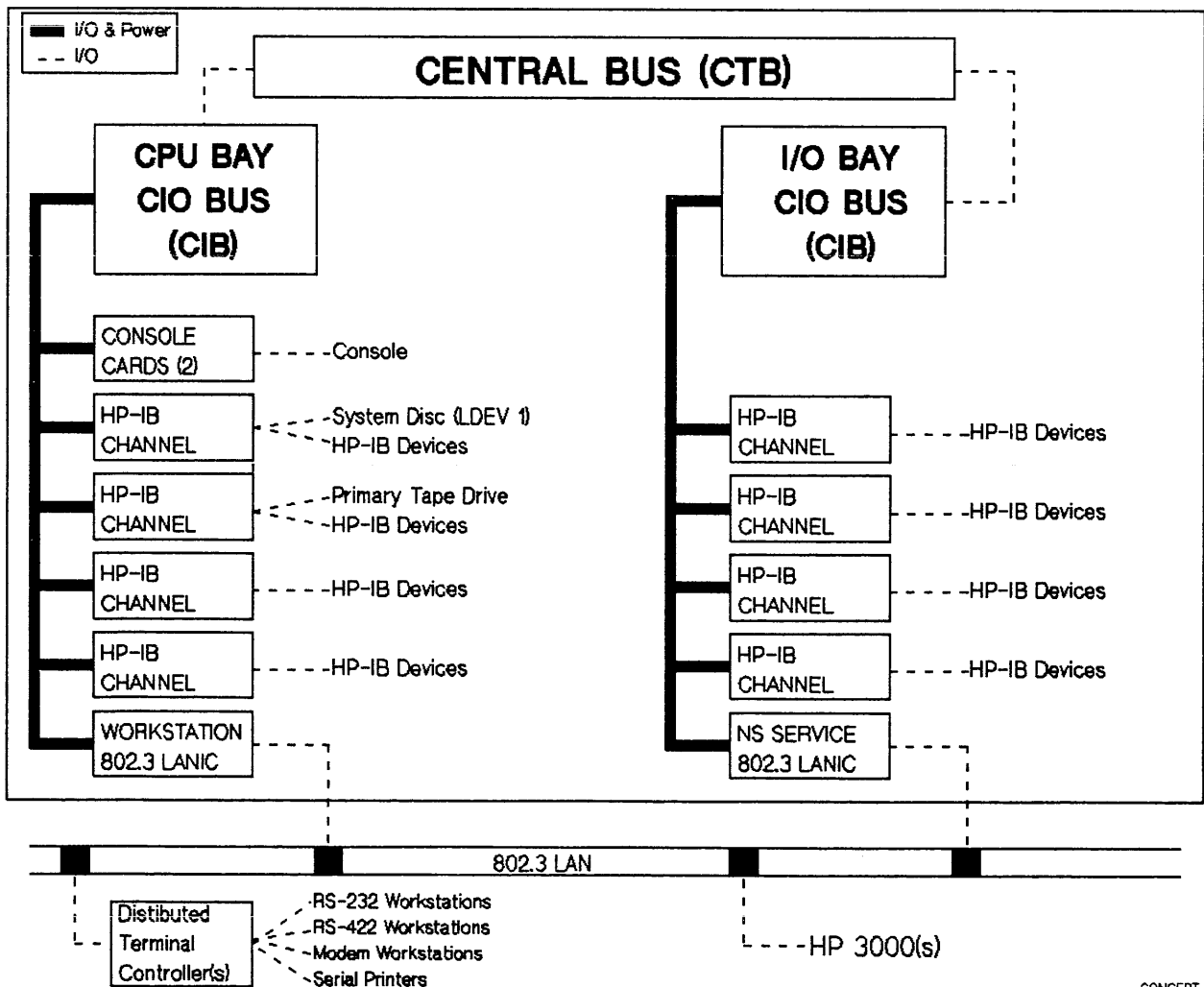
Memory Expansion

16 Mb of 256 Kb RAM error correcting memory are supplied with the System Processor Unit. System memory sizes of 16 Mb and 24 Mb are supported. An additional 8 Mb of main memory, consisting of a 2 board set with memory controller, may be purchased as a field upgrade (product 19748A). These memory boards are configured into the CPU memory slots and do not use I/O card slots.

Floating Point Coprocessor

The standard SPU is capable of handling floating point calculations by software emulation. A hardware floating point coprocessor is available to accelerate floating point operations. For those systems which use floating point, generally technical or scientific applications, a floating point coprocessor is recommended (19742A). This board is configured into a reserved CPU slot and does not use I/O card slots.

Conceptual Schematic: Series 930 I/O Configuration



CONCEPT

I/O

Channel I/O Bus

The Series 930 connects to peripheral devices and datacommunication networks via the Channel I/O Bus (CIB). Two CIBs are provided and are connected to the CPU via the CIB Adapters (CIB Adapters have reserved slots in the SPU, so they do not affect I/O slot configuration). The 10 I/O slots in the SPU Bay comprise one CIB. The I/O Bay contains one CIB with 9 I/O slots. *Note: There are additional slots in both the SPU Bay and I/O Bay CIBs which are not be used by MPE-XL systems. With current configuration limits, I/O slots are not a constraint.*

Slot Availability

Seven I/O cards are included with each system occupying seven I/O slots. Two CIB Adapters each connect to a CIB Attachment card on its Channel I/O Bus. Two boards are supplied on the SPU CIB for console attachment and system diagnostic support. One 802.3 LANIC board is included on the SPU CIB for workstation attachment. Two HP-IB Channel cards are supplied for peripheral attachment. This leaves 4 I/O slots in the SPU Bay and 8 I/O slots in the I/O Bay for additional HP-IB Channels (27113A) or LAN Links (36921A).

CIB Card Cage Rules

Each Card Cage must have a CIB Attachment card. This is placed in slot D of the CPU Bay CIB and in the first slot of the I/O Bay CIB (factory installed).

Console card #1 must be in slot C of the SPU Bay card cage (factory installed).

Console card #2 must be in slot 1 of the SPU Bay card cage (factory installed).

Factory installed HP-IB Channels are positioned for cold boot ability.

Factory installed 802.3 LANIC placement is shown but may be moved.

Maximum of four HP-IB Channels per CIB.

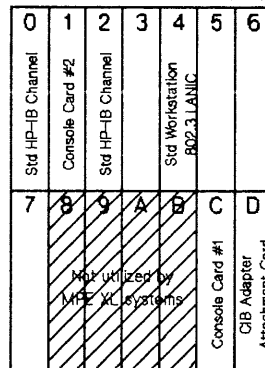
Maximum of two 802.3 LANIC boards per CIB.

Combined maximum of five HP-IB Channels and LANIC boards per CIB.

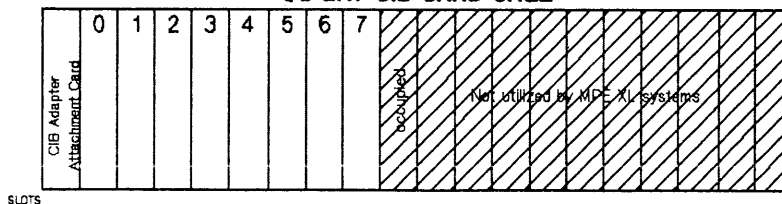
Slots 8 to B are not used in the SPU Bay CIB.

Only slots 0 to 7 are used in the I/O Bay CIB.

SPU BAY CIB CARD CAGE



I/O BAY CIB CARD CAGE



HP-IB Channels

Each system is supplied with two HP-IB Channels as standard equipment. The HP-IB Channel (27113A) is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the Series 930. Each HP-IB Channel is a board that uses one I/O card slot and 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 first device in the chain utilizes a special 2m HP-IB cable (included with the HP-IB Channel) to connect directly to the HP-IB Channel card. The number of peripherals which may be practically connected to a single HP-IB Channel depends on cable length restrictions and performance considerations.

Up to 4 HP-IB Channels are supported per CIB. In the maximum configuration, 8 HP-IB Channels are possible. As a rule of thumb, you should not exceed 3 HP-IB Channels per CIB without consulting a performance specialist. In general you should spread HP-IB Channels and LANICs as evenly as possible across CIBs.

High-speed peripherals may be attached to all HP-IB Channels. (Note that all devices supported on the 900 Series are high-speed.) Order product 27113A to obtain additional HP-IB Channels. See the Chapter One Appendix for details on supported peripherals and cabling requirements.

HP-IB Channel Restrictions

A maximum of 6 devices may be attached to an HP-IB Channel.

There is a maximum of 8 electrical device loads per HP-IB Channel.

It is not recommended that the same HP-IB Channel be used for connecting the main system backup tape drive and the system disc (LDEV 1). System performance may be degraded with such a configuration when the tape drive is in use.

802.3 LANIC Cards

Each system is supplied with one IEEE 802.3 LAN Interface Channel (LANIC) card dedicated to workstation communication. The Asynchronous Serial Communication (ASC) software included with FOS uses this card and the 802.3 LAN to communicate between the SPU and the Distributed Terminal Controller.

Each system is supplied with both ThickLAN and ThinLAN Medium Attachment Units (MAU), taps and Attachment Unit Interface (AUI) cables. The DTC is supplied standard with a ThickLAN MAU, tap and AUI cable; but ThinLAN connections may be substituted.

For system-to-system communication via NS3000/XL, a second LANIC card must be purchased. Each LAN Link includes both the LANIC card and low-level communication software that operate in conjunction with the NS service.

Each LANIC board uses one I/O card slot and connects to one LAN. A maximum of two LANIC boards per system is supported. These Links may utilize the same or two separate 802.3 LAN cables.

PERIPHERALS

Disc Drives

One 7933H (404 Mb) or 7935H (404 Mb) disc drive is required as the system disc drive (LDEV1) and must be ordered separately.

The following table lists the maximum number of each type of disc drive that can be configured on the Series 930.

Series 930 Maximum Disc Drive Configuration

	Maximum
7933H Discs	16
7935H Discs	16
Total Discs	24

Each 7933H and 7935H disc drive is shipped with a 1m HP-IB cable standard.

Disc performance may vary depending on the specific configuration of discs, HP-IB Channels and CIBs. Check with an HP performance specialist if you have performance concerns. As a rule of thumb, you may connect 3-4 disc drives per HP-IB Channel without significant performance degradation.

Magnetic Tape Drives

A 7978A/B or 7974A magnetic tape drive is required for system backup and distribution of software on each 900 Series system. This tape drive must be ordered separately.

The following table lists the maximum number of each type of tape drive that can be configured on the Series 930.

Series 930 Maximum Tape Drive Configuration

	Maximum
7974A	4
7978A/B	4
Total Tape Drives	8

The 7974A and 7978A/B are shipped with a 2m HP-IB cable standard. If desired, you may specify Option 800 to obtain the dual 800/1600 cpi capability on the 7974A.

System Printers

The following table lists the maximum number of each type of system printer that can be configured on the Series 930.

Series 930 Maximum Printer Configuration

	Maximum
Line Printers	
2566A/B	8
2565A	8
Subtotal Line Printers	8
Intelligent Page Printers	
2680A	4
2688A	4
Subtotal Page Printers	4
Total System Printers	12

The 2565A and 2566A/B are dot matrix line printers that attach directly to an HP-IB cable system. Order the Option 393 to obtain the HP-IB interface and a 4m HP-IB cable.

On the 2680A order option 393 to obtain the Series 930 subsystem with 8m HP-IB cable. You may specify Option 099 with the 2680A to replace the 8m HP-IB cable with a 2m cable. For the 2688A order Option 393, which includes an 8m HP-IB cable.

Power Line Conditioners

In many areas AC power line disturbances can interfere with system operation, possibly causing data corruption or even system failures. "Dirty" lines from local utilities or noise generated by electrical equipment on customer premises can cause these problems. Please consult with your site preparation CE concerning any such power line conditioner needs you may have. Your CE will have a list of recommended power line conditioners that may be purchased from local third parties.

Data Communications

Workstation Connection

Point-to-point workstation (terminals, personal computers and serial printers) connections are made to the Series 930 through the Distributed Terminal Controller (DTC, p/n 2345A) which connects to the SPU via the 802.3 LAN. The DTC supports local RS-232-C & RS-422 connections and remote RS-232-C modem connections. The Series 930 supports a maximum of 400 ports. Although 400 sessions may be simultaneously logged on to a Series 930, performance considerations may limit the number of active sessions. The number of active sessions that are practical is dependent upon the application mix and response time/throughput requirements. Please consult with an HP performance specialist to determine the number of sessions that can be concurrently active with a particular application.

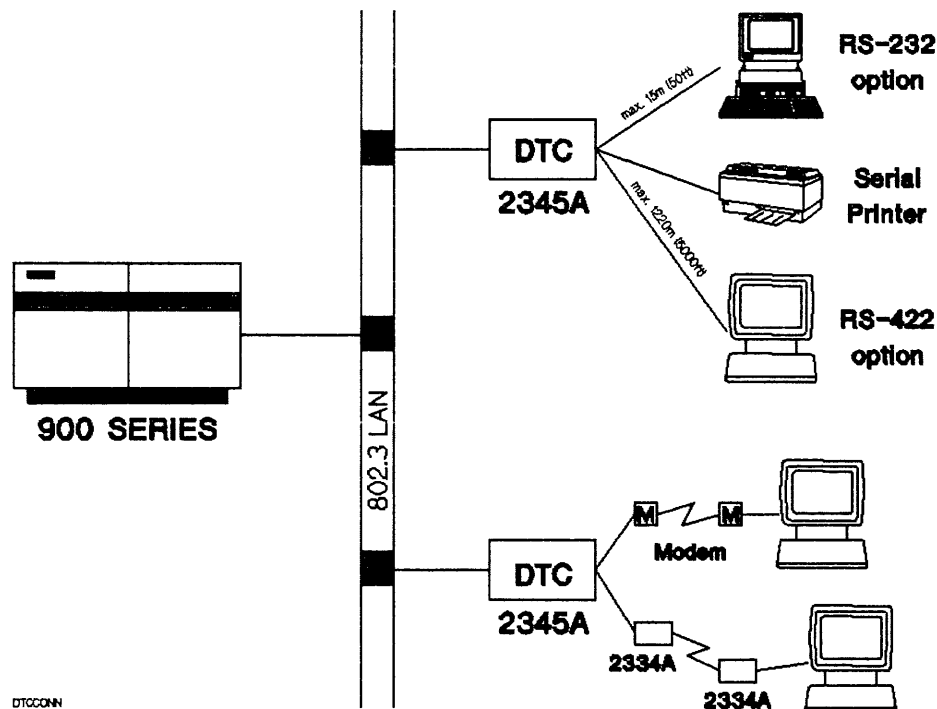
Distributed Terminal Controller

The Distributed Terminal Subsystem consists of three components. Two components reside on the 900 Series SPU; the Asynchronous Serial Communications (ASC) software and the workstation LANIC card. The third component of the subsystem is the Distributed Terminal Controller (DTC) which attaches to the 802.3 LAN.

Each DTC has six slots which can each accommodate one workstation interface product (2 board set).

The interface products available are:

- * 8 local RS-232-C ports
- * 8 local RS-422 ports
- * 6 remote RS-232-C modem ports



The minimum required Distributed Terminal subsystem for the 900 Series consists of the ASC software, one workstation LANIC card, one DTC with one interface option (RS-232-C, RS-422, or modem) and the 802.3 LAN cable (Thick or Thin) between the SPU and the DTC.

The maximum configuration consists of one terminal LAN channel, 16 DTCs, and 400 workstations (terminals, PCs and serial printers) attached to the DTCs. Each DTC can support up to 48 local ports (RS-232-C or RS-422) or 36 remote ports (RS-232-C modem). Local and remote interface products can be mixed in any combination resulting in port counts per DTC between 36 and 48. The Series 930 is delivered standard with the ASC software, workstation LANIC, and connection hardware for both Thick and Thin 802.3 LAN. For the ThickLAN, this connection hardware includes Media Access Unit (MAU), tap and 6m Attachment Unit Interface (AUI) cable. A ThinMAU with integral 1m AUI cable is provided for ThinLAN connection.

Each DTC also comes standard with a ThickLAN MAU, tap and 6m AUI for connection to the LAN (ThinLAN connections may be substituted). 802.3 10Base5 (Thick) or 10Base2 (Thin) LAN cable must be ordered separately if not already installed. For further cabling detail see Chapter 4.

System Console

One hardwired point-to-point 2392A terminal must be ordered as the system console. To connect this terminal, Option 305 (EMP Protect 40242Y cable) must be ordered.

The console connects to the Synapse Box (provided with the system). It has no direct connection to the Distributed Terminal Controller. The two console attachment boards and their respective cables (provided with the system) also connect to the Synapse Box. These connections are made at the factory. For further detail on the console connection refer to the following Support Link II modem section and the cabling diagram in Chapter 4.

Console printing is accomplished via a terminal attached serial printer.

Support Link Modem

Under the HP Remote Support Program, all non-upgrade system orders will be shipped with a free HP Support Link Modem. Upgrade customers should keep their present modem. This modem connects to the Synapse Box. When not being used for support purposes, the modem is available for customer use.

The single connection described above allows HP personnel to log on to the system as a remote console and perform system level diagnostic and/or corrective services. Support of certain HP applications (utilizing screen modes other than VIEW) requires an additional connection in order for the remote console to simulate a user workstation. There are two alternatives. 1) Connect the Synapse Box to a nearby DTC via the 50 ft RS-232 modem cable included with the system. 2) Customers may purchase a second modem for attachment to any DTC. HP personnel would log on to this second modem for application support.

Output Spooling

To avoid having a terminal or batch process tied up as a real time printer server, and to allow multiple processes access to a printer, MPE can "spool" output to a print file or "spool file". When output is spooled, the SPU is not delayed by a low-speed output device; instead, the output is written to a temporary disc file. When the print job has been spooled and the output device becomes available, MPE manages the printing. This leaves the terminal or batch job free to do other work.

Spooled Output Devices

There are several types of spooled output devices. This section discusses only printers. Note that any I/O device configured as a printer will be spooled; however, MPE will not necessarily support the full feature set of that device. Note: "Hot" printing under direct programmatic control is not supported.

A) System Printers

System printers are printers that guarantee data integrity, ensure print job independence, and report operational status to the system. System printers include the following HP-IB printers: 2565/66 line printers; and 2680A and 2688A page printers. These printers connect to an HP-IB Channel.

B) Serial Printers

The 900 Series supports spooled serial printers through the DTC. They connect to a DTC port either via a hardwired RS-232/422 cable or via a modem. This is known as "local" or "remote" spooling respectively. Not all serial printers are supported via modem, see the text for details.

1) 2934A Printers. These printers have an RS-232-C interface supplied standard. RS-422 is also available. Both hardwire and modem connection is supported.

2) 2686A Printer. These printers have an RS-232-C interface supplied standard. RS-422 is also supported. Modem connection is not supported.

Series 930 Maximum Spooled Device Configuration

	Maximum
System Printers	
Line Printers (HP-IB)	
2565A	8
2566A/B	8
Total Line Printers	8
Page Printers	
2680A	4
2688A	4
Total Page Printers	4
Total System Printers	12
Serial Connected Printers	
2934A	32
2686A	10
Total Serial Printers	32

The spooled device support numbers stated in the table above are based on performance considerations.

Series 930 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

I. System Processor Unit.

32480A	Series 930 Preconfigured System (32481A for SPU only and 32650A for FOS)	1A _____
19742A	Floating Point Coprocessor	1B _____
51453A	MPE-XL Media Product	1C _____
Opt 630	Series 930 Preconfigured System (Opt 730 for SPU only)	
Opt 051	1600 cpi Magnetic Tape Media	
Opt 200	Latest release of MPE XL (Opt 201 for release 1.0)	

II. Memory Expansion.

	Total Memory Size (Standard memory is 16 Mb, MAX=24)	2A _____
19748A	Series 930 Main Memory - 8 Mb (16 Mb to 24 Mb field upgrade)	2B _____

III. Disc Drives.

7933H	404 Mb Disc Drive (MAX=16) (1m HP-IB cable included)	3A _____
7935H	404 Mb Removable Media Disc Drive (MAX=16) (1m HP-IB cable included).	3B _____
	Total Disc Drives (Sum of lines 3x, MAX=24)	3 _____

IV. Magnetic Tape Drives.

7974A	1600 cpi (800/1600 cpi optional) Magnetic Tape Subsystem (MAX=4) (2m HP-IB cable included)	4A _____
7978A/B	6250/1600 cpi Magnetic Tape Subsystem (MAX=4) (2m HP-IB cable included)	4B _____
	Total Magnetic Tape Drives (Sum of lines 4x, MAX=8)	4 _____

Series 930 Configuration Worksheet

Product Number	Description	Quantity
V. System Printers.		
2565A Opt 393	600 lpm Dot Matrix Printer (MAX=8) (4m HP-IB cable included)	5A _____
2566A/B Opt 393	900 lpm Dot Matrix Printer (MAX=8) (4m HP-IB cable included)	5B _____
	Total Line Printers (Sum of lines 5x, MAX=8)	5 _____
2680A Opt 393	Intelligent Page Printer (MAX=4) (8m HP-IB cable included with Option 393)	6A _____
2688A Opt 393	Page Printer (MAX=4) (8m HP-IB cable included with Option 393)	6B _____
	Total Page Printers (Sum of lines 6x, MAX=4)	6 _____
	Total System Printers (Sum of lines 5 and 6, MAX=12)	7 _____

VI. Serial Printers.

2934A	200 cps Dot Matrix Printer (MAX=32) (Order cable separately)	8A _____
2686A	8 ppm Laser Page Printer (MAX=10) (Order cable separately)	8B _____
	Total Serial Printers (Sum of lines 8x, MAX=32)	8 _____

VII. System Console

2392A Opt 305	Block Mode Terminal (MAX=1)(cable supplied with option 305)	9 _____
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Series 930 Configuration Worksheet

VIII. Data Communications.

A. Workstations and Serial Printers (Enter quantities in lines below):

	Connection Method				
	Distributed Terminal Controller				
Product		Modem	RS-422	RS-232-C	Terminal Attached
Display Terminals 2392A 2393A 2397A 2622A 2624B 2627A		_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____	N/A N/A N/A N/A N/A N/A
Personal Office computers Touchscreen/HP150 Vectra PortablePLUS		_____ _____ _____	_____ _____ N/A	_____ _____ _____	N/A N/A N/A
Serial Printers** 2934A 2686A		_____ N/A	_____ _____	_____ _____	_____ _____
Totals		10 _____	11 _____	12 _____	13 _____

Line 10: MAX=400
 Line 11: MAX=400
 Line 12: MAX=400
 Sum of lines 10, 11, 12: MAX=400

Line 13: MAX=400

** Note device maximums in Section VI of worksheet.

Series 930 Configuration Worksheet

Product Number	Description	Quantity
B. 802.3 LANIC Cards:		
36921A	Optional LAN Links (MAX=1) (One LANIC card is included standard for workstation and serial printer attachment, optional LANIC card is required for NS3000/XL datacomm)	14 _____

IX. I/O Expansion.

A. Distributed Terminal Controllers and Interface Products

Because the DTCs may be distributed on a site, a configuration may require more DTCs than would be needed if they were centralized. This occurs because a DTC might only be partially filled by the needs of the particular location and the excess capacity may not be conveniently utilized by a second location. To account for this, it is suggested that this section be completed for each location at which one or more DTCs will be placed. Add the results to determine the total number of DTCs and interface products. This form has lines for four locations (A to D), up to sixteen DTCs are supported.

1. Determine the number of modem connections desired and the appropriate number of modem interface products to order. Interface products can be ordered either as an option to the DTC (Opt 625) or separately for add-ons (p/n 2346C).

Opt 625 or 2346C	6 modem ports, RS-232-C. (line 10 divided by "6" and rounded up to next integer)(External cables for devices ordered separately)	15A _____
		15B _____
		15C _____
	Total - Sum of lines 15x	15D _____
		15 _____

2. Determine the number of modem ports that are not used for modem connections and can be used for RS-232-C local direct connections. Since the modem ports must be ordered in groups of six, you may have up to five available for this purpose.

	Unused Modem ports [{"6" times line 15} minus line 10]	16A _____
		16B _____
		16C _____
	Total - Sum of lines 16x	16D _____
		16 _____

Series 930 Configuration Worksheet

Product Number	Description	Quantity
	3. Determine the number of local RS-232 and RS-422 interface products to order. Interface products can be ordered as an option to the DTC (Opt 803 for RS-232-C or Opt 805 for RS-422) or separately for add-ons (p/n 2346A or 2346B).	
Opt 803 or 2346A	8 RS-232 ports. [(line 12 minus line 16) divided by "8" and rounded up to next integer]	17A _____ 17B _____ 17C _____ 17D _____
	Total - Sum of lines 17x	17 _____
Opt 805 or 2346B	8 RS-422 ports (Line 11 divided by "8" and rounded up to next integer)	18A _____ 18B _____ 18C _____ 18D _____
	Total - Sum of lines 18x	18 _____
	4. Determine the number of Distributed Terminal Controllers required.	
	# of slots - 1st location (15A + 16A + 17A + 18A)	19A _____
	- 2nd location (15B + 16B + 17B + 18B)	19B _____
	- 3rd location (15C + 16C + 17C + 18C)	19C _____
	- 4th location (15D + 16D + 17D + 18D)	19D _____
2345A	Distributed Terminal Controllers	
	Location A (Line 19A divided by "6" and rounded up)	20A _____
	Location B (Line 19B divided by "6" and rounded up)	20B _____
	Location C (Line 19C divided by "6" and rounded up)	20C _____
	Location D (Line 19D divided by "6" and rounded up)	20D _____
	Total DTCs (Sum of lines 20x) (MAX=16)	20 _____

B. HP-IB Channels

To determine the number of HP-IB channels required on the system, refer to the text and to the Appendix. You must take into consideration the maximum number of devices per HP-IB channel, maximum number of HP-IB devices per CIB, electrical device loads, cable lengths, and system performance.

27113A	Optional HP-IB Channels (MAX=6) Two HP-IB Channels are shipped standard. The special HP-IB cable for connecting the card to the first device is included. External HP-IB cables are usually supplied with devices.	21 _____
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LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the most recent version of each page in the manual. To verify that your manual contains the most current information, check the dates printed at the bottom of each page with those listed below. The date on the bottom of each page reflects the edition or subsequent update in which that page was printed.

Effective Pages	Date
iii/iv	Mar. 1986
vii/x	Feb. 1986
1-71,73/75,77/78,80/83,85/101	Mar. 1986
1-102/115	Feb. 1986
Appendix 1-1/7,9/25	Feb. 1986
Appendix 1-8	Mar. 1986
2-1,2,4,6/7,9/14,22.	Feb. 1986
4-4,10,11,13,16,17,22,28.1/30.1	Feb. 1986
6-1/10.	Feb. 1986
7-1/2.1	Feb. 1986
Else	July 1985

Series 70

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HP 3000 SERIES 70 MINIMUM SYSTEM CONFIGURATION

Supplied Hardware

- Central Processing Unit
- System Clock
- Diagnostic Control Unit (DCU)
- Two General I/O Channels (GICs): for System Disc and Backup Tape Drive (These GICs are not included with box swap system upgrade orders.)
- Eight (8) Megabytes Fault Control Memory with Controller
- 128 Kb Cache Memory
- System Mainframe Cabinet including Card Cage and Power Supplies for CPU, Cache, I/O Adapter, up to 8 Mb Main Memory, and Writeable Control Store
- Standard I/O Bay with Card Cage, includes 24 I/O Card Slots
- 60 Kb of Writeable Control Store (WCS)
- Built-in Isolation Transformers for the System Processor
- Support Link Modem
- A 2m HP-IB Cable to Increase Disc Cabling Flexibility

Required Hardware Ordered Separately

- One System Console: HP 45851A Touchscreen II with 9123D Disc Drive.
- One System Console Cable (See Chapter 4.)
- One System Disc: 7914P, 7914CT, 7914TD, 7914ST, 7920M, 7925M, 7933H, 7935H, 7933XP or 7935XP Master Disc Drive.
- One Advanced Terminal Processor (One System Interface Board *and* One Port Controller) to interface the system console.
- One Magnetic Tape Drive for System Backup: 7914TD, 7914ST, 7970E, 7971A, 7974A, or 7978A/B.

Supplied Software

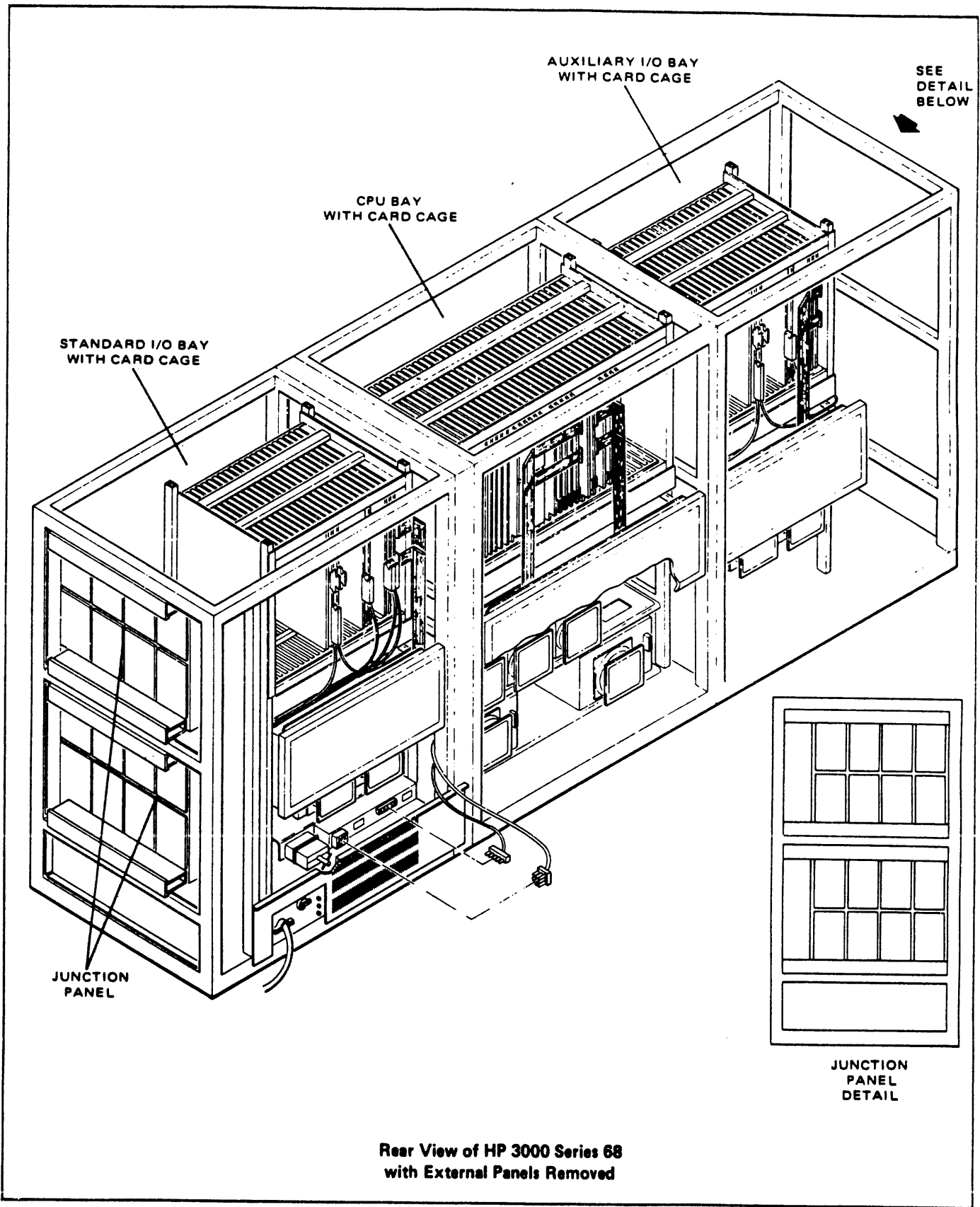
Standard on each HP 3000 system is the Fundamental Operating Software which includes:

- Multiprogramming Executive (MPE) Operating System
- Text Editor (EDIT/V)
- File Copying Utility (FCOPY/V)
- Sort and Merge Package (SORT-MERGE/V)
- Data Base Mgmt. System (TurboIMAGE/V)
- Data Base Inquiry Language (QUERY/V)
- Data Entry and Forms Management Software (HP VPLUS/V)
- Keyed Sequential Access Method Software (KSAM/V)
- A complete User Manual Set and Diagnostic Set is supplied. (For a Manual listing, please see the Chapter on Manuals.)

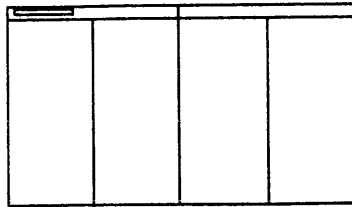
All of the Fundamental Operating Software is included in the system, but must still be ordered separately. Please see the section on MPE Media Products.

The Series 68/7x includes Disc Caching, an I/O performance product, which is not a part of the Fundamental Operating Software. Also included is the Series 6x/7x Console Communications Program, which enables the Touchscreen II to function as the system console. This software is contained on a 3.5 inch diskette which is supplied with the system.

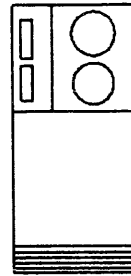
The customer and CE will need to work together on site preparation prior to the installation of the system, as the room must be prepared for the environmental and power requirements.



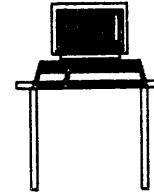
HP 3000 Series 70 Minimum System Configuration Example



HP 3000
Series 70
with Standard I/O Bay



7914ST
Tape and Disc
Drive Combination



Touchscreen II
System Console

HP 3000 SERIES 70 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

MPE V

The Series 70 runs MPE V/E UA-MIT as its standard operating system.

MPE Media Products

One MPE Media Product **MUST** be ordered with every Series 70 system. The MPE Media Product is 50154 (MPE V/E). Option 604 must be ordered to designate the Series 70; Option 280 must be ordered to specify UA-MIT; Option 051 should be ordered to specify 1600 cpi media. The operating system will then be shipped directly to the customer on 1600 cpi magnetic tape.

Note, Series 6x systems may select previous MITS; however, only U-MIT or later supports TurboIMAGE.

Memory Expansion

Two four megabyte modules using 256 Kb RAM fault-control memory are supplied with the System Processor Unit. System memory sizes of 2 - 16 Mb are supported in 1 Mb increments, with any mix of 1 Mb and 4 Mb boards. *Note that the small memory configurations result from Series 6x upgrades; to achieve full performance Series 7x systems should be configured with a minimum of 8 Mb.* (For S/6x systems expansion beyond 8 Mb requires MPE V/E U-MIT or later).

Additional memory may be added by ordering product 30142A (1 Mb memory expansion module) or 30165A (4Mb memory expansion module). With initial orders option 500 may be ordered to receive a discount on an additional 4 Mb board.

Memory boards are configured into the CPU card cage and do not use I/O bay card cage slots. A maximum of 8 memory boards may be placed in the CPU card cage, thus configurations above 8 Mb must contain some 4 Mb boards. Any 4 Mb boards must precede 1 Mb boards in the CPU card cage memory slots.

I/O Bay Card Cages

Ordering

The Series 70 (product 32471A for new orders or product 32471AH for box swap upgrades) comes standard with one I/O bay including card cage. To order the optional second or "Auxiliary" I/O bay including card cage with the initial system order, please specify Option 250 on the SPU.

For a Series 6x/7x installed with only the standard I/O bay, the optional auxiliary I/O bay can be added later by ordering either product 30464A or 30464B. Check with your CE if there is any question as to which product to order. The "A" or "B" designation relates to the type of power supplies used. You will encounter an "A" system only when the system was a Series 64 and has been field upgraded to a Series 68/70. Note, however, that not all upgrades from the Series 64 have the "A" power supplies. "B" type Series 64s were first shipped in April, 1983.

Slot Availability

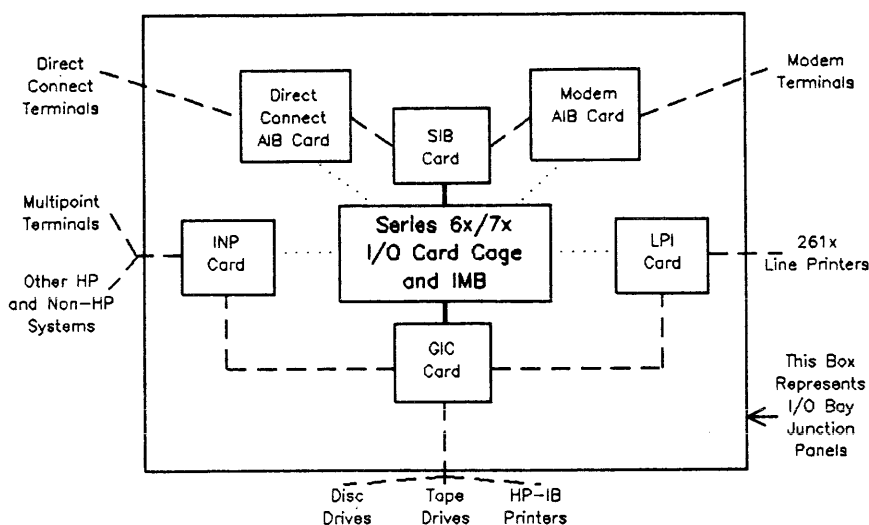
With the standard I/O bay card cage the SPU has a total of 24 I/O card slots; with the auxiliary I/O bay card cage, the total number of I/O slots increases to 48. These card slots are available to supply power to the following cards/boards:

- Intermodule Bus (IMB) interface cards (30143A)
- ATP/System Interface Boards (SIBs) (30144A)
- ATP/Direct Connect or Modem Port Controllers (30145A and 30155A, respectively)
- General I/O Channel (GIC) cards (30079A)

- Network Link/Intelligent Network Processor (INP) cards (formerly product 30020B)
- Local Area Network Interface Controller (LANIC) cards (included in 30242A)
- 261x Line Printer Interface (LPI) cards (26069A, which are included with the 261x printer product)

Five card cage slots in the standard I/O card cage will be filled by one IMB interface card (in slot 24), and two GICs, (all three of which are standard on the system) and by one SIB and one AIB (both of which must be ordered separately). When the two I/O bay configuration is ordered, these five cards are configured in the first I/O bay card cage, and one additional IMB interface card is configured in slot 24 of the second I/O bay card cage.

Conceptual Schematic of Series 6x/7x I/O Configuration



Legend:

I/O and Device Power ———
 I/O Only - - - - -
 Device Power Only ·····

The Intermodule Bus (IMB)

IMBs allow GICs, SIBs, and the LANIC in the I/O bay card cage to communicate with the CPU and Memory Modules in the CPU card cage. INPs, AIBs, and 261X LPIs do not communicate directly with an IMB system. Through internal, inter-board cabling, INPs and 261X LPIs connect to GICs. In a similar manner, AIBs connect to SIBs.

Each Series 6x/7x I/O bay card cage requires at least one IMB to communicate with modules in the CPU card cage. These IMBs consist of an IMB interface card, a data path or bus embedded in the backplane, two cards configured in the CPU card cage (a central system bus interface card and an I/O buffer board), and two cables.

An IMB is supplied standard with each I/O bay ordered, and its interface card must be configured in slot 24 of each card cage. One additional IMB can be ordered as a separate product. This single, optional IMB can be installed as a second IMB on either one of the I/O bay card cages. (This IMB is known as the "I/O Adapter Module", product 30143A.) This optional IMB may help improve

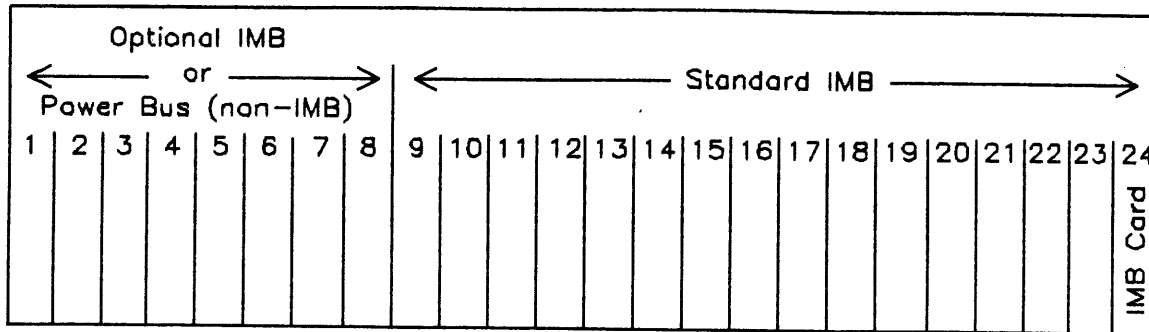
performance on large configuration systems and systems with heavy I/O usage. To determine whether your system would benefit from the optional IMB, please consult with an HP performance specialist.

A maximum of two IMBs are supported on a Series 6x/7x with one I/O bay. A maximum of three IMBs are supported on a Series 6x/7x with two I/O bays. *Any system with 3 IMBs must run MPE-V/E. A maximum of 2 IMBs are supported on a system running MPE-V/P regardless of whether it has one or two I/O bays.*

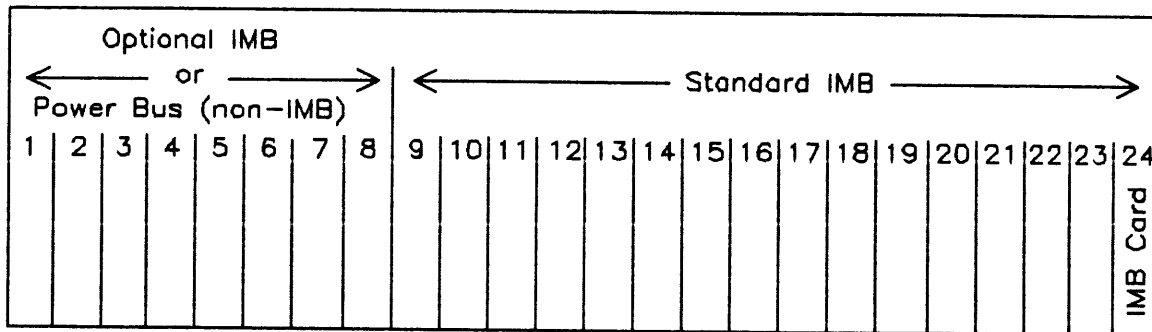
The optional IMB interface card must be configured in slot 8 of either I/O card cage for SIBs and GICs to be configured in slots 1 through 7. When there is no IMB interface card in slot 8, slots 1 through 8 act only as a power bus supplying power to AIB, INP, and 261X LPI cards.

Please photocopy this page and use it as an I/O bay card cage configuration worksheet:

Standard I/O Bay I/O Card Cage



Auxiliary I/O Bay I/O Card Cage



Please check to see that your configuration does not violate the following card cage rules. Except for the restrictions imposed by this set of rules, cards may be configured anywhere in the card cage.

I/O Bay Card Cage Rules

- IMB interface, GIC, SIB, AIB, INP, LANIC, and LPI cards each require one slot.
 - One IMB comes standard with each I/O card cage and must be placed in slot 24. One optional IMB can be configured in either (but not both) I/O card cage. This optional IMB must be placed in slot 8 in order for the GICs and SIBs to be configured in slots 1 to 7. When not configured with an IMB interface card, slots 1 through 8 simply supply power and support only AIBs, INPs, and 261x LPIs.
 - AIBs and their controlling SIB must be adjacent to one another.
 - INPs cannot be placed side-by-side in slots 1 and 2. The same is true of slots 9 and 10.
 - The LANIC card must be placed in the I/O portion of the card cage and be connected to the IMB.
- Remember to include the two standard GICs and the separately ordered SIB and AIB for the minimum system configuration.

Junction Panels

Junction panels are used in the connection of GIC, LANIC, INP, AIB, and LPI cards to peripherals, terminals, or other systems. The number of these devices permitted in a configuration may be restricted by the number of junction panel spaces available. Junction panels are found on the outside ends of each I/O bay and allow external cabling for terminals, peripherals and other systems to connect to internal system cabling.

Each I/O bay provides 48 junction mounting panels for a total of 96 junction mounting panels in the two I/O Bay Series 6x/7x configuration. On each bay the 48 mounting panels of the junction panel are separated into two sets of 24 mounting panels, one above the other.

Please photocopy this page and use it as a junction mounting panel worksheet.

Standard I/O Bay Junction Panel

Bottom Row Reserved *

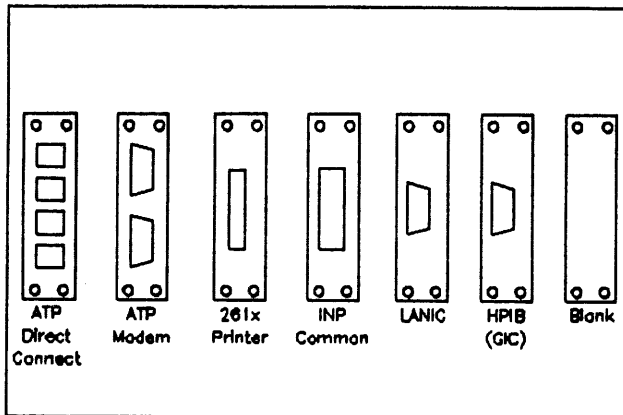
✱ GIC 1	✱ GIC 2	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱

Auxiliary I/O Bay Junction Panel

Junction Panel Rules

- There are 48 mounting panels per I/O bay junction panel.
- GIC, LANIC, INP, and LPI cards that are connected to external devices each require one mounting panel.
- Direct Connect ATP products each require 3 mounting panels that must be side-by-side. Each Direct Connect product supports up to 12 terminal ports or 4 terminal ports per mounting panel.
- Modem Port ATP products each require 6 mounting panels which must be side-by-side. Each Modem product supports up to 12 terminal ports or 2 terminal ports per mounting panel.
- Mounting panels can only be used to connect devices to GIC, LANIC, INP, AIB, and LPI cards that are in the same I/O card cage.
- *• The bottom 12 mounting panels on the standard I/O bay are reserved for connections to GICs, LANICs, INPs, and LPIs.

Junction Mounting Panel Types



LANIC

The Local Area Network Interface Controller (LANIC) is a hardware controller for interfacing to the Local Area Network (LAN). Each LANIC uses one I/O card slot and connects to one LAN. A maximum of one LANIC card per system is supported.

The LANIC connects directly to an Intermodule Bus (IMB) and is a high-speed channel. The other type of high-speed channel is a GIC with one or more high-speed devices attached.

A Series 6x/7x system supports up to three IMBs. *Each IMB can support a maximum of two high-speed channels.* This maximum can be either two high-speed GICs, or a high-speed GIC and a LANIC. A maximum system (three IMBs) can have either six high-speed GICs or five high-speed GICs and a LANIC.

General I/O Channels

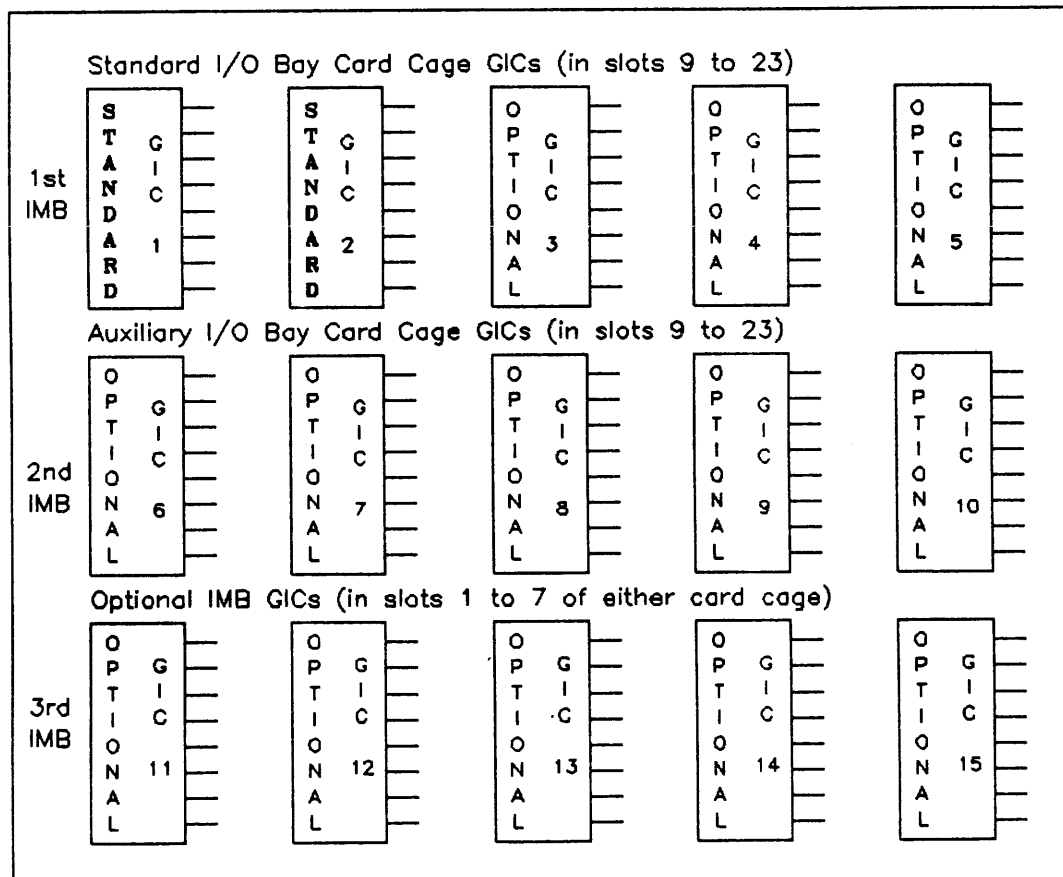
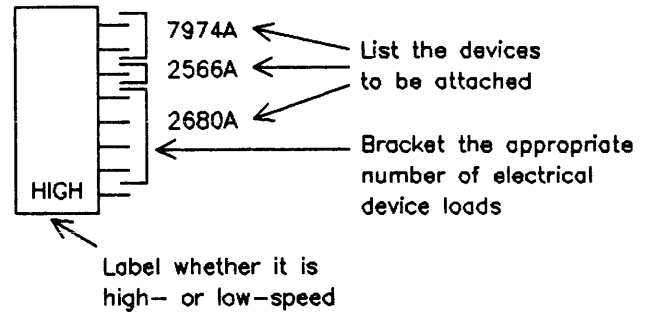
A General I/O Channel (GIC) is a hardware controller used to interface HP-IB (IEEE 488 protocol) peripherals to the Series 6x/7x. Each GIC is a board that uses one I/O bay card slot, supports one HP-IB cabling system, and uses one junction mounting panel when connected directly to external devices. An HP-IB system may be used to connect from one to eight HP-IB peripherals. Peripherals connected to one GIC are linked together with HP-IB cables and connect to a single mounting panel. The number of peripherals which may be connected to a single GIC depends on peripheral speed, cable length restrictions, and performance considerations.

Up to five GICs are supported on each IMB. Thus, in the maximum configuration with two I/O bays and three IMBs, a maximum of 15 GICs are supported. Order product 30079A to obtain a GIC. You must also specify Option 064 to obtain the internal GIC cable for the Series 6x/7x. See the Chapter One Appendix for details on supported peripherals and cabling requirements.

Summary: GIC Attachment Restrictions

- A maximum of six devices may be attached to a GIC with one or more high-speed devices attached.
- Unless other restrictions apply, low-speed peripherals can share a GIC with high-speed devices.
- Some low-speed devices require a dedicated GIC to which no other devices may be attached. (See the GIC Interface table in the Chapter One Appendix.)
- The 2608A line printer cannot be attached to a GIC with high-speed devices.
- The 2608S line printer can share a GIC with all high-speed devices except the 7906M, 7920M, and 7925M family of disc drives.
- It is not recommended that the same GIC be used for connecting the main system backup tape drive and the system disc (LDEV1). System performance may be degraded with such a configuration when the tape drive is in use.

How to Use the GIC Worksheet



PERIPHERALS

Disc Drives

One 7920M (50Mb), 7925M (120 Mb), 7914CT (132 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7914ST (132 Mb), 7933H/35H (404 Mb), or 7933XP/35XP (404 Mb) disc drive is required as the system disc (LDEV1) and must be ordered separately for the Series 6x/7x.

The following table lists the maximum number of each type of disc drive that can be configured on the Series 6x/7x with one or two I/O bays:

Series 6x/7x Maximum Disc Drive Configuration

	1 I/O Bay	2 I/O Bay
7911P/7912P/7914P/ 7914TD/7914ST Discs w/Cartridge Tape	1	1
Total 7911P/7912P	1	1
7914TD Discs	2	2
7914CT Discs	4	4
7914ST Discs	4	4
Total 7914TD/7914ST/ 7914P/7914CT Discs	8	8
7945A Discs	4	4
792x Master Discs	16	16
792x Slave Discs	14	14
7933H/35H Discs	16	24
7933XP/35XP Discs	16	24
Total Discs	16	24

The 7920M and 7925M are master disc drives and can each support up to seven slave disc drives. These slave drives are ordered as 7920S or 7925S

and do not have their own controllers. They connect to the controller in the master drive and are not part of the HP-IB cabling. The 7945A, 7911P, 7912P, 7914P, 7914TD, 7914CT, 7914ST, 7933H/35H, and 7933XP/35XP disc drives each have their own controllers.

With the 7920M and 7925M, Option 102 must be ordered to obtain the HP-IB interface and a 2m HP-IB cable. Each 7920S and 7925S comes standard with two non-HP-IB cables, a disc drive multiunit cable and a data cable. Both are used to connect to 7920M or 7925M master drives.

Each 7933H/35H and 7933XP/35XP disc drive is shipped with a 1m HP-IB cable standard. The 7945A is not supported as LDEV1 on the Series 6x/7x.

Disc performance may vary depending on the specific configuration of discs, controllers, GICs, and IMBs. Check with an HP performance specialist if you have performance concerns.

Integrated Storage Units

The 7911P, 7912P, and 7914P are integrated storage units that include both a Winchester disc drive and an integral Cartridge Tape unit standard. Only one 7911P or 7912P is supported on the Series 6x/7x; it must be ordered with the cartridge tape unit; and it cannot be configured as the system disc (LDEV1). A maximum of eight 7914Ps are supported. A 7914P hard disc drive can be configured as the system disc (LDEV1). Because only one cartridge tape unit is allowed on the system, additional 7914P units must be ordered with the cartridge tape delete Option 140 specified.

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a 1m HP-IB cable standard. If you order the cartridge tape unit on any of these integrated storage units, you must also order Option 001 which supplies a controller for the cartridge tape unit and a 1m HP-IB cable. *The cartridge tape unit requires its own dedicated GIC.*

The 7914TD and 7914ST combine into a single package a 7914 rackmounted disc drive, a 1/2" tape drive, and an optional cartridge tape unit (Option 002). The 7914TD includes a 7970E

master tape drive. The 7914ST includes a 7974A tape drive. A second 7914 disc drive can be added to the same cabinet by specifying Option 114. (Option 114 will automatically delete the cartridge tape unit for the additional disc drive.) The 7970E master tape drive will support up to three slave devices. The 7914TD and 7914ST are supplied with HP-IB cables standard -- one 2m cable for the disc drive, a 6m cable with the 7970E tape drive, or a 2m cable with the 7974A tape drive. When Option 002 is ordered, the cartridge tape drive, a controller, and a 1m HP-IB cable is shipped.

The 7914CT combines the 7914 disc drive with a 9144A cartridge tape unit which does not require a dedicated GIC or separate controller (do not confuse 7914CT with cartridge tape in 7914P disc drive). Two 1m HP-IB cables are shipped with the 7914CT. The 9144A cartridge tape unit is not supported as a cold load device on the Series 6x/7x. In addition, it cannot be placed on the same GIC as either the system disc or the cold load device.

Magnetic Tape Drives

A 7970E, 7914TD, 7971A, 7974A, 7914ST, 7976A, or 7978A/B magnetic tape drive is required for system backup and distribution of software for all Series 68s and must be ordered separately. Both the 7914TD and 7971A include a 7970E tape drive. The 7970E master tape drive can support up to three slave tape drives. The 7914ST includes a 7974A tape drive. The 7974A, 7976A and 7978A/B do not support slave drives; each drive has its own controller.

The following table lists the maximum number of each type of tape drive that can be configured on the Series 68 with one or two I/O bays. You may have one integrated cartridge tape drive (in 7911P, 7912P, or 7914P) in addition to these maximums.

Series 6x/7x Maximum Tape Drive Configuration:

	1 or 2 I/O Bays
9144A Cartridge Tape Drive	4
7970E/7971A/7914TD Masters	2
7970E/7971A Slaves	6
7974A/14ST Tape Drives	4
7976A Tape Drive	2
7978A/B Tape Drive	4
Total Tape Drives	8

The 7970E master tape drive comes with a 6m HP-IB cable standard. Each 7970E slave drive comes with a 6.1m (non-HP-IB) multiunit cable for tape drives.

The 7971A is a package of one or two 7970E tape drives in various master and/or slave drive configurations. Please see the HP 3000 Price Guide for the list of your options. Included with the options chosen are the appropriate cables.

The 7914TD includes a 7970E tape drive. The 7914ST includes a 7974A tape drive. For a description of the 7914TD and 7914ST configuration options see the paragraph in the Integrated Storage Unit section.

The 7974A, 7976A, and 7978A/B are shipped with a 2m HP-IB cable standard. Each 7976A must include Option 616 for the Series 68. The 7974A and 7978A/B do not require a system option. You may specify Option 800 to obtain the 800/1600 cpi capability on the 7974A.

The 9144A one-quarter inch cartridge tape drive is supported on the Series 68 but not as a cold load device. In addition, it cannot share a GIC with either the system disc or the cold load device.

Up to four 9144As are supported on the Series 6x/7x. The 9144A is shipped without a HP-IB cable; please see Chapter 4 for cabling information.

System Printers

The following table lists the maximum number of each type of system printer that can be configured on the Series 6x/7x with one or two I/O bays:

Series 6x/7x Maximum Printer Configuration:

	1 or 2 I/O Bays
Line Printers:	
2608A, 2608S,	4
256x	4
2611A/13A/17A/19A	4
Total Line Printers	8
Intelligent Page Printers:	
2680A	2
2688A	4(5)*
Total Page Printers	4(5)*
Total System Printers (Line Plus Page)	10

* HP-IB Extender support in parentheses.

The 261X family of line printers does not connect directly to a GIC; rather, each one uses a 1m HP-IB ribbon cable between the 26069A translator and the GIC card. The line printer itself can be up to 500 feet away. The printer is connected by a parallel differential current driven line to a separate junction mounting panel. An internal cable connects the interface card to the junction mounting panel.

To obtain the 26069A interface card, internal cables, and external 15m parallel differential cable, order Option 364. Cabling beyond 15m must be ordered as a special from Boise Division.

The 2608A, 2608S, and 256x are dot matrix line printers that attach directly to

GICs. They do not require an additional interface card in the I/O card cage, nor do they use an extra junction mounting panel space beyond the one used by the GIC. The standard 2608A includes an HP-IB interface and a 2m HP-IB cable. For the 2608S and 256x, order Option 364 to obtain the HP-IB interface and 4m HP-IB cable. Note that the 2608S cannot share a GIC with a 7920M or 7925M disc drive. Furthermore, the 2608A cannot be configured on a GIC with high-speed devices attached.

If the 2608S or 2563A is to be configured as a multipoint printer, it will be connected to an INP. Please see the Output Spooling section of this chapter.

Order Option 364 to obtain the Series 6x/7x subsystem with 8m HP-IB cable for the 2680A. Specify Option 099 with the 2680A to replace the 8m cable with a 2m cable. This option is not available on the 2688A. The 2680A and 2688A are similar to the 2608A/S in that they attach directly to a GIC and do not require an interface card in the I/O card cage.

The 2563A, 2564B, 2565A, 2566A/B, 2680A, and 2688A printers may be connected via HP-IB Extenders. See the HP-IB Extender Section in the Chapter One Appendix.

Other Peripherals

Flexible Disc Drive

Only one 1.2 Mb flexible disc drive is supported on the Series 6x/7x. Product 9895A must be ordered with Option 010 to specify a single master drive. The flexible disc drive attaches to a GIC. Order the HP-IB cable separately.

Card Reader

The 30106A 80-column card reader interfaces to the Series 6x/7x through a dedicated GIC. You must have either Option 333 or the 30309A upgrade kit to provide a 2m HP-IB cable. When a card reader is configured on the system, a power line conditioner is required. The 30106A and 30309A are no longer orderable. (They will be supported until December 31, 1989.)

Power Line Conditioners

In many areas AC power line disturbances can interfere with system operation, possibly causing data corruption or even system failures. "Dirty" lines from local utilities or noise generated by electrical equipment on customer premises can cause these problems. Please consult with your site preparation CE concerning any such power line conditioner needs you may have. Your CE will have a list of recommended power line conditioners that may be purchased through local third parties.

Multiple System Access Selector

The 26075A Multiple System Access Selector is a switch box that allows up to three HP 3000s to share either a 2680A or a 7976A. An operator can manually switch the peripheral to be active on any one of the sharing systems. A maximum of one (1) 26075A may be connected to a system. Other devices on the same GIC must be "downed" when switching the 26075A. Therefore, the 26075A cannot be on the same GIC as a disc drive. When determining HP-IB cable length, include 0.5 meter for the 26075A.

Data Communications

Terminal Connection

Point-to-point connections are made to the Series 6x/7x through the Advanced Terminal Processor (ATP). The ATP supports modem, RS-232, and RS-422 connections. Multipoint connections are made to the Series 68 through the MTS Modem Link or the MTS Data Link in combination with Multipoint Terminal Support Service Software. The Link products provide an INP board and related cables.

The following table summarizes the number of terminals supported:

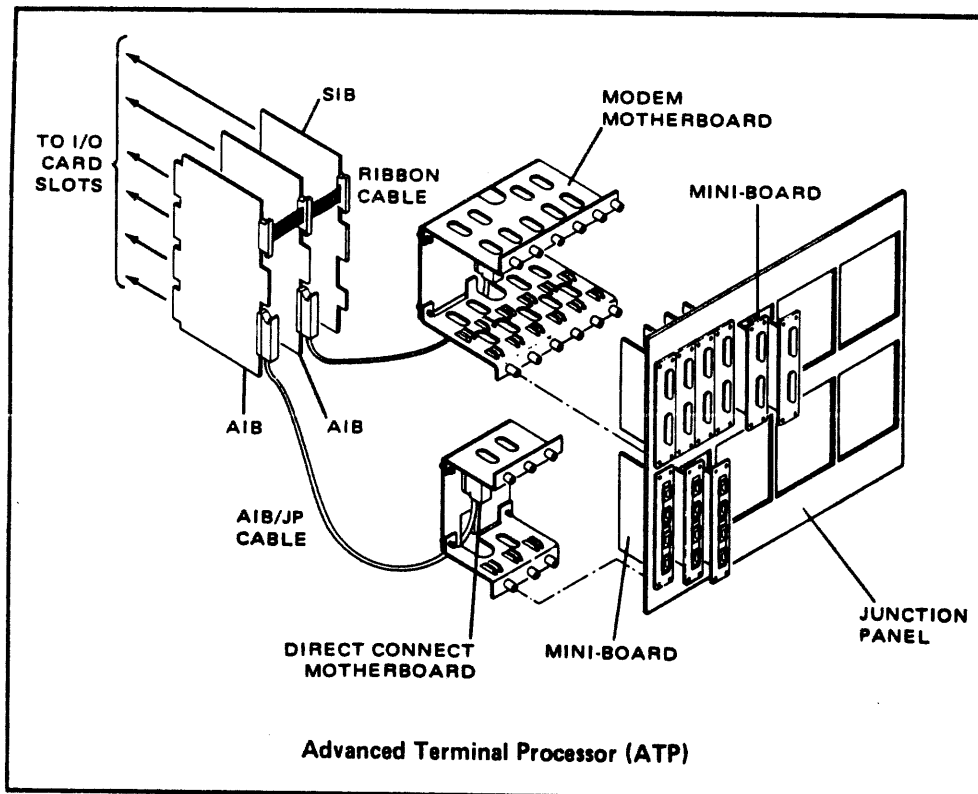
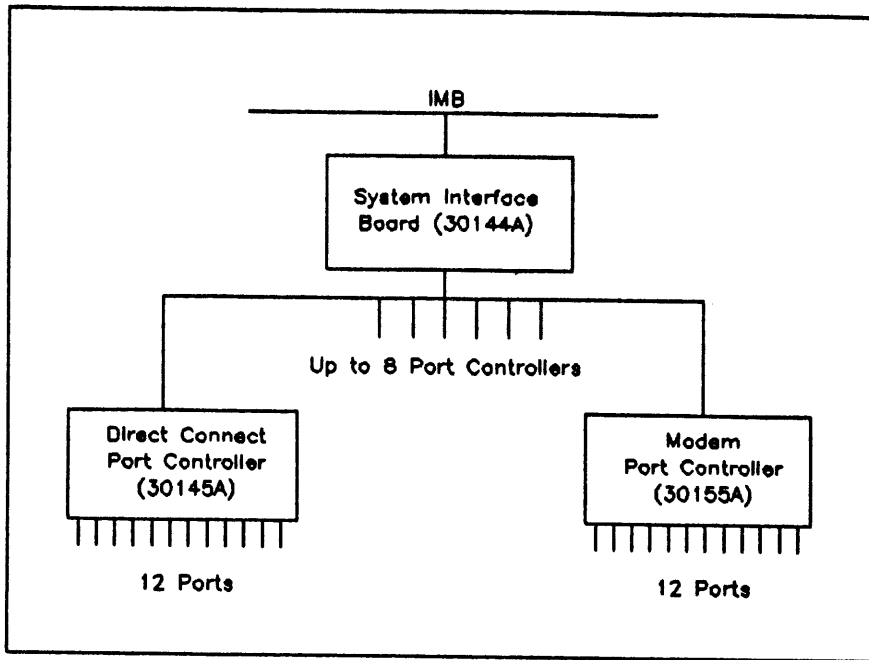
Series 6x/7x Maximum Terminal Configuration:

	1 I/O Bay		2 I/O Bay	
	MPE V/P	MPE V/E	MPE V/P	MPE V/E
Direct Connect	144	144	144	336
Modem	84	84	143	168
Total Pt-to-Pt	144	144	144	336
Multipoint	151	335	151	335
Total	152	400	152	400

When running MPE-V/P, a maximum of 110 terminals can be logged on the system. When running MPE V/E, 400 terminals can be logged on. While 400 terminals may be simultaneously logged on to a Series 6x/7x running MPE V/E, performance considerations may limit the number of simultaneous active sessions. The number of active sessions that can be supported is dependent on both the application and response time requirements. For many customer applications, 200 active sessions is a realistic maximum. This active session limit includes all point-to-point, multipoint, system console, and DS virtual terminals. Please consult with an HP performance specialist to determine the number of sessions that can be simultaneously active with a particular application.

The number of terminals per multipoint line is normally determined by response time considerations, but may be restricted by the specific cabling option chosen. You may also use the 2333A multipoint or 2334A X.25 cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 68 via the MTS Data Link or via modems and phone lines. The 2334A permits a group of up to 16 devices to communicate with the Series 68 via X.25 Packet Switched Networks.

ATP Subsystem Structure



System Console

One point-to-point connected 45851A Touchscreen II with 9123D disc drive must be ordered as the system console. In addition, one of the following cables must be ordered: 13242x (direct connect RS-232), 13242P (direct connect RS-422), 13242N (U.S. Modem), or 13242M (European Modem). For console printing, the 2934A (Option 046) dot-matrix printer or the 2225A Thinkjet printer are supported with the Touchscreen II, and must be connected via the HP-IB interface.

The Series 6x/7x Console Communications Program is also required. It is contained on a 3.5-inch diskette which is supplied with the system or may be obtained by ordering P/N 32342-60002.

Also supported as the system console are the 2647F with Option 890 and the 2642A with Option 964.

Advanced Terminal Processor (ATP)

As shown in the preceding figure, the ATP on the Series 6x/7x consists of three products: ATP System Interface Board (SIB), 30144A; ATP Direct Connect Port Controller, 30145A; and ATP Modem Port Controller, 30155A. Each Direct Connect or Modem Port Controller product includes both an Asynchronous Interface Board (AIB) (which occupies a slot in the I/O bay card cage) and the associated junction mounting panel motherboard and terminal port mini-boards. *The ATP Expansion Packages (30273A and 30274A) are NOT supported on the Series 6x/7x.*

The minimum required ATP subsystem on the Series 6x/7x consists of one SIB and one Port Controller Product. One modem ATP product is recommended to connect the Support Link Modem for remote diagnostics; however, it is not required. If a Modem Port Controller is not configured, the Support Link Modem will be connected to the DCU port. This connection method will cause system hardware status reports to be unavailable while the diagnostics are being run.

The minimum ATP configuration requires two I/O slots, supports up to 12 terminals, and uses three junction mounting panels for the direct connect product or six junction mounting panels for the

modem product. A maximum subsystem consists of one SIB and eight port controller products, supporting 96 terminals and consuming nine I/O slots. For the maximum direct connect terminal configuration in two I/O bays (336 terminals), three maximum ATP subsystems and one partial ATP subsystem are needed.

Each Direct Connect Port Controller supports RS-422 and RS-232 connections. This direct connect product comes standard with 12 RS-422 ports which can be converted to RS-232 ports in groups of four by ordering Option 002, (which replaces an RS-422 mini-board with an RS-232 mini-board). Thus, 0, 4, 8, or 12 RS-232 ports may be ordered on a single Direct Connect Port Controller by specifying the appropriate quantity of Option 002 (0, 1, 2, or 3).

When ordering a Series 6x/7x, it is important to note that it does NOT automatically come with junction panels. The junction panel is ordered at the time the ATP is ordered. This is done by ordering either Option 001 or 003 with product 30145A or 30155A. The difference between Option 001 and Option 003 is that Option 001 provides the junction panel for the standard I/O Bay and Option 003 provides the junction panel for the auxiliary I/O Bay (30464A/B or SPU Option 250).

To add the Auxiliary I/O Bay (30464A/B) and the ATP to a Series 6x/7x system that has already been installed, specify Option 003 with product 30145A or 30155A. If ordering the Auxiliary I/O Bay without an ATP, you must specify Option 251 on either product 30443A/B, 30444A/B, 30464A/B, 30468A/B, 32468C/CH or 32471A/AH to obtain the junction panels.

Support Link Modem

Under the HP Remote Support Program, all non-upgrade system orders will be shipped with a free HP Support Link Modem (35031A).

Output Spooling

To avoid having a terminal or batch process tied up as a real time printer server, and to allow multiple processes access to a printer, MPE can "spool" output to a print file or "spool file". When output is spooled, the SPU is not delayed by a

low-speed output device; instead, the output is written to a temporary disc file. When the print job has been spooled and the output device becomes available, MPE manages the printing. This leaves the terminal or batch process free to do other work.

Spooled Output Devices

There are several types of spooled output devices. This section discusses only printers. Note that any I/O device configured as a printer may be spooled; however, MPE will not necessarily support the full feature set of that printer.

A) SYSTEM PRINTERS

System printers are printers that guarantee data integrity, ensure print job independence, and report operational status to the system. System printers include the following HP-IB Printers: 256x, 261x type, 2608A, and 2608S line printers; and 2680A and 2688A page printers. These printers are connected to a GIC via HP-IB cabling.

B) MTS PRINTERS

MTS printers can be connected to the HP 3000 in one of three ways: (1) directly connected to the multipoint line using an MTS interface in the printer, (2) through a 2333A Multipoint Cluster Controller using a standard RS-232-C interface in the printer, or (3) to the second port of a 2624B terminal (connected directly to a multipoint line) using the Bypass Mode of the 2624B and a standard RS-232-C interface in the printer. Printers and terminals can be linked together to form a workstation network using either the MTS Data Link Connection or the MTS Synchronous Modem Link.

The 2563A, 2608S, 2933A and 2934A printers, with their respective multipoint interfaces, can all be attached directly to a multipoint line. Using the 2563A or the 2608S in this configuration provides a high-speed remote printing capability. A dedicated line of at least 9600 baud is recommended to achieve up to 300 lpm with the 2563A and a 19,200 baud line is recommended to achieve up to 400 lpm with the 2608S.

The 2333A Multipoint Cluster Controller provides local or remote control for up to 16 RS-232-C

point-to-point devices (or 32 model 3081A terminals connected to eight Port Current Loop Interface cards) when used in conjunction with either the MTS Data Link Connection or the MTS Synchronous Modem Link. The 2563A, 2601A/02A/31B, and the 2932A/33A/34A printers with RS-232-C interfaces are supported by the 2333A as XON-XOFF printers. As with direct connect multipoint printers, printers on a 2333A can either be spooled or under the control of an application program.

Another way in which printers are supported in an MTS environment is through connection to the second port of a 2624B terminal. This is an RS-232-C printer connection that allows the user to work at a terminal while other users can access the printer by taking advantage of the Bypass Mode feature of the 2624B. Both spooling and dedicated application usage are supported. Character printers (as opposed to line printers) are supported in this configuration.

The number of MTS printers should be limited to four per MTS line, and a maximum of 16 MTS printers per system. The aggregate baud rate of the printers should not exceed the baud rate of the MTS line to which they are attached. The performance of printers on an MTS line is dependent upon the speed of that line, the printer's priority, the traffic pattern, and the processor load.

C) SERIAL PRINTERS

1) 2631B/293x Printers. These printers have an RS-232-C interface supplied standard. Referred to as "local" or "remote" spooled, these printers may be connected point-to-point either by modem or hardwired.

2) Generic Serial Printers (including 2601A, 2602A, and 2603A). These printers have RS-232-C data communications ports supplied standard. To use the MPE spooler, they must be attached in a local point-to-point configuration.

3) Serial Line Printers (2563A/64B). These can be spooled in a hardwired RS-232 (Option 049) or RS-422 (Option 050) configuration. Modem connection is not supported.

4) Serial Page Printers (2686A, 2687A). The 2686A can be spooled via hardwired RS-232-C connection. RS-422 is not available. Remote modem connection is not supported. The 2687A can be spooled in a hardwired RS-232-C or RS-422 configuration. Remote modem connection is not supported.

While printers usually are configured to use the spooler, most can also be configured to run "hot" under programmatic control. The 2680A and 2688A are the exceptions. They must be spooled; running "hot" is not permitted.

Series 6x/7x Maximum Spooled Device Configuration:

	1 or 2 I/O Bays
SYSTEM PRINTERS:	
Line Printers: (HP-IB)	
2608A/S	4
256x	4
261x	4
Total Line Printers	8
Page Printers:	
2680A	2
2688A	4(5)*
Total Page Printers	4(5)*
Total System Printers	10
SERIAL PRINTERS:	
2601A/2602A/2603A	16
2631B	
2932A/2933A/2934A	16
2563A/2564B	6
2686A	5
2687A Page Printer	4
Total Serial Printers:	16

* HP-IB Extender support in parentheses.

The spooled device support numbers stated in the table above are based on performance considerations.

If the system is running MPE V/P, operating system table sizes could limit the number of simultaneously active spooled printers. MPE V/P operating system tables effectively limit the total number of spooled printers on the system to 16.

In order to determine the maximum number of spooled devices which can be configured on an MPE V/P system, the following formula must be used:

Max. Spooled Devices =

$$[256 - (1.25 \times \text{\#Sessions and Jobs}) - \text{\#INPs}] / 16$$

where:

\#Sessions and Jobs = the maximum number of sessions and jobs which will be supported on the system

\#INPs = the number of Network Links/INPs which will be configured on the system

After plugging in the values for the number of sessions and jobs and also the number of INPs, the maximum number of spooled devices will have been derived. Take the result and round it down to the nearest whole number. It is evident from this formula that the number of spooled devices a system can support will vary with the customer's configuration and application mix.

e.g. A system running at peak periods, with 28 sessions, 4 batch jobs and 3 INPs configured, can support the following number of spooled devices:

Max. Spooled Devices =

$$\frac{[256 - (1.25 \times 32) - 3]}{16} = 13.3$$

Rounding this result down means that a maximum of 13 spooled devices can be supported on the system.

With the expanded tables of MPE V/E there is no longer a software tables limitation that further restricts the number of spooled devices on a Series 6x/7x running MPE V/E beyond the number of devices listed in the table above. System performance considerations are responsible for restricting the number of spooled devices to these limits. Note that the appropriate table structure must be configured for this number of spooled devices to be supported.

Serial Printers and Plotters

The Series 6x/7x supports remote spooled 293x or 2631B serial printers through the ATP via RS-232-C connections. When used as remote spooled printers, they are connected to an ATP direct connect port via hardwired cable or to an ATP modem port via a modem. 2631B printers must include Option 331 to obtain the RS-232-C remote spooled printer capability.

The Series 6x/7x can support 2601A, 2602A and 2603A daisywheel printers via the ATP through local direct connection only. Modem connection is not supported. The 2601A, 2602A, 2631B, and 293x printers can also be attached as slave devices to terminals under the control of application programs.

The 2563A and 2564B line printers are also supported on the Series 6x/7x in a serial configuration. RS-232-C and RS-422 hardwire connections are available; modem connections are not supported. One must specify Option 049 for RS-232-C or Option 050 for RS-422 interfaces. Cables must be ordered separately; see Page 4-30 for further details. Do not order the subsystem option (Option 364) for the 2563A or 2564B when it is being used as a serial printer.

The 2686A is supported via hardwired RS-232-C connections. Remote operation over a modem is not supported. RS-422 connections are not available.

The 2687A laser printer is only available on the Series 6x/7x as a serial printer. Both RS-232-C and RS-422 hardwired connections are supported, but modem connection is not available. Option 364 must be specified to obtain the Series 6x/7x subsystem. Cables need to be ordered separately; see Page 4-30 for a list of available cables for the 2687A.

HP plotters can be configured as slave devices to terminals and personal computers or as eavesdrop devices between the terminal and the ATP. As slave devices, both HP-IB and RS-232-C connections may be possible depending upon the individual plotter. Only RS-232-C connections are available in an eavesdrop configuration or when connected point-to-point to an ATP.

Network Link Products (INPs)

A maximum of 16 Network Link products (sets of Link hardware) are supported on a Series 6x/7x with the standard I/O bay. An additional eight, for a total of 24, Links can be operated concurrently on the Series 6x/7x when the auxiliary I/O bay is used and the system is running MPE V/E. A maximum of 16 sets of Link hardware are supported on a Series 6x running MPE V/P regardless of whether the system has one or two I/O bays.

Each set of Link hardware includes an Intelligent Network Processor (INP), and requires one I/O card slot in the Series 6x/7x card cage and one junction mounting panel. The INP counts as one device load on a GIC and is considered a low-speed device.

A 1m HP-IB ribbon cable for connecting the INP to a GIC, and a non-HP-IB cable for connecting the INP to the junction mounting panel, are included. An external cable is also included but must be specified by a particular option when ordering based on the connection desired. Please refer to the latest HP 3000 Price Guide for a complete list of options.

Series 70 Configuration Worksheet

Product Number	Description	Quantity
I. Memory Expansion.		
	Total Memory Size (Standard memory is 8 Mb, MAX=16)	1 _____
Opt. 500	4 Mb Memory Module with initial order.	2A _____
30142A	1 Mb Memory Module for Series 6x/7x.	2B _____
30165A	4 Mb Memory Module for Series 6x/7x.	2C _____

II. Disc Drives.

A. Storage Units *with* Integrated Cartridge Tape:

One of the following may be included:

7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3A _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3B _____
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (Opt. 001, MAX=1) (Two 1m HP-IB cables are included.)	3C _____
7914ST Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Cartridge Tape (Opt. 002, MAX=1.) Because the 7914ST may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check lines 4B and 9C to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), tape drive (2m), and disc drive (2m). (Also enter on line 9C in Tape Drive section.)	3D _____
7914TD Opt. 002	132 Mb Mass Storage Subsystem <i>with</i> Cartridge Tape (Opt. 002, MAX=1.) Because the 7914TD may combine a Cartridge Tape, a 1/2" tape drive, and one or two disc drives into a single package, you need to check lines 4C and 9A to ensure that the totals for those lines do not violate device support maximums. HP-IB cables are included with each storage unit: cartridge tape (1m), tape drive (2m), and disc drive (6m). (Also enter on line 9A in Tape Drive section.)	3E _____
	Total Integrated Storage Units <i>with</i> Cartridge Tape (Sum of Lines 3x, MAX=1)	3 _____

Series 70 Configuration Worksheet

Product Number	Description	Quantity
B. Mass Storage Products (No Integrated Cartridge Tape):		
7914P	132 Mb Integrated Storage Unit (Opt. 140, Cartridge Tape Deleted, MAX=8) (A 1m HP-IB cable is included.)	4A _____
7914ST Disc	132 Mb Mass Storage Subsystem (MAX=4) (Without Opt. 114, this subsystem contains one drive. With Opt. 114, the subsystem contains <i>two</i> drives.) Enter the <i>total</i> number of disc drives on line 4B. The number of 7914ST products ordered may be less depending on the number of subsystems with two drives. (For cabling information, see line 3D.) (Also enter on line 9C in Tape Drive section.)	4B _____
7914TD Disc	132 Mb Mass Storage Subsystem (MAX=2) (Without Opt. 114, this subsystem contains one drive. With Opt. 114, the subsystem contains <i>two</i> drives.) Enter the <i>total</i> number of disc drives on line 4C. The number of 7914TD products ordered may be less depending on the number of subsystems with two drives. (For cabling information, see line 3E.) (Also enter on line 9A in Tape Drive section.)	4C _____
7914CT Disc	132 Mb Integrated Storage Unit containing 9144A Cartridge Tape. (MAX=4). Two 1m HP-IB cables are included. (Also enter on line 9E in Tape Drive section.)	4D _____
	Total 7914P/14ST/14TD/14CT Disc Drives (MAX=8, total of lines 3C, 3D, 3E, and 4x)	4 _____
7920M	50 Mb Master Disc Drive (A 2m HP-IB cable is included with Opt. 102.) (MAX=16)	5A _____
7925M	120 Mb Master Disc Drive (A 2m HP-IB cable is included with Opt. 102.) (MAX=16)	5B _____
	Total 7920/25 Master Disc Drives (Sum of Lines 5x) (MAX=16)	5 _____
7920S	50 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	6A _____
7925S	120 Mb Slave Disc Drive (A 2.4m multiunit cable and a 15.2m data cable are included.) (MAX=14)	6B _____
	Total 7920/25 Slave Disc Drives (Sum of Lines 6x) (MAX=14. This maximum will require two 7920/25 Master Disc Drives because each master drive supports up to 7 Slave Drives)	6 _____

Series 70 Configuration Worksheet (Continued)

Product Number	Description	Quantity
7933H/ 7935H	404 Mb Disc Drive (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system) (A 1m HP-IB cable is included.)	7A _____
7933XP/ 7935XP	404 Mb Disc Drive with 1 Mb Cache (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system) (A 1m HP-IB cable is included.)	7B _____
Total Disc Drives & Integrated Storage Units (Sum of lines 3A, 3B, 4, 5, 6, 7A and 7B) (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system)		8 _____

Series 70 Configuration Worksheet

Product Number	Description	Quantity
III. Magnetic Tape Drives.		
7970E/ 7971A/ 7914TD	1600 cpi Master Tape Drive Subsystem (MAX=2) Each master supports up to three Slave Tape Drives. Each tape drive includes a 6m HP-IB cable. (Also enter 7914TD on line 3E or 4C.)	9A _____
7970E	Slave Tape Drive Subsystem (MAX=6) (A 6.1m multiunit cable is included.)	9B _____
7974A/ 7914ST	1600 cpi (800/600 cpi optional) Magnetic Tape Subsystem (MAX=4) (A 2m HP-IB cable is included.) (Also enter 7914ST on line 3D or 4B.)	9C _____
7978A/ 7978B	6250/1600 cpi Magnetic Tape Subsystem (MAX=4) (A 2m HP-IB cable is included.)	9D _____
9144A/ 7914CT	One-quarter (1/4) inch Cartridge Tape Drive. (Order cable separately with 9144A. Two 1m HP-IB cables are shipped with 7914CT.) (MAX=4)	9E _____
	Total Magnetic Tape Drives (Sum of lines 9x, MAX=8)	9 _____

IV. System Printers.

2608S	400 lpm Dot Matrix Printer (MAX=4). Option 364 includes a 4m HP-IB cable.	10A _____
256x	300, 600, 900 and 1200 lpm Dot Matrix Printers (MAX=4) (A 4m HP-IB cable is included.)	10B _____
261xA	Line Printer Series (e.g., 2611A and 2619A) (MAX=4) (A 15m parallel differential cable is included with Option 364.)	10C _____
	Total Line Printers (Sum of lines 10x, MAX=8)	10 _____
2680A	Intelligent Page Printer (MAX=2) (An 8m HP-IB cable is included with Option 364.)	11A _____
2688A	Page Printer (MAX=4; 5 via Extenders) (An 8m HP-IB cable is included with Option 364.) See discussion in Chapter One Appendix regarding connection of 2688A via HP-IB Extenders.	11B _____
	Total Page Printers (Sum of lines 11x, MAX=4)	11 _____
	Total System Printers (Sum of Lines 10 and 11, MAX=10)	12 _____

Series 70 Configuration Worksheet

Product Number	Description	Quantity
V. Serial Printers.		
2601A	40 cps Daisywheel Printer (MAX=16) (2601A includes RS-232 cable)	13A _____
2602A	25 cps Daisywheel Printer (MAX=16) (Order cable separately.)	13B _____
2603A	xx cps Daisywheel Printer (MAX=16) (Order cable separately.)	13C _____
293x	200 cps Dot Matrix Printer (MAX=16) (Order cable separately.)	13D _____
2563A	300 lpm Dot Matrix Printer (Opt. 049 for RS-232 or Opt. 050 for RS-422. Order cable separately.) (MAX=6)	13E _____
2564B	600 lpm Dot Matrix Printer (Opt. 049 for RS-232 or Opt. 050 for RS-422. Order cable separately.) (MAX=6)	13F _____
2686A	8 ppm Laser Page Printer (MAX=5) (Order cable separately)	13G _____
2687A	12 ppm Laser Page Printer (Opt. 364), (MAX=4) (Order cable separately.)	13H _____
	Total Serial Printers (Sum of lines 13x, MAX=16)	13 _____

VI. Other Peripherals.

9895A	Flexible Disc Drive (Opt. 010, MAX=1) (Order HP-IB cable separately.)	14 _____
26075A	Multiple System Access Selector (MAX=1) (Order cables separately.)	15 _____

Series 70 Configuration Worksheet

VII. Data Communications.

A. Workstations, Plotters, and Printers (Enter quantities in lines below):

NOTE: Cabling must be ordered separately for these devices!

	Connection Method				
	Pt-to-Pt with ATP				
	Direct Connect				
Product	Daisychain* Multipoint	Modem	Type 422		Type 232-C
Display Terminals					
239x	N/A*	_____	_____	_____	N/A
2623A	N/A*	_____	_____	_____	N/A
2624B	_____	_____	_____	_____	N/A
2625A	_____	_____	_____	_____	N/A
2626A	_____	_____	_____	_____	N/A
2626W	N/A*	_____	_____	_____	N/A
2627A	N/A*	_____	_____	_____	N/A
2628A	_____	_____	_____	_____	N/A
System Console (HP Touchscreen II)	N/A*	_____	_____	_____	N/A
Plotters					
7470A	N/A	_____	N/A	_____	_____
7475A	N/A	_____	N/A	_____	_____
7550A	N/A	_____	N/A	_____	_____
7580A/B	N/A	_____	N/A	_____	_____
7585B	N/A	_____	N/A	_____	_____
Data Collection Terminals					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
3081A	_____	_____	N/A	_____	N/A
Subtotal (this page)	16A _____	17A _____	18A _____	19A _____	20A _____

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

Series 70 Configuration Worksheet

Connection Method					
Pt-to-Pt with ATP					
Direct Connect					
Product	Daisychain* Multipoint	Modem	Type 422	Type 232-C	Terminal Attached
Serial Printers**					
2932A	N/A	_____	_____	_____	_____
2934A	_____	_____	_____	_____	_____
2563A	_____	N/A	_____	_____	N/A
2564B	_____	N/A	_____	_____	N/A
2601A	N/A*	N/A	N/A	_____	_____
2602A	N/A*	N/A	N/A	_____	_____
2603A	N/A*	N/A	N/A	_____	_____
Page Printers**					
2686A	N/A	N/A	N/A	_____	N/A
2687A	N/A	N/A	_____	_____	N/A
Personal Office Computers					
Touchscreen (150x)	N/A*	_____	_____	_____	N/A
Portable Plus	N/A*	_____	N/A	_____	N/A
Subtotal (this page)	16B _____	17B _____	18B _____	19B _____	20B _____
Subtotal (previous page)	16A _____	17A _____	18A _____	19A _____	20A _____
Totals (both pages)	16 _____	17 _____	18 _____	19 _____	20 _____

Line 16: MAX=335 (one or two I/O bays); MAX=151 (one or two I/O bays with MPE V/P).

Line 17: MAX=84 (one I/O bay); MAX=168 (two I/O bays); MAX=143 (two I/O bays with MPE V/P).

Sum of lines 17, 18, and 19: MAX=144 (one I/O bay or two I/O bays with MPE V/P); MAX=336 (two I/O bays)

Sum of lines 16, 17, 18, and 19: MAX=400 (one or two I/O bays)

* The 2333A and 2334A Cluster Controller will support any RS-232-C device except the 2635B, 2382A, and 2932A.

** Note device maximums in Section V of worksheet.

Series 70 Configuration Worksheet

Product Number	Description	Quantity
B. Network Links:		
	HP to HP System Lines (30270A, 30271A, 32187A, 32188A)	21A _____
	HP to IBM System Lines (30246A, 30251A)	21B _____
	Multipoint Lines (32026A, 32027A, 32028A)	21C _____
	Local Area Network (30242A)	21D _____
	Total number of Links (INPs) (Sum of lines 21A, 21B, and 21C; MAX=16 with one I/O bay; MAX=24 with two I/O bays and MPE-V/E.)*	21 _____
*Additional Links without hardware (with Opt. 490) are supported.		

VIII. I/O Expansion.

A. ATP Advanced Terminal Processors:

Step #1: Determine the number of modem connections desired and the appropriate number of Modem Port Controllers to order.

30155A	Modem Port Controller (Line 17 divided by "12" and rounded up to the next integer.) (Internal cables included; external cables for devices must be ordered separately.)	22 _____
---------------	---	----------

Step #2: Determine the number of modem ports that are not to be used for modem connection and can be used for RS-232-C local direct connections to the Modem Port Controller.

(Note: Modem ports must be ordered in groups of 12. Therefore, you could have up to 11 available for RS-232-C direct connection.)

	Unused modem ports [("12" times line 22) minus line 17]	23 _____
--	--	----------

Step #3: Based on the desired number of RS-422 connections, RS-232-C connections, and extra modem ports; calculate the number of Direct Connect Port Controllers required and the mix of RS-422 and RS-232-C ports on the controller. Allow room for expansion.

(Note: Each Direct Connect Port Controller supports 12 terminal connections. It is configured with RS-422 ports standard but can be converted to RS-232-C ports in groups of four (4) by ordering the appropriate number of Opt. 002s.)

Series 70 Configuration Worksheet

Product Number	Description	Quantity
	Number of Direct Connect RS-232-C ports connected through Direct Connect Port Controllers (Line 19 minus line 23, enter "0" if the result is less than "0".)	24 _____
	Groups of 4 RS-232-C connections to Direct Connect Port Controllers. (Divide line 24 by "4" and round up to the next integer.)	25 _____
	Groups of 4 RS-422 connections to Direct Connect Port Controllers. (Divide line 18 by "4" and round up to the next integer.)	26 _____
30145A	Direct Connect Port Controller (Divide sum of lines 25 and 26 by "3" and round up to the next integer.) (Internal cables included; external cables for devices must be ordered separately.)	27 _____
	Quantity of Opt. 002s: Replaces 4 RS-422 ports with 4 RS-232 ports. (Equals line 25.)	28 _____
30144A	System Interface Board (SIB) (Divide the sum of lines 22 and 27 by "8" and round up to the next integer.) (Internal cables are included.)	29 _____
B. General I/O Channels:		
To determine the number of GICs required on the system, refer to the text and to the Appendix.		
(Note: To configure GICs you must take into consideration IMBs peripheral speed, electrical device loads, cable lengths, peripheral incompatibilities and system performance.)		
<i>A figure showing 15 GICs (the maximum supported configuration on a two I/O Bay Series 6x/7x) has been included in the section on GICs in this chapter for your use as a configuration worksheet.</i>		
30079A	Optional GICs (MAX=8 on a one I/O Bay system and MAX=13 on a two I/O Bay system. Two GICs are shipped standard with a new system order. Box swap upgrade systems do not include the two standard GICs.) Internal cables included by ordering Opt. 064; external HP-IB cables are supplied with devices.	30 _____

Series 70 Configuration Worksheet

Product Number	Description	Quantity
----------------	-------------	----------

C. Junction Mounting Panels:

The sum of:

Line 10C - 261X Line Printer Series	31A	_____
Line 21 - Network Links/INPs	31B	_____
GICs included standard with system (zero if box swap upgrade)	31C	_____
Line 30 - Optional GICs	31D	_____
ATP Direct Connect and Modem Port Controllers:		
Line 22 times "6"	31E	_____
Line 27 times "3"	31F	_____
Line 21D - LANIC	31G	_____
Total of lines 31x	31	_____

Each I/O Bay has 48 mounting panels. *A figure depicting the junction panel has been included in the section on junction panel configuration rules. Please use this as a configuration worksheet to ensure that you have stayed within the limitations of the junction panel configuration rules.* In addition, to plan the configuration of the ATP at installation, please see the following worksheet appendix.

D. I/O Card Slots:

I/O Card Slots Required

The sum of:

Line 10C - 261X Line Printer Interface Cards	32A	_____
Line 21 - Network Links/INP Cards	32B	_____
Line 22 - Modem Port Controllers (AIB)	32C	_____
Line 27 - Direct Connect Port Controllers (AIB)	32D	_____
Line 29 - System Interface Boards (SIB)	32E	_____
Line 30 - Optional GICs	32F	_____
GICs included standard (zero if box swap upgrade)	32G	_____
Line 33 - Optional IMB (See note below.)	32H	_____
Standard IMBs (one per I/O Bay) (See note below.)	32I	_____
Line 21D - LANIC	32J	_____
Total of Lines 32x	32	_____

Each I/O Bay has a MAX of 24 Card Slots.

Series 70 Configuration Worksheet

Product Number	Description	Quantity
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Note: At this point in configuring the Series 6x/7x, you should already have an idea whether you require the second I/O Bay because of: a) Discs (Line 8), b) INPs (Line 21), c) GICs (Line 30), d) Junction panel space (Line 31) or f) I/O Card Slots (Line 32). If, however, none of the above have required you to order the Auxiliary I/O Bay and you require a second IMB, you have a choice of obtaining that second IMB by ordering the Auxiliary I/O Bay or by ordering the optional IMB for configuration as a second IMB on the standard I/O Bay.

The "corner case" in this second IMB decision occurs when 22 I/O Card Cage slots are already filled. The two IMBs would each require one slot of the two remaining slots in the standard I/O Bay and all card slots would be full.

If your configuration is at all close to this corner case, it is highly recommended that you order the Auxiliary I/O Bay to obtain the second IMB rather than ordering the optional IMB for the standard bay. This will ensure room to expand the system easily in the future, as needs grow.

30143A	Optional I/O Adapter Module (the product name for the IMB) (MAX=1.) When product 30143A is ordered, it can be configured as a second IMB on either I/O Bay. (Cables are supplied.)	33 _____
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IX. System SPU and I/O Bays.

Having completed Parts I through VIII of this configuration worksheet, you should know whether you require a one or a two I/O Bay configuration.

A. To Order an SPU with One I/O Bay, Order:

32471A	HP 3000 Series 70 System Processor Unit	
	The standard I/O Bay will include an IMB, card cage and power supply. You must also order Opt. 001 on the first ATP/AIB (30145A or 30155A) for the junction panels to be configured with the system. Please see the following worksheet appendix on Series 6x/7x ATP Junction Panel Pre-Configuration.	34 _____

Series 70 Configuration Worksheet

Product Number	Description	Quantity
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B. To Order an SPU with Two I/O Bays, Order:

32471A	HP 3000 Series 70 System Processor Unit	35A _____
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Plus

Opt. 250	Add expansion bay and I/O adapter (IMB)	35B _____
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Each I/O Bay will include an IMB, card cage, and power supply. You must order both options 001 and 003 on the first ATP/AIB (30145A or 30155A) for the junction panels to be configured with the system on both I/O Bays. Please see the following worksheet appendix on the Series 6x/7x ATP Junction Panel Pre-Configuration.

X. MPE Media Products

A Media Product *must* be ordered with each HP 3000 Series 70. (Series 6x may alternatively select Media Product 51451A).

51450A	MPE V/E Media Product	36A _____
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Opt. 604	Series 6x/7x SPU	36B _____
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Opt. 280	MPE V/E UA-MIT (or later)	36C _____
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Opt. 051	1600 cpi Magnetic Tape Media	36D _____
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Series 70 Configuration Worksheet Appendix

Series 6x/7x ATP Junction Panel

Pre-Configuration

When ordering a Series 6x/7x, it is important to note that it does not automatically come with junction panels. The junction panel is ordered at the time the ATP is ordered. This is done by ordering either Option 001 or 003 with product 30145A or 30155A. The difference between Option 001 and Option 003 is that Option 001 provides the junction panel for the standard I/O Bay and Option 003 provides the junction panel for the auxiliary I/O Bay (30464A/B or SPU Option 250).

The Series 6x/7x with two I/O Bays offers significant flexibility in I/O junction panel configuration. This includes great flexibility when installing ATP Subsystems. The following configurations show the recommended installations. The ATP configuration worksheet will help you plan for the installation.

ATP SIB Configuration

1. For a 1-SIB system, the SIB is installed on the Standard I/O Bay panel.
2. For a 2-SIB system, one SIB is installed on the Standard I/O Bay panel and one SIB is installed on the Auxiliary I/O Bay panel.
3. For a 3-SIB system, one SIB is installed on the Standard I/O Bay panel and two SIBs are installed on the Auxiliary I/O Bay panel.
4. For a 4-SIB system, two SIBs are installed on the Standard I/O Bay panel and two SIBs are installed on the Auxiliary I/O Bay panel.

To add the Auxiliary I/O Bay (30464A/B) and the ATP to a system that has already been installed at a customer's site, specify Option 003 with product 30145A or 30155A. Complete the worksheet on the following page using *only* the "Auxiliary I/O Bay Junction Panels".

(Note: If ordering the Auxiliary I/O Bay without an ATP, you must specify Option 251 on either product 30443A/B, 30444A/B, 30464A/B or 30468A/B (with Option 250) to obtain the junction panels.)

Series 70 Configuration Worksheet Appendix

ATP Configuration Worksheet

(Please Duplicate.)

Procedures:

For the appropriate Junction Panel, mark where the ATP should be installed. Use the legend below to indicate the placement of the products. GICs, LANICs, INPs, and 261X Line Printers should also be configured on the panels to ensure that you have adequate space.

G=GIC
(1 mounting panel each)

I=INP
(1 mounting panel each)

M=ATP Modem Connect
(6 mounting panels each)

LP= 261X Line Printer (1 mounting panel each)

D422=ATP Direct Connect Type 422 (3 mounting panels each)

D232=ATP Direct Connect Type 232 (3 mounting panels each)

L=LANIC
(1 mounting panel)

Standard I/O Bay Junction Panel

Auxiliary I/O Bay Junction Panel

Bottom Row Reserved *

* GIC 1	* GIC 2	*	*	*	*	*	*	*	*	*	*	*	*	*	*

* The bottom 12 mounting panels on the standard I/O bay are reserved for connections to GICs, LANICs, INPs, and LPs.

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