HP 3000 Computer Systems

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Configuration Guide

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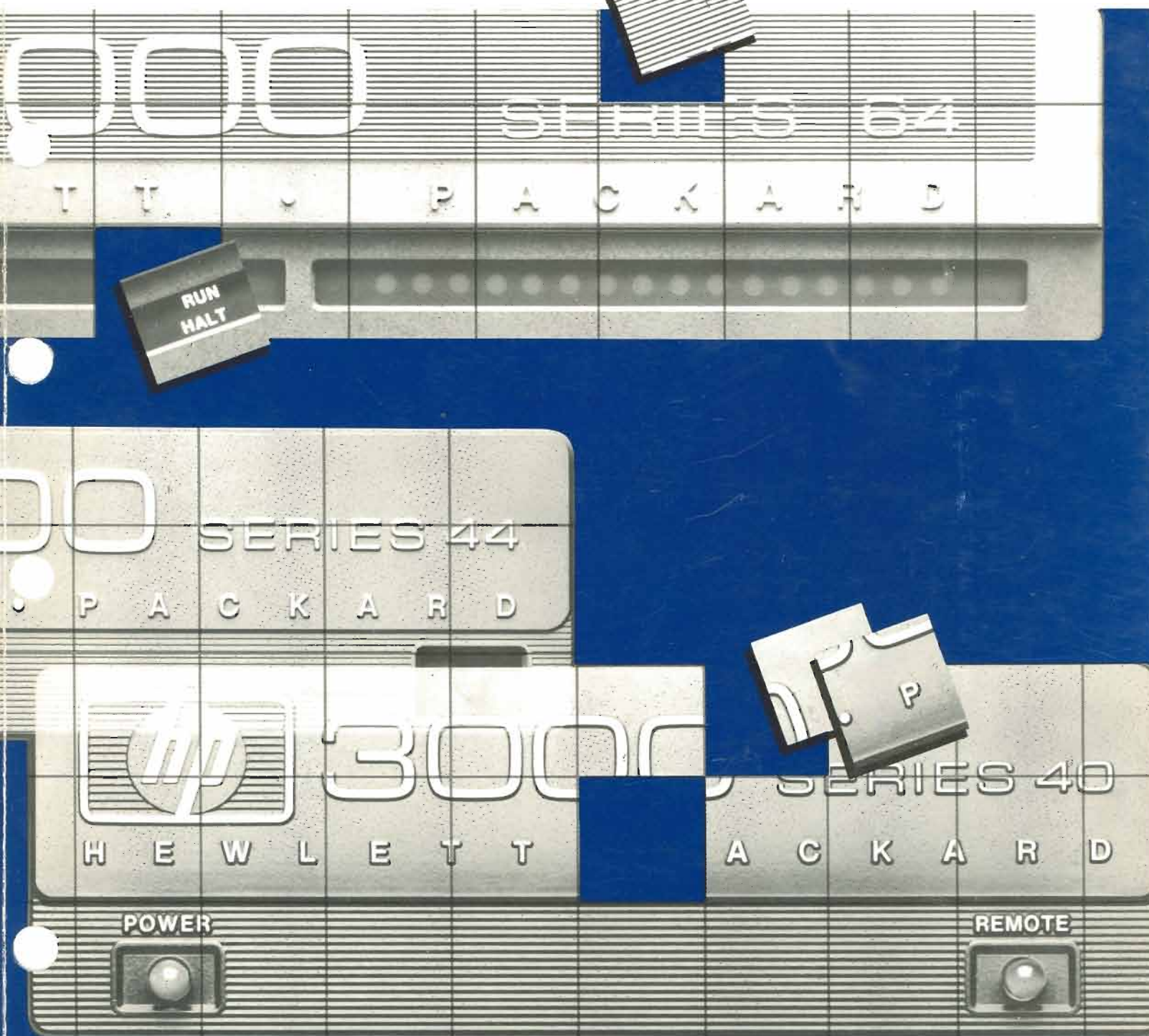
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HP 3000 Computer Systems Configuration Guide

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Contents

Introduction

This Configuration Guide is designed to aid Hewlett-Packard Sales Representatives in working with customers purchasing new systems or upgrading their present system(s) to larger, more powerful HP 3000 systems. This guide contains configuration instructions and worksheets for the Series 40, 44, and 64 systems. It should be used in conjunction with the HP 3000 Computer Systems *Product Information Guide* and the *Price Guide*.

The Configuration Guide is divided into two major sections:

Section I—contains guidelines and worksheets for configuring HP 3000 systems. It allows a determination to be made about whether or not the configuration is achievable. Once the worksheet has been completed, the filled-in columns detail the items and quantities which need to be ordered.

Section II—contains instructions and a sample worksheet for ordering an upgrade. It takes into account equipment the customer already owns, whether or not it can be used on the upgrade system and also any return credits that are available. When the worksheet has been completed, it provides a record of all the products which need to be ordered.

Worksheets can be obtained from Literature Distribution in bulk quantity.

Configuring
HP 3000 Systems

Series 40 and 40SX Minimum Configuration

Series 40 and 40SX Configuration Guidelines

Series 40/40SX Configuration Worksheet

Series 44 Minimum Configuration

Series 44 Configuration Guidelines

Series 44 Configuration Worksheet

Series 64 Minimum Configuration

Series 64 Configuration Guidelines

Series 64 Configuration Worksheet

Configuring HP 3000 Systems

This portion of the Configuration Guide is designed to help in the configuration of HP 3000 systems. It is comprised of separate sections for the Series 40/40SX, Series 44, and Series 64. For each system type, a "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 number of I/O controllers needed, for testing the validity of the configuration, and for subsequent ordering of the actual HP 3000 system.

The product sections also provide a brief review of the standard and required equipment comprising a minimum 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 worksheet following the guidelines provided in the product sections of this manual.

3. Verify the Configuration.

Use the guidelines and information provided on the worksheets 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.

Although cables and options for HP 3000 peripherals ARE NOT included on configuration worksheets they MUST be specified when actually ordering an HP 3000 system. The Product Information Guide gives a detailed listing of different HP 3000 peripheral products and the options and requirements associated with each. Review the appropriate section for each of the entries made on the configuration worksheet to ensure that all required options and cables are ordered correctly.

5. Order Optional Software.

Use the Product Information Guide to identify what optional software products are needed. Particularly note that hardware data communications lines require optional 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:

- Training Courses
- System Engineering Consulting
- Manuals
- Manual Update Service
- Hardware and Software Support Services
- Supplies provided by HP Computer Supplies Operation

For further assistance in using the Configuration Worksheets provided in this section, refer to Appendix A which contains examples of typical system configurations.

HP 3000 Series 40 and 40SX Minimum System Configuration

Supplied Hardware:

- Central Processing Unit.
- System Clock.
- Control and Maintenance Processor (CMP).
- 2 General I/O Channels (GIC's) for System Disc and Backup Tape Drive.
- 256 Kb (Series 40SX); 512 Kb (Series 40) Fault Control Memory with Controller.
- System Mainframe Cabinet including Card Cage and Power Supplies.
- 13 I/O Card Slots and expansion capability to support up to 2 Mb of memory.

Series 40SX Only:

- One (1) 7911P or 7912P (Option 012) Integrated Storage Unit with Cartridge Tape Drive.

Required Hardware Ordered Separately:

- 1 System Console: Any HP 262X, 264x, 2382A, or 2635B terminal.
- 1 System Console Cable: if console is terminal type 262x, 264x, or 2382A.

- 1 Asynchronous Data Communications Controller (ADCC-Main) to interface system console.
- 1 Magnetic Tape Drive for system backup: 7970E or 7976A required for systems with more than 128 Mb disc storage. A 7911P or 7912P with integrated cartridge tape, which is supplied with the Series 40SX, may be used for systems having 128 Mb or less disc storage.

Series 40 only:

- 1 System Disc: 7920M, 7925M, or 7935H Master Disc Driver or 7911P or 7912P Integrated Storage Unit.

Supplied Software:

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

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

262X
System
Console

HP 3000
Series 40

7911P
Integrated Storage Unit
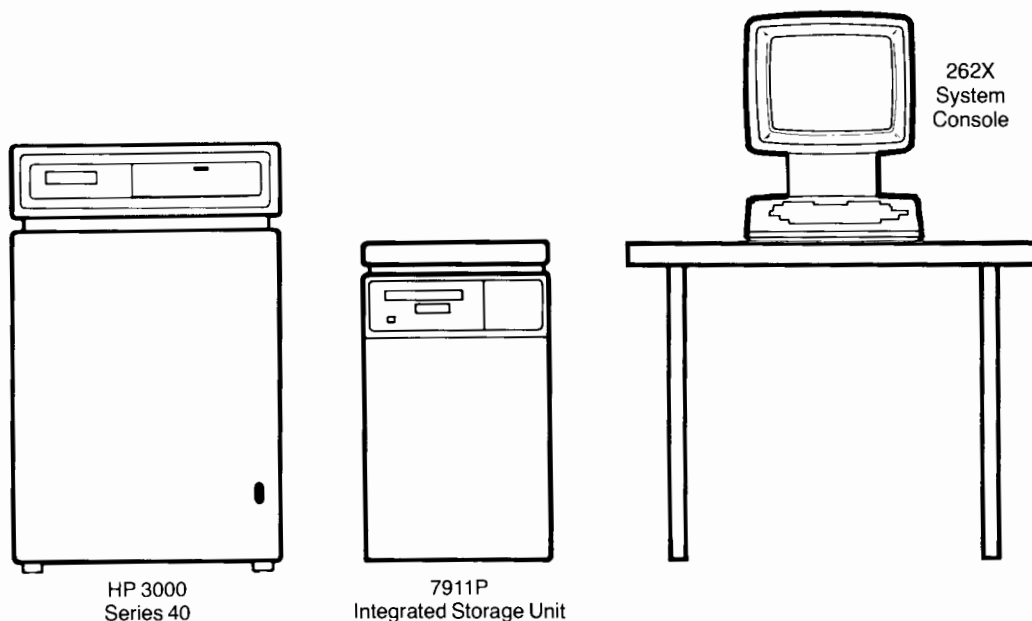
HP 3000 Series 40 Minimum System Configuration

Series 40 and 40 SX Configuration Guidelines

The Series 40 and 40SX each have a total of 13 I/O card slots available for interfacing any of the following devices: Asynchronous Data Communication Controllers (ADCCs), General I/O Channels (GICs), DSN/ Intelligent Network Processors (INPs) and 2617A/ 2619A printer interfaces. Three I/O card slots will be filled with two GICs which are standard on both systems, and one ADCC which must be ordered separately to support the system console.

Memory Expansion.

Series 40SX only:

Standard on every Series 40SX is one 256 Kb memory board. Option 507 may be ordered to replace the 256 Kb memory board with a one megabyte 64 K RAM memory board. System memory sizes of ¼ Mb, ½ Mb, ¾ Mb, 1 Mb, 1½ Mb, and 2 Mb are supported using combinations of the 30161A (1 Mb) memory module, the 30092A (512 Kb) memory module, and the 30171A (256 Kb) memory module.

The following table may be used to determine which memory products or options should be ordered for each possible memory configuration.

	Memory Expansion Table Total Memory Size (Mb)					
	STD .25	.5	.75	1	1.5	2
Series 40SX Option 507 (Replace 256 Kb with 1 Mb)				1		1
30161A 1 Mb Memory Module for Series 40/44					1	1
30092A 512 Kb Memory Module for Series 40/44			1			
30171A 256 Kb Memory Module for Series 40		1			1	

Series 40 only:

The Series 40 System Processor Unit comes standard with 512 Kb of memory. Option 507 may be ordered to replace the 512 Kb memory array with a one megabyte 64 K RAM memory board. System memory sizes of ½ Mb, ¾ Mb, 1 Mb, 1½ Mb, and 2 Mb are supported using combinations of the 30161A (1 Mb) memory module, the 30092A (512 Kb) memory module, and the 30171A (256 Kb) memory module.

	Memory Expansion Table Total Memory Size (Mb)				
	STD .5	.75	1	1.5	2
Series 40 Option 507 (Replace 512 Kb with 1 Mb)			1		1
30161A 1 Mb Memory Module for Series 40/44				1	1
30092A 512 Kb Memory Module for Series 40/44					
30171A 256 Kb Memory Module for Series 40		1			

Disc Drives.

Series 40SX only:

Integrated Storage Units:

One 7911P Integrated Storage Unit (27 Mb disc) with Cartridge Tape Drive and two device controllers is included as standard on the Series 40SX. Option 012, ordered with the system, replaces the 7911P (27 Mb disc) with a 7912P (64 Mb disc). A dedicated GIC is required to support the integrated Cartridge Tape.

Additional 7911P or 7912P Integrated Storage Units WITH the Cartridge Tape drive CAN NOT be used on the Series 40SX.

Mass Storage Products:

Add-on 7911P and 7912P Disc Drives WITHOUT the Cartridge Tape may be purchased by ordering 7911s or 7912s with Option 140 which deletes the integrated tape drive. However, if more than 128 Mb of disc storage is configured on the Series 40SX, a 1600 bpi or 6250 bpi magnetic tape drive must be purchased (see Magnetic Tapes).

A total of eight (8) disc drives, including the Integrated Storage Unit which comes with the system, is supported on the Series 40SX. Of this eight, a maximum of four (4) 7911P or 7912P disc drives, and a maximum of two (2) 7920M/7925M disc drives is supported. The 7920M and 7925M can each support up to a maximum of seven (7) slave disc drives. Up to eight (8) 7935H disc drives are supported. The 7911P, 7912P, and 7935H do NOT support any slave drives.

Option 102 must be ordered with both the 7920M and 7925M to specify the HP-IB interface and two-meter (6.5 feet) cable. The 7920S, 7925S, 7911P, 7912P, and 7935H discs each include cables as standard equipment.

System disc performance may vary depending on the specific disc/controller configuration (ratio of Masters to Slaves and Masters to GICs). Check with a Hewlett-Packard System Engineer or Performance Consultant for complete configuration details.

Series 40 only:

Integrated Storage Units:

A maximum of one Integrated Storage Unit (7911P or 7912P) WITH Cartridge Tape Drive is supported on the Series 40 and, if purchased, MUST be ordered with a second device controller (option 001). The Cartridge Tape requires its own dedicated GIC.

Mass Storage Products:

One Master Disc Drive, 7911P Option 140, 7912P Option 140, 7920M, 7925M or 7935H Disc Drive, is required and must be ordered separately for the Series 40.

A total of eight (8) disc drives, Masters or Slaves, is supported on the Series 40. Of this eight, a maximum of four (4) 7911P or 7912P disc drives and a maximum of two (2) 7920M or 7925M disc drives can be supported. The 7920M and 7925M can each support up to a maximum of seven (7) slave disc drives. Up to eight (8) 7935H disc drives are supported. The 7911P, 7912P, and 7935H do NOT support any slave devices.

Option 102 must be ordered with both the 7920M and 7925M to specify the HP-IB interface and two-meter (6.5 feet) cable. The 7920S, 7925S, 7911P, 7912P, and 7935H discs each include cables as standard equipment.

System disc performance may vary depending on the specific disc/controller configuration (ratio of Masters to Slaves and Masters to GICs). Check with a Hewlett-Packard System Engineer or Performance Consultant for complete configuration details.

Magnetic Tape Drives.

Series 40SX only:

Included as a standard part of the Series 40SX system is the 7911P (or 7912P if option 012 is ordered) Integrated Storage Unit with Cartridge Tape Drive. The cartridge tape unit is required for both system backup and distribution of software updates for all HP 3000 Series 40SX systems.

The Integrated Cartridge Tape Drive is designed as a backup device for a maximum of 128 Mb of disc capacity. When additional discs, whether 7911s, 7912s, 7920s, 7925s, or 7935s, are added to the system, resulting in greater than 128 Mb of mass storage, a 7970E or 7976A magnetic tape drive must also be added to function as the primary system backup device.

The Series 40SX will support up to four 7970E magnetic tape drives. A maximum of one Master 7970E with option 426 can be configured on the Series 40SX and this Master can support up to three additional Slave magnetic tape drives (7970E with option 421). The 7970E Master tape drive REQUIRES a dedicated GIC.

One 7976A with option 416 can be interfaced to the Series 40SX. It does NOT require a dedicated GIC. The 7976A does not support slave tape drives.

A maximum of four total magnetic tape drives is allowed on the Series 40SX. Cables for the 7970E and 7976A are included as standard equipment.

Series 40 only:

A 7970E or 7976A magnetic tape drive is required for system backup and distribution of software updates for all Series 40s and must be ordered separately.

The Series 40 will support up to four 7970E magnetic tape drives. A maximum of one Master 7970E with option 426 can be configured on the Series 40 and this Master can support up to three additional Slave magnetic tape drives (7970E with option 421). The 7970E Master tape drive REQUIRES a dedicated GIC.

One 7976A with option 416 can be interfaced to the Series 40. It does NOT require a dedicated GIC. The 7976A does not support slave tape drives.

A maximum of four total magnetic tape drives is allowed on the Series 40. Cables for the 7970E and 7976A are included as standard equipment.

Printers.

The Series 40/40SX supports up to two Line Printers. These can include 2608A, 2617A, or 2619A Line Printers.

Dot Matrix Line Printers:

The 2608A is attached to a GIC in the System Processing Unit but cannot be interfaced to the same GIC used to interface high-speed peripherals. (See the General I/O Channel section for a list of high and low speed peripherals). Each 2608A printer comes with a two-meter cable (specify 2608A option 340).

2617A and 2619A Line Printers:

Each 2617A and 2619A Line Printer interfaces to the Series 40/40SX through a GIC and also uses an interface which occupies one I/O card slot in the Series 40/40SX. This interface is ordered as option 340 to the 2617A and 2619A printer. Each 2617A and 2619A with option 340 comes with a 15 meter (50 feet) cable.

Laser Printing Systems:

A maximum of two 2680A Intelligent Page Printers are supported on the Series 40/40SX in addition to the maximum of two 2608A, 2617A or 2619A line printers discussed above. The Intelligent Page Printer is connected to the system through a GIC. Specify 2680A option 340 for the Series 40 cable.

Other Peripherals.

Flexible Disc Drive:

Only one 1.2 Mb flexible disc drive can be used on the Series 40/40SX. Product number 9895A with option 010 MUST be ordered to specify a single master drive. The flexible disc drive attaches to a GIC in the Series 40/40SX; MUST order option 333 for a two-meter (6.5 feet) cable.

Card Reader:

The 30106A Card Reader is ordered as a "SPECIAL" to ensure suitability to your customer's environment. In order for shipment to take place, consult your BCG Sales Development Representative before quoting to the customer. The 30106A 80-Column Card Reader interfaces to the Series 40/40SX through a DEDICATED GIC. To order the HP-IB Card Reader and cable, specify option 333. A powerline conditioner, 35030A or equivalent, is required with the Card Reader.

Terminals.

At least one point-to-point connected 2382A, 262X, 264X, or 2635B terminal must be ordered as the system console. Point-to-point terminals are connected to the Series 40/40SX by means of the Asynchronous Data Communications Controllers (ADCCs). Each ADCC provides ports for four point-to-point terminals (see ADCC section). The Series 40/40SX supports a total of eight ADCCs (for a maximum of 32 point-to-point asynchronous terminals).

To attach multipoint terminals, the Series 40/40SX requires one copy of DSN/Multipoint Terminal Software (DSN/MTS), and for each multipoint communication line, one DSN/Intelligent Network Processor (INP). The number of terminals that may be attached to each multipoint communication line is normally determined by response time considerations but may be limited by the specific cabling option chosen. Up to 55 multipoint terminals total are supported per system.

Up to 56 terminals total (including point-to-point, multipoint, system console, and DSN/DS virtual terminals) can be configured per system. All 56

terminals may run at 9600 baud, however, block mode applications not using VPLUS/3000 should check for data overruns when using ADCCs.

Character Printers and Plotters.

In addition to line printers which are attached to GICs, (see Printers) the Series 40/40SX can support remote spooled 2631B character printers through ADCCs. When used as a remote spooled printer, the 2631B is connected directly to an ADCC port via hardwired cable or modems. Up to four 2631B printers are supported on the Series 40/40SX in this fashion (specify 2631B with option 331).

The Series 40/40SX can also support 2601A daisy-wheel printers as terminals (nonspooled only) via ADCCs. The 2601A can be directly attached to an ADCC port via hardwired cable. The 2601A cannot be configured as a remote device connected through a modem.

The 2631B and 2601A printers can also be attached as slave devices (non-spooled only) to Series 40/40SX terminals, under the control of user-supplied application programs.

HP Plotters can be operated using DSG/3000 Software or under user supplied application programs.

The Product Information Guide contains details on Graphics Terminals, Plotters, and Graphics Workstation Software. Included within the Guide is a complete explanation of the different types of data communications connections; cables for terminals, character printers, and plotters; and interfaces required for character printers.

Spooled Devices.

The following devices can be spooled:
- 2608A dot matrix printer
- 2617A line printer
- 2619A line printer
- 2631B character printer
- 2680A page printer
- 30106A card reader
- 7970E Tape Drive
- 7976A Tape Drive

In order to determine the maximum number of spooled devices which can be configured on a system, the following formula must be used:

Max. Spooled Devices =

$$\frac{256 - (1.25 \times \#Sessions/Jobs) - \#INP's}{16}$$

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

#INP's = the number of Intelligent Network Processors which will be configured on the system

After plugging in the values for the number of sessions/jobs and also the number of INP's, 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 INP's configured can support the following number of spooled devices:

Max. Spooled Devices =

$$\frac{256 - (1.25 \times 32) - 3}{16} = 13.6$$

ROUNDING this result *DOWN* means that a maximum of *13* spooled devices can be supported on the system.

DSN/Intelligent Network Processors.

A maximum of three DSN/Intelligent Network Processors may be configured on the Series 40/40SX. Each INP provides 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 (non-concurrently) by any of these software products. Each INP board requires one I/O card slot and a connection to a GIC.

A modem or hardwire connection cable is required for each data communication line (INP) that is specified, and must be ordered separately (refer to the Product Information Guide).

I/O Expansion

Asynchronous Data Communication Controllers.

Point-to-point terminals and other RS-232-C devices must be connected to the Series 40/40SX by means of ADCC-Mains and ADCC-Extenders. ADCC-Mains and ADCC-Extenders must be ordered in alternating fashion. Each ADCC (either Main or Extender) supports up to four devices. The first ADCC-Main is required with the Series 40/40SX System Processor Unit and must be ordered separately. This permits the attachment of the system console (ordered separately from the SPU) and up to three other devices. The Series 40/40SX supports up to 8 ADCCs altogether.

General I/O Channels

General I/O Channels (GICs) are used for interfacing HP-IB peripherals to the Series 40/40SX. The following table summarizes the requirements of peripherals using GICs as an interface:

Peripherals	Peripheral Speed	HP-IB Electrical Device Loads
7911P/12P Cart. Tape	Low	Dedicated GIC
7911P/12P Disc	High	1
7920M/25M/35H	High	1
7970E (Opt. 426)	Low	Dedicated GIC
7976A	High	2
2608A/17A/19A	Low	1
2680A	High	3
9895A	Low	1
30106A	Low	Dedicated GIC
INP	Low	1

Each General I/O Channel supports from 1 to 8 HP-IB peripherals. The number of peripherals which may be connected depends on the particular peripherals involved and the length of the HP-IB cable.

Up to 8 HP-IB "electrical device loads" are allowed on a single GIC. As shown in the table above, peripherals may require from 1 to 8 HP-IB electrical device loads. Multiple peripherals may be connected to an HP-IB as long as the sum of the HP-IB device loads required does not exceed 8 (and so long as the combination does not violate other configuration constraints).

The maximum allowed length of the HP-IB cable which connects devices to a GIC is 7 meters plus 1 meter per device (plus 2 meters internal to the SPU). In a large Series 40/40SX configuration, a customer could be limited as to where the peripherals can be placed around a system. Increasing the number of GICs on a system can increase cabling flexibility. Consult your CE to determine optimum GIC, cable and peripheral configurations.

Two GICs are supplied with the Series 40/40SX and up to 2 optional GICs may be ordered, for a total of 4 GICs. Each GIC will require an I/O card slot. High-speed peripherals may only be attached to two GICs on the Series 40 and 40SX. Low-speed peripherals (except 2608As) can be attached to any GIC. 2608As and high-speed peripherals cannot be attached to the same GIC. A maximum of six devices can be attached to GICs with high-speed peripherals attached. In addition, it is recommended that separate GICs be used for connecting 7976A's and the system disc. Otherwise, performance may be degraded.

Series 40/40SX Configuration Worksheet

Product Number	Description	Quantity

I. System Processor Units.

32446A Series 40SX System Processor . . . . 1. ____

32445A Series 40 System Processor . . . . 2. ____

II. Memory Expansion.

(Refer to the Memory Expansion Tables in the Series 40/40SX Configuration Guidelines)

Total Memory Size (Standard memory is 512 Kb on the Series 40. MAX = 2 Mb.
256 Kb on the Series 40SX. MAX = 2 Mb) . . . . 3. ____

Series 40/40SX Option 507: Replace 512 Kb/256 Kb with 1 Mb. . . . . 4. ____

30161A 1 Mb Memory Module for Series 40/44 . . . . 5. ____

30092A 512 Kb Memory Module for Series 40/44 . . . . 6. ____

30171A 256 Kb Memory Module for Series 40 . . . . 7. ____

III. Disc Drives.

A. Integrated Storage Units

For Series 40 only, one of the following may be included:

7911P 27 Mb Integrated Storage Unit with Cartridge Tape (opt. 001. MAX = 1) . . . . 8. ____

7912P 64 Mb Integrated Storage Unit with Cartridge Tape (opt. 001. MAX = 1) . . . . 9. ____

For either the Series 40 or Series 40SX, the following may be included:

7911P 27 Mb Integrated Storage Unit without Cartridge Tape (opt. 140) . . . . 10. ____

7912P 64 Mb Integrated Storage Unit without Cartridge Tape (opt. 140) . . . . 11. ____

Total Integrated Storage Units (Sum of lines 1,8,9,10,11. MAX = 4) . . . . 12. ____

B. Removable Mass Storage Products:

7920M 50 Mb Master Disc Drive . . . . 13. ____

7920S 50 Mb Slave Disc Drive . . . . 14. ____

7925M 120 Mb Master Disc Drive . . . . 15. ____

7925S 120 Mb Slave Disc Drive . . . . 16. ____

7935H 404 Mb Disc Drive . . . . 17. ____

Total Master 7920/25 Disc Drives (Sum of lines 13 & 15. MAX = 2) . . . . 18. ____

Total Slave 7920/25 Disc Drives (Sum of lines 14 & 16. A maximum of 7 slave 7920/25 drives can be
supported by each 7920/25 master drive) . . . . 19. ____

Total Disc Drives & Integrated Storage Units (Sum of lines 12,17,18,19. MAX = 8) . . . . 20. ____

Series 40/40SX Configuration Worksheet

Product Number	Description	Quantity
	IV. Magnetic Tape Drives.	
7970E	1600 bpi Magnetic Tape Drive	
	Option 426: Master Tape Drive (Required if any 7970E Tape Drives are desired. MAX = 1)	21. _____
	Option 421: Slave Tape Drive	22. _____
7976A	1600/6250 bpi Magnetic Tape Drive (MAX = 1)	23. _____
	Total Magnetic Tape Drives (Sum of lines 21,22,23. MAX = 4)	24. _____
	V. Printers.	
2608A	400 lpm Dot Matrix Printer	25. _____
2617A	600 lpm Line Printer	26. _____
2619A	1000 lpm Line Printer	27. _____
	Total 2617A/19A Line Printers (Sum of lines 26 & 27)	28. _____
	Total Dot-Matrix, 2617A/19A Line Printers (Sum of lines 25 & 28. MAX = 2)	29. _____
2680A	Intelligent Page Printer (MAX = 2)	30. _____
	VI. Other Peripherals	
9895A	Flexible Disc Drive (MAX = 1)	31. _____
30106A	80 Column HP-IB Card Reader (opt. 333) (MAX = 1)	32. _____

Series 40/40SX Configuration Worksheet

VII. Data Communications

A. Terminals, Plotters, and Character Printers

Product	Connection Method		
	Multipoint	**Pt-to-Pt w/ADCC**	**Terminal Attached**
Interactive Display Terminals			
2382A	N/A	_____	N/A
2621A/B/P	N/A	_____	N/A
2622A	N/A	_____	N/A
2623A	N/A	_____	N/A
2624B	_____	_____	N/A
2626A	_____	_____	N/A
2626W	N/A	_____	N/A
2642A	_____	_____	N/A
2645A	_____	_____	N/A
2647A	_____	_____	N/A
2648A	_____	_____	N/A
Plotters			
7220C/T	N/A	_____	_____
7221C/T	N/A	_____	_____
7225B	N/A	_____	_____
7240A	N/A	_____	_____
7580A	N/A	_____	_____
Data Collection Terminals			
3075A	_____	_____	N/A
3076A	_____	_____	N/A
3077A	_____	_____	N/A
7260A	N/A	_____	_____
Printing Terminals			
2635B	N/A	_____	N/A
Character Printers			
2601A	N/A	_____	_____
2631B	N/A	_____	_____
Totals	33. _____	34. _____	35. _____

Constraints: Multipoint Connections (Line 33): MAX = 55.
Point-to-Point Connections (Line 34): MAX = 32.
Total Connections (Sum of Lines 33 & 34): MAX = 56.
2631B Point-to-Point and Remote Connected: MAX = 4.

NOTE: The 2626W cannot use HPWORD when connected via a modem.
The 2601A cannot be connected via a modem.

Series 40/40SX Configuration Worksheet

Product Number	Description	Quantity

B. Data Communication Lines

Multipoint Lines . . . . 36. ____

System to System Lines (Direct & Modem Connect) . . . . 37. ____

30020A/B DSN/INPs Required (Sum of lines 36 & 37. MAX = 3) . . . . 38. ____

VIII. I/O Expansion.

(Refer to the I/O Expansion Section of the Series 40/40SX Configuration Guidelines)

A. Asynchronous Data Communications Controllers

Total Asynchronous Data Communication Controllers
(Divide line 34 by "4" and round up. MAX = 8) . . . . 39. ____

30018A   ADCC-Main (Divide line 39 by "2" and round up. MIN = 1, MAX = 4) . . . . 40. ____

30019A   ADCC-Extender (Subtract line 40 from line 39. MAX = 4) . . . . 41. ____

B. General I/O Channels

For all devices requiring connection using a GIC (see the table below), indicate how they will be attached to GICs (follow GIC rules closely). Use this to determine the number of optional GICs required in line 42.

```
+--------+      +--------+      +--------+      +--------+
| S      |      | S      |      | O      |      | O      |
| T      |      | T      |      | P      |      | P      |
| A   G  |      | A   G  |      | T   G  |      | T   G  |
| N   I  |      | N   I  |      | I   I  |      | I   I  |
| D   C  |      | D   C  |      | O   C  |      | O   C  |
| A      |      | A      |      | N      |      | N      |
| R   1  |      | R   2  |      | A   1  |      | A   2  |
| D      |      | D      |      | L      |      | L      |
+--------+      +--------+      +--------+      +--------+
```
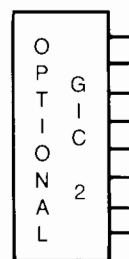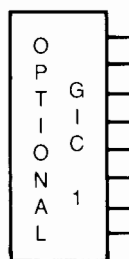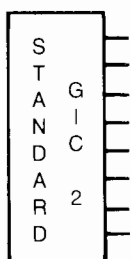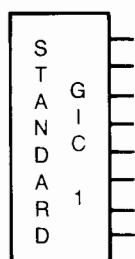
GIC Rules:

- MAX 8 HP-IB electrical device loads per GIC
- MAX 2 GICs with HIGH-SPEED devices connected
- MAX 6 devices (not HP-IB loads) per GIC with high-speed devices
- CAN connect ANY low-speed device (except 2608A) to GIC with high-speed devices connected while observing the 6 device max of high speed GIC's
- CANNOT connect 2608A to GIC with high-speed devices
- Performance may be degraded if a 7976A and the System Disc are connected to the same GIC.

Line	Device	Device Speed	HP-IB Electrical Device Loads
8, 9	7911P/12P Cart. Tape	Low	Dedicated GIC
8, 9, 10, 11	7911P/12P Disc	High	1
13, 15, 17	7920M/25M/ 35H	High	1
21	7970E (opt. 426)	Low	Dedicated GIC
23	7976A	High	2
25	2608A	Low	1
26, 27	2617A/19A	Low	1
30	2680A	High	3
31	9895A	Low	1
32	Card Reader	Low	Dedicated GIC
38	INP	Low	1

30079A   Optional GICs (MAX = 2). . . . . 42. ____

C. I/O Card Slots

I/O Card Slots Required (Sum of lines 28, 32, 38, 39, 42. MAX = 11) . . . . 43. ____

HP 3000 Series 44
Minimum System Configuration

Supplied Hardware:

- Central Processing Unit.
- System Clock.
- Control and Maintenance Processor (CMP).
- 2 General I/O Channels (GICs): for System Disc and Backup Tape Drive.
- 1 Megabyte Fault Control Memory with Controller.
- System Mainframe Cabinet including Card Cages and Power Supplies.
- 26 I/O Slots and expansion capacity for 4 Megabytes of Memory.
- Built-in Isolation Transformer.

Required Hardware Ordered Separately:

- 1 System Console: Any HP 262x, 264x, 2382A, or 2635B terminal.
- 1 System Console Cable: if console is terminal type 262x, 264x, or 2382A.

- 1 System Disc: 7920M, 7925M or 7935H Master Disc Drive.
- 1 Asynchronous Data Communications Controller (ADCC-Main) to interface system console.
- 1 Magnetic Tape Drive for system backup: 7970E 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 Management 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.

264X
System
Console

HP 3000
Series 44

7970E
Tape Drive

7920M
Disc Drive
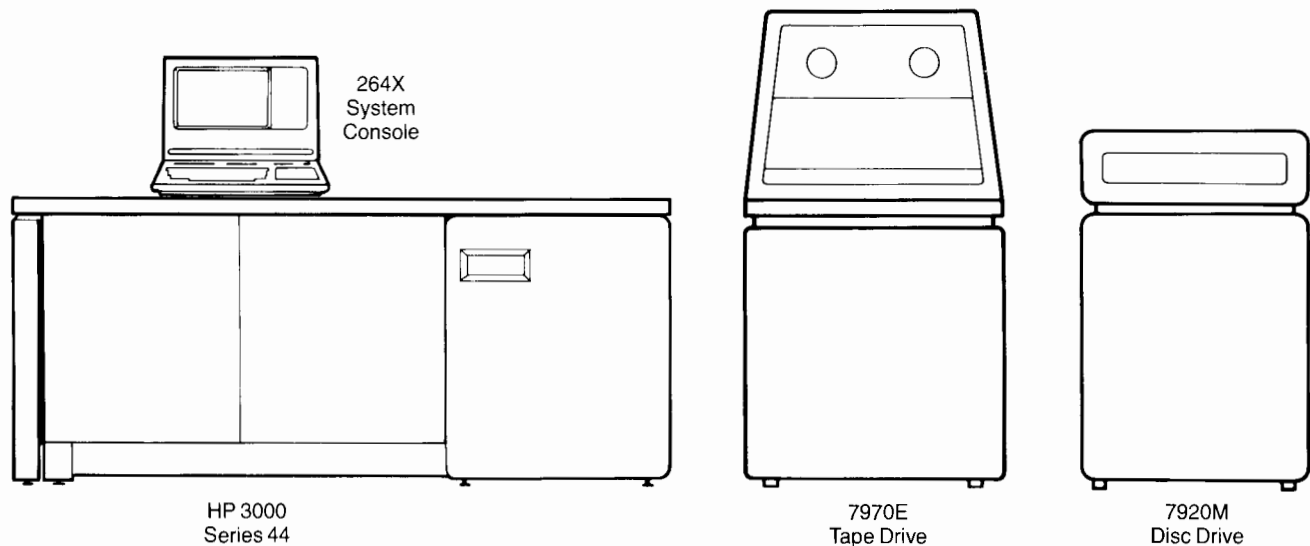
HP 3000 Series 44 Minimum System Configuration

HP 3000 Series 44 Configuration Guidelines

The Series 44 System Processor Unit contains 26 I/O card slots for interfacing any of the following devices: Asynchronous Data Communication Controllers (ADCCs), General I/O Channels (GICs), System Interface Board (SIB), Direct Connect Port Controllers, DSN/Intelligent Network Processors (INP) and 2617A or 2619A printer interfaces. Three slots will be filled with two (2) GICs, which are standard on the system, and one (1) ADCC, which must be ordered separately. Of the remaining 23 I/O slots, only 15 may be used for interfacing additional ADCCs, GICs and the SIB.

Memory Expansion.

One megabyte of 64 K RAM fault control memory is supplied as standard on the Series 44. System memory sizes of 1 Mb, 1.5 Mb, 2 Mb, 2.5 Mb, 3 Mb, 3.5 Mb and 4 Mb are supported using combinations of the 30161A (1 Mb) memory module and 30092A (512 Kb) memory modules. A second memory controller (30094A) is required IF the Series 44 has more than 2 megabytes of memory and IF any of those memory modules includes Product Number 30092A. A single memory controller can support up to four 30161A (1 Mb) memory modules.

The following table may be used to determine what products need to be ordered for the memory size desired:

	Memory Expansion Table **Total Memory Size (Mb)**						
	STD **1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**
30161A 1 Mb Memory Module for Series 40/44			1	1	2	2	3
30092A 512 Kb Memory Module for Series 40/44		1		1		1	
30094A Add-on Series 44 Memory Controller				1		1	

Disc Drives.

Integrated Storage Units:

A maximum of one Integrated Storage Unit (7911P or 7912P) is supported on the Series 44 and must be ordered with the Cartridge Tape. A second controller MUST be included (option 001). The Cartridge Tape requires its own dedicated GIC.

Mass Storage Products:

One 7920M (50 Mb), 7925M (120 Mb) or 7935H (404 Mb) Disc Drive is required and must be ordered separately for the Series 44.

A maximum total of sixteen (16) disc drives, Masters or Slaves, is supported on the Series 44. Of this 16, only one (1) can be a 7911P or 7912P Disc Drive, a maximum of eight (8) can be 7935H Disc Drives, and only two (2) can be 7920M or 7925M Master Disc Drives. The 7920M and 7925M can each support up to 7 slave disc drives. The 7911P, 7912P, and 7935H do NOT support any slave devices.

When ordering 7920Ms and 7925Ms, include option 102 for the HP-IB Interface and 2M (6.5 ft) cable. All other discs (7920S, 7925S, 7935H, 7911P and 7912P) include the cable as standard.

System disc performance may vary depending on the specific disc controller configuration (ratio of Masters to Slaves and Masters to GICs). Check with an HP System Engineer or Performance Consultant for complete details.

Magnetic Tape Drives.

A 7970E or 7976A magnetic tape drive is required for system backup and distribution of software updates for all Series 44s and must be ordered separately.

The Series 44 will support up to two 7970E Master tape drives (with option 426) and each 7970E can support up to three additional slave magnetic tape drives (7970E with option 421). This means a maximum of eight master and slave 7970E tape drives can be configured on the Series 44. EACH 7970E Master tape drive REQUIRES a dedicated GIC.

Only one 7976A (with option 516) can be interfaced to the Series 44. It does not require a dedicated GIC. The 7976A does not support slave tape drives.

A maximum of eight (8) total 7970E and 7976A Tape Drives is allowed on the Series 44. Cables for the 7970E and 7976A are included as standard equipment.

Printers.

The Series 44 supports up to four Line Printers. These four printers may consist of 2617A, 2619A and 2608A printers.

Dot Matrix Line Printers:

A maximum of two 2608A printers is allowed on the Series 44. The 2608A is attached to a GIC in the System Processing Unit but cannot be interfaced to the same GIC used to interface high-speed peripherals. Each 2608A printer comes with a two-meter cable (specify 2608A option 344). (See the General I/O Channel for a list of high and low speed peripherals.)

2717A and 2619A Line Printers:

2617A and 2619A Line Printers interface to the Series 44 through a GIC and use an interface which occupies one (1) I/O card slot in the Series 44. This interface is ordered as option 344 to the 2617A and 2619A printer. Each 2617A and 2619A with option 344 comes with a 15 meter (50 feet) cable.

Laser Printing Systems:

A maximum of two 2680A Intelligent Page Printers are supported on the Series 44 in addition to the maximum of four 2608A, 2617A or 2619A line printers discussed above. The Intelligent Page Printer is connected to the system through a GIC. Specify 2680A option 344 for the Series 44 cable.

Other Peripherals

Flexible Disc Drive:

Only one 1.2 Mb flexible disc drive can be used on the Series 44. Product Number 9895A must be ordered with option 010 to specify a single master drive. The flexible disc drive attaches to a GIC in the Series 44; MUST order option 333 for a two-meter (6.5 ft) cable.

Card Reader:

The 30106A Card Reader is ordered as a "SPECIAL" to ensure suitability to your customer's environment. In order for shipment to take place, consult your BCG Sales Development Representative before quoting to the customer. The 30106A 80-Column Card Reader interfaces to the Series 44 through a DEDICATED GIC. To order the HP-IB Card Reader and cable, specify option 333. A powerline conditioner, 35030A or equivalent, is required with the Card Reader.

Data Communications.

Terminals.

One point-to-point connected 2382A, 262x, 264x or 2635B terminal must be specified for the system console (cable must be ordered separately for the 262x, 264x or 2382A). The System Console MUST be connected through an Asynchronous Data Communications Controller (see ADCC section).

Point-to-point connections are made to the Series 44 either through ADCCs or using the DSN/Advanced Terminal Processor (see DSN/ATP section). Modem support on the Series 44 is ONLY provided using ADCCs. Multipoint connections are made to the Series 44 through multipoint data communication lines attached through DSN/Intelligent Network Processors (DSN/Multipoint Terminal Software is required). The number of terminals per multipoint line is normally determined by response time considerations, but may be limited by the specific cabling option chosen. Up to 95 multipoint terminals are supported per system.

A maximum total of 64 point-to-point terminals is supported using one ADCC and a fully configured ATP. A maximum of 60 point-to-point terminals is supported using ADCCs only. Up to 96 terminals (point-to-point, multipoint, system console, and DSN/DS virtual terminals) can be configured per system. All 96 terminals may run at 9600 baud, however, block mode applications not using VPLUS/3000 should check for data overruns when using ADCCs.

Character Printers and Plotters.

The Series 44 can support local or remote spooled 2631B character printers through one or more ADCCs or DSN/ATP ports. When used as a local/remote spooled printer, the 2631B is connected directly to an ADCC via hardwired cable or to a DSN/ATP via hardwired connection. Up to four 2631B printers are supported on the Series 44 in this fashion (specify 2631B with option 331).

In addition to local/remote spooled printers, the Series 44 can support 2601A daisy-wheel printers (non-spooled only) via ADCCs or ATPs. The 2601A can only be directly attached to an ADCC or ATP port via hardwired cable.

The 2631B and 2601A printers can also be attached as slave devices (nonspooled only) to Series 44 terminals under the control of user-supplied application programs. The 2601A cannot be configured as a remote device connected through a modem.

HP Plotters can be operated using DSG/3000 Software or under user supplied application programs. Refer to the Product Information Guide for complete details on Graphics Terminals, Plotters, and Graphics Workstation Software.

The Product Information Guide contains a complete explanation of the different types of data communications connections; cables for terminals, character printers, and plotters; and interfaces required for character printers.

Spooled Devices.

The following devices can be spooled:
- 2608A dot matrix printer
- 2617A line printer
- 2619A line printer
- 2631B character printer
- 2680A page printer
- 30106A card reader
- 7970E Tape Drive
- 7976A Tape Drive

In order to determine the maximum number of spooled devices which can be configured on a system, the following formula must be used:

Max. Spooled Devices =
$$\frac{256 - (1.25 \times \#Sessions/Jobs) - \#INP's}{16}$$

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

#INP's = the number of Intelligent Network Processors which will be configured on the system

After plugging in the values for the number of sessions/jobs and also the number of INP's, 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, 48 sessions, 5 batch jobs and has 5 INP's configured can support the following number of spooled devices:

Max. Spooled Devices =
$$\frac{256 - (1.25 \times 53) - 5}{16} = 11.5$$

ROUNDING this result *DOWN* means that a maximum of *11* spooled devices can be supported on the system.

DSN/Intelligent Network Processors.

For a Series 44, up to seven DSN/Intelligent Network Processors (INPs) may be configured; three in the first card cage and four in the second card cage. 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 (non-concurrently) by any of these software products. Each INP board requires one (1) I/O card slot and a connection to a GIC.

A modem or hardwire connection cable is required for each data communication line INP that is specified, and these must be ordered separately (refer to the Product Information Guide).

I/O Expansion

Two methods are available for connecting point-to-point terminals and other peripherals with both RS-422 or RS-232-C standards. The first method is by using the Asynchronous Data Communication Controller (ADCC); the second is the Advanced Terminal Processor (ATP). Both methods are described below.

Asynchronous Data Communications Controllers (ADCCs).

Point-to-point terminals and other RS-232-C devices can be connected to the Series 44 by means of ADCC-Mains and ADCC-Extenders. ADCC-Mains and ADCC-Extenders must be ordered in alternating fashion. Each ADCC (either Main or Extender) supports up to four devices. The first ADCC-Main is required with the Series 44 System Processor Unit and must be ordered separately. This permits the attachment of the system console (ordered separately from the SPU) and up to three other devices. The Series 44 supports up to 15 ADCCs altogether.

DSN/Advanced Terminal Processor (DSN/ATP).

As shown in Fig. 1, the DSN/ATP on the Series 44 consists of two products: DSN/ATP System Interface Board (30144A) and DSN/ATP Direct Connect Port Controller (30145A). Modem ports on the Series 44 must be connected through an ADCC.

The minimum DSN/ATP subsystem available on the Series 44 consists of one System Interface Board and one Direct Connect Port Controller. It requires two I/O slots and supports up to 12 direct connections. A maximum subsystem consists of one SIB and five Direct Connect Port Controllers; it requires six I/O slots and supports up to 60 terminals.

Each Direct Connect Port Controller supports both RS-422 and RS-232 connections. It comes standard with 12 RS-422 ports and these can be converted to RS-232 ports *in groups of four* by ordering option 002. Thus, 0, 4, 8, or

12 RS-232 ports may be ordered on a single Direct Connect Port Controller by specifying the appropriate number of option 002's.

The DSN/ATP cannot be used to connect the system console on the Series 44—an ADCC is required. The 4 terminals supported by this ADCC, combined with the 60 supported on the DSN/ATP, provide a maximum of 64 point-to-point connections on the Series 44. The DSN/ATP must be placed in the second card cage of the Series 44.
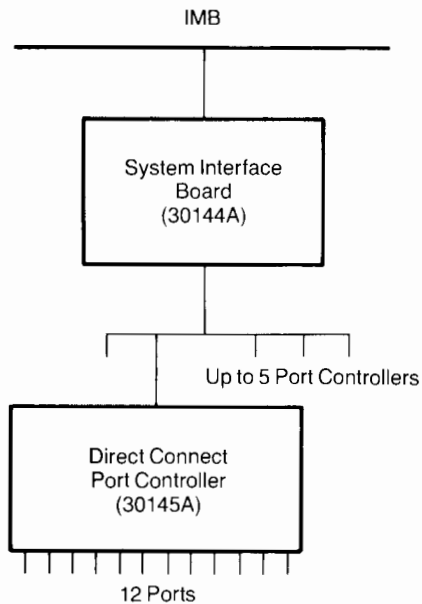
Fig. 1 DSN/ATP Subsystem Structure

General I/O Channels.

General I/O Channels (GICs) are used for interfacing HP-IB peripherals to the Series 44. The following table summarizes peripherals using GICs for interface and their requirements:

Peripherals	Peripheral Speed	HP-IB Electrical Device Loads
7911P/12P Cart. Tape	Low	Dedicated GIC
7911P/12P Disc	High	1
7920M/25M/35H	High	1
7970E (Opt. 426)	Low	Dedicated GIC
7976A	High	2
2608A/17A/19A	Low	1
2680A	High	3
9895A	Low	1
30106A	Low	Dedicated GIC
INP	Low	1

Each General I/O Channel supports from 1 to 8 HP-IB peripherals. The number of peripherals which may be connected depends on the particular peripherals involved and the length of the HP-IB cable.

Up to 8 HP-IB "electrical device loads" are allowed on a single GIC. As shown in the table above, peripherals may require from 1 to 8 HP-IB device loads. Multiple peripherals may be connected to an HP-IB as long as the sum of the HP-IB device loads required does not exceed 8 (and so long as the combination does not violate other configuration constraints).

The maximum allowed length of the HP-IB cable which connects devices to a GIC is 7 meters plus 1 meter per device (plus 2 meters internal to the SPU). In large Series 44 configurations a customer could be limited as to where the peripherals can be placed around a system. Increasing the number of GICs on a system can increase cabling flexibility. Consult your CE to determine optimum GIC, cable and peripheral configurations.

Two GICs are supplied with the Series 44 and up to 3 optional GICs may be ordered, for a total of 5 GICs. High-speed peripherals may only be attached to two (2) GICs on the Series 44. A maximum of six (6) devices (either low-speed or high-speed) may be connected to any GIC with high-speed devices attached. Low-speed peripherals (except 2608As) can be attached to any GIC. 2608As and high-speed peripherals cannot be attached to the same GIC. In addition, it is recommended that separate GICs be used for connecting 7976As and the System Disc. Otherwise, performance may be degraded. Each GIC will require a card slot.

Junction Panels

Junction Panels are used in connecting GIC's, INP's, 2617A/19A Line Printers, ADCCs and Direct Connect Port Controllers to the Series 44. The number of these devices permitted in a configuration may be restricted by the number of junction panel spaces available. The Series 44 Worksheet contains the calculations required to determine whether a particular configuration meets the junction panel constraints.

Series 44 Configuration Worksheet

Product Number	Description	Quantity

I. Memory Expansion. (Refer to the Memory Expansion Table in the Series 44 Configuration Guidelines)

	Total Memory Size (Standard memory is 1 Mb. MAX = 4 Mb)	1. ____
30161A	1 Mb Memory Module for Series 40/44.	2. ____
30092A	512 Kb Memory Module for Series 40/44	3. ____
30094A	Add-on Series 44 Memory Controller	4. ____

II. Disc Drives.

A. Integrated Storage Units One of the following may be included:

7911P	27 Mb Integrated Storage Unit with Cartridge Tape (opt. 001 MAX = 1)	5. ____
7912P	64 Mb Integrated Storage Unit with Cartridge Tape (opt. 001 MAX = 1)	6. ____
	Total Integrated Storage Units with Cartridge Tape (Sum of line 5 & 6. MAX = 1)	7. ____

B. Removable Mass Storage Products:

7920M	50 Mb Master Disc Drive	8. ____
7920S	50 Mb Slave Disc Drive.	9. ____
7925M	120 Mb Master Disc Drive	10. ____
7925S	120 Mb Slave Disc Drive.	11. ____
7935H	404 Mb Disc Drive (MAX = 8)	12. ____
	Total Master 7920/25 Disc Drives (Sum of lines 8 & 10. MAX = 2)	13. ____
	Total Slave 7920/25 Disc Drives (Sum of lines 9 & 11. A maximum of 7 slave (7920/25) drives can be supported by each 7920/25 master drive).	14. ____
	Total Master Disc Drives (sum of lines 7, 12, 13.).	15. ____
	Total Disc Drives & Integrated Storage Units (Sum of lines 14, 15. MAX = 16)	16. ____

III. Magnetic Tape Drives.

7970E	1600 bpi Magnetic Tape Drive	
	Option 426: Master Tape Drive (Each 7970E master supports up to 3 7970E slave drives. MAX = 2)	17. ____
	Option 421: Slave Tape Drive	18. ____
7976A	1600/6250 bpi Magnetic Tape Drive (MAX = 1).	19. ____
	Total Magnetic Tape Drives (Sum of lines 17, 18, 19. MAX = 8)	20. ____

IV. Printers.

2608A	400 lpm Dot Matrix Printer (MAX = 2)	21. ____
2617A	600 lpm Line Printer.	22. ____
2619A	1000 lpm Line Printer	23. ____
	Total 2617A/19A Line Printers (Sum of lines 22, 23).	24. ____
	Total Dot-Matrix, 2617A/19A Line Printers (Sum of lines 21 & 24. MAX = 4)	25. ____
2680A	Intelligent Page Printer (MAX = 2)	26. ____

V. Other Peripherals

9895A	Flexible Disc Drive (MAX = 1)	27. ____
30106A	80 Column HP-IB Card Reader (opt. 333) (MAX = 1)	28. ____

Series 44 Configuration Worksheet

VI. Data Communications

A. Terminals, Plotters and Character Printers

Product	Multipoint	Pt-to-Pt with ADCC Modem or Direct Connect	Pt-to-Pt with DSN/ATP Direct Connect		Terminal Attached
			Type 422	Type 232	
Interactive Display Terminals					
2382A	N/A	_____	N/A	_____	N/A
2621A/B/P	N/A	_____	N/A	_____	N/A
2622A	N/A	_____	_____	_____	N/A
2623A	N/A	_____	_____	_____	N/A
2624B	_____	_____	_____	_____	N/A
2626A	_____	_____	_____	_____	N/A
2626W	N/A	_____	_____	_____	N/A
2642A	_____	_____	_____	_____	N/A
2645A	_____	_____	_____	_____	N/A
2647A	_____	_____	_____	_____	N/A
2648A	_____	_____	_____	_____	N/A
Plotters					
7220C/T	N/A	_____	N/A	_____	_____
7221C/T	N/A	_____	N/A	_____	_____
7225B	N/A	_____	N/A	_____	_____
7240A	N/A	_____	N/A	_____	_____
7580A	N/A	_____	N/A	_____	_____
Data Collection Terminals					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
7260A	N/A	_____	N/A	_____	_____
Printing Terminals					
2635B	N/A	_____	N/A	_____	N/A
Character Printers					
2601A	N/A	_____	N/A	_____	_____
2631B	N/A	_____	N/A	_____	_____
Totals	29. _____	30. _____	31. _____	32. _____	33. _____

Constraints: Multipoint Connections (Line 29): MAX = 95.
          Point-to-Point Connections with ADCC (Line 30): MAX = 60.
          Point-to-Point Connections with ATP (Sum of lines 31, 32): MAX = 60.
          Point-to-Point Connections (sum of lines 30, 31, 32): MAX = 64.
          Total Connections (Sum of 29, 30, 31, 32): MAX = 96.
          2631B Point-to-Point or Remove Connections: MAX = 4.

NOTE: The 2626W cannot use HPWORD when connected via modem.
       The 2601A cannot be connected via a modem.

Series 44 Configuration Worksheet

Product Number	Description	Quantity

B. Data Communication Lines:

Multipoint Lines . . . . 34. _____

System to System Lines (Direct & Modem Connect) . . . . 35. _____

30020A/B DSN/INPs Required (Sum of lines 34 & 35. MAX = 7) . . . . 36. _____

VII. I/O Expansion.

(Refer to I/O Expansion Section of the Series 44 Configuration Guidelines)

A. Asynchronous Data Communications Controllers

Total Asynchronous Data Communication Controllers (Divide line 30 by "4" and round up. MIN = 1, MAX = 15) . . . . 37. _____

30018A ADCC-Main (Divide line 37 by "2" and round up) . . . . 38. _____

30019A ADCC-Extender (Subtract line 38 from line 37) . . . . 39. _____

B. DSN/ATP Advanced Terminal Processor

Groups of 4 RS-232 Connections (Divide line 32 by "4" and round up) . . . . 40. _____

Groups of 4 RS-422 Connections (Divide line 31 by "4" and round up) . . . . 41. _____

30145A Direct Connect Port Controllers (Divide sum of lines 40 & 41 by "3" and round up. MAX = 5) . . . . . 42. _____

Option 002: Replace 4 RS-422 Ports with 4 RS-232 Ports (Equals Line 40) . . . . 43. _____

30144A System Interface Board ("1" if line 42 is greater than "0") . . . . 44. _____

C. General I/O Channels

For all devices requiring connection using a GIC (see the Table below), indicate how they will be attached to GICs (follow GIC rules closely). Use this to determine the number of optional GICs required in line 45.
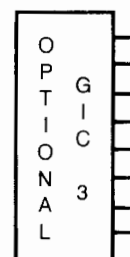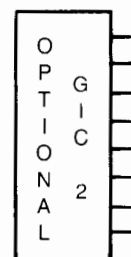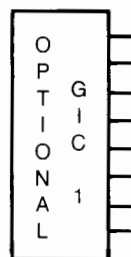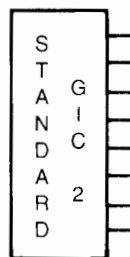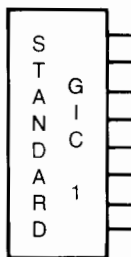
Series 44 Configuration Worksheet

Product Number	Description	Quantity

GIC Rules:

- MAX 8 HP-IB electrical device loads per GIC
- MAX 2 GICs with HIGH-SPEED devices connected
- MAX 6 devices (not HP-IB loads) per GIC with high-speed devices
- CAN connect ANY low-speed device (except 2608A) to GIC with high-speed devices connected while observing 6 device maximum of high speed GIC's
- CANNOT connect 2608A to GIC with high-speed devices
- Performance may be degraded if a 7976A and the System Disc are connected to the same GIC

Line	Device	Device Speed	HP-IB Electrical Device Load
5, 6	7911P/12P Cart. Tape	Low	Dedicated
5, 6	7911P/12P disc	High	1
8, 10, 12	7920M/25M/35H	High	1
17	7970E (opt. 426)	Low	Dedicated
19	7976A	High	2
21	2608A	Low	1
22, 23	2617A/19A	Low	1
26	2680A	High	3
27	9895A	Low	1
28	Card Reader	Low	Dedicated
36	INP	Low	1

30079A Optional General I/O Channels (MAX = 3) . . . . 45. ____

D. Card Slots

ADCCs, SIBs, GICs (Sum of lines 37, 44, 45. MAX = 16) . . . . 46. ____

I/O Card Cage Slots (Sum of lines 24, 36, 42, 46. MAX = 24) . . . . 47. ____

Need an additional optional GIC (line 45) if BOTH of the following occur:

- Optional GIC's (line 45) is equal to 0
- I/O Card Cage Slots (line 47) is greater than 18

E. Junction Panels

Sum of the following must not exceed 34:

- Sum of lines 24, 36, 45   ____
- "1.5" times line 37 and round up   1.5 x = ____
- "3" times line 42   3 x = ____

HP 3000 Series 64 Minimum System Configuration

Supplied Hardware:

- Central Processing Unit.
- System Clock.
- Diagnostic Control Unit (DCU).
- 2 General I/O Channels (GIC's): for System Disc and Backup Tape Drive.
- 2 Megabytes Fault Control Memory with Controller.
- 8 Kb Cache Memory.
- System Mainframe Cabinet including Card Cage and Power Supplies.
- 24 I/O Slots and expansion capacity for 8 Mbytes of Memory.
- 40 Kb of Writeable Control Store (WCS).
- Built-in Isolation Transformers.

Required Hardware Ordered Separately:

- 1 System Console: HP 2642A Terminal with Option 964 (includes cable).
- 1 System Disc: 7920M, 7925M, 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: 7970E 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 Management 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.
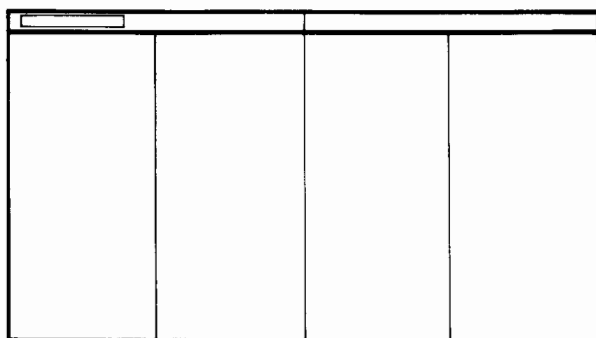
HP 3000
Series 64
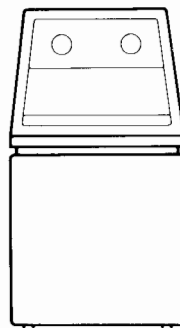
7970E
Tape Drive
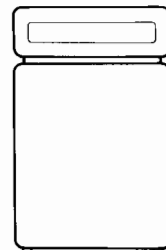
7920M Disc Drive

264X
System
Console

HP 3000 Series 64 Minimum System Configuration
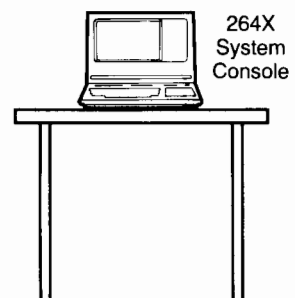
HP 3000 Series 64 Configuration Guidelines

The Series 64 has a total of 24 I/O card slots for interfacing any of the following devices: Intermodule Bus Interfaces (IMBIs), System Interface Boards (SIBs), Direct Connect or Modem Port Controllers, General I/O Channels (GICs), DSN/Intelligent Network Processors (INPs), and 2617A or 2619A printer interfaces. Five I/O card slots will be filled by one IMBI and two GICs, which are standard on the system, and one SIB and one Port Controller, which must be ordered separately.

Memory Expansion.

Two Megabytes of 64 K RAM fault control memory is supplied with the System Processor Unit. System memory sizes of 3 Mb, 4 Mb, 5 Mb, 6 Mb, 7 Mb, and 8 Mb are also supported using 30142A Series 64 1 Mb memory modules.

Disc Drives.

Integrated Storage Units:

Only one Integrated Storage Unit (7911P and 7912P) is supported on the Series 64 and must be ordered with the Cartridge Tape. A second controller MUST be included (option 001). The Cartridge Tape requires its own dedicated GIC.

Mass Storage Products:

One 7920M (50 Mb), 7925M (120 Mb) or 7935H (404 Mb) Disc Drive is required and must be ordered separately for the Series 64.

A total of sixteen (16) disc drives, masters or slaves, is supported on the Series 64. Of this 16, only one (1) can be a 7911P or 7912P Disc Drive. the 7920M and 7925M can each support up to 7 slave disc drives. The 7911P, 7912P, and 7935H do NOT support any slave devices.

Option 102 must be ordered with both the 7920M and 7925M to specify the HP-IB interface and two-meter (6.5 feet) cable. The 7920S, 7925S, 7911P, 7912P, and 7935H discs each include cables as standard equipment.

System disc performance may vary depending on the specific disc/controller/IMB configuration (ratio of masters to slaves, masters to GICs, and masters to IMBs). Check with an HP System Engineer or Performance Consultant for complete details.

Magnetic Tape Drives.

A 7970E or 7976A magnetic tape drive is required for system backup and distribution of software updates for all Series 64's and must be ordered separately.

The Series 64 will support up to two 7970E Master tape drives and each 7970E Master can support up to three additional slave magnetic tape drives (7970E with option 421). This means a maximum of eight 7970E tape drives can be configured on the Series 64. EACH 7970E Master tape drive REQUIRES a dedicated General I/O Channel (GIC).

The 7976As (with option 616) can be interfaced to the Series 64. It does NOT require a dedicated GIC. The 7976A does not support slave tape drives.

A maximum of eight total magnetic tape drives is allowed on the Series 64. Cables for the 7970E and 7976A are included as standard equipment.

Printers.

The Series 64 supports up to eight Line Printers. These eight may consist of 2608A, 2617A, and 2619A Line Printers.

Dot Matrix Line Printers:

A maximum of four 2608A printers are allowed on the Series 64. The 2608A is attached to a GIC but cannot be interfaced to the same GIC used to interface high-speed peripherals. Each 2608A printer comes with a two-meter cable (specify 2608A option 344).

2617A and 2619A Line Printers:

Each 2617A and 2619A Line Printer interfaces to the Series 64 through a General I/O Channel (GIC) and uses an interface which occupies one (1) I/O card slot in the Series 64. This interface is ordered as option 364 to the 2617A and 2619A printer. Each 2617A and 2619A with option 364 comes with a 15 meter (50 feet) cable.

Laser Printing Systems:

A maximum of two 2680A Intelligent Page Printers are supported on the Series 64 in addition to the maximum of eight 2608A, 2617A or 2619A line printers discussed above. The Intelligent Page Printer is connected to the system through a GIC. Specify 2680A option 364 for the Series 64 cable.

Other Peripherals.

Flexible Disc Drive:

Only one 1.2 Mb flexible disc drive can be used on the Series 64. Product number 9895A MUST be ordered with option 010 to specify a single master drive. The flexible disc drive attaches to a GIC; order option 333 for a two-meter (6.5 ft) cable.

Card Reader:

The 30106A Card Reader can 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 BCG Sales Development representative before quoting to the customer. The 30106A 80-Column Card Reader interfaces to the Series 64 through a DEDICATED General I/O Channel (GIC). To order the HP-IB Card Reader and cable, specify option 333. A powerline conditioner, 35030A or equivalent, is required with the Card Reader.

Data Communications.

Terminals.

Point-to-point connections are made to the Series 64 through the DSN/Advanced Terminal Processor. Multipoint connections are made to the Series 64 through multipoint data communication lines attached through DSN/Intelligent Network Processors. (DSN/Multipoint Terminal Software is required). The number of terminals per multipoint line is normally determined by response time considerations, but may be limited by the specific cabling option chosen. Up to 143 multipoint terminals are supported per system. However, only 110 sessions (including point-to-point, multipoint, system console, and DSN/DS virtual terminals) can simultaneously be active.

One point-to-point connected 2642A terminal with option 964 must be specified for the system console (cable is included).

Character Printers and Plotters.

The Series 64 can support local or remote spooled 2631B character printers through the DSN/ATP. When used as a local/remote spooled printer, the 2631B is connected directly to a DSN/ATP direct connect port via hardwired cable or DSN/ATP modem port via modem. Up to sixteen 2631B printers are supported on the Series 64 in this fashion (specify 2631B with option 331).

In addition to the 2631B, the Series 64 can support 2601A daisy-wheel printers (non-spooled only) via the DSN/ATP. The 2601A can only be directly attached to a DSN/ATP port via hardwired cable.

The 2631B and 2601A printers can also be attached as slave devices (nonspooled only) to Series 64 terminals under the control of user-supplied application programs. The 2601A cannot be configured as a remote device connected through a modem.

HP Plotters can be operated using DSG/3000 software or under user supplied application programs. Refer to the Product Information Guide for complete details on Graphics Terminals, Plotters, and Graphics Workstation Software.

The Product Information Guide contains a complete explanation of the different types of data communications connections; cables for terminals, character printers, and plotters; and interfaces required for character printers.

Spooled Devices.

The following devices can be spooled:
- 2608A dot matrix printer
- 2617A line printer
- 2619A line printer
- 2631B character printer
- 2680A page printer
- 30106A card reader
- 7970E Tape Drive
- 7976A Tape Drive

In order to determine the maximum number of spooled devices which can be configured on a system, the following formula must be used:

$$\text{Max. Spooled Devices} = \frac{256 - (1.25 \times \#\text{Sessions/Jobs}) - \#\text{INP's}}{16}$$

where:

$\#$Sessions/Jobs = the maximum number of sessions *AND* jobs which will be supported on the system

$\#$INP's = the number of Intelligent Network Processors which will be configured on the system

After plugging in the values for the number of sessions/ jobs and also the number of INP's, 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, 96 sessions, 6 batch jobs and has 7 INP's configured can support the following number of spooled devices:

Max. Spooled Devices =

$$\frac{256 - (1.25 \times 102) - 7}{16} = 7.6$$

ROUNDING this result *DOWN* means that a maximum of 7 spooled devices can be supported on the system.

DSN/Intelligent Network Processors.

A maximum of 16 DSN/Intelligent Network Processors may be configured on the Series 64. With more than 10 INPs the maximum speed supported is 19.2 Kb. 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 (non-concurrently) by any of these software products. Each INP board requires one (1) I/O card slot and a connection to a GIC.

A modem or hardwire connection cable is required for each data communication line (INP) that is specified, and these must be ordered separately (refer to the Product Information Guide).

I/O Expansion.

DSN/Advanced Terminal Processor (DSN/ATP).

As shown in Fig. 1, the DSN/ATP on the Series 64 consists of three products: DSN/ATP System Interface Board (30144A); DSN/ATP Direct Connect Port Controller (30145A); and DSN/ATP Modem Port Controller (30155A).
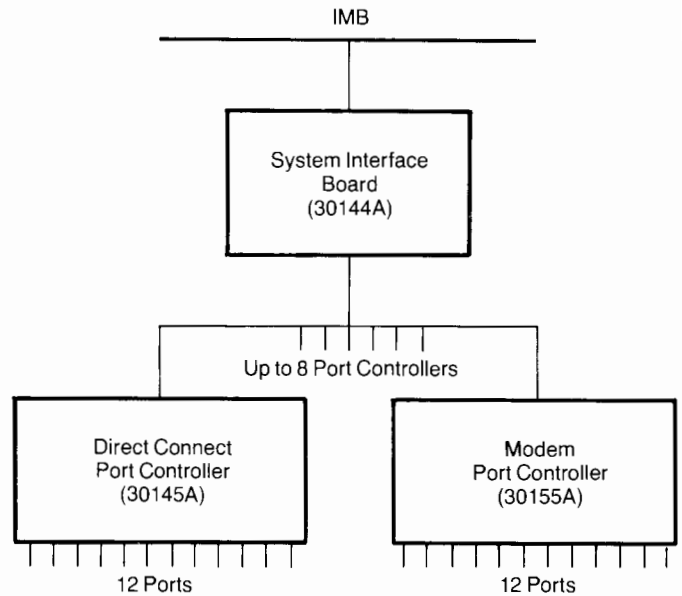
Fig. 1 DSN/ATP Subsystem Structure

The minimum DSN/ATP subsystem required on the Series 64 consists of one System Interface Board and one Port Controller (either direct connect or modem). It requires two I/O slots and supports up to 12 terminals. A maximum subsystem consists of one SIB and eight Port Controllers; it requires nine I/O slots and supports up to 96 terminals. Up to two subsystems are supported on the Series 64 providing a maximum of 144 ports for terminal connections.

Each Modem Port Controller supports 12 RS-232-C connections (either modem or direct connect). At least one Modem Port Controller is recommended for remote support.

Each Direct Connect Port Controller supports both RS-422 and RS-232 connections. It comes standard with 12 RS-422 ports and these can be converted to RS-232 ports *in groups of four* by ordering option 002. Thus, 0, 4, 8, or 12 RS-232 ports may be ordered on a single Direct Connect Port Controller by specifying the appropriate number of Option 002's.

Option 001 must be specified for the first Port Controller on the Series 64 in order to delete an internal cable which is already provided with the system.

A general approach for configuring a system with the DSN/ATP consists of the following steps:

1. Determine the number of modem connections desired and the appropriate number of Modem Port Controllers to order.
2. Determine the number of modem ports available for direct connection of RS-232 devices. Since modem ports can only be ordered in groups of 12, ports not used for modems may be available for connecting RS-232 terminals directly.
3. Based on the desired number of RS-422 connections, RS-232 connections, and available modem ports, calculate the number of Direct Connect Port Controllers required and the mix of RS-422 and RS-232 ports on the controller(s). It may be desirable to include additional modem, RS-422, or RS-232 ports in the configuration due to anticipated future system expansion.
4. Finally, determine the number of System Interface Boards required to support the number of Port Controllers calculated above. A single SIB can support up to 8 Port Controllers and, thus, up to 96 terminals. Support of more than 96 terminals requires an additional SIB.

General I/O Channels.

General I/O Channels (GICs) are used for interfacing HP-IB peripherals to the Series 64. The following table summarizes peripherals using GICs for interface and their requirements:

Peripherals	Peripheral Speed	HP-IB Electrical Device Loads
7911P/12P Cart. Tape	Low	Dedicated GIC
7911P/12P Disc	High	1
7920M/25M/35H	High	1
7970E (Opt. 426)	Low	Dedicated GIC
7976A	High	2
2608A/17A/19A	Low	1
2680A	High	3
9895A	Low	1
30106A	Low	Dedicated GIC
INP	Low	1

Each GIC supports from 1 to 8 HP-IB peripherals. The number of peripherals which may be connected depends on the particular peripherals involved and the length of the HP-IB cable.

Up to 8 HP-IB "electrical device loads" are allowed on a single GIC. As in the table above, peripherals may require from 1 to 8 HP-IB electrical device loads. Multiple peripherals may be connected to an HP-IB as long as the sum of HP-IB electrical device loads required does not exceed 8 (and so long as the combination does not violate other configuration constraints).

The maximum allowed length of the HP-IB cable which connects devices to a GIC is 7 meters plus 1 meter per device (up to 2 meters are internal to the SPU). In a large configuration a customer could be limited as to where the devices could be placed around a system. Increasing the number of GICs on a system can increase cabling flexibility. Consult your CE to determine optimum GIC cables and peripheral configurations.

Two GICs are supplied with the Series 64 and up to 8 optional GICs may be ordered, for a total of 10 GICs. Each GIC will require a card slot and a junction panel space.

High-speed peripherals may only be attached to two GICs on each Intermodule Bus (IMB). The Series 64 has one IMB as standard and a second IMB may be added. An additional I/O Adapter Module (30143A) is required for the second IMB. Thus, with two IMBs, high-speed peripherals may be attached to as many as four GICs on the Series 64. A maximum of six devices may be attached to a GIC with high-speed peripherals.

Low-speed peripherals (except 2608As) can be attached to any GIC. A 2608A and high-speed peripherals cannot be attached to the same GIC. In addition, it is recommended that separate GICs be used for connecting 7976A's and the system disc. Otherwise, system performance may be degraded.

Junction Panels:

Junction Panels are used in connecting GICs, INPs 2617A/19A Line Printers, Direct Connect Port Controllers, and Modem Port Controllers to the Series 64. The number of these devices permitted in a configuration may be restricted by the number of junction panel spaces available. The Series 64 Worksheet contains the calculations required to determine whether a particular configuration meets the junction panel constraints.

Series 64 Configuration Worksheet

Product Number	Description	Quantity

I. Memory Expansion.

Total Memory Size (Standard memory is 2 Mb. MAX = 8) . . . . 1. _____

30142A 1 Mb Memory Module for Series 64 (Number of Mb in line 1 minus "2". MAX = 6) . . . . 2. _____

II. Disc Drives.

A. Integrated Storage Units

One of the following may be included:

7911P 27 Mb Integrated Storage Unit with Cartridge Tape (opt. 001 MAX = 1) . . . . 3. _____

7912P 64 Mb Integrated Storage Unit with Cartridge Tape (opt. 001 MAX = 1) . . . . 4. _____

Total Integrated Storage Units with Cartridge Tape (Sum of lines 3 & 4. MAX = 1) . . . . 5. _____

B. Removable Mass Storage Products:

7920M 50 Mb Master Disc Drive . . . . 6. _____

7920S 50 Mb Slave Disc Drive. . . . . 7. _____

7925M 120 Mb Master Disc Drive . . . . 8. _____

7925S 120 Mb Slave Disc Drive. . . . . 9. _____

Total 7920/25 Master Disc Drives (Sum of lines 6 & 8) . . . . 10. _____

Total 7920/25 Slave Disc Drives (Sum of lines 7 & 9. A maximum of 7 slave drives can be supported by each master drive). . . . . 11. _____

7935H 404 Mb Disc Drive . . . . 12. _____

Total Disc Drives & Integrated Storage Units (Sum of lines 5 & 10, 11, 12. MAX = 16) . . . . 13. _____

III. Magnetic Tape Drives.

7970E 1600 bpi Magnetic Tape Drive
Option 426: Master Tape Drive (Each 7970E master tape drive supports up to 3 7970E slave drives. MAX = 2) . . . . 14. _____

Option 421: Slave Tape Drive . . . . 15. _____

7976A 1600/6250 bpi Magnetic Tape Drive (MAX = 2). . . . . 16. _____

Total Magnetic Tape Drives (Sum of lines 14, 15, 16. MAX = 8). . . . . 17. _____

IV. Printers.

2608A 400 lpm Dot Matrix Printer (MAX = 4) . . . . 18. _____

2617A 600 lpm Line Printer. . . . . 19. _____

2619A 1000 lpm Line Printer . . . . 20. _____

Total 2617A/19A Line Printers (Sum of lines 19 & 20. MAX = 4) . . . . 21. _____

Total Dot-Matrix, 2617A/19A Line Printers (Sum of lines 18 & 21. MAX = 8) . . . . 22. _____

2680A Intelligent Page Printer (MAX = 2) . . . . 23. _____

V. Other Peripherals.

9895A Flexible Disc Drive (MAX = 1) . . . . 24. _____

30106A 80 Column HP-IB Card Reader (opt. 333) (MAX = 1). . . . . 25. _____

Series 64 Configuration Worksheet

VI. Data Communications.

A. Terminals, Plotters, and Character Printers

Product	Multipoint	Connection Method Pt-to-Pt with DSN/ATP Modem	Direct Connect Type 422	Type 232	Terminal Attached
Display Terminals					
2382A	N/A	_____	N/A	_____	N/A
2621A/B/P	N/A	_____	N/A	_____	N/A
2622A	N/A	_____	_____	_____	N/A
2623A	N/A	_____	_____	_____	N/A
2624B	_____	_____	_____	_____	N/A
2626A	_____	_____	_____	_____	N/A
2626W	N/A	_____	_____	_____	N/A
2642A	_____	_____	_____	_____	N/A
2645A	_____	_____	_____	_____	N/A
2647A	_____	_____	_____	_____	N/A
2648A	_____	_____	_____	_____	N/A
Plotters					
7220C/T	N/A	_____	N/A	_____	_____
7221C/T	N/A	_____	N/A	_____	_____
7225B	N/A	_____	N/A	_____	_____
7240A	N/A	_____	N/A	_____	_____
7580A	N/A	_____	N/A	_____	_____
Data Collection Terminals					
3075A	_____	_____	N/A	_____	N/A
3076A	_____	_____	N/A	_____	N/A
3077A	_____	_____	N/A	_____	N/A
7260A	N/A	_____	N/A	_____	N/A
Printing Terminals					
2635B	N/A	_____	N/A	_____	N/A
Character Printers					
2601A	N/A	N/A	N/A	_____	_____
2631B	N/A	_____	N/A	_____	_____

Totals . . . . 26. _____ 27. _____ 28. _____ 29. _____ 30. _____

Constraints: Multipoint Connections (Line 26): MAX = 143.
 Modem Port Connections (Line 27): MAX = 84.
 Total Connections (Sum of lines 26, 27, 28, 29): MAX = 144.
 2631B Point-to-Point and Remote Connected: MAX = 16.

Note: The 2626W cannot use HPWORD when connected via a modem.
 The 2601A cannot be connected via a modem.

Series 64 Configuration Worksheet

Product Number	Description	Quantity

B. Data Communication Lines:

Multipoint Lines .... 31. ____

System to System Lines (Direct & Modem Connect)........................... 32. ____

30020B DSN/INPs Required (Sum of lines 31 & 32. MAX = 16) .... 33. ____

VI. I/O Expansion.

(Refer to the I/O Expansion Section of the Series 64 Configuration Guidelines)

A. DSN/ATP Advanced Terminal Processors

30155A Modem Port Controller (Divide line 27 by "12" and round up)................. 34. ____

Unused Modem Ports (Subtract line 27 from ["12" times line 34])............. 35. ____

Direct Connect RS-232 through Direct Connect Port Controllers (Subtract line 35 from line 29. "0" if result less than "0") .... 36. ____

Groups of 4 RS-232 connections (Divide line 36 by "4" and round up) .... 37. ____

Groups of 4 RS-422 connections (Divide line 28 by "4" and round up) .... 38. ____

30145A Direct Connect Port Controllers (Divide sum of lines 37, 38 by "3" and round up.) .... 39. ____

Option 002: Replaces 4 RS-422 Ports with 4 RS-232 Ports (Equals line 37) .... 40. ____

30144A System Interface Board ("2" if sum of lines 34 & 39 is greater than 8. "1" otherwise) .... 41. ____

B. General I/O Channels

For all devices requiring connection using a GIC (see the table below), indicate how they will be attached to GICs (follow GIC rules closely). Use this to determine the number of optional GICs required in line 42.

STANDARD GIC 1   STANDARD GIC 2   OPTIONAL GIC 1   OPTIONAL GIC 2   OPTIONAL GIC 3

STANDARD GIC 4   STANDARD GIC 5   OPTIONAL GIC 6   OPTIONAL GIC 7   OPTIONAL GIC 8
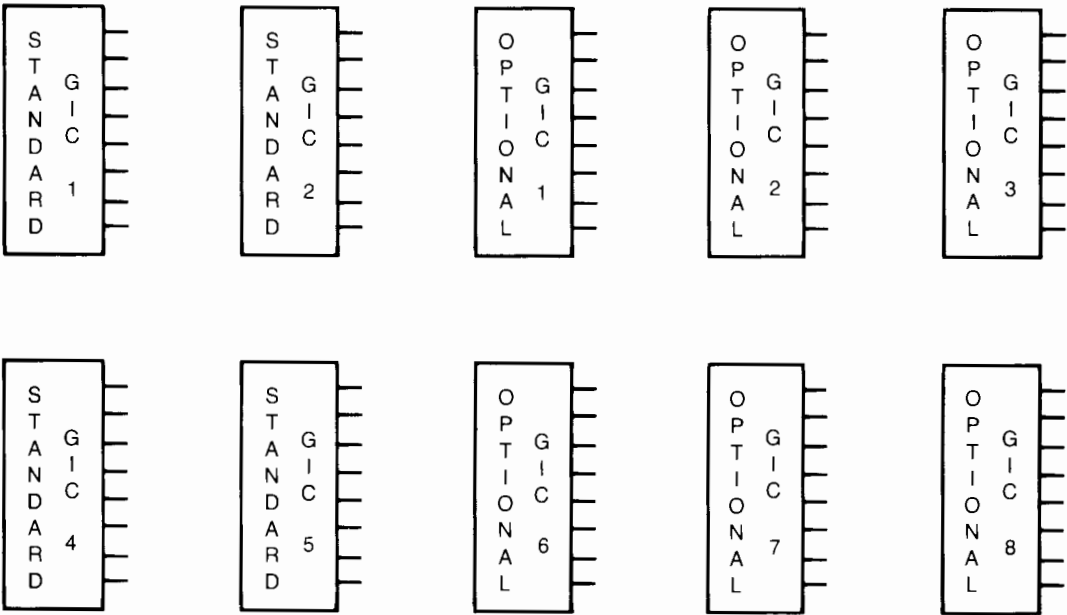
Series 64 Configuration Worksheet

Product Number	Description	Quantity

GIC Rules:

- MAX 8 HP-IB device loads per GIC
- MAX 4 GICs with HIGH-SPEED devices connected
- MAX 6 devices (not HP-IB loads) per GIC with high-speed devices
- CAN connect ANY low-speed device (except 2608A) to GIC with high-speed devices connected while observing 6 device maximums of high speed GIC's
- CANNOT connect 2608A to GIC with high-speed devices
- Performance may be degraded if the 7976A and the System Disc are connected to the same GIC

Line	Device	Device Speed	HP-IB Electrical Device Load
3, 4	7911P/12P Cart. Tape	Low	Dedicated
3, 4	7911P/12P Disc	High	1
6, 8, 12	7920M/25M/35H	High	1
14	7970E (opt. 426)	Low	Dedicated
16	7976A	High	2
18	2608A	Low	1
19, 20	2617A/19A	Low	1
23	2680A	High	3
24	9895A	Low	1
25	Card Reader	Low	Dedicated
33	INP	Low	1

30079A Optional GICs (MAX = 8). . . . . 42. ____

C. I/O Card Slots

30143A I/O Adapter Module (Required if more than 2 GICs have high-speed devices attached. MAX = 1) . . . 43. ____

I/O Card Slots required (Sum of lines 21, 33, 34, 39, 41, 42, 43. MAX = 20) . . . . 44. ____

D. Junction Panels

Sum of the following must not exceed 46

- Sum of lines 21, 33, 42   ____
- "3" times line 39   3 x ____ = ____
- "6" times line 34   6 x ____ = ____

Ordering Upgrades

How to order an Upgrade
How to use the Upgrades Ordering Worksheet
Things to look out for
Upgrade Ordering Instructions
Upgrades Ordering Worksheet

Ordering Upgrades

How to Order an Upgrade

This portion of the Configuration Guide is designed to help you properly order an HP 3000 Upgrade to the Series 40/44/64. Hewlett-Packard now offers the following upgrade paths:

	HP 3000 Upgrade Paths			
From:	**Series III**	**Series 40**	**Series 44**	**Series 64**
pre-Series II	*	X	X	X
Series II	*	X	X	X
Series 30		X	X	X
Series 33		X	X	X
Series III			X	X
Series 40			X	X
Series 44				X

*Upgrades to the Series III from the Series II or pre-Series II systems are detailed in the *Configuration and Upgrades Guide for Series 30, 33, III and pre-Series III Systems*.

Refer to the HP 3000 Computer Systems *UPGRADES FIELD TRAINING MANUAL* for additional details on Upgrades and Return Credits available to customers.

"UPGRADE INSTRUCTIONS" and an "UPGRADES ORDERING WORKSHEET" have been designed to help you correctly specify the order.

Upgrade Instructions: Line-by-line instructions explaining what information must be specified on the worksheet to accurately order the upgrade. The instructions are keyed by line number to corresponding items on the worksheet, and brief descriptions are given about any conditions pertaining to each type of device involved in the upgrade.

Upgrade Ordering Worksheet: A product-by-product checklist for each upgrade path, detailing the equipment presently owned by the customer may be transferred directly or upgraded for use on the new system; new equipment which needs to be purchased; and any return credits which are applicable toward the purchase of the system.

How to Use the Upgrades Ordering Worksheet

Ordering an upgrade will require using the UPGRADES ORDERING WORKSHEET. The worksheet provides information about the products that are supported on the upgrade, any peripheral upgrades which are required and return credits which are available.

The reproduction of the worksheet heading below provides a description of the major sections of the worksheet:

Upgrades Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
(1)	(2)	(3)	(4)	(3)	(4)	(3)	(4)

(1) **Product Number**—The product number identified in this column identifies the product number or option to be specified in the order.

(2) **Description**—A brief description is provided in this column of the product number listed in column (1).

(3) **Quantity Owned by Customer**—This column is used to identify the quantity of devices a customer already owns and intends to use on the system being purchased. A space _____ in this column means that the device is supported on the upgrade. Absence of a space in the column means the device is not supported and a return credit should be specified if one is offered.

(4) **Quantity to be Ordered**—This column is for specifying the quantity of the line item which must be purchased to complete the configuration specified in the Configuration Worksheet. A space _____ in this column identifies the devices which can be purchased for use on the new system. Absence of a space in this column means that the device is not supported on the particular upgrade system and cannot be ordered.

Note: Devices not listed on the worksheet are no longer supported.

Follow the steps below to completely and accurately order an HP 3000 Upgrade.

1. Verify the Configuration: With the customers assistance, *Complete Section One* of the Configuration Guide. This will allow the customer to specify the final configuration desired when the upgrade is complete and will also provide a check that the desired configuration can be achieved.

2. Use the Upgrades Ordering Worksheet: Since the customer is upgrading to a more powerful HP 3000, it is necessary to consider the hardware which the customer already owns. The worksheet will help to determine the following.

- A. What can be used on the new system
- B. What must be upgraded to properly function on the new system
- C. What new items *must* be purchased
- D. What items must be returned for a credit toward the purchase of the upgrade
- E. What equipment the customer, at his option, can return for a credit toward the purchase of newer equipment.

Using the Upgrades Ordering Worksheet, follow the upgrade instructions to properly address each of the above items.

3. Order Options and Cables: Make sure that the necessary options and cables are ordered for each device which will be upgraded or purchased. These items must be specified when actually ordering the system. Refer to the *Product Information Guide* to obtain a detailed listing of different HP 3000 peripheral products and the options and requirements associated with each.

4. Order Optional Software: Use the Product Information Guide to identify what optional software needs to be purchased, including data communications software.

5. Make the Quote: When the above steps have been completed, use the ordering worksheet to prepare the quote for the products which are to be ordered. Combining this information with the correct options, cables and software will allow you to make an accurate quote to the customer.

Things to Look Out For

The following details should be reviewed and taken into consideration before ordering an upgrade.

Minimal Field Installation Time

All upgrades with the possible exception of some of those to the Series 64 can be accomplished in one day or less. An upgrade to a Series 64 from either a Series III or pre-Series III system may take as much as two days.

Discount Eligibility

The upgrade products will continue to appear on exhibit A-1 and will be subject to the End User "B" and OEM "B" discount schedules. The discount on upgrades applies to the net amount. That is, they apply to the net value of both the upgrade and return credit products.

One For One SPU Upgrade Policy

The SPU upgrade program has been developed under the premise that a customer will either make the decision to distribute their workload by keeping the existing SPU and purchasing a new HP 3000, or upgrade a single system to meet increased requirements. Thus a "return credit" for only a single HP 3000 SPU may be applied to any single upgrade.

Installation and Deinstallation Considerations

The SPU being upgraded must already be installed at the time of the upgrade order. Also, the deinstallation and installation must take place at the same facility in order to avoid additional CE costs and charges. Deinstallation and installation charges are included within the price of the upgrade. Domestic, ICON and Canadian return freight guidelines are applicable. All units returned in Europe (including Series III SPUs, discs, and tapes) are to be shipped to BGD in Boeblingen.

Series 40, 44 16 K RAM Memory Upgrades INDEPENDENT of SPU Upgrades

Series 40 and Series 40SX customers wishing to expand to 2 Mb of main memory need the 30161A 1 Mb 64 K RAM memory boards. There are return credits available to the Series 40, Series 40SX and Series 44 customer wishing to return their 16 K RAM based memory towards the purchase of the 30161A. The return credit products are 30171AN for 256 Kb memory and 30092AN for 512 Kb memory. These memory upgrades may be ordered independently from the SPU upgrades. Note, however, that either a 30161A 1 Mb board(s) or an SPU upgrade must be ordered in conjunction with the memory return credits; HP will not "buy back" memory unless new memory or an upgrade is simultaneously purchased.

2649E Console Must be Returned with Series 30 and Series 33 SPU's

All Series 30 and Series 33 upgrades require the return of the 2649E system and maintenance console along with the SPU and 256 Kb memory. Return of the 2649E is *not* optional.

Series 40 to Series 44 Upgrades Include 1 Mb Memory

All upgrades to the Series 44 include 1 Mb of main memory. Thus, an upgrade from a Series 40/40SX to a Series 44 may have a memory configuration not supported on the Series 40. All Series 40, 40SX and 44 memory is compatible. The final Series 44 memory size must be one of the supported memory configurations: 1, 1½, 2, 2½, 3, 3½, or 4 Mb.

For example, a 768 Kb Series 40/40SX system being upgraded to a Series 44 will have 1¼ Mb of memory. This memory size is *not* supported; the customer *must* either increase his memory to 2 Mb (or higher) or return one 256 Kb board for credit (30171AN) so that the Series 44 memory size matches a supported configuration.

Series 30/33 Flexible Disc Upgrade Considerations:

If the Series 30/33 system which the customer is upgrading has a built-in 7902A flexible disc drive and the customer wants a flexible disc on the Series 40, a new 9895A-010, 333 flexible disc drive must be ordered. If the 9895A is purchased as a replacement, the HP 7902A flexible disc media cannot be used with the HP 9895A flexible disc drive. Tests have shown that if the 7902A media is used more than once in the 9895A, it will damage the 9895A heads and cause damage to itself because of its softer material. You should use it only once to copy it to a 9895 media.

Peripheral Upgrades

In the Upgrade Instructions, the following conventions are used to differentiate the interface protocols used by different generations of HP 3000 systems:

Systems	Protocol	Reference
Series III, II and pre-II	Parallel-Differential	Non HP-IB
Series 30, 33, 40, 44, 64	HP-IB	HP-IB

The following conditions apply to all systems being upgraded:

- some peripherals may be transferred as is (e.g., many terminals, 792x slave discs, etc.)
- some peripherals must be converted to the "HP-IB" protocol via an upgrade kit (e.g., 792x master disc, 2608A, 261x line printers, etc.)

- some peripherals are not supported (e.g., 47 Mb ISS discs, paper tape reader, 2762A/B printing terminal, etc.)
- some peripherals and boards (GICs, ADCCs) may require new cables

For a list of supported peripherals, see the Upgrades Field Training Manual.

Peripheral Cable Lengths May be Shorter on HP-IB Systems than Older HP 3000s

The maximum allowed length of the HP-IB cable which connects devices to a GIC is 15 meters. The cable length configured to a GIC can be checked by allowing 7 meters (plus 2 meters for cabling internal to the SPU), plus 1 meter per device. The total *CANNOT EXCEED* 15 meters. This is less than the maximum peripheral cable length on the Series III and Pre-Series III systems. As the number of peripherals increase, the length of the cable per device decreases. In a large upgrade configuration, a customer could be limited as to where the peripherals can be placed around a system. Have your CE do a site layout plan so that the customer is aware of any potential limitations.

APL/3000 is not Supported on Series 40, 44, 64 Systems

Pre-Series II Upgrades—Software Considerations:

On the Series I and HP 3000 CX, programs utilizing FORTRAN double precision and BASIC long data types will require recompilation and some recoding (this will be the case whether the customer is upgrading to a Series III, 40, 44, or 64).

Series 40, 44 and 64 Upgrades—Software Considerations:

There are some user application programs which may need to be recompiled for maximum system performance. This is due to the stack underflow detection algorithm in the Series 40, 44 and 64 which will detect stack underflows not recognized by the Series 30, 33, III, II, or Pre-Series II. Therefore, the new system protects the user from system crashes caused by certain stack underflow conditions. If a stack underflow is detected, the application program will trap to special software routines and, therefore, may execute somewhat slower. All application programs which are trapping to these software routines will be logged to a special MPE file which may be read by the user. If the programs listed in the MPE file are recompiled with MPE IV, they will no longer trap to software and will execute up to speed.

If an application program is written in SPL utilizing ASSEMBLE mode, it is possible to experience a program abort on the upgrade in which case recoding would be necessary before the program could be executed.

Half Duplex Asynchronous Modems are not Supported by the Advanced Terminal Processor.

The Series 64 SPU Requires More Electrical and Air Conditioning Capacity than Previous Systems.

See the Product Information Guide for additional details.

Supported Terminal Types

The Series 40 will support the same terminal types which are available on the Series 30, 33, and 44. These include terminal types: 4, 6, 9, 10, 12, 13, 14, 15, 16, 17, and 19. The Series II and Pre-Series II support several others not supported on the Series 30, 33, 44, and 40. These terminal types are not supported: 0, 1, 2, 3, 5, and 31. The most significant of these are the standard teletype terminals (terminal types 0, 1, 2 which are ASR 33, 37, 35 teletype) which are not supported because they are seldom used.

The Series 64 supports most of the terminal types available on other HP 3000s. These include terminal types: 6, 9, 10, 12, 13, 15, 18, and 19. The Series III supports several others not supported on the Series 30, 33, 40, 44, and 64. These terminal types not supported are: 0, 1, 2, 3, 4, 5, and 11. The most significant of these are the standard teletype terminals (terminal types 0, 1, and 2, which are ASR 33, 37, and 35 teletypes), which are not supported because they are seldom used.

Series 64 Limits

■ Terminal Limit

The Series 64 provides the capability for configuring up to 144 terminal devices, significantly more than other HP 3000 systems. Terminal devices include direct-connect and modem-connect terminals. MTS terminals, and virtual DS devices.

This maximum terminal limit comes from the size limitation of the Logical Device (LDEV) table, an MPE table that has an entry for each configuration device and spool-file.

■ Session Limit

It is possible to run a maximum of 110 active sessions simultaneously even though more than 110 terminals may be configured. A new user will not be able to log on if 110 sessions are already running; virtual DS sessions and MTS sessions are included in this limit.

The reason for the session limit is the Process Control Block (PCB) table, an MPE table used to store information about current processes. It has only enough entries to hold the information necessary for 110 simultaneous sessions.

Upgrade Ordering Instructions

Line No.	Instruction

I. System Processor Units

Line 1   **32445AH Upgrade to the HP 3000 Series 40 SPU:** If upgrading to a Series 40, enter an "X" on *Line 1* to identify the worksheet columns to be used.

Considerations:
1. The upgrade product consists of the standard Series 40 SPU with 512 Kb of memory, *without* the two (2) standard GIC's and comes with 120V/60Hz operation (USA version). Order option 015 to specify 220V/50Hz operation for International installations.
2. Two GIC's with cables must be ordered separately if upgrading from Series III or pre-Series III systems.

Line 2   **32440BH Upgrade to the HP 3000 Series 44 SPU:** If upgrading to a Series 44, enter an "X" on *line 2* to identify the worksheet columns to be used.

Considerations:
1. The upgrade product consists of the standard Series 44 SPU with 1 Mb memory (64 K RAM) and the second I/O card cage, *without* the two (2) standard GIC's and comes with 208V/60Hz 3-Phase operation (USA version). Order option 015 to specify 220V/50Hz operation for International installations.
2. Two GIC's with cables must be ordered separately if upgrading from Series III or pre-Series III systems.

Line 3   **32460AH Upgrade to the HP 3000 Series 64 SPU:** If upgrading to a Series 64, enter an "X" on *line 3* to identify the worksheet columns to be used.

Considerations:
1. The upgrade product consists of the standard Series 64 SPU with 2 Mb memory *without* the two (2) standard GIC's, 208V/60Hz 3-Phase operation (USA version). Order option 015 to specify 380V/50Hz 3-Phase operation for International Installations.
2. Two GIC's with cables must be ordered separately if upgrading from Series III or pre-Series III systems.
3. System console, 2642A, must be ordered with Option 964.

Return Credit Options:

Line 4   **Option 601:** Return Credit for an *HP 3000 pre-Series II SPU* with 128 Kb memory and one 30215A magnetic tape controller: If upgrading from a pre-series II system, enter a "1" in the appropriate space of *line 4*.

Line 5   **Option 602:** Return Credit for an *HP 3000 Series II SPU* with 128 Kb memory and one 30215A magnetic tape controller. If upgrading from a Series II system, enter a "1" in the appropriate space of *line 5*.

Upgrade Ordering Instructions

Line No.	Instruction

Line 6   **Option 603:** Return Credit for an *HP 3000 Series III SPU* with 256 Kb memory and one 30215A magnetic tape controller. If upgrading from a Series III system (including 32421A, 32435A, 32435B and systems which have been upgraded to a Series III), enter a "1" in the appropriate space of space of *line 6*.

Line 7   **Option 613:** Return Credit for an *HP 3000 Series III SPU* with 256 Kb memory *and* an *HP-IB Interface Module*, 30341A. If upgrading from a Series III of this configuration, enter a "1" in the appropriate space of *line 7*.

Consideration:

1. Option 613 will be on the Corporate Price List Dec. 1, 1981.

Line 8   **Option 605*:** Return Credit for *HP 3000 Series 33 A/B SPU* with 256 Kb memory, the 2649E console, and built-in flexible disc drive. If upgrading from a Series 33 SPU (including 32412A/B and 32413A/B), enter a "1" in the appropriate space of *line 8*.

     A = Series 30/33 with *integrated* flexible disc *and* ADCC's

     B = Series 30/33 with ADCC's and an *Optional* flexible disc

Line 9   **Option 606*:** Return Credit for *HP 3000 Series 33 C/U SPU* with 256 Kb memory and the 2649E console. If upgrading from a Series 33 C/U SPU (including 32412C/U or 32413C/U), enter a "1" in the appropriate space of *line 9*.

     C = Series 30/33, an *Optional* flexible disc and *unbundled* ADCC's

     U = A *refurbished*, remarketed Series 30/33

Line 10   **Option 607:*** Return Credit for *HP 3000 Series 30 A/B SPU* with 256 Kb memory, the 2649E console, and built-in flexible disc drive. If upgrading from a Series 30 A/B SPU (including 32430A/B or 32431A/B), enter a "1" in the appropriate space of *line 10*.

Line 11   **Option 608*:** Return Credit for *HP 3000 Series 30 C/U SPU* with 256 Kb memory and 2649E console. If upgrading from a Series 30 SPU (including 32430C/U or 32431C/U) enter a "1" in the appropriate space of *line 11*.

Line 12   **Option 609*:** Return Credit for the *HP 3000 Series 44 SPU* with 1 Mb memory. If upgrading from a Series 44 SPU (including 32440A/B or 32441A), enter a "1" in the appropriate space on *line 12*.

Line 13   **Option 611*:** Return Credit for the *HP 3000 Series 40 SPU* and *NO* memory. If upgrading from a Series 40 SPU (32445A or 32446A), enter "1" on *line 13*. Series 40 memory is compatible with the Series 44 and may be transferred to the Series 44 or may be returned for a separate credit toward the purchase of larger memory modules.

*GIC's and ADCC's can be used on upgrades to the Series 40 and 44. As such, this return credit does not include GIC's or ADCC's. If an ATP is desired on the Series 44 or if the upgrade is to a Series 64, then separate return credits should be specified for the ADCC's.

Upgrade Ordering Instructions

Line No.	Instruction

II. Memory

Line 14   **Series 40 Option 507:** specifies a 1 Mb (64 K RAM) memory board be configured in the system. Enter a "1" in *line 14* if the option is to be specified.

Lines 15–19   **Memory Modules:** Enter the following information in the appropriate spaces
1. The amount of memory presently owned by the customer which is supported on the upgrade system.
2. The number of additional memory modules remaining to be purchased in order to complete the upgrade.

Considerations:
1. Memory beyond that specified in the SPU return credit is to be returned for separate credits as outlined in *lines 20–25*.
2. Series 40 256 Kb and 512 Kb memory modules, while supported on the Series 44 upgrade, may be returned, at the customers' option, for a credit toward the purchase of 30161A 1 Mb memory.

Return Credit Products:

Lines 20–25   Enter, in the appropriate spaces, the memory return credits to be applied to the order. These return credits are for additional memory modules to be returned beyond those already specified in the SPU return credit.

e.g. If a Series III SPU with 1.5 Mb of memory is being upgraded, one 256 Kb memory module is included in the SPU return credit. Five (5) additional 30008BN return credits would then be ordered for the remaining 256 Kb boards.

III. Data Communications

A. Terminals

Line 26   In this section, identify the terminals presently owned by the customer which will be used on the upgrade system. For each terminal type, the difference between the total number of terminals specified in the configuration and the total number currently owned should equal the number of terminals which must be ordered new. Enter the number of each terminal type to be ordered in the appropriate space.

Considerations:
1. Terminals not identified on the worksheet are not supported on the upgrade. No return credits are available for terminal products.
2. The 2641A APL Display Station is supported for use on upgrades only as a standard 2645A Display Station.
3. Refer to Appendices C–E for information regarding the proper cabling to be ordered for each system.

B. Character Printers

Line 27   **2601A Daisy Wheel Printer:** Enter, in the appropriate columns, the number of printers to be transferred to the new system and the number to be ordered new.

Line 28   **2631B Character Printer:** Enter the number of 2631A/B printers currently owned by the customer which will be used on the new system and the number which need to be ordered.

Upgrade Ordering Instructions

Line No.	Instruction

C. Communication Interfaces

Lines 29–30
30018A and 30019A ADCC's: Enter the number of Mains & Extenders which the customer already owns and intends to use on the new system, and also the number of each type which need to be ordered.

    a. Option 040 supplies a Series 40 ADCC cable.
    b. Option 044 supplies a Series 44 ADCC cable.

Line 31
30021C Upgrade of ADCC Cables: ADCC's which the customer already owns and will use on the new system require a cable upgrade. Enter the number of cable upgrades required to allow Main and Extender ADCC's already owned to be used on the new system.

    a. Option 040 provides a new cable for ADCC's being transferred from the Series 30/33 to the Series 40.
    b. Option 044 provides a new cable for ADCC's being transferred from the Series 30/33/40 systems to the Series 44.

Lines 32–33
30020A/B INP's: Specify the number of 30020A/B INP's already owned and planned to be used on the new system, and also the number of INP's which remain to be ordered. Refer to the Product Information Guide for ordering required cables.

Line 34
30079A GIC: Enter the number of 30079A GIC's currently owned which will be used on the new system and *also* the number remaining to be ordered to complete the configuration. For new GIC's, be sure to order the required cable option as described below.

    a. Option 040 supplies a cable for connecting a new GIC to the Series 40.
    b. Option 044 supplies a cable for connecting a new GIC to the Series 44.
    c. Option 064 supplies a cable for connecting a new GIC to the Series 64.

Line 35
30022A GIC: GIC's which are already owned by the customer and will be used on the new system require a cable upgrade. Specify the appropriate number of cable upgrades required.

    a. Option 040 provides a new cable for GIC's being transferred to the Series 40 from Series 30/33 systems.
    b. Option 044 provides a new cable for GIC's being transferred to the Series 44 from Series 30/33/40 systems.
    c. Option 064 provides a new cable for GIC's being transferred to the Series 64 from Series 30/33/40/44 systems.

Consideration:
1. Each cable upgrade option supplies one (1) cable. Order the necessary quantity of cable upgrades for the number of GIC's to be transferred to the new system.

Upgrade Ordering Instructions

Line No.	Instruction

Line 36 **30144A System Interface Board (SIB):** Specify the number of SIB's to be used on the new system.

Consideration:

1. The SIB is supported on the Series 44 as well as the Series 64. Any SIB's used on Series 44's may be transferred directly to the Series 64 upon upgrade.

Line 37 **30145A Direct Connect Port Controller:** Enter the number of Direct Connect Port Controllers which are currently owned and will be used on the new system and also specify the number which need to be ordered.

Consideration:

1. When specifying the first Direct Connect Port Controller, order option 001 for upgrades to the Series 64. The first ATP cable is provided with the system.

Line 38 **30145A Option 002:** specifies for the Direct Connect Port Controllers replacement of 4 RS-422 ports with 4 RS-232-C ports. Enter the number of option 002's required for terminal configuration.

Line 39 **30155A Modem Port Controller:** Enter the number of Modem Port Controllers required. The 30155A is only supported on the Series 64.

Consideration:

1. Modem connections on the Series 40 and Series 44 are supported through the ADCC.

Return Credit Products:

Line 40 **30010A INP Return Credit:** The 30010A INP is not supported on upgrades. Any 30010A INP's in the customers' system may be returned for a credit toward the purchase of new 30020A/B INP's. Specify the number of credits to be applied to the order.

Lines 41–42 **30018A and 30019A ADCC Return Credit:** When upgrading to the Series 64, ADCC Main & Extender boards are not supported and must be returned for a credit toward the purchase of ATP boards. Enter the number of return credits for each type of ADCC board in the appropriate space. This return credit also applies when Series 44 ADCC's are converted to the DSN/ATP.

Line 43 **30020A INP:** The 30020A INP is not supported on upgrades to the Series 64 and must be returned for a credit toward the purchase of 30020B INP's. Enter the number of return credits to be ordered.

Line 44 **30032B ATC's:** On upgrades from Series III and pre-Series III systems, ATC's can be returned for credits. Enter the number of credits to be applied.

Line 45 **30032B Option 001 (Bell 103 Modem Support) ATC:** Option 001 ATC's are eligible for an additional return credit over ATC's without modem support. Specify the number of credits to be applied.

Line 46 **30032B Option 002 (Bell 202 Modem Support) ATC:** Option 002 modems are eligible for an additional return credit over ATC's without modem support or with Bell 103 modem support. Specify the number of credits to be applied.

Line 47 **30055A SSLC:** This board is not supported on upgrades but is eligible for a return credit. Specify the number of credits to be applied.

Line 48 **30360A HSI:** This board is not supported on upgrades but is eligible for a return credit. Specify the number of credits to be applied. This credit will be available on the Dec. 1, 1981 Corporate Price list.

Upgrade Ordering Instructions

Line No.	Instruction

IV. Disc Storage

A. Integrated Storage Units:

Line 49   **7911P (27 Mb) Integrated Storage Units:** Enter the number of 27 Mb drives the customer has for use on the upgrade and also the number the customer wants to purchase. One of the following options must be specified for each drive being purchased.

    a. Option 001 specifies a 7911P *with* Cartridge Tape Drive. Enter a "1" in *line 49a* if the customer wants to add cartridge tape.

    b. Option 140 specifies a 7911P *without* the Cartridge Tape Drive. Enter the quantity desired in the appropriate space.

Line 50   **7912P (64 Mb) Integrated Storage Units:** Enter the number of 64 Mb drives the customer has for use on the upgrade and also the number which the customer wants to purchase. One of the following options must be specified for each drive being purchased.

    a. Option 001 specifies a 7912P *with* Cartridge Tape drive. Enter a "1" in line *49b* if the customer wants to add cartridge tape.

    b. Option 140 specifies a 7912P *without* the Cartridge Tape Drive. Enter the quantity desired in the appropriate space.

B. Mass Storage Products:

Line 51   **7906M 20 Mb Master Cartridge Disc:** Enter the number of units currently owned and planned for use on the new system. Also, enter the number of additional 7906M drives to be ordered.

Considerations:

1. Due to the limited 20 Mb capacity of the 7906, it is not suggested for use on new systems as the system disc drive.

2. The 7906 is not able to function in surface mode and, as such, restricts its use to cylinder mode only.

3. No return credit is available for 7906M disc drives.

Line 52   **7906S 20 Mb Slave Cartridge Disc:** Enter the number of units currently owned and planned for use on the new system.

Considerations:

1. The 7906S can no longer be purchased even though it is supported on upgrades.

2. No return credit is available for 7906S disc drives.

Upgrade Ordering Instructions

Line No.	Instruction

Line 53   **7920A 50 Mb Disc Drive with Interface mounted in the SPU:** Enter the number of 7920A drives currently owned and planned for use on the new system. These units require an upgrade of the controller (See *line 54*).

Line 54   **13037C Option 102 Upgrade for 7920A Disc Controller:** Specifies an HP-IB controller and cable upgrade to allow the 7920A to be used on the new system. Enter the number of upgrades required.

Line 55   **7920A 50 Mb Slave Disc Drives:** Enter the number of 7920A drives currently owned and planned for use on the new system.

Considerations:

1. The 7920A is no longer available for purchase.
2. 7920A disc drives are eligible for return credits. (See *line 71* to specify 7920A return credits.)

Line 56   **7920M 50 Mb Master Disc Drive (NON HP-IB):** Enter the number of 7920M Drives (NON HP-IB) which are currently owned by the customer and are planned for use on the new system.

Consideration:

1. 7920M drives that have NON HP-IB controllers require an upgrade. See *line 58* to order upgrades to an HP-IB controller.

Line 57   **7920M Option 102 50 Mb Master Disc Drives (HP-IB):** Enter the following information in the appropriate spaces—

1. The number of 7920M drives having HP-IB controllers which are already owned by the customer and are planned for use on the new system.
2. The number of 7920M drives which must be ordered to complete the configuration.

Line 58   **12745A Upgrade of NON HP-IB Controller to HP-IB:** Order one upgrade for each 7920M NON HP-IB drive the customer has and plans to use on the new system.

Line 59   **7920S 50 Mb Slave Disc Drive:** Specify the following information in the appropriate spaces—

1. The number of 7920S drives currently owned by the customer which are planned for use on the new system.
2. The number of additional 7920S drives which must be purchased to complete the configuration.

Line 60   **7925A 120 Mb Master Disc Drive (NON HP-IB):** Enter the number of 7925A drives (NON HP-IB) which are currently owned by the customer and are planned for use on the new system.

Considerations:

1. 7925A drives that have NON HP-IB controllers require an upgrade. See *line 61* to order upgrades to an HP-IB controller.
2. 7925A drives, while supported on upgrades, are no longer available for purchase.

Upgrade Ordering Instructions

Line No.	Instruction

Line 61   **13037C Option 102 Upgrade for 7925A Disc Controller:** Specifies an HP-IB controller and cable upgrade to allow the 7925A to be used on new systems. Enter the number of upgrades required.

Line 62   **7925A 120 Mb Slave Disc Drive:** Specify the number of 7925A slave drives currently owned and planned for use on the new system.

Line 63   **7925M 120 Mb Master Disc Drive (NON HP-IB):** Enter the number of 7925M drives (NON HP-IB) which are currently owned and are planned to be used on the new system.

Consideration:

1. 7925M drives which have NON HP-IB controllers require an upgrade. See *line 65* to order upgrades to an HP-IB controller.

Line 64   **7925M Option 102 120 Mb Master Disc Drive (HP-IB):** Enter the following information in the appropriate spaces—

1. The number of 7925M drives (HP-IB) currently owned and planned for use on the new system.
2. The number of new 7925M drives the customer wants to purchase.

Line 65   **12745A Upgrade of NON HP-IB Controller to HP-IB:** Order one upgrade for each 7925M NON HP-IB drive the customer currently has and plans to use on the new system.

Line 66   **7925S 120 Mb Slave Disc Drive:** Specify the following information in the appropriate space—

1. The number of 7925S drives currently owned and planned for use on the new system.
2. The number of new 7925S drives the customer wants to purchase.

Line 67   **7925T 240 Mb Add-on Disc Storage System:** The 7925T product is made up of two 7925S disc drives. For upgrading and ordering purposes, follow the instructions for *line 66* and enter the information in the appropriate space on this line.

Line 68   **7935H 404 Mb Disc Drive:** Enter the following information in the appropriate spaces—

1. The number of drives currently owned by the customer and planned for use on the new system.
2. The number of new 7935H drives the customer wants to purchase.

Line 69   **9895A Flexible Disc Drive:** Enter the following information in the appropriate spaces—

1. The number of 9895A drives currently owned and planned for use on the new system.
2. Enter a "1" in *line 69* if the customer wants to purchase a 9895A and none are being upgraded.

Return Credit Products:

Line 70   **7920M Disc Drive Return Credit:** Enter the number of credits for returned 7920M drives to be applied toward the purchase of 7935H drives.

Line 71   **7920S Disc Drive Return Credit:** Enter the number of credits for returned 7920S drives to be applied toward the purchase of 7935H disc drives. This return credit also applies to 7920A disc drives.

Line 72   **7925M Disc Drive Return Credit:** Enter the number of credits for returned 7925M drives to be applied toward the purchase of 7935H disc drives.

Line 73   **7925S Disc Drive Return Credit:** Enter the number of credits for returned 7925S drives to be applied toward the purchase of 7935H disc drives. This return credit is also available for 7925A and 7925T disc drives. Remember that a 7925T equals two 7925S drives for return credit purposes.

Upgrade Ordering Instructions

Line No.	Instruction

V. Magnetic Tape Drives

Line 74 **7970E Lo-Boy Master Tape Drive (NON HP-IB):** Enter the number of tape drives which are currently owned by the customer and are planned for use on the new system.

Consideration:
1. The 7970E NON HP-IB tape drive requires a controller upgrade to HP-IB. See *line 77* for ordering the upgrade.

Line 75 **7970E Option 426 Lo-Boy Master Tape Drive (HP-IB):** Enter the following information in the appropriate spaces—
1. The number of 7970E master tape drives currently owned by the customer which are planned to be used on the new system.
2. The number of new 7970E master drives the customer wants to purchase.

Line 76 **7970E Option 421 Slave Tape Drive:** Enter the following information in the appropriate spaces—
1. The number of 7970E slave tape drives which the customer currently owns and plans to use on the new system.
2. The number of 7970E slave tape drives which must be purchased to complete the configuration.

Line 77 **26072A Upgrade of 7970E NON HP-IB Controller to HP-IB:** Order one upgrade for each 7970E NON HP-IB Master drive which the customer currently has and will be used on the new system.

Line 78 **26072A Option H01 Upgrade of 7970E HP-IB Master Tape Drives having Serial Numbers LESS THAN 2034A-XXXX:** Order one upgrade for each tape drive with such a serial number. Enter the number to be ordered in the appropriate space.

Line 79 **7976A 1600/6250 bpi Tape Drive:** Enter the following information in the appropriate spaces—
1. The number of 7976 tape drives the customer currently owns and plans to use on the new system.
2. The number of 7976 tape drives which must be ordered to complete the configuration.

Return Credit Products:

Line 80 **7970B 800 bpi Tape Drive Return Credit:** The 7970B tape drive is not supported on new systems but may be returned for a credit toward the purchase of a new tape drive. Enter the number of credits to be applied.

Line 81 **7970E Hi-Bay Master & Slave Tape Drives Return Credit:** The 7970E *Hi-Bay* tape drive is not supported on new systems but may be returned for a credit toward the purchase of new tape drives. Enter the number of credits to be applied.

Line 82 **7970E Lo-Boy Master & Slave Tape Drives Return Credit:** These drives are supported on the upgrades but may, at the customers option, be returned for a credit toward the purchase of a 7976 tape drive. Enter the number of return credits to be applied toward the purchase of new 7976 tape drives.

Line 83 **30215A Series III Tape Controller Return Credit:** Enter the number of add-on tape controllers (beyond the one allowed for in the SPU return credit) to be returned for a credit.

Upgrade Ordering Instructions

Line No.	Instruction

VI. Line Printers

A. Dot Matrix Line Printers:

Line 84   **2608A Line Printer:** Enter the following information in the appropriate spaces—

1. The number of printers currently owned by the customer and planned for use on the new system.
2. The number of new printers the customer wants to purchase.

   a. Option 340 specifies the HP-IB interface and cable for new 2608A printers. Order the required number for configuring to the Series 40.

   b. Option 344 specifies the HP-IB interface and cable for new 2608A printers. Order the required number for configuring to the Series 44.

   c. Option 364 specifies the HP-IB interface and cable for new 2608A printers. Order the required number for configuring to the Series 64.

Considerations:

1. 2608A line printer with NON HP-IB interfaces must be upgraded to HP-IB interface. See *line 85* to order the interface upgrade.
2. On upgrades from Series 30, 33 and 44 systems where 2608A line printers were connected to the same GIC as the system disc, an additional GIC may now be required since the 2608A can no longer be connected to the system disc. Review the GIC guidelines of the appropriate upgrade system which are detailed in SECTION ONE.

Line 85   **26002A Option 046 Printer Interface Upgrade to HP-IB:** 2608A printers being transferred from NON HP-IB systems require an upgrade of the interface in order to be used on new systems. Order one upgrade for each NON HP-IB printer to be upgraded to the new system.

B. Drum Line Printers:

Line 86   **2613A Line Printer:** Enter the number of 2613A line printers which are currently owned by the customer and are planned to be used on the new system. Be sure to order the proper interface and cable option for the system being configured.

Considerations:

1. While upgrades of the 2613A are supported on the new system, it can no longer be purchased.
2. Line printers with NON HP-IB interfaces must be upgraded to HP-IB for use on new systems. See *line 89* to order the HP-IB upgrade.
3. Currently owned HP-IB line printers which will be used on the upgrade may require new cabling for use on the new system. Contact *Boise Division* for cabling information.

Upgrade Ordering Instructions

Line No.	Instruction

Lines 87–88   **2617A and 2619A Line Printers:** Enter the following information in the appropriate spaces—
1. The number of each line printer which the customer already owns and plans to use on the new system.
2. The number of new line printers the customer wants to purchase to complete the configuration.

Considerations:
1. Line printers with NON HP-IB interfaces must be upgraded to HP-IB for use on new systems. See *line 89* to order the interface upgrade and cable.
2. Currently owned HP-IB line printers which will be used on the upgrade may require new cabling for use on the new system. Contact *Boise Division* for cabling information.
3. When ordering new line printers, specify the appropriate cable option.

Line 89   **26069A Upgrade of NON HP-IB 2613/17/19 Line Printers:** Specify the number of 26069A interface upgrades required to allow customer owned NON HP-IB printers to be used on the new system. Be sure to order the proper cable option for the system being configured.

Return Credit Products:

Line 90   **30209A Series III Line Printer Interface Return Credit:** The 30209A interface for 2613/17/19 printers which are replaced with 26069A interfaces are eligible for return credit. Enter the number of return credits to be applied to the order.

VII. Laser Printing System

Line 91   **2680A Intelligent Page Printer:** Enter the following information in the appropriate spaces—
1. The number of 2680 printers the customer currently owns and plans to use on the new system.
2. The number of new 2680 printers the customer wants to purchase.

   a. Option 340 specifies a Series 40 HP-IB cable

   b. Option 344 specifies a Series 44 HP-IB cable

   c. Option 364 specifies a Series 64 HP-IB cable

VIII. Card Reader

Line 92   **30106A NON HP-IB Card Reader:** Enter the number of NON HP-IB card readers which are currently owned by the customer which are planned for use on the new system. These units will require an upgrade to an HP-IB interface. See *line 94* to order the interface upgrade.

Line 93   **30106A Option 333 HP-IB Card Reader:** Enter the number of new HP-IB card readers the customer wants to purchase.

Line 94   **30309A Upgrade for NON HP-IB Card Readers:** Enter the number of 30309A upgrades required for those NON HP-IB card readers which the customer already owns and plans to use on the new system.

IX. I/O Expansion

Line 95   **30143A Series 64 I/O Adapter Module:** If it has been determined that a second I/O Adapter is required, enter a "1" in line 95.

Upgrade Ordering Worksheet

Product Number	Description		Series 40		Series 44		Series 64	
			Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	Complete the configuration in SECTION ONE before using this worksheet.							
	I. System Processor Units:							
32445AH	Upgrade to Series 40 SPU	1.		___				
32440BH	Upgrade to Series 44 SPU	2.				___		
32460AH	Upgrade to Series 64 SPU	3.						___
	Return Credit Options:							
-601	pre-Series II SPU, 128 Kb	4.	___		___		___	
-602	Series II SPU, 128 Kb	5.	___		___		___	
-603	Series III SPU, 256 Kb	6.			___		___	
-613	Series III SPU, 256 Kb Memory & HP-IB Interface Module	7.			___		___	
-605	Series 33 A/B SPU, 256 Kb, 2649E	8.	___		___		___	
-606	Series 33 C/U SPU, 256 Kb, 2649E	9.	___		___		___	
-607	Series 30 A/B SPU, 256 Kb, 2649E	10.	___		___		___	
-608	Series 30 C/U SPU, 256 Kb, 2649E	11.	___		___		___	
-609	Series 44 SPU, 1 Mb	12.			___		___	
-611	Series 40 SPU, No memory	13.			___		___	
	II. Memory:							
	Series 40 Option 507: 1 Mb Memory Brd.	14.	___					
30092A	Series 40/44 512 Kb Memory	15.	___		___			
30094A	Series 44 Memory Controller	16.			___			
30142A	Series 64 1 Mb Memory	17.					___	
30161A	Series 40/44 1 Mb Memory	18.	___		___			
30171A	Series 40/44 256 Kb Memory	19.	___		___			
	Return Credit Products:							
30008AN	Series II 64 Kb Memory	20.	___		___		___	
30008BN	Series III 256 Kb Memory	21.			___		___	
30078AN	Series 30/33 128 Kb Memory	22.	___		___		___	
30092AN	Series 40/44 512 Kb Memory	23.	(___)*		(___)		___	
30161AN	Series 40/44 1 Mb Memory	24.					___	
30171AN	Series 40/44 256 Kb Memory	25.	(___)		(___)		___	

*Return Credit products enclosed by parentheses ( ) indicate that the customer has the option of returning the products for a credit towards the purchase of other products or keeping it for use in the upgraded system.

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered

III. Data Communications

A. Terminals

Total Terminals . . . . 26. ___ ___ ___ ___ ___ ___

Interactive Displays:

Product Number	Description						
2382A	Office Display Terminal	___	___	___	___	___	___
2621A	Character Mode Terminal.	___	___	___	___	___	___
2621B	Character Mode Terminal.	___	___	___	___	___	___
2621P	Character Mode Term. w/Printer	___	___	___	___	___	___
2622A	Block Mode Terminal	___	___	___	___	___	___
2623A	Graphics Terminal	___	___	___	___	___	___
2624B	Data Entry Terminal	___	___	___	___	___	___
2626A	Display Station	___	___	___	___	___	___
2626W	Word Processing Station	___	___	___	___	___	___
2640B	Display Station	___		___		___	
2641A	APL Display Station . . . . (APL mode no longer supported)	___		___		___	
2642A	Display Station, Flex. Mini Disc	___	___	___	___	___	___
2645A	Display Station	___	___	___	___	___	___
2647A	Intelligent Graphics Terminal.	___	___	___	___	___	___
2648A	Graphics Terminal	___	___	___	___	___	___

Plotters:

Product Number	Description						
7220C	Graphics Plotter	___	___	___	___	___	___
7220T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___
7221C	Graphics Plotter	___	___	___	___	___	___
7221T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___
7225B	Graphics Plotter	___	___	___	___	___	___
7240A	RS-232-C Plotter/Printer	___	___	___	___	___	___
7245B	Plotter/Printer.	___	___	___	___	___	___
7580A	Drafting Plotter	___	___	___	___	___	___
9872C	Graphics Plotter	___	___	___	___	___	___
9872T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___

Data Collection Terminals:

Product Number	Description						
3075A	Desk Top Data Capture Terminal	___	___	___	___	___	___
3076A	Wall Mount. Data Capture Term.	___	___	___	___	___	___
3077A	Time Reporting Terminal	___	___	___	___	___	___
7260A	Optical Mark Reader	___	___	___	___	___	___

Printing Terminals:

Product Number	Description						
2635B	180 cps Printing Terminal	___	___	___	___	___	___
2675A	Printing Term. w/Cartridge Tape.	___		___		___	

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
B. Character Printers							
2601A	40 cps Daisy-Wheel Printer . . . . 27.	___	___	___	___	___	___
2631B	180 cps Character Printer. . . . . 28.	___	___	___	___	___	___
C. Communication Interfaces							
30018A	ADCC-Main w/o cable. . . . . 29.	___	___	___	___	___	___
-040	Series 40 Cable. a.		___				
-044	Series 44 Cable. b.				___		
30019A	ADCC-Extend w/o cable . . . . 30.	___	___	___	___		
-040	Series 40 Cable. a.		___				
-044	Series 44 Cable. b.				___		
30021C	Upgrade of ADCC Cables . . . . 31.	___		___			
-040	Series 30/33 Cable Upgrade . . . . a.	___					
-044	Series 30/33/40 Cable Upgrade. . . . . b.			___			
30020A	INP . . . . 32.	___	___	___	___		
30020B	INP . . . . 33.	___	___	___	___	___	___
30079A	GIC . . . . 34.	___	___	___	___	___	___
-040	Series 40 Cable. a.		___				
-044	Series 44 Cable. b.				___		
-064	Series 64 Cable. c.						___
30022A	Upgrade of GIC Cables . . . . 35.	___		___		___	
-040	Series 30/33 Cable Upgrade . . . . a.	___					
-044	Series 30/33/40 Cables Upgrade . . . . b.			___			
-064	Series 30/33/40 Cables Upgrade . . . . c.					___	
30144A	ATP—System Interface Board. . . . . 36.			___		___	
30145A	ATP—Direct Conn 12-Port Contr. . . . . 37.			___		___	
-002	Replace 4 RS-422 Ports w/RS-232. . . . . 38.			___		___	___
30155A	ATP—Modem Conn 12-Port Contr. . . . . . . 39.			___			___
Return Credit Products:							
30010AN	INP—Series II/III . . . . 40.	___		___		___	
30018AN	ADCC-Main . . . . 41.	___		___		___	
30019AN	ADCC-Extend . . . . 42.	___		___		___	
30020AN	INP . . . . 43.	___		___		___	
30032BN	ATC—Series II/III . . . . 44.	___		___		___	
-001	Bell 103 Modem Support . . . . 45.	___		___		___	
-002	Bell 202 Modem Support . . . . 46.	___		___		___	
30055AN	SSLC—Series II/III. . . . . 47.	___		___		___	
30360AN	HSI—Series II/III . . . . 48.	___		___		___	

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
IV. Disc Storage							
A. Integrated Storage Units:							
7911P	27 Mb Integrated Storage Unit. . . . . 49.	___	___	___	___	___	___
-001	With Cartridge Tape Drive . . . . a.	___	___	___	___	___	___
-140	Delete Cartridge Tape Drive . . . . b.	___	___	___		___	
7912P	64 Mb Integrated Storage Unit. . . . . 50.	___	___	___	___	___	___
-001	With Cartridge Tape Drive . . . . a.	___	___	___	___	___	___
-140	Delete Cartridge Tape Drive . . . . b.	___	___			___	
B. Mass Storage Products:							
7906M	20 Mb Cartridge Disc. . . . . 51. (Used in Cylinder mode only)	___	___	___	___	___	___
7906S	20 Mb Slave Cartridge Disc . . . . 52. (Used in Cylinder mode only)	___		___		___	
7920A	50 Mb Disc Drive w/Ctlr in SPU. . . . . 53.	___	___	___	___	___	___
13037C	Upgrade Disc Controller in SPU		___		___		___
-102	HP-IB Controller and Cable. . . . . 54.		___		___		___
7920A	50 Mb Slave Disc Drive . . . . 55.	___		___		___	
7920M	50 Mb Master Disc w/Ctlr in SPU. . . . . 56.	___	___	___	___	___	___
-102	With HP-IB controller and cable . . . . 57.	___	___	___	___	___	___
12745A	Upgrade Controller to HP-IB. . . . . 58.		___		___		___
7920S	50 Mb Slave Disc Drive . . . . 59.	___	___	___	___	___	___
7925A	120 Mb Disc Drive w/Ctlr in SPU . . . . 60.	___	___	___	___	___	___
13037C	Upgrade Disc Controller in SPU		___		___		___
-102	HP-IB Interface and Cable. . . . . 61.		___		___		___
7925A	120 Mb Slave Disc Drive. . . . . 62.	___	___	___	___	___	___
7925M	120 Mb Master Disc w/Ctlr in SPU . . . . 63.	___	___	___	___	___	___
-102	With HP-IB Controller and cable. . . . . 64.	___	___	___	___	___	___
12745A	Upgrade Controller to HP-IB. . . . . 65.		___		___		___
7925S	120 Mb Slave Disc Drive. . . . . 66.	___	___	___	___	___	___
7925T	240 Mb Slave Drive (2-7925S). . . . . 67.	___	___	___	___	___	___
7935H	404 Mb Disc Drive . . . . 68.	___	___	___	___	___	___
9895A	Flexible Disc Drive. 69.	___	___	___	___	___	___
Return Credit Products:							
7920MN	Return Credit—Master Drives . . . . 70.		(___)		(___)		(___)
7920SN	Return Credit—Slave Drives. . . . . 71. (Also applies to 7920A drives)		(___)		(___)		(___)
7925MN	Return Credit—Master Drives . . . . 72.		(___)		(___)		(___)
7925SN	Return Credit—Slave Drives. . . . . 73. (Also applies to 7925A/T drives)		(___)		(___)		(___)

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	V. Magnetic Tape Drives						
7970E	Lo-Boy 1600 bpi Tape Drive . . . . 74.	___	___	___	___	___	___
-426	HP-IB Master Mag Tape. . . . . 75.	___	___	___	___	___	___
-421	HP-IB Slave Mag Tape . . . . 76.	___	___	___	___	___	___
26072A	Upgrade of Series III/pre-Series III Lo-Boy Master Tape Drives to HP-IB Interface . . . . 77.		___		___		___
-H01	Upgrade of HP-IB Master Drives w/Serial Number < 2034A-XXXX . . . . 78.		___		___		___
7976A	1600/6250 bpi Tape Drive . . . . 79.	___	___	___	___	___	___
	Return Credit Products:						
7970BN	800 bpi Mag Tape Drive . . . . 80.		___		___		___
7970EN	1600 bpi Mag Tape Drives Hi-Bay Master & Slave Drives . . . . 81.		___		___		___
	Lo-Boy Master & Slave Drives . . . . 82.		(___)		(___)		(___)
30215AN	Add-on Mag Tape Controller for Series III . 83.		___		___		___
	VI. Printers						
	A. Dot Matrix Line Printers:						
2608A	400 lpm Printer . . . . 84.	___	___	___	___	___	___
-340	HP-IB infc & cable for Series 40 . . . . a.		___				
-344	HP-IB infc & cable for Series 44 . . . . b.				___		
-364	HP-IB infc & cable for Series 64 . . . . c.						___
26002A	2608A Line Printer Interface						
-046	Upgrade to HP-IB Interface . . . . 85.		___		___		___
	B. System Line Printers:						
2613A	300 lpm Line Printer . . . . 86.	___		___		___	
2617A	600 lpm Line Printer . . . . 87.	___		___		___	
-340	HP-IB infc & cable for Series 40 . . . . a.		___				
-344	HP-IB infc & cable for Series 44 . . . . b.				___		
-364	HP-IB infc & cable for Series 64 . . . . c.						___
2619A	1000 lpm Line Printer. . . . . 88.	___		___		___	
-340	HP-IB infc & cable for Series 40 . . . . a.		___				
-344	HP-IB infc & cable for Series 44 . . . . b.				___		
-364	HP-IB infc & cable for Series 64 . . . . c.						___
26069A	2613/17/19A Infc HP-IB Upgrade . . . . 89.		___		___		___
-340	Cables for Series 40 . . . . a.		___				
-344	Cables for Series 44 . . . . b.				___		
-364	Cables for Series 64 . . . . c.						___
	Return Credit Products:						
30209AN	Series III Line Printer Infc. . . . . 90.		___		___		___

Upgrade Ordering Worksheet

Product Number	Description		Series 40		Series 44		Series 64	
			Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	VII. Laser Printing System							
2680A	Intelligent Page Printer	91.	___	___	___	___	___	___
	VIII. Card Reader							
30106A	80 Column NON HP-IB Card Reader	92.	___		___		___	
-333	HP-IB Card Reader	93.		___		___		___
30309A	Upgrade for NON HP-IB Card Reader	94.		___		___		___
	IX. I/O Expansion							
30143A	Series 64 I/O Adapter Module	95.						___

Appendix A.
Configuration Examples

Series 40 Configuration Example

Configuration Required:

Series 40 with 1.5 Mb memory

System console

  1—Communication line

  1—7935H 404 Mb disc drive

1—7970E tape drive

1—2619A 1000 lpm line printer

1—2680A Intelligent Page Printer

19—Display Terminals

Ordering Information:

Qty.	Product No. and Options	Description
1	32445A	Series 40 System Processor Unit, 512 Kb memory, 2 General I/O Channels, FOS
1	30161A	1 Mb Series 40 Memory Module
3	30018A	Asynchronous Data Communications Controller (ADCC)—Main
3	-040	Series 40 cable
2	30019A	Asynchronous Data Communications Controller (ADCC)—Extender
2	-040	Series 40 cable
1	30020B	Intelligent Network Processor
1	30021A	Synchronous Modem Cable
1	7935H	404 Mb disc drive
1	7970E	1600 bpi magnetic tape
1	-426	Specifies HP-IB master
1	2619A	1000 lpm line printer
1	-340	Series 40 interface and cable
1	2680A	Intelligent Page Printer
1	-340	Series 40 interface and cable
1	2621A	Display Terminal for system console
19	2622A	Display Terminal
20	13222N	Terminal cable

Series 44 Configuration Example

Configuration Required:

Series 44 with 4 Mb memory
System console
 2—Communication lines
 6—7935H 404 Mb disc drives
 1—7970E tape drive

1—7976A tape drive
1—2680A Intelligent Page Printer
7—2622A Modem Connect Terminals
48—2622A Direct Connect Terminals via ATP (RS-232)

Ordering Information:

Qty.	Product No. and Options	Description
1	32440B	Series 44 System Processor Unit, 1 Mb memory, 2 General I/O Channels, I/O Expansion card cage, and FOS
3	30161A	1 Mb Series 44 memory module
1	30079A	General I/O Channel
1	-044	Series 44 cable
2	30020B	Intelligent Network Processor
2	30221A	Synchronous Modem Cable
6	7935H	404 Mb disc drive
1	7970E	1600 bpi magnetic tape
1	-426	Specifies HP-IB master
1	7976A	1600/6250 bpi magnetic tape
1	-516	Series 44 interface and cable
1	2680A	Intelligent Page Printer
1	-344	Series 44 interface and cable
1	30144A	System Interface Board
4	30145A	Direct Connect Port Controller
12	-002	Replace 4 RS-422 ports with 4 RS-232 ports
1	30018A	Asynchronous Data Communications Controller (ADCC)—Main
1	-044	Series 44 cable
1	30019A	Asynchronous Data Communications Controller (ADCC)—Extender
1	-044	Series 44 cable
1	2621A	Display Terminal for system console
55	2622A	Display Terminal
8	13222N	Terminal cable (ADCC—modem connect/console)
48	13222X	Direct Connect Type 232 Cable (ATP)

Series 64 Configuration Example

Configuration Required:

Series 64 with 4 Mb memory

System console

2—Communication lines

10—7935H 404 Mb disc drives

2—7976A 1600/6250 bpi tape drives

1—7970E 1600 bpi tape drive

2—2619A 1000 lpm printers

1—2680A Intelligent Page Printer

75—2622A Display Terminals (Direct Connect RS-232)

20—2624A Display Terminals (Modem Connect)

Ordering Information:

Qty.	Product No. and Options	Description
1	32460A	Series 64 System Processor Unit, 2 Mb memory, 1 I/O Adapter, 2 General I/O Channels, FOS
2	30142A	1 Mb Series 64 Memory Module
1	30143A	Series 64 I/O Adapter Module
2	30079A	General I/O Channel
2	-064	Series 64 cable
2	30020B	Intelligent Network Processor
2	30221A	Synchronous Modem Cable
10	7935H	404 Mb disc drive
1	7970E	1600 bpi magnetic tape
1	-426	Specifies HP-IB master
2	7976A	1600/6250 bpi magnetic tape
2	-616	Tape drive subsystem for Series 64
2	2619A	1000 lpm line printer
2	-364	Series 64 interface and cable
1	2680A	Intelligent Page Printer
1	-364	Series 64 interface and cable
2	30144A	System Interface Board
7	30145A	Direct Connect Port Controller
1	-001	First Port Controller on Series 64
21	-002	Replaces 4 RS-422 ports with 4 RS-232 ports (Replaces all RS-422 ports)
2	30155A	Modem Port Controller
1	2642A	Display Terminal
1	-964	Specifies system console
75	2622A	Display Terminal
55	13222X	Direct Connect Type 232 cable
20	13222N	Terminal Modem cable

Appendix B.
Upgrade Examples

Upgrade Examples

This appendix provides two examples of upgrades. One copy of the worksheet is provided and is filled out for each example. Note that one upgrade is to the Series 44 and the other is to the Series 64. The columns are labeled as EXAMPLE 1 and EXAMPLE 2, respectively. The basic configurations used are specified below.

Example 1—Series 33 to Series 44 Ordering Example

The following example illustrates an order for upgrading a 1 Mb Series 33 to a 2 Mb Series 44.

CPU Upgrade

1	32440BH	Upgrade to Series 44 (1 Mb)
1	-605	Return credit option for 256 Kb Series 33 A/B with 2649E console
6	30078AN	Return credit for additional 768 Kb memory
1	30161A	1 Mb memory module for Series 44

I/O Boards

2	30079A	General I/O Channels retained from Series 33
2	30022A	General I/O Channel Upgrade Cable for each GIC
2	-044	Series 44 cables
4	30021C	ADCC Upgrade cable for each ADCC beyond 1st
4	-044	Series 44 cable set

Peripheral Upgrade Kits   (N.A.)

1	7925MN	Return Credit for a 7925M
1	7925SN	Return Credit for a 7925S

(Note: Another terminal is required for the system console since the 2649E must be returned.)

Purchase 7935H and/or **7976A** with return credit
(optional)

Purchase New Data Comm/Terminal Boards   (optional)

Purchase New HP 3000 Software   (optional)

Example 2—Series III to Series 64 Ordering Example

The following example illustrates an order for upgrading a 1.5 Mb Series III to a 2 Mb Series 64.

SPU Upgrade

1	32460AH	Upgrade to Series 64
1	-603	Return credit for 256 Kb Series III
5	30008BN	Return credit 256 Kb memory
1	2642A	Display station w/flexible mini disc
1	-964	Specifies Series 64 console

I/O Boards

2	30079A	General I/O Channels
2	-064	Series 64 internal cable
1	26069A	2613/17/19A line printer interface
1	-364	Cable set for Series 64
1	30209AN	Return credit for LP controller

Peripheral Upgrade Kits

1	12745A	Master disc drives (7925M) I/F upgrade
1	26072A	Master low boy mag tape drive upgrade

Purchase 7935H and/or 7976A with return credits
(optional)

Purchase New Data Comm/Terminal Boards

1	30144A	DSN/ATP System Interface Board (SIB)
1	30155A	DSN/ATP Modem Port Controller
1	-001	First port controller on Series 64
2	30145A	DSN/ATP Direct Connect Port Controller
2	30032BN	Return credit for ATC
2	-001	Return credit for Bell 103 modem board
1	30020B	Intelligent Network Processor
1	30221A	Synchronous Modem Cable for INP (order separately)
1	30055AN	Return credit for SSLC

Purchase New HP 3000 Software   (optional)

Upgrade Ordering Worksheet

Product Number	Description		Series 40		Series 44		Series 64	
			Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	Complete the configuration in SECTION ONE before using this worksheet.							
	I. System Processor Units:							
32445AH	Upgrade to Series 40 SPU	1.		___				
32440BH	Upgrade to Series 44 SPU	2.				___		
32460AH	Upgrade to Series 64 SPU	3.						___
	Return Credit Options:							
-601	pre-Series II SPU, 128 Kb.	4.	___		___		___	
-602	Series II SPU, 128 Kb	5.	___		___		___	
-603	Series III SPU, 256 Kb	6.			___		___	
-613	Series III SPU, 256 Kb Memory & HP-IB Interface Module	7.			___		___	
-605	Series 33 A/B SPU, 256 Kb, 2649E	8.	___		___		___	
-606	Series 33 C/U SPU, 256 Kb, 2649E	9.	___		___		___	
-607	Series 30 A/B SPU, 256 Kb, 2649E	10.	___		___		___	
-608	Series 30 C/U SPU, 256 Kb, 2649E	11.	___		___		___	
-609	Series 44 SPU, 1 Mb.	12.			___		___	
-611	Series 40 SPU, No memory	13.			___		___	
	II. Memory:							
	Series 40 Option 507: 1 Mb Memory Brd. . . .	14.	___					
30092A	Series 40/44 512 Kb Memory	15.	___		___	___		
30094A	Series 44 Memory Controller.	16.			___			
30142A	Series 64 1 Mb Memory	17.					___	
30161A	Series 40/44 1 Mb Memory.	18.	___		___	___		
30171A	Series 40/44 256 Kb Memory	19.	___		___	___		
	Return Credit Products:							
30008AN	Series II 64 Kb Memory	20.	___		___		___	
30008BN	Series III 256 Kb Memory.	21.			___		___	
30078AN	Series 30/33 128 Kb Memory	22.	___		___		___	
30092AN	Series 40/44 512 Kb Memory	23.	(___)*		(___)		___	
30161AN	Series 40/44 1 Mb Memory.	24.					___	
30171AN	Series 40/44 256 Kb Memory	25.	(___)		(___)		___	

*Return Credit products enclosed by parentheses ( ) indicate that the customer has the option of returning the products for a credit towards the purchase of other products or keeping it for use in the upgraded system.

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	III. Data Communications						
	A. Terminals						
	Total Terminals. . . . . 26.	___	___	___	___	___	___
	Interactive Displays:						
2382A	Office Display Terminal	___	___	___	___	___	___
2621A	Character Mode Terminal.	___	___	___	___	___	___
2621B	Character Mode Terminal.	___	___	___	___	___	___
2621P	Character Mode Term. w/Printer	___	___	___	___	___	___
2622A	Block Mode Terminal	___	___	___	___	___	___
2623A	Graphics Terminal	___	___	___	___	___	___
2624B	Data Entry Terminal	___	___	___	___	___	___
2626A	Display Station	___	___	___	___	___	___
2626W	Word Processing Station	___	___	___	___	___	___
2640B	Display Station	___	___	___	___		
2641A	APL Display Station . . . . (APL mode no longer supported)	___	___	___	___		
2642A	Display Station, Flex. Mini Disc	___	___	___	___	___	___
2645A	Display Station	___	___	___	___	___	___
2647A	Intelligent Graphics Terminal.	___	___	___	___	___	___
2648A	Graphics Terminal	___	___	___	___	___	___
	Plotters:						
7220C	Graphics Plotter	___	___	___	___	___	___
7220T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___
7221C	Graphics Plotter	___	___	___	___	___	___
7221T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___
7225B	Graphics Plotter	___	___	___	___	___	___
7240A	RS-232-C Plotter/Printer	___	___	___	___	___	___
7245B	Plotter/Printer.	___	___	___	___	___	___
7580A	Drafting Plotter	___	___	___	___	___	___
9872C	Graphics Plotter	___	___	___	___	___	___
9872T	Graphics Plotter, Auto. Paper Advance	___	___	___	___	___	___
	Data Collection Terminals:						
3075A	Desk Top Data Capture Terminal	___	___	___	___	___	___
3076A	Wall Mount. Data Capture Term.	___	___	___	___	___	___
3077A	Time Reporting Terminal	___	___	___	___	___	___
7260A	Optical Mark Reader	___	___	___	___	___	___
	Printing Terminals:						
2635B	180 cps Printing Terminal	___	___	___	___	___	___
2675A	Printing Term. w/Cartridge Tape.	___	___	___	___	___	___

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	B. Character Printers						
2601A	40 cps Daisy-Wheel Printer . . . . 27.	___	___	___	___	___	___
2631B	180 cps Character Printer. . . . . 28.	___	___	___	___	___	___
	C. Communication Interfaces						
30018A	ADCC-Main w/o cable. . . . . 29.	___	___	___	___	___	___
-040	Series 40 Cable. . . . . a.		___				
-044	Series 44 Cable. . . . . b.				___		
30019A	ADCC-Extend w/o cable . . . . 30.	___	___	___	___	___	___
-040	Series 40 Cable. . . . . a.		___				
-044	Series 44 Cable. . . . . b.				___		
30021C	Upgrade of ADCC Cables . . . . 31.		___		___		
-040	Series 30/33 Cable Upgrade . . . . a.		___				
-044	Series 30/33/40 Cable Upgrade. . . . . b.				___		
30020A	INP . . . . 32.	___	___	___	___		
30020B	INP . . . . 33.	___	___	___	___	___	___
30079A	GIC . . . . 34.	___	___	___	___	___	___
-040	Series 40 Cable. . . . . a.		___				
-044	Series 44 Cable. . . . . b.				___		
-064	Series 64 Cable. . . . . c.						___
30022A	Upgrade of GIC Cables . . . . 35.		___		___		___
-040	Series 30/33 Cable Upgrade . . . . a.		___				
-044	Series 30/33/40 Cables Upgrade . . . . b.				___		
-064	Series 30/33/40 Cables Upgrade . . . . c.						___
30144A	ATP—System Interface Board. . . . . 36.				___		___
30145A	ATP—Direct Conn 12-Port Contr. . . . . 37.				___		___
-002	Replace 4 RS-422 Ports w/RS-232. . . . . 38.				___		___
30155A	ATP—Modem Conn 12-Port Contr. . . . . . . 39.						___
	Return Credit Products:						
30010AN	INP—Series II/III. 40.		___		___		___
30018AN	ADCC-Main . . . . 41.				___		___
30019AN	ADCC-Extend . . . . 42.				___		___
30020AN	INP . . . . 43.				___		___
30032BN	ATC—Series II/III . . . . 44.		___		___		___
-001	Bell 103 Modem Support . . . . 45.		___		___		___
-002	Bell 202 Modem Support . . . . 46.		___		___		___
30055AN	SSLC—Series II/III. . . . . 47.		___		___		___
30360AN	HSI—Series II/III . . . . 48.		___		___		___

Upgrade Ordering Worksheet

Product Number	Description		Series 40		Series 44		Series 64	
			Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
	IV. Disc Storage							
	A. Integrated Storage Units:							
7911P	27 Mb Integrated Storage Unit	49.	___	___	___	___	___	___
-001	With Cartridge Tape Drive	a.	___	___	___	___	___	___
-140	Delete Cartridge Tape Drive	b.	___	___	___	___	___	___
7912P	64 Mb Integrated Storage Unit	50.	___	___	___	___	___	___
-001	With Cartridge Tape Drive	a.	___	___	___	___	___	___
-140	Delete Cartridge Tape Drive	b.	___	___	___	___	___	
	B. Mass Storage Products:							
7906M	20 Mb Cartridge Disc (Used in Cylinder mode only)	51.	___	___	___	___	___	___
7906S	20 Mb Slave Cartridge Disc (Used in Cylinder mode only)	52.	___		___		___	
7920A	50 Mb Disc Drive w/Ctlr in SPU	53.	___	___	___	___	___	___
13037C	Upgrade Disc Controller in SPU			___		___		___
-102	HP-IB Controller and Cable	54.	___	___	___	___	___	___
7920A	50 Mb Slave Disc Drive	55.	___		___		___	
7920M	50 Mb Master Disc w/Ctlr in SPU	56.	___	___	___	___	___	___
-102	With HP-IB controller and cable	57.	___	___	___	___	___	___
12745A	Upgrade Controller to HP-IB	58.	___	___	___	___	___	___
7920S	50 Mb Slave Disc Drive	59.	___	___	___	___	___	___
7925A	120 Mb Disc Drive w/Ctlr in SPU	60.	___	___	___	___	___	___
13037C	Upgrade Disc Controller in SPU			___		___		___
-102	HP-IB Interface and Cable	61.	___	___	___	___	___	___
7925A	120 Mb Slave Disc Drive	62.	___	___	___	___	___	___
7925M	120 Mb Master Disc w/Ctlr in SPU	63.	___	___	___	___	___	___
-102	With HP-IB Controller and cable	64.	___	___	___	___	___	___
12745A	Upgrade Controller to HP-IB	65.	___	___	___	___	___	___
7925S	120 Mb Slave Disc Drive	66.	___	___	___	___	___	___
7925T	240 Mb Slave Drive (2-7925S)	67.	___	___	___	___	___	___
7935H	404 Mb Disc Drive	68.	___	___	___	___	___	___
9895A	Flexible Disc Drive	69.	___	___	___	___	___	___
	Return Credit Products:							
7920MN	Return Credit—Master Drives	70.		(___)		(___)		(___)
7920SN	Return Credit—Slave Drives (Also applies to 7920A drives)	71.		(___)		(___)		(___)
7925MN	Return Credit—Master Drives	72.		(___)		(___)		(___)
7925SN	Return Credit—Slave Drives (Also applies to 7925A/T drives)	73.		(___)		(___)		(___)

Upgrade Ordering Worksheet

Product Number	Description		Series 40		Series 44		Series 64	
			Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered

V. Magnetic Tape Drives

Product Number	Description	
7970E	Lo-Boy 1600 bpi Tape Drive	74.
-426	HP-IB Master Mag Tape.	75.
-421	HP-IB Slave Mag Tape	76.
26072A	Upgrade of Series III/pre-Series III Lo-Boy Master Tape Drives to HP-IB Interface	77.
-H01	Upgrade of HP-IB Master Drives w/Serial Number < 2034A-XXXX	78.
7976A	1600/6250 bpi Tape Drive	79.

Return Credit Products:

Product Number	Description	
7970BN	800 bpi Mag Tape Drive	80.
7970EN	1600 bpi Mag Tape Drives Hi-Bay Master & Slave Drives	81.
	Lo-Boy Master & Slave Drives	82.
30215AN	Add-on Mag Tape Controller for Series III	83.

VI. Printers

A. Dot Matrix Line Printers:

Product Number	Description	
2608A	400 lpm Printer	84.
-340	HP-IB infc & cable for Series 40	a.
-344	HP-IB infc & cable for Series 44	b.
-364	HP-IB infc & cable for Series 64	c.
26002A	2608A Line Printer Interface	
-046	Upgrade to HP-IB Interface	85.

B. System Line Printers:

Product Number	Description	
2613A	300 lpm Line Printer	86.
2617A	600 lpm Line Printer	87.
-340	HP-IB infc & cable for Series 40	a.
-344	HP-IB infc & cable for Series 44	b.
-364	HP-IB infc & cable for Series 64	c.
2619A	1000 lpm Line Printer.	88.
-340	HP-IB infc & cable for Series 40	a.
-344	HP-IB infc & cable for Series 44	b.
-364	HP-IB infc & cable for Series 64	c.
26069A	2613/17/19A Infc HP-IB Upgrade	89.
-340	Cables for Series 40	a.
-344	Cables for Series 44	b.
-364	Cables for Series 64	c.

Return Credit Products:

Product Number	Description	
30209AN	Series III Line Printer Infc.	90.

Upgrade Ordering Worksheet

Product Number	Description	Series 40		Series 44		Series 64	
		Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered	Quantity Owned by Customer	Quantity to be Ordered
VII. Laser Printing System							
2680A	Intelligent Page Printer . . . . 91.	____	____	____	____	____	____
VIII. Card Reader							
30106A	80 Column NON HP-IB Card Reader . . . . . 92.	____		____		____	
-333	HP-IB Card Reader . . . . 93.		____		____		____
30309A	Upgrade for NON HP-IB Card Reader . . . . 94.		____		____		____
IX. I/O Expansion							
30143A	Series 64 I/O Adapter Module . . . . 95.						____

Appendix C.
Series 40
Terminal Cable Matrix

HP 3000 Series 40 Terminal Cable Matrix

Terminal	Direct Connect RS-232-C (ADCC)	Modem Connect RS-232-C (ADCC)	
		U.S.	Europe
2382A Display Terminal	13242Y	13242N	13242M
2601A Character Printer	STD.	N/A	N/A
262X Display Terminals			
Port 1	13222M/N/Y	13222N	13222M
Port 2 (2624A, 2626A Only)	13242M/N/Y	13242N	13242M
2631B Character Printer	STD.	STD.	STD.
2635B Printing Terminal	STD.	STD.	STD.
264X Display Terminal	13232M/N/Y	13232N	13232M
307X Data Capture Terminal	13232M/N/Y	13232N	13232M

N/A = Not Available

Refer to the PRODUCT INFORMATION GUIDE for the cabling requirements of other peripheral devices.

Appendix D:
Series 44
Terminal Cable Matrix

HP 3000 Series 44 Terminal Cable Matrix

Terminal	Direct Connect Type			Modem Connect RS-232-C (ADCC)	
	RS-232-C (ADCC)	**RS-422 (ATP)**	**RS-232-C (ATP)**	**U.S.**	**Europe**
2382A Display Terminal	13242M/N/Y	N/A	13242X	13242N/Y	13242M
2601A Character Printer	STD.	N/A	13242X	N/A	N/A
262X Display Terminals					
Port 1	13222M/N/Y	13222P	13222X	13222N/Y	13222M
Port 2 (2624A, 2626A Only)	13242M/N/Y	N/A	13242X	13242N/Y	13242M
2631B Character Printer	STD.	N/A	13242X	STD.	STD.
2635B Printing Terminal	STD.	N/A	13242X	STD.	STD.
264X Display Terminal	13232M/N/Y	13232I	13232X	13232N/Y	13232M
307X Data Capture Terminal	13232M/N/Y	N/A	13232X	13232N/Y	13232M

N/A = Not Available

Refer to the PRODUCT INFORMATION GUIDE for the cabling requirements of other peripheral devices.

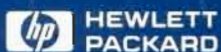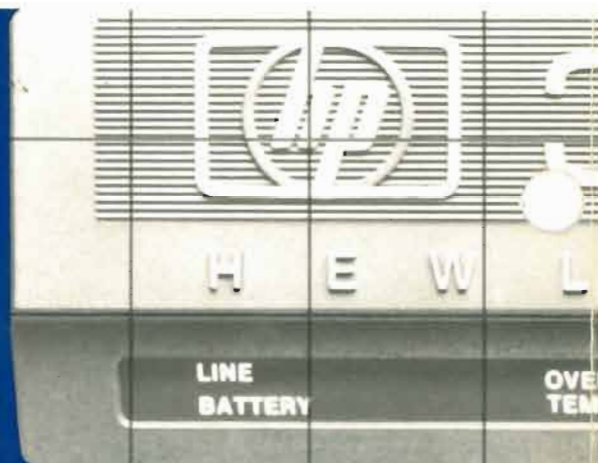# Appendix E:
Series 64
Terminal Cable Matrix

HP 3000 Series 64 Terminal Cable Matrix

Terminals	Direct Connect Type		Modem Connect RS-232-C (ATP)	
	RS-422 (ATP)	RS-232-C (ATP)	U.S.	Europe
2382A Display Terminal	N/A	13242X	13242N	13242M
2601A Character Printer	N/A	13242X	N/A	N/A
262X Display Terminals				
Port 1	13222P	13222X	13222N	13222M
Port 2 (2624A, 2626A Only)	N/A	13242X	13242N	13242M
2631B Character Printer	N/A	13242X	STD.	STD.
2635B Printing Terminal	N/A	13242X	STD.	STD.
264X Display Terminal	13232I	13232X	13232N	13232M
307X Data Capture Terminal	N/A	13232X	13232N	13232M

N/A = Not Available

Refer to the PRODUCT INFORMATION GUIDE for the cabling requirements of other peripheral devices.