

# HP 3000 System Configuration Guide

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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 39/42, Series 48, and Series 68 and sections on upgrading and cabling. For each system type, an SPU I/O slot worksheet, junction panel worksheet, and GIC worksheet are included in the maximum system configuration guidelines text. Also, 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.

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 INP data communications lines require separately ordered software packages to drive them.

## 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
- Training Courses
- System Engineering Consulting
- Manuals
- Manual Update Service
- Supplies provided by HP Computer Supplies Operation

# 1

## System Configuration Rules

Series 30 and 40

Series 45

Series 55

HP 3000 Supported Peripherals

## Series 39 and 42

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## HP 3000 SERIES 39 AND 42 MINIMUM SYSTEM CONFIGURATION

### Supplied Hardware:

- Central Processing Unit
- System Clock
- Control and Maintenance Processor
- 2 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
- Tele-support Modem

### Required Hardware Ordered Separately:

- 1 System Console: Any HP 262x, 264x, 2382A, or 2635B terminal
- 1 System Console Cable: (The 2635B includes a 3.8 meter modem cable)
- 1 Asynchronous Data Communications Controller (ADCC-Main) to connect the console to the system
- 1 Magnetic Tape Drive for System Backup: 7914TD, 7970E, 7971A, 7974A, or 7976A required for systems with more than 132 Mb disc storage. A 7911P, 7912P, or 7914P with integrated cartridge tape may be used for systems having 132 Mb or less disc storage.

- 1 System Disc: 7914TD, 7920M, 7925M, or 7933H Master Disc Drive or 7911P, 7912P, or 7914P Integrated Storage Unit (When the Series 39 is ordered with options 011, 012, or 014, the corresponding integrated storage unit must be ordered with the cartridge tape unit)

### Supplied Software:

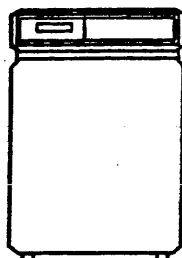
Standard on each HP 3000 system is the Fundamental Operating Software which includes:

- 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)
- Complete User Manual Set (For a manual listing, please see the section on manuals)

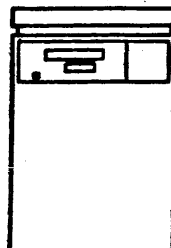
The Series 42 also includes Disc Caching, an I/O performance product, which is not a part of the fundamental operating software. Disc caching can be added to the Series 39--it is not supplied as a standard feature.

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

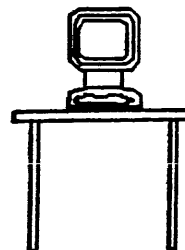
## HP 3000 Series 39/42 Minimum System Configuration Example



HP 3000  
Series 39/42  
System Processor Unit

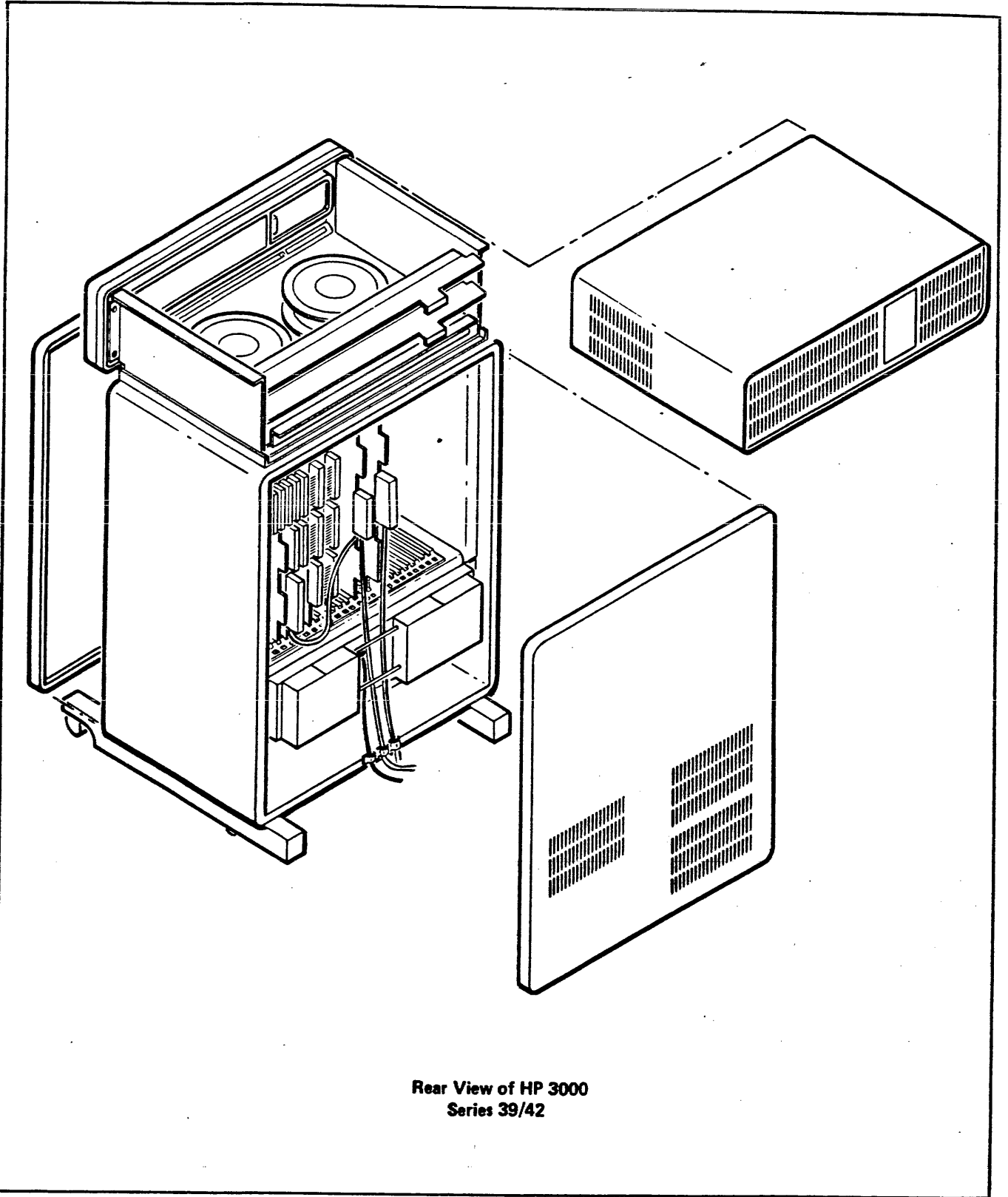


7911P  
Integrated  
Storage Unit



262x  
System  
Console

1-2 System Configuration Rules



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 can be ordered either as a low-cost packaged system in three models or as a separate SPU. To order the packaged systems, you must specify option 011, 012, or 014. When ordered in conjunction with the 7911P, 7912P, and 7914P integrated storage units with cartridge tape drive, respectively, these options provide credits that effectively lower the price of the system packages. The Series 39 can also be ordered without options 011, 012, or 014. In that case, you should also order a 1/2" tape drive and a disc drive (e.g., the 7914TD). No discount credit will be given when the Series 39 is ordered without option 011, 012, or 014. (Note that there is no upgrade path from other HP 3000 systems to the Series 39.) The Series 39 runs MPE-V/P as its standard operating system. If you wish to substitute MPE-V/E, order option 408 with product 32514B.

The **Series 42** can be obtained by ordering either product number 32542B for new systems or 32542BH for box swap upgrades. The Series 42 runs MPE-V/P as its standard operating system. If you wish to substitute MPE-V/E, order option 409 with product 32542B or 32542BH.

### 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 (product 30171A),

.5 Mb (product 30092A), and 1 Mb (product 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	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 (product 30092A) and 1 Mb (product 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 it is targeted for small configurations, the Series 39 does not have disc caching as a standard feature. However, as the application load on a Series 39 grows, your customer may wish to add disc caching. It can be added by ordering product number 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.

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 figure below depicts the Series 39/42 card cage.

## The Card Cage

The Series 39 and Series 42 both 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 I/O cards including Asynchronous Data Communications Controllers (ADCCs), General I/O Channels (GICs), DSN/Intelligent Network Processors (INPs), and 261X Line Printer Interface (LPI) cards.

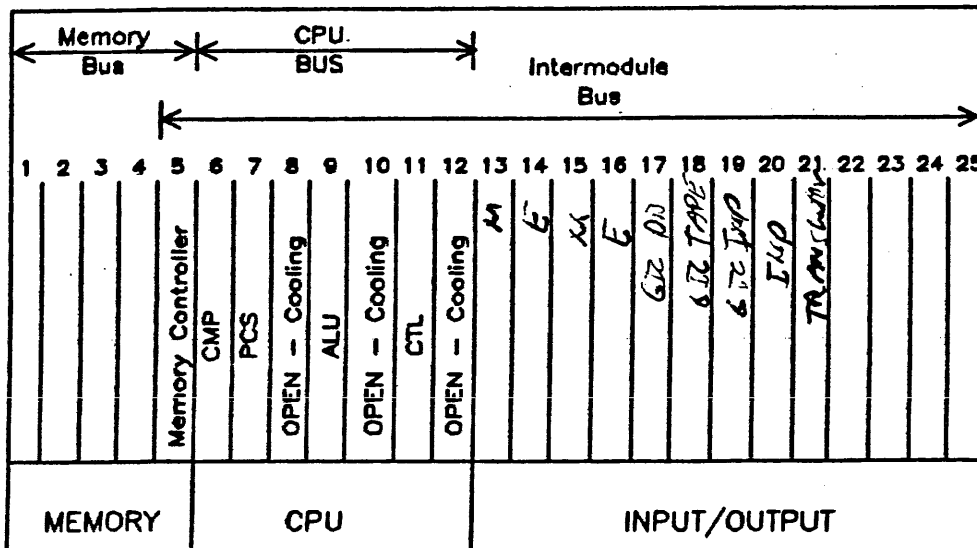
### Card Cage Restrictions:

The only restriction about placement of I/O cards in the I/O portion of the card cage is that ADCC-Main and ADCC-Extender cards must be placed side-by-side in alternating fashion. Remember also to include the two standard GICs and the required and separately ordered ADCC-Main in your configuration.

### Junction Panels

The Series 39 and Series 42 do not have junction panels. 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.

Please photocopy this page and use it as a worksheet:



## 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 Series 68 maximum configuration section for a complete explanation of these rules. All rules on configuration of devices on individual GICs that apply to the Series 68 also apply to the Series 39 and Series 42. Note, however, that the internal HP-IB cabling length between the GIC and the outside of the system is one meter for the Series 39 and Series 42 rather than the two meter length that the Series 48 and 68 require.)

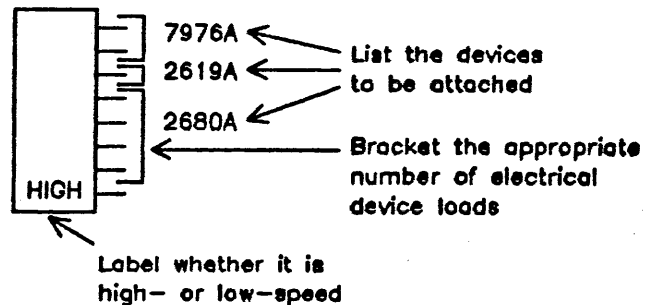
Order product number 30079A to obtain additional GICs. You must also specify option 040 to obtain the proper HP-IB cable.

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. *Simultaneous transmission by three or more GICs with high-speed devices attached may exceed the available IMB bandwidth and corrupt data being transmitted.* (Please refer to the table on the next page for a definition of high-speed devices and a high-/low-speed classification of supported devices.)

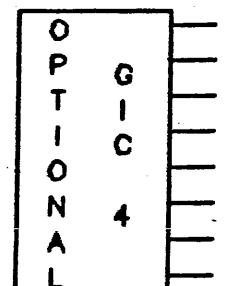
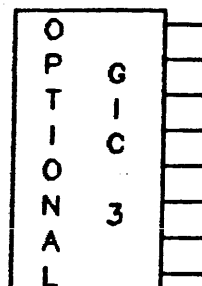
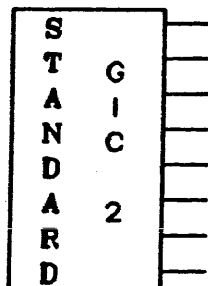
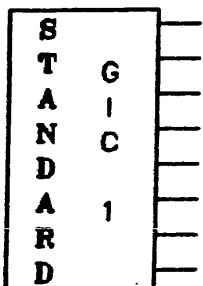
## Summary: GIC Attachment Restrictions:

- 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 (see table below) require a dedicated GIC to which no other devices may be attached.
- 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 (LDEV 1). System performance may be degraded with such a configuration when the tape drive is in use.

### How to Use the GIC Worksheet

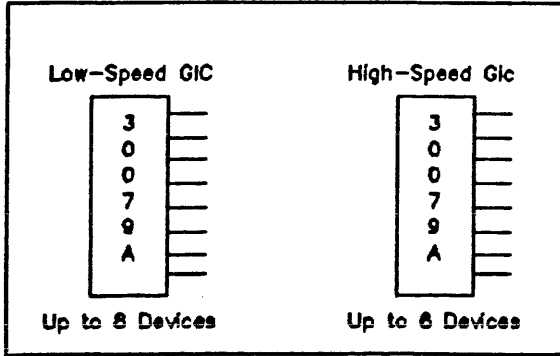


Please photocopy this page and use it as a GIC configuration worksheet:



Note that the GIC is a single product (30079A). Whether a GIC is considered high- or low-speed depends solely upon which peripherals are attached to it.

A maximum of six devices may be attached to each high-speed GIC. This maximum of "six" relates to devices per GIC and not to electrical device loads. The electrical device load maximum remains at eight per GIC.



**GIC Interface Requirements of Peripherals:**

The following table summarizes the requirements of peripherals and other devices using GICs to connect to the Series 39 and Series 42:

Peripherals	Peripheral Speed*	HP-IB Electrical Device Loads	Internal Device Cable Length (Meters)
Cartridge Tape In 7911P/12P/14P/14TD	Low	1 (Requires Dedicated GIC)	0
7911P/12P Disc Drive	High	1	1
7914P/14TD Disc Drive	High	1	1
7906M/20M/25M Master Disc Drive	High	1	1
7933H/7935H Disc Drive	High	1	0
7970E/7971A/7914TD 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)	0
7976A 1/2" Tape Drive	High	Shipped w/2 (Variable from 1 to 4)	2
2611A/13A/17A/19A Line Printer Interface Card (26069A)	Low	1	1
2608A Line Printer	Low (Do not mix with high)	1	0
2608S Line Printer	High (Do not mix w/7906/20/25)	Shipped w/2 (Variable from 1 to 7)	1
2680A/88A Page Printer	High	Shipped w/4 (Variable from 1 to 8)	1
INP Card (30020A/B)	Low	1	1
30106A (Opt. 333) Card Reader	Low	1 (Requires Dedicated GIC)	0
9895A (Opt. 010) Flexible Disc Drive	Low	1	1

\* A high-speed peripheral is one that has a data transfer rate on the HP-IB which exceeds 400KBytes per second.

## Peripherals

### Disc Drives:

One 7911P (28 Mb), 7912P (65 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7920M (50 Mb), 7925M (120 Mb), 7933H (404 Mb), or 7935H (404 Mb) hard disc drive is required as the system disc (LDEV 1).

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

7911P/12P/14P/14TD Discs w/Cartridge Tape	1
Total 7911P/12P Discs (With or Without Cartridge Tape)	4
Total 7914P/14TD Discs (With or Without Cartridge Tape)	8
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 7 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 7911P, 7912P, 7914P, 7914TD, 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. (Please see the peripherals cabling chapter for more details.)

The 7914TD combines into a single package a 7914 rackmounted disc drive, a 7970E type master tape drive, and an optional cartridge tape unit (option 002). 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 7970E type master drive will support up to three slave devices. The 7914TD is supplied with HP-IB cables standard -- one two meter cable for the disc drive and a six meter cable for the tape drive. When option 002 is ordered, the cartridge tape drive, a controller, and a one meter HP-IB cable are shipped.

Each 7933H and 7935H disc drive is shipped with a one meter HP-IB cable standard.

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 one meter 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 one meter HP-IB cable. The cartridge tape unit requires its own dedicated GIC.

**Magnetic Tape Drives:**

A cartridge tape unit or a 7970E, 7914TD, 7971A, 7974A or 7976A 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. When the Series 39 is ordered, software will be distributed on cartridge tape unless you order option 051 with the Series 39 SPU (product number 32514A), which will cause software to be distributed on 1600 cpi tape. Conversely, when the Series 42 is ordered, software will be distributed on 1600 cpi tape unless you order option 022 with the Series 42 SPU (product number 32542A or 32542AH), which causes software to be distributed on cartridge tape.

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 type tape drives. The 7974A and 7976A 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 cartridge tape drive in addition to these maximums.

**Series 39/42 Maximum Tape Drive Configuration**

7970E/71A/14TD Masters	1
7970E/71A/14TD Slaves	3
7974A/76A Tape Drives	2
<b>Total Tape Drives</b>	<b>4</b>

The 7970E master tape drive comes with a six meter HP-IB cable standard. Each 7970E slave drive comes with a 6.1 meter non-HP-IB) multiunit cable for tape drives. (Please see the peripherals cabling chapter for more details.)

The 7971A is a package of one or two 7970E type 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. Please see the peripherals cabling chapter for more details.) Note: the dual master drive 7971A option 344 is *not* supported on the Series 39 and Series 42 because only one such master drive is allowed.

For a description of the 7914TD's configuration options see the paragraph in the section above on disc drives.

The 7974A and 7976A are shipped with a two meter HP-IB cable standard. Each 7976A must be ordered with option 416 for it to interface with the Series 39 and Series 42. The 7974A does not require an option; however, you must specify option 800 to obtain the 800 bpi capability.

**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 Printer Configuration**

<b>Line Printers:</b>	
2608A, 2608S	2
2611A/13A/17A/19A	2
<b>Total Line Printers Supported</b>	<b>2</b>
<b>Intelligent Page Printers:</b>	
2680A, 2688A	2
<b>Total System Printers Supported</b>	<b>4</b>



The 261x family of line printers does not connect directly to a GIC; rather, each one uses a 1 meter HP-IB ribbon cable between only the interface card and the GIC card. (The line printer interface card (product 26069A) is included standard with option 340.) 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. To obtain the interface card, internal cables, and fifteen meter parallel differential cable, order option 340. Cabling beyond 15 meters must be ordered as a special from Boise.

The 2608A and 2608S are dot matrix line printers that attach directly to GICs. They do not require an interface card in the I/O card cage. The 2608A is shipped with an HP-IB interface and a two meter HP-IB cable standard. For the 2608S, order option 340 to obtain the HP-IB interface and four meter 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 eight meter HP-IB cable. (This is an eight meter cable; it is not two four meter cables linked together.) Specify option 099 with the 2680A to replace the eight meter cable with a two meter 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.

## Other Peripherals

### Flexible Disc Drive:

Only one 1.2 Mb flexible disc drive is supported on the Series 39 or Series 42. 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 card reader must be ordered as a "special" to ensure suitability to your customer's environment. In order for shipment to take place, you must consult with your factory sales development representative before quoting to the customer. The 30106A 80-column card reader interfaces to the Series 39 and Series 42 through a dedicated GIC. You must specify option 333 to receive a two meter HP-IB cable. When a card reader is configured on the system, a powerline conditioner is required. (This product will only be orderable through January 1, 1984.)

### 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 your customer may have. HP offers a small 1.8 kVA conditioner (product 35030A) which is adequate for some peripherals like the 30106A card reader, but it is inadequate for conditioning a full system. Your CE will have a list of recommended third party power line conditioners that your customer may purchase.

### 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. Other than not being able to share a GIC with a disc, the switchbox has no other configuration restrictions. Other devices on the same GIC must be "downed" when switching the 26075A. When determining HP-IB cable length, include 1/2 meter for the 26075A.

## Data Communications

### Terminal Connection:

Point-to-point connections are made to the Series 39 and Series 42 through the DSN/Asynchronous Data Communications Controller (ADCC). The ADCC supports local (RS-232) and remote (full duplex) point-to-point display terminal, printing terminal, and character printer connections. Multipoint connections are made to the Series 39 and Series 42 through multipoint data communication lines attached through the DSN Intelligent Network Processor (INP). (DSN/Multipoint Terminal Software is also required.)

The following table summarizes the number of terminals supported on the Series 39 and Series 42:

#### Series 39/42 Maximum Terminal Configuration

Direct Connect	32
Modem	32
Total Point-to-Point	32
Multipoint	60
Total	92

All 92 terminals can be logged on when the system is running either MPE-V/P or MPE-V/E. The maximum of 92 terminals includes all point-to-point, multipoint, system console, and DSN/DS virtual 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 or 2334A multipoint 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 DSN/Data Link or via modems and phone lines. The 2334A permits a group of up to 16 point-to-point devices to communicate with the Series 39/42 via x.25 packet switching

networks. (Please refer to the display terminals and data communications sections of this guide or to the HP 3000 Data Communications Products Specifications Guide for further details on configuration and cabling.)

### System Console:

One point-to-point connected 262X, 264X, 2382A, or 2635B must be ordered as the system console. For the 262x, 264x, and 2382A, you must order the cable as an option: order option 304 for direct connect RS-232; or order option 301 for U.S. modem connect or option 302 for European modem connect. The 2635B includes a 3.8 meter modem cable standard.

### DSN/Asynchronous Data Communications Controller:

The ADCC on the Series 39 and Series 42 consists of two products: the ADCC-Main card (product number 30018A) and the ADCC-Extender card (product number 30019A). You must also order option 040 with these products to obtain the correct internal cable. Each ADCC card uses one slot in the I/O section of the card cage. ADCC-Main and ADCC-Extender cards must be ordered in alternating fashion (e.g. main, extender, main, extender, etc.) and must be placed side-by-side in alternating fashion in the card cage. Each ADCC-Main or ADCC-Extender supports up to four devices. The first ADCC-Main is required with the Series 39 SPU and the Series 42 SPU and it must be ordered separately. This ADCC permits the attachment of the system console and up to three other RS-232-C devices. The Series 39 and Series 42 support a maximum of 8 ADCCs or a total of 32 devices.

### Tele-support Modem:

Under the HP Tele-support program, all new (non-upgrade) system orders will be shipped with the HP Support Link Modem (product number 35141A) and with all required cables. CSD will supply this modem to box swap upgrade customers who require it.

**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 system configuration guidelines.

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 AND 2608S MTS PRINTERS:**

Line Printers:

2608A/S (HP-IB and Multipoint)	2
261x	2
<b>Total Line Printers</b>	<b>2</b>

Page Printers:

2680A, 2688A	2
<b>Total System Printers</b>	<b>4</b>

**SERIAL CONNECTED PRINTERS:**

2631B and Generic RS-232 Printers:

2601A, 2602A, 2631B	8
2687A Page Printer	1
<b>Total Serial Connected Printers:</b>	<b>8</b>

---

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 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 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 RS-232-C 2631B character printers through the DSN/ADCC via RS-232-C connections. When used as a remote spooled printer, they are connected to an ADCC direct connect port via hardwired cable or to an ADCC modem port via a modem. For 2631B printers specify option 331 to obtain the RS-232 remote spooled printer capability and a 3.8 meter cable.

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

The Series 39 and Series 42 can support the 2687A laser printer in a serial configuration. RS-232-C hardwire connections to the ADCC are supported--modem connection is not. You must specify option 340 to obtain the Series 39 and Series 42 subsystem. Cables must be ordered separately. (For more information on cabling, please refer to the chapter on cabling in this guide.)

HP plotters can be configured as slave devices to terminals and operated using HP software packages and user-supplied application programs. Plotters may be point-to-point connected to the ADCC via RS-232-C or modem cables.

### **DSN/Intelligent Network Processors:**

A maximum of three DSN/Intelligent Network Processors (INPs) (product number 30020B) may be configured on the Series 39 and Series 42. Each INP provides for one communication line that may be used by DSN/DS, DSN/MTS, DSN/RJE, DSN/MRJE, or DSN/IMF software. The same INP can be used (nonconcurrently) by any of these software products. Each INP board requires one I/O card slot and a 1 meter HP-IB ribbon cable (supplied with the product) for connection to a GIC. Each INP also counts as one electrical device load on a GIC.

The INP card in the I/O bay card cage is connected via two factory supplied cables: the HP-IB ribbon cable between the INP card and the GIC card and a non-HP-IB cable between the INP card and the external cable connection. The external cable must be ordered separately. There are many possible cabling options depending upon which system or device is to be connected. (Please refer to the display terminals and data communications sections of this guide or to the INP section of the HP 3000 Data Communications Products Specifications Guide for information on which cable to order.)

## Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
<b>I. System Processor Unit</b>		
32514B OR 32542B	Series 39 System Processor	1. _____
	Series 42 System Processor	2. _____

### 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)

3. \_\_\_\_\_

For configurations above the standard memory support, please refer to the memory expansion section in the Series 39/42 maximum system configuration guidelines to decide which are the appropriate options or products to order.

30514A Opt. 507	Series 39 Memory Expansion to 1 Mb	4. _____
30161A	1 Mb Memory Module for Series 39, 4x	5. _____
30092A	512 Kb Memory Module for Series 39, 4x	6. _____
30171A	256 Kb Memory Module for Series 39, 40, 42	7. _____

### III. Disc Drives.

#### A. Storage Units *with* Cartridge Tape:

One of the following may be included:

7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001 MAX=1)* (2 one-meter HP-IB cables are included)	8. _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001 MAX=1)* (2 one-meter HP-IB cables are included)	9. _____
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001 MAX=1)* (2 one-meter HP-IB cables are included)	10. _____

\* If ordered with Series 39 SPU, please specify the appropriate option (O11, O12, O14) with product 32514A to receive the packaged system discount.

## Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
<b>7914TD</b>	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 11, 16, and 26 to ensure that the totals for those lines do not violate device support maximums. (A 6 meter, a 2 meter, and a 1 meter HP-IB cable is included with each tape drive, disc drive, and cartridge tape, respectively)	11. _____
	<b>Total Integrated Storage Units <i>with</i> Cartridge Tape</b> (Sum of Lines 8, 9, 10, and 11, MAX=1)	12. _____
	<b>B. Mass Storage Products (No Cartridge Tape):</b>	
<b>7911P</b>	28 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=4) (a 1 meter HP-IB cable is included)	13. _____
<b>7912P</b>	65 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=4) (a 1 meter HP-IB cable is included)	14. _____
	<b>Total 7911P/7912P Disc Drives</b> (Sum of Lines 8, 9, 13, and 14, MAX=4)	14A. _____
<b>7914P</b>	132 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=8) (a 1 meter HP-IB cable is included)	15. _____
<b>7914TD (Discs)</b>	132 Mb Mass Storage Subsystem (without opt. 114 this subsystem contains one drive. With opt. 114 the subsystem contains two drives. Enter the total number of disc drives on Line 16. The number of 7914TD products ordered may be less depending on the number of subsystems with two drives) (MAX=8) (For cabling information, see Line 10)	16. _____
	<b>Total 7914P/7914TD Type Disc Drives</b> (MAX=8, Total of Lines 10, 11, 15, and 16)	17. _____
<b>7920M</b>	50 Mb Master Disc Drive (a 2 meter HP-IB cable is included with opt. 102) (MAX=2)	18. _____
<b>7920S</b>	50 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=7)	19. _____
<b>7925M</b>	120 Mb Master Disc Drive (a 2 meter HP-IB cable is included with opt. 102) (MAX=2)	20. _____
<b>7925S</b>	120 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=7)	21. _____
	<b>Total 7920/25 Master Disc Drives</b> (Sum of Lines 18 and 20) (MAX=2)	22. _____

## Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
	<b>Total 7920/25 Slave Disc Drives</b> (Sum of Lines 19 and 21, Max=7. This maximum would also require a 7920/25 Master Disc Drive because a master drive is required to support up to 7 Slave Drives)	23. _____
<b>7933H/ 7935H</b>	404 Mb Disc Drive (MAX=8) (a 1 meter HP-IB cable is included)	24. _____
	<b>Total Disc Drives and Integrated Storage Units</b> (Sum of Lines 14A, 17, 22, 23, and 24, MAX=8)	25. _____

### IV. Magnetic Tape Drives.

<b>7970E/ 7971A/ 7914TD</b>	1600 CPI Magnetic Tape Drive Master Tape Drive Subsystem (MAX=1, each master supports up to 3 Slave Tape Drives) (Each tape drive includes a 6 meter HP-IB cable)	26. _____
	Slave Tape Drive Subsystem (MAX=3) (a 6.1 meter multiunit cable is included)	27. _____
<b>7974A</b>	1600 CPI (800 CPI optional) Magnetic Tape Subsystem (MAX=2) (2 meter HP-IB cable included)	28A. _____
<b>7976A</b>	6250/1600 CPI Magnetic Tape Subsystem (option 416) (MAX=2) (2 meter HP-IB cable included)	28B. _____
	<b>Total of Lines 28A and 28B</b> (MAX=2)	28. _____
	<b>Total Magnetic Tape Drives</b> (Sum of Lines 26, 27, and 28, MAX=4)	29. _____

### V. Printers.

<b>2608A/ 2608S</b>	400 LPM Dot Matrix Printer (MAX=2) (The 2608A comes with a 2 meter HP-IB cable standard; the 2608S includes a 4 meter HP-IB cable with option 344)	30. _____
<b>261xA</b>	Line Printer Series (e.g., 2611A and 2619A) (MAX=2) (a 15 meter parallel differential cable is included with option 344)	31. _____
	<b>Total Line Printers</b> (Sum of Lines 30 and 31, MAX=2)	32. _____
<b>2680A/ 2688A</b>	Intelligent Page Printers (MAX=2) (an 8 meter HP-IB cable is included with option 344)	33. _____
	<b>Total System Printers</b> (Sum of Lines 32 and 33, MAX=4)	34. _____

**Series 39/42 Configuration Worksheet**

<b>Product Number</b>	<b>Description</b>	<b>Quantity</b>
<b>VI. Other Peripherals.</b>		
<b>9895A</b>	Flexible Disc Drive (opt. 010, MAX=1) (a 2 meter HP-IB cable is included with option 333)	35. _____
<b>30106A</b>	80 Column HP-IB Card Reader (opt. 333, MAX=1, order as a "special") (a 2 meter HP-IB cable is included with option 333)	36. _____



## Series 39/42 Configuration Worksheet

### VII. Data Communications.

#### A. Terminals, Plotters, Printers, and Personal Office Computers:

**NOTE: CABLING MUST BE ORDERED SEPARATELY FOR THESE DEVICES!**

Product	Connection Method			
	Daisychain* Multipoint	Pt-to-Pt with DSN/ADCC		Terminal Attached
		Modem	Direct Connect Type 232-C	
<b>Display Terminals</b>				
2382A	N/A*	_____	_____	N/A
2621B	N/A*	_____	_____	N/A
2622A	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
2641A	_____	_____	_____	N/A
2645A/N/S	_____	_____	_____	N/A
2647A	_____	_____	_____	N/A
2647F	N/A*	_____	_____	N/A
2648A	_____	_____	_____	N/A
2703A	N/A*	_____	_____	N/A
<b>Plotters</b>				
7220C/T	N/A	_____	_____	_____
7221C/T	N/A	_____	_____	_____
7470A	N/A	_____	_____	_____
7475A	N/A	_____	_____	_____
7580A/B	N/A	_____	_____	_____
7585B	N/A	_____	_____	_____
9872C/T	N/A	_____	_____	_____
<b>Subtotal (this page)</b>	<b>37A.</b> _____	<b>38A.</b> _____	<b>39A.</b> _____	<b>40A.</b> _____

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration, except the 2635B.

### Series 39/42 Configuration Worksheet

	Connection Method			
		Pt-to-Pt with DSN/ADCC		
Product	Daisychain* Multipoint	Modem	Direct Connect Type 232-C	Terminal Attached
<b>Data Collection Terminals</b> 3075A 3076A 3077A 3081A 3092A 3093A	_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____	N/A N/A N/A N/A N/A N/A
<b>Printing Terminals</b> 2635B	N/A	_____	_____	N/A
<b>Character Printers**</b> 2601A 2602A 2631B	N/A* N/A* N/A*	N/A N/A _____	_____ _____ _____	_____ _____ _____
<b>Page Printers**</b> 2687A	N/A	N/A	_____	N/A
<b>Personal Office Computers</b> 120/125 150	N/A* N/A*	_____ _____	_____ _____	N/A N/A
Subtotal (this page)	37B. _____	38B. _____	39B. _____	40B. _____
Subtotal (previous page)	37A. _____	38A. _____	39A. _____	40A. _____
<b>Totals (both pages)</b>	<b>37.</b> _____	<b>38.</b> _____	<b>39.</b> _____	<b>40.</b> _____

Line 37: MAX=60  
 Sum of Lines 38 and 39: MAX=32  
 Sum of Lines 37, 38, and 39: MAX=92

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration except the 2635B.

\*\* Note device maximums in system configuration guide.

## Series 39/42 Configuration Worksheet

Product Number	Description	Quantity
	<b>B. Data Communication Lines:</b>	
	Multipoint Lines	41. _____
	System to System Lines (Direct & Modem Connect)	42. _____
30020B	DSN/INPs Required (Sum of Lines 41 and 42, MAX=3) (Internal cables included; external communication cables must be ordered separately)	43. _____

## VIII. I/O Expansion.

## A. DSN/ADCC Asynchronous Data Communication Controller:

If you require direct connect RS-232-C or modem ports, they must be configured on the ADCC. *At a minimum, you must order 1 ADCC-Main to support the system console.*

	ADCC ports required (total of Lines 38 and 39, MAX=32)	44. _____
	Total of ADCC-Main and ADCC-Extender cards required (Divide Line 44 by "4" and round up to the nearest integer) (MIN=1; MAX=8)	45. _____
30018A	ADCC-Main (Divide Line 45 by "2" and round up to the nearest integer) (Internal cables included; external cables for devices must be ordered separately)	46. _____
30019A	ADCC-Extender (Line 45 minus Line 46) (Internal cables included; external cables for devices must be ordered separately)	47. _____

## B. General I/O Channels:

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.

*A figure showing 4 GICs has been included above in the section on GICs for your use as a configuration worksheet.*

30079A	Optional GICs (MAX=2. 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; external HP-IB cables are supplied with devices)	48. _____
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## Series 39/42 Configuration Worksheet

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

**C. Junction Mounting Panels:**

The Series 39/42 SPU has no junction panels.

**D. I/O Card Slots:**

The sum of:

Line # 31 - 261X Line Printer Series	49A. _____
Line # 43 - INPs	49B. _____
Line # 45 - ADCC Cards	49C. _____
Line # 48 - Optional GICs	49D. _____
GICs included standard with new systems	49E. <u>  2  </u>
Total of Lines 49A thru 49E (MAX=13)	49. _____

## Series 48

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Maximum System Configuration	
Ordering the SPU	1-23
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Card Reader	1-30
Power Line Conditioners	1-30
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Data Communications	
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DSN/INPs	1-33
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## HP 3000 SERIES 48 MINIMUM SYSTEM CONFIGURATION

### Supplied Hardware:

- Central Processing Unit
- System Clock
- Control and Maintenance Processor
- 2 General I/O Channels (GICs) for System Disc and Backup Tape Drive (These GICs are not included with box swap system upgrades)
- 2 Megabytes Fault Control Memory with Controller
- System Mainframe Cabinet including Card Cages and Power Supplies supporting the CPU, up to 4 Mb Memory, and 26 I/O Card Slots
- Built-in Isolation Transformer
- Telesupport Modem

### Required Hardware Ordered Separately:

- 1 System Console: Any HP 262x, 264x, 2382A, or 2635B terminal
- 1 System Console Cable. (The 2635B includes a 3.8 meter modem cable)
- 1 System Disc: 7914TD, 7920M, 7925M, or 7933H Master Disc Drive or 7911P, 7912P, or 7914P Integrated Storage Unit

- 1 Asynchronous Data Communications Controller (ADCC-Main) to connect the console to the system
- 1 Magnetic Tape Drive for System Backup: 7914TD, 7970E, 7971A, 7974A, or 7976A

### Supplied Software:

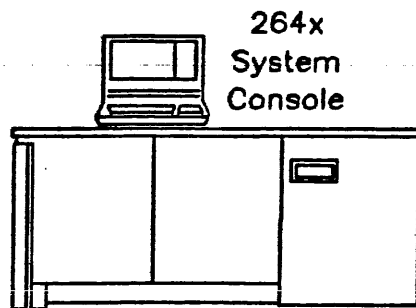
Standard on each HP 3000 system is the Fundamental Operating Software which includes:

- 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)
- Complete User Manual Set (For a Manual Listing, please see the Section on Manuals)

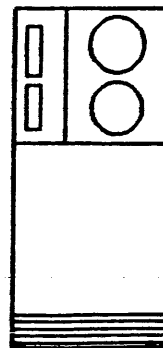
The Series 48 also includes Disc Caching, an I/O performance product, which is not a part of the fundamental operating software.

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

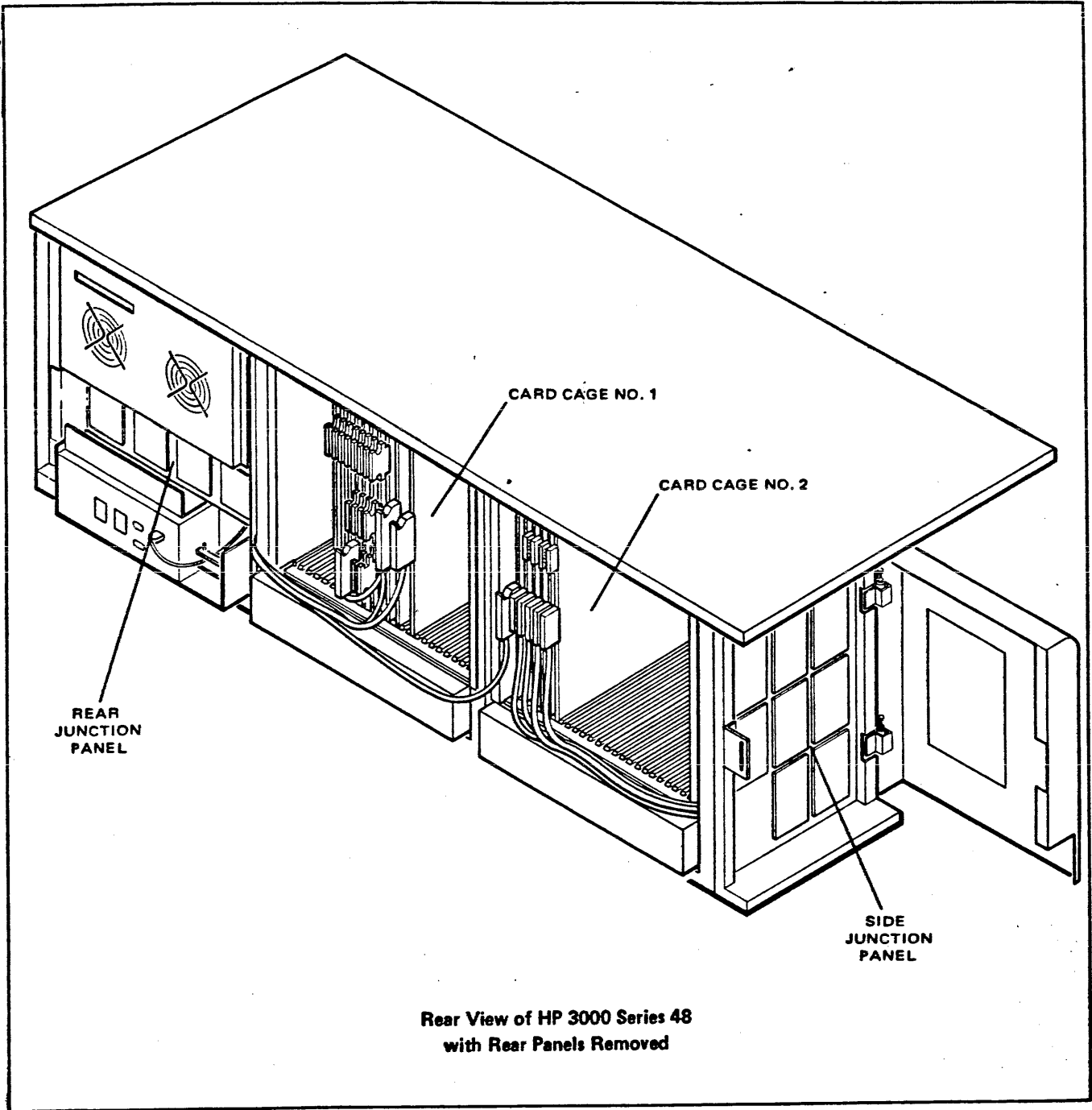
### HP 3000 Series 48 Minimum System Configuration Example



HP 3000 Series 48



7914TD Tape and Disc Drive Combination



# HP 3000 SERIES 48 MAXIMUM SYSTEM CONFIGURATION GUIDELINES

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

## Ordering the System Processor Unit

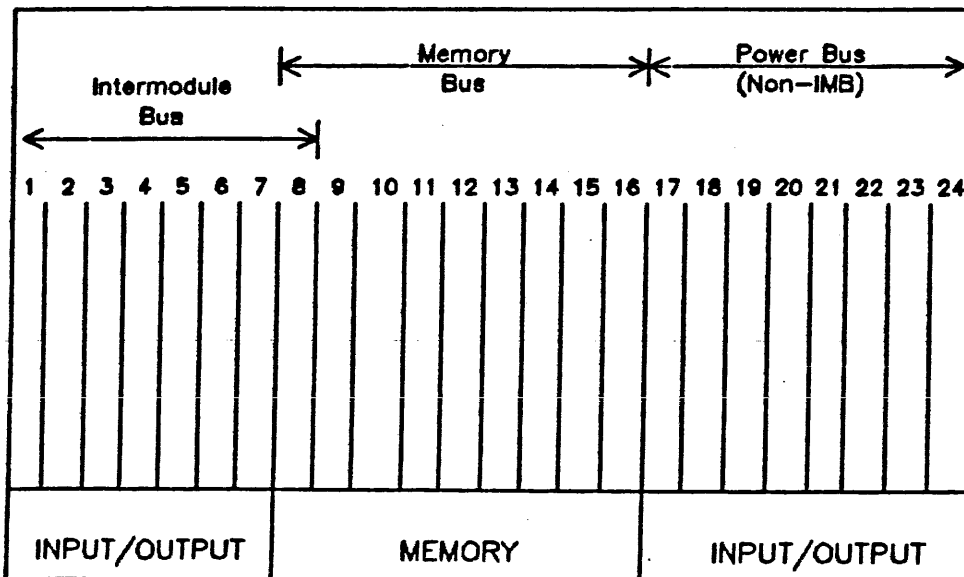
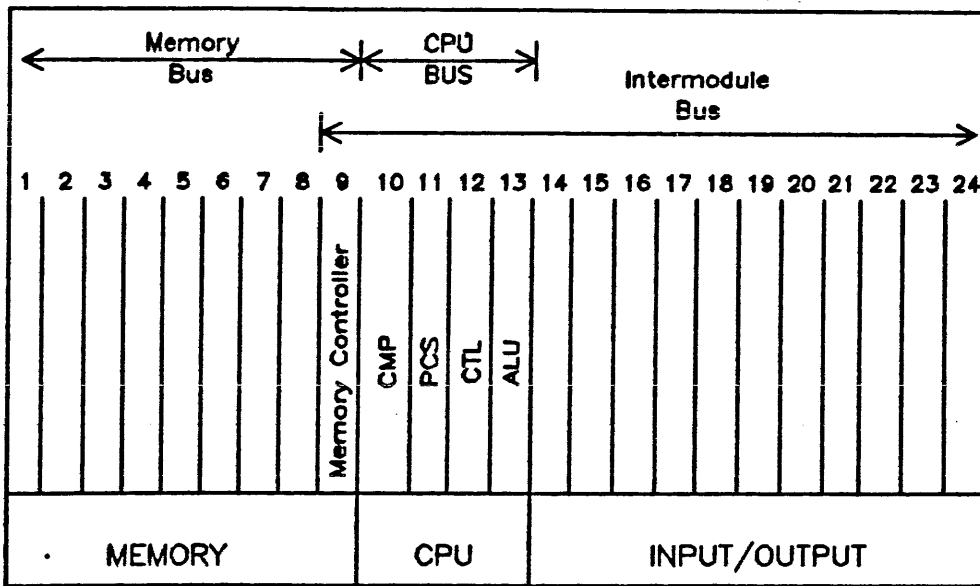
To obtain the Series 48 System Processor Unit order product number 32548B for new systems or 32548BH for box swap upgrades.

## The Card Cages

The Series 48 comes standard with two side-by-side card cages. Each card cage has 24 card slots.

The following figure depicts the Series 48 card cages.

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.
- Remember also to include the two standard GICs and the required and separately ordered 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), General I/O Channel (GIC), DSN/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.

**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 expanded by ordering memory expansion modules including: .5 Mb (product 30092A) and 1 Mb (product 30161A). The .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 .5 Mb product also require a separately ordered memory controller (product number 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	

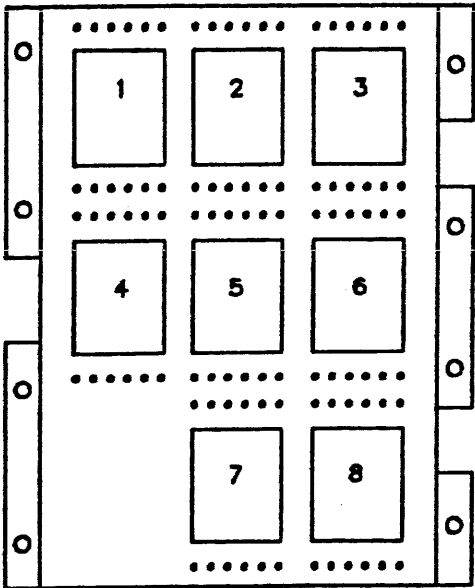
### Junction Panels

Junction panels are used in the connection of GIC, INP, ADCC, ATP/AIB, 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.

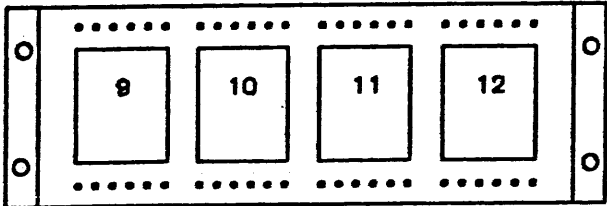
The Series 48 has two junction panels: one on the side and one on the rear. These panels allow external cabling for terminals, peripherals, and other systems to connect to internal system cabling.

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

Side Junction Panel



Rear Junction Panel

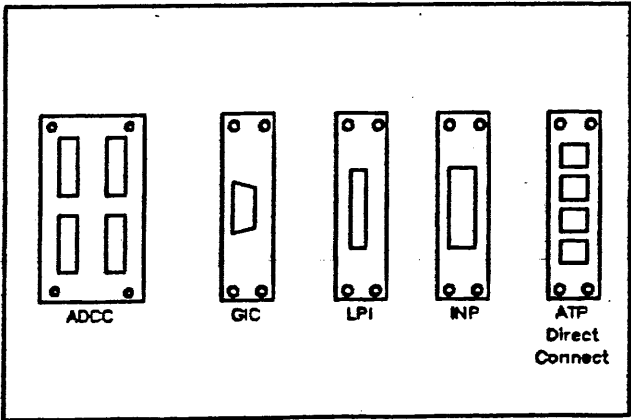


### Junction Panel Rules:

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

- Junction mounting panels that cover one third of a cutout are used for each GIC, LPI, 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 ATP's junction mounting panel motherboard and the associated terminal port mini-boards.
- 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.)

### Junction Mounting Panel Types



## 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 Series 68 maximum configuration section for a complete explanation of these rules. All rules on configuration of devices on individual GICs that apply to the Series 68 also apply to the Series 48. Note that the internal HP-IB cabling length between the GIC and the junction panels is two meters for the Series 48--the same length that the Series 68 requires.)

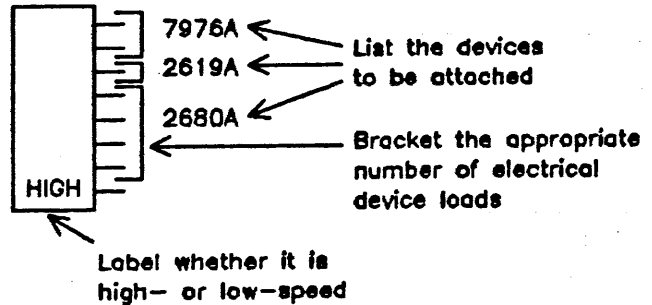
Order product number 30079A to obtain a GIC. You must also specify option 044 to obtain the proper HP-IB cable.

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. *Simultaneous transmission by three or more GICs with high-speed devices attached may exceed the available IMB bandwidth and corrupt data being transmitted.* (Please refer to the table on page 1-27 for a definition of high-speed devices and a high-/low-speed classification of supported devices).

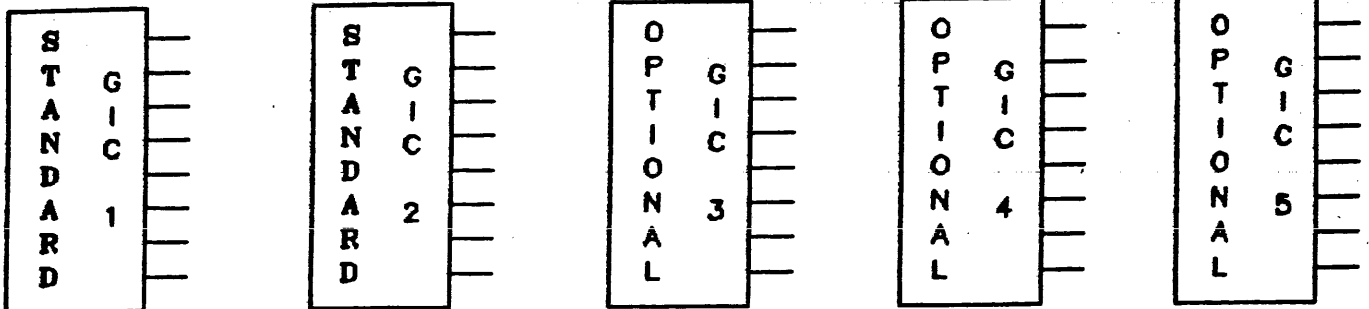
## Summary: GIC Attachment Restrictions:

- 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 (see table below) require a dedicated GIC to which no other devices may be attached.
- 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 (LDEV 1). System performance may be degraded with such a configuration when the tape drive is in use.

### How to Use the GIC Worksheet

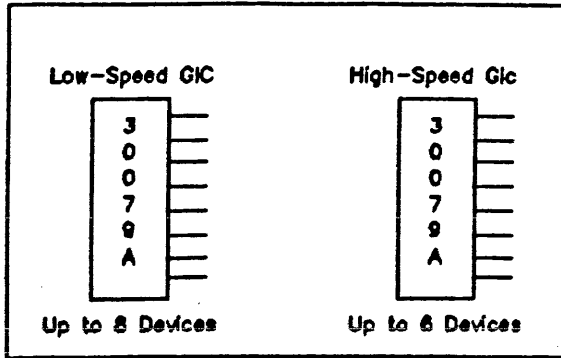


Please photocopy this page and use it as a GIC configuration worksheet:



Note that the GIC is a single product (30079A). Whether a GIC is considered high- or low-speed depends solely upon which peripherals are attached to it.

A maximum of six devices may be attached to each high-speed GIC. This maximum of "six" relates to devices per GIC and not to electrical device loads. The electrical device load maximum remains at eight per GIC.



**GIC Interface Requirements of Peripherals:**

The following table summarizes the requirements of peripherals and other devices using GICs to connect to the Series 48:

Peripherals	Peripheral Speed*	HP-IB Electrical Device Loads	Internal Device Cable Length (Meters)
Cartridge Tape in 7911P/12P/14P/14TD	Low	1 (Requires Dedicated GIC)	0
7911P/12P Disc Drive	High	1	1
7914P/14TD Disc Drive	High	1	1
7906M/20M/25M Master Disc Drive	High	1	1
7933H/7935H Disc Drive	High	1	0
7970E/7971A/7914TD 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)	0
7976A 1/2" Tape Drive	High	Shipped w/2 (Variable from 1 to 4)	2
2611A/13A/17A/19A Line Printer Interface Card (26069A)	Low	1	1
2608A Line Printer	Low (Do not mix with high)	1	0
2608S Line Printer	High (Do not mix w/7906/20/25)	Shipped w/2 (Variable from 1 to 7)	1
2680A/88A Page Printer	High	Shipped w/4 (Variable from 1 to 8)	1
INP Card (30020A/B)	Low	1	1
30106A (Opt. 333) Card Reader	Low	1 (Requires Dedicated GIC)	0
9895A (Opt. 010) Flexible Disc Drive	Low	1	1

\* A high-speed peripheral is one that has a data transfer rate on the HP-IB which exceeds 400KBytes per second.

## Peripherals

### Disc Drives:

One 7911P (28 Mb), 7912P (65 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7920M (50 Mb), 7925M (120 Mb), 7933H (404 Mb), or 7935H (404 Mb) hard disc drive is required as the system disc (LDEV 1).

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

7911P/12P/14P/14TD Discs w/Cartridge Tape	1
Total 7911P/12P Disc (With or Without Cartridge Tape)	4
Total 7914P/14TD Discs (With or Without Cartridge Tape)	8
792x Master Discs	2
792x Slave Discs	14
793x Discs	8
Total Discs	16

The 7920M and 7925M are master disc drives and can each support up to 7 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 7911P, 7912P, 7914P, 7914TD, 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. (Please see the peripherals cabling chapter for more details.)

The 7914TD combines into a single package a 7914 rackmounted disc drive, a 7970E type master tape drive, and an optional cartridge tape unit (option 002). 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 7970E type master drive will support up to three slave devices. The 7914TD is supplied with HP-IB cables standard -- one two meter cable for the disc drive and a six meter cable for the tape drive. When option 002 is ordered, the cartridge tape drive, a controller, and a one meter HP-IB cable are shipped.

Each 7933H and 7935H disc drive is shipped with a one meter HP-IB cable standard.

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 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, number 140, specified.

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a one meter 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 one meter HP-IB cable. The cartridge tape unit requires its own dedicated GIC.

**Magnetic Tape Drives:**

A 7970E, 7914TD, 7971A, 7974A or 7976A magnetic tape drive is required for system backup for the Series 48. When the Series 48 is ordered, software will be distributed on one-half inch tape unless you order option 022 with the Series 48 SPU (product number 32548A or 32548AH), which causes software to be distributed on cartridge tape.

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 type tape drives. The 7974A and 7976A 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 cartridge tape drive in addition to these maximums.

**Series 48 Maximum Tape Drive Configuration**


---

7970E/71A/14TD Masters	2
7970E/71A/14TD Slaves	6
7974A/76A Tapes	2
Total Tapes	8

---

The 7970E master tape drive comes with a six meter HP-IB cable standard. Each 7970E slave drive comes with a 6.1 meter (non-HP-IB) multiunit cable for tape drives. (Please see the peripherals cabling chapter for more details.)

The 7971A is a package of one or two 7970E type 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. Please see the peripherals cabling chapter for more details.)

For a description of the 7914TD's configuration options, see the paragraph in section above on disc drives.

The 7974A and 7976A are shipped with a two meter HP-IB cable standard. Each 7976A must be ordered with option 516 for it to interface with the Series 48. The 7974A does not require an option; however, you must specify option 800 to obtain the 800 cpi capability.

**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
2611A/13A/17A/19A	4
Total Line Printers Supported	4
Intelligent Page Printers:	
2680A, 2688A	2
Total System Printers Supported	6

---

The 261x family of line printers does not connect directly to a GIC; rather, each one uses a 1 meter HP-IB ribbon cable between only the interface card and the GIC card. (The line printer interface card (product 26069A) is included standard with option 344.) 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, internal cables, and external fifteen meter parallel differential cable, order option 344. Cabling beyond 15 meters must be ordered as a special from Boise.

The 2608A and 2608S 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 2608A is shipped with an HP-IB interface and a two meter HP-IB cable standard. For the 2608S, order option 344 to obtain the HP-IB interface and four meter 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 eight meter HP-IB cable for the 2680A or 2688A, order option 344. (This is an eight meter cable ; It is not two four meter cables linked together.) Specify option 099 with the 2680A to replace the eight meter cable with a two meter 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 a separate interface card in the I/O card cage.

## 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 card reader must be ordered as a "special" to ensure suitability to your customer's environment. In order for shipment to take place, you must consult with your factory sales development representative before quoting to the customer. The 30106A 80-column card reader interfaces to the Series 48 through a dedicated GIC. You must specify option 333 to receive a two meter HP-IB cable. When a card reader is configured on the system, a powerline conditioner is required. (This product will only be orderable through January 1, 1984.)

### 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 your customer may have. HP offers a small 1.8 kVA conditioner (product 35030A) which is adequate for some peripherals like

the 30106A card reader, but is inadequate for conditioning a full system. Your CE will have a list of recommended third party power line conditioners that your customer may purchase.

### 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. Other than not being able to share a GIC with a disc, the switchbox has no other configuration restrictions. Other devices on the same GIC must be "downed" when switching the 26075A. When determining HP-IB cable length, include 1/2 meter for the 26075A.

## Data Communications

### Terminal Connection:

Point-to-point connections are made to the Series 48 through either the DSN/Asynchronous Data Communications Controller (ADCC) or the DSN/Advanced Terminal Processor (ATP). The ADCC supports local (RS-232) and remote (full duplex) point-to-point display terminal, printing terminal, and character printer connections. The ATP supports only local (RS-232 and RS-422) connections on the Series 48. Multipoint connections are made to the Series 48 through multipoint data communication lines attached through the DSN/Intelligent Network Processor (INP). (DSN/Multipoint Terminal Software is also required.)

The following table summarizes the number of terminals supported on the Series 48:

### Series 48 Maximum Terminal Configuration

Direct Connect (ATP and ADCC)	104
Modem (ADCC Only)	60
Total Point-to-Point	104
Multipoint	95
Total	152

When running MPE-V/P, 110 terminals can be logged on the system. When running MPE-V/E, 152 terminals can be logged on. The maximum of 152 terminals includes all point-to-point, multipoint, system console, and DSN/DS virtual 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 or 2334A multipoint cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 48 via the DSN/Data Link or via modems and phone lines. The 2334A permits a group of up to 16 point-to-point devices to communicate with the Series 48 via X.25 packet switching networks. (Please refer to the display terminals and data communications sections of this guide or to the HP 3000 Data Communications Products Specifications Guide for further details on configuration and cabling.)

#### System Console:

One point-to-point connected 262X, 264X, 2382A, or 2635B must be ordered as the system console. For the 262x, 264x, and 2382A you must order the cable as an option: order option 304 for direct connect RS-232; and order option 301 for U.S. modem connect or option 302 for European modem connect. The 2635B includes a 3.8 meter modem cable standard. The system console must be configured on the ADCC.

#### DSN/Asynchronous Data Communications Controller:

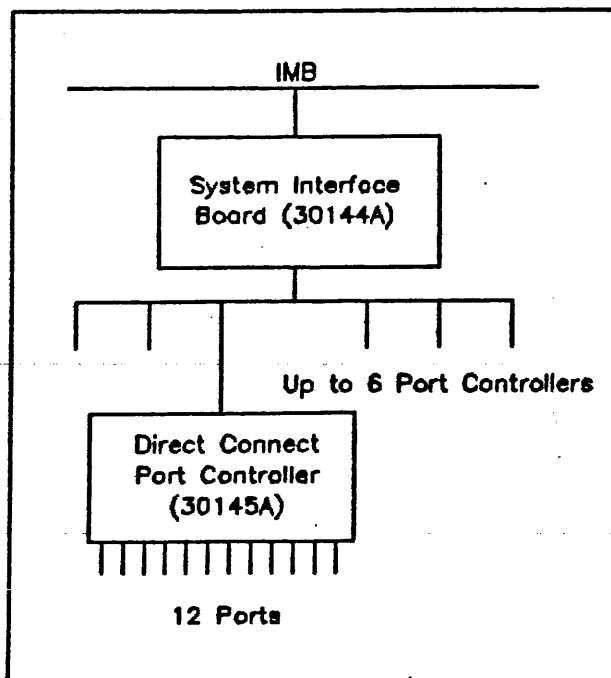
The ADCC on the Series 48 consists of two products: the ADCC-Main card (product number 30018A) and the ADCC-Extender card (product number 30019A). You must also order option 044 with these products to obtain the correct internal cable. Each ADCC card uses one slot in the I/O section of the card cage. ADCC-Main and ADCC-Extender cards must be ordered in alternating fashion (e.g. main, extender, main, extender, etc.) and must be placed side-by-side in alternating fashion in the card cage. Each ADCC-Main or ADCC-Extender supports up to four devices.

The first ADCC-Main is required with the Series 48 SPU to support the system console, and it must be ordered separately. This ADCC permits the attachment of the system console and up to three other devices. Limited by card cage slots, the Series 48 supports a maximum of 15 ADCCs or a total of 60 ADCC connected devices.

#### DSN/Advanced Terminal Processor:

As shown below, the ATP on the Series 48 consists of two products: DSN/ATP System Interface Board (SIB), product number 30144A and DSN/ATP Direct Connect Controller, product number 30145A. (ATP Modem connection is not supported.) The SIB occupies a slot in the card-cage. Each Direct Connect 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. (A graphic of the full ATP system has been included in the ATP discussion in the Series 68 maximum configuration guide. Note that this graphic also depicts ATP modem connections which are supported on the Series 68 but not on the Series 48.)

#### DSN/ATP Subsystem Structure





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. A maximum subsystem on the Series 48 consists of one SIB and six direct connect port controllers, supporting 72 terminals and consuming 7 I/O slots. (To connect the maximum of 104 point-to-point terminals requires this maximum ATP subsystem supporting 72 terminals plus eight additional ADCCs supporting 32 more terminals including the system console.) Each direct connect AIB supports RS-422 and RS-232 connections. This direct connect ATP product comes standard with 12 RS-422 ports, which can be converted to RS-232 ports in groups of four by ordering option 002. (Option 002 replaces an RS-422 miniboard with an RS-232 miniboard.) 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 002s.

**Tele-support Modem:**

Under the HP Tele-support program, all new (non-upgrade) system orders will be shipped with the HP Support Link Modem (product number 35141A) and with all required cables. CSD will supply this modem to box swap upgrade customers who require it.

**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 system configuration guidelines.

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

**Series 48 Maximum Spooled Device Configuration**

---

**SYSTEM AND 2608S MTS PRINTERS:**

<b>Line Printers:</b>	
2608A/S (HP-IB and Multipoint	2
261x	4
<b>Total Line Printers</b>	<b>4</b>
<b>Page Printers:</b>	
2680A, 2688A	2
<b>Total System Printers</b>	<b>6</b>

**SERIAL CONNECTED PRINTERS:**

<b>2631B and Generic RS-232 Printers:</b>	
2601A, 2602A, 2631B	8
2687A Page Printer	1 (ADCC*) or 2 (ATP*)
<b>Total Serial Connected Printers:</b>	<b>8</b>

*\* Field personnel and customers must be careful when attaching the 2687A to the Series 48. Two 2687As 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.*

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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 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 RS-232-C 2631B character printers through the DSN/ADCC or through the DSN/ATP via RS-232 connections. When used as a remote spooled printer, they are connected to an ADCC or ATP direct connect port via hardwired cable or to an ADCC modem port via a modem. For 2631B printers, specify option 331 to obtain the RS-232-C remote spooled printer capability and a 3.8 meter cable.

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

The Series 48 can support the 2687A laser printer in a serial configuration. RS-232-C (ADCC/ATP) and RS-422 (ATP) hardwire connections are supported--modem connection is not. You must specify option 344 to obtain the Series 48 subsystem. Cables must be ordered separately. (For more information on cabling, please refer to the chapter on cabling in this guide.)

HP plotters can be configured as slave devices to terminals and operated using HP software packages and user-supplied application programs. Plotters may be point-to-point connected to the ADCC or ATP via RS-232-C or to the ADCC via modem cables.

### DSN/Intelligent Network Processors:

A maximum of seven DSN/Intelligent Network Processors (INPs) (product number 30020B) may be configured on the Series 48. Each INP provides for one communication line that may be used by DSN/DS, DSN/MTS, DSN/RJE, DSN/MRJE, or DSN/IMF software. The same INP can be used (nonconcurrently) by any of these software products. Each INP board requires one I/O card slot and a 1 meter HP-IB ribbon cable (supplied with the product) for connection to a GIC. Each INP also counts as one electrical device load on a GIC.

The INP card in the I/O bay card cage is connected via two factory supplied cables: the HP-IB ribbon cable between the INP card and the GIC card and a non-HP-IB cable between the INP card and the external cable connection. The external cable must be ordered separately. There are many possible cabling options depending upon which system or device is to be connected. (Please refer to the display terminals and data communications sections of this guide or to the INP section of the HP 3000 Data Communications Products Specifications Guide for information on which cable to order.)

## Series 48 Configuration Worksheet

Product Number	Description	Quantity
<b>I. System Processor Unit</b>		
32548B	Series 48 System Processor	1. _____

### II. Memory Expansion (Refer to the memory expansion table in the Series 48 configuration guidelines).

**Total Memory Size** (Standard memory is 2 Mb, MAX=4) 2. \_\_\_\_\_

For configurations above the standard 2 Mb order:

30161A	1 Mb Memory Module for Series 4x	3. _____
30092A	512 Kb Memory Module for Series 4x	4. _____
30094A	Add-on Series 4x Memory Controller (needed for 2.5 and 3.5 Mb configurations)	5. _____

### III. Disc Drives.

#### A. Storage Units *with* Cartridge Tape:

One of the following may be included:

7911P	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	6. _____
7912P	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	7. _____
7914P	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	8. _____
7914TD	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 9, 14, and 24 to ensure that the totals for those lines do not violate device support maximums. (A 6 meter, a 2 meter, and a 1 meter HP-IB cable is included with each tape drive, disc drive, and cartridge tape, respectively)	9. _____
<b>Total Integrated Storage Units <i>with</i> Cartridge Tape (Sum of Lines 6, 7, 8, and 9, MAX=1)</b>		10. _____

## Series 48 Configuration Worksheet

Product Number	Description	Quantity
<b>B. Mass Storage Products (No Cartridge Tape):</b>		
7911P	28 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=4) (a 1 meter HP-IB cable is included)	11. _____
7912P	65 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=4) (a 1 meter HP-IB cable is included)	12. _____
	<b>Total 7911P/7912P Type Disc Drives (Total of Lines 6, 7, 11, and 12, MAX=4)</b>	13. _____
7914P	132 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=8) (a 1 meter HP-IB cable is included)	14. _____
7914TD (Discs)	132 Mb Mass Storage Subsystem (without opt. 114 this subsystem contains one drive. With opt. 114 the subsystem contains two drives. Enter the total number of disc drives on Line 15. MAX=8 for Lines 14 and 15. MAX=7 if a 7914P or 7914TD with Cartridge Tape is ordered above in Line 8 or 9. The number of 7914TD products ordered may be less depending on the number of subsystems with two drives) (For cabling information, see Line 9)	15. _____
7920M	50 Mb Master Disc Drive (a 2 meter HP-IB cable is included with option 102) (MAX=2)	16. _____
7920S	50 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=14)	17. _____
7925M	120 Mb Master Disc Drive (a 2 meter HP-IB cable is included with option 102) (MAX=2)	18. _____
7925S	120 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=14)	19. _____
	<b>Total 7920/25 Master Disc Drives (Sum of Lines 16 and 18) (MAX=2)</b>	20. _____
	<b>Total 7920/25 Slave Disc Drives (Sum of Lines 17 and 19) (MAX=14. This maximum would also require two 7920/25 Master Disc Drives because each master drive supports up to 7 Slave Drives)</b>	21. _____
7933H/ 7935H	404 Mb Disc Drive (MAX=8) (a 1 meter HP-IB cable is included)	22. _____
	<b>Total Disc Drives &amp; Integrated Storage Units (Sum of Lines 10, 13, 14, 15, 20, 21, and 22) (MAX=16)</b>	23. _____

## Series 48 Configuration Worksheet

Product Number	Description	Quantity
<b>IV. Magnetic Tape Drives.</b>		
<b>7970E/ 7971A/ 7914TD</b>	1600 CPI Magnetic Tape Master Tape Drive Subsystem (MAX=2, each master supports up to 3 Slave Tape Drives) (Each tape drive includes a 6 meter HP-IB cable)	24. _____
	Slave Tape Drive Subsystem (MAX=6) (a 6.1 meter multiunit cable is included)	25. _____
<b>7974A</b>	1600 CPI (800 CPI optional) Magnetic Tape Subsystem (MAX=2) (2 meter HP-IB cable included)	26A. _____
<b>7976A</b>	6250/1600 CPI Magnetic Tape Subsystem (option 516) (MAX=2) (2 meter HP-IB cable included)	26B. _____
	<b>Total of Lines 26A and 26B (MAX=2)</b>	26. _____
	<b>Total Magnetic Tape Drives (Sum of Lines 24, 25, and 26, MAX=8)</b>	27. _____

### V. Printers.

<b>2608A/ 2608S</b>	400 LPM Dot Matrix Printer (MAX=2) (The 2608A comes with a 2 meter HP-IB cable standard; the 2608S includes a 4 meter HP-IB cable with option 344)	28. _____
<b>261xA</b>	Line Printer Series (e.g., 2611A and 2619A) (MAX=4) (a 15 meter parallel differential cable is included with option 344)	29. _____
	<b>Total Line Printers (Sum of Lines 28 and 29, MAX=4)</b>	30. _____
<b>2680A/ 2688A</b>	Intelligent Page Printers (MAX=2) (an 8 meter HP-IB cable is included with option 344)	31. _____
	<b>Total System Printers (Sum of Lines 30 and 31, MAX=6)</b>	32. _____

### VI. Other Peripherals.

<b>9895A</b>	Flexible Disc Drive (opt. 010, MAX=1) (a 2 meter HP-IB cable is included with option 333)	33. _____
<b>30106A</b>	80 Column HP-IB Card Reader (opt. 333, MAX=1) (a 2 meter HP-IB cable is included with option 333)	34. _____

## Series 48 Configuration Worksheet

### VII. Data Communications.

#### A. Terminals, Plotters, Printers, and Personal Office Computers:

	Connection Method				
		Pt-to-Pt with DSN/ATP or ADCC			
			Direct Connect		
Product	Dalsychain* Multipoint	ADCC Modem	ATP Type 422	ADCC/ATP Type 232-C	Terminal Attached
<b>Display Terminals</b>					
2382A	N/A*	_____	N/A	_____	N/A
2621B	N/A*	_____	N/A	_____	N/A
2622A	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
2641A	_____	_____	_____	_____	N/A
2645A/N/S	_____	_____	_____	_____	N/A
2647A	_____	_____	_____	_____	N/A
2647F	N/A*	_____	_____	_____	N/A
2648A	_____	_____	_____	_____	N/A
2703A	N/A*	_____	_____	_____	N/A
<b>Plotters</b>					
7220C/T	N/A	_____	N/A	_____	_____
7221C/T	N/A	_____	N/A	_____	_____
7470A	N/A	_____	N/A	_____	_____
7475A	N/A	_____	N/A	_____	_____
7580A/B	N/A	_____	N/A	_____	_____
7585B	N/A	_____	N/A	_____	_____
9872C/T	N/A	_____	N/A	_____	_____
<b>Subtotal (this page)</b>	35A. _____	36A. _____	37A. _____	38A. _____	39A. _____

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration except the 2635B.

### Series 48 Configuration Worksheet

Product	Connection Method				Terminal Attached
	Pt-to-Pt with DSN/ATP or ADCC			Direct Connect	
	Daisychain* Multipoint	ADCC Modem	ATP Type 422		
<b>Data Collection Terminals</b> 3075A 3076A 3077A 3081A 3092A 3093A	_____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____	N/A N/A N/A _____ _____ _____	_____ _____ _____ _____ _____ _____	N/A N/A N/A N/A N/A N/A
<b>Printing Terminals</b> 2635B	N/A	_____	N/A	_____	N/A
<b>Character Printers**</b> 2601A 2602A 2631B	N/A* N/A* N/A*	N/A N/A _____	N/A N/A N/A	_____ _____ _____	_____ _____ _____
<b>Page Printers**</b> 2687A	N/A	N/A	_____	_____	N/A
<b>Personal Office Computers</b> 120/125 150	N/A* N/A*	_____ _____	N/A _____	_____ _____	N/A N/A
<b>Subtotal (this page)</b>	35B. _____	36B. _____	37B. _____	38B. _____	39B. _____
<b>Subtotal (previous page)</b>	35A. _____	36A. _____	37A. _____	38A. _____	39A. _____
<b>Totals (both pages)</b>	35. _____	36. _____	37. _____	38. _____	39. _____

Line 35: MAX=95

Line 36: MAX=60

Sum of Lines 36, 37, and 38: MAX=104

Sum of Lines 35, 36, 37, and 38: MAX=152

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration except the 2635B.

\*\* Note device maximums in system configuration guide.

## Series 48 Configuration Worksheet

Product Number	Description	Quantity
<b>B. Data Communication Lines:</b>		
	Multipoint Lines	40. _____
	System to System Lines (Direct & Modem Connect)	41. _____
<b>30020B</b>	DSN/INPs Required (Sum of Lines 40 and 41, MAX=7) (Internal cables included; external communications cables must be ordered separately)	42. _____

### VIII. I/O Expansion.

#### A. DSN/ATP Advanced Terminal Processors:

**Step #1:** Determine the number of ATP direct connections desired.

<b>30145A</b>	Direct Connect Port Controllers (Sum of Lines 37 and 38 divided by "12" and rounded up to the next integer) (MAX=6) (Internal cables included; external cables for devices must be ordered separately)	43. _____
---------------	--	-----------

If you require more than 72 direct connect ports, i.e., more than the capacity of the 6 AIBs, you will have to configure those ports on the ADCC.

**Step #2:** Based on the desired number of RS-422 connections and RS-232-C connections, calculate the mix of RS-422 and RS-232-C ports on the controllers (it may be desirable to include additional RS-422 or RS-232-C ports in the configuration due to anticipated system 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 4 by ordering the appropriate number of options 002s.)

	Number of Direct Connect RS-232-C ports to be connected through Direct Connect Port Controller. (MAX=72)	44. _____
--	--	-----------

	Groups of 4 RS-232-C connections to Direct Connect Port Controller. (Divide Line 44 by "4" and round up to the next integer) (MAX=18)	45. _____
--	---	-----------

	Groups of 4 RS-422 connections to Direct Connect Port Controllers. (Divide Line 37 by "4" and round up to the next integer) (MAX=18) (Sum of Lines 45 and 46 cannot exceed 18)	46. _____
--	--	-----------

	Quantity of option 022s on 30145A: (Replaces 4 RS-422 ports with 4 RS-232-C ports) (Equals Line 45)	47. _____
--	---	-----------

<b>30144A</b>	System Interface Board (SIB) (MAX=1, Required if you have ordered one or more AIBs, see Line 43) (Internal cables included)	48. _____
---------------	---	-----------



## Series 48 Configuration Worksheet

Product Number	Description	Quantity
<p><b>B. DSN/ADCC Asynchronous Data Communications Controller.</b></p> <p>If you require modem ports or require more than 72 direct connect ports, you must order the ADCC (MAX=104 point-to-point devices). <i>At a minimum, you must order 1 ADCC-Main to support the system console; it cannot be supported on the ATP.</i></p> <p>ADCC ports required [(Total of Lines 36 and 38) minus number of RS-232-C ATP ports configured, i.e., Line 44] <span style="float: right;">49. _____</span></p> <p>Total ADCC-Main and ADCC-Extender cards required (Divide Line 49 by "4" and round up to the nearest integer) (MIN=1; MAX=15) <span style="float: right;">50. _____</span></p> <p><b>30018A</b> ADCC-Main (Divide Line 50 by "2" and round up to the nearest integer) (Internal cables included; external cables for devices must be ordered separately) <span style="float: right;">51. _____</span></p> <p><b>30019A</b> ADCC-Extender (Line 50 minus Line 51) (Internal cables included; external cables for devices must be ordered separately) <span style="float: right;">52. _____</span></p> <p><b>C. General I/O Channels:</b></p> <p>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.</p> <p>(Note: To configure GICs you must take into consideration peripheral speed, electrical device loads, cable lengths, peripheral incompatibilities and system performance.)</p> <p><i>A figure showing 5 GICs has been included in the previous section on GICs for your use as a configuration worksheet.</i></p> <p><b>30079A</b> 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; external HP-IB cables are supplied with devices) <span style="float: right;">53. _____</span></p>		

## Series 48 Configuration Worksheet

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

**D. Junction Mounting Panels:**

The sum of:

Line # 29 - 261X Line Printer Series	54A. _____
Line # 42 - INPs	54B. _____
GICs included standard with system	54C. <u>2</u>
Line # 53 - Optional GICs	54D. _____
DSN/ATP Direct Connect Controllers (AIBs):	
Line # 43 times "3"	54E. _____
DSN/ADCCs	
Line # 50 times "1.5"	54F. _____
Total of Lines 54A thru 54F	54. _____

Each Series 48 has 12 junction panel cutouts. Three junction mounting panels for GICs, LPis, or INPs can be configured on a cutout. Each AIB uses three junction mounting panels (12 ports) and consumes a full cutout. 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 above 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.*

**E. I/O Card Slots:**

I/O Card Slots Required

The sum of:

Line # 29 - 261X Line Printer Interface Cards	55A. _____
Line # 42 - INPs	55B. _____
Line # 50 - ADCC Cards	55C. _____
Line # 43 - Direct Connect Port Controllers (AIB)	55D. _____
Line # 48 - System Interface Boards (SIB)	55E. _____
Line # 53 - Optional GICs	55F. _____
GICs included standard	55G. <u>2</u>
Total of Lines 55A thru 55G (MAX=26)	55. _____

## Series 68

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## HP 3000 SERIES 68 MINIMUM SYSTEM CONFIGURATION

### Supplied Hardware:

- Central Processing Unit
- System Clock
- Diagnostic Control Unit (DCU)
- 2 General I/O Channels (GICs): for System Disc and Backup Tape Drive (These GICs are not included with box swap system upgrade orders)
- 3 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
- 8Kb of Writeable Control Store (WCS)
- Built-in Isolation Transformers for the System Processor
- Telesupport Modem
- A 2 Meter HP-IB Cable to Increase Disc Cabling Flexibility

### Required Hardware Ordered Separately:

- 1 System Console: HP 2647F Terminal with Option 890
- 1 System Console Cable (See Terminal Section of this Configuration Guide for Console Cabling Options)

- 1 System disc: 7914P, 7914TD, 7920M, 7925M, 7933H or 7935H Master Disc Drive
- 1 DSN/Advanced Terminal Processor (1 System Interface Board *AND* 1 Port Controller) to interface the system console
- 1 Magnetic Tape Drive for System Backup: 7914TD, 7970E, 7971A, 7974A, or 7976A

### Supplied Software:

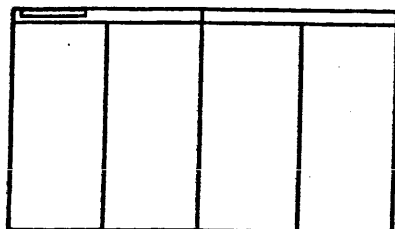
Standard on each HP 3000 system is the Fundamental Operating Software which includes:

- 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)
- Complete User Manual Set and Diagnostic Set (For a Manual Listing, please see the Section on Manuals)

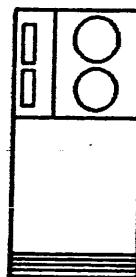
The Series 68 also includes Disc Caching, an I/O performance product, which is not a part of the fundamental operating software.

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

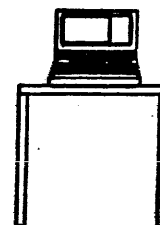
## HP 3000 Series 68 Minimum System Configuration Example



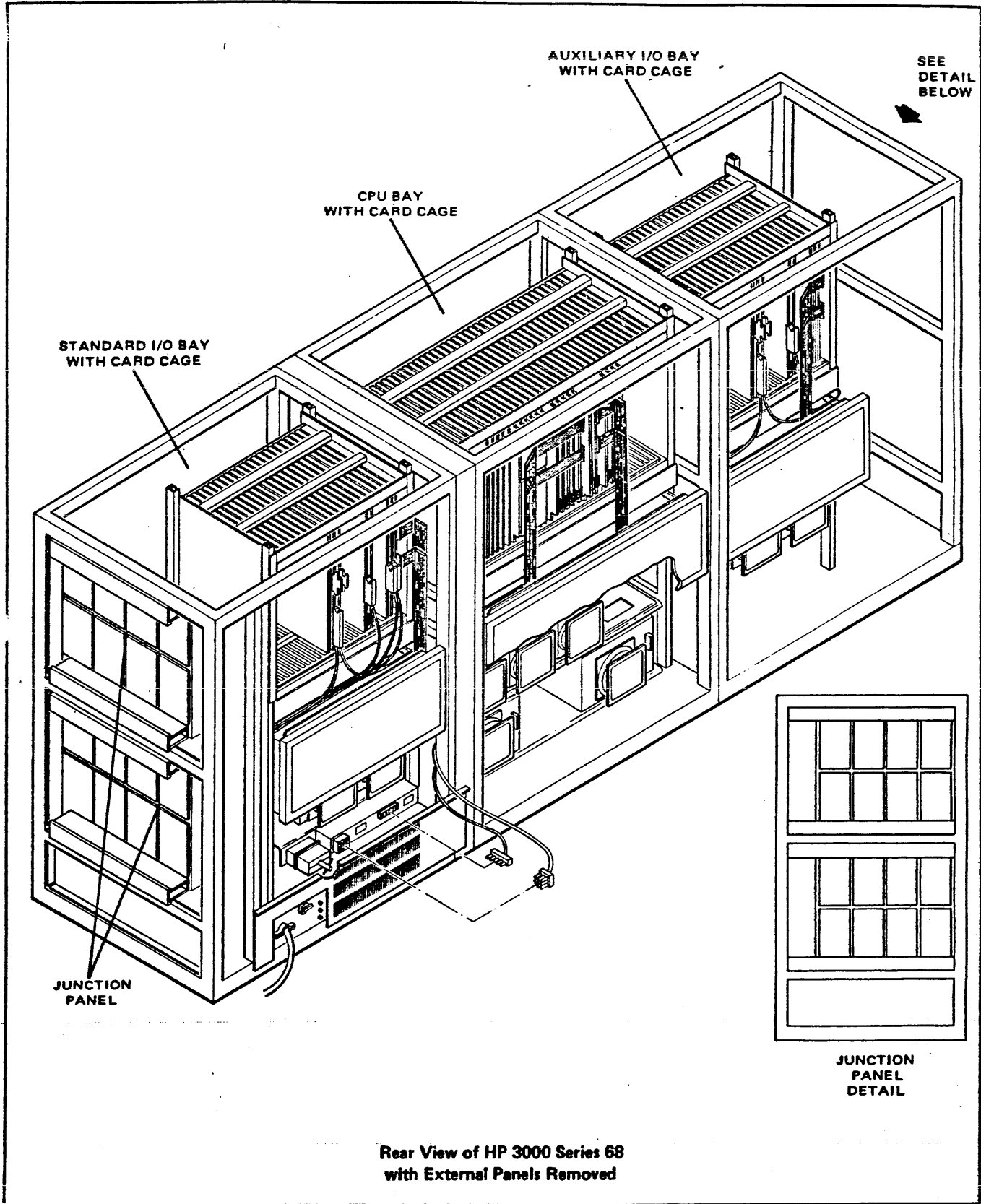
HP 3000  
Series 68  
with Standard I/O Bay



7914TD  
Tape and Disc  
Drive Combination



2647F  
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 32468B (new system orders) or 32468BH (box swap upgrade orders).

**Memory Expansion**

Three megabytes of 64K RAM fault control memory are supplied with the system processor unit. System memory sizes of 3 Mb, 4 Mb, 5 Mb, 6 Mb, 7 Mb, and 8 Mb are supported. Additional memory may be added by ordering Product Number 30142A (1 Mb memory expansion modules). These memory boards are configured into the CPU card cage and do not use I/O bay card cage slots.

**Series 68 Memory Expansion Order Quantity**

		Series 68 Memory Size (Mb)					
		STD					
		3	4	5	6	7	8
30142A	1 Mb Memory	1	2	3	4	5	

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**

dering:

The Series 68 (Product Number 32468B for new orders or Product Number 32468BH 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 32468B or 32468BH.

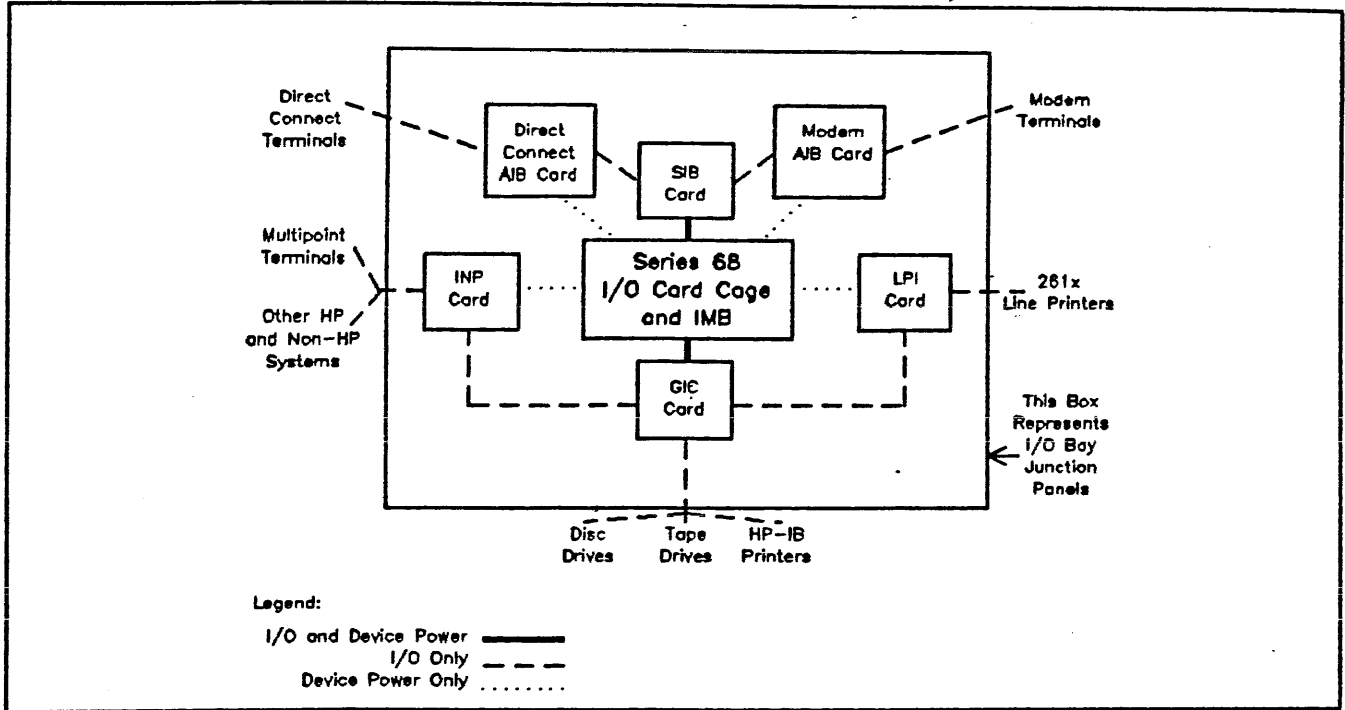
For Series 68s installed with only the standard I/O bay, the optional auxiliary I/O bay can be added later by ordering either product number 30464A or 30464B. Check with your CE if there is any question as to which product to order. The "A" or "B" designation relates to the type of power supplies used. 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, and 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 (product number 30143A)
- System Interface Boards (SIBs) (Part of a DSN/ATP subsystem) (product number 30144A)
- Direct Connect or Modem Port Controllers (product numbers 30145A and 30155A, respectively)
- General I/O Channel (GIC) cards (product number 30079A)
- DSN/Intelligent Network Processor (INP) cards (product number 30020B)
- 261X type line printer interface (LPI) cards (product number 26069A, which is included with the 261X printer product)

## Conceptual Schematic of Series 68 I/O Configuration



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.

### The Intermodule Bus (IMB):

IMBs allow GICs and SIBs in the I/O bay card cage to communicate with the CPU and Memory Modules in the CPU card cage. INPs, AIBs, and 261X LPs do not communicate directly with an IMB system. Through internal, inter-board cabling, INPs and 261X LPs 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 imbedded in the backplane motherboard, two cards configured in the CPU card cage (a central system bus interface card and an I/O buffer board), and two cables.

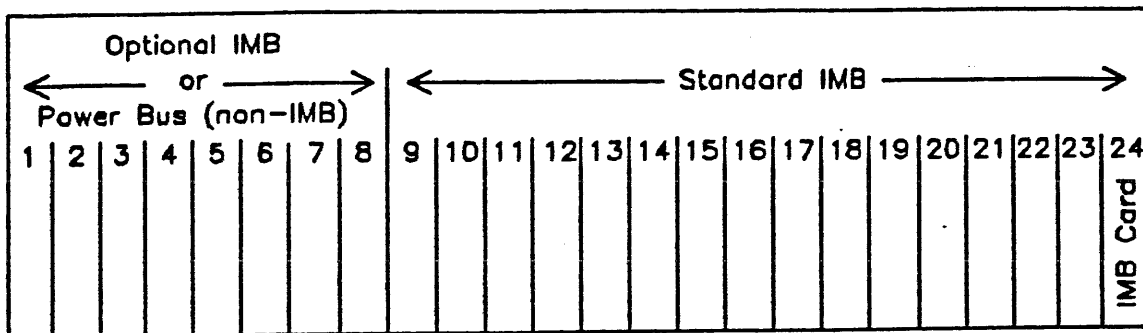
An IMB is supplied standard with each I/O bay ordered, and its interface card must be configured in slot 24 of each card cage. One additional IMB can be ordered as a separate product. This single, optional IMB can be installed as a second IMB on either one of the I/O bay card cages. (This IMB is known as the "I/O Adapter Module", product number 30143A.) This optional IMB may help improve performance on large configuration systems and systems with heavy I/O usage. To determine whether your customer would benefit from the optional IMB, please consult with your 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.

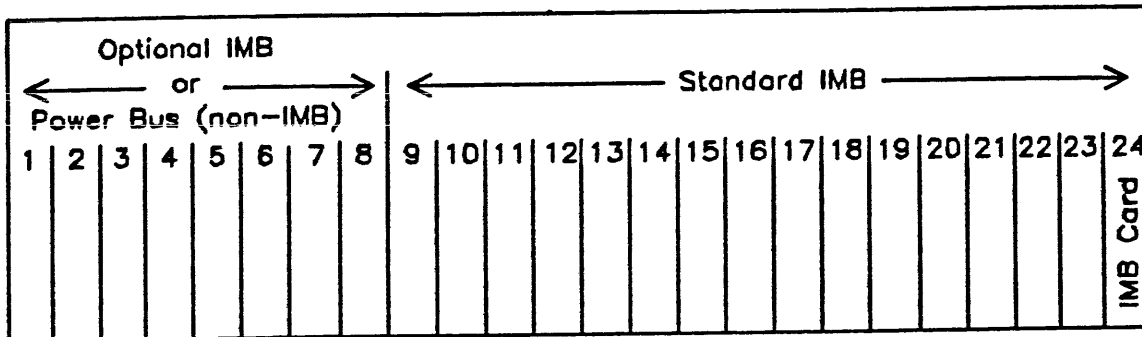
The optional IMB interface card must be configured in slot 8 of either I/O card cage for SIBs and GICs to be configured in slots 1 through 7. When there is no IMB interface card in slot 8, slots 1 through 8 act only as a power bus supplying power to AIB, INP, and 261X LPI cards.

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, 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 for 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.

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



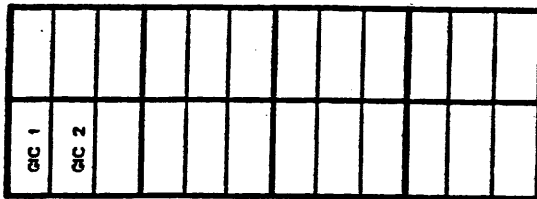
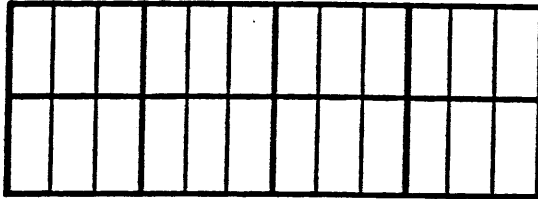
## Junction Panels

Junction panels are used in the connection of GIC, 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 these panels 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.

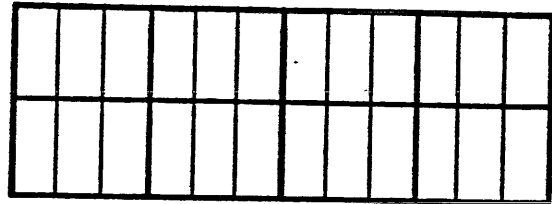
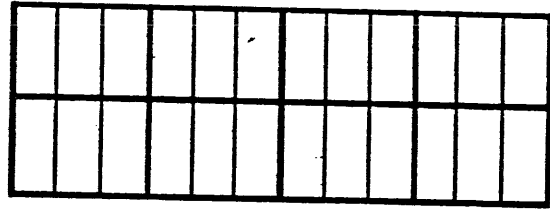
Please photocopy this page and use it as a junction mounting panel worksheet. (If you wish to have the factory preconfigure the ATP on the junction mounting panels prior to shipment, copy the final configuration from this worksheet onto the form included in the appendix following entitled "Series 68 Factory Junction Panel ATP Preconfiguration".)

### Standard I/O Bay Junction Panel



Bottom Row Reserved \*

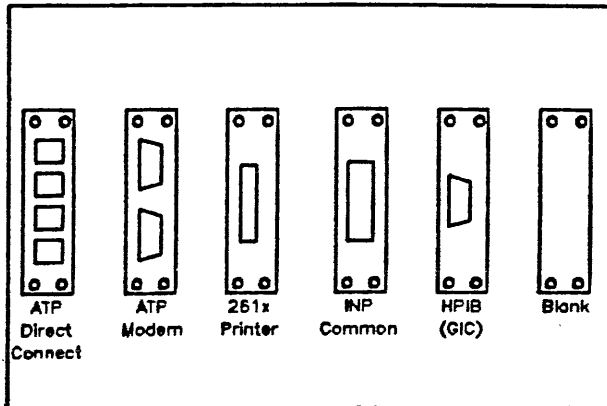
### Auxiliary I/O Bay Junction Panel



### Junction Panel Rules:

- There are 48 mounting panels per I/O bay junction panel.
- GIC, 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, 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, INPs, and LPIs.

### Junction Mounting Panel Types



### 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 1 to 8 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 5 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 number 30079A to obtain a GIC. You must also specify option 064 to obtain the internal GIC cable.

### Attaching Peripherals to GICs

#### Electrical Device Loads:

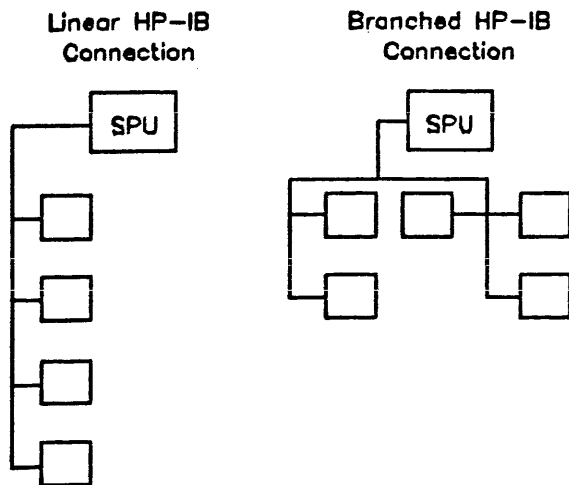
Up to 8 HP-IB "electrical device loads" are allowed on a single GIC. Each peripheral may generate between 1 and 8 HP-IB electrical device loads. For most peripherals the electrical device load is fixed; however, five currently supported peripherals, the 2608S, 2680A, 2688A, 7974A, and 7976A, can be configured 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 1-50 for a list of supported peripherals and their respective device loads.)

Multiple peripherals may be connected to a GIC as long as the sum of the electrical device loads does not exceed 8 (and so long as the combination does not violate other configuration constraints). Some peripherals require a dedicated GIC to which other peripherals cannot be attached.

### GIC HP-IB Cable Length:

*(Please read these paragraphs carefully.)*

The maximum total length of HP-IB cable linked together and connected to a single GIC 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 to a GIC. (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) between the nearest peripheral and the junction panel on the I/O bay,
- d) inside the I/O card cage between the junction panel and the GIC (2 meters for the Series 68 and 48 and 1 meter for the Series 39 and 42), and
- e) between the GIC card and 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 Series 68 and inside the peripheral devices are supplied standard with each product ordered. External HP-IB cables are usually supplied with system peripherals. (Such cabling information has been incorporated into the discussion on peripherals at the end of this Series 68 system configuration section. If you need further information, please check the peripherals cabling section of this guide.) To increase cabling flexibility, HP-IB cables can also be ordered separately in lengths of 1, 2, or 4 meters by ordering product numbers 10833A, 10833B, and 10833C, respectively.

### The "Seven Plus One Rule"

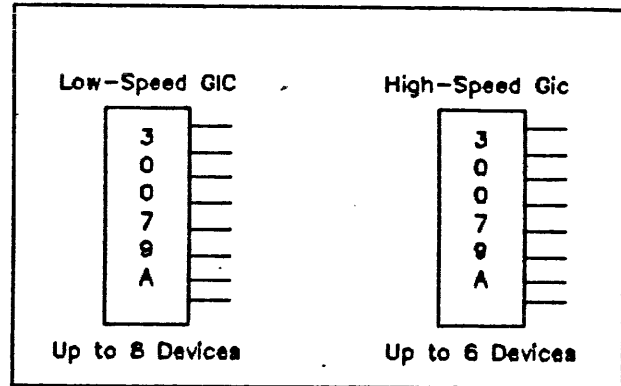
The length of allowable HP-IB cable is a function of the electrical device loads generated by the attached peripherals. By relating electrical device loads to cable length, we are able to optimize data transfer rates, ensuring correct performance. *The total HP-IB cable length may not exceed 7 meters plus 1 meter for each electrical device load attached to the HP-IB cable.*

### High- Versus Low-Speed Peripherals:

High-speed peripherals may be attached to no more than two GICs on each IMB. *Simultaneous transmission by three or more GICs with high-speed devices attached may exceed the available IMB bandwidth and corrupt data being transmitted.* 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. (Note that an optional IMB can be configured in either I/O card cage, but not in both.)

A maximum of six devices may be attached to each high-speed GIC. This maximum of "six" relates to devices per GIC and not to electrical device loads. The electrical device load maximum remains at eight per GIC.

Note that the GIC is a single product (30079A). Whether a GIC is considered high- or low-speed depends solely upon which peripherals are attached to it. A GIC is considered high-speed if it has one or more high-speed devices attached to it.



### GIC Interface Requirements of Peripherals:

The following table summarizes the requirements of peripherals and other devices using GICs to interface with the Series 68:

Peripherals	Peripheral Speed*	HP-IB Electrical Device Loads	Internal Device Cable Length (Meters)
Cartridge Tape In 7911P/12P/14P/14TD	Low	1 (Requires Dedicated GIC)	0
7911P/12P Disc Drive	High	1	1
7914P/14TD Disc Drive	High	1	1
7906M/20M/25M Master Disc Drive	High	1	1
7933H/7935H Disc Drive	High	1	0
7970E/7971A/7914TD 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)	0
7976A 1/2" Tape Drive	High	Shipped w/2 (Variable from 1 to 4)	2
2611A/13A/17A/19A Line Printer Interface Card (26069A)	Low	1	1
2608A Line Printer	Low (Do not mix with high)	1	0
2608S Line Printer	High (Do not mix w/7906/20/25)	Shipped w/2 (Variable from 1 to 7)	1
2680A/88A Page Printer	High	Shipped w/4 (Variable from 1 to 8)	1
INP Card (30020A/B)	Low	1	1
30106A (Opt. 333) Card Reader	Low	1 (Requires Dedicated GIC)	0
9895A (Opt. 010) Flexible Disc Drive	Low	1	1

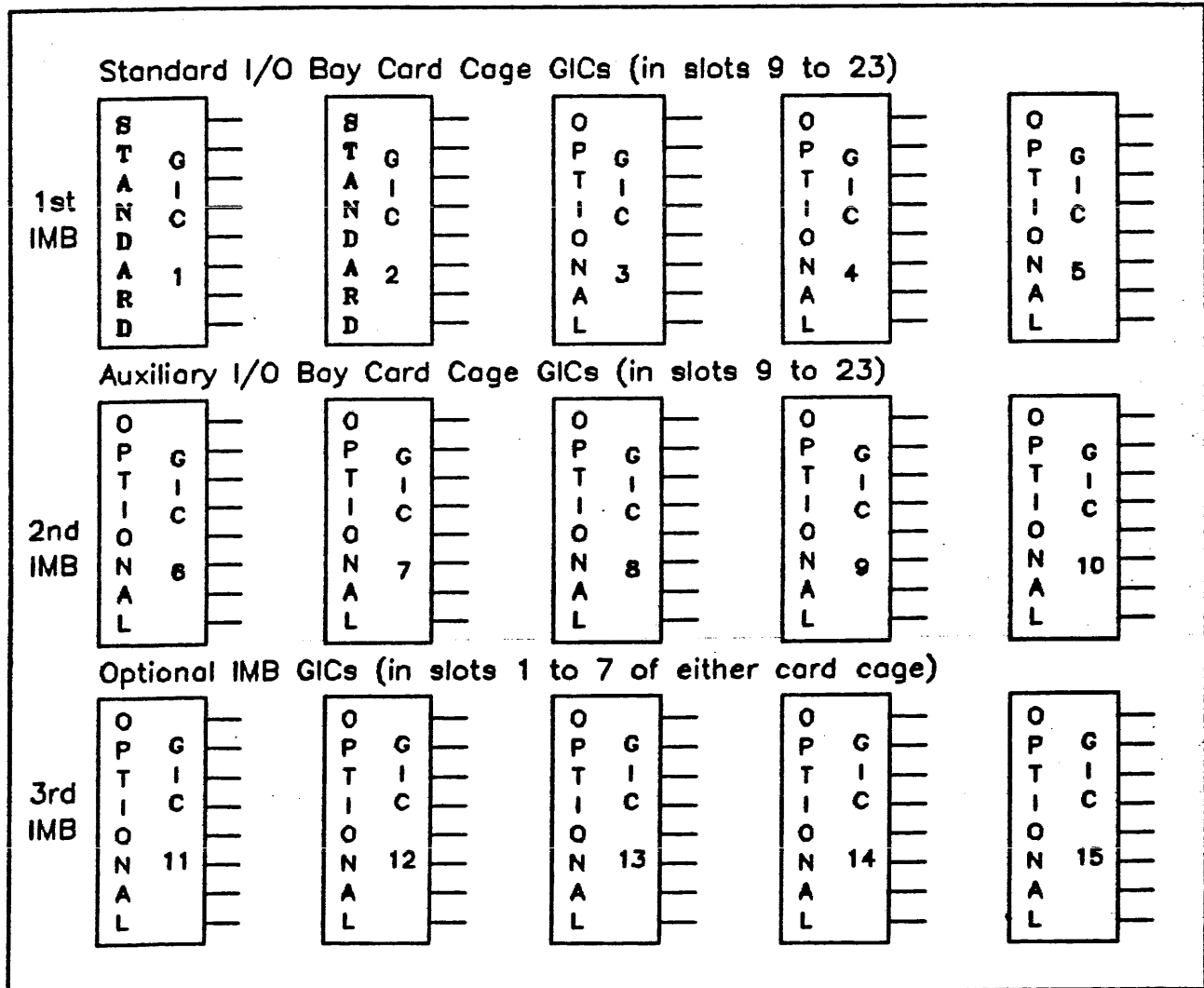
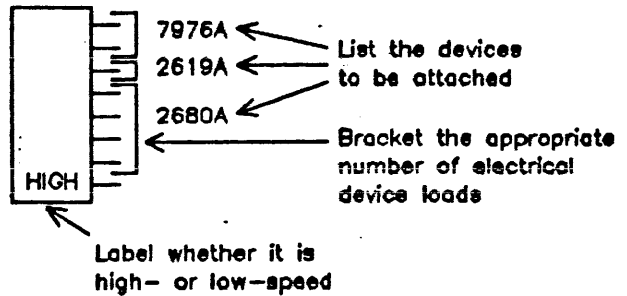
\* A high-speed peripheral is one that has a data transfer rate on the HP-IB which exceeds 400KBytes per second.

**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 (see table below) require a dedicated GIC to which no other devices may be attached.
- 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 (LDEV 1). System performance may be degraded with such a configuration when the tape drive is in use.

**How to Use the GIC Worksheet**



## Attaching Peripherals to a GIC, an Example:

Your customer needs to attach a 7933H disc drive, a 2619A line printer, and a 2680A page printer to a single GIC. Is this configuration allowed and how much HP-IB cable can I have?

### 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 8, i.e. 6 in this case.

### 2) Check the "Seven Meters Plus one Meter Per Electrical Device Load" Rule:

How much cable is allowed?

7 meters	
+ 1 meters	(7933H is configured with 1 electrical device load)
+ 1 meters	(2619A is configured with 1 electrical device load)
+ 4 meters	(2680A is configured with 4 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 furthest 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.)

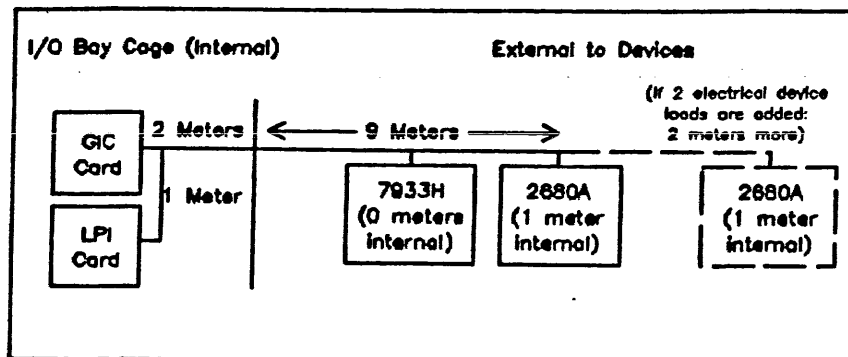
13 meters	(maximum length allowed)
- 1 meters	(ribbon cable between 2619A Interface card and GIC; see the table above)
-2 meters	(from GIC to junction panel; standard length allowed for the Series 68 I/O card cage)
-0 meters	(no 7933H internal cabling; see the table above)
- 1 meters	(2680A internal cable; see the table above)
<hr/>	
9 meters	(cable length remaining for external connections)

(Note that the 2619A, as well 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 I do anything?

Yes. A CE can reconfigure five peripherals, the 2608S, 2680A, 2688A, 7974A and 7976A 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 6 instead of 4 electrical device loads. This would allow the furthest peripheral to be placed 2 meters further away or 11 meters away in this example. (Note, however, that by doing this, 8 electrical device loads have now been configured on this GIC, leaving no more capacity for later adding another peripheral.)



## Peripherals

### Disc Drives:

One 7920M (50 Mb), 7925M (120 Mb), 7914P (132 Mb), 7914TD (132 Mb), 7933H (404 Mb), or 7935H (404 Mb) disc drive is required as the system disc (LDEV 1) 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/12P/14P/14TD Discs w/Cartridge Tape	1	1
Total 7914TD and 7914P Discs (With or Without Cartridge Tape)	8	8
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 7 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 7911P, 7912P, 7914P, 7914TD, 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. (Please see the peripherals cabling chapter for more details.)

The 7914TD combines into a single package a 7914 rackmounted disc drive, a 7970E type master tape drive, and an optional cartridge tape unit (option 002). 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 type master drive will support up to three slave devices. The 7914TD is supplied with HP-IB cables standard -- one two meter cable for the disc drive and a six meter cable for the tape drive. When option 002 is ordered, the cartridge tape drive, a controller, and a one meter HP-IB cable is shipped.

Each 7933H and 7935H disc drive is shipped with a one meter HP-IB cable standard.

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 (LDEV 1). A maximum of eight 7914Ps are supported. A 7914P hard disc drive can be configured as the system disc (LDEV 1). Because only one cartridge tape unit is allowed on the system, additional 7914P units must be ordered with the cartridge tape delete option, number 140, specified. (Option 140 will also delete the cartridge tape unit on the 7911P and 7912P.)

The Winchester disc drive component in the 7911P, 7912P, and 7914P is shipped with a controller and a one meter 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 one meter HP-IB cable. The cartridge tape unit requires its own dedicated GIC.

**Magnetic Tape Drives:**

A 7970E, 7914TD, 7971A, 7974A or 7976A 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 type tape drive. The 7970E type master tape drive can support up to three slave tape drives. The 7974A and 7976A 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 cartridge tape drive in addition to these maximums.

**Series 68 Maximum Tape Drive Configuration**

	1 or 2 I/O Bays
7970E/71A/14TD Masters	2
7970E/71A/14TD Slaves	6
7974A/76A Tape Drives	2
<b>Total Tape Drives</b>	<b>8</b>

The 7970E master tape drive comes with a six meter HP-IB cable standard. Each 7970E slave drive comes with a 6.1 meter (non-HP-IB) multiunit cable for tape drives. (Please see the peripherals cabling chapter for details on cabling.)

The 7971A is a package of one or two 7970E type 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. Please see the peripherals cabling chapter for details on cabling.)

For a description of the 7914TD's configuration options see the paragraph in the section above on disc drives.

The 7974A and 7976A are shipped with a two meter HP-IB cable standard. Each 7976A must be ordered with option 616 for it to interface with the Series 68. The 7974A does not require an option; however, you must specify option 800 to obtain the 800 bpi capability.

**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
<b>Line Printers:</b>	
2608A, 2608S	4
2611A/13A/17A/19A	4
<b>Total Line Printers Supported</b>	<b>8</b>
<b>Intelligent Page Printers:</b>	
2680A, 2688A	2
<b>Total System Printers Supported</b>	<b>10</b>

The 261X family of line printers does not connect directly to a GIC; rather, each one uses a 1 meter HP-IB ribbon cable between only the interface card and the GIC card. (The line printer interface card (product 26069A) is included standard with option 364.) 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, internal cables, and external fifteen meter parallel differential cable, order option 364. Cabling beyond 15 meters must be ordered as a special from Boise.



The 2608A and 2608S 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 2608A is shipped with an HP-IB interface and a two meter HP-IB cable standard. For the 2608S, order option 364 to obtain the HP-IB interface and 4 meter 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.)

If the 2608S is to be configured as a multipoint printer, it will be connected to an INP. Please see the last section of this guide for a discussion of INPs.

Order option 364 to obtain the Series 68 subsystem with eight meter HP-IB cable for the 2680A cable for the 2680A. (This is an eight meter cable; it is not two four meter cables linked together.) Specify option 099 with the 2680A to replace the eight meter cable with a two meter 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.

## Other Peripherals

### Flexible Disc Drive:

Only one 1.2 Mb flexible disc drive is supported on the Series 68. 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 card reader must be ordered as a "special" to ensure suitability to your customer's environment. In order for shipment to take place you must consult with your factory sales development representative before quoting to the customer. The 30106A 80-column card reader interfaces to the Series 68 through a dedicated GIC. You must

specify option 333 to receive a two meter HP-IB cable. When a card reader is configured on the system, a powerline conditioner is required. (This product will only be orderable through January 1, 1984.)

### 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 your customer may have. HP offers a small 1.8 kVA conditioner (product 35030A) which is adequate for some peripherals like the 30106A card reader, but is inadequate for conditioning a full system. Your CE will have a list of recommended third party power line conditioners that your customer may purchase.

### 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. Other than not being able to share a GIC with a disc, the switchbox has no other configuration restrictions. Other devices on the same GIC must be "downed" when switching the 26075A. When determining HP-IB cable length, include 1/2 meter for the 26075A.

## Data Communications

### Terminal Connection:

Point-to-point connections are made to the Series 68 through the DSN/Advanced Terminal Processor (ATP). The ATP supports modem, RS-232, and RS-422 connections. Multipoint connections are made to the Series 68 through multipoint data communication lines attached through DSN/Intelligent Network Processors (INP). (DSN/Multipoint Terminal Software is also required.)

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	
	V/P	V/E	V/P	V/E
Direct Connect	144	144	144	336
Modem	84	84	143	168
Total Pt-to-Pt	144	144	144	336
Multipoint	151	400	151	400
<b>Total</b>	<b>152</b>	<b>400</b>	<b>152</b>	<b>400</b>

When running MPE-V/P, 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 DSN/DS virtual terminals. Please consult with an SE or 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 or 2334A multipoint cluster controllers. The 2333A permits a group of up to 16 point-to-point devices to communicate with the Series 68 via the DSN/Data Link or via modems and phone lines. The 2334A permits a group of up to 16 point-to-point devices to communicate with the Series 68 via X.25 packet switching networks. (Please refer to the display terminals and data

communications sections of this guide or to the HP 3000 Data Communications Products Specifications Guide for further details on configuration and cabling.)

### System Console:

One point-to-point connected 2647F terminal with option 890 must be ordered as the system console. You must order the cable as an option: order option 306 for direct connect RS-422; order option 304 for direct connect RS-232; and order option 301 for U.S. modem connect or option 302 for European modem connect.

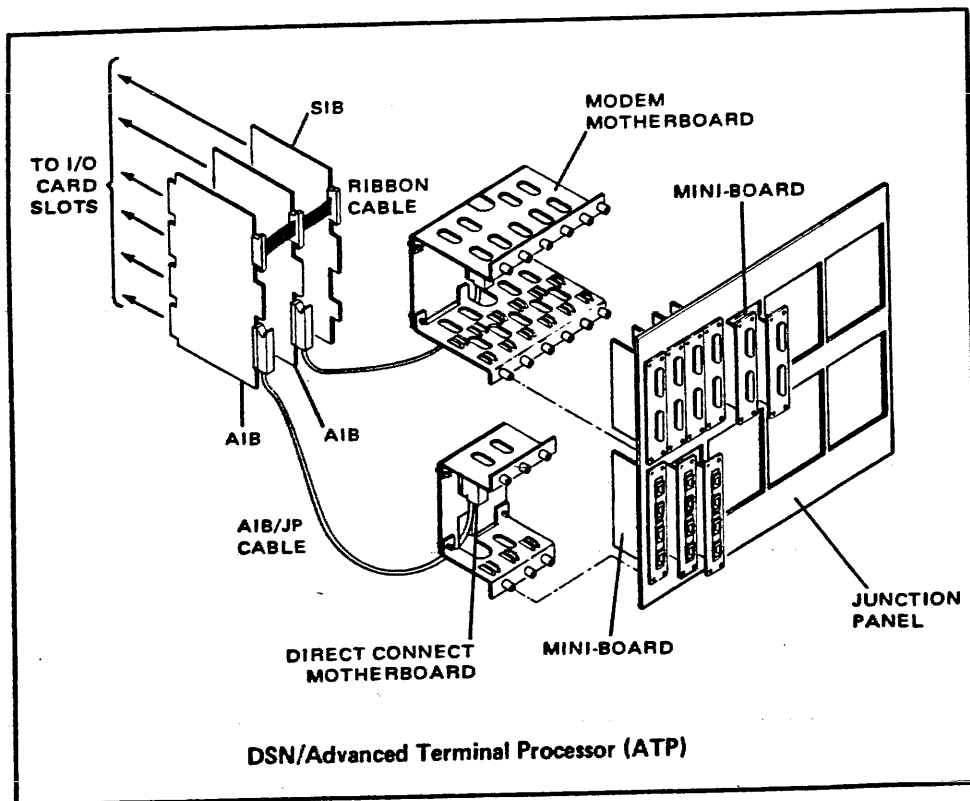
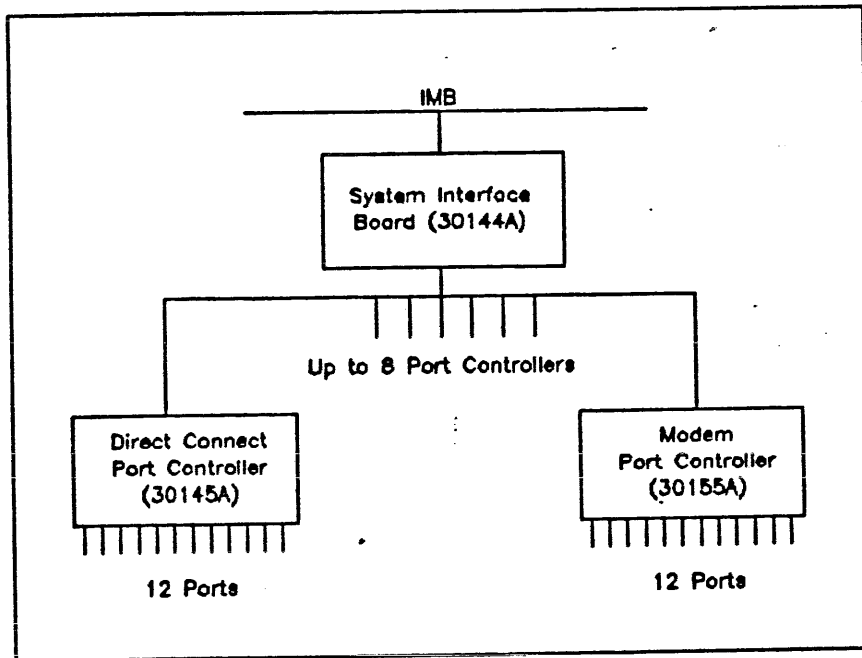
### DSN/Advanced Terminal Processor:

As shown in the figure on the next page, the ATP on the Series 68 consists of three products: DSN/ATP System Interface Board (SIB), product number 30144A; DSN/ATP Direct Connect Port Controller, product number 30145A; and DSN/ATP Modem Port Controller, product number 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 minimum required ATP subsystem on the Series 68 consists of one SIB and one Port Controller Product. One modem ATP product is recommended to support the Tele-support modem for remote diagnostics which is supplied with the system, however, it is not required. When a modem product is not configured, the Tele-support modem will be connected to the DCU port. This DCU port Tele-support modem 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.

### DSN/ATP Subsystem Structure



Each direct connect product 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. (Option 002 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 002s.

You must order options 001 and/or 003 with the initial Direct Connect or Modem ATP product ordered for the junction panels to be configured on the I/O Bay(s). For a more detailed discussion of your alternatives, please refer to the appendix following this section entitled "Series 68 Factory Junction Panel ATP Preconfiguration". Note that you must specify either option 001 or 003 to obtain the junction panels -- whether or not they are factory preconfigured.

#### Tele-support Modem:

Under the HP Tele-support program, all new (non-upgrade) system orders will be shipped with the HP Support Link Modem (product number 35141A) and with all required cables. CSD will supply this modem to box swap upgrade customers who require it.

#### 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:

A.1) HP-IB Printers (Including 261X type, 2608A, and 2608S line printers, and 2680A and 2688A page printers). These printers are connected to a GIC via an HP-IB cabling system.

#### B) DSN/MTS 2608S PRINTERS

B.1) Multipoint 2608S Printers. When ordered with option 055, the multipoint interface, and with DSN/MTS software, the 2608S can be connected to the DSN/Data Link or to a modem connected multipoint line. Maximum allowable line and modem baud rates allow only one 2608S to be attached to an INP, and no other spooled printer can be configured on that INP. At 19,200 baud the 2608S can achieve its full rated speed (400 lpm). At 9600 baud the 2608S can achieve 280 lpm.

#### C) SERIAL CONNECTED PRINTERS

C.1) 2631B Printers. These printers have a RS-232-C data communication ports supplied standard. Referred to as "local" or "remote" spooled, these printers may be either point-to-point connected by modem or hardwire, or they can be multipoint connected to the 2333A cluster controller or to the 2624B when configured to serve as a cluster controller. A maximum of four 2631B printers are supported per multipoint line. The total baud rate of printers connected must not exceed the baud rate of the line. For example, with a 9600 baud line you could attach up to two 2631B's configured at 4800 baud or up to four 2631B's configured at 2400 baud.

C.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.

C.3) 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**

1 or 2 I/O Bays

**SYSTEM AND 2608S MTS PRINTERS:**

**Line Printers:**

2608A/S (HP-IB and Multipoint)	4
261x	4
<b>Total Line Printers</b>	<b>8</b>

**Page Printers:**

2680A, 2688A	2
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**Total System Printers 10**

**SERIAL CONNECTED PRINTERS:**

**2631B and Generic**

**RS-232 Printers:**

2601A, 2602A, 2631B	16
2687A Page Printer	4

**Total Serial Connected Printers: 16**

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 =

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

16

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

#INPs = the number of 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.

e.g. A customer plans to run at peak periods, 28 sessions, 4 batch jobs and has 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 RS-232-C 2631B character printers through the DSN/ATP via RS-232 connections. When used as a remote spooled printer, they are connected to an ATP direct connect port via hardwired cable or to an ATP modem port via a modem. For 2631B printers, specify option 331 to obtain the RS-232-C remote spooled printer capability and a 3.8 meter cable.

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

The Series 68 can support the 2687A laser printer in a serial configuration. RS-232-C and RS-422 hardwire connections are supported-- modem connection is not. You must specify option 364 to obtain the Series 68 subsystem. Cables must be ordered separately. (For more information on cabling, please refer to the chapter on cabling in this guide.)

HP plotters can be configured as slave devices to terminals and operated using HP software packages and user-supplied application programs. Plotters also may be point-to-point connected to the ATP via RS-232-C or modem cables.

**DSN/Intelligent Network Processors:**

A maximum of 16 DSN/Intelligent Network Processors (INPs) (product number 30020B) may be configured on the Series 68 with the standard I/O bay. An additional 8 for a total of 24 INPs are supported on the Series 68 when the auxiliary I/O bay is also ordered and the system is running MPE-V/E. A maximum of 16 INPs are supported on a Series 68 running MPE-V/P regardless of whether it has one or two I/O bays.

Each INP provides for one communication line that may be used by DSN/DS, DSN/MTS, DSN/RJE, DSN/MRJE, or DSN/IMF software. The same INP can be used (nonconcurrently) by any of these software products. Each INP board requires one I/O card slot and a 1 meter HP-IB ribbon cable (supplied with the product) for connection to a GIC. Each INP also counts as one electrical device load on a GIC.

The INP card in the I/O bay card cage is connected via two factory supplied cables: the HP-IB ribbon cable between the INP card, and the GIC card and a non-HP-IB cable between the INP card and the junction mounting panel. Each INP uses one junction mounting panel. The external cable must be ordered separately. There are many possible cabling options depending upon which system or device is to be connected. (Please refer to the display terminals and data communications section of this guide, or to the INP section of the HP 3000 Data Communications Products Specifications Guide for information on which cable to order.)

## Series 68 Configuration Worksheet

Product Number	Description	Quantity
<b>I. Memory Expansion.</b>		
	<b>Total Memory Size</b> (Standard memory is 3 Mb, MAX=8)	1. _____
<b>30142A</b>	1 Mb Memory Module for Series 6X (Number of Mb in Line 1 minus "3", MAX=5)	2. _____

### II. Disc Drives.

#### A. Storage Units *with* Cartridge Tape:

One of the following may be included:

<b>7911P</b>	28 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	3. _____
<b>7912P</b>	65 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	4. _____
<b>7914P</b>	132 Mb Integrated Storage Unit <i>with</i> Cartridge Tape (opt. 001, MAX=1) (2 one-meter HP-IB cables are included)	5. _____
<b>7914TD</b>	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 6, 9, and 19 to ensure that the totals for those lines do not violate device support maximums) (a 6 meter, a 2 meter, and a 1 meter HP-IB cable is included with each tape drive, disc drive, and cartridge tape, respectively)	6. _____
	<b>Total Integrated Storage Units <i>with</i> Cartridge Tape</b> (Sum of Lines 3, 4, 5, and 6, MAX=1)	7. _____

#### B. Mass Storage Products (No Cartridge Tape):

<b>7914P</b>	132 Mb Integrated Storage Unit (opt. 140, Cartridge Tape Deleted, MAX=8; MAX=7 if a 7914P with Cartridge Tape is ordered above in Line 6) (a one-meter HP-IB cable is included)	8. _____
<b>7914TD (Discs)</b>	132 Mb Mass Storage Subsystem (without opt. 114 this subsystem contains one drive. With opt. 114 the subsystem contains two drives. Enter the total number of disc drives on Line 9, MAX=8 for Lines 8 and 9. The number of 7914TD products ordered may be less depending on the number of subsystems with two drives) (For cabling information, see Line 6)	9. _____

## Series 68 Configuration Worksheet

Product Number	Description	Quantity
<b>7920M</b>	50 Mb Master Disc Drive (a 2 meter HP-IB cable is included with option 102) (MAX=16)	10. _____
<b>7920S</b>	50 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=14)	11. _____
<b>7925M</b>	120 Mb Master Disc Drive (a 2 meter HP-IB cable is included with option 102) (MAX=16)	12. _____
<b>7925S</b>	120 Mb Slave Disc Drive (a 2.4 meter multiunit cable and a 15.2 meter data cable are included) (MAX=14)	13. _____
	<b>Total 7920/25 Master Disc Drives (Sum of Lines 10 and 12) (MAX=16)</b>	14. _____
	<b>Total 7920/25 Slave Disc Drives (Sum of Lines 11 and 13) (MAX=14. This maximum would also require two 7920/25 Master Disc Drives because each master drive supports up to 7 Slave Drives)</b>	15. _____
<b>7933H/ 7935H</b>	404 Mb Disc Drive (MAX=16 on a one I/O bay system and MAX=24 on a two I/O bay system) (a 1 meter HP-IB cable is included)	16. _____
	<b>Total Disc Drives &amp; integrated Storage Units (Sum of Lines 7, 8, 9, 14, 15, and 16) (MAX=16 on a one I/O bay system and MAX=24 on a two I/O Bay System)</b>	17. _____

### III. Magnetic Tape Drives.

<b>7970E/ 7971A/ 7914TD</b>	1600 CPI Magnetic Tape Master Tape Drive Subsystem (MAX=2, each master supports up to 3 Slave Tape Drives) (Each tape drive includes a 6 meter HP-IB cable)	18. _____
	Slave Tape Drive Subsystem (MAX=6) (a 6.1 meter multiunit cable is included)	19. _____
<b>7974A</b>	1600 CPI (800 CPI optional) Magnetic Tape Subsystem (MAX=2) (2 meter HP-IB cable included)	20A. _____
<b>7976A</b>	6250/1600 CPI Magnetic Tape Subsystem (Option 616) (MAX=2) (2 meter HP-IB cable included)	20B. _____
	<b>Total of Lines 20A and 20B (MAX=2)</b>	20. _____
	<b>Total Magnetic Tape Drives (Sum of Lines 18, 19, and 20, MAX=8)</b>	21. _____



## Series 68 Configuration Worksheet

Product Number	Description	Quantity
<b>IV. Printers.</b>		
<b>2608A/ 2608S</b>	400 LPM Dot Matrix Printer (MAX=4) (The 2608A comes with a 2 meter HP-IB cable standard; the 2608S includes a 4 meter HP-IB cable with option 364)	22. _____
<b>261xA</b>	Line Printer Series (e.g., 2611A and 2619A) (MAX=4) (a 15 meter parallel differential cable is included with option 364)	23. _____
	<b>Total Line Printers (Sum of Lines 22 and 23, MAX=8)</b>	24. _____
<b>2680A/ 2688A</b>	Intelligent Page Printers (MAX=2) (an 8 meter HP-IB cable is included with option 364)	25. _____
	<b>Total System Printers (Sum of Lines 24 and 25, MAX=10)</b>	26. _____

### V. Other Peripherals.

<b>9895A</b>	Flexible Disc Drive (opt. 010, MAX=1) (a 2 meter HP-IB cable is included with option 333)	27. _____
<b>30106A</b>	80 Column HP-IB Card Reader (opt. 333, MAX=1) (a 2 meter HP-IB cable is included with option 333)	28. _____

## Series 68 Configuration Worksheet

### VI. Data Communications.

#### A. Terminals, Plotters, Printers, and Personal Office Computers:

**NOTE: CABLING MUST BE ORDERED SEPARATELY FOR THESE DEVICES!**

	Connection Method				
		Pt-to-Pt with DSN/ATP			
			Direct Connect		
Product	Daisychain* Multipoint	Modem	Type 422	Type 232-C	Terminal Attached
<b>Display Terminals</b>					
2382A	* N/A*	_____	N/A	_____	N/A
2621B	N/A*	_____	N/A	_____	N/A
2622A	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	_____	N/A
2628A	_____	_____	_____	_____	N/A
2641A	_____	_____	_____	_____	N/A
2645A/N/S	_____	_____	_____	_____	N/A
2647A	_____	_____	_____	_____	N/A
2647F/opt.890**	N/A*	_____	_____	_____	N/A
2648A	_____	_____	_____	_____	N/A
2703A	N/A*	_____	_____	_____	N/A
<b>**Console Terminal</b>					
<b>Plotters</b>					
7220C/T	N/A	_____	N/A	_____	_____
7221C/T	N/A	_____	N/A	_____	_____
7470A	N/A	_____	N/A	_____	_____
7475A	N/A	_____	N/A	_____	_____
7580A/B	N/A	_____	N/A	_____	_____
7585B	N/A	_____	N/A	_____	_____
9872C/T	N/A	_____	N/A	_____	_____
<b>Subtotal (this page)</b>	29A. _____	30A. _____	31A. _____	32A. _____	33A. _____

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration except the 2635B.

### Series 68 Configuration Worksheet

Product	Connection Method				Terminal Attached
	Daisychain* Multipoint	Pt-to-Pt with DSN/ATP		Modem	
		Type 422	Type 232-C		
<b>Data Collection Terminals</b>					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
3081A	_____	_____	_____*	_____	N/A
3092A	_____	_____	_____	_____	N/A
3093A	_____	_____	_____	_____	N/A
<b>Printing Terminals</b> 2635B	N/A	_____	N/A	_____	N/A
<b>Character Printers**</b>					
2601A	N/A*	N/A	N/A	_____	_____
2602A	N/A*	N/A	N/A	_____	_____
2631B	N/A*	_____	N/A	_____	_____
<b>Page Printers**</b> 2687A	N/A	N/A	_____	_____	N/A
<b>Personal Office Computers</b>					
120/125	N/A*	_____	N/A	_____	N/A
150	N/A*	_____	_____	_____	N/A
<b>Subtotal (this page)</b>	29B. _____	30B. _____	31B. _____	32B. _____	33B. _____
<b>Subtotal (previous page)</b>	29A. _____	30A. _____	31A. _____	32A. _____	33A. _____
<b>Totals (both pages)</b>	29. _____	30. _____	31. _____	32. _____	33. _____

Line 29: MAX=400 (one or two I/O bays)

Line 30: MAX=84 (one I/O bay); MAX=168 (two I/O bays)

Sum of Lines 30, 31 and 32: MAX=144 (one I/O bay); MAX=336 (two I/O bays)

Sum of Lines 29, 30, 31, and 32: MAX=400 (one or two I/O bays)

\* The 2333A and 2334A Cluster Controller will support any RS-232-C terminal in a multipoint configuration except the 2635B.

\*\* Note device maximums in system configuration guide.

## Series 68 Configuration Worksheet

Product Number	Description	Quantity
<b>B. Data Communication Lines:</b>		
	Multipoint Lines	34. _____
	System to System Lines (Direct & Modem Connect)	35. _____
<b>30020B</b>	DSN/INPs Required (Sum of Lines 34 and 35, MAX=16 on a one I/O Bay System, and MAX=24 on a two I/O Bay System) (Internal cables Included; external communications cables must be ordered separately)	36. _____

### VII. I/O Expansion.

#### A. DSN/ATP Advanced Terminal Processors:

**Step #1:** Determine the number of modem connections desired & the appropriate number of modem port controllers to order.

<b>30155A</b>	Modem Port Controller Product (Line 30 divided by "12" and rounded up to the next integer) (Internal cables Included; external cables for devices must be ordered separately)	37. _____
---------------	---	-----------

**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 37) minus Line 30]	38. _____
--	-----------

**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 & RS-232-C ports on the controller (it may be desirable to include additional modem, RS-422, or RS-232-C ports in the configuration due to anticipated system expansion).

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

Number of Direct Connect RS-232-C ports connected through Direct Connect Port Controllers (Line 32 minus Line 38, enter "0" if the result is less than "0")	39. _____
---	-----------

Groups of 4 RS-232-C connections to Direct Connect Port Controllers. (Divide Line 39 by "4" and round up to the next integer)	40. _____
---	-----------

Groups of 4 RS-422 connections to Direct Connect Port Controllers. (Divide Line 31 by "4" and round up to the next integer)	41. _____
---	-----------

## Series 68 Configuration Worksheet

Product Number	Description	Quantity
<b>30145A</b>	Direct Connect Port Controller Product (Divide sum of Lines 40 and 41 by "3" and round up to the next integer) (internal cables included; external cables for devices must be ordered separately)	42. _____
	Quantity of Option 002s: Replaces 4 RS-422 ports with 4 RS-232 ports. (equals Line 40)	43. _____
<b>30144A</b>	System Interface Board (SIB) (Divide the sum of Lines 37 and 42 by "8" and round up to the next integer) (internal cables included)	44. _____
	<b>B. General I/O Channels:</b>	
	To determine the number of GICs required on the system, refer to the section on GICs in the Series 68 maximum system configuration guide	
	(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 above in the section on GICs for your use as a configuration worksheet.</i>	
<b>30079A</b>	Optional GICs (MAX=8 on a one I/O Bay system and MAX=13 on a two I/O Bay system. 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; external HP-IB cables are supplied with devices)	45. _____
	<b>C. Junction Mounting Panels:</b>	
	The sum of:	
	Line # 23 - 261X Line Printer Series	46A. _____
	Line # 36 - INPs	46B. _____
	GICs included standard with system (zero if box swap upgrade)	46C. <u>  2  </u>
	Line 45 - Optional GICs	46D. _____
	DSN/ATP Direct Connect and Modem Port Controllers:	
	Line # 37 times "6"	46E. _____
	Line # 42 times "3"	46F. _____
	Total of Lines 46A thru 46F	46. _____

Each I/O Bay has 48 mounting panels. *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.* In addition, if you wish to specify how the ATP will be installed at the factory, please see the appendix following this configuration worksheet.

## Series 68 Configuration Worksheet

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

### D. I/O Card Slots:

I/O Card Slots Required

The sum of:

Line # 23 - 261X Line Printer Interface Cards	47A. _____
Line # 36 - INPs	47B. _____
Line # 37 - Modem Port Controllers (AIB)	47C. _____
Line # 42 - Direct Connect Port Controllers (AIB)	47D. _____
Line # 44 - System Interface Boards (SIB)	47E. _____
Line # 45 - Optional GICs	47F. _____
GICs Included standard (zero if box swap upgrade)	47G. <u>  2  </u>
Line # 48 - Optional IMB (see note below)	47H. _____
Standard IMBs (one per I/O Bay) (see note below)	47I. _____
Total of Lines 47A thru 47I	47. _____

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

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 17), b) INPs (Line 36), c) GICs (Line 45), d) Junction panel space (Line 46) or f) I/O Card Slots (Line 47). If, however, none of the above have forced you into ordering 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 that in the future, your customer has room to easily expand their system as their 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 supplied)

48. \_\_\_\_\_

## Series 68 Configuration Worksheet

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### VIII. System SPU and I/O Bays.

Having completed Parts I through VII 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:**

**32468B** "HP 3000 Series 68 System Processor Unit"

The I/O Bay will include an IMB, card cage and power supply. You must also order option 001 on the first ATP/AIB (product number 30145A or 30155A) for the junction panels to be configured with the system. Please see the appendix on Series 68 Factory Junction Panels ATP preconfiguration following this configuration worksheet. This will allow you to specify how the ATP will be installed at the factory.

**B. To Order an SPU with Two I/O Bays, Order:**

**32468B** "HP 3000 Series 68 System Processor Unit"

plus

**Option 250.** Add expansion bay and I/O adapter (IMB)

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 (product number 30145A or 30155A) for the junction panels to be configured with the system on both I/O Bays. Please see the appendix on the Series 68 factory junction panel ATP preconfiguration following this configuration worksheet. This will allow you to specify how the ATP will be installed at the factory.

## Series 68 Configuration Worksheet

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### Appendix

#### Series 68 Factory Junction Panel

#### ATP Preconfiguration

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 the 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 32468B 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. To better accommodate your customer's configuration requirements, the factory is providing you an opportunity to tell us exactly where your customer would like the ATP to be installed on the junction panel.

This can be done by completing the attached form and returning it to the factory at least 3 weeks prior to the system ship date. *Provided this is an initial order with either an option 001 or option 003, on product 30145A or 30155A you can specify where the ATP mini-boards will be installed.*

- A. For the Series 68 (32468B) without Auxiliary I/O Bay specify option 001 with the first ATP product 30145A or 30155A. Complete the worksheet on the following page using *only* the "Standard I/O Bay Junction Panels".
- B. For the Series 68 (32468B with option 250) with Auxiliary I/O Bay specify options 001 and 003 with the first ATP product 30145A or 30155A. Complete the worksheet on the following page using *both* the "Standard" and "Auxiliary" I/O Bay Junction Panels.

If you do not care to complete and return this form for a new Series 68 with two I/O Bays, your customer will receive the default configuration. This default is:

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

### 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, INPs, and 261X Line Printers should also be configured on the panels to ensure that you have adequate space. These products, however, will be installed at the customer site by a CE.

**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)

- Upon completion, mail this form to:

Junction Panel Diagrams  
Hewlett Packard Company  
19420 Homestead Road  
Cupertino, CA 95014

This form must be received at the factory at least 3 weeks prior to system ship date.

**SALES ORDER NO.** \_\_\_\_\_

**CUSTOMER NAME** \_\_\_\_\_

**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, INPs, and LPs.

## HP 3000 Supported Peripherals

### Maximum Peripheral Configurations

(See Notes for Differences in Support on MPE-V/P and MPE-V/E)

Devices	S/39/42	S/48	S/68 1 I/O Bay	S/68 2 I/O Bays	Notes
Maximum IMBs	1	1	2	3	10,14
Maximum High Speed Gics	2	2	4	6	1,2
Maximum Gics	4	5	10	15	3
Maximum INPs	3	7	16	24	8,15
<b>Discs:</b>					
7920/7925M	2	2	16	16	4
7920/7925S	7	14	14	14	
7933H/7935H	8	8	16	24	4
7914	8	8	8	8	4
7911/7912	4	4	1	1	4
7906M	1	1	0	0	4
7906S	6	7	0	0	4
Maximum Disc Drives	8	16	16	24	
<b>Tapes:</b>					
7970E-M	1	2	2	2	5
7970E-S	3	6	6	6	
7974A/7976A	2	2	2	2	4,6
Maximum 1/2" Mag Tape Drives	4	8	8	8	
Maximum Integrated Tape Cart.	1	1	1	1	5,9
<b>Line Printers:</b>					
2611A/13A/17A/19A	2	4	4	4	
2608A	2	2	4	4	7
2608S	2	2	4	4	11
Maximum Line Printers	2	4	8	8	
<b>Page Printers:</b>					
2680	2	2	2	2	4
2688	2	2	2	2	4
Maximum Page Printers	2	2	2	2	
<b>Serial Connected Printers:</b>					
2687 (RS-232/422) ADCC	1	2			12,13
2687 (RS-232/422) ATP		1	4	4	12,13
2631B	8	8	16	16	13
<b>Other Devices:</b>					
9895A-010 Flexible Disc Dr.	1	1	1	1	
30106A Card Reader	1	1	1	1	5

# HP 3000 Supported Peripherals

Maximum Peripheral Configurations	1-73
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## 1-74 System Configuration Rules

### Notes:

1. Maximum of 6 high-speed device controllers per GIC. The number of controllers may be further limited by cable lengths and loads.
2. Only 2 high-speed GICs are allowed per IMB on the Series 6x.
3. Up to 5 GICs per IMB on the Series 6x.
4. High-speed GIC only.
5. Requires a dedicated GIC.
6. The minimum main memory requirement for use of the 7976A is as follows:

1 drive	512 Kbytes
2 drives	768 Kbytes
7. Cannot share a GIC with disc or tape drives.
8. 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.
9. The Integrated Tape Cartridge is only supported on the Series 39/42 for systems with less than 130 Mbytes of disc storage.
10. Third IMB requires Auxillary I/O Bay.
11. Must be on a high-speed GIC, but cannot be on the same GIC as a 792x disc.
12. The 2687 *cannot* be a "System" printer.
13. These maximums are not additive. See the Spooled Output Device heading in the Series 39/42, 48, and 68 sections of this chapter.
14. Only 2 IMBs are supported on a 1 or 2 I/O Bay Series 68 with MPE-V/P.
15. Maximum of 16 INPs on a 1 or 2 I/O Bay Series 68 with MPE-V/P.

## Maximum Terminal Configurations

	S/39/42	S/48	S/68 1 I/O Bay		S/68 2 I/O Bays	
			MPE-V/E	MPE-V/P	MPE-V/E	MPE-V/P
<b>Terminals Attached*</b>						
Direct Connect	32	104	144	144	336	144
Modem Connect	32	60	84	84	168	143
Total Point-to-Point	32	104	144	144	336	144
Total Multipoint	60	95	400	151	400	151
<b>Total Terminals Attached</b>	<b>92</b>	<b>152**</b>	<b>400</b>	<b>152</b>	<b>400</b>	<b>152</b>
<b>Sessions ***</b>						
Total Sessions Logged On:						
MPE-V/P	92	110	N/A	110	N/A	110
MPE-V/E	90	152	400	N/A	400	N/A

\* This includes Remote Spooled Printers (2631B, 2687A, 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.

\*\*\* These session limits include all point-to-point, multipoint, system console, and DSN/DS virtual terminals.

**Disc Support Matrix**  
(Series 39, 40/42, 44/48, 64/68)

Disc	LDEV 1	System Disc	Private Volume	Serial Disc
9895	No	No	Yes	Yes
7906M/S	No	Yes	Yes*	Yes*
7920/25M	Yes	Yes	Yes	Yes
7920/25S	No	Yes	Yes	Yes
7911/12	S/39 & 4x only	Yes	Yes	No
7914	Yes	Yes	Yes	No
7933	Yes	Yes	Yes	Yes

\* Only the 10Mb removable portion of the 7906 disc drive is supported in this configuration.

2

## Upgrade Configuration Rules

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## UPGRADING HP 3000 SYSTEMS

### Overview

Upgrades to the current HP 3000 systems, Series 42, 48 and 68 are available from all previous HP 3000 systems. HP 2000 and HP 300 systems can also be upgraded to current systems. These upgrades are designed to provide a smooth growth path for expanding applications and organizations.

Upgrades can take one of two forms. The first of these is the field upgrade and would be ordered by a customer who had a Series 40 and wanted a Series 42, a Series 44, desiring a Series 48 or a Series 64, which could become a Series 68. In the case of a field upgrade, the customer's original hardware, including peripherals, is retained and additional hardware and software are added to upgrade to the new system. It is the simplest of upgrades and can be achieved with minimum cost to and impact on the operation.

All other upgrade paths constitute a box swap upgrade, where the original System Processing Unit (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 the case of a box swap upgrade, there are important considerations to make as to the disposition of the system peripherals. If the system to be upgraded is an HP-IB system (Series 30, 33, 39, 40, 40SX, 42, 44, 48), existing peripherals can be moved to the new system without conversion. On the other hand, if the system being upgraded is a non-HP-IB system (Series III, pre-Series III, HP 2000), many peripherals are not supported on the current systems. Some peripherals may be supported, but only after conversion. Chapters two and three discuss the two types of box swap upgrades and give detailed information about supported peripherals and necessary conversions.

For a complete list of the upgrades available and the appropriate part numbers, see Appendix A.

The following details should be taken into consideration when configuring an upgrade:

### Installation and Deinstallation

The SPU being upgraded must already be installed at the time of the upgrade order. The deinstallation and installation should take place at the same facility in order to avoid additional CE costs and charges. Normal deinstallation and installation charges are included in the price of the upgrade.

### Site Preparation

When upgrading to a larger system, site preparation requirements could differ. It is important to have a site preparation specialist visit if there is a question as to the suitability of the site. In particular, the Series 68 SPU requires more air conditioning and electrical capacity than most previous systems.

### Return Credits

Return credits are available on SPUs being upgraded to a new system. In addition, credits may be available for certain peripherals and accessory equipment. The return credit availability for non-SPU items varies over time. For the list of currently available return credits, consult the latest HP 3000 Computer Systems Price Guide.

## UPGRADING FROM SERIES III OR PRE-SERIES III

When upgrading from a Series III or pre-Series III system, many of the existing peripherals will be incompatible because of the difference in I/O structures between the older and current systems. An exception to this would be a Series III equipped with an HP-IB interface module (30341A). In that case the peripherals

attached to the interface module can be carried over to the new systems.

The following table identifies at a glance those peripherals that can be carried straight to the new system (S), those which need conversion or additional equipment (NC) and those which are not supported (NS). If the peripheral needs conversion, the rightmost column contains the part number of the conversion product needed. A more detailed explanation of the information in the chart follows.

Peripherals	NS	NC	S	Conversion Needed
<b>Discs</b> 7933H 404 Mb, fixed 7935H 404 Mb, removable 7925M 120 Mb master 7925S 120 Mb slave 7925A 120 Mb 7920M 50 Mb master 7920S 50 Mb slave 7920A 50 Mb 7905A (13180B) 15 Mb 7900A (30110A) 5 Mb 2888A (30102A) 47 Mb 2600A (30103A) fixed head				
		X	X	12745A
		X	X	13037U, option 102
		X	X	12745A
		X	X	13037U, option 102
	X			
	X			
	X			
	X			
<b>Magnetic Tape Drives</b> 7976A 6250 bpi 7970E Master 1600 bpi 7970E Slave 1600 bpi 7970B 800 bpi 30215A additional Mag Tape Interface				
		X	X	26072A
	X			
	X			
<b>Page Printer</b> 2680A Page Printer			X	



Peripherals	NS	NC	S	Conversion Needed
<b>Line Printers</b> 2619A 1000 lpm 2618A 1250 lpm 2617A 600 lpm 2614A 600 lpm 2613A 300 lpm 2611A 300 lpm 2610A 200 lpm 2608A 400 lpm 2607A 200 lpm				
<b>Character Printers</b> 2631A 180 cps 2631B 180 cps 2601A Daisy Wheel 2602A Daisy Wheel 2762A/B Printer Terminal 2749B Teleprinter				
<b>Terminals</b> HP 262X HP 264X HP 2382A HP 2703A HP 2641A in APL mode ASR 33/35/37 Execuport Datapoint 3300 Memorex 1240 MiniBee				
<b>Communications Interfaces</b> 30010A INP 30032A ATC 30032B ATC 3055A SSLC 30360A HSI				
<b>Other Products</b> 30104A Paper Tape Reader 30105A Paper Tape Punch 30119A Card Reader Punch 30126A Calcomp Interface 30300B Programmable Controller 30301B Real-time Programmable Controller 30106A Card Reader (non HP-IB version)				

The following information is necessary to determine what conversion is needed to carry over certain peripherals:

### Discs

The conversion necessary for a disc depends on whether the controller was in the SPU (i.e., in the case of a 7925A or 7920A) or in the disc (such as the 7925M or 7920M). Pre-Series III systems and the original Series III (two-bay) systems were configured with the controller in the SPU. Later Series III (low-cost) systems used the controller in the disc. Discs which had their controller in the SPU need both a controller and an HP-IB interface. These are available as a 13037U with option 102. This upgrade will also convert a slave drive (7920S, 7925S) to a master. If the disc already has a controller, order the Master Disc Drive Interface Upgrade, 12745A, to add the HP-IB interface.

### Magnetic Tape Drives

7970E tape drives (1600 bpi) need the addition of the HP-IB interface. This is accomplished by ordering a 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 a cabinet, 26078A.

### Line Printers

2613/17/19 line printers need a new line printer interface. Order one 26069A for each line printer. Check the current HP 3000 Computer Systems Price Guide for the proper system option to receive the HP-IB interface and the correct cable set.

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

### Character Printers

Although no conversion is necessary for the supported character printers, new cables may be necessary. See the terminals cabling matrix

in the HP 3000 Configuration Guide for more information.

### Terminals

The Series 42, 48 and 64 will support the following terminal types: 4, 6, 9, 10, 12-16, 18-22. Terminal types which were supported on Series III and pre-Series III systems but 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 the HP 3000 Configuration Guide for more information.

### Communications Interfaces

Since the ATC terminal connectors used on the Series III and previous systems are not supported on the current systems, ADCCs or ATPs must be ordered. See the HP 3000 Configuration Guide for more information on how to configure ADCCs or ATPs.

### Card Reader

Supported card reader is the 30106A with option 333, the HP-IB option. 30106A card readers without the HP-IB interface can be upgraded with the 30309A conversion kit.

### 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, product number 30079A, should be ordered in addition to the system upgrade. Cables are included in the product.

### 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 the HP 3000 Configuration Guide for information on configuring the Series 42, 48 or 68.

## Example of a Series III to Series 68 Upgrade

Assume a Series III (32435A) system with the following configuration:

- SPU
- 2 Mbytes 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
- 2608A line printer
- 30010A INP

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

- SPU
- 4 Mbytes memory
- 60 terminal ports
- Discs:
  - 1 7920M
  - 1 7920S
  - 2 7925M
- 7970E tape drive
- 2619A line printer
- INP

The following should be ordered:

32468BH	Series 68 SPU with 3 Mbytes memory
Opt. 603	Upgrade from Series III
30142A	Additional megabyte of memory
2647F	Terminal
Opt. 890	Series 6x system console
3 30079A	GICs
30144A	SIB
30145A	Direct connect port controller
Opt. 001	First controller on system
4 30145A	Additional direct connect port controllers
* 26072A	Tape drive conversion (for 7970E)
26069A	Printer interface (for 2619A)
Opt. 364	
26002A	Printer conversion (for 2608A)
** 12745A	Disc drive conversion (for 7920M)
2 13037U	Disc Drive Conversion (for 7925S to 7925M)
30020B	INP

The following equipment will be returned for credit:

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

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

- 2645A system console (can be used as a user terminal)
- 30032A ATC
- 30010A INP
- 1.5 Mbytes 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 HP-IB SYSTEM

When upgrading from an HP-IB system (Series 30,33, 40/42 or 44/48) most peripherals will be supported on the new system. Existing GICs can also be carried over. However, in many cases, new cables are required. The following

table identifies at a glance those peripherals that can be carried straight to the new system (S), those which need conversion or additional equipment (NC) and those which are not supported (NS). If the peripheral needs conversion, the rightmost column contains the part number of the conversion product needed. A more detailed explanation of the information in the chart follows.

Peripherals	NS	NC	S	Conversion Needed
<b>Discs</b> 9895A, options 010,333, 1.2 Mb 7933/5H 404 Mb 7925M option 102, 120 Mb Master 7925S 120 Mb Slave 7920M, option 102, 50 Mb Master 7920S, 50 Mb Slave 7914P, option 001, 132 Mb 7914TD, 132 Mb disc and 7970E tape drive 7912P, options 001, 65 Mb 7911P, options 001, 28 Mb 7906M, option 102, 19.6 Mb, Master 7906S, 19.6 Mb, Slave 7902A flexible disc	X		X X X X X X X X X X X X	
<b>Magnetic Tape Drives</b> 7976A 6250 bpl 7974A 1600/800 bpl 7970E, option 426, serial number less than 2034A-0000 7970E, option 426, serial number greater than 2034A-0000 7970E, option 421, slave		X	X X  X X	26072A, option H01
<b>Page Printer</b> 2680A Page Printer 2687A/2688A Desktop Page Printers			X X	
<b>Line Printers</b> 2619A 1000 lpm 2617A 600 lpm 2613A 300 lpm 2611A 300 lpm 2608A 400 lpm 2608S 400 lpm			X X X X X X	

Peripherals	NS	NC	S	Conversion Needed
<b>Character Printers</b> 2631B 180 cps 2631A 180 cps 2601A Daisy Wheel 2602A Daisy Wheel 2672A/B Printing Terminal 2749B Teleprinter	X    X X		X  X X	
<b>Terminals</b> HP 262X HP 264X HP 2382A HP 2703A HP 2641A In APL mode ASR 33/35/37 Execuport Datapoint 3300 Memorex 1240 MiniBee	X X X X X X X		X X X X	
<b>Communications Interfaces</b> 30018A ADCC (Main) 30019A ADCC (Extender) 30020A INP 30020B INP		X* X*	X* X	30021C 30021C
<b>General I/O Channels</b> 30079A		X		30022A
<b>Other Products</b> 30106A Card Reader (HP-IB version)			X	

\*Not supported on Series 68

The following information is necessary to determine what conversion is required to carry over certain peripherals:

**Discs**

HP-IB discs which were used on previous 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 HP 7902A flexible disc drive and the customer wants a flexible disc on the new system, a new HP 9895A (with options 010 and 333) flexible disc drive must be ordered. The HP 7902A flexible disc media cannot be used with the HP 9895A flexible disc drive. Tests have shown that if the HP 7902A media is used more than once in the HP 9895A, the media will damage the drive heads and itself because of its softer material. You should use it only once to copy it to an HP 9895A media.

**Magnetic Tape Drive**

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 current systems. However, when upgrading from one system to another, new cables may be required for support of 2611A/13A/17A/19A printers. Refer to the 26069A Cable Matrix below to determine which cable, if any, must be ordered.

**26069A Cable Matrix**

New System	Existing System			
	30	33	39/40/42	48
39/42	None	26069-60005	-----	-----
48/68	26069-60002 26069-60003	26069-00008	26069-60002 26069-60003	None

## Terminals

The Series 42, 48 and 64 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 the HP 3000 Configuration Guide for more information.

## Communications Interfaces

When upgrading from one system with ADCCs to another, new cables (30021C) must be ordered for each ADCC main and extender beyond the first main ADCC in the system.

The 30020A INP is supported on the Series 42 and 48. It is not supported on the Series 68. The "B" version, 30020B INP, is required for the Series 68.

## General I/O Channels

General I/O Channels (GICs) may be transferred from HP-IB systems to new systems. However, new cables are required. Order one 30022A cable for each GIC being carried over. Be sure to include the proper system option number as indicated in the HP 3000 Computer Systems Price Guide.

## Memory

All upgrades to the Series 48 include 2 megabytes of main memory. All Series 39, 40, 40SX, 44 and 48 memory is compatible and can be carried over when upgrading from a smaller to a larger system. Thus, an upgrade from a Series 39/40/40SX/42 to a Series 48 may result in a non-supported memory configuration. The final Series 48 memory size must be one of the supported memory configurations: 2, 2 1/2, 3, 3 1/2 or 4 megabytes.

For example, a 768 kilobyte Series 40 system being upgraded to a Series 48 will have 2 3/4 megabytes of memory. This memory size is not supported; the customer must either increase his memory to 3 megabytes (or higher) or remove one 256 kilobyte board from his system so that the Series 48 memory size matches a supported configuration.

## 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 the HP 3000 Configuration for information on configuring the Series 42, 48 or 68.

## Example of a Series 30 to Series 48 Upgrade

Assume a Series 30 system with the following configuration:

- SPU
- 1 Mbyte 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)
- 2608A line printer

The system is to be upgraded to a Series 48 with the following configuration:

- SPU
- 2 Mbytes memory
- 2621A system console
- Flexible disc
- 24 terminal ports (12 modem, 12 direct connect)
- 7920M disc drive
- 7970E tape drive
- 2608A line printer

The following should be ordered:

32548BH	Series 48 SPU with 2 Mbytes memory
Opt. 607	Upgrade from Series 30A
2621A	System console
9895A	Flexible disc drive
Opt. 010	Single drive only
Opt. 333	HP-IB interface
2 30021C	ADCC cable (for second main, extender)
30144A	SIB
30145A	AIB direct connect port controller
Opt. 001	
2 30022A	GIC cables
Opt. 044	

The following equipment will be returned for credit:

- SPU
- 2649E system console
- 7902A built-in flexible disc
- 256 Kbytes memory

The additional 1.5 Kbytes of memory cannot be carried over to the new system. All other equipment can be carried over.



## UPGRADE ORDERING MATRIX

The following matrix shows the product to be ordered when upgrading.

You Have A	You Want A			
	High Perf. Series 39	Series 42	Series 48	Series 68
Pre-Series II	NA	Box Swap 32542BH Option 601	Box Swap 32548BH Option 601	Box Swap 32468BH Option 601
Series II	NA	Box Swap 32542BH Option 602	Box Swap 32548BH Option 602	Box Swap 32468BH Option 602
Series III	NA	Box Swap 32542BH Option 603/613	Box Swap 32548BH Option 603/613	Box Swap 32468BH Option 603/613
Series 30	NA	Box Swap 32542BH Option 607/608	Box Swap 32548BH Option 607/608	Box Swap 32468BH Option 607/608
Series 33	NA	Box Swap 32542BH Option 605/606	Box Swap 32548BH Option 605/606	Box Swap 32468BH Option 605/606
Series 39	Field Upgrade 30539B	NA	Box Swap 32548BH Option 614	Box Swap 32468BH Option 614
Series 40	NA	Field Upgrade 30542B	Box Swap 32548BH Option 611	Box Swap 32468BH Option 611
Series 42	NA	NA	Box Swap 32548BH Option 615	Box Swap 32468BH Option 615
Series 44	NA	NA	Field Upgrade 30548B	Box Swap 32468BH Option 609
Series 48	NA	NA	NA	Box Swap 32468BH Option 616
Series 64	NA	NA	NA	Field Upgrade 30468A/B

## SERIES 68 UPGRADE PRODUCT DESCRIPTION

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### 32468BH Upgrade to an HP 3000 Series 68

208V/60 Hz; three phase; 3 megabytes fault control memory; 1 Intermodule Bus; support modem; remote diagnostic capability; system cabinet; disc caching; 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:

- 2 General I/O Channels (30079A)
- System disc drive (7925M with option 102; 7920M with option 102; 7933H; 7935H; 7914P; 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 (2647F with option 890; 2642A with option 964. Cable must be ordered separately with 2647F.)
- Magnetic tape drive (7970E with option 426; 7971A with option 340, 343 or 344; 7976A with option 416; 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)
- 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/no 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
- M01 Remote support credit (outside U.S. only)

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**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.

**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

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**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.

**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**

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### **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.

- 2 General I/O Channels (30079A)
- System disc drive (7911P, 7912P, 7914P; 7914TD; 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 (262x, 264x, 2382A or 2635B. Cable must be ordered separately for 262x, 264x or 2382A)
- Magnetic tape drive (7970E with option 426; 7971A with option 340, 343 or 344; 7976A with option 416; 7974A; or 7914TD)

#### **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
- M01 Remote support credit (outside U.S. only)

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**30548B      Series 44 to Series 48 Field Upgrade**

Upgrade includes Disc Caching software and 1 megabyte of memory.

**Options:**

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

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**30085B      HP 300 to Series 48 Upgrade**

See preceding page for description of the Series 48 upgrade product.

**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:

- 2 General I/O Channels (30079A)
- System disc drive (7911P, 7912P, 7914P; 7914TD; 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 (262x, 264x, 2382A or 2635B. Cable must be ordered separately for 262x, 264x or 2382A)
- Magnetic tape drive (7970E with option 426; 7971A with option 340, 343 or 344; 7976A with option 416; 7974A; or 7914TD) required for system with more than 132 Mb disc storage. A cartridge tape drive (integrated into the 7911P, 7912P, or 7914P with option 001) 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
- M01 Remote support credit (outside U.S. only)

---

**30542B      Series 40 to 42 Field Upgrade**

Upgrade includes Disc caching software and 1 megabyte of memory.

**Options:**

- 160 Delete Firmware Upgrade
- 180 Delete 512 Kb memory
- 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.

**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

**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.

System	Equipment to be Returned
Pre-Series II	SPU 128 Kb memory 1 30125A mag tape controller
Series II	SPU 128 Kb memory 1 30215A mag tape controller
Series III	SPU 256 Kb memory 1 30215A mag tape controller
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
Series 40/42	SPU
Series 44/48	SPU 1 Mb memory



# 3

## **System Sizing and Performance**

This section will be distributed in the future

## System Cabling

### Peripheral Cabling

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### Display Terminal and Data Communications Products

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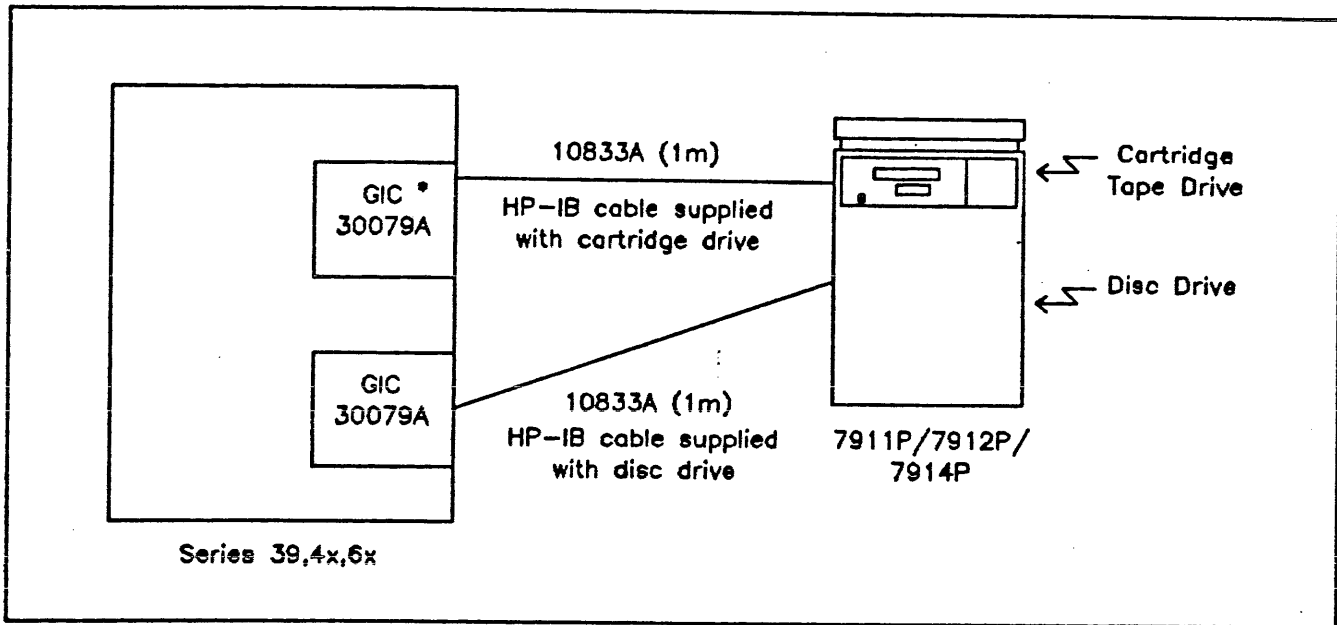
### Graphics Workstation Configuration

HP 3000 Business Graphics Workstation	4-37
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# **Peripheral Cabling**

## Disc Drives

Cable Configuration for 7911P/7912P/7914P Disc Drives



\* Dedicated GIC is required for cartridge tape drive. Maximum of 1 cartridge tape drive per system.

### Notes:

- Additional disc drives may be added to the configuration shown above:

**Series 39, 4x:** Maximum of 4 7911P/7912P and 8 7914P drives supported per Series 39 and Series 4x system. Up to 6 drives are supported per high-speed GIC. Maximum of 2 high-speed GICs supported per Series 39 and Series 4x.

**Series 6x:** Maximum of 1 7911P/7912P and 8 7914P drives supported per system. Up to 6 drives are supported per high-speed GIC. Maximum of 4 high-speed GICs per Series 6x.

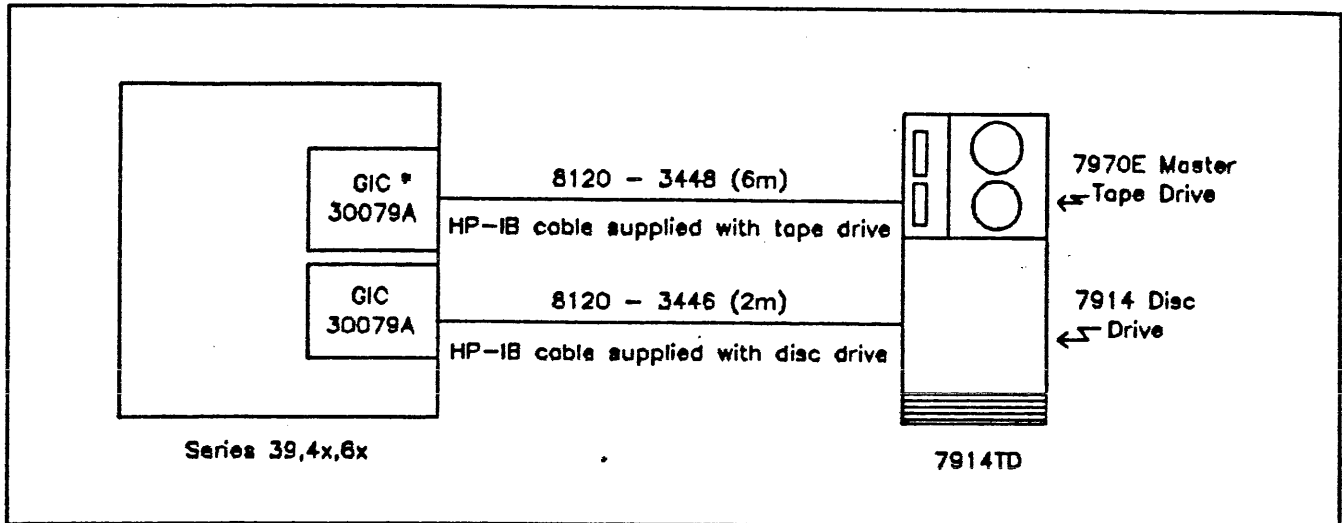
- See configuration guidelines chapter of this guide for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- 7911P/7912P/7914P also include 1m of cabling internal to the drive which must be considered for calculating maximum HP-IB cable length.

## Disc Drives

Cable Configuration for 7914TD Mass Storage Subsystem



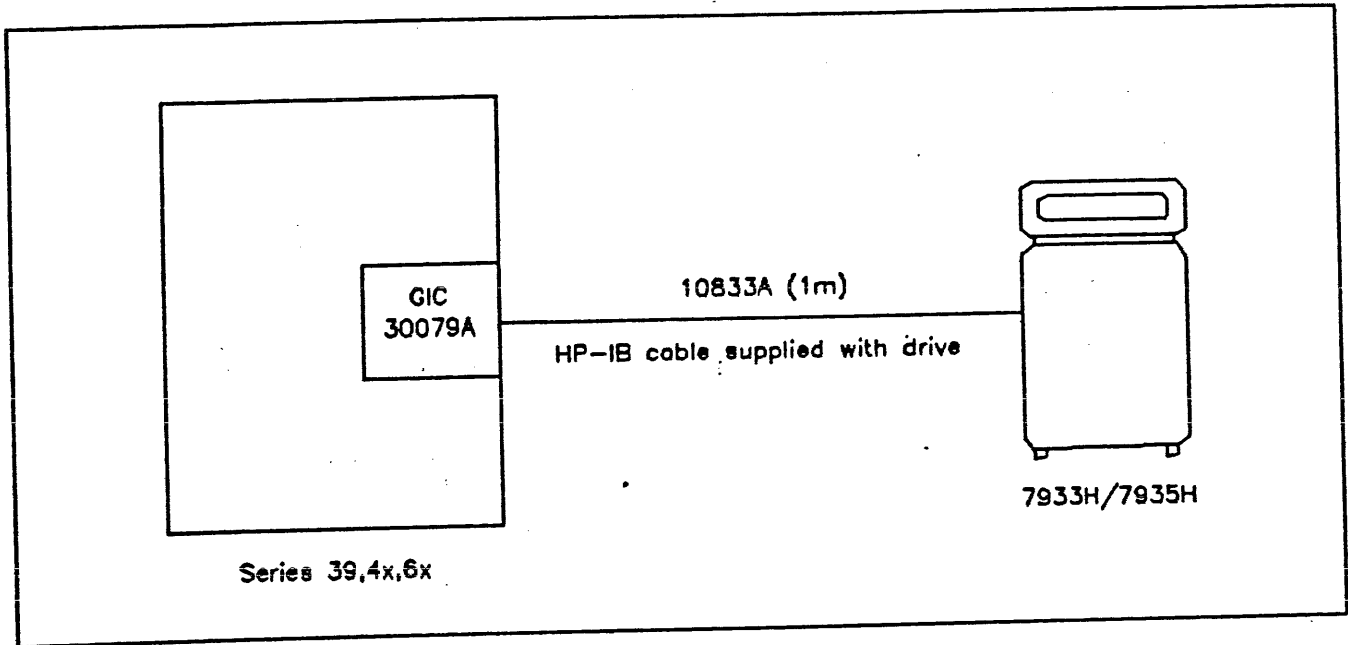
\* Dedicated GIC is required for 7970E tape drive. Up to 3 slave tape drives may be supported on the 7970E master drive.

### Notes:

- 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.
- Additional disc drives may be supported on the disc GIC. Use standard configuration rules for additional disc drive support.

# Disc Drives

## Cable Configuration for 7933H/7935H Disc Drives



### Notes:

- Additional disc drives may be added to the configuration shown above:

**Series 39,4x:** Maximum of 8 7933H/7935H drives supported per Series 39 and Series 4x system. Up to 6 7933H/7935H drives are supported per high-speed GIC. Maximum of 2 high-speed GICs per Series 39 and Series 4x.

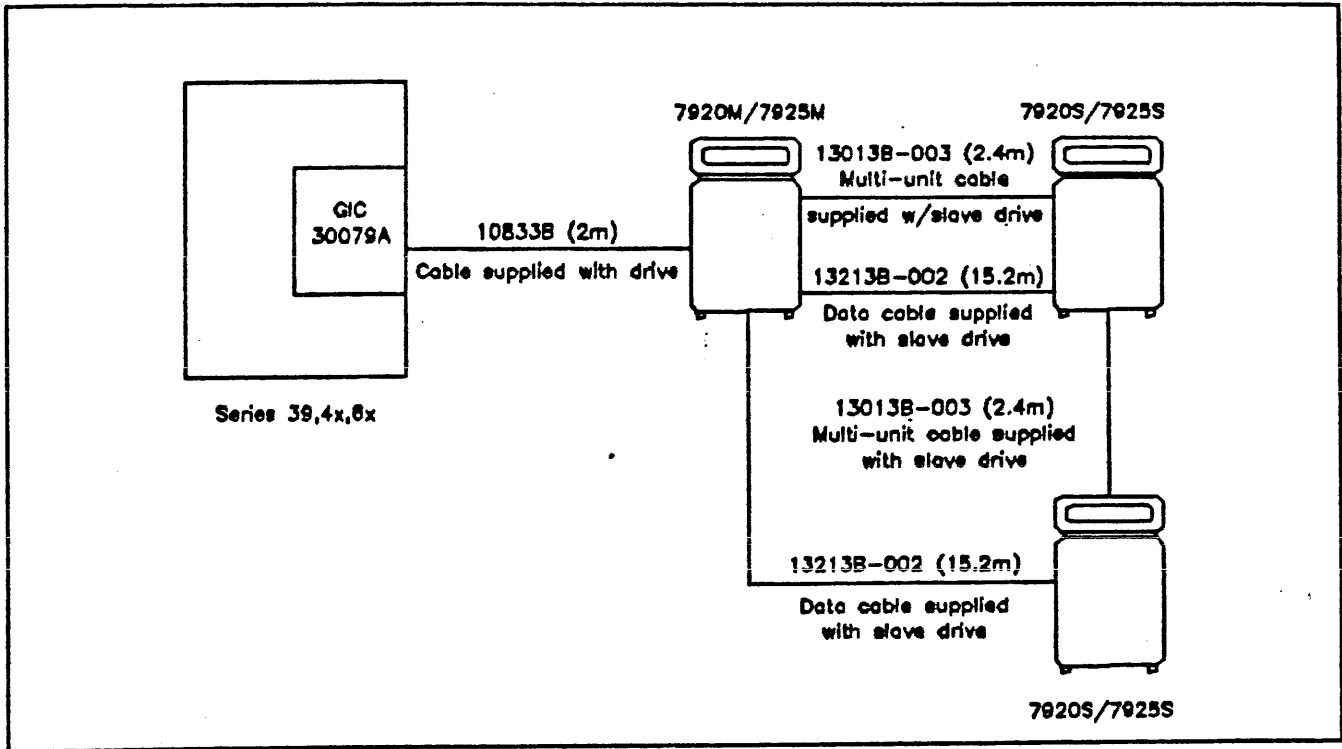
**Series 6x:** Maximum of 16 7933H/7935H drives per one-bay Series 6x and 24 drives per two-bay Series 6x system. Up to 6 7933H/7935H drives are supported per high-speed GIC. Maximum of 4 high-speed GICs per Series 6x.

- See configuration guidelines chapter of this guide 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



Notes:

- **Series 39,40,42:** Maximum of 2 master 7920M/7925M drives supported per system. Up to 7 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 2 master 7920M/7925M drives supported per system. Maximum of 14 slave drives per system. Up to 7 slave drives are supported per master drive.

- **Series 6x:** Maximum of 16 master 7920M/7925M drives supported per system. Maximum of 14 slave drives per system. Up to 7 slave drives are supported per master drive.

- Cumulative HP-IB cable length cannot exceed 6m. (See configuration guidelines chapter of this guide 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:

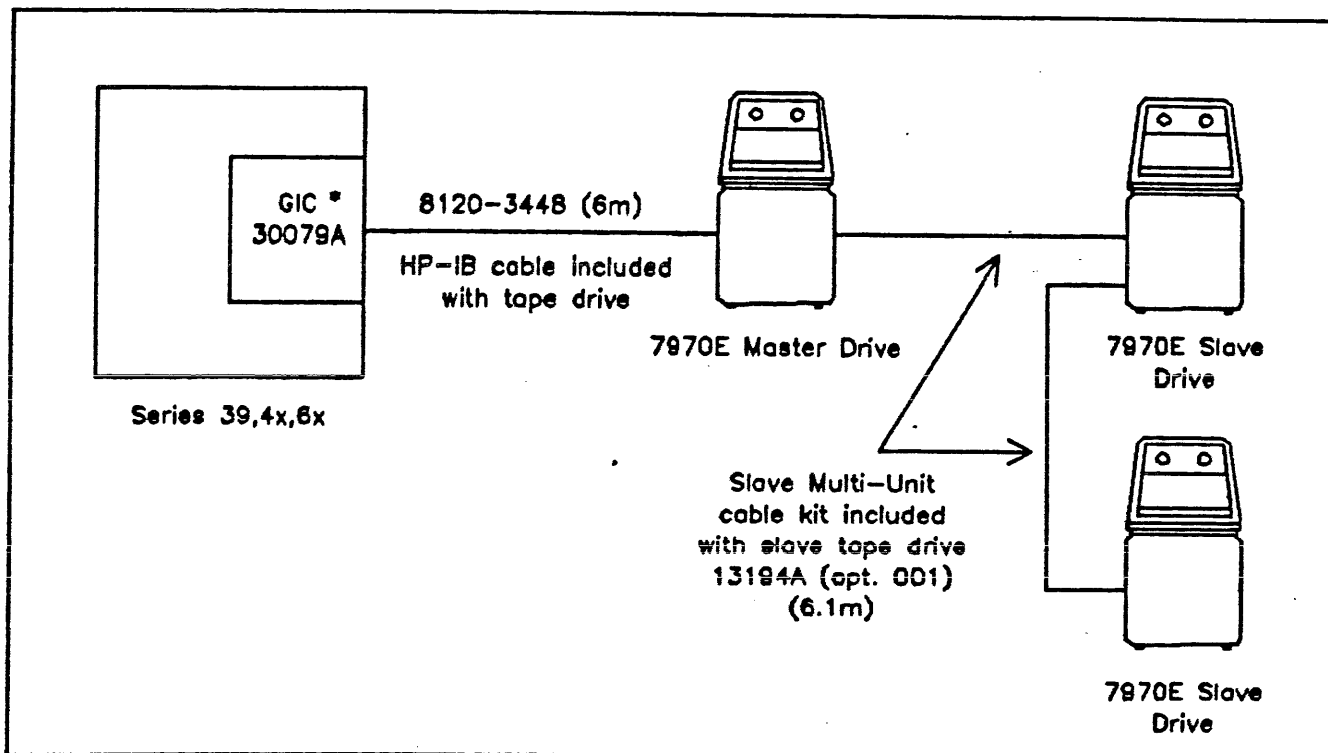
Cable Length	Product Number
1.8m	13013B
3.7m	13013B-001
5.5m	13013B-002

- Data cables available are:

Cable Length	Product Number
3m	13213B
7.6m	13213B-001
22.9m	13213B-002

## Tape Drives

**Cable Configuration for 7970E Master Tape Drive**



\* Dedicated GIC is required for 7970E master drive.

**Notes:**

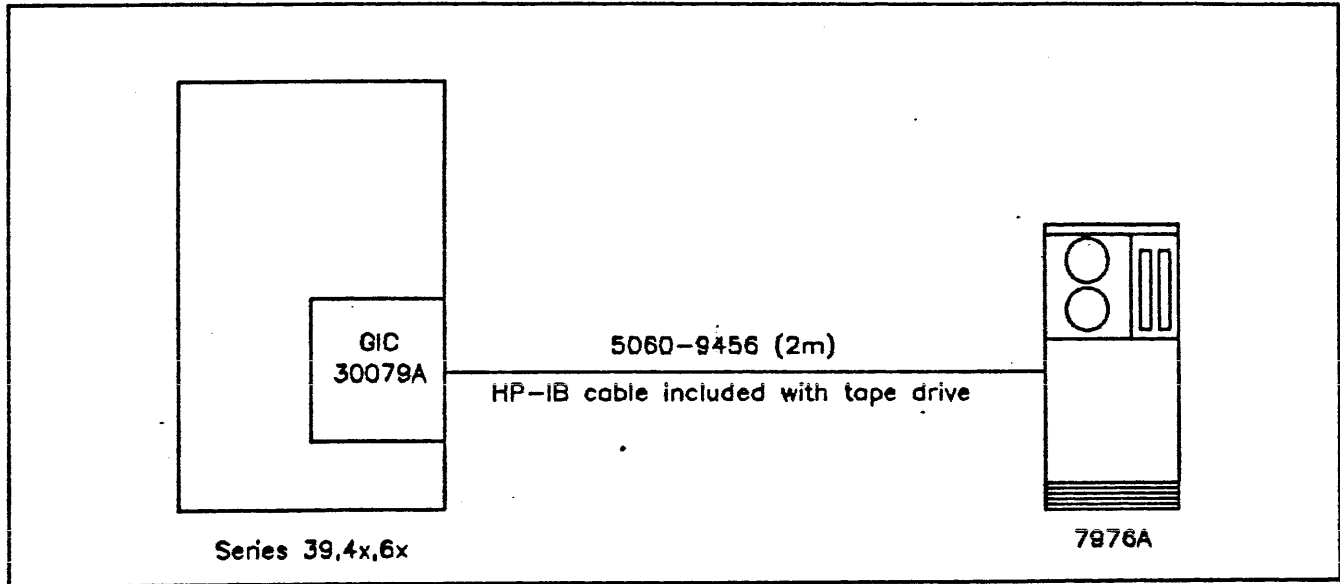
- Maximum of 2 master drives supported per system, each with a dedicated GIC. Up to 3 slave drives are supported per master drive. (Two slave drives are shown connected in the above diagram.)
- See configuration guidelines chapter of this guide for discussion of maximum HP-IB cable length rules. HP-IB 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



Notes:

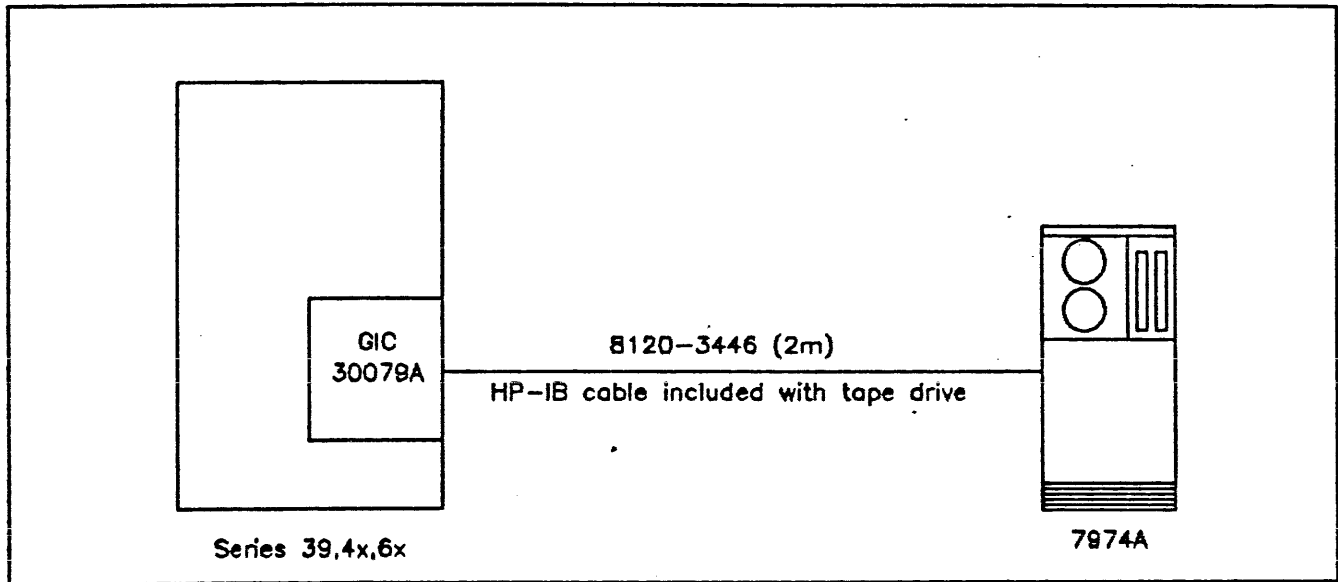
- Maximum of 2 7976A drives supported per system
- See configuration guidelines chapter of this guide for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- 1.5m of HP-IB cabling is internal to the 7976A and must be considered for calculating maximum HP-IB cable length.

## Tape Drives

### Cable Configuration for 7974A Tape Drive



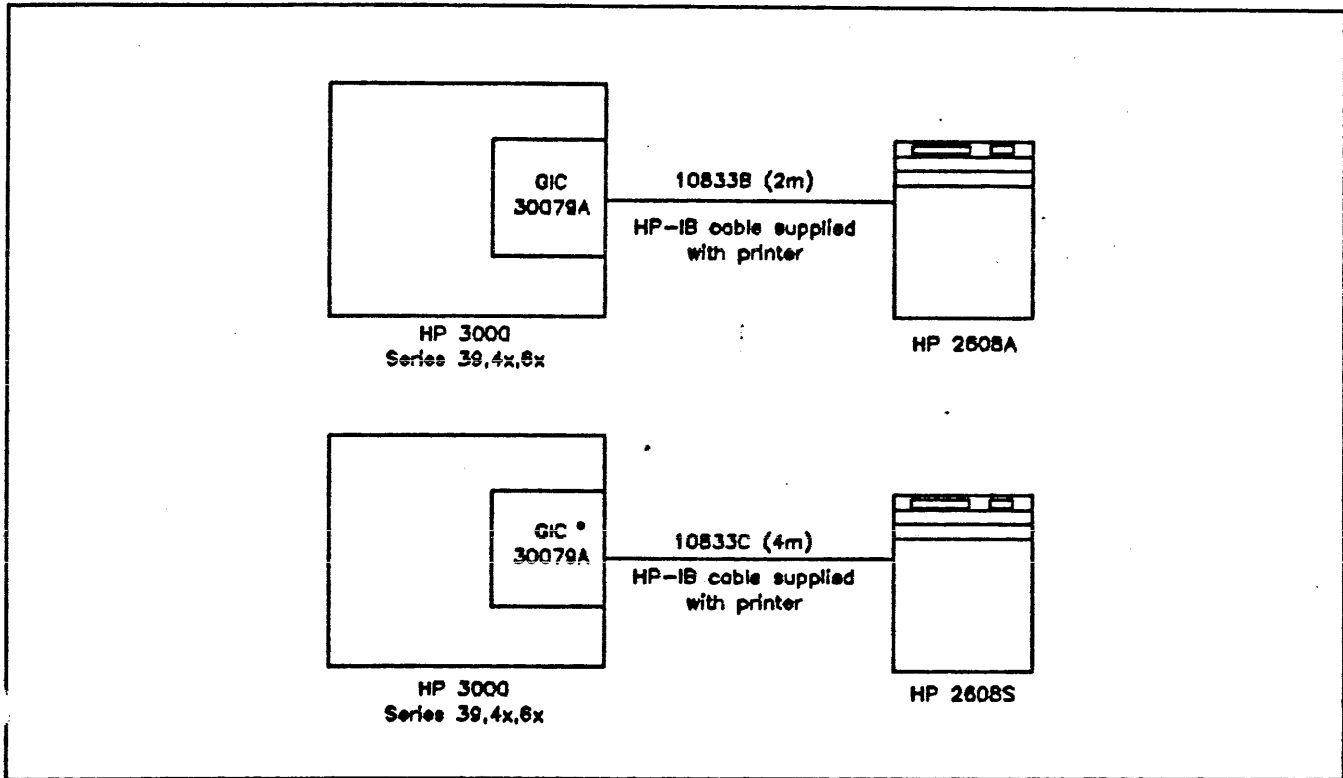
#### Notes:

- Maximum of 2 7974A drives supported per system
- See configuration guidelines chapter of this guide 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



Notes:

- 2608A: Maximum supported HP-IB cable length for 2608A is 6m.

\* - 2608S: 2608S is attached to a high-speed GIC. Maximum supported HP-IB cable length for 2608S is 13m.

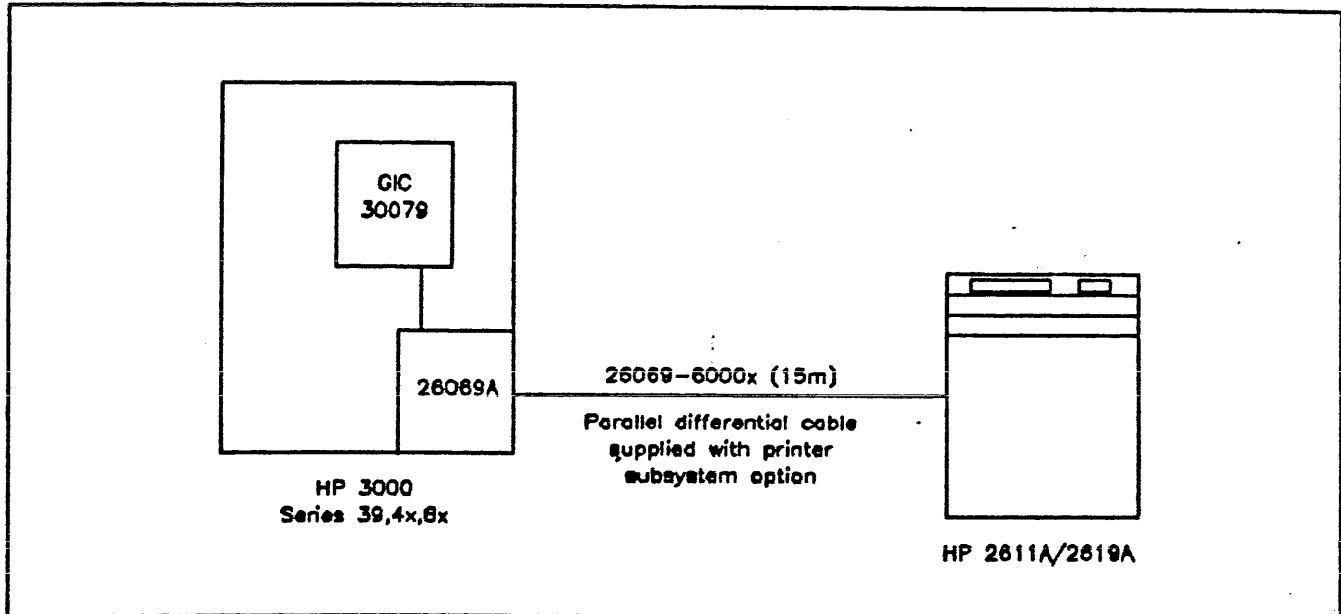
2608S may also be configured on an DSN/MTS line. (See Display Terminal and Data Communication Products chapter of this guide for cabling diagram.)

- See configuration guidelines chapter of this guide 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 2611A/2619A Printers

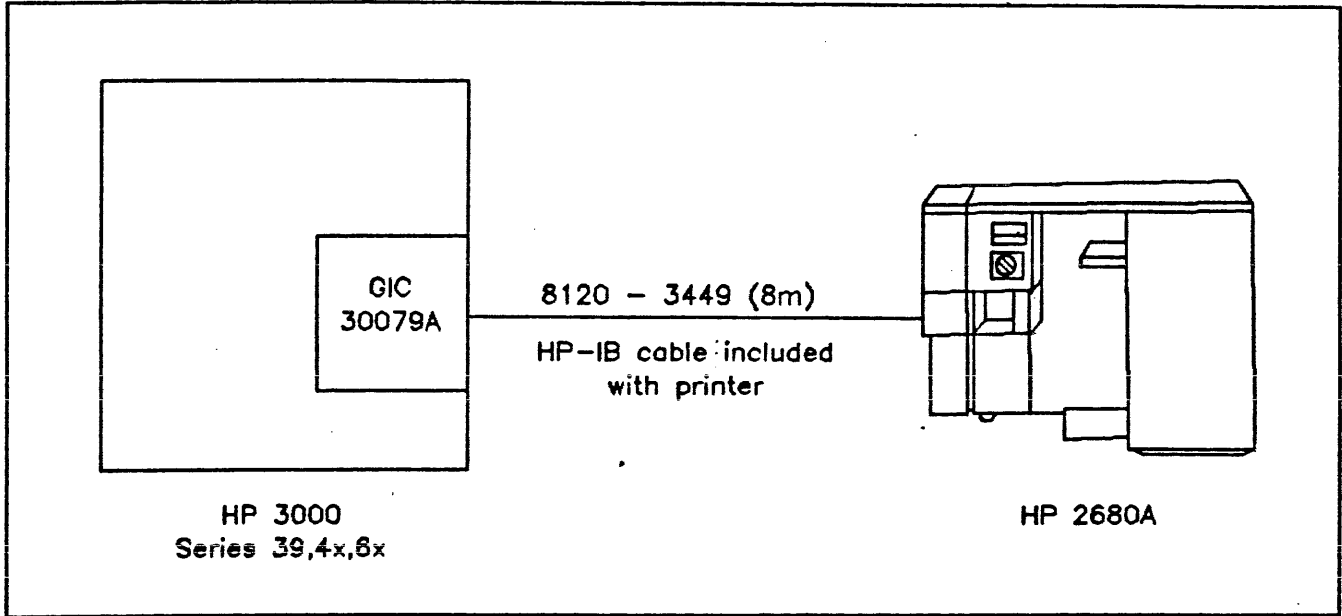


#### Notes:

- 26069A line printer interface is supplied with the 2611A/2619A printer when the corresponding subsystem option is ordered.
- Expansion cables are made-to-order upon request for distances of up to 500 ft. Contact Boise Division for quote.

## Printers

### Cable Configuration for 2680A Page Printer



#### Notes:

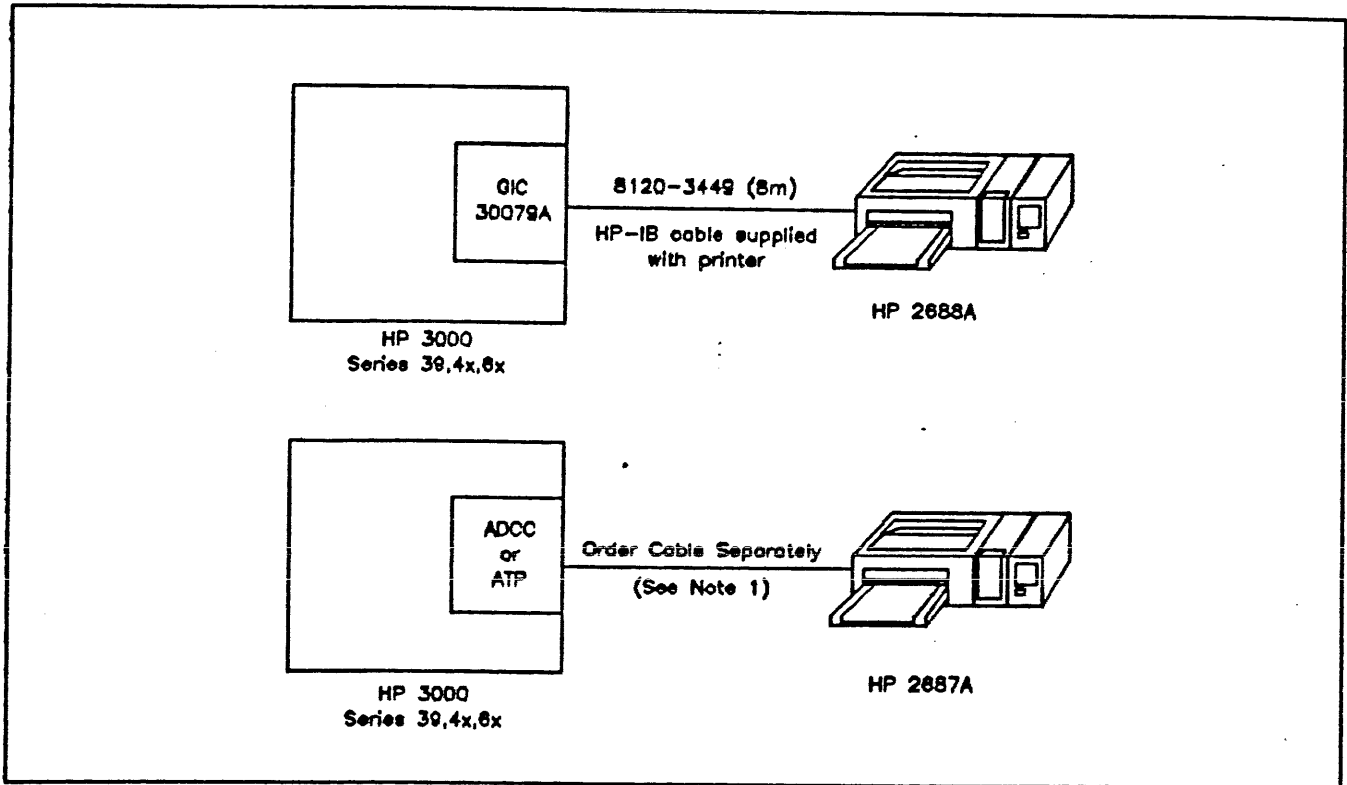
- Cumulative HP-IB cable length cannot exceed 15m. See configuration guidelines chapter of this guide for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

- For connection of a second 2680A, 1 2m HP-IB cable is available by ordering the 2680A with option 099.

# Printers

## Cable Configuration for 2687A/2688A Page Printers



**Notes:**

- See configuration guidelines chapter of this guide for discussion of maximum HP-IB cable length rules. HP-IB expansion cables available are:

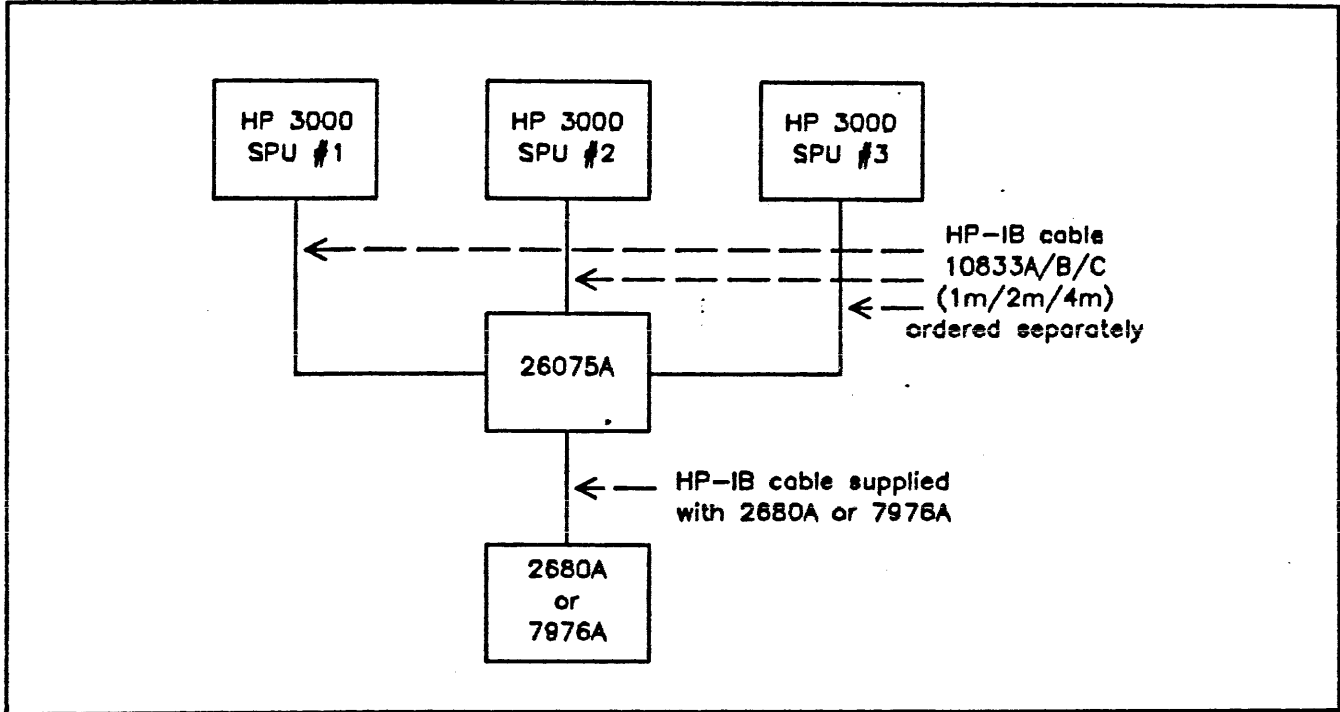
**Note 1:**

Cable Length	Product Number	Part Number
1m	10833A	8120-3445
2m	10833B	8120-3446
4m	10833C	8120-3447

Connection		Cable Product Number	Cable Length
RS-232	ADCC	32219G	3.8m
RS-232	ADCC	30062-60018 (Ext. Cable)	7.6m
RS-232	ADCC	92215A (Ext. Cable)	15m
RS-232	ATP	92218D	5m
RS-232	ATP	30153-60001 (Ext. Cable)	15m
RS-422	ATP	92216C	5m
RS-422	ATP	30154-60001 (Ext. Cable)	30m

## HP-IB Peripheral Selector

**Cable Configuration for 26075A Multiple System Access Selector  
(Maximum Configuration)**



**Notes:**

- The 26075A is an HP-IB switchbox designed to switch a 2680A or 7976A between up to 3 HP 3000 Series 39, 4x, or 6x CPUs. An operator can manually switch the peripheral to be active on any of the sharing systems.
- The Selector is equivalent to less than .05 meter of HP-IB cable and represents no loads on the GIC.

- See configuration guidelines chapter of this guide for discussion of maximum HP-IB 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

**Display Terminal and  
Data Communications  
Products**



## Workstation Connection Matrix

	Point-To-Point			Multipoint				
	Direct Connect ADCC, ATP RS-232	Direct Connect ATP RS-422	Remote ADCC, ATP	Data Link	IBM 3270 Support	Remote Daisy Chain	Multipoint Cluster Controller	X.25 Cluster Controller
<b>Distance</b>								
- Meters/Ft.	Up to 15m (50 ft.) With fiber optic mux- up to 1Km (3280 ft.)	Up to 1220m (4000 ft.)	Unlimited	Up to 4Km (2.5 mi.)	Local: Up to 15m (50 ft.) Remote: Unlimited	Unlimited	Local: Up to 4Km (2.5 mi.) Remote: Unlimited	Remote: Unlimited
<b>Communication Lines</b>								
- Hardwired	X	X		X	X		X (Local)	
- Leased			X			X	X (Remote)	X
- Switched			X			X		
<b>Transmission Mode</b>								
- Character	X	X	X				X	X
- Block	X	X	X	X	X	X	X	X
<b>Transmission Clocking</b>								
- Asynchronous	X	X	X	X (3074A req.)			X (Local)	
- Synchronous					X	X	X (Remote)	X
<b>Environment</b>								
- High Noise Immunity	Fair (w/fiber optic mux- very good)	Good	Fair	Very Good	Fair	Fair	Very Good (Local)	Fair
- Lightning Immunity, Secure Transmission, No Spark Hazard	Very Good (w/fiber optic mux only)	Good	Fair	Fair	Fair	Fair	Fair (Local)	Good

X = Is Supported

	Point-To-Point			Multipoint				
	Direct Connect ADCC, ATP RS-232	Direct Connect ATP RS-422	Remote ADCC, ATP	Data Link	IBM 3270 Support	Remote Daisy Chain	Multipoint Cluster Controller	X.25 Cluster Controller
<b>Terminals/ Printers</b>								
- # of Terminals Per Line	1	1	1	+	Max. 32 per controller	+	Max. 16 per controller	Max 16 per controller
- 262x, 264x	X	X (see Note below)	X	X w/asynch. multipoint interface (see Note below)		X w/synch. multipoint interface	X	X
- 270x	X	X	X					
- 2382A, Series 100	X	2382A only	X				X	X
- 2631B/35B	X		X				2631B only	2631B only
- 2601A/02A	X						X	X
- 2687A	X	X						
- 307x, 3081A <sup>++</sup>	X	307x only	X	X			X	
- 2608S				X		X		
<b>BPS</b>	Up to 9600	Up to 9600	Up to 9600	Up to 19,200	Up to 9600	Up to 9600	Up to 19,200 w/Data Link	Up to 9600
<b>Notes</b>		HP 2621B does not interface to HP ATP RS-422	Line speed is the limitation of the modem	2624B/26A 2625A/28A and 264x (except 2640A/B, 2644A and 2649x) are multipoint terminals				

X = Is Supported

<sup>+</sup> Maximum configuration depends upon performance considerations.  
<sup>++</sup> 3081A does not support multipoint Local Data Link.

## Systems Communication Support Matrix for DSN/INP

	DSN/DS 32189A/R/M	DSN/X.25 32191A/R/M	DSN/MRJE 32192A/R/M	DSN/RJE 30130E/R/M	DSN/IMF 32229A/R/M	DSN/MTS 32193A/R/M
<b>Interface</b>	RS-232-C V.24/V.28 RS-422 X.21; V.35	RS-232-C V.24/V.28 RS-422	RS-232-C V.24/V.28 V.35	RS-232-C V.24/V.28 X.21; V.35	RS-232-C V.24/V.28	RS-232-C V.24/V.28
<b>Protocol</b>	Contention BSC	LAP-B	Conversa- tional BSC	Contention BSC	Multipoint BSC,SDLC	Multipoint BSC
<b>Modems</b>	Group 1,2,3,	Modems Supplied by Certified PDN	Group 1,2,3	Group 1,2,3	Bell 201C, 208A, 209A HP 37230A Bell 2048A	Group 1,2,3 HP 37230A
<b>Line Speed</b>	Up to 56 Kbps	Up to 56 Kbps	Up to 56 Kbps	Up to 56 Kbps	Up to 9.6 Kbps	Up to 19.2 Kbps <sup>(1)</sup>
<b>Switched Line</b>	X		X	X		X <sup>(2)</sup>
<b>Leased Line</b>	X	X	X	X	X	X
<b>Auto Dial</b>	X		X	X		
<b>Auto Answer</b>	X		X	X		X
<b>Dual Speed (European)</b>	X		X	X		X

## Notes:

- 19.2 Kbps with Data Link Only,  
9.6 Kbps with modems
- For single drop only

Group 1 Bell Modems: 201C/208A/209A/208B  
 Group 2 Bell Dataphone II: 2024A/2048A/2096A  
 Group 3 HP Modems: 37210T/37220T/37230A

X= Is supported

## HP 3000 Point-to-Point Terminal Cabling

Ordering Method:	Terminal or Printer Number:	Direct Connections			Remote/Modem Connections	
		RS-232		RS-422	U.S.	European
		ADCC for Series 39,4x	ATP for Series 44,48,64,68	ATP for Series 44,48,64,68	ADCC and ATP for Series 39,4x,and 6x	
Ordering Cables with Terminals by Option Number:	2382A	Opt. 301 or 305	Opt. 304	N/A	Opt. 301	Opt. 302
	262x,270x (Port #1), 264x,307x, 308x,309x	Opt. 301,303, or 305 (1)	Opt. 304	Opt. 306 (2)	Opt. 301	Opt. 302

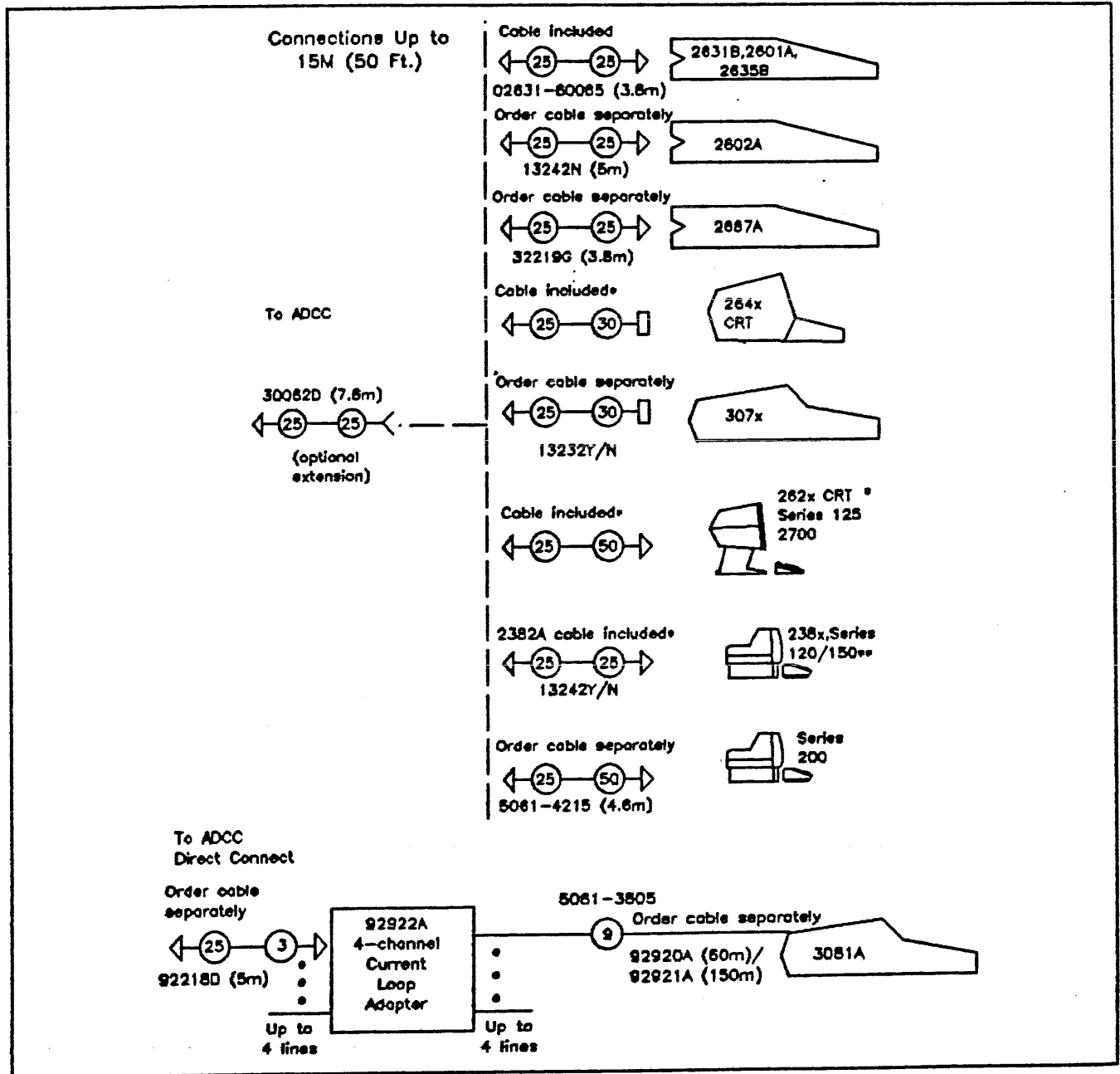
Ordering Cables Separately as Accessories:	2382A	13242N/Y	13242X	N/A	13242N	13242M
	2601	Cable Inc. w/Printer	13242X	N/A	N/A	N/A
	2602A	13242N	13242X	N/A	N/A	N/A
	262x, 270x (Port #1)	13222N/C/Y	13222X	13222P (2)	13222N	13222M
	2624A/B,2625A 2626A/W 2627A,2628A 270x,(Port #2)	13242N/Y	13242X	N/A (4)	13242N	13242M
	2631B,2635B	Cable Incl. w/Printer	13242X	N/A	Cable Incl. w/Printer	Cable Incl. w/Printer
	2687A	32219G	92218D	92216C	N/A	N/A
	264x,307x	13232N/Y/C (1)	13232X	13232 I	13232N	13232M

Ordering Extension Cables as Accessories:	All Terminals/ Printers Listed Above (3)	30062D	30153A	30154A	30062C	30062C
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- NOTES:
- Option 305 or cable 13232Y not available on 2647F.
  - Not available on 2621B.
  - Total length not to exceed 15 meters/50 feet for RS-232 and 1220 meters/4000 feet for RS-422.
  - RS-422 support is available on 2625A/2628A. Order cable 13242P.

## Display Workstation Cabling Diagrams

### Point-to-Point Cable Configuration for ADCC (Direct Connect Type RS-232)



\* See chart on page 8 of the chapter for cable supplied with 262x, 264x, 2703, and 2382 terminals.

\*\* Series 120/150 cable (13242N/Y) must be ordered separately.

Note 1: For Port 2 of 2626A/W, 2624A/B, 2727A, 2703x, and Series 125, order 13242Y/N, male/male, 25 pin/25 pin, 5m.

Note 2: The 3081A workstation is a current loop device and requires a 4-channel current loop adapter (92922A) to interface to the ADCC or ATP on the HP 3000. The 92922A supports up to 4 3081A workstations. 92920A or 92921A cables are ordered separately. Each cable requires a nine pin connector (5064-3805) which is also ordered separately.

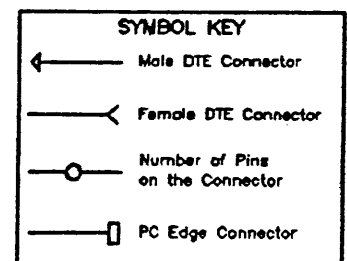
Note 3: 309x requires custom cable supplied by customer.

## Display Workstation Cabling Diagrams

Cables Supplied with 262x, 264x, 2382A, and 2703 Terminals

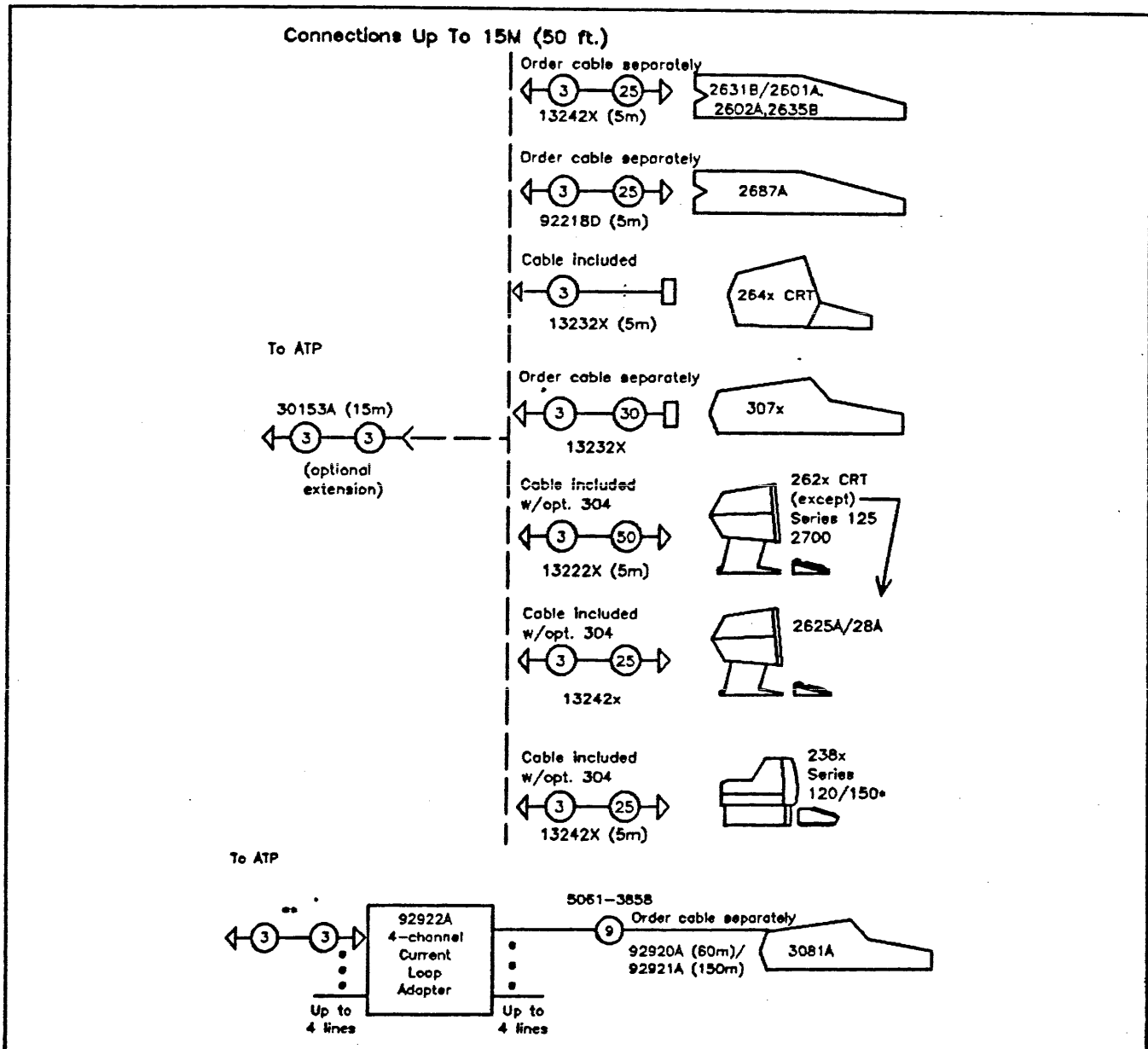
### ADCC Direct Connect Type RS-232

Terminal	Option	Cable	Description
2382A	301	U.S. Modem, 13242N	Male/Male, 25 pin/25 pin, 5m
	305	RS-232 EMP Protect, 13242Y	Male/Male, 25 pin/25 pin, 5m
262x (except) 2625A/2528A	301	U.S. Modem, 13222N	Male/Male, 50 pin/25 pin, 5m
	303	RS-232, 13222C	Male/Female, 50 pin/25 pin, 2m
	305	RS-232 EMP Protect, 13222Y	Male/Male, 50 pin/25 pin, 5m
2625A/2628A	301	U.S. Modem, 13242N	Male/Male, 25 pin/25 pin, 5m
	303	European Modem, 13242M	Male/Male, 25 pin/25 pin, 5m
	305	RS-232 EMP Protect, 13242Y	Male/Male, 25 pin/25 pin, 5m
264x	301	U.S. Modem, 13232N	Female/Male, 30 pin/25 pin, 4.5m
	302	RS-232, 13232C	Female/Female, 30 pin/25 pin, 1.5m
	305	RS-232 EMP Protect, 13232Y	Female/Male, 30 pin/25 pin, 4.5m



## Display Workstation Cabling Diagrams

### Point-to-Point Cable Configuration for ATP (Direct Connect Type RS-232)



\* Series 120/150 cable (13222X) must be ordered separately.

\*\* An RS-232C interface cable for the ATP must be fabricated by the customer.

Note 1: Direct connect type 232 is an RS-422 implementation with a special HP 3 pin connector.

Note 2: Adapter cable 30152A can convert installed terminals to an ATP configuration.

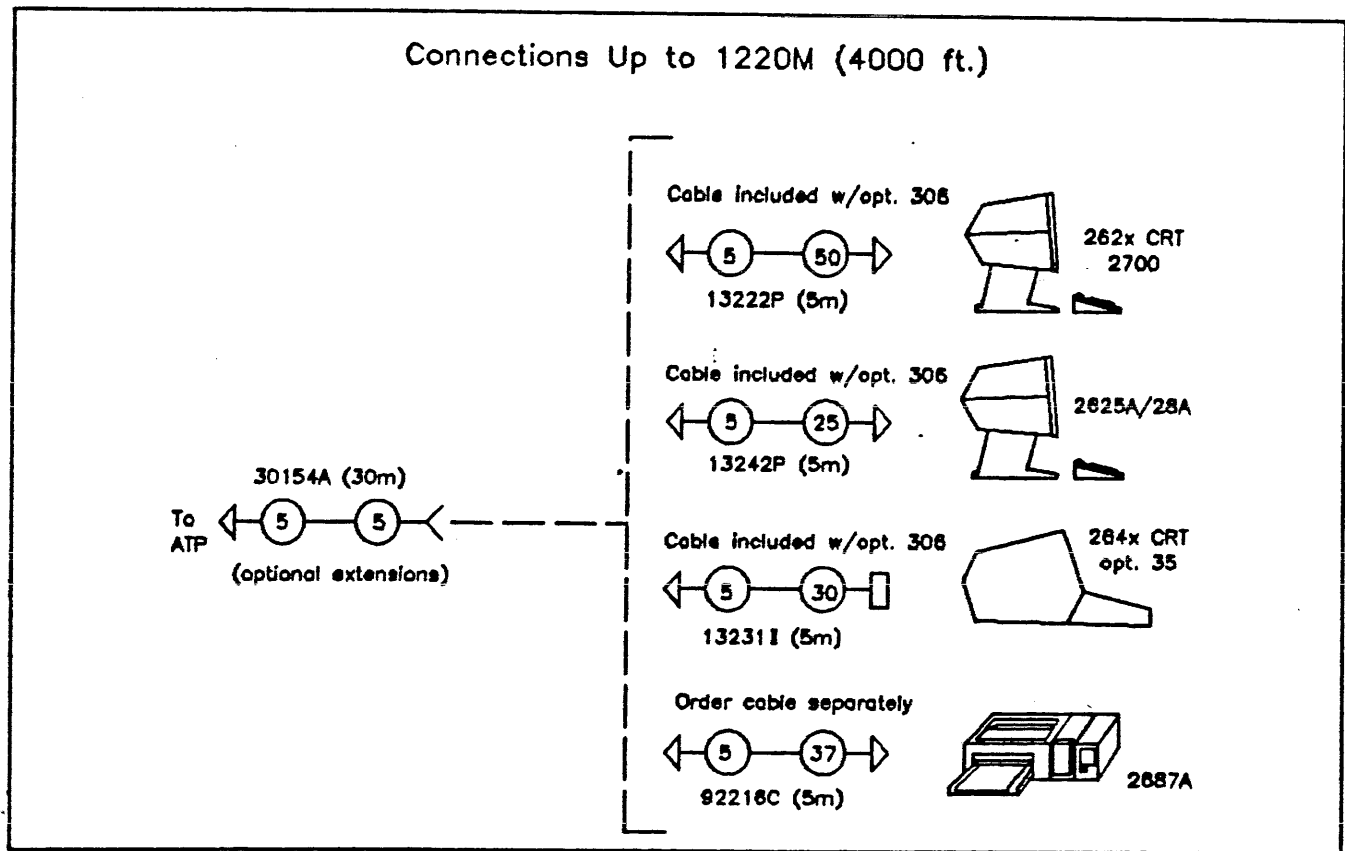
Note 3: For port 2 of 2626W, 2624A/B, 2627A and 2703A order 13242X, male/male, 25 pin/25 pin, 5m

Note 4: The 3081A workstation is a current loop device and requires a 4-channel current loop adapter (92922A) to interface to the ADCC or ATP on the HP 3000. The 92922A supports up to four 3081A workstations. 92920A or 92921A cables are ordered separately. Each cable requires a nine pin connector (5064-3858) which is also ordered separately.

Note 5: 309x requires custom power and data communications cable supplied by customer.

## Display Workstation Cabling Diagrams

### Point-to-Point Cable Configuration for ATP (Direct Connect Type RS-422)



Note 1: Direct connect type 422 is an RS-422 implementation with a special HP 5 pin connector.

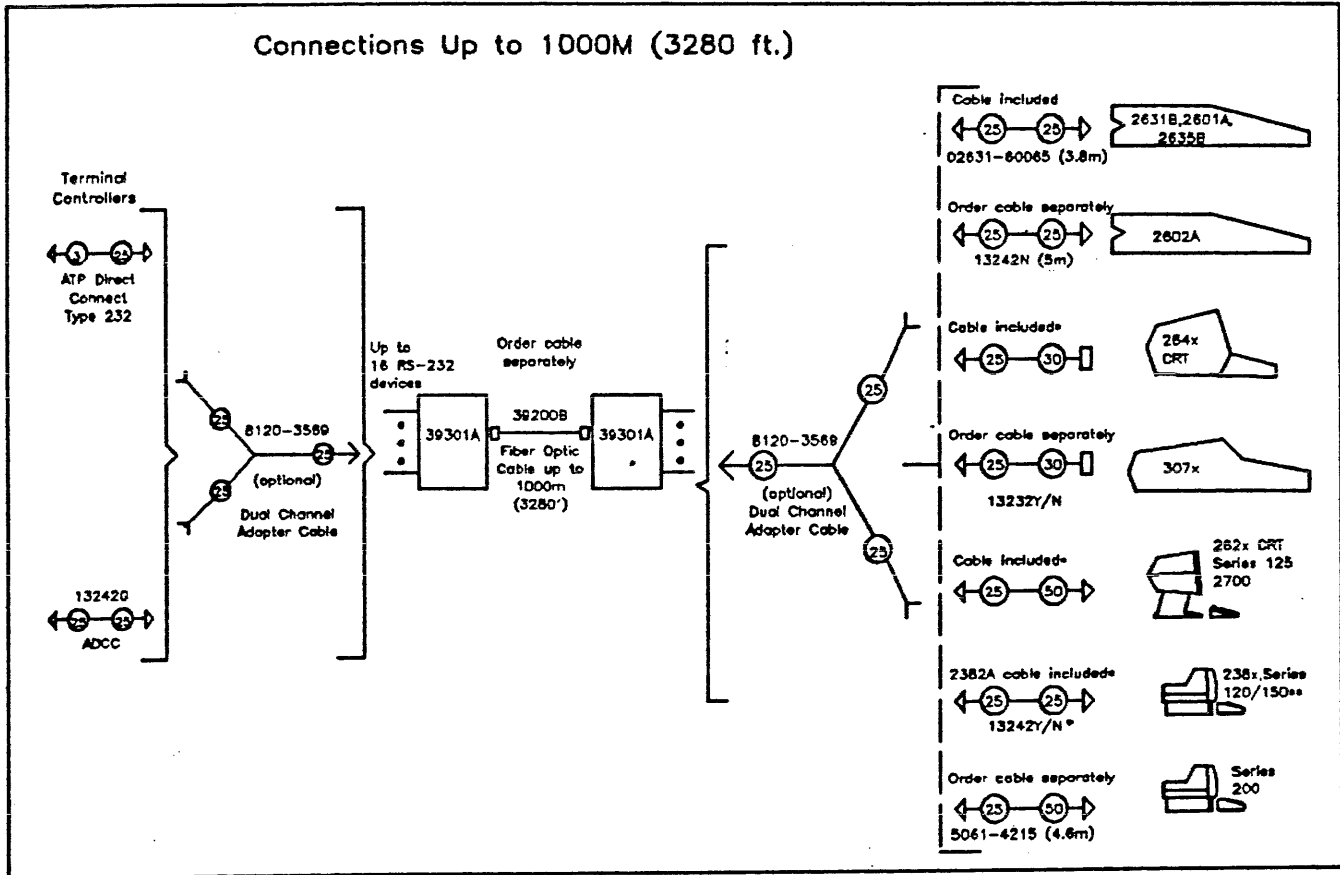
Note 2: Terminals must contain either 13266E, 13260E or opt 035 interface for use with HP Direct Connect Type 422.

Note 3: HP Direct Connect Type 422 is not available on 2621B or 2627A.



## Display Workstation Cabling Diagrams

### Point-to-Point ADCC, ATP, Connections with Fiber Optic Multiplexer (Type RS-232)



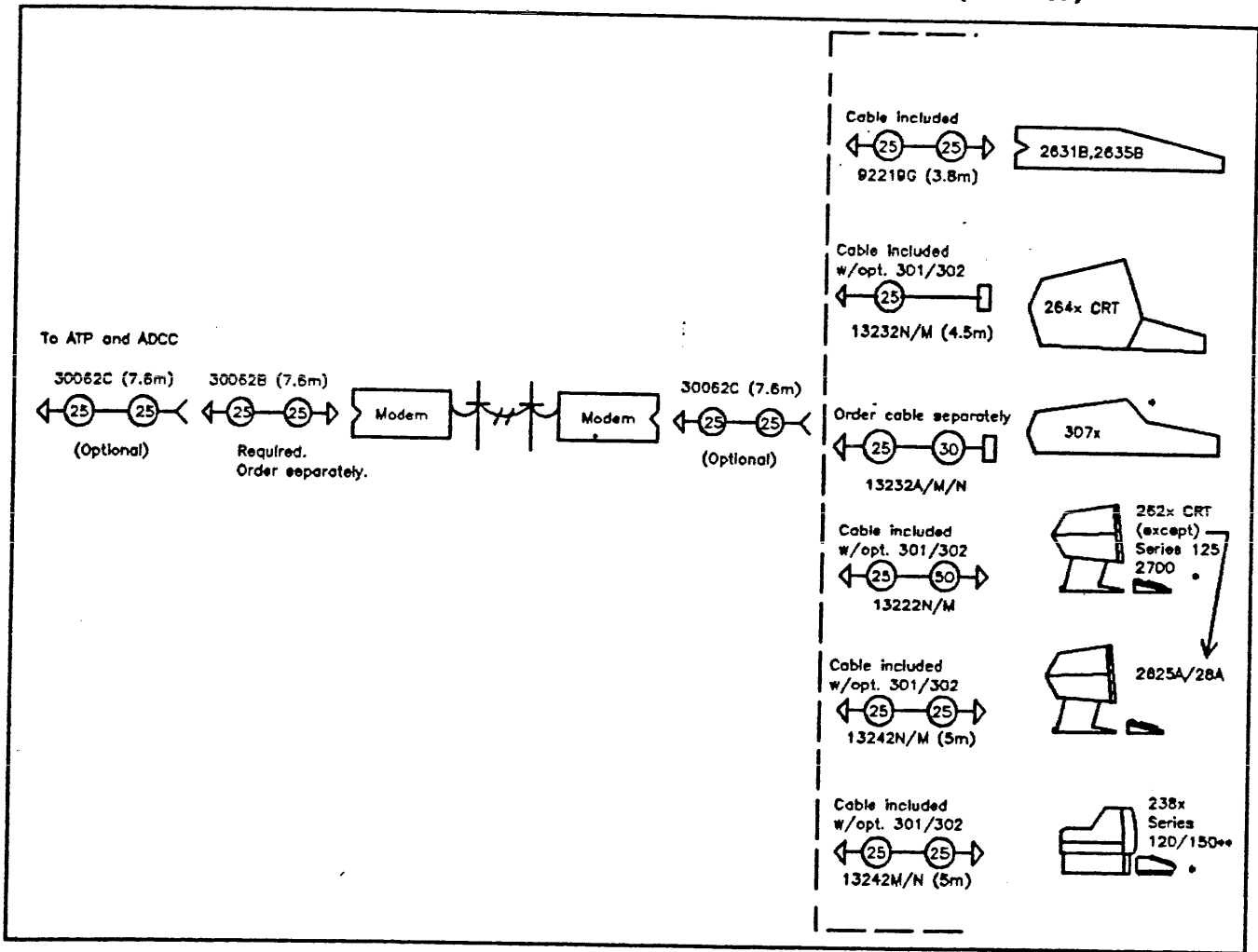
\* See chart on page 8 of this chapter for cables supplied with 262x, 264x, 2703, and 2382 terminals.

\*\* Series 120 cable (13242N/Y) must be ordered separately.

Note 1: For port 2 of 2626A/W, 2624A/B, 2627A, 2703x, and Series 125, order 13242Y/N, male/male, 25 pin/25 pin, 5m.

# Display Workstation Cabling Diagrams

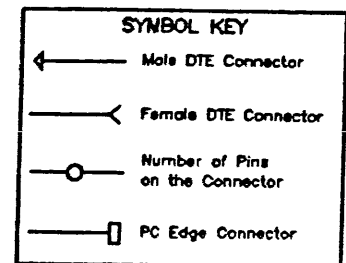
## Point-to-Point Cable Configurations for ADCC and ATP (Remote)



\* For use with full duplex modems only.

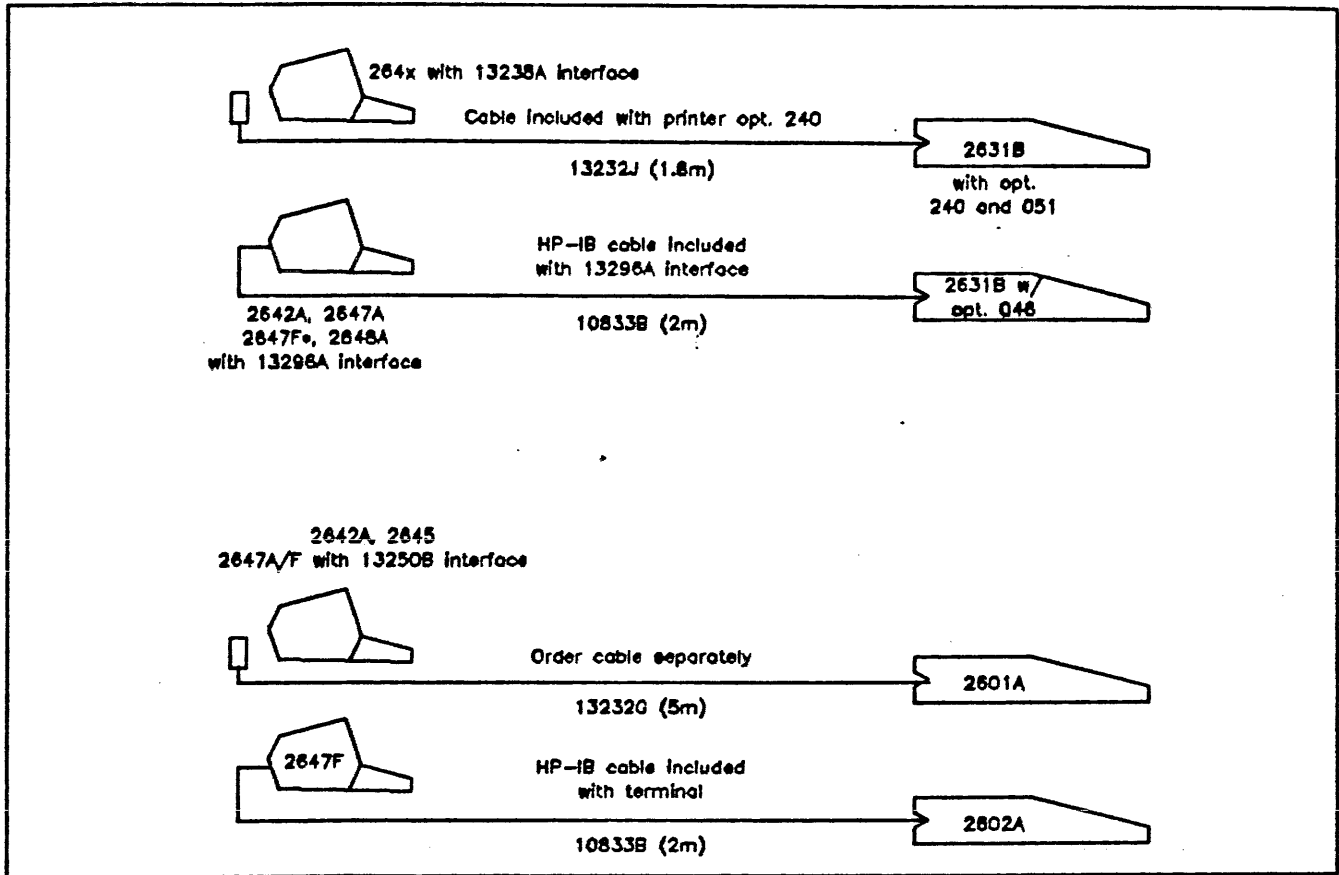
\*\* Series 120/150 cable (13242M/N) must be ordered separately.

Note 1: For port 2 of 2626A/W, 2624A/B, 2627A, 2703A, and Series 125, order 13242M/N, male/male, 25 pin/25 pin, 5m.



## Terminal Printer Cabling Diagrams

### Alphanumeric Printers



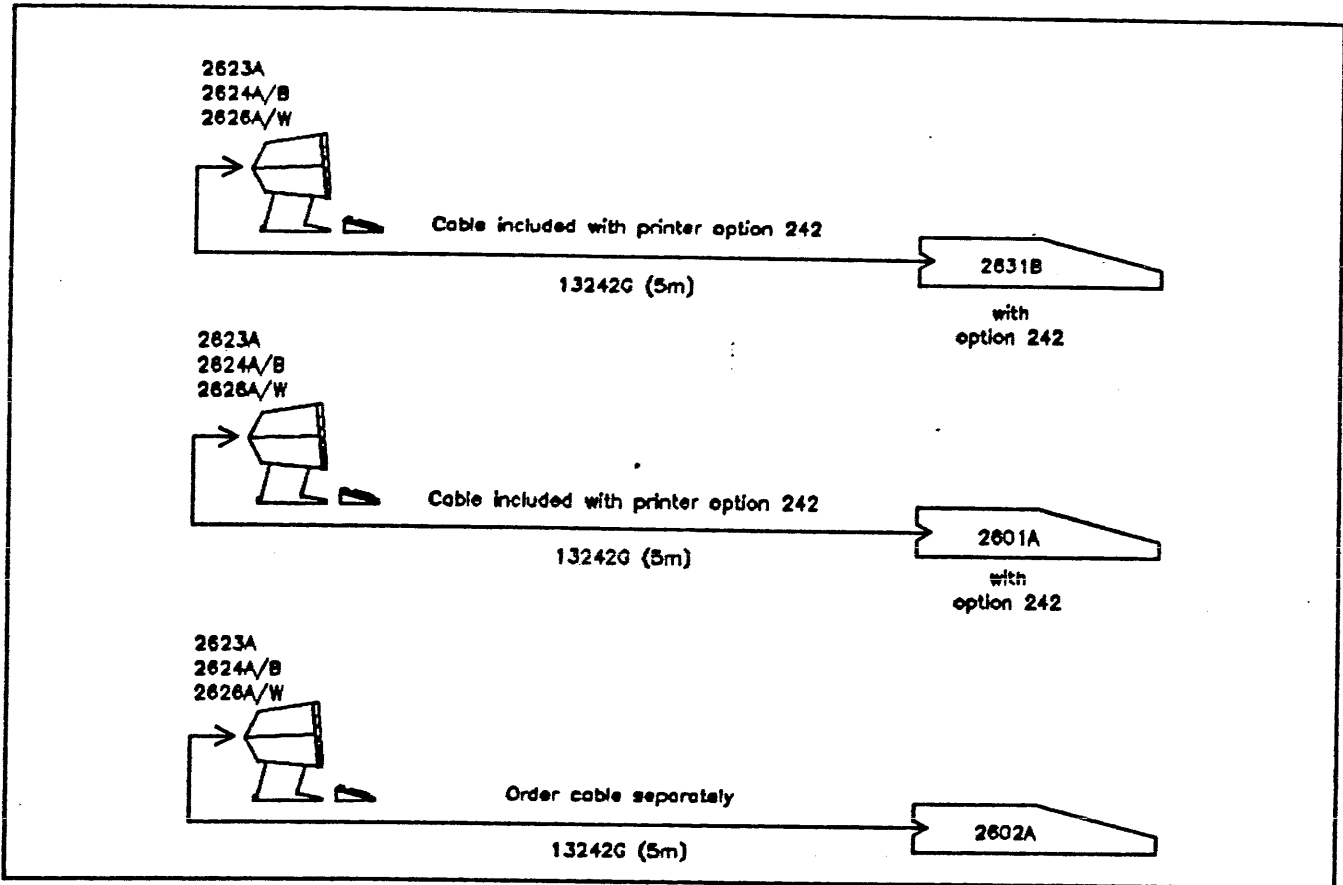
\* The 2647F has the 13296A HP-IB interface as standard.

**Notes:**

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.

# Terminal Printer Cabling Diagrams

## Alphanumeric Printers (continued)

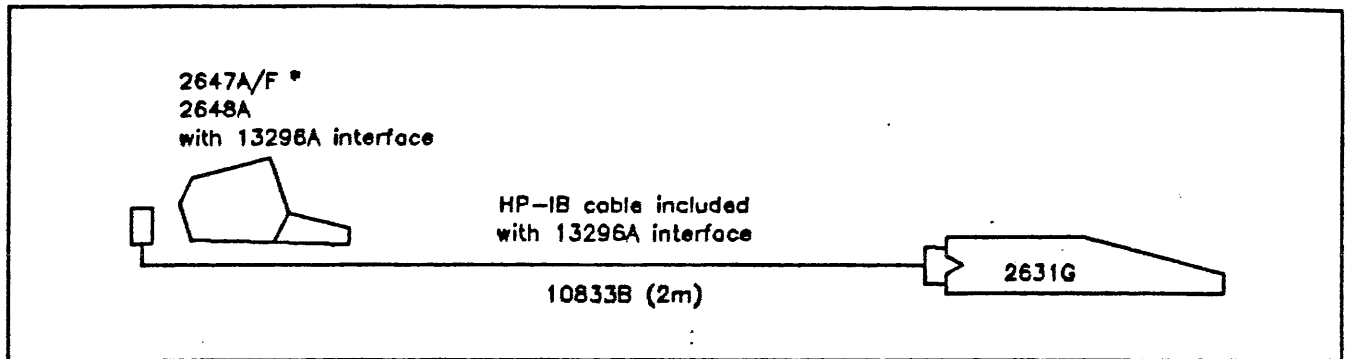


**Notes:**

Printer is interfaced to port 2 of 262x terminal.

## Terminal Printer Cabling Diagrams

### Graphics Printers



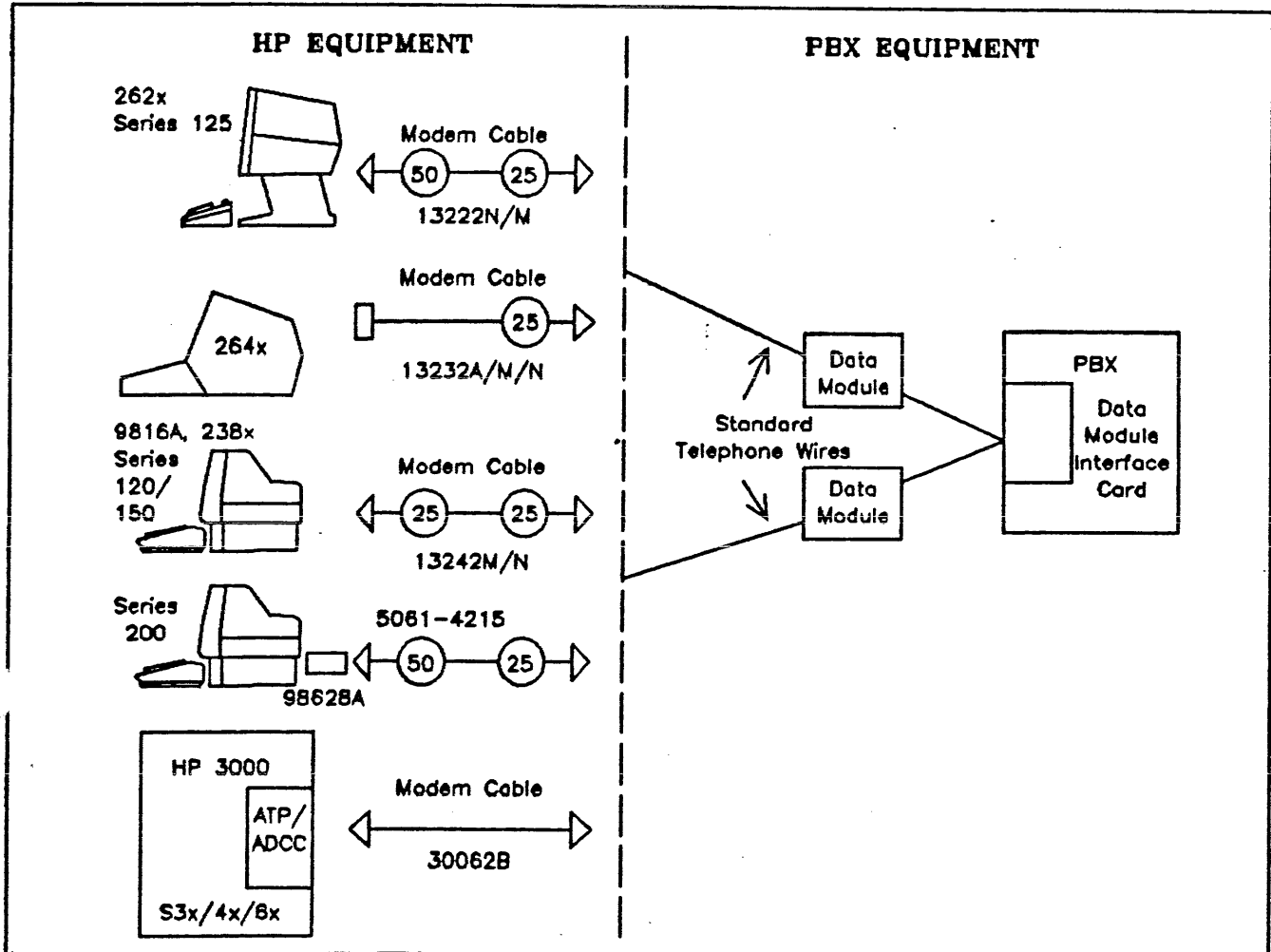
\* The 2647F has the 13296A HP-IB interface as standard.

#### Notes:

The graphics software--HPEasyChart, DSG/3000, and HPDraw--will not directly plot to the devices shown above. The terminal screen graphics can be output to these printers using capabilities of the specific terminals, not the graphics software.

# System Communications Cabling Diagrams

Point-to-Point PBX Cable Configuration for ADCC and ATP

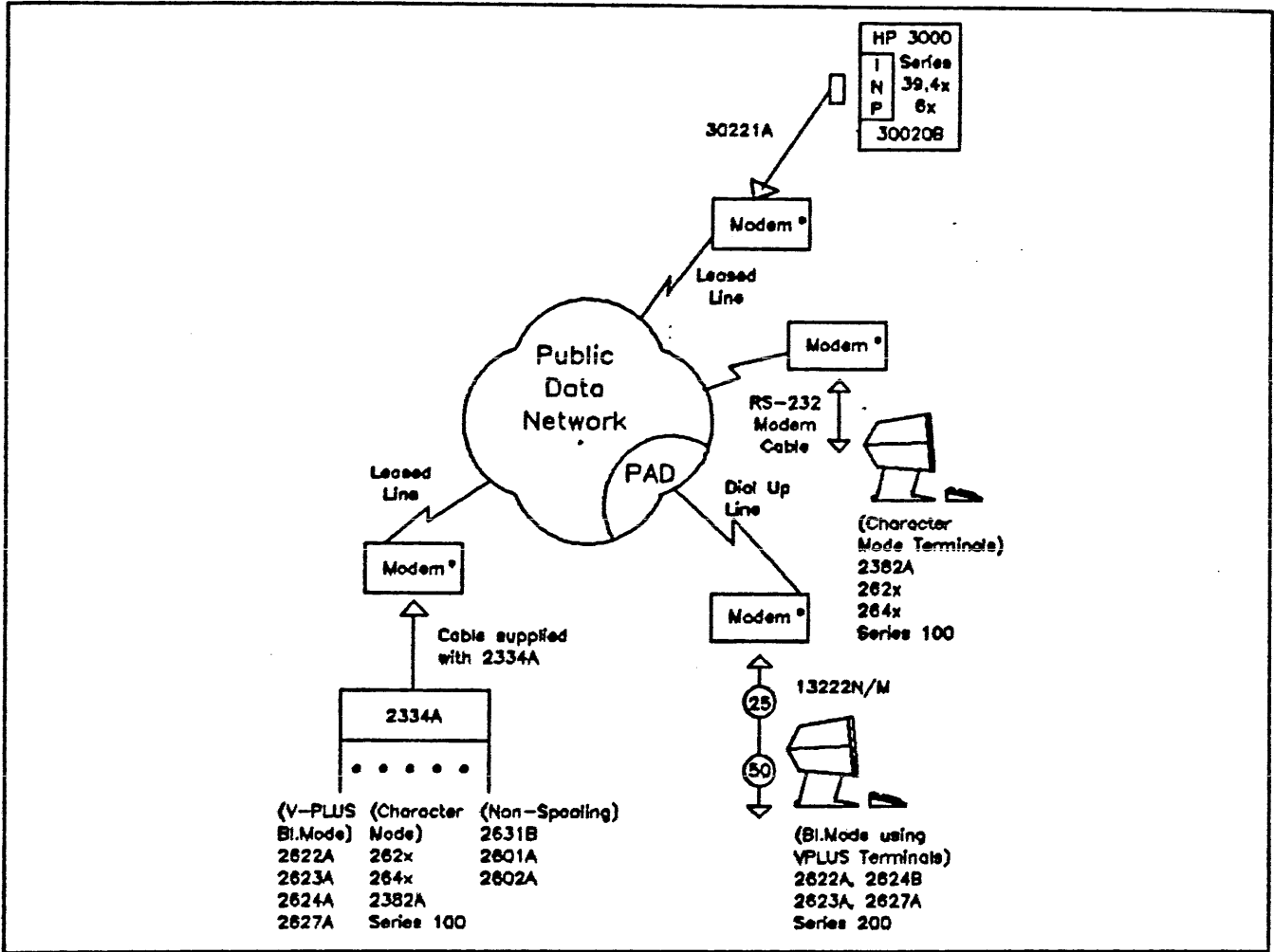


## Certified PBX Equipment

Manufacturer	PBX Model	Data Module	Data Module Interface Card
Northern Telecom	SL-1A, SL-1M, SL-1LE, SL-1VLE, SL-1XL	QMT-7, QMT-8 Add-On Data Module	Data Line Card QPC-311
Roim Corp.	VSCBX, SCBX, MCBX, VLCBX	Data Terminal Interface	Data Line Interface
Intecom Inc.	IBX S/40	Intelligent Telephone Equipment Data Interface Unit	ITE Card

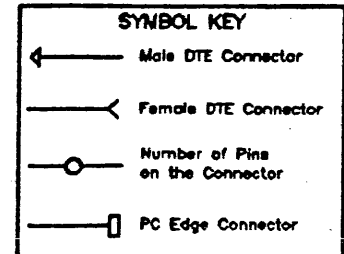
# System Communications Cabling Diagrams

## Point-to-Point X.25 Workstation Cable Connection for 2334A and PAD Support



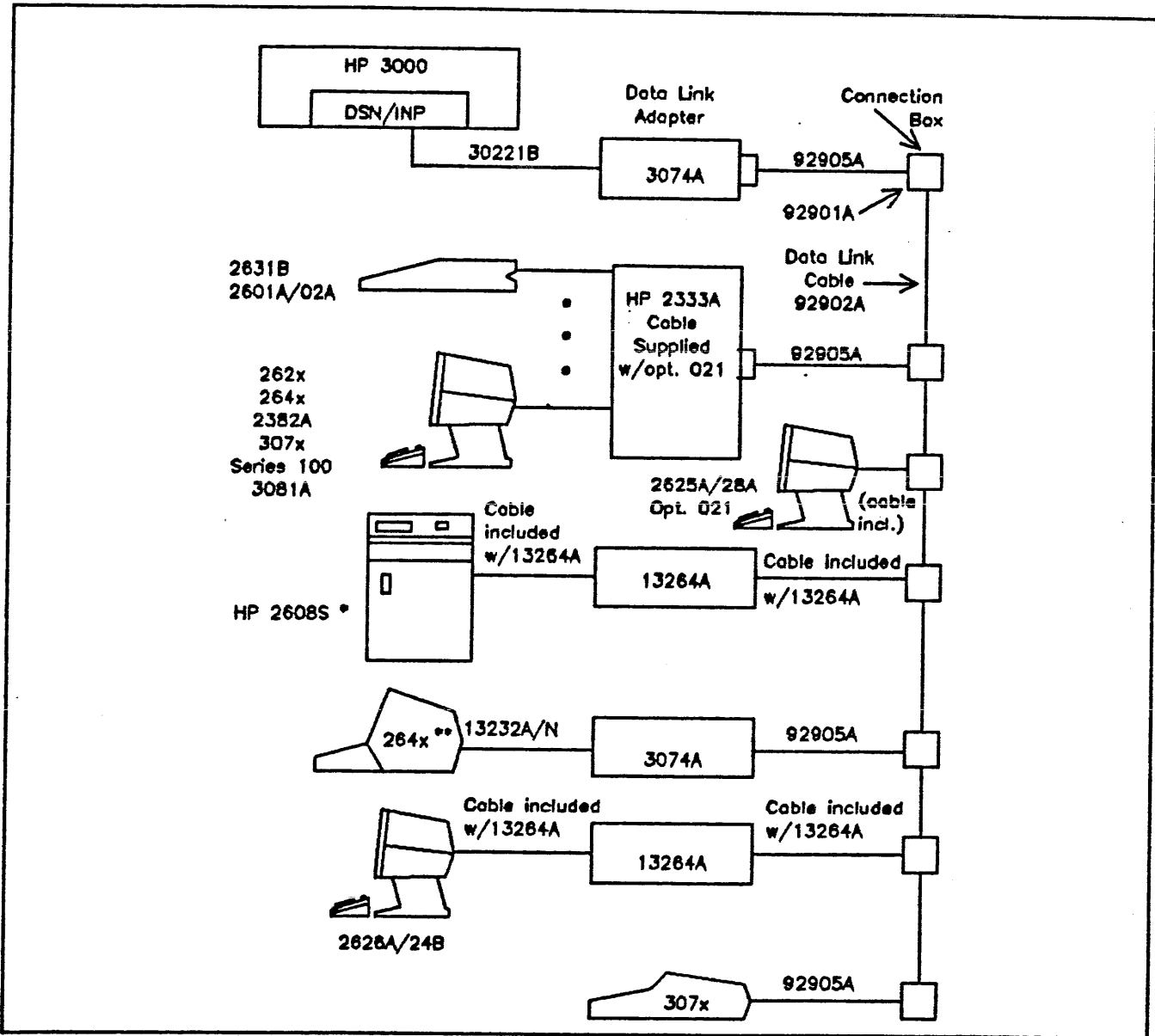
• Modem support varies with PDN. Consult your PDN.

Note 1: Refer to the HP 3000 Data Communications Products Specifications Guide Supplement for complete discussion.



# System Communications Cabling Diagrams

DSN/MTS Hardwired Data Link (Asynchronous)



\* Printer Limitations: Only one 2608S or one 2563A is allowed on the Data Link when sharing the line with terminals.

\*\* The 2640A/B/C/N/S, 2642A, 2647F, 2644A, and 2649x are not multipoint terminals and are not supported in this configuration.

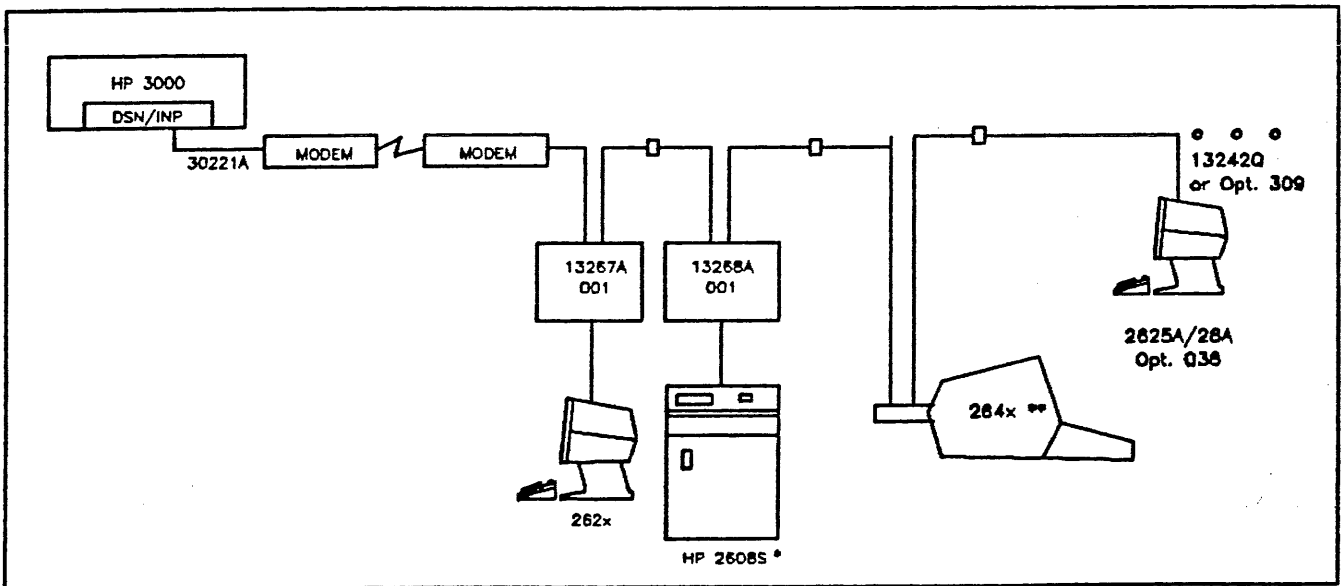
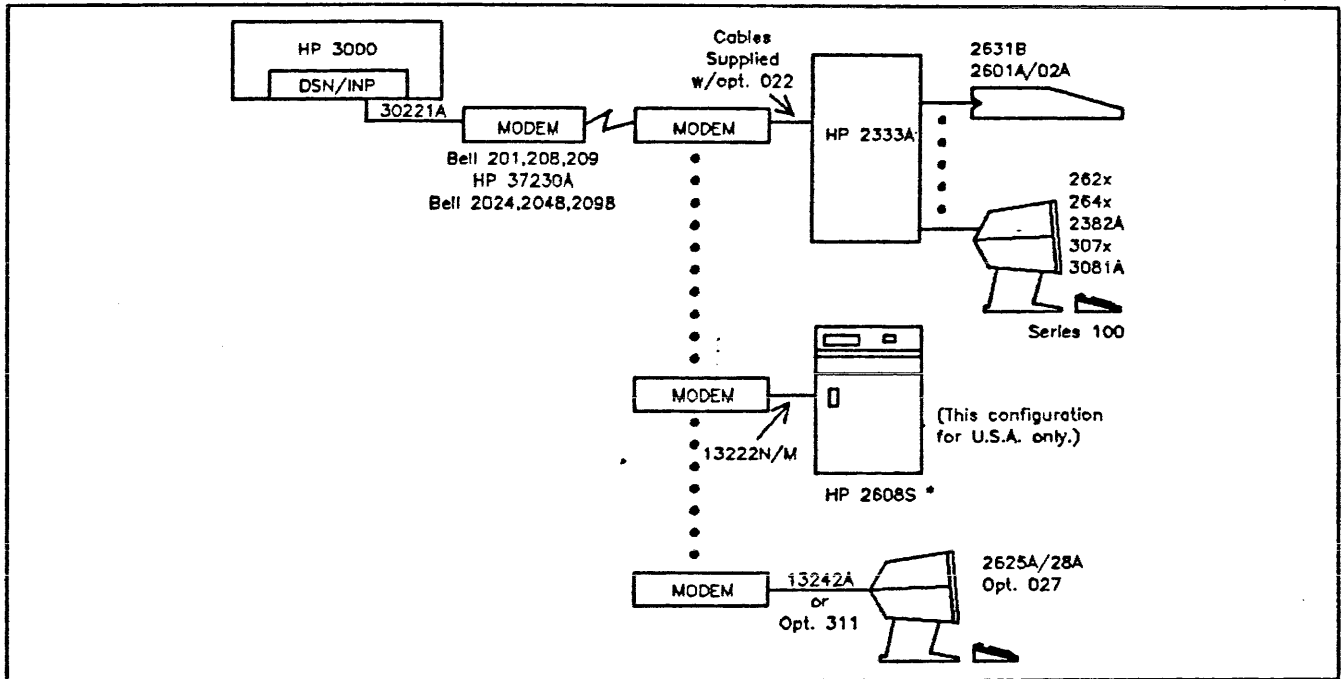
Note 1: Multiple low-speed printers (e.g., 2631B, 2601A, and 2602A) can be configured provided the aggregate speed of the printers does not exceed the Data Link line.

Note 2: In this configuration, the 3081A requires a 2314A power unit and a 40253A 8-channel current loop adapter which must be ordered separately.



## System Communications Cabling Diagrams

### DSN/MTS Remote Connections (Synchronous)



\* Printer Limitations: Only one 2608S is allowed on a multipoint line.

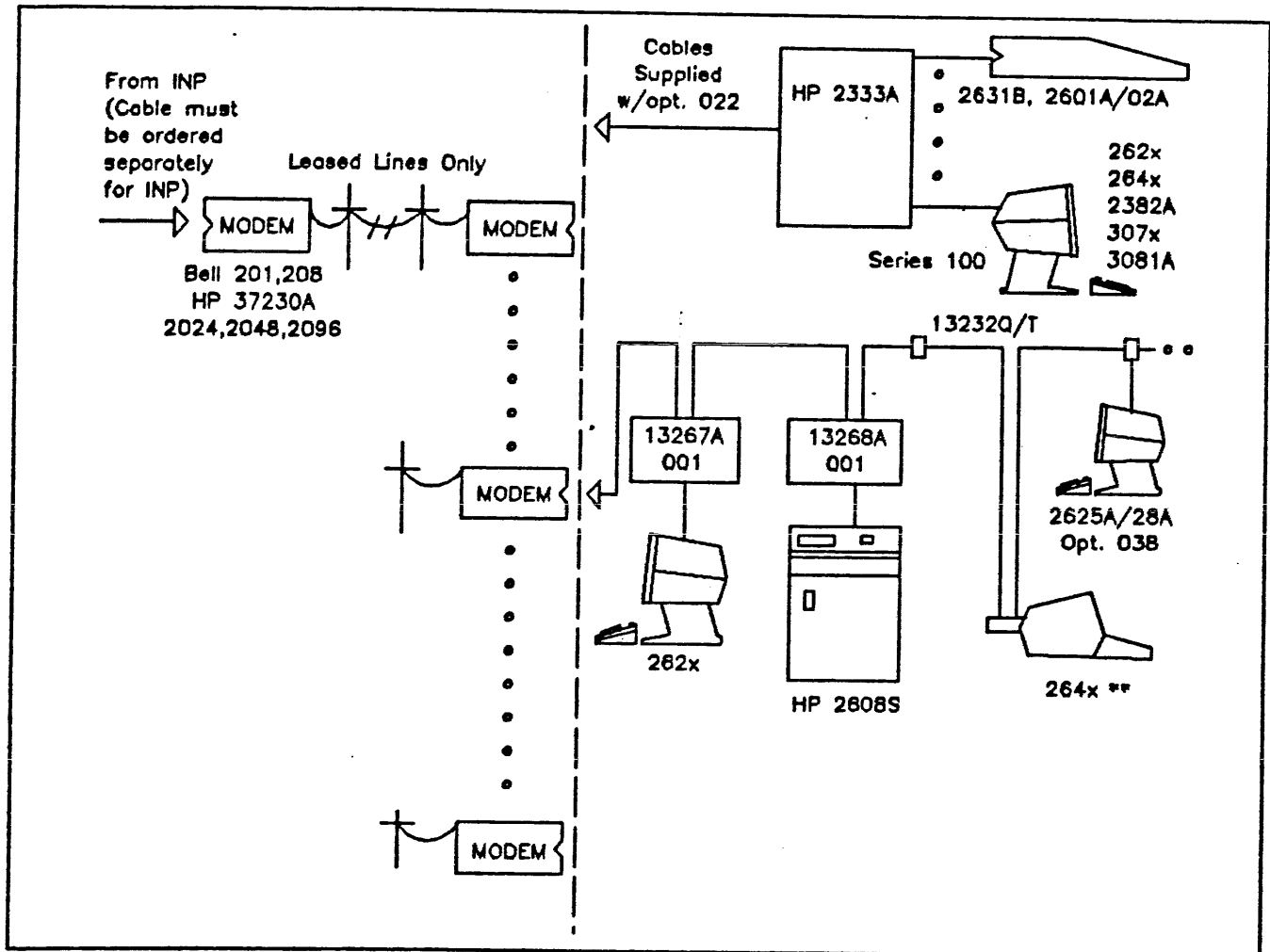
\*\* The 2640A/B/C/N/S, 2642A, 2647F, 2644A, and 2649x are not multipoint terminals and are not supported in this configuration.

Note 1: Multiple low-speed printers (e.g., 2631B, 2601A, and 2602A) can be configured provided the aggregate speed of the printer does not exceed the line speed.

Note 2: In this configuration, the 3081A requires 2314A power unit and a 40253A 8-channel current loop adapter which must be ordered separately.

# System Communications Cabling Diagrams

## DSN/MTS Multiple Remote Drops (Sample Multipoint Configurations)



\*\* The 2640A/B/C/N/S, 2642A, 2647F, 2644A, and 2649x are not multipoint terminals and are not supported in this configuration.

Note 1: All cables must be ordered separately unless otherwise specified.

Note 2: Extension cables may be used between synchronous terminals. The maximum allowable length is a function of line speed and number of terminals on the line. Refer to Appendix A of the DSN/MTS Reference Manual (32193-90002).

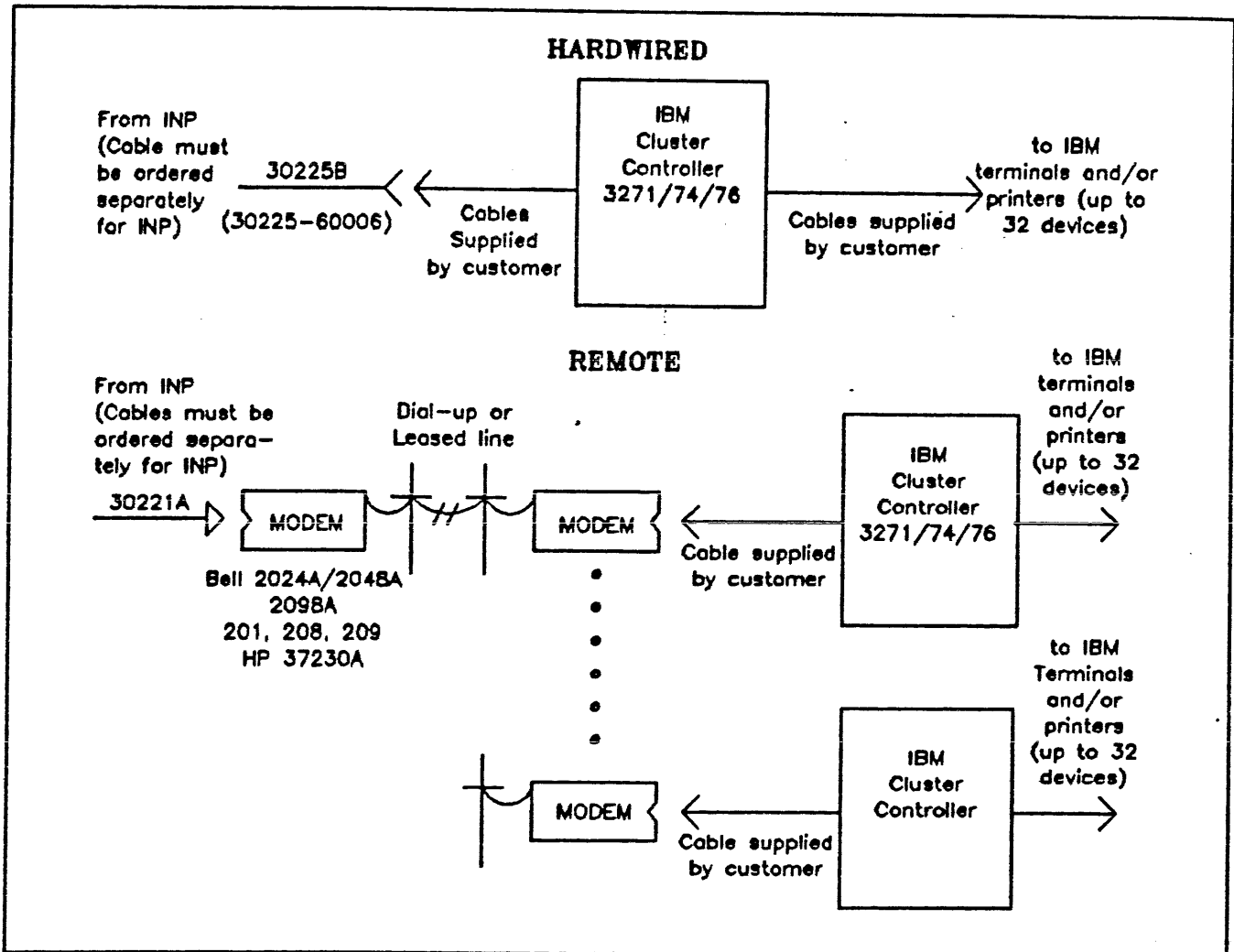
Note 3: The 13232T cable provides a terminal power-down re-routing relay for HP 264x terminals. If distance limitations are not exceeded and a terminal using this cable loses power, other terminals in the chain will not be affected. The 13232T is recommended but is not required for the last terminal.

Note 4: Additional configuration examples may be found in the DSN/MTS Reference Manual (32193-90002).

Note 5: In this configuration, the 3081A requires a 2314A power unit and a 40253A 8-channel current loop adapter which must be ordered separately.

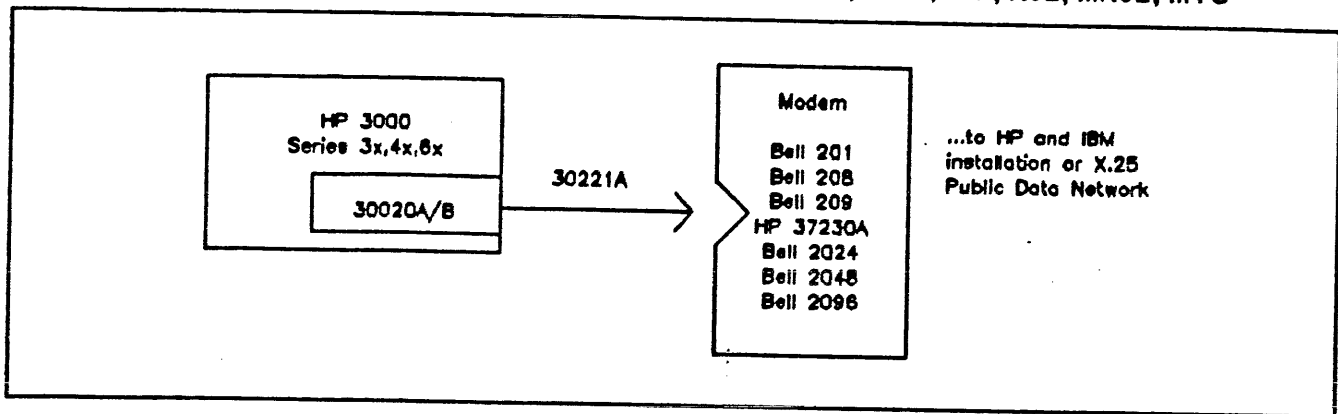
# System Communications Cabling Diagrams

## DSN/MTS Synchronous IBM 3270 Connections



## System Communications Cabling Diagrams

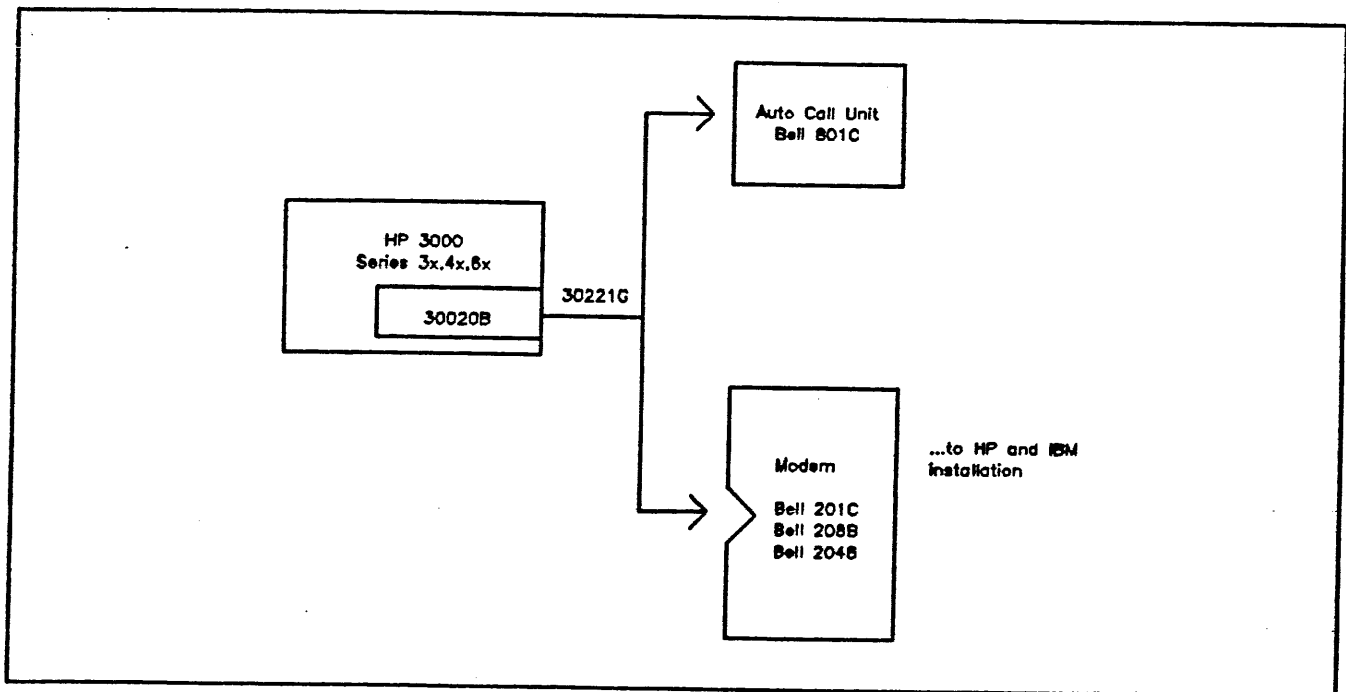
### INP Synchronous Modem Connection with DSN/DS, X.25, IMF, RJE, MRJE, MTS



Note 1: X.25 is used only with DSN/DS and the 30221A or 30222A cable. X.21 is used only with DSN/DS or DSN/RJE and the 30221H cable.

Note 2: Series 64/68 operates only with the 30020B.

### INP Synchronous Auto Dial Connection

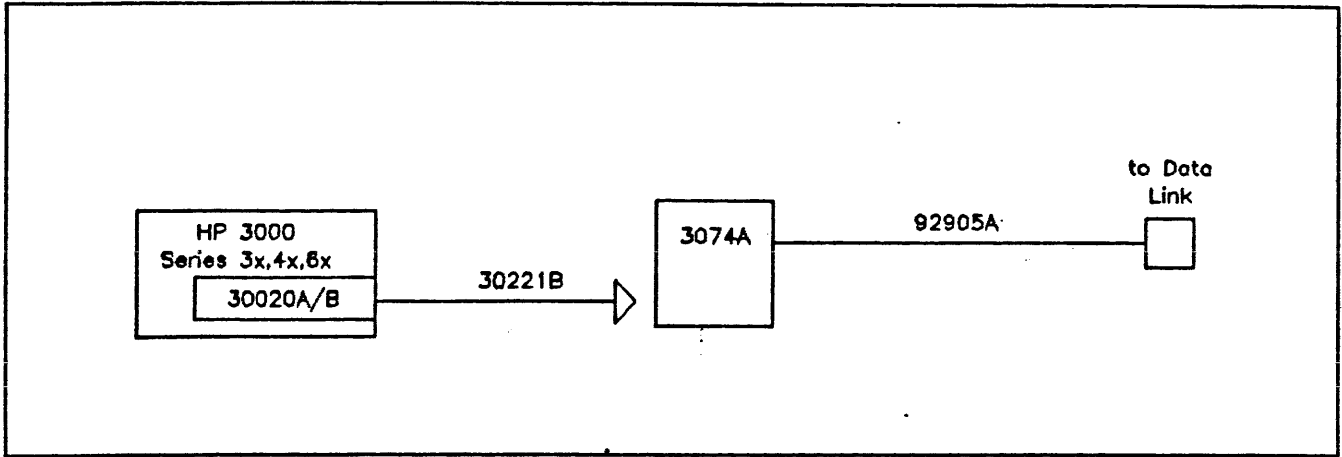


Note 1: May not be used for DSN/IMF, DSN/MTS, or DSN/X.25.

Note 2: Series 64/68 operates only with the 30020B.

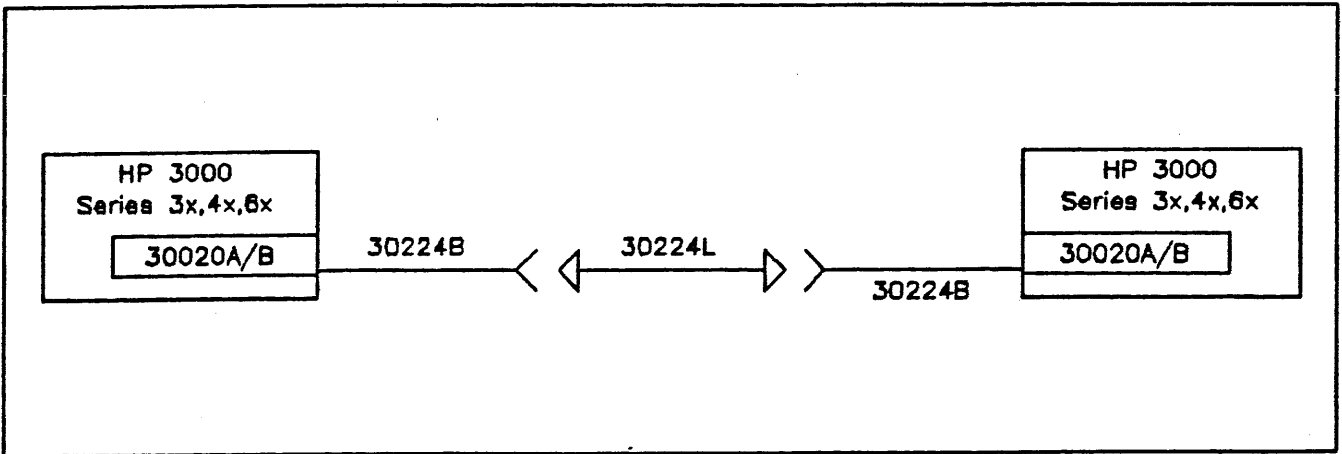
## System Communications Cabling Diagrams

### INP Asynchronous Connection with DSN/MTS



Note 1: Series 64/68 operates only with the 30020B.

### INP-INP Direct Connection with DSN/DS

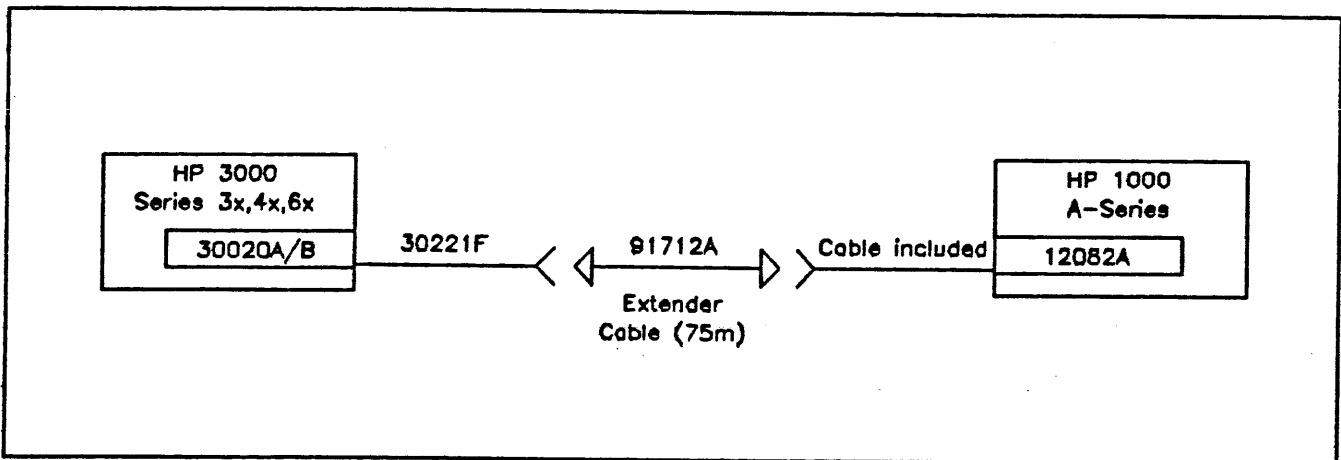
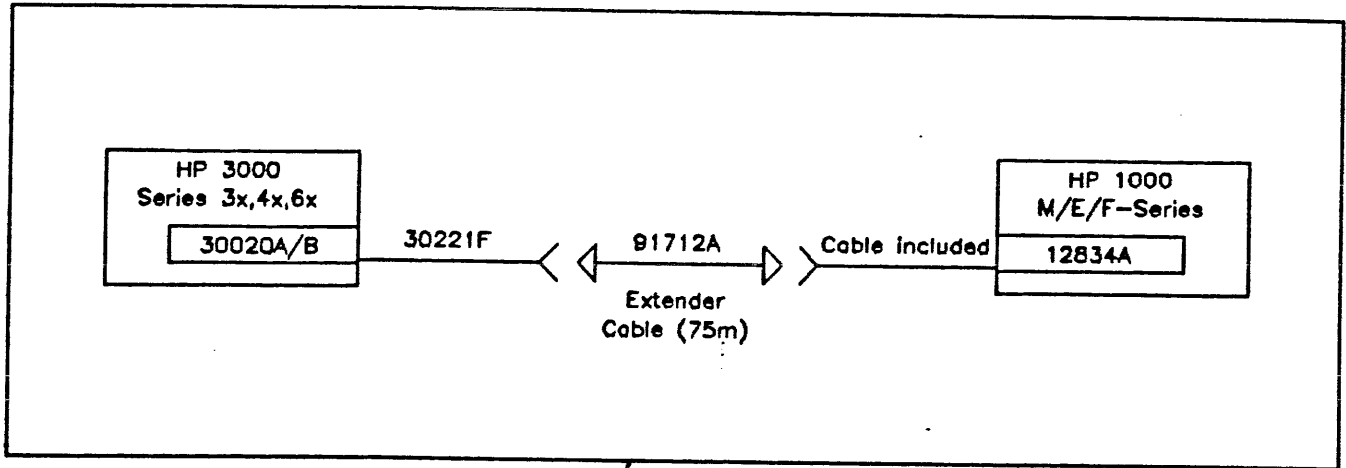


Note 1: 30224L may be ordered in lengths of 10m to 1000m.

Note 2: Series 64/68 operates only with the 30020B.

## Systems Communications Cabling Diagrams

HP 3000 to HP 1000 Hardwired Connection with DSN/DS

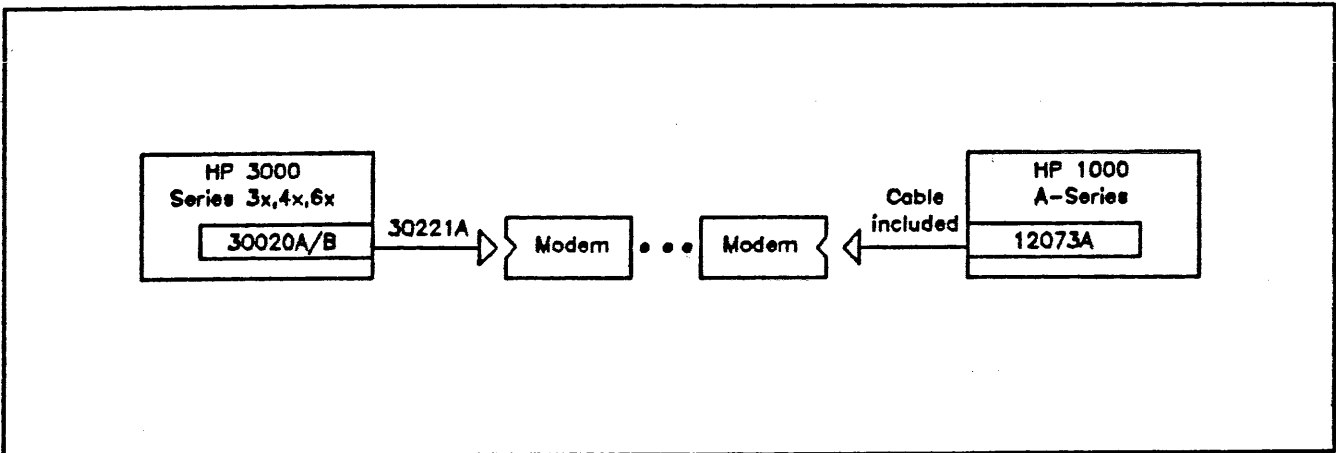
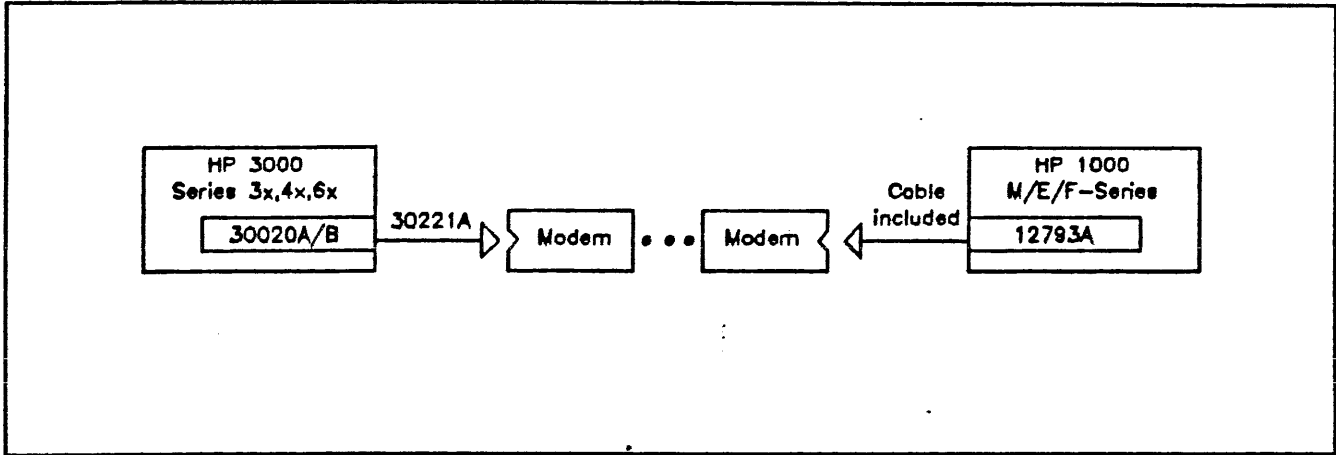


Note 1: Maximum distance of 4000 feet supported.

Note 2: Series 64/68 operates only with the 30020B.

## System Communications Cabling Diagrams

HP 3000 to HP 1000 Modem Connection with DSN/DS (continued)



Note 1: Modems Supported: Bell 201C, 208A/B, 209A, 2024, 204B, 2096, and HP 37230A.

Note 2: Series 64/68 operates only with the 30020B.

# **Graphics Workstation Configurations**



## 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

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

The table below indicates which graphics terminals, plotters, printer/plotters, printers, and graphics tablet may be used in a graphics workstation:

**Hardware Supported Under HP 3000 Business Graphics Software - HPEasyChart, DSG/3000, HPDraw**

Graphics Terminals	Plotters and Printer/Plotters	Printers	Tablets <sup>(1)</sup>
2623A 2625A <sup>(2)</sup> 2627A 2628A 2647A/F 2648A <sup>(2)</sup> 2703A HP 150	7220A/C/S/T 7221A/B/C/S/T 7225A/B 7240A 7245A/B 7470A 7475A 7580A/B 7585A/B 9872A/B/C/S/T	2608S <sup>(3)</sup> 2680A 2688A <sup>(3)</sup>	17623A

**Notes:**

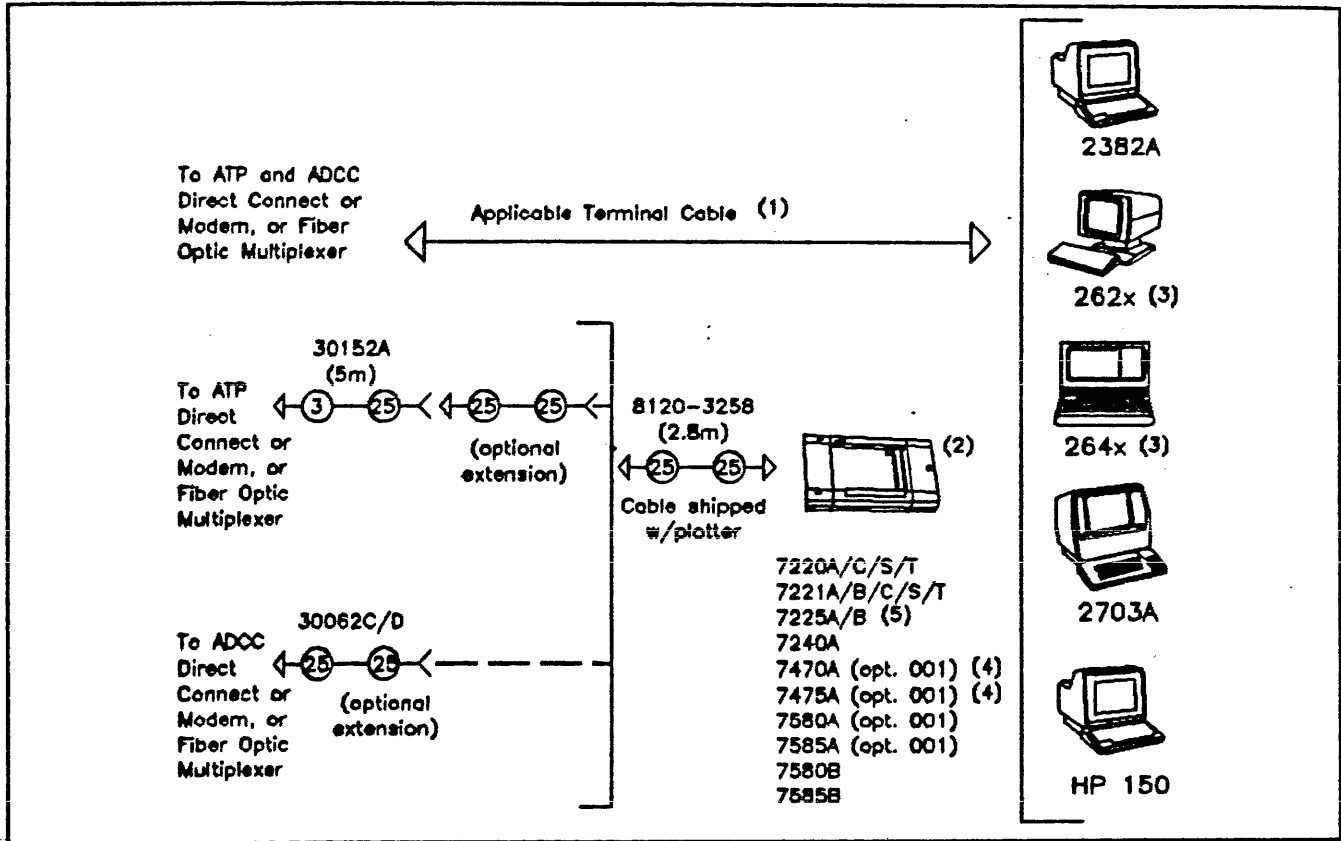
(1) Tablet support applies only to HPDraw. HPDraw currently supports the 17623A graphics tablet with the 2627A terminal only. Support on the 2623A terminal is planned to be available 12/83.

(2) Graphics support is an option on these devices.

(3) Additional software is required to support graphics on these devices.

# HP Business Graphics Workstation Configuration Diagrams

## RS-232 Direct Connect Terminal and Plotter Configuration

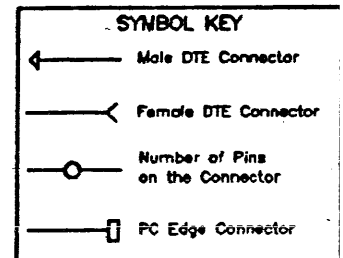


**Notes:**

- (1) See display terminals chapter of this guide for applicable terminal cables.
- (2) Plotter is accessed as a non-shareable device. No spooling capability exists. Configure plotter ports as follows:
- (3) See page 1 of this chapter for applicable terminals.
- (4) Cable for the 7470A and 7475A must be ordered separately. Cable number 17355A, male/male, 25 pin/25 pin, 2.8m.
- (5) Requires 17603A or 17604A personality module.

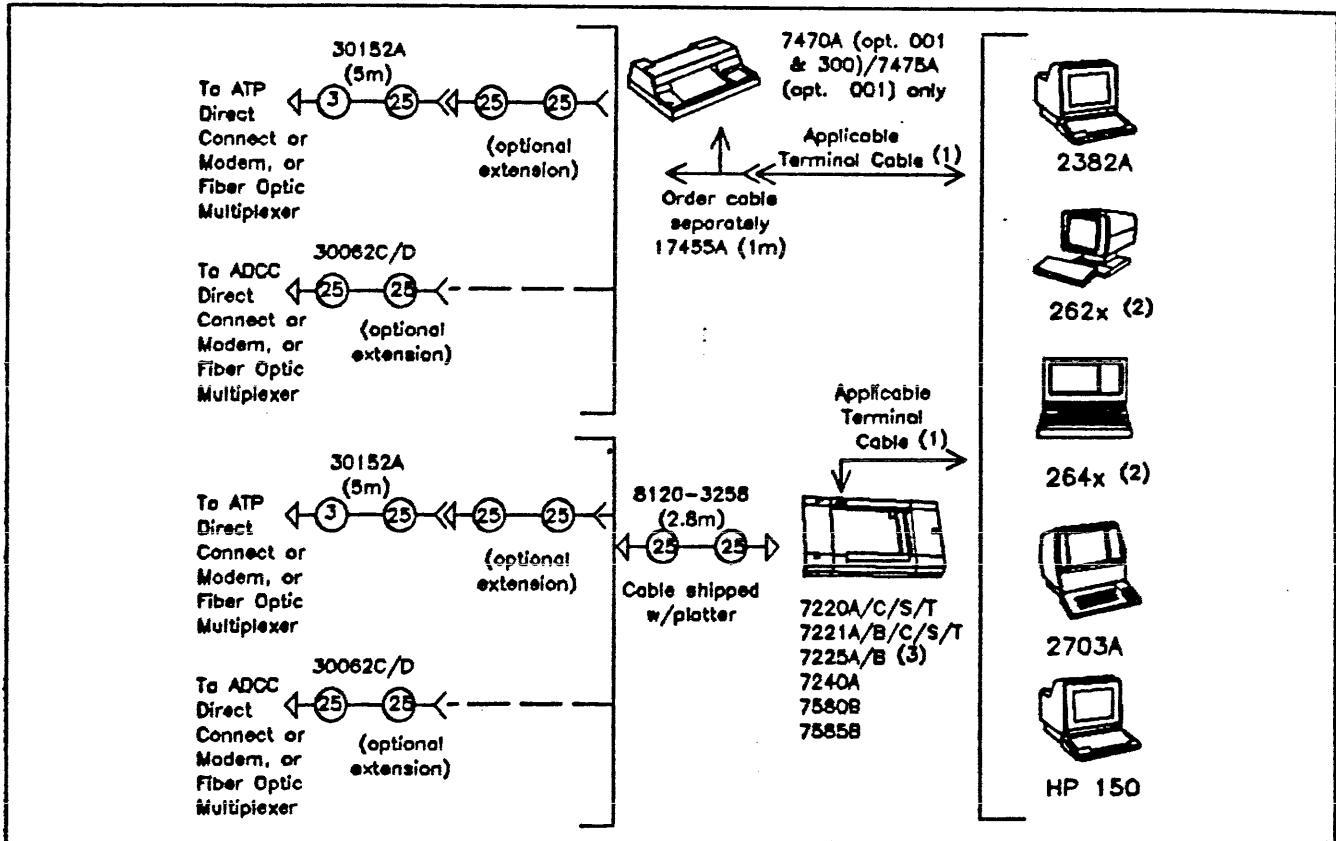
ATP - Type 16.Sub-type 0. Termttype 9.  
 Rec Width 40.JAID.HIOTERM1  
 ADCC/ATC - Type 16.Sub-type 4  
 Termttype 10.  
 Rec Width 40.  
 JAID.HIOTERM0/IOTERM0

Specify port speed to match device baud rate.



# HP Business Graphics Workstation Configuration Diagrams

## Eavesdrop Plotter Configuration



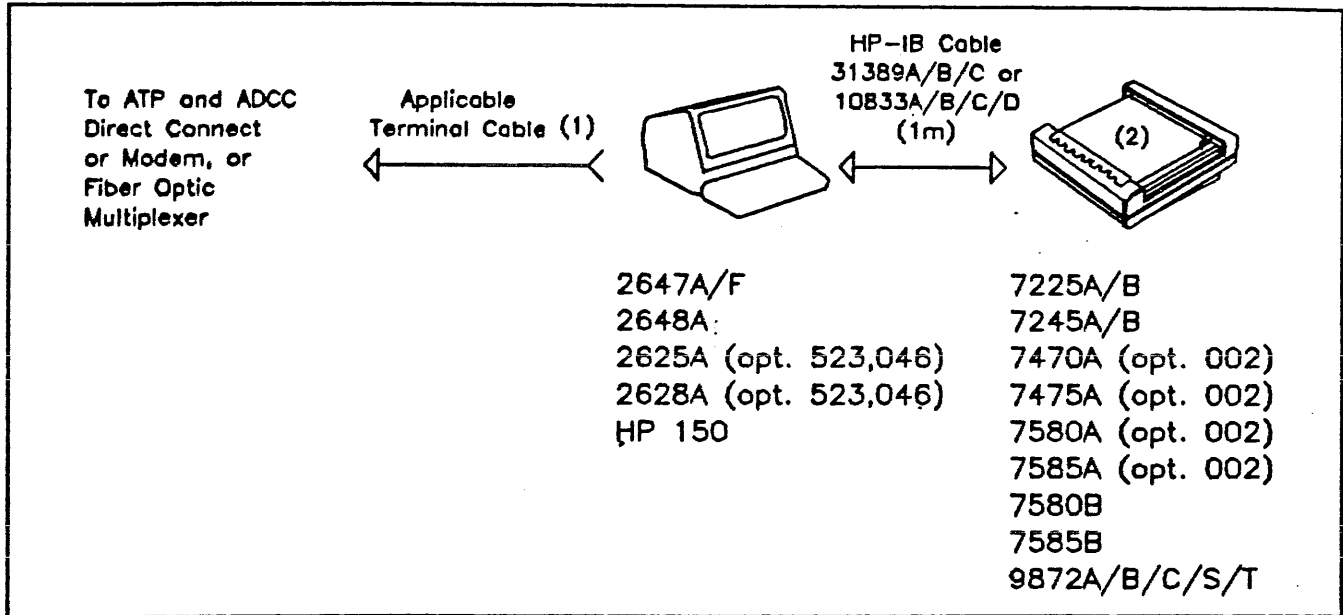
**Notes:**

Terminals and plotters may be supported via modem. See display terminals chapter of this guide for modem configuration.

- (1) See display terminals chapter of this guide for applicable terminal cables.
- (2) See page 1 of this chapter for applicable terminals.
- (3) Requires 17604A personality module.

## HP Business Graphics Workstation Configuration Diagrams

### HP-IB Plotter Configuration



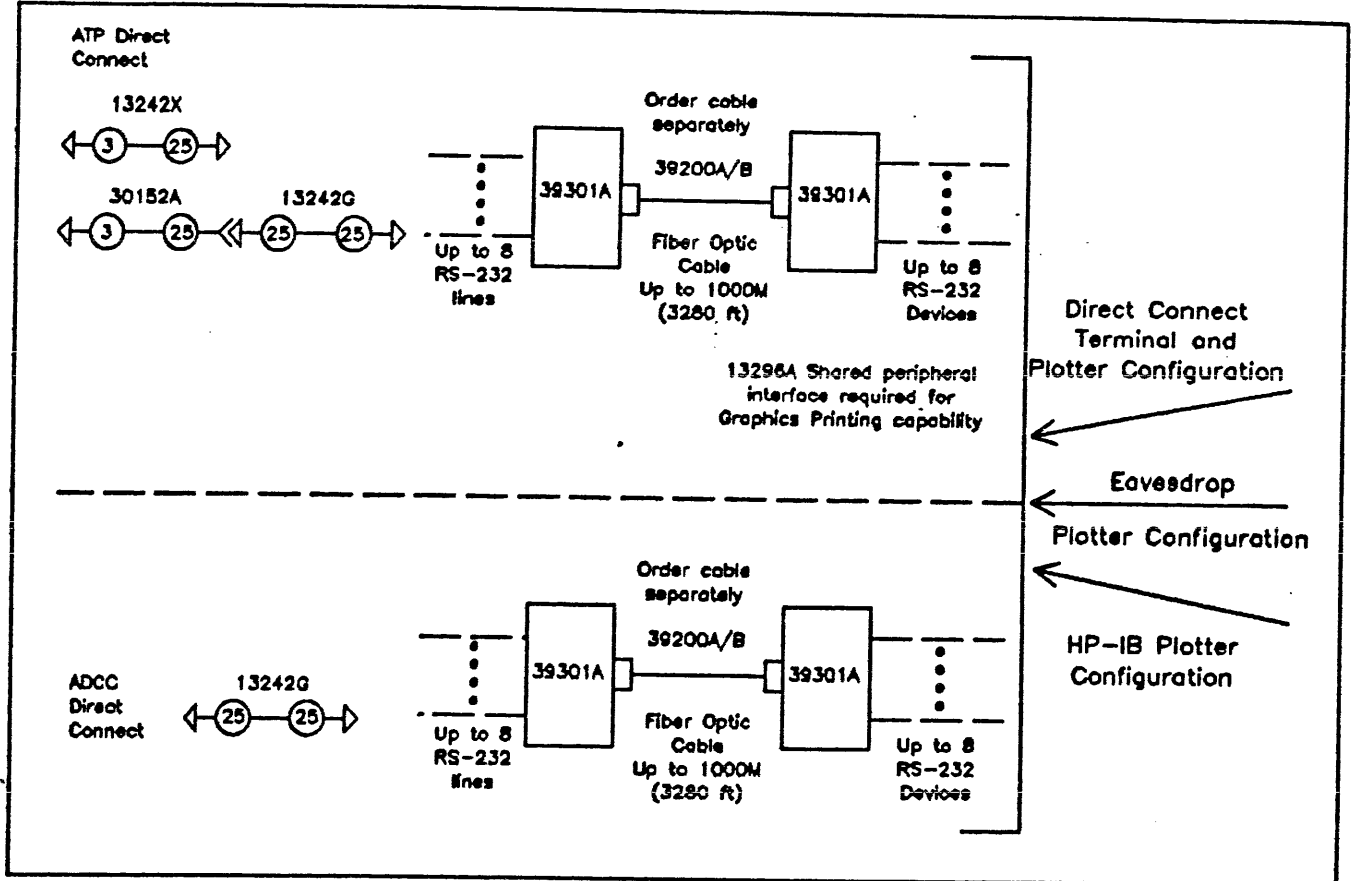
**Notes:**

Terminals and plotters may be supported via modem. See display terminals chapter of this guide for modem configuration.

- (1) See display terminals chapter of this guide for applicable terminal cables.
- (2) HP-IB plotter configuration not supported with HP 2703A.

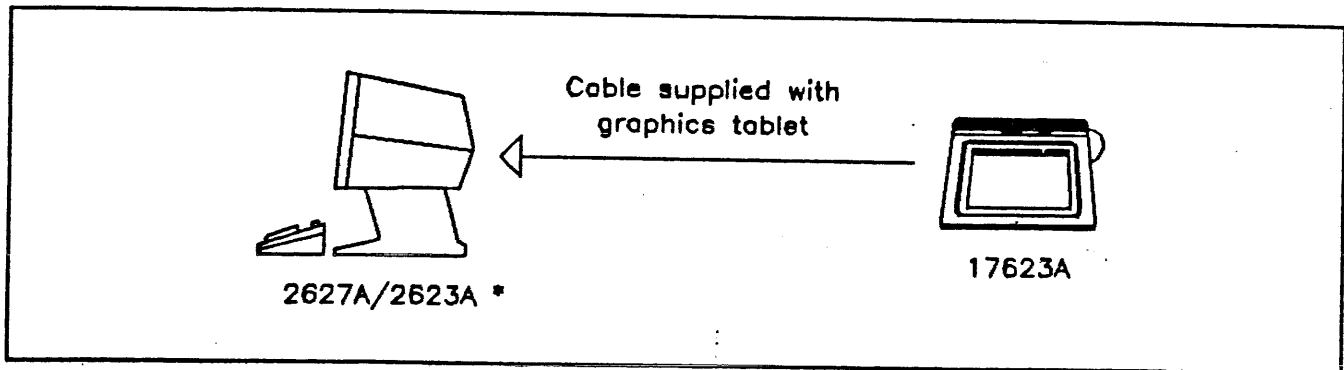
# HP Business Graphics Workstation Configuration Diagrams

## Fiber Optic Extension



## HP Business Graphics Workstation Configuration Diagrams

### Graphics Tablet Configuration



- Support of the 17623A on the 2623A terminal is planned for 12/83.

#### Notes:

Tablet support applies only to HPDraw with the 2627A graphics terminal. The HP 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 Plotter and Eavesdrop Plotter configurations.

# 5

## Manuals

HP 8000 System Manuals  
Software Manuals

5-1  
5-2

## HP 3000 System Manuals

Each HP 3000 system is shipped with a complete User Manual Set. Manuals included in

the set are shown below. In addition, the User Manual Set may be ordered as product number 30381A. (See the HP 3000 Computer Systems Price Guide for ordering and pricing information.

Description	Manuals Included with System
<p>HP 3000 Series 39, Series 40, Series 42, Series 44, Series 48, Series 64 and Series 68 User Manual Set</p>	<p>General Information Manual (5953-7553)            EDIT/3000 (03000-90012)            FCOPY/3000 (03000-90064)            Using the HP 3000 (03000-90121)            MPE Commands (30000-90009)            MPE Intrinsic (30000-90010)            MPE Segmenter (30000-90011)            MPE Debug/Stack Dump (30000-90012)            System Manager/System Supervisor (30000-90014)            Error Messages (30000-90015)            Compiler Library (30000-90028)            QUERY/3000 (30000-90042)            MPE System Utilities (30000-90044)            Index to MPE (30000-90045)            Software Pocket Guide (30000-90049)            KSAM/3000 (30000-90079)            Using Files (30000-90102)            MPE File System (30000-90236)            Console Operator's Guide (32002-90004)            HP VPLUS/3000 Reference Manual (32209-90001)            HP V/3000 Quick Reference Guide (32209-90003)            Using VPLUS/3000 (32209-90004)            SORT-MERGE/3000 (32214-90001)            IMAGE/3000 (32215-90003)            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)            Series 64 Diagnostic Manual Set (32342-60001)                (For Series 64 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)</p>



# 6

## Software and Hardware Support

HP 3000 Software Support Services	6-1
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Maintenance Agreement Availability Matrix	6-6

# 7

## Site Preparation Data

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## Environmental Specifications

### System Processor Units

Environment	Series 39/40/42	Series 44/48	Series 64/68
Relative Humidity (operating) --recommended (non-condensing)	40-60%	40-60%	40-60%
Recommended Operating Temperature	68°-78°F (20°-25.5°C)	68°-78°F (20°-25.5°C)	68°-78°F (20°-25.5°C)
Line Voltage (VAC) and Frequency	120 @ 50/60 Hz 220 @ 50/60 Hz Single Phase	210 @ 60 Hz 220 @ 50 Hz Single Phase	208 @ 60 Hz 380 @ 50 Hz 415 @ 50 Hz Three Phase

Note: 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.

## Physical Dimensions

### System Processor Units

Dimension	Height	Depth	Width	Weight
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	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	122 cm (48 in.)	66 cm (26 in.)	176 cm (69 in.)	522 Kg (1150 lbs.)

## Electrical Characteristics

### System Processor Units

Product	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
Series 39	3000 (756)	120 @ 50/60 Hz 220 @ 50/60 Hz	8.5A 4.5A
Series 42	3000 (756)	120 @ 50/60 Hz 220 @ 50/60 Hz	8.5A 4.5A
Series 48 Two Card Cages	7350 (1908)	210 @ 60 Hz 220 @ 50 Hz	13.1A 12.4A
Series 68	12,000 (3024)	208 @ 60 Hz three-phase 380 @ 50 Hz three-phase 415 @ 50 Hz three-phase	24.0A/phase 13.0A/phase 12.0A/phase

### Magnetic Tape Drives

Product Number	Equipment	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
7970E	Magnetic Tape Drive	580 (154)	115 @ 60 Hz 230 @ 50 Hz	2.0A 1.7A
7970E Opt. 426	Magnetic Tape Drive (Master)	750 (198)	115 @ 60 Hz 230 @ 50 Hz	2.5A 1.4A
7974A	Magnetic Tape Drive	2050 (517)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	4.5A 4.5A 1.9A 1.9A
7976A	Magnetic Tape Drive	5100 (1285)	117 @ 60 Hz 220 @ 50 Hz	15.8 8.2

## Electrical Characteristics

## Disc Drives

Product Number	Equipment	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
7906S	Disc Drive (Slave)	1780 (440)	120 @ 60 Hz 220 @ 50 Hz	5.7A 3.2A
7906M	Disc Drive (Master)	2526 (636)	120 @ 60 Hz 220 @ 50 Hz	8.0A 4.5A
7911P	Disc Drive	2593 (654)	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7912P	Disc Drive	2593 (654)	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7914P	Disc Drive	2593 (654)	120 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7920S	Disc Drive (Slave)	1621 (409)	120 @ 60 Hz 220 @ 50 Hz	5.1A 3.0A
7920M	Disc Drive (Master)	2389 (602)	120 @ 60 Hz 220 @ 50 Hz	7.4A 4.3A
7925S	Disc Drive (Slave)	1160 (292)	120 @ 60 Hz 220 @ 50 Hz	4.4A 2.2A
7925M	Disc Drive (Master)	1928 (486)	120 @ 60 Hz 220 @ 50 Hz	6.7A 3.5A
7933H	Disc Drive	5450* (1376)	208 @ 60 Hz 220 @ 50 Hz	4.7A 2.6A
7935H	Disc Drive	5450* (1376)	208 @ 60 Hz 220 @ 50 Hz	9.3A 9.0A
9895A	Flexible Disc Drive	295 (74)	120 @ 60 Hz 220 @ 50 Hz	2.1A 0.88A

\* Includes drive and accessory outlets

## Electrical Characteristics

### Printers

Product Number	Equipment	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
2601A	Daisywheel Printer	444 (109)	100 @ 50/60 Hz	2.0A
			120 @ 50/60 Hz	1.7A
			220 @ 50/60 Hz	0.9A
			240 @ 50/60 Hz	0.8A
2602A	Daisywheel Printer	307 (78)	120 @ 50/60 Hz	1.1A
			220 @ 50/60 Hz	0.6A
			240 @ 50/60 Hz	0.6A
2608A	Line Printer	2900 (730)	120 @ 60 Hz 220 @ 50 Hz	10.5A 5.3A
2608S	Line Printer	2380 (595)	100 @ 50/60 Hz	13.8A
			120 @ 50/60 Hz	11.5A
			220 @ 50/60 Hz	5.7A
			240 @ 50/60 Hz	6.3A
2611A	Line Printer	2720 (680)	100 @ 50/60 Hz	7.0A
			115 @ 50/60 Hz	6.0A
			200 @ 50/60 Hz	3.5A
			230 @ 50/60 Hz	3.0A
2619A	Line Printer	4340 (1090)	115 @ 60 Hz 230 @ 50 Hz	12.5A 6.3A
2631B	Line Printer	512 (126)	120 @ 60 Hz 220 @ 50 Hz	1.7A 0.9A
2631G	Graphics Printer	478 (118)	100 @ 50/60 Hz	2.7A
			120 @ 50/60 Hz	2.2A
			220 @ 50/60 Hz	1.2A
			240 @ 50/60 Hz	1.1A
2635B	Printing Terminal	512 (126)	120 @ 60 Hz 220 @ 50 Hz	1.7A 1.0A
2680A	Page Printer	13,650 (3447)	208 @ 60 Hz	30A
			220 @ 50 Hz	30A
2687A	Page Printer	2870 (725)	115 @ 60 Hz	7.4A
			220 @ 50 Hz	3.5A
2688A	Page Printer	3775 (953)	115 @ 60 Hz	10.6A
			220 @ 50 Hz	5.2A

## Electrical Characteristics

## Terminals

Product Number	Equipment	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
2382A	CRT Terminal	207 (52)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	0.75A 0.75A 0.75A 0.75A
2621A	CRT Terminal	140 (35)	120 @ 60 Hz 220 @ 50 Hz	0.43A 0.25A
2622A	CRT Terminal	255 (65)	110 @ 60 Hz 220 @ 50 Hz	1.38A 1.15A
2623A	CRT Terminal	244 (62)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	1.7A 1.4A 0.7A 0.7A
2624A	CRT Terminal	408 (103)	110 @ 60 Hz 220 @ 50 Hz	1.2A 0.6A
2624B	CRT Terminal	195 (49)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	1.7A 1.4A 0.7A 0.7A
2626A	CRT Terminal	255 (65)	120 @ 60 Hz 220 @ 50 Hz	0.8A 0.4A
2626W	CRT Terminal	203 (51)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	1.7A 1.4A 0.7A 0.7A
2627A	CRT Terminal	413 (114)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	2.8A 2.4A 1.4A 1.3A
2625A/28A	CRT Terminal	341 (86)	100 @ 50/60 Hz 120 @ 50/60 Hz 220 @ 50/60 Hz 240 @ 50/60 Hz	1.7A 1.4A 0.7A 0.7A

## Electrical Characteristics

### Terminals (continued)

Product Number	Equipment	BTU/Hr (KCAL/Hr)	Voltage (VAC) and Frequency	Maximum Steady State Current
2641A	CRT Terminal	290 (73)	115 @ 60 Hz 230 @ 50 Hz	1.2A 0.6A
2645A/N/R/S	CRT Terminal	478 (120)	120 @ 50/60 Hz 220 @ 50/60 Hz	4A 2A
2647F	CRT Terminal	560 (140)	120 @ 50/60 Hz 230 @ 50 Hz	1.5A 0.8A
2648A	CRT Terminal	440 (111)	115 @ 60 Hz 230 @ 50 Hz	1.7A 0.9A
2703A	CRT Terminal	1727 (435)	120 @ 50/60 Hz 220 @ 50/60 Hz	5.5A 3.5A